temenos

Maestro

JOURNEY MANAGER

VERSION 24.04

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Journey Maestro Overview

Journey Maestro is a tool for designing and building application forms that implement various customer onboarding journeys. Maestro is a product suite of the Temenos Journey Manager platform, so it is seamlessly integrated with all other products to give you a maximum edge in creating web-based apps using latest technologies.

> NOTE
>
> Maestro 5.0 is the first version of our Maestro tool. It was versioned as 5.0 to keep it in line with Journey Manager version numbering. Therefore, Maestro forms are not supported in Manager prior to 5.0.

Maestro allows anyone with moderate technical expertise and skills to design and configure web-based forms using the built-in Maestro editor. The Maestro editor is a WYSIWYG[1] editor so you can see how a form will look like while creating it. You can also preview the form in different device emulators or render it as a PDF or HTML receipt. The Maestro editor comes with the rich text editor to give you a flexibility of using various content formatting.

The forms that Maestro produces are single-page AngularJS applications with responsive designs, and can be previewed in formats suitable for smartphones, tablets, and desktop computers. A single design runs on all devices, takes the screen size into account, and gives an optimal experience without creating versions for each device.

Maestro provides you with the following features to streamline your form development process:

- Drag-and-drop pre-built components directly into the WYSIWYG editor for rapid form creation
- Create custom components from scratch or by combining existing components
- Use templates to maintain a consistent look and feel across a large number of forms
- Generate receipts based on the design of a form or design custom receipts
- Implement save and resume functionality without writing any code
- Define rules that run arbitrary JavaScript code when events, such as a click, occur
- Maintain multiple translations of a single form
- Configure form accessibility

---

[1]WYSIWYG, an acronym for What You See Is What You Get, is a system in which editing software allows content to be edited in a form that resembles its appearance when printed or displayed as a finished product, such as a printed document, web page, or slide presentation.

For more information, see the complete list of Maestro features.

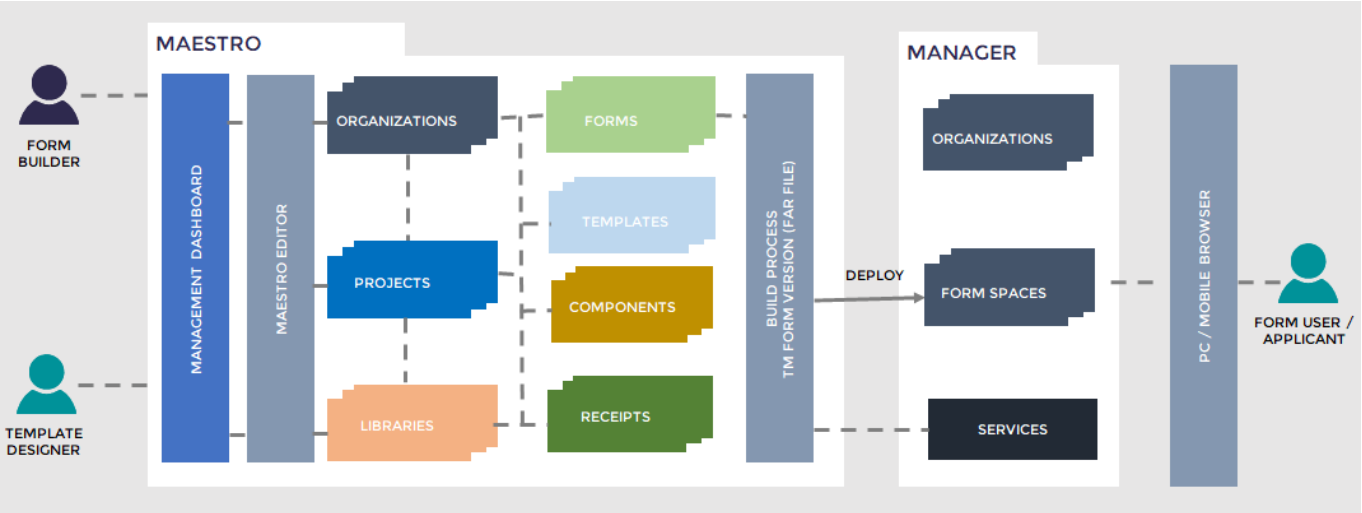
Maestro uses the following entities to enable you to design and build application forms efficiently:

- Organization - contains projects and organization level libraries
- Project - contains forms, components, templates and project level libraries
- Form - contains components to captured user data and pass it to Manager
- Template - a super form that defines and controls the look and feel of forms and receipts based on this template
- Receipt - a read-only statement for various stages of form application processes
- Component - a modular building block that can be dragged and dropped into all types of designs, including forms, receipts, templates, and even other components
- Library - related resources, such as components and shared components, images, core libraries, which can be used across different projects and even organizations

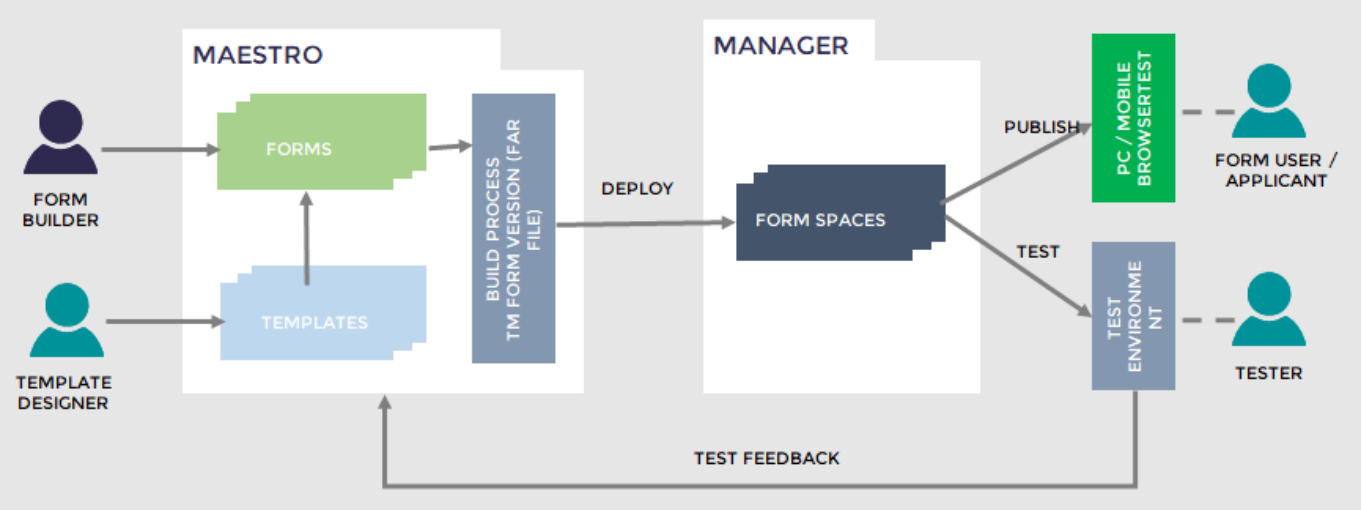
Organizations, projects and forms make up the three-tired hierarchy that allows you to minimize configuration effort yet maximize development efficiency by using a correct scope while defining and configuring a form.

Maestro relies on Journey Manager to host forms, process user inputs and store all relevant information to ensure a form user gets the best onboarding experience. Therefore, Manager has the similar concept of entities as Maestro, plus it also includes back-end configuration and data that are not exposed to web-based forms.

The diagram below shows the main entities of Maestro, communication with Manager and interaction with form users (applicants), Form Builders and Template Designers.



A typical Maestro form goes through several stages of the customer journey experience, such as, Prefill, Data Capture, Save and Resume, Payments, Notifications, and Collaboration between various participating or approving parties. Some of these stages have an impact on a form's design. Let's explain it with the diagram below, which outlines the development workflow that Maestro provides to Form Builders and Template Designers to create a customer journey.



This workflow begins with a template designed in Maestro by a Template Designer. Once the template is created, Form Builders can start work on new forms based on the template, taking advantage of the common features built into the template and maintaining compliance with brand guidelines. The Template Designer can continue adding to the template incrementally, even while Form Builders are creating forms based on the template, without affecting any forms in progress.

Once a form is implemented, the Form Builder can build the form and import it into Manager. After importing, the form can be tested across multiple environments and, if needed, further improvements can be made before the form is published into a production environment for customers to use.

Maestro forms move through various events of the journey experience, which is a sequence of events that include prefill, data capture, save and resume, payments, notifications, and collaboration activities between parties.

Next, learn about Management Dashboard.

Journey Maestro Features

Journey Maestro comes packed with the wide range of features empowering you to create complex customer onboarding and user journey solutions. Some of the main product features have now become its core functionality. Click on each feature to learn more.

Main Features

- Ready-to-use form components and complex native widgets that support standard JavaScript[1]
- Internationalization and right-to-left (R2L) language support
- Configurable form accessibility
- Security permissions and roles to access and design forms
- Advanced Maestro editor including WYSIWYG, undo editing operations, copy and paste across several forms, and source code editing functionality
- Seamless form building and deployment to Journey Manager using FAR files
- Offline Build to develop forms in your favorite IDE
- External source control
- Templates and brands to accelerate form development process
- Logging and error handling to simplify form troubleshooting
- Optimized performance
- All tools are accessible via a web browser so no local software installation is required

Features by Release

Each release of Maestro is shipped with new features and bug fixes to provide you with the best-in-class software and to accelerate business agility and improvements across the board.

The key features for each major Maestro release are listed below.

24.04

Structure Tree Usability Enhancements

We've enabled searching for a field ID in the View pane while showing labels.

Initialize Event Hook

---

[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

We've added a new component - Initialize Event Hook - with one-off create event that runs the `onCreate` rule when the object is created. Depending on where you drop this component on the form it will potentially run more times.

Additional Notification

We've added support to the Login pages' info panel to show to users the Maestro upgrade dates.

Components

We've introduced a new component - Configurable Text Input, which you can use as a replacement for Text Field component with text filtering enabled, thus preventing the input of invalid characters.

For more information, see 24.04 Release Notes.

23.10

Maestro parallel development

We've added an information dialog, which alerts developers when form designs are opened and saved by other users.

Compare designs

We've introduced a Version Diffing tool to compare design versions.

Security

We've added support for Two-Factor Authentication (2FA)[1] for Maestro that runs on the shared instances.

Libraries

Updated 3-rd party libraries and dependencies, including security updates.

For more information, see 23.10 Release Notes.

23.04

Libraries

---

[1]Two-factor authentication (2FA), sometimes referred to as two-step verification or dual factor authentication, is a security process in which the user provides two different authentication factors to verify themselves to better protect both the user's credentials and the resources the user can access. Two-factor authentication provides a higher level of assurance than authentication methods that depend on single-factor authentication (SFA), in which the user provides only one factor -- typically a password or passcode. Two-factor authentication methods rely on users providing a password as well as a second factor, usually either a security token or a biometric factor like a fingerprint or facial scan.

Updated 3-rd party libraries and dependencies, including security updates.

Build process

Added the Enable generating brand variables as CSS variables, conditions apply option to output CSS variables to a form during a form build process.

User notification

Added the Server Status tab to the Management Dashboard to display a status of a Manager server.

Added support to show all users, who have a current design open, in the Maestro editor.

Security

Added support to auto logout Dashboard and show session has ended in the Maestro editor.

For more information, see 23.04 Release Notes.

22.10

Libraries

Updated 3-rd party libraries and dependencies, including security updates.

Form building

Improved the Offline / Online form building process.

New look and feel

Rebranded the Maestro product according to Temenos' vision, mission and strategy.

For more information, see Maestro 22.10 Release Notes.

22.04

Libraries

Upgraded the Font Awesome library to version 5.15.4 from 4.5.0, so many new icons are now available in the icon picker in the rich text editor.

Updated 3-rd party libraries and dependencies, including support for ECMAScript 2019.

Components

Improved accessibility in several included widgets.

Enhanced the validation framework to properly include component validation on pages that were not visited.

For more information, see Maestro 22.04 Release Notes.

21.11

Templates and brands

Introduced the new Avalon Template, which replaces the Maguire template, and brings a more modern look and feel and encapsulates common design pattern, helping to speed development time frames.

Improved white-labelling[1] support so you can set up multiple brands in a single template much easier.

For more information, see Maestro 21.11 Release Notes.

21.05

Maestro Dashboard

To improve the management of users' organizations, projects, forms, form versions, libraries, and resources, we've added ability to select multiple resources and perform the available actions on them, such as delete, export and publish.

You, as a form developer, can now delete published projects, forms and form designs from the Maestrodashboard as you may not have access to the Managerdashboard on the shared environment.

We've introduced the Upload new Resources button to the library resource list so you can easily add a resource to your project.

Components

We've added support to have a " " (space) as the thousand separator to the Decimal, Percentage and Currency Field components.

Maestro editor

We've added the ability to copy and paste a block of content from one form to another. It only works in a Chrome browser or any Chromium including Microsoft Edge.

We've added an Icon Picker[2] in the rich text editor, which is used in many component's properties, for example a label.

We've added support for scrolling through the entire list of Brand options (Branding for Form) to find a required configuration without clicking on each individual entries.

Security

We've updated all required libraries to harden our software security.

For more information, see Maestro 21.05 Release Notes.

---

[1]White-label software is software that is purchased by a company from a service provider and re-branded as its own.

[2]The Icon Picker is a selection dialog allowing you to pick an icon from the range of images shipped with Maestro.

20.11

Libraries

Introduced the new concept of shared organization libraries.

Added drag and drop functionality to order libraries in the list.

Library exclude option retains the order of libraries.

For more information, see Maestro 20.11 Release Notes.

20.05

SCM

Improved the command line offline build tool.

Language

Added the right to left language support.

Components

Enhanced component publishing dependency.

For more information, see Maestro 20.05 Release Notes.

19.11

Shared components

Improvements to shared components:

- View a component's order of inheritance and source details
- View a component's properties and their source
- Display child components at any level
- Revert local overrides from properties panel or properties display

Security

Security hardening to address security issues uncovered during penetration tests.

For more information, see Maestro 19.11 Release Notes.

19.05

Components

Video Capture component added to provide you with a reliable user verification option.

Receipts

Receipt Designer.

SCM

Offline Builds (BETA).

For more information, see Maestro 19.05 Release Notes.

18.11

Libraries

- Library Tagging.

SCM

- Maestro SCM Feature Branching

Forms

- Form Dependencies
- Form Resource Summary

For more information, see Maestro 18.11 Release Notes.

Next, learn more about Manager features.

Maestro 3rd Party Libraries

Journey Maestro UI and published forms use a broad range of open source 3rd party libraries. We have carefully selected each library to make sure it's right for our purpose. We diligently update each library with new versions to ensure Maestro runs as expected. If we get to know that a library contains a bug or a security vulnerability, we will update it as soon as possible, so each major release of Maestro will include only updated libraries.

Licenses

Maestro uses the 3rd party libraries according to their term and conditions, which you can find on their web sites listed in the table below.

Libraries

The main 3rd party library names and their versions are listed below for each major Manager version:

Library Name	21.0-5	21.1-1	22.04	22.10	23.04	23.10	24.04
AngularJS	1.8.2	1.8.2	1.8.7	1.9.0	1.9.0	1.9.0	1.9.0
Babel	6.26.-0	6.26.-0	7.16.1-2	7.16.1-2	7.16.1-2	7.16.1-2	7.16.1-2
FontAwe-some	4.5.0	4.5.0	5.15	5.15.4	5.15.4	6.0.0	6.0.0
jQuery	3.6.0	3.6.0	3.6.0	3.6.0	3.6.3	3.6.3	3.6.3
jQuery UI	1.12.-1	1.12.-1	1.13.1	1.13.2	1.13.2	1.13.2	1.13.2
CK Editor	4.16.-0	4.16.-2	4.18.0	4.18.0	4.21.0	4.21.0	4.21.0
Less	1.7.3	1.7.3	1.7.3	1.7.3	1.7.3	1.7.3	1.7.3
Moment JS [1]	2.29.-4	2.29.-4	2.29.4	2.29.4	2.29.4	2.29.4	2.29.4

The table above uses the following legend:

- [1] - A library is used in published forms only. A published form is a form that is built and rendered to a user in a browser.

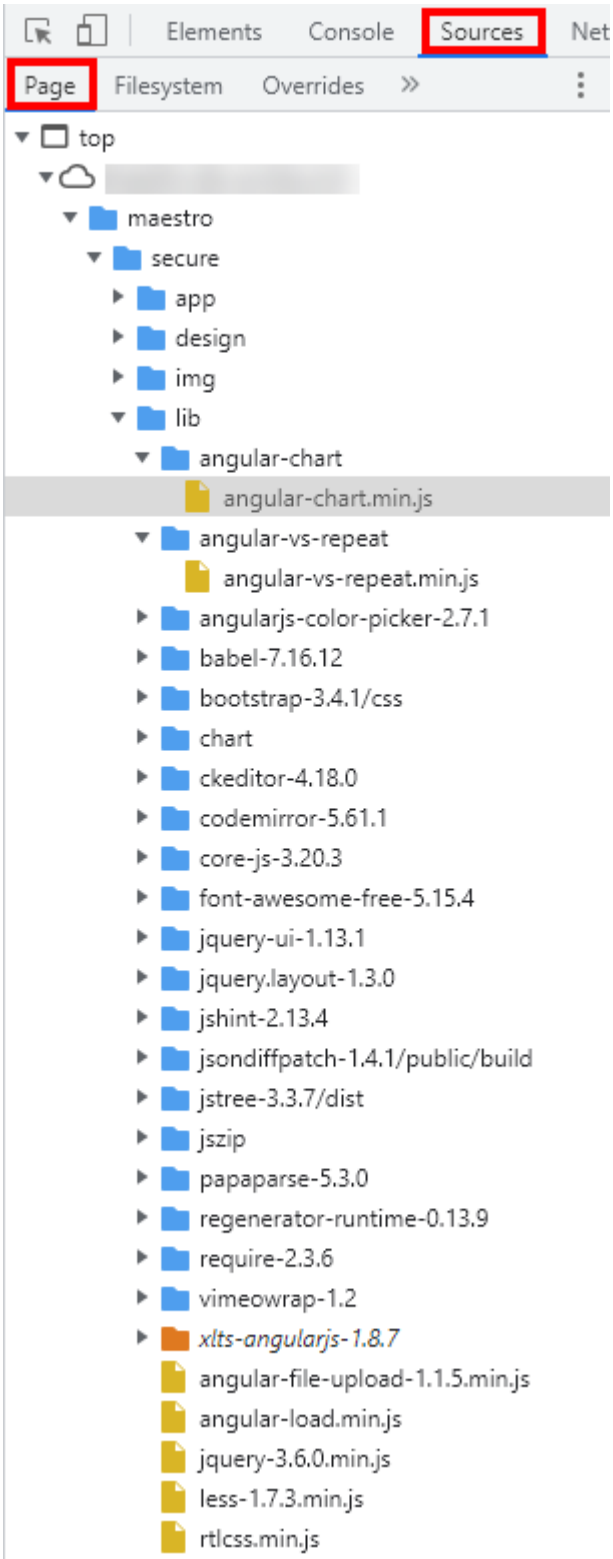
If you use one of End-of-Life Maestro versions, you can check their 3rd party libraries here.

Check Libraries

You can find out the complete list of libraries and their versions for each form for the release version that the form is built in.

To check what libraries a form uses:

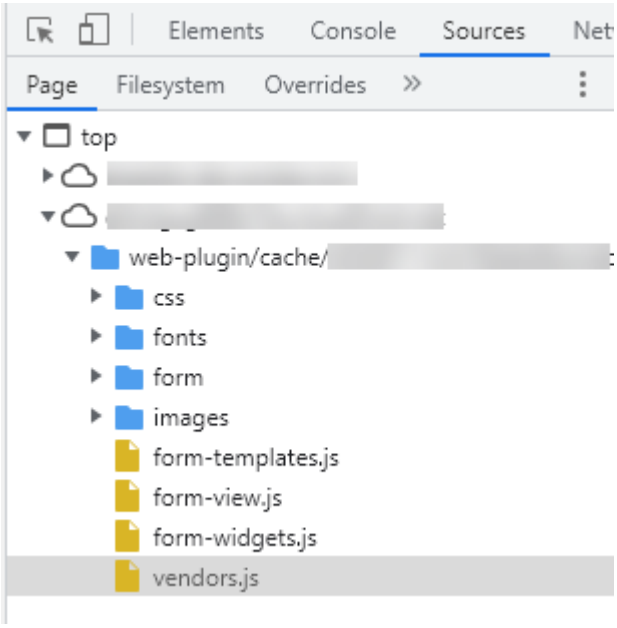
1. Open a form in the Maestro editor.
2. Open a browser's Development Tool, for example, select Chrome menu > More Tools > Developer Tools in the Chrome browser.
3. Select the Sources tab and click Page.
4. Expand the hierarchy under the server host name.
5. Select maestro > secure > libs to list all 3rd party libraries and their versions the form was built with.



6. Expand each library's folder to see its JavaScript file where you can find some additional info, such as what license it uses.

To check what libraries a published form uses:

1. Open a form in a browser.
2. Open a browser's Development Tool, for example, select Chrome menu > More Tools > Developer Tools in the Chrome browser.
3. Select the Sources tab and click Page.
4. Expand the hierarchy under the cloudfront.net name.



5. Double-click the `vendors.js` to view the source code with 3rd party libraries, which are used in published forms.

Next, learn about our end-of-life policy.

Maestro Roles Overview

Although a single person is capable of creating a form with Journey Maestro, we generally recommend that at least two people are involved in the form creation process. We refer to these people as the Template Designer and the Form Builder.

Template Designer

Template Designers are responsible for how the form looks. They're the ones creating the graphics, choosing the colors, and making sure the final result is pixel-perfect, works across a range of display sizes, and follows the organization's style guides.

An effective Template Designer asks the following questions:

- What are the best ways to communicate meaning through color, layout, and typography?
- Can users with disabilities navigate the design? Or is it biased toward the able-bodied?
- How adaptable is the design to alternative contexts, such as different products or white-labeling opportunities?

If a form doesn't look good, the Template Designer will need to go back to the drawing board.

Form Builder

Form Builders are responsible for how the form feels. They're the ones laying out the fields, defining how the fields are validated, and constructing the overarching journey the users take while completing the form.

An effective Form Builder asks the following questions:

- Do the field validations work as expected?
- Are any of the steps confusing? Can they be made simpler?
- How can users be motivated to complete the form?

If the form isn't performing as expected — if user abandonment is high, for instance — the Form Builder will be the one taking the heat.

We suggest splitting the form development process between these roles because, while the roles are related, designing how a form looks and how a form functions are distinct tasks that require distinct skills. Even if someone in your organization has the skills to handle both of them, our experience suggests that it's difficult to effectively prioritize both tasks. It seems inevitable that the look or function of the form will suffer if both takes are handled by the same individual.

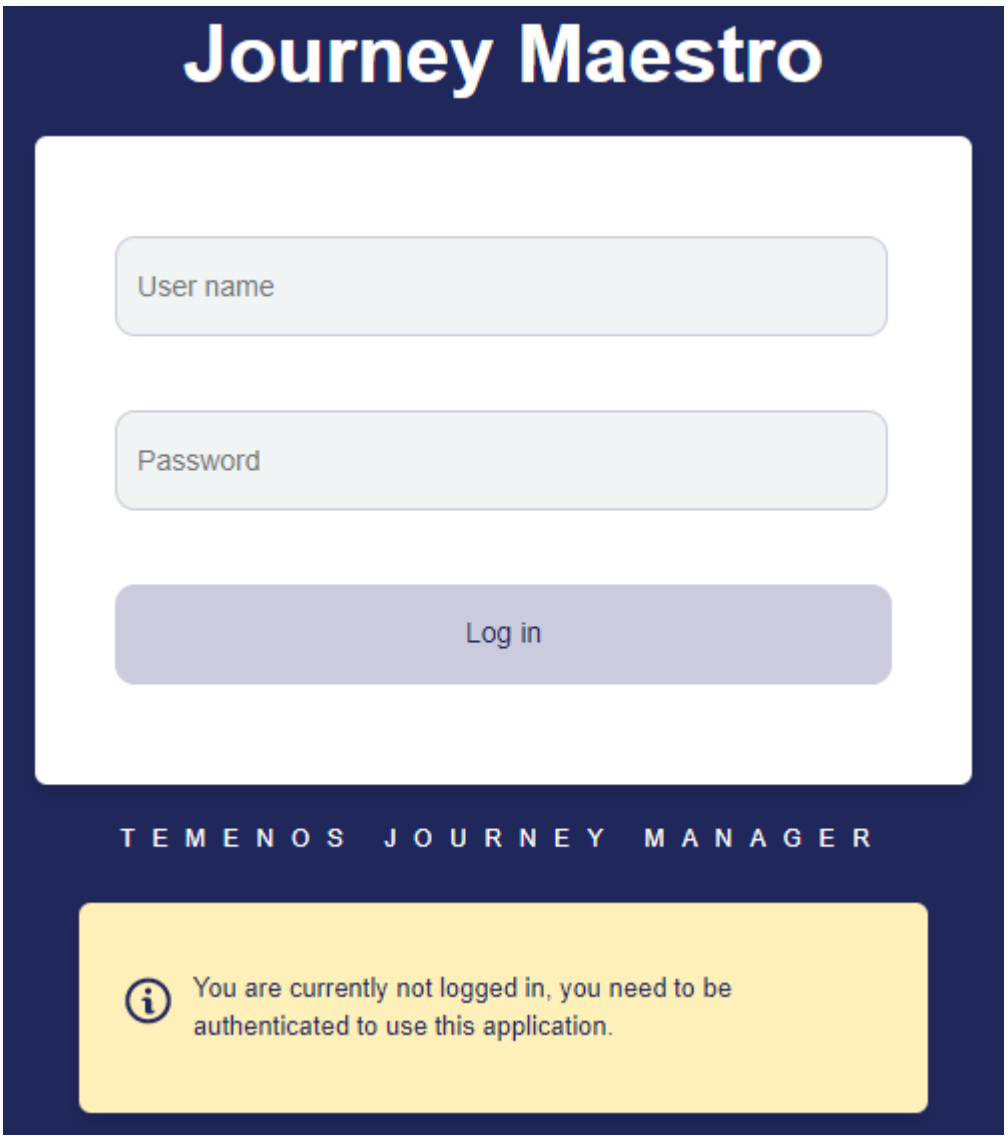
Next, learn about Maestro organizations.

Log in to Maestro

Maestro requires all users to authenticate using a username and password before allowing them access to forms. A Journey Manager Administrator must create a user account for you and provide you with a username and password.

To log in to Maestro:

1. Go to `https://<HOST_NAME>/maestro/secure/dashboard` in your browser.



2. Enter your user name in the User name field.

   NOTE

   Your username is the email address associated with your account.

3. Enter your password in the Password field.

   NOTE

   If you don't have a password, ask your Journey Manager Administrator to get one.

4. Click Log in. If the login is successful, you are shown the Maestro home page. Otherwise, a error message is displayed, for example, Invalid User Name or Password, please try again. Please ensure Caps Lock is off.

NOTE

If you have any problems with login, contact your Journey Manager Administrator or our support team.
If you've forgotten your password, contact your Journey Manager Administrator and request a new one. You can't reset your own password.

The login screen can display some extra information, such as latest Maestro upgrade announcements, so you may be required to perform additional actions, for example, clear your browser's cache. The example of a message is shown below:

NOTE

Maestro was upgraded to version 22.10.0 on 29 November 2022 at 2130 AEST
Please clear your browser's cache after the upgrade (required one time only)

To subscribe to upgrade notifications please visit the Product Announcements page

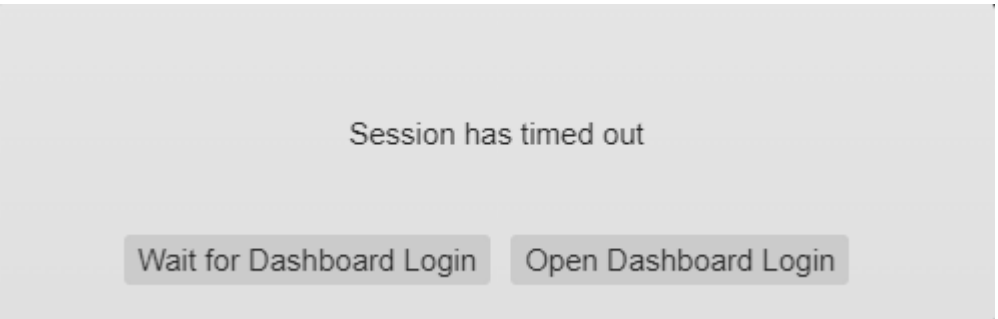
NOTE

You only have to clear your browser's cache once after an upgrade. The upgrade message, however, will continue to appear on return visits.

Log out

To log out of Maestro, click Logout. Your current session will be closed, so you must log in again to continue working on a form.

Maestro keeps track of user sessions for both the Maestro Dashboard and the Maestro editor and informs a user when a session ha timed out by displaying the following dialog, which is available from | 23.04 This feature was introduced in 23.04



To continue, you can do one of the following:

- Click Wait for Dashboard Login to log in to the Dashboard that automatically loads the design you were working on when the session timed out in the Maestro editor.
- Click Open Dashboard Login to log in to the Dashboard and then manually open a design you want.

Session Management

Maestro creates a session when a user logs in, which is valid for a limited time to prevent unauthorized access to the environment. There are a few important things about session management:

- Maestro sessions are only valid in a browser a user used to log in first. Maestro stores the session information as cookies in the browser. These cookies are shared among all the windows and tabs of the browser you first logged in with, but not with other types of browsers. For example, if you initially logged in to Maestro using Safari, you can open a new Safari tab or window and continue to use Maestro without logging in again. However, if you also try to access Maestro using Chrome, you'll be asked to re-authenticate with your Maestro's username and password.
- Maestro sessions expiration. A configuration setting in Journey Manager determines the session validity duration. When a session expires, Maestro pops up a new window and asks you to re-authenticate yourself, so you can return to the original window to continue working without losing any unsaved changes.

Clear Browser Cache

After upgrading to a new version of Maestro, the previous version of the application may still be cached in your browser, possibly leading to unpredictable behavior. To address this issue, we recommend clearing your browser cache after each upgrade.

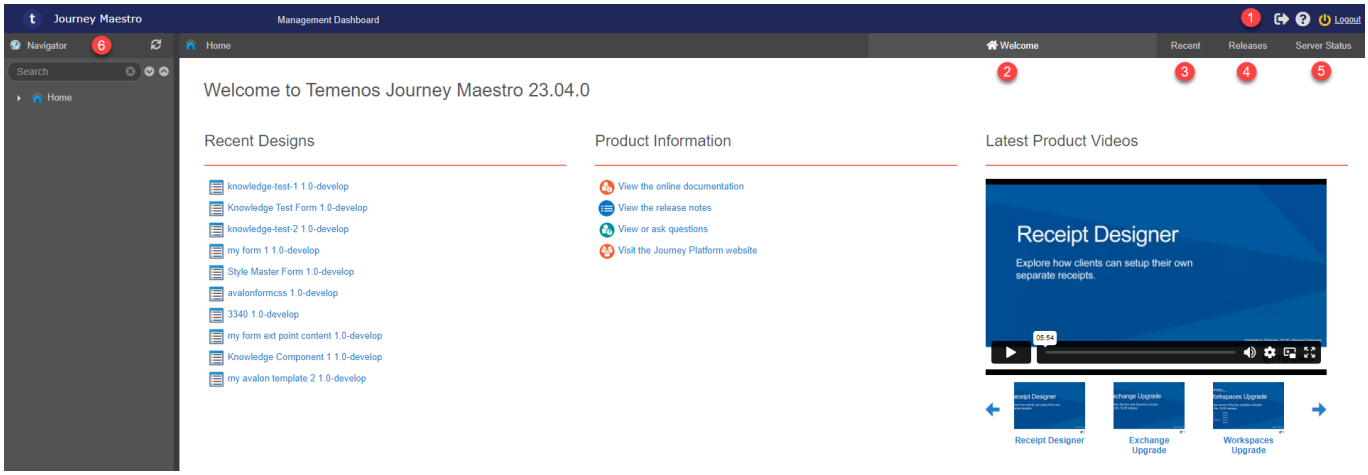
The process of clearing your cache depends on your browser, so check the following links for further details:

- Google Chrome
- Microsoft Edge
- Mozilla Firefox
- Safari

Next, learn about the Management Dashboard

Journey Maestro Management Dashboard

Maestro comes with the Management Dashboard allowing you to easily and quickly perform day-to day tasks. The Management Dashboard is the first page where you land after a successful login to Maestro.



The Management Dashboard consists of the following sections and tabs that group related functionality:

1. Screen Header
2. Welcome Tab
3. Recent Tab
4. Release Tab
5. Server Status Tab
6. Navigator Pane

Screen Header

The screen header displays some useful information, including:

- Product name: Journey Maestro

The Screen Header provides you with the following actions:

- : logs you out of Maestro.
- : displays the following help options:
  - About Journey Maestro - shows the product information including a version.
  - API Guide - redirects you to the Temenos Journey Manager documentation web site.
  - API Reference - shows the Maestro API reference documentation shipped with this product version. The same documentation may be available on the documentation

web site. However, we recommend using the local version of the documentation as it is tailored to your Maestro version.

- Online Help - redirects you to the Temenos Journey Manager community web site.
- Keyboard Shortcuts - lists the available keyboard shortcuts for Windows and macOS.

Action	Windows	macOS
Cut	CTRL + X	CMD + X
Copy	CTRL + C	CMD + C
Paste	CTRL + V	CMD + V
Undo	CTRL + Z	CMD + Z
Redo	CTRL + Y	CMD + Y
Publish	CTRL + P	CMD + P
Save Form	CTRL + S	CMD + S
Move to Next Item	CTRL + Enter	CMD + Return
Stop Progress / Close Dialog	ESC	ESC

NOTE

You can use Copy and Paste shortcuts across different forms. However, it may depend on each browser's ability to access the system clipboard. For more information, see browser compatibility.

Maestro comes with built-in documentation, which is accessible in each development environment, as well as the links to the Temenos Journey Manager documentation web site.

Welcome Tab

Select the Welcome tab to view the following:

Recent Designs

This list displays up to 10 of the most recently viewed designs, for example, a form or component. In order to maintain optimal software performance, Maestro has the total limit of recently opened forms set to 50.

Selecting a design will direct you to the latest Version Details for that design. You can view details about the design by pointing your mouse at the design name. These details include the

organization and project where the design is stored, the design name, version number, and the time and date the design was last opened.

Product Information

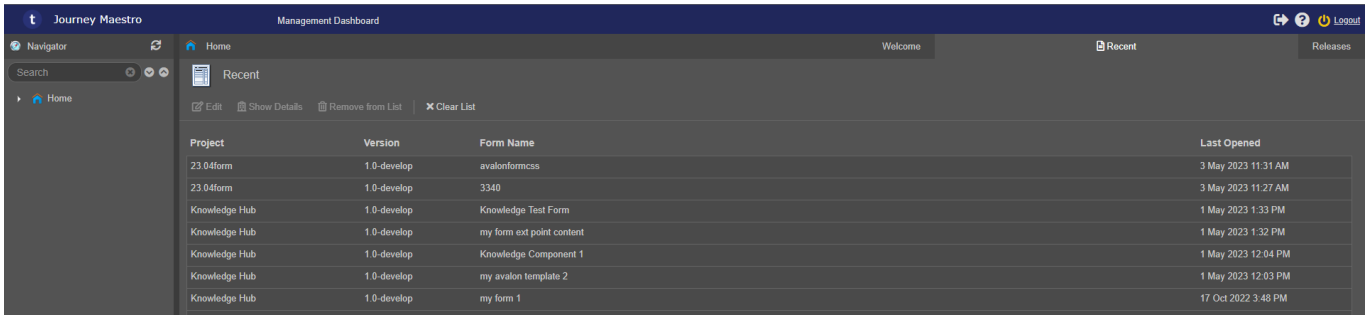
This list displays links to various online resources where you can get information about Temenos Journey Manager platform products.

Latest Product Videos

This list shows links to various online tutorial videos.

Recent Tab

Select the Recent tab to view your recent projects so you can easily go back and continue working on them.



You can perform the following actions:

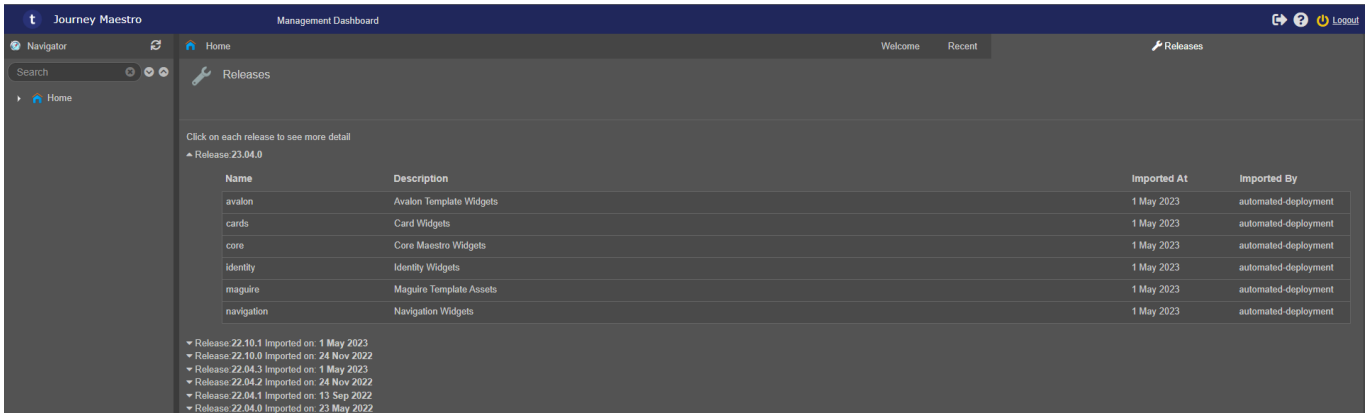
- Click Edit to open a selected design in the Editor window.
- Click Show Details to see a selected project's details.
- Click Remove from List to remove selected designs from the list.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple projects. | 21.05 This feature was introduced in 21.05.

- Click Clear List to clear the list completely.

Release Tab

Select the Releases tab to see which releases of Maestro software were installed on your Maestro instance.



You can perform the following actions:

- Select a particular release to view detailed information on what libraries were changed. This is important for form compatibility and it helps in troubleshooting form issues.

Server Status Tab

NOTE

You must have the certain permissions set by an Administrator to see this section. For more information, see Administrator's documentation.

Navigator Pane

The Navigator pane displays the organizations' structure consisting of projects, libraries, their assets and resources, which is available to you. If you can't see some organizations, it is because they are not assigned to your user account.

You can perform the following actions:

- Select Home to show or collapse the list of organizations.
- Type a name or a part of a name of a project, a form , or a library in the search field to quickly find it in the organizations structure.
- Click the refresh icon to reload the Navigator pane content.
- Select an organization to view and manager its projects.
- Select a project to view and manage its forms and associated resources.
- Select Forms to view and manager forms of a project.
- Select Components to view and manager components belonging to a project.
- Select Templates to view and manager templates used a project.
- Select Receipts to view and manager receipts of a project using Receipt Designer. It is a

different mode in the Maestro editor that has certain things removed for receipts.

- Select Libraries to view and manager libraries and their versions used a project.

Next, learn how to save history.

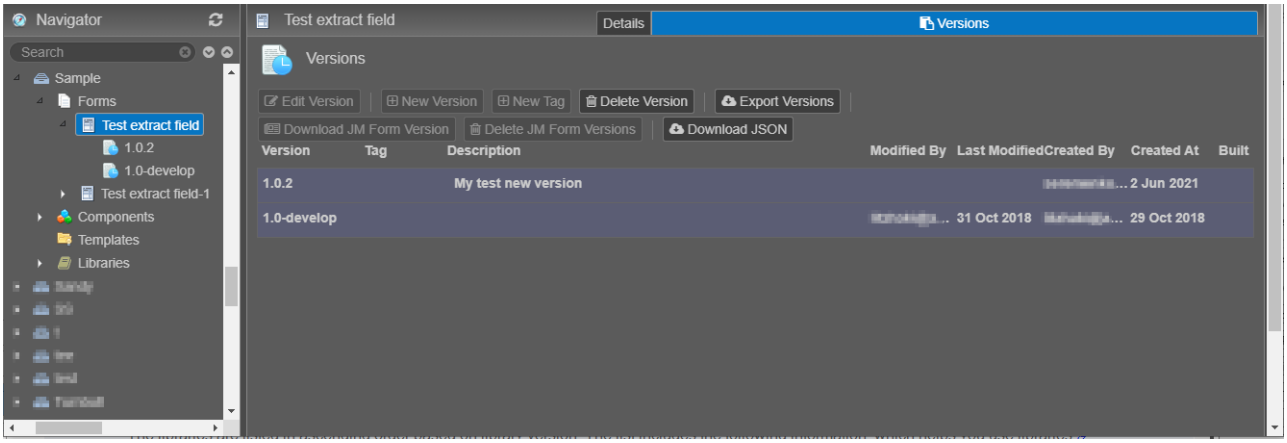
View Designs

Journey Maestro allows you to view and manage designs and their versions from the Journey Maestro Management Dashboard.

> NOTE
>
> This UI is similar for all designs, such as forms, components, templates and receipt, so it's described using a form as an example.

To view the list of design versions:

1. Open your project in the Navigator pane and click Forms to view the list of forms created in your project.
2. Select a form in the Forms folder to view available versions of this form.



   The forms are listed in ascending order by form versions. The list includes the following information:

   - Version - a form version
   - Tag - whether a form version is tagged or not
   - Description a form version description
   - Modified by - who modified a form version
   - Last Modified - when a form version was modified
   - Created By - who created a form version
   - Created At - when a form version was created
   - Built - this flag is set when there is a corresponding built form where the form developer has edited a form version and clicked Build in the editor and there is a Manager Form Version. In this case, if you use the Delete JM Form Versions

functionality, described below, it will delete the built form and deleting the form design version will also delete the built version as well. If the Built checkbox is selected, the Download JM Form Version button is available, so you can use it. Otherwise, you need to open the form version in Maestro and build the TM Form Version of the form.

3. Click Edit Version to open a selected form version in the Maestro editor for editing.
4. Click New Version to create a new version of a selected form.
5. Click New Tag to tag a selected form version.
6. Click Delete Version to delete the selected form version.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple form versions. | 21.05 This feature was introduced in 21.05.

7. Click Export Versions to export the selected form versions.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple form versions. | 21.05 This feature was introduced in 21.05.

8. Click Download JM Form Version to download a form version deployed in Manager. This button is only available for selection once the form version has been built at least once. | 21.05 This feature was introduced in 21.05.
9. Click Delete JM Form Versions to delete a built form version from a Manager instance where it is deployed but leave the form design in Maestro.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple form versions. | 21.05 This feature was introduced in 21.05.

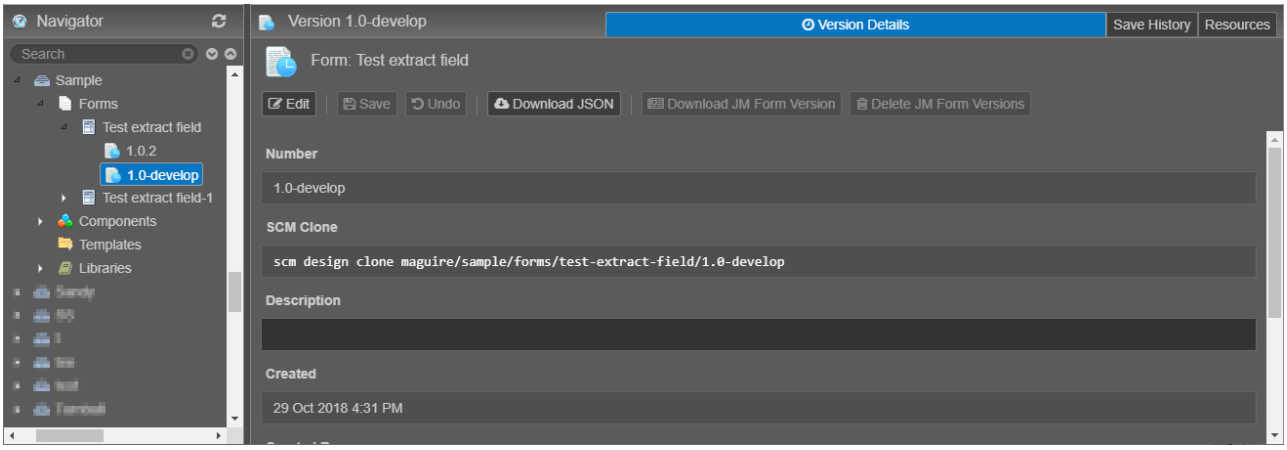
   You can use this functionality to solve the following project issue. Each form you build needs an organization wide unique name in Manager. Now, if you want to use the same form name in a new project, you must delete the previously published forms that use that name, for example, My Application Form, and start using the other form to publish to the same name. If you delete a project, form design or form design version, it will also delete the published form, otherwise the published form is "orphaned". If you have access to the

Manager dashboard, you can do it manually from there. However, this features allows you to do it straight from the Maestro dashboard.

10. Click Render JM Form Version to open a form version, that has previously been built and deployed in the host Manager, in a new tab of your browser. | 21.05 This feature was introduced in 21.05.
11. Click Download JSON to download JSON files of the selected form versions. If you have multiple versions of a form, you can download a JSON[1] file of each version and use an external tool to compare them to see the differences between the versions.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple form versions. | 21.05 This feature was introduced in 21.05.

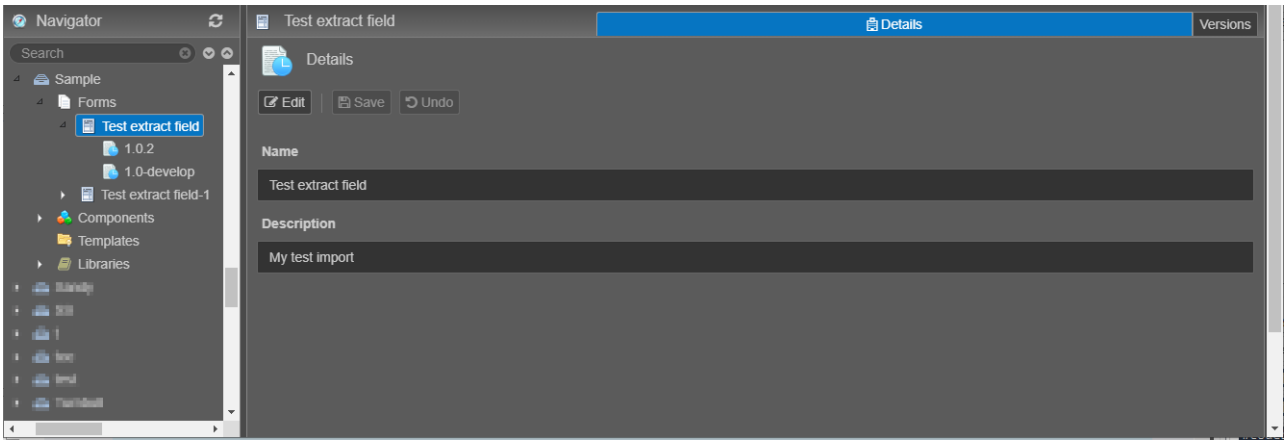
12. Select two design versions and click Compare Version to see the difference between them. | 23.10 This feature was introduced in 23.10
13. Double-click a selected form version to view the form version's details where you can update the **Description** field. Click Save to update the changes.



> NOTE
>
> You can't update the name and version number of the form.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

14. Select the Details tab to see the form details where you can change the form's name and description in the corresponding Name and Description fields.



Click Save to persist the changes after you are done.

Next, learn how to export form versions.

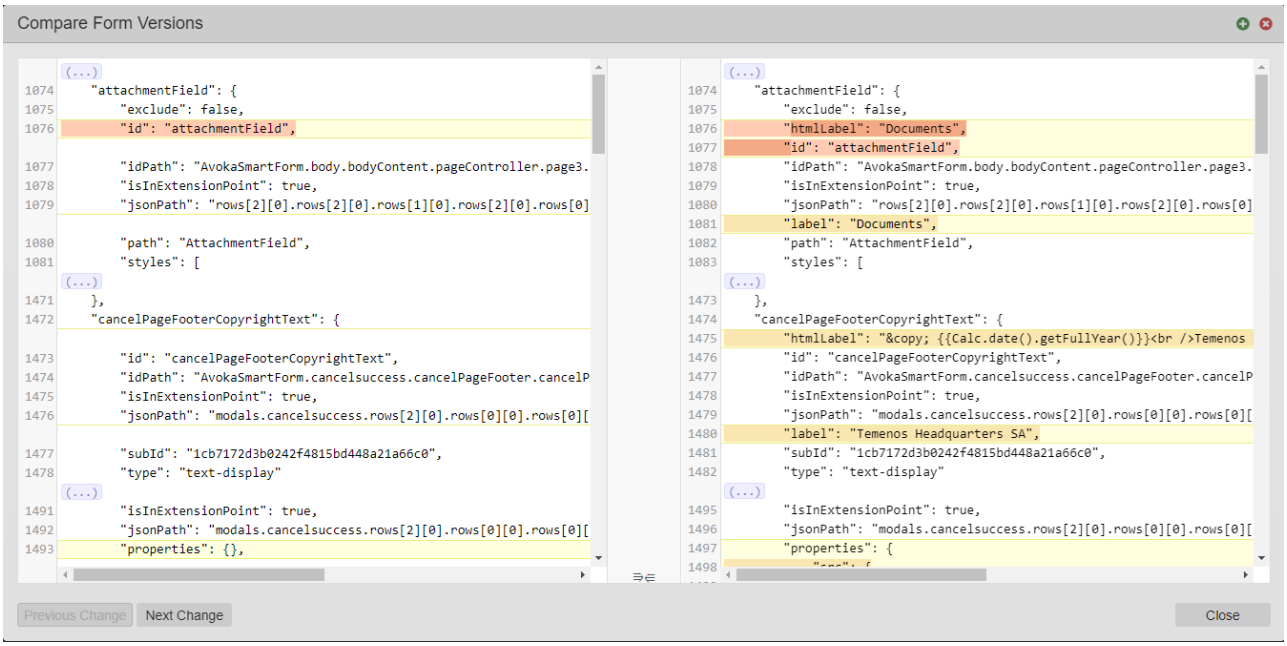
Compare Designs

Journey Maestro allows you to compare two versions of a designs so you can clearly see the differences between them as well as compare historical changes in one design version. However, the current functionality doesn't support merging of differences. Also, you can't compare two versions of a library as they are binary, nor two different designs, for example, two forms, as their structure can be very different.

> NOTE
>
> This UI is similar for all designs, such as forms, components, templates and receipt, so it's described using a form as an example.

To compare design versions:

1. Open your project in the Navigator pane and click Forms.
2. Select a form in the Forms folder to view available versions.
3. Select two form versions from the Versions pane and click Compare Version to view the difference between them in a new dialog:



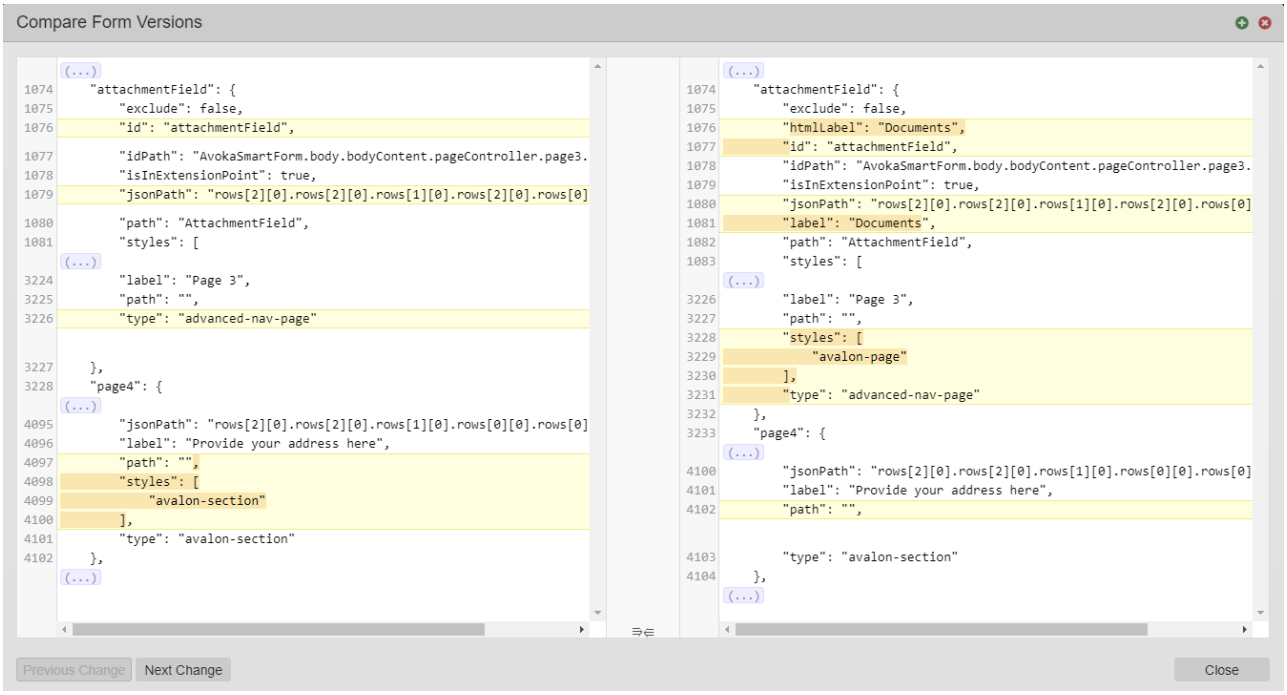
> NOTE
>
> If there are no differences in the designs, the Files are identical message is shown.

4. Click Next Change to see a next change or click Previous Change to go back to the previous difference.
5. Click Ellipses (...) to expand the design source file, so you can select it and copy and paste to an external editor.
6. Click Close to close the dialog and return to the Management Dashboard to the list of form versions.

Often, you need to find out what changes have been made to a design after it was published. Maestro allows you to do this using the Save History functionality.

To compare historical changes in a design version:

1. Open your project in the Navigator pane and click Forms.
2. Select a form in the Forms folder and click a form version you need.
3. Click the Save History tab to view the list of changes done to this form version.
4. Select two saved history records from the Save History pane and click Compare Version to view the difference between them in a new dialog.



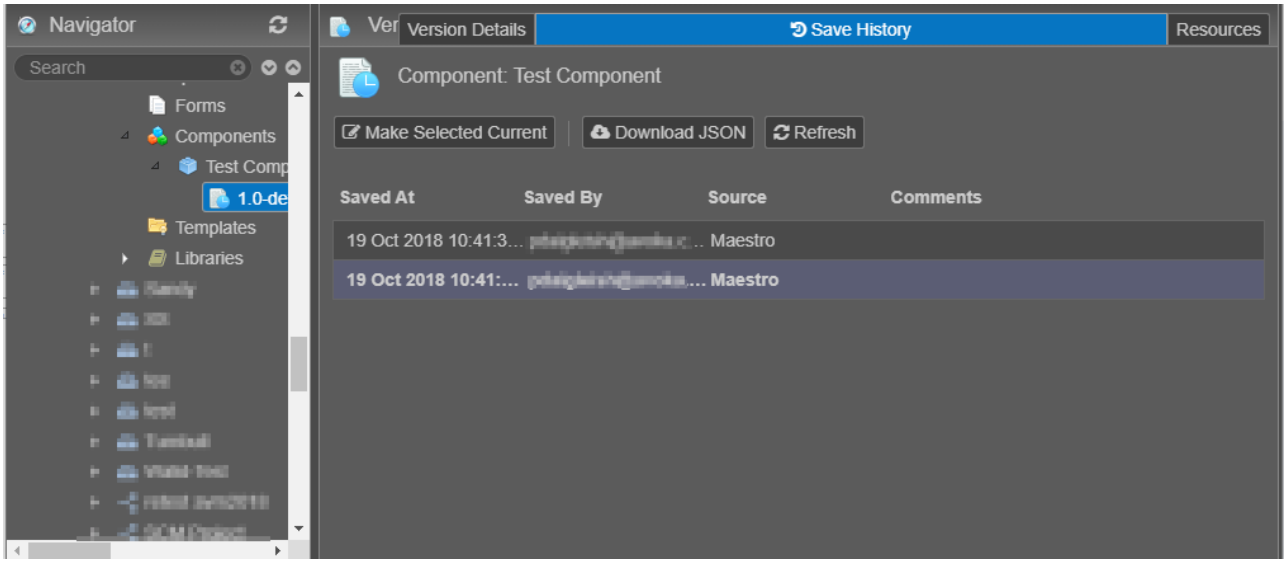
Next, learn how to view designs' saved history.

Design Save History

Every time Journey Maestro saves a design, such as forms, templates, receipts and components, its compressed copy is sent to Manager to be kept for historical references. This allows you to view designs' saved history and restore designs to previous saved states.

To view saved history of a design:

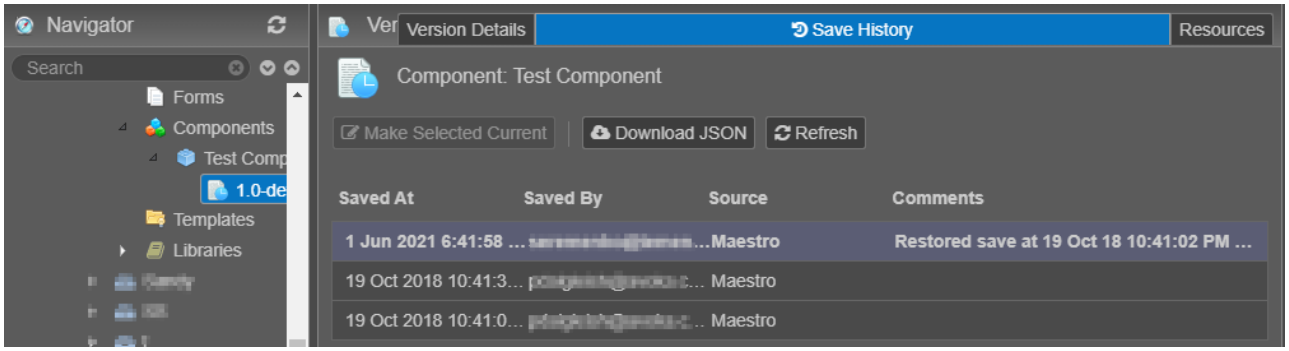
1. Open the Management Dashboard.
2. Find a design's version you want to view and select the Save History tab.



   The list of saved designs is shown of chronological order, with most recently saved design on top, and includes the following information:

   - Saved At
   - Saved By
   - Source
   - Comment

3. Click Make Selected Current to make the selected historical design current. You can use this feature to revert the selected design to its previous save state. A copy of the previous saved instance of the design will be created and added to the top of the list. A comment is added next to the saved instance that indicates which previous save was restored and is now the current instance of the asset.



4. Click Download JSON to download selected designs as JSON[1] files on your PC. You can use this functionality to compare previously saved instances of designs. Just download JSON files of designs you want to compare and then use an external tool to compare these files and see the differences.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.

5. Click Refresh to refresh the list.

Next, learn how to view designs' resources.

[1] JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

Export a Maestro Design

Journey Maestro allows you to export designs, such as forms, receipts, and templates, so you can easily move or copy them to a different environment. Once a design has been exported, you can import it into the original project, which will create a copy of the design, or you can import it into a different project, if you need to move the design.

To export a design:

1. Open a project in the Navigator pane and select a folder where a design is stored.
2. Select the design and then click Export to download the design as a ZIP file on your PC.

Next, learn how to import a design.

Import a Maestro Design

Maestro allows you to import designs, such as forms, receipts, and templates, which is handy when you want to move or copy them to different environments. Once a design has been exported, you can import it either back into the location it came from or a new location.

To import a design:

1. Open a project in the Navigator pane and select a folder where you want to import the design.

   > NOTE
   >
   > It is important to import the design into the correct location. For example, if you export a form, you must import the form into the project's form folder.

   > NOTE
   >
   > You can't import a form into the template's folder.

2. Click Import.
3. Choose the exported design as the archive ZIP file and click Open.

   > NOTE
   >
   > If a design with the same name already exists, a number will be added to the end of the design name. You can always edit this name in the Details tab.

Next, learn how to export a design.

Maestro Editor Overview

Maestro comes with the Maestro editor for creating and managing forms, components, templates, receipts and related assets and libraries. You use this editor to build complex web applications, such as onboarding customer journeys. You visually arrange components within a design by dragging and dropping them and then updating their properties using the central part of the editor - the Wireframe - which is Maestro's WYSIWYG editor.

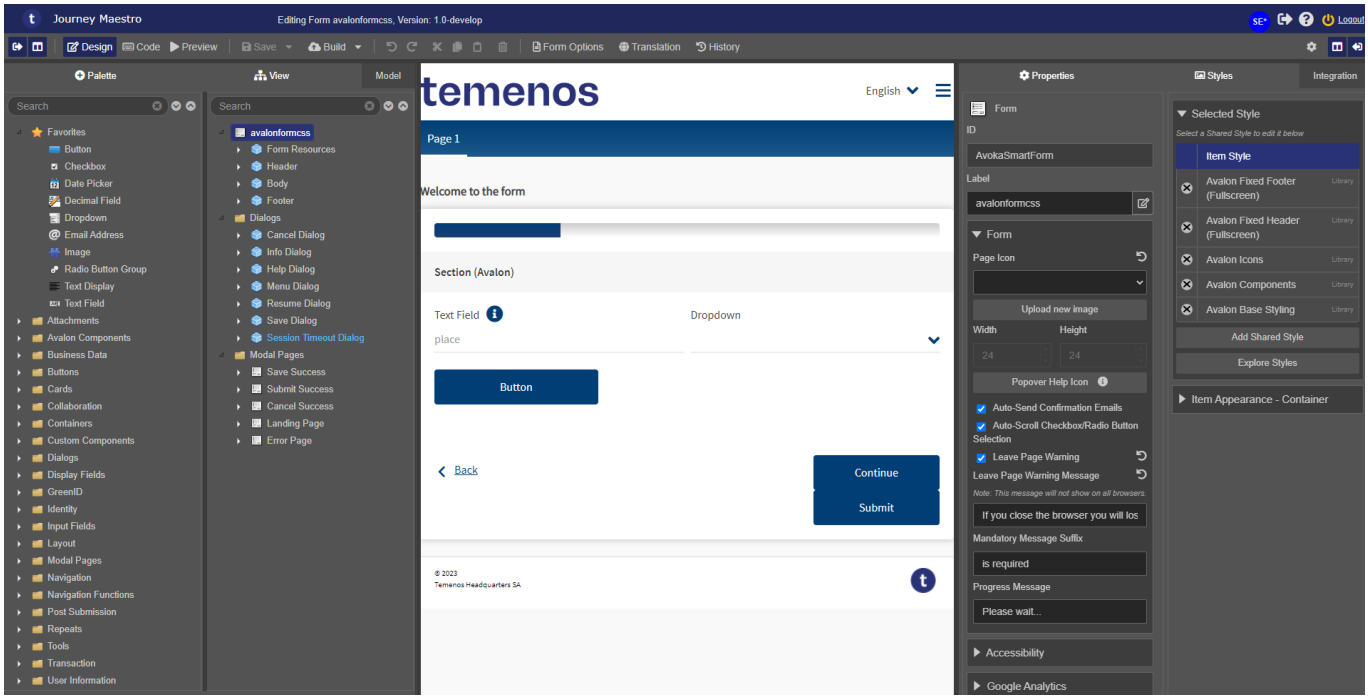
The Maestro editor allows you to create four types of designs:

- Forms - web applications designed to capture data from applicants
- Receipts - documents of record that provide organizations and applicants with a reference of their submitted data
- Templates - used to provide a consistent look and feel to multiple forms and receipts
- Components - modular building blocks that can be drag and dropped into forms, receipts, and templates

For more information, see design types.

Open the Maestro Editor

When you view forms, templates, receipts or components in Maestro and want to start working on a selected design, you click Edit Form Version that opens the design in the Design mode in the Maestro editor. This is illustrated below.



The Maestro editor consists of several UI allowing you to perform specific editing and configuration tasks. The editor comes with the default panel structure and layout, which is configured to display one pane on each side of the editor's central window. However, you can use the toolbar functions to change the layout to display more information or less depending on your editing task at hand.

The Maestro editor consists of the following sections:

1. Screen Header
2. Menu Bar
3. Left Panel
4. Right Panel
5. Views

Screen Header

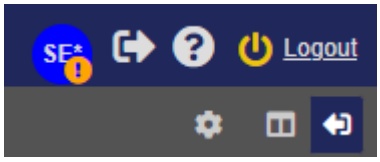
The screen header displays some useful information, including:

Product name
: Journey Maestro

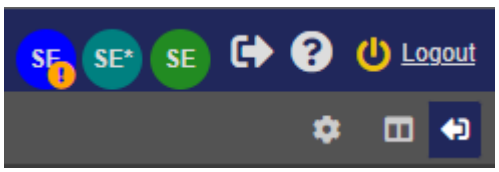
Form name
: avalonformcss

Version of the form
: 1.0-develop

Users | 23.04 This feature was introduced in 23.04
: Avatars of users who have this design open and whether they have unsaved changes to the design, indicated with * and !, in this example, it's the user with the SE* avatar. This feature helps you avoid overriding changes made by another user to a design before changes are saved.



Multiple users are listed using different colors.



NOTE

If you open a design, which has already been opened by other users, a warning message is displayed. For more information, see Open a Design.

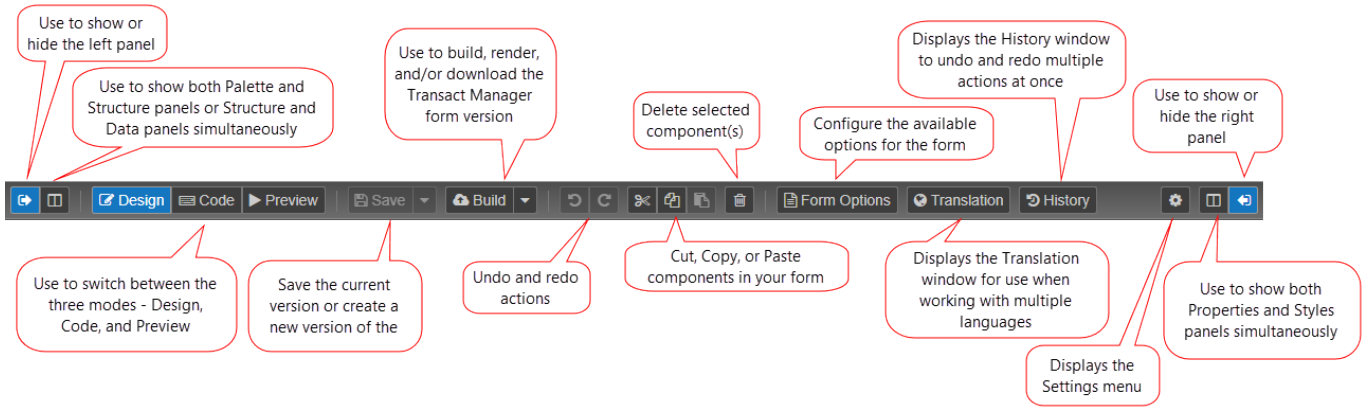
The Screen Header provides you with the following actions:

- and - logs you out of the Maestro editor
- - provides you with the same help options as the Maestro Dashboard, plus the addition option - Show Form Details to view more information about an open form, template or receipt.

Menu Bar

The Toolbar is located at the top of the editor. It contains a range of options for interacting with the current design. Most of the options are available for all types of designs, but some options are only available based on the type of design being edited. It has a slightly different layout when you work on a form, a component, or a template, as shown below:

Form



Receipt



Template



Component



For more information, see Design Mode Toolbar.

The Toolbar provides the following functionality, which you need to efficiently work with Maestro's forms, components, and templates:

-  shows or hides the left panel and  shows or hides the right panel.
-  displays two panes side by side or clear it to show only one pane. This is beneficial for larger screens as you can adjust the size of the panes according to the screen width.

  If you have a larger screen, the four-tab view can be extremely powerful. On the left side, this allows you to drag and drop components from the Palette pane directly onto the form. Many seasoned Maestro developers find this a quicker and easier way to add components. You can also double-click the component from Palette for even faster additions. On the right side, this allows you to view the Properties and Styles panes together, which can also make editing a little faster.

- Design switches to design view in the editor, that is where a form is displayed when you open it from the Maestro Dashboard
- Code shows the code view in the editor
- Preview checks how a form will look when it's built
- Save updates a form's content
- Build a form version
- Publish a component or publish a template
- Undo and redo actions, as well as cut, copy and paste of a selected components
- Delete a selected component
- Form Options allows you open form configurations when you work with forms
- Component Options allows you open component configurations when you work with components
- Brand allows you to select a brand you want to modify while working with a template
- Translation applies multiple languages to a form
- History views the history of the asset and undo recent changes made to a form
- Settings Menu applies various configuration options to a form
- Close closes an open form

Left Panel

The left panel of the editor includes the following panes:

- Palette Pane displays all available components. All listed components are available to be added to a Maestro asset.
- View Pane provides a hierarchical structure of the form, which is particularly useful with larger forms, where finding components can be difficult. This pane replaces the Structure pane.
- Model Pane displays data models and is used to manage and share domain models. | 18.05 This feature was introduced in 18.05.
- History Pane shows a history of every action that has been performed in the current editing session. | 17.10 This feature was removed in 17.10 Use the History button instead.
- Editor pane shows an editable preview of component's properties on the right side of the window.

All panes in the left panel have the following controls:

Icon	Label	Description
	Search Input	
	Expand All	
	Collapse All	

Right Panel

The right panel of the editor includes the following panes:

- Properties pane displays the properties and business rules of a selected component. The properties vary depending on a type of the selected component. Some properties can contain rich text content which you can modify using the built-in rich text editor.
- Styles pane provides options to customize the look and feel of a component. It's recommended using a template to create and modify form's styles.
- Integration pane allows you to control the underlying data representation of a selected component. This pane replaces the Data pane. | 17.10 This feature was introduced in 17.10.

Views

The Maestro editor comes with the following views, also called modes, which help you create various Maestro assets:

- Design view is the default view, which is displayed when you open a new asset, and it is where you work with the open form, template, and component.
- Code view allows you to view, create and modify all business rules.

- Preview shows how a form will look when it is built. This is a working preview of the form that allows you to check the added components and some functionality without having to build a form.

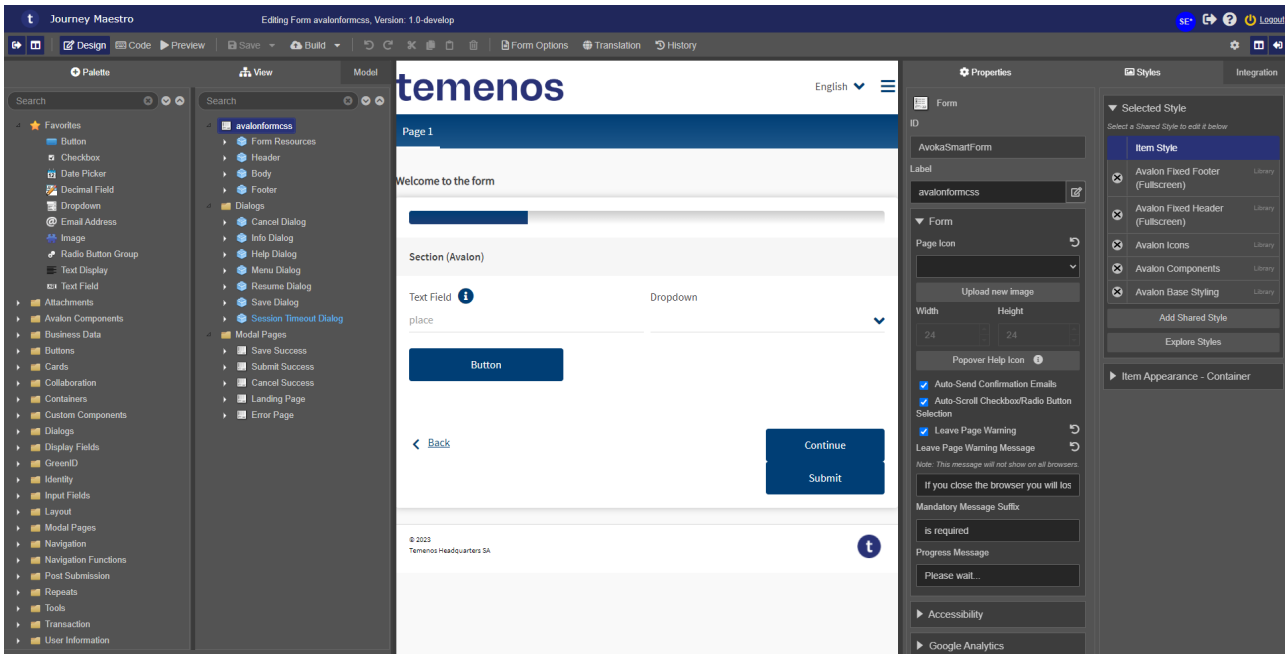
Next, learn about the Properties pane.

Design Mode

The Maestro editor comes with the Design Mode interface, also known as Wireframe, to create and configure designs, such as Maestro forms, templates and components.

To work on a design in the Design Mode:

1. Open a design in the Maestro editor and click Design.

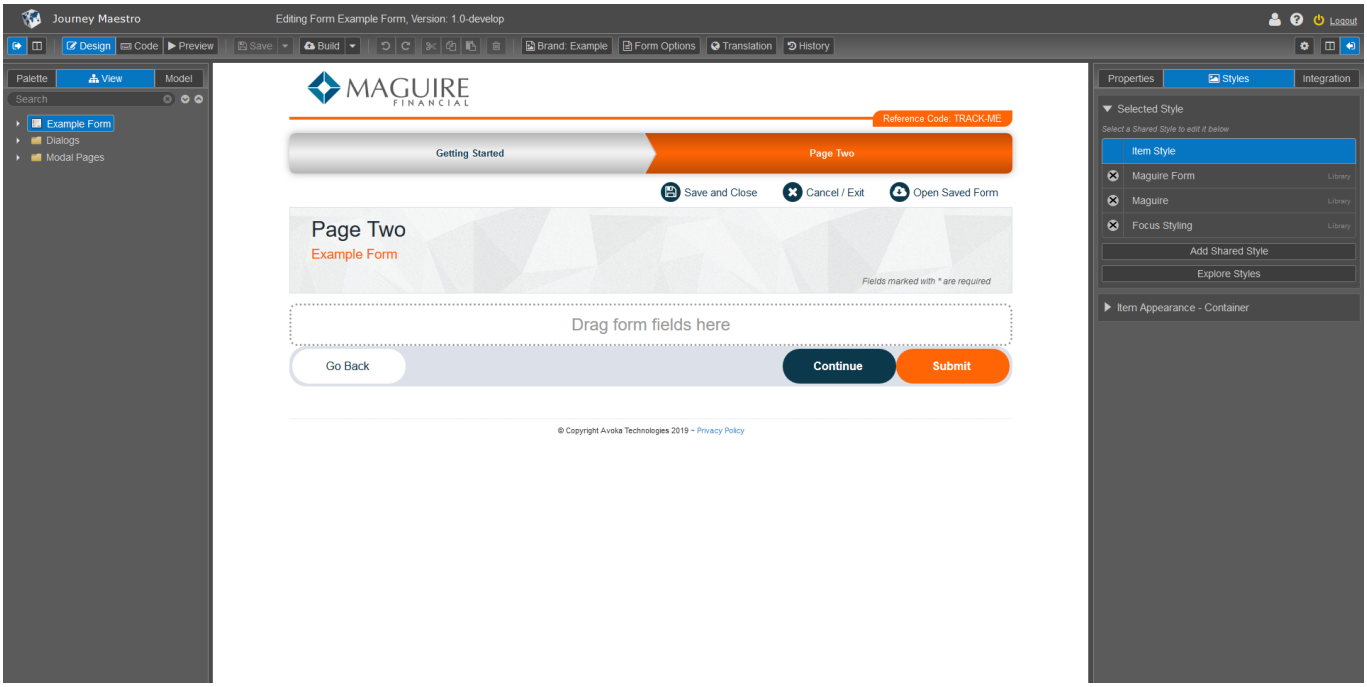


> NOTE
>
> When you open a design in Maestro, it will open it in Design Mode by default.

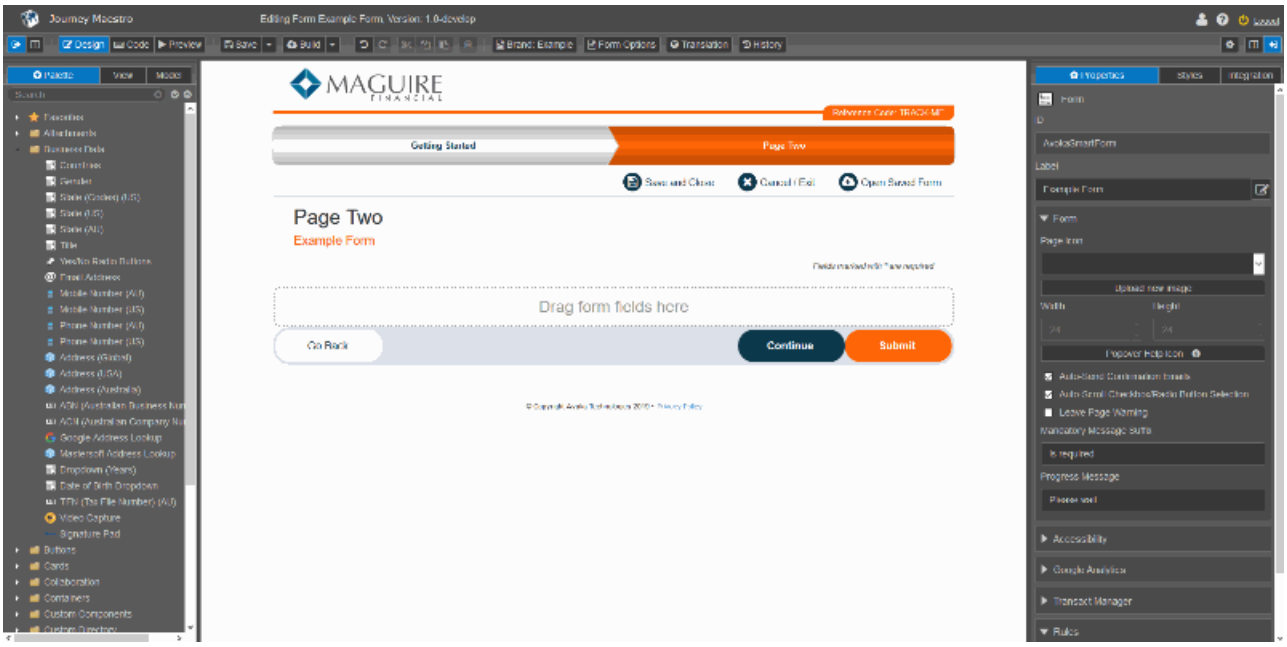
2. Add components from the Palette pane to the wireframe, for example, by dragging and dropping them. Indicators appear to inform you where the component will be inserted.
3. Select the Properties pane and click the **Layout** heading to adjust the component's column widths. All of Maestro's designs are based on Bootstrap's twelve-column grid, which means multiple components can sit within the same row. However, you may need to adjust their positions now and then.

> NOTE
>
> You can't select multiple components at once within the wireframe.

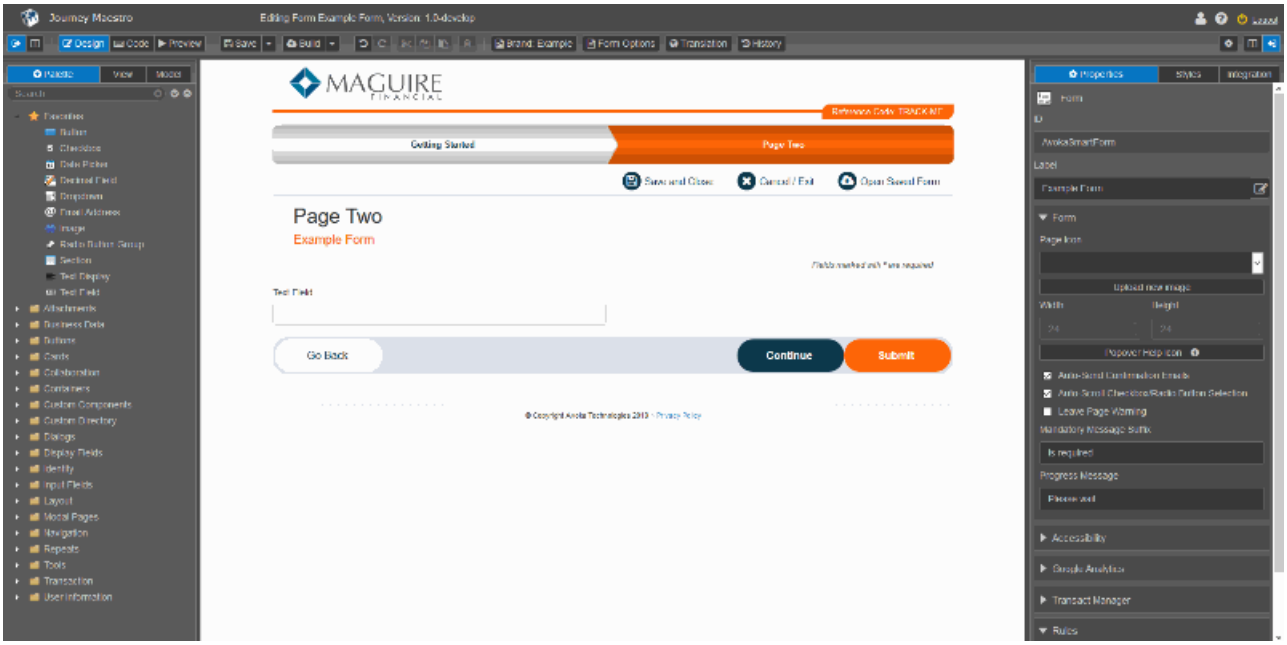
Here is a quick demonstration how you can design a form by dragging and dropping different components within the wireframe.



Drag and drop them from the Palette pane.



Add another component within the same row.



Next, learn about the rich text editor.

Rich Text Editor

The Maestro editor comes with the rich text editor allowing you to directly apply custom HTML, styles, images and Font Awesome[1], as well as use AngularJS[2] expressions in some component's, such as a label, to derive the text from other fields in the form.

To edit text in the rich text editor:

1. Open a form or a template in the Maestro editor and click the Design tab.
2. Select a component and switch to the Properties tab.
3. Click the property with a pencil icon, for example the label, to open the rich text editor.

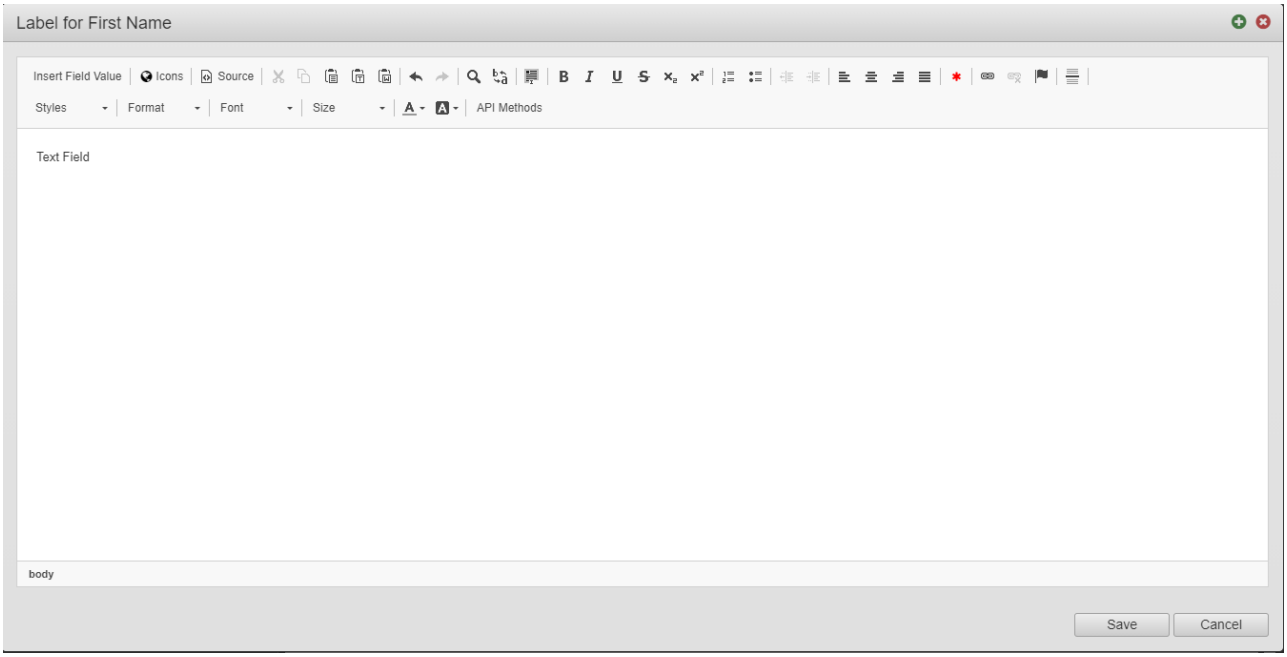
> NOTE
>
> The component's property must be enabled for the rich text content. Rich text is enabled for all labels, but you can also define component properties as rich text, for example section headings and the help text (popover) to name a few.



[1]Font Awesome is a font and icon toolkit based on CSS and Less.

[2]AngularJS is a structural framework for dynamic web apps. It lets you use HTML as your template language and lets you extend HTML's syntax to express your application's components clearly and succinctly. AngularJS's data binding and dependency injection eliminate much of the code you would otherwise have to write. For more information, see http://angularjs.org/

4. Edit the text in the editor using rich formatting as required.



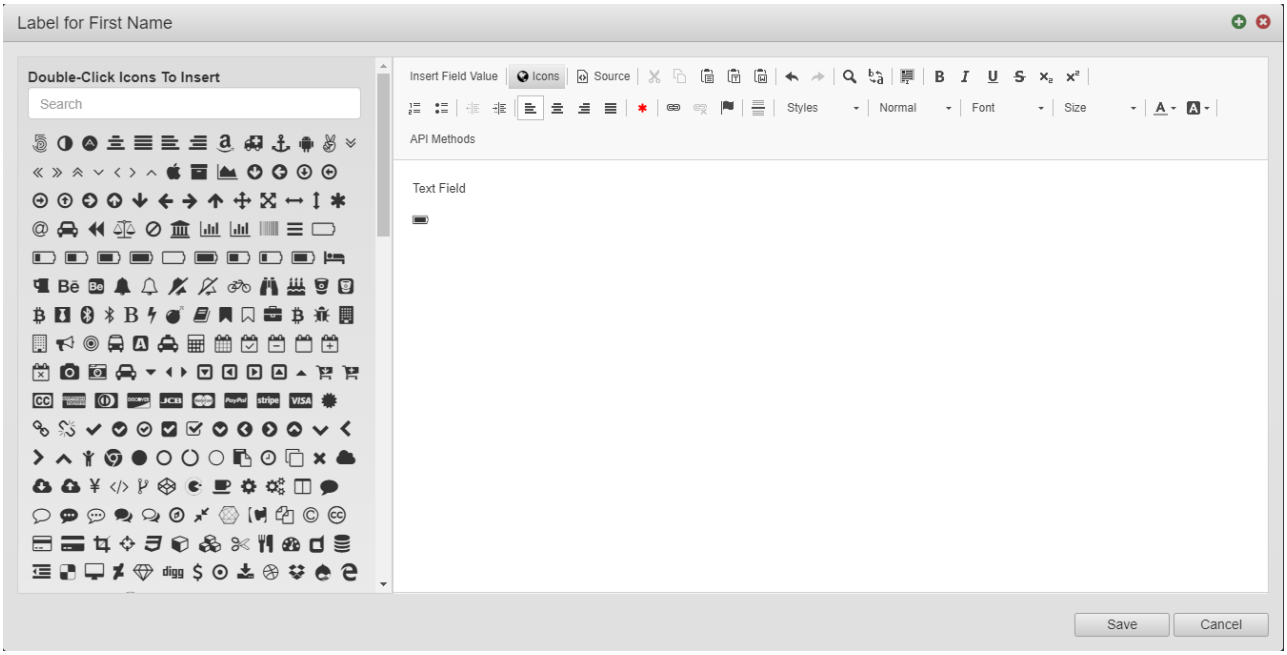
The editor provides a larger workspace for editing the properties, as compared to the label text area itself, and the editor has the following options:

- Insert Field Value
- Source
- Paste as Plain Text
- Paste from Word
- Find
- Replace
- Bold
- Italic
- Insert / Remove Numbered List
- Insert / Remove Bulleted List
- Decrease Indent
- Increase Indent
- Align Left
- Align Center
- Align Right
- Justify
- Mandatory Marker
- Link
- Unlink

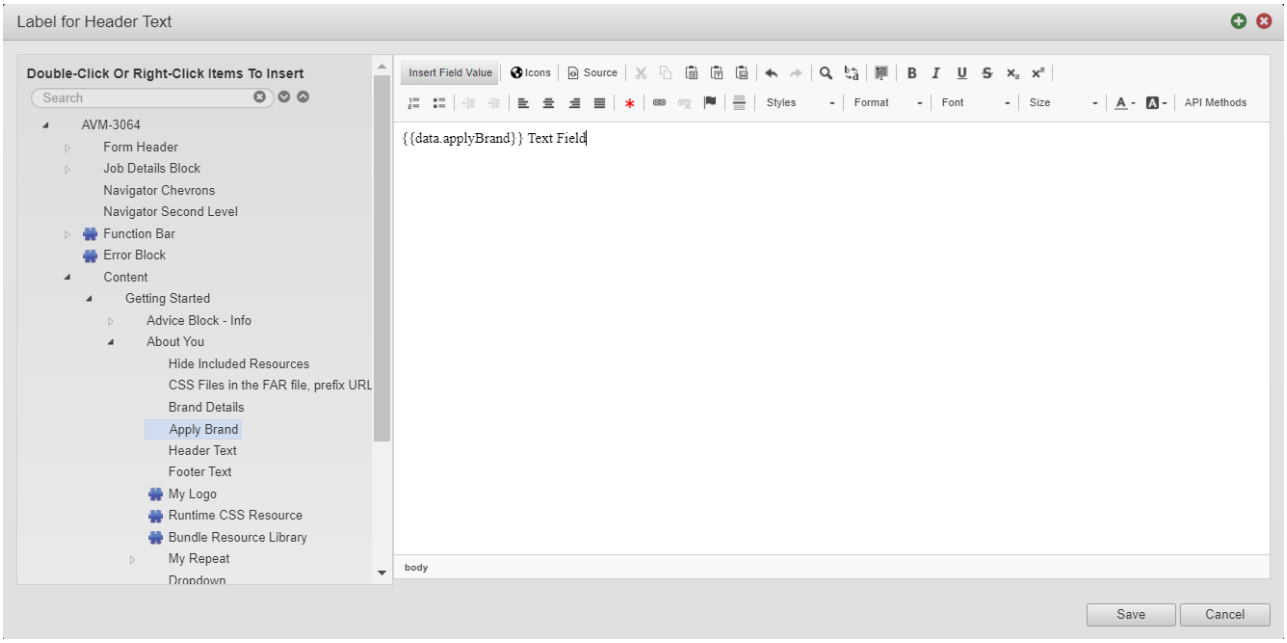
- Format
- Font
- Size
- Text Color
- Background Color
- API Methods

5. Click an HTML element displayed at the left bottom corner of the editor to highlight it in the editor. In this example, the HTML element is `body`.
6. Select the Icons tab to choose an icon using the Icon Picker from the list of available icons and double-click it to insert it into the property. | 21.05 This feature was introduced in 21.05.

> NOTE
>
> You can also insert Font Awesome icons into a component using rich text properties using the HTML code, for example, `<i class="fa fa-camera-retro"></i>`



7. Select the Insert Field Value tab and double-click a property from the tree to reference its values in your property. This makes your property value change dynamically. This tree view displays the structure of the design, similar to the **View** pane. Click API Methods to open the JavaScript API Reference documentation for all available functions that you can use in your component. For more information, see dynamic labels.



8. Select the Source tab to view and edit the rich text content as a source code. You may need to use this feature to create a content including special characters, such as `&`. For example, if you want to have a label text as R & D, you should type it as `R & D` HTML source.

   NOTE

   You can't use any of rich text formatting in this mode.

9. Click Save to save your changes.

Next, learn about Properties pane.

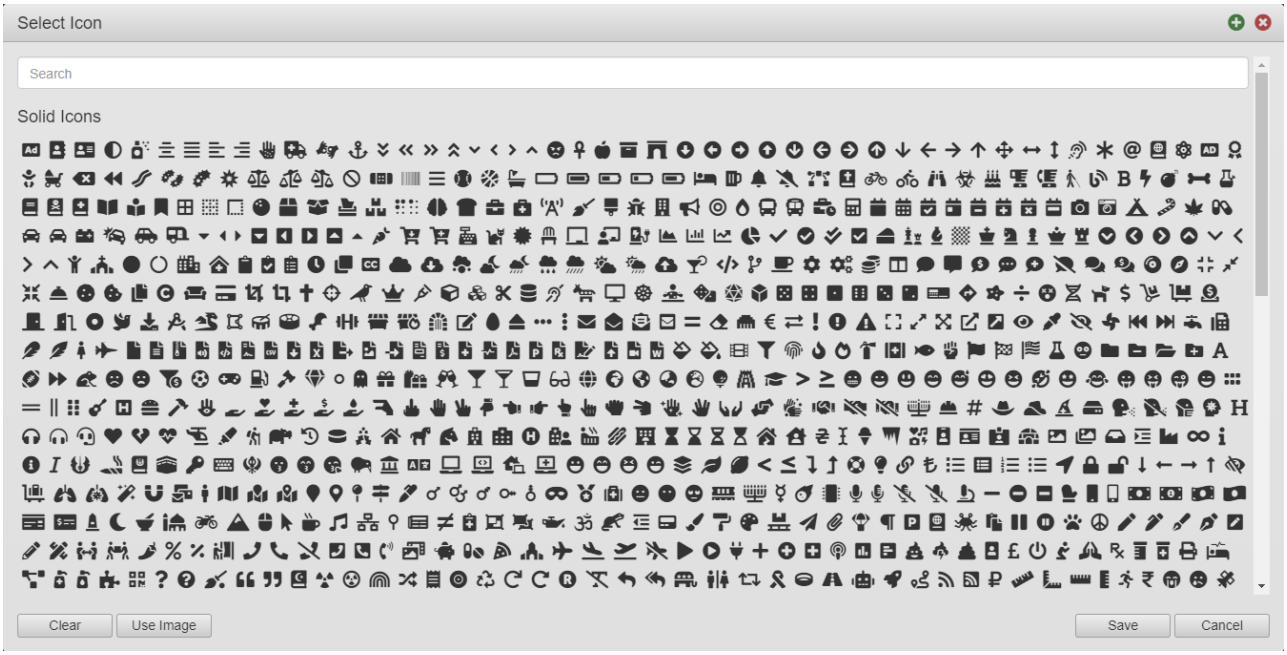
Icon Picker

The Maestro editor comes with the Icon Picker allowing you to choose an icon from the pre-defined collection of icons, which is shipped with each release of Maestro. We use web font icons. For more information, see Font Awesome documentation.

> NOTE
>
> You can also use the rich text editor to set an icon for a component.

To select an icon using the Icon Picker:

1. Open a form or a template in the Maestro editor and click the Design tab.
2. Select a component and switch to the Properties tab.
3. Click the item's property, which allows you to specify an icon, to open the Icon Picker. For example, the Collapsed Icon property of the Section (Avalon) component opens up the Icon Picker.



The icons are grouped by the following categories:

- Solid Icons: They are faster to recognize unless their cues are subtle and not noticeable enough.
- Regular Icons:
- Brand Icons: They are specific to various company brands. For more information, see Font Awesome documentation.

4. Type a full or partial name of an icon you are looking for in the Search bar to filter the icon list.
5. Select an icon you need from the list or filtered list and click Save to inset the icon into the property.
6. Click Clear to undo your selection or click Cancel to discard your changes.
7. Click Use Image to see the instructions on how to use an image in the property. These instructions are explained below.

Use Image

In some cases, you may need to decide whether to use icons or images. There are the following differences you may want to consider while making such a decision:

- Icons are included in the core Maestro libraries by default
- Icons have simple HTML markup, so using a different font family to display the icon - the font family only needs to be loaded once and the entire icon set is available in the form
- Images need to be provided separately and loaded into the page individually

To use an image in a property:

1. Open a form or a template in the Maestro editor and click the Design tab.
2. Select a component and switch to the Styles tab.
3. Select a styling target, for example, Container.
4. Expand Items Appearance - Container
5. Expand Background and select Image from the dropdown list.
6. Choose an available image from the dropdown list or click Upload new image to choose your background image.

   > NOTE
   >
   > Images you see in the dropdown list are these inside one of the libraries available to the project - either core, or any other organization or project-level libraries that have been added to your project.

7. Style the image as required.
8. Click Save to save your changes.

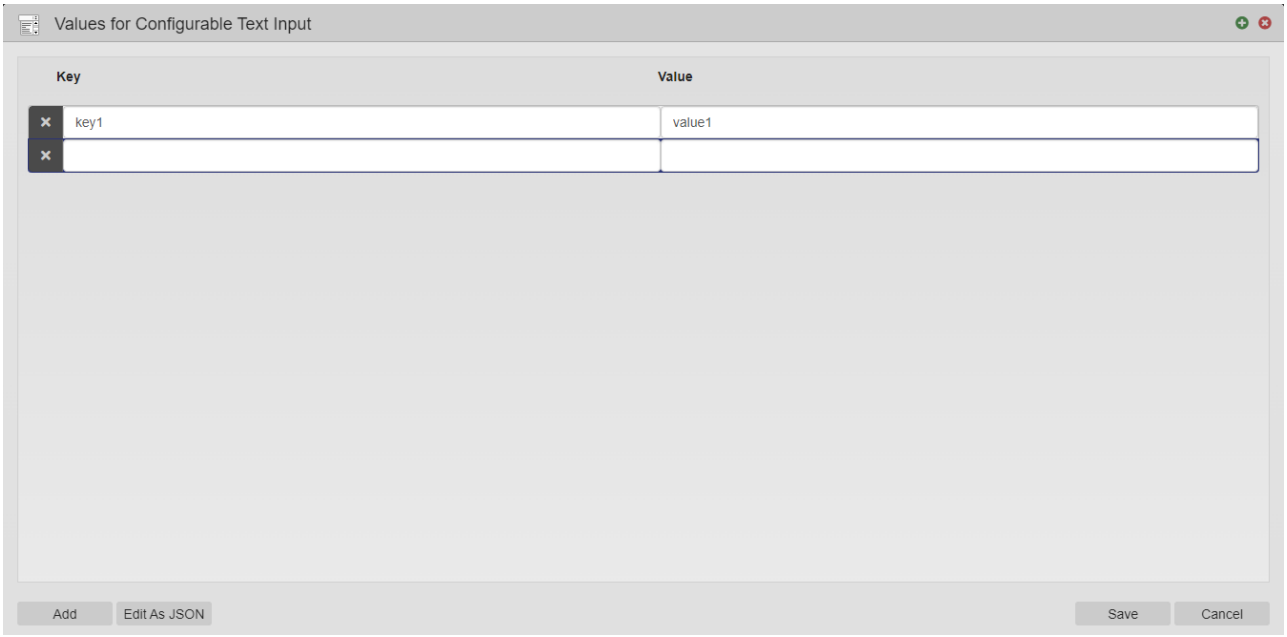
Next, learn about Properties pane.

Key-Value Editor

The Maestro editor comes with the Key-Value editor allowing you to create and manage key / value mappings, which may be required to configure different components, for example, Configurable Text Input. The mappings are stored as a JSON[1] object so the editor lets you edit these pairs using JSON syntax directly.

To create a key / value pair in the editor:

1. Open a form or a template in the Maestro editor and click the Design tab.
2. Select a component and switch to the Properties tab.
3. Click Values to open the Key-Value editor.



> NOTE
>
> The component's property must be enabled for the key-value content, otherwise this option is not available.

4. Click Add to create a new mapping and provide a key in the Key column and its value in the Value column.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

5. Click Edit As JSON to edit the mapping in JSON format.



6. Click Clean Up to format the JSON file.
7. Click Done to return to the main UI of the key-value editor.
8. Click Save to save your changes.

Next, learn about Properties pane.

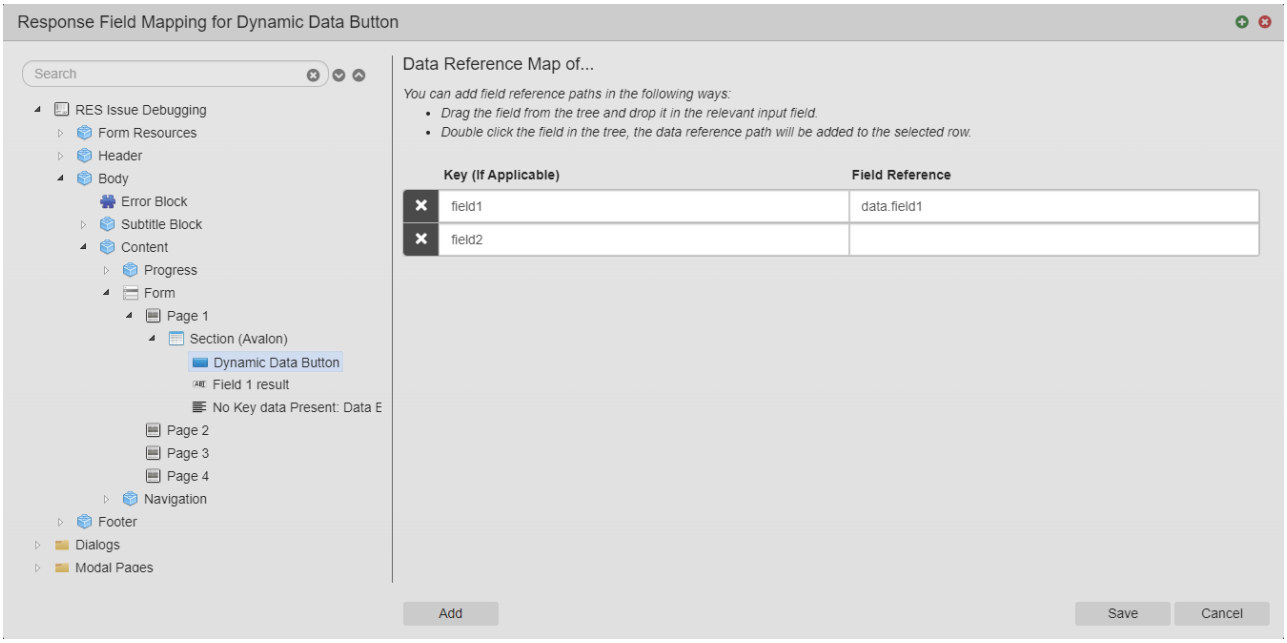
Data Reference Mapping Editor

The Maestro editor comes with the Data Reference Mapping editor allowing you to create and manage key / value mappings, which may be required to configure different components, for example, Dynamic Data Button. The mappings are stored as a JSON[1] object.

The editor is attached to a field of a type called `fieldRefMap`. In the standard widgets, it is used on the Dynamic Data Button, the Auto Tab Controller, the Autocomplete Field and Signature widgets. It is used to collect a list of field references with a key. This can be used in various ways by scripts but the common one is to get data out of the data model into a JSON object, hence the key field and the fields ref. You can map data coming into the form with the key in an object and where it maps to in the data model, for example, handling the response from the dynamic data call and where the data gets injected in to the form data model.

To create an input field mapping in the editor:

1. Open a form or a template in the Maestro editor and click the Design tab.
2. Select a component and switch to the Properties tab.
3. Click Click to Browse to open the Data Reference Mapping editor.



[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

> NOTE
>
> The component's property must be enabled for the key-value content, otherwise this option is not available.

4. Click Add to create a new mapping and provide a key in the Key column and its value in the Value column. You can add field reference paths in the following ways:
   - Drag the field from the tree and drop it in the relevant input field.
   - Double-click the field in the tree, the data reference path will be added to the selected row.
5. Click Save to save your changes.

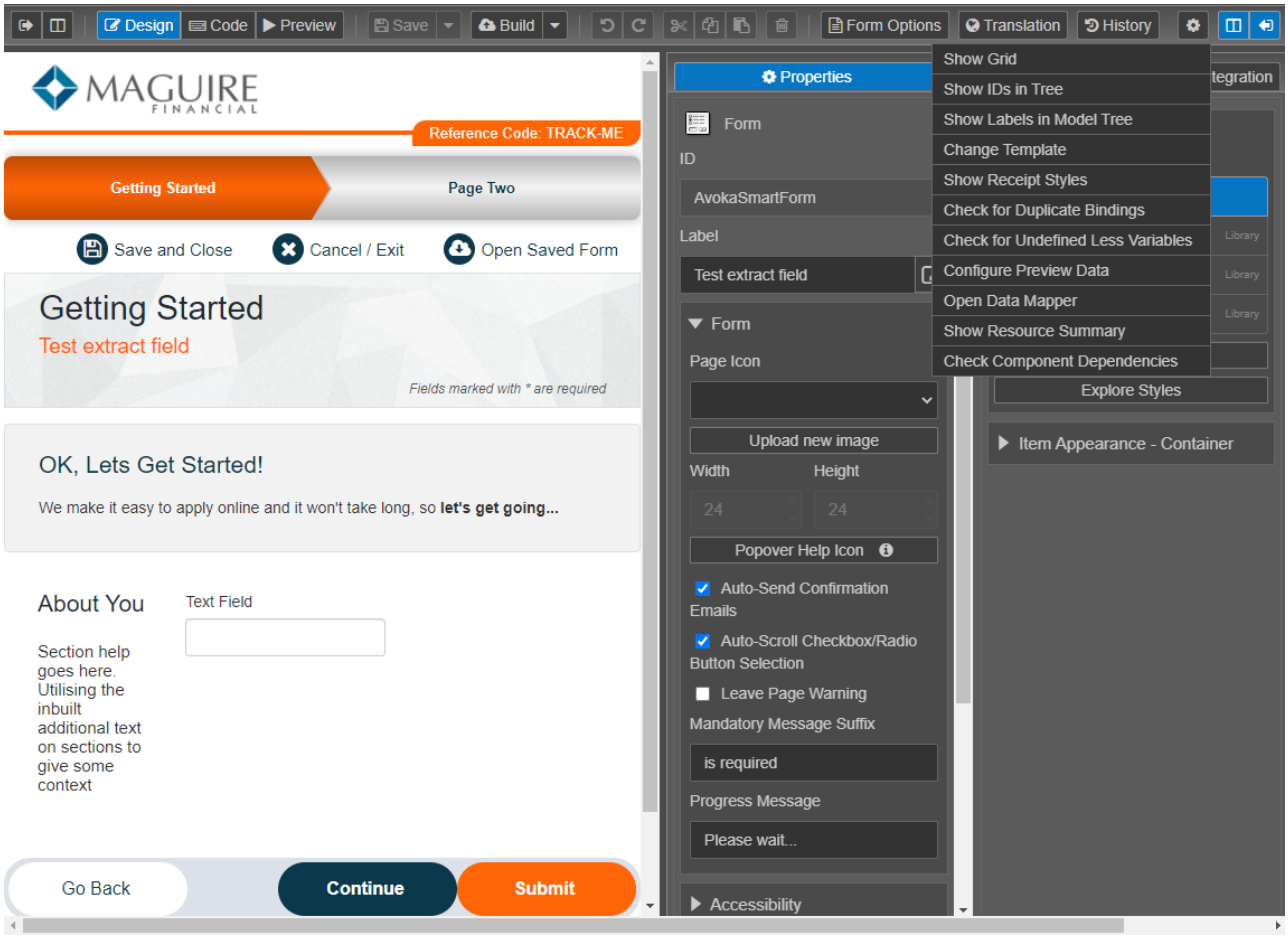
Next, learn about Properties pane.

Settings Menu

The Maestro editor allows you to access and perform various actions on a form quickly using the Settings Menu functionality,

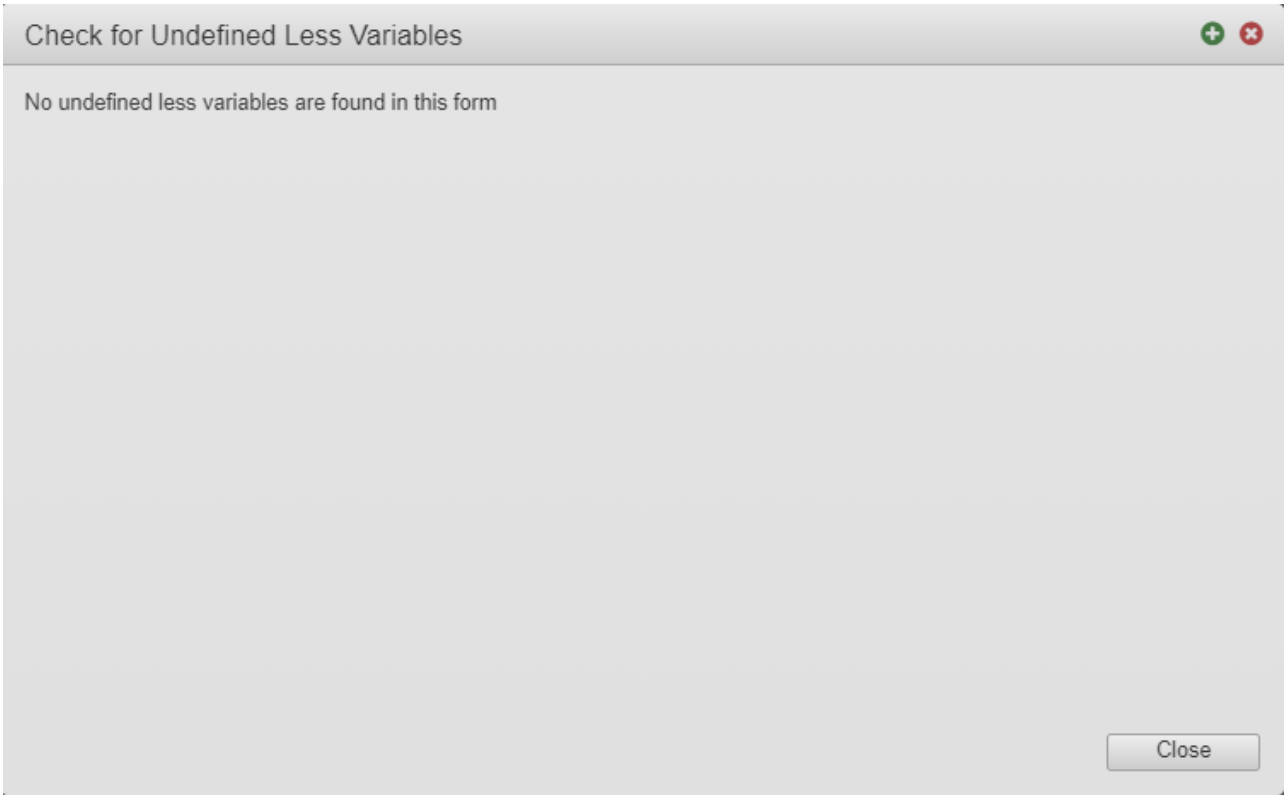
To open Settings Menu:

1. Open a form in the Maestro editor and click Settings Menu  .



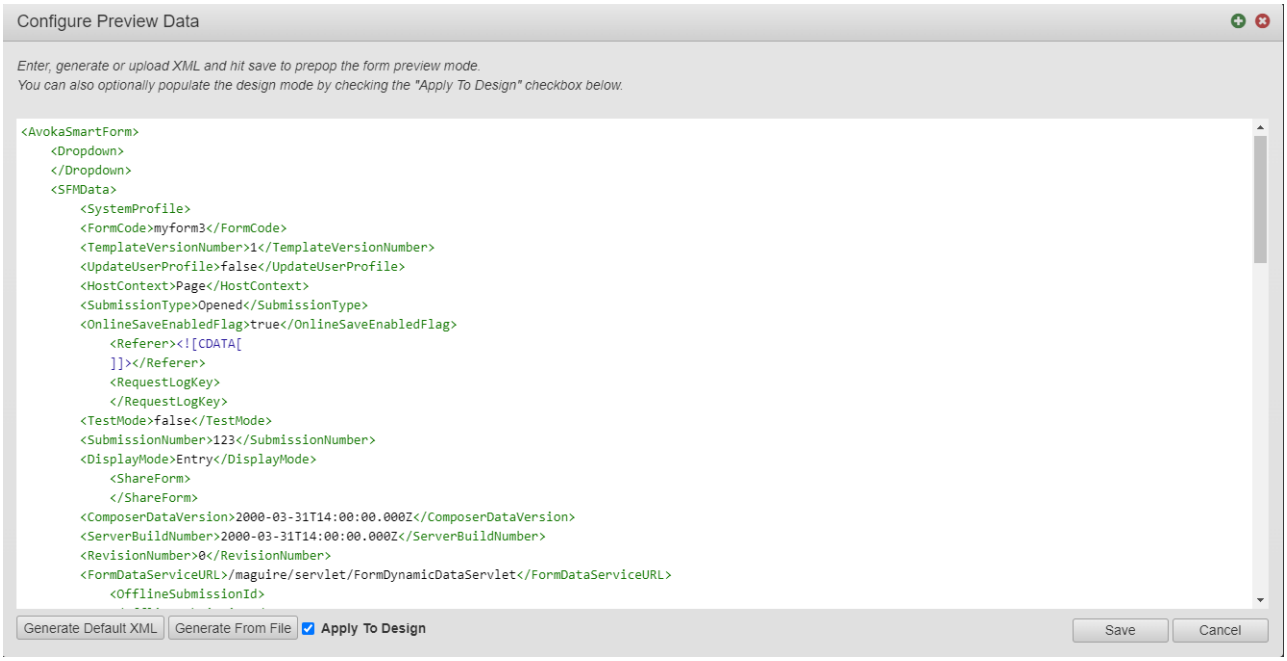
2. Select Show Grid to show a grid of horizontal and vertical dashed lines over a form to help you align components to a form layout. Select Hide Grid to hide the supplemental lines.
3. Select Show IDs in Tree to show components' IDs in the Palette pane. Select Show Labels in Tree to show components' labels.
4. Select Show Labels in Model Tree to show components' labels in the Model pane. Select Show IDs in Tree to show components' labels.
5. Select Change Template to change a template that a form uses.

6. Select Show Receipt Styles to show a form in the Maestro editor as it will be shown on a rendered receipt, for example, a PDF document. Select Hide Receipt Styles to show a form as it is normally displayed in the Maestro editor.
7. Select Check for Duplicate Bindings to check a form duplicate bindings.
8. Select Check for Undefined Less Variables to run a check for all undefined Less[1] variables in shared styles within the form or template and the referenced styles so you can resolve them.

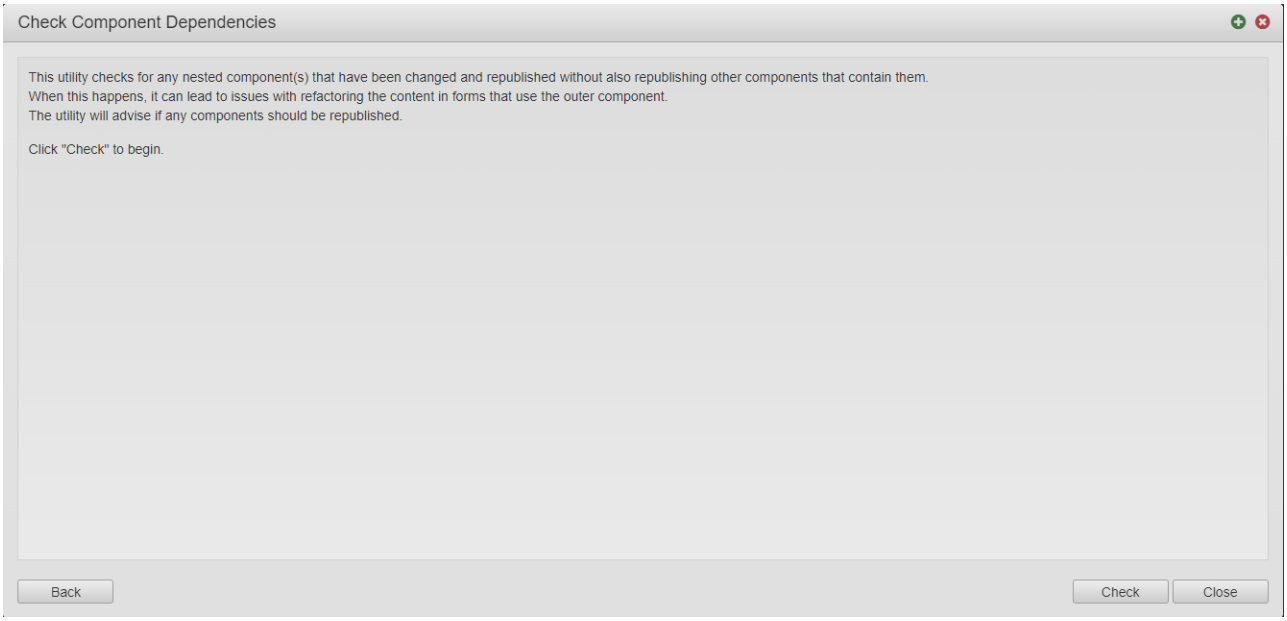


9. Select Configure Preview Data to pre-populate form data for the Preview mode. Click Generate Default XML or Generate from File to create form data. Select the Apply To Design checkbox to apply this data to form design and click Save.

[1]LESS is a dynamic preprocessor style sheet language that can be compiled into Cascading Style Sheets (CSS) and run on the client side or server side.



10. Select Open Data Mapper to map form fields to submission data using the Data Mapper functionality.
11. Select Show Resource Summary to see what resources are included in this form and how much space each resource takes.
12. Select Check Component Dependencies and click Check to run a check for any nested components that have been changed and re-published without also re-publishing the components that contain them. When this happens, it can lead to issues with re-factoring the content in forms that use the other components.



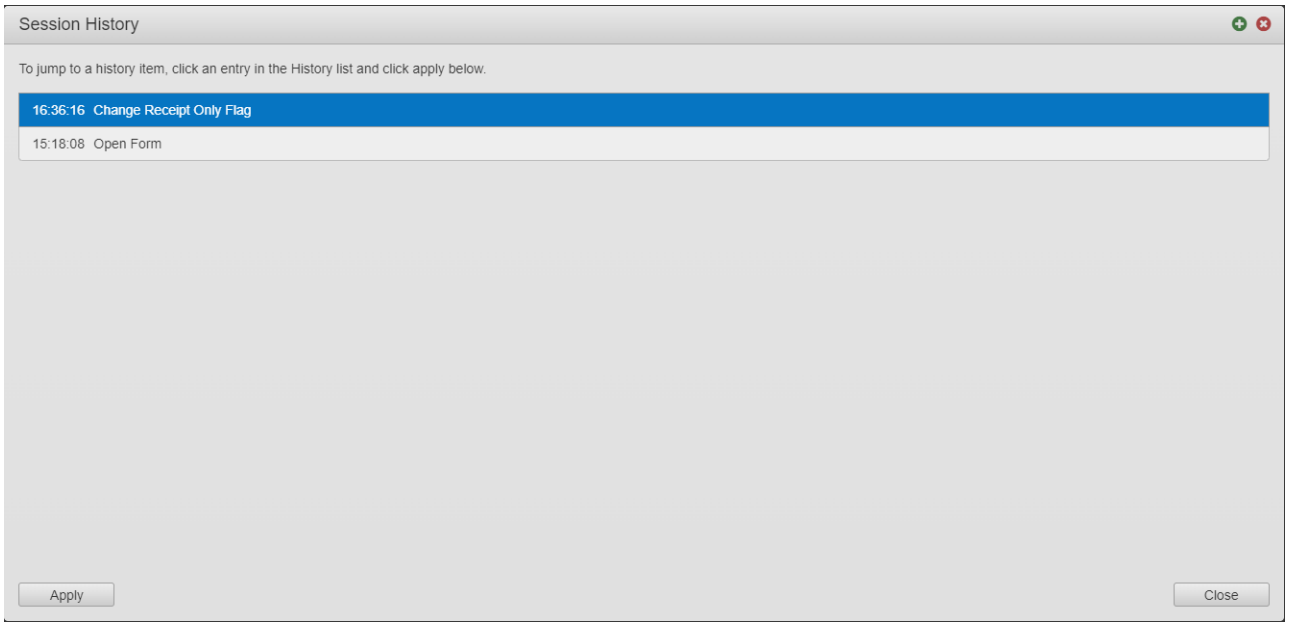
Next, learn how to check form history.

Design History

The Maestro editor allows you to check and undo changes made to a design, such as a form, a template, or a component, since it was opened in the editor.

To view, undo or revert the most recent design actions:

1. Open a form in the Maestro editor and click History.



2. Select an item from the session history list and click Apply to revert the design to an earlier state, thereby undoing one or more changes.

If you revert the design to an earlier state, the changes you've undone are not immediately lost. They will remain in the **Session History** dialog until new changes are made or until you exit the current design. Therefore, if you undo changes by mistake, you may be able to reapply those changes. If you're planning on making large changes to a design, use versions to keep those changes separate from existing work.

> NOTE
>
> Prior to version 17.10, the Maestro editor used the History pane, inside the **Right Panel**, instead of the History button.

Next, learn about the Maestro Palette Pane.

Form Resource Summary

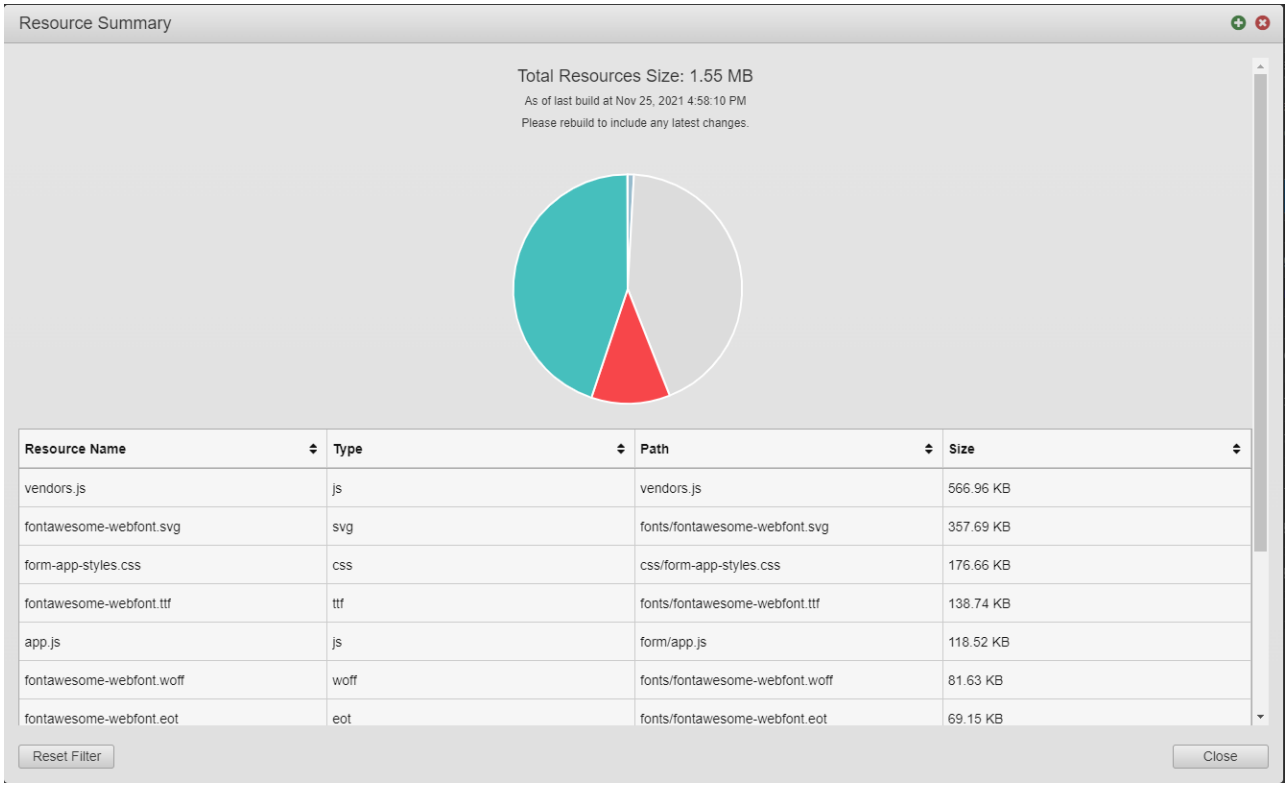
The Maestro editor comes with the Show Resource Summary functionality that generates the resource summary report for a form. This allows you to view what resources, such as HTML, image, CSS and JavaScript files, are used in the form and resources' sizes. You can use this information to troubleshoot form loading performance, or make a decision whether form resources should be externalized out of the form.

NOTE

The Resource Summary is only available once you have built a form. You can't get report summary for a template.

To show form resource summary:

1. Open a form in the Maestro editor.
2. Select Settings Menu > Show Resource Summary.



NOTE

Hover over any section of the Pie Chart to see the specific storage size of the resource.

3. Click black arrows on each column of the table to sort the summary table, for example, to sort all resources in alphabetical order.
4. Click a segment of the Pie Chart to filter the table by showing only selected resource type.
5. Click Reset Filter to clear the filter you made by clicking on the Pie Chart.
6. Click Close.

NOTE

Check other Settings Menu options.

Next, learn about the Palette pane.

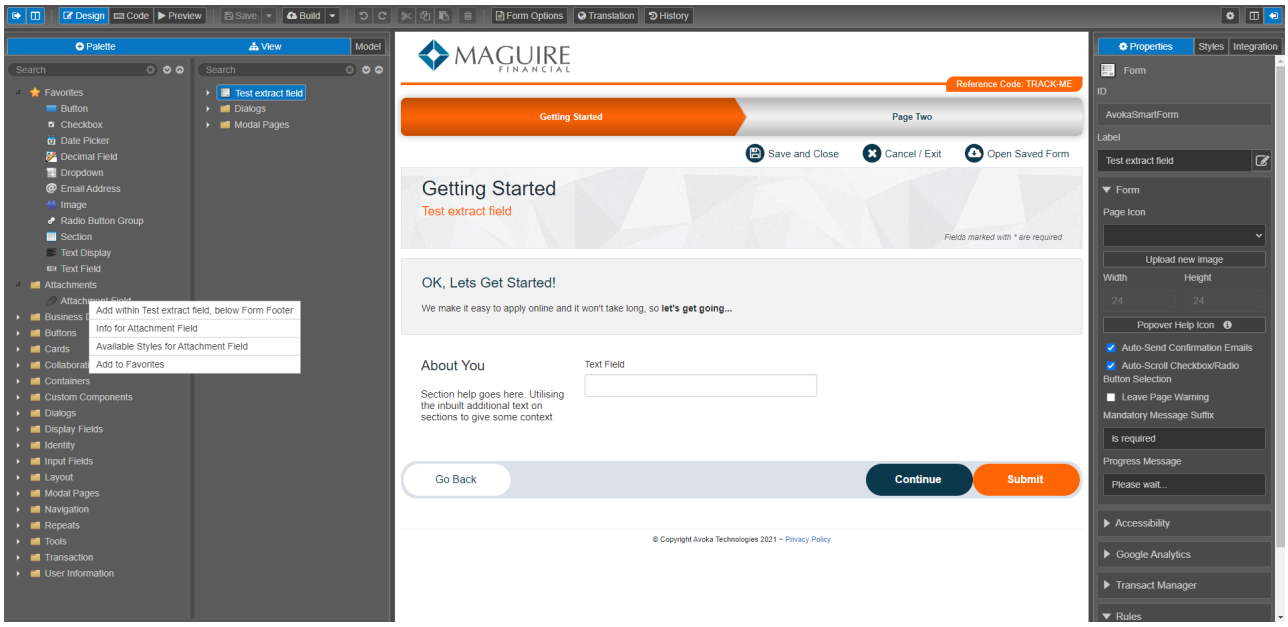
Palette Pane

The Maestro editor comes with the Palette pane that shows all available components you can use to build Maestro forms for different customer journeys. The components are Native, Custom Native, Shared Exchange components and they are listed by categories to help you find them easily. The components available to a design depends on the libraries available to that design's project and organization. The receipt design types has access to fewer components, as some components don't make sense to include in flat, uneditable documents.

> NOTE
>
> The Palette pane gets its name from its similarity to an artist's palette that contains a range of distinct colors that are used to create masterful pieces of art.

To view a form in the Palette pane:

1. Open a form or a template in the Maestro editor and click the Palette tab.



2. Find a component you need. Components are grouped by categories according to their functionality. You may need to use the arrow to expand a category to see all available components. Alternatively, type a part of component's name in the search box. Use the down and up arrows to expand and collapse the selected categories.

NOTE

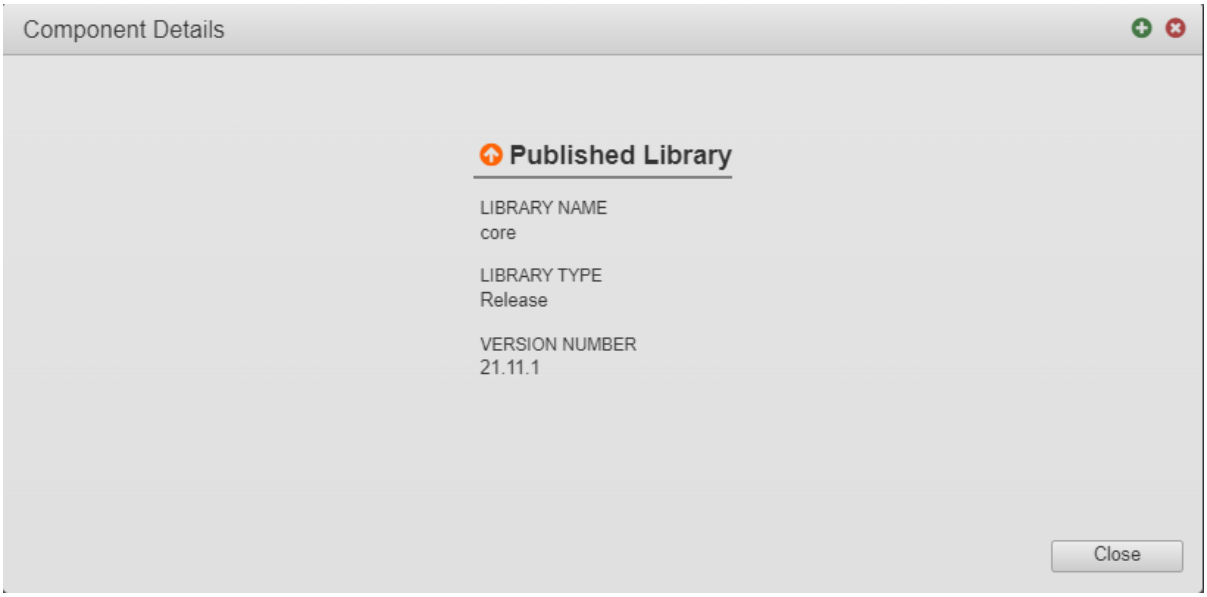
The list of displayed components may be different for different customers, or even different projects. This is because the Maestro editor might have been customized.

3. Right-click the component and select one of the following options:

NOTE

Some of these options are available when right-clicking a component in the View pane.

- Add below [COMPONENT NAME] to add the selected component into the wireframe, below whatever component is selected in the **View** pane.
- Add within [COMPONENT NAME], below [COMPONENT NAME] to add the selected component into the wireframe as the last child of whatever component is selected in the **View** pane.
- Info for [COMPONENT NAME] to view the following details of a library the component is published to:
  - Library name - core
  - Library type - release
  - Library version number - a major and minor versions of a library



NOTE

You can see additional details about components and their properties when you start using them in your design.

- Available Styles for [COMPONENT NAME] to view and modify the list of shared styles that the selected component can access to. For more information, see Make a Shared Style Available.
- Add to Favorites to add the regularly used component to the **Favorites** category for easy access.
- Remove from Favorites to remove the selected component from the **Favorites** category.
- Exclude from Palette to prevent the component from appearing in the **Palette** pane. This option is only available while editing a template. A Template Designer can control which components are available to a Form Builder by excluding them from or including them in the Palette.
- Include in Palette to add the component back to the Palette pane, if it has been previously excluded, see the option above.

4. Click Save to update the component's changes in the form or the template.

Next, learn about the view pane.

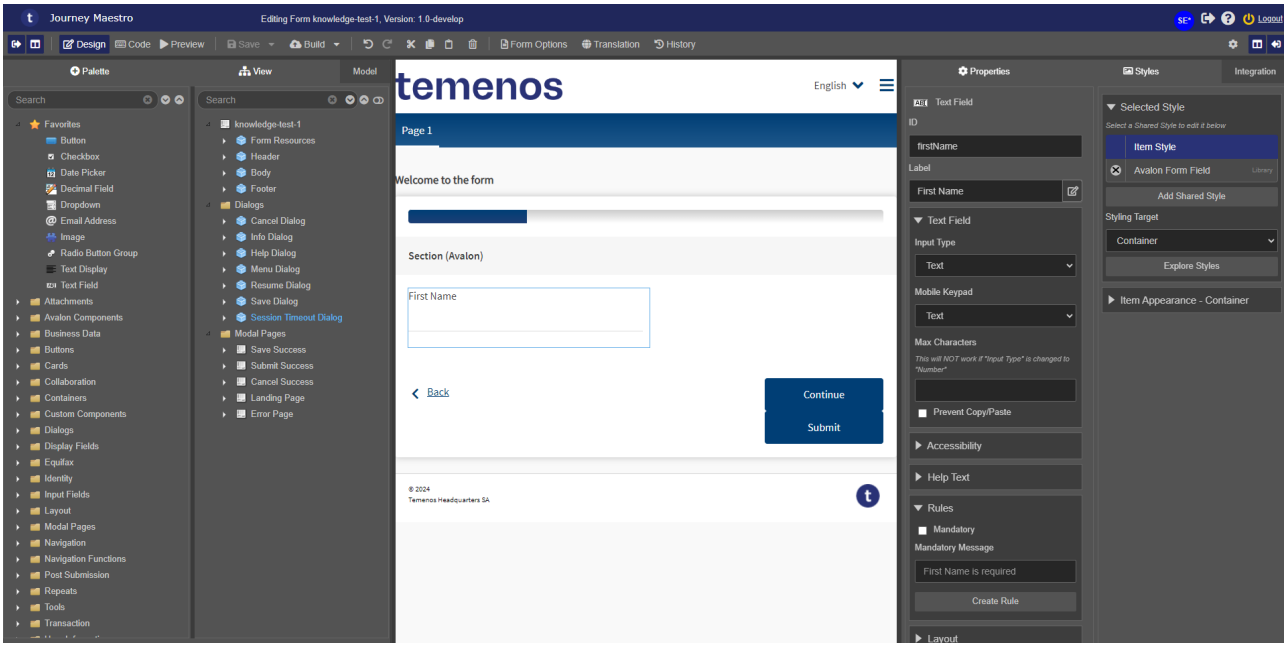
View Pane

The Maestro editor provides the View pane to visualize a selected component in a hierarchical list of the components used in the current design. The component list can be a more efficient way of navigating the structure of a design than working within the Wireframe. The hierarchy you see is determined by the form's template, so even if a Form Builder does not have permission to make changes to some components, the View pane always displays the dialogs and modal pages. This is handy in navigating through large forms.

> NOTE
>
> The Structure pane was replaced with the View pane. | 18.05 This feature was introduced in 18.05.

To view a design in the View pane:

1. Open a design, such as a form or a template, in the Maestro editor and click the View tab.



   The pane shows the structure of a design as a hierarchical tree of components. At a minimum, all designs have a root node, which is the parent to most other components in a design. In many designs, this root node is a Form component, however, it also depends on the extension points configured in the parent template.

Most design types also have a **Dialogs** and a **Modal Pages** directories containing corresponding components that sit outside the normal flow of the form and are therefore located outside of the root node. For more information, see Template's Components.

The table below explains which design types have a **Dialogs** and/or a **Modal Pages** directorys:

Design Type	Dialogs	Modal Pages
Forms		
Components		
Templates		
Receipts		

2. Expand a component's hierarchy to see its child components. For example, expand knowledge-test-1 > Body > Content > Form > Page 1 > Section (Avalon) > First Name.
3. Select each component to see where it is positioned on your page - it will be outlined with a blue box. In this example, select First Name to get it outlined in Section (Avalon). The Maestro editor automatically locates the selected component in the Properties pane. In this case, it's a Text Field component with an ID as `firstName`.
4. Move components from one location to another by dragging and dropping them within the hierarchy.

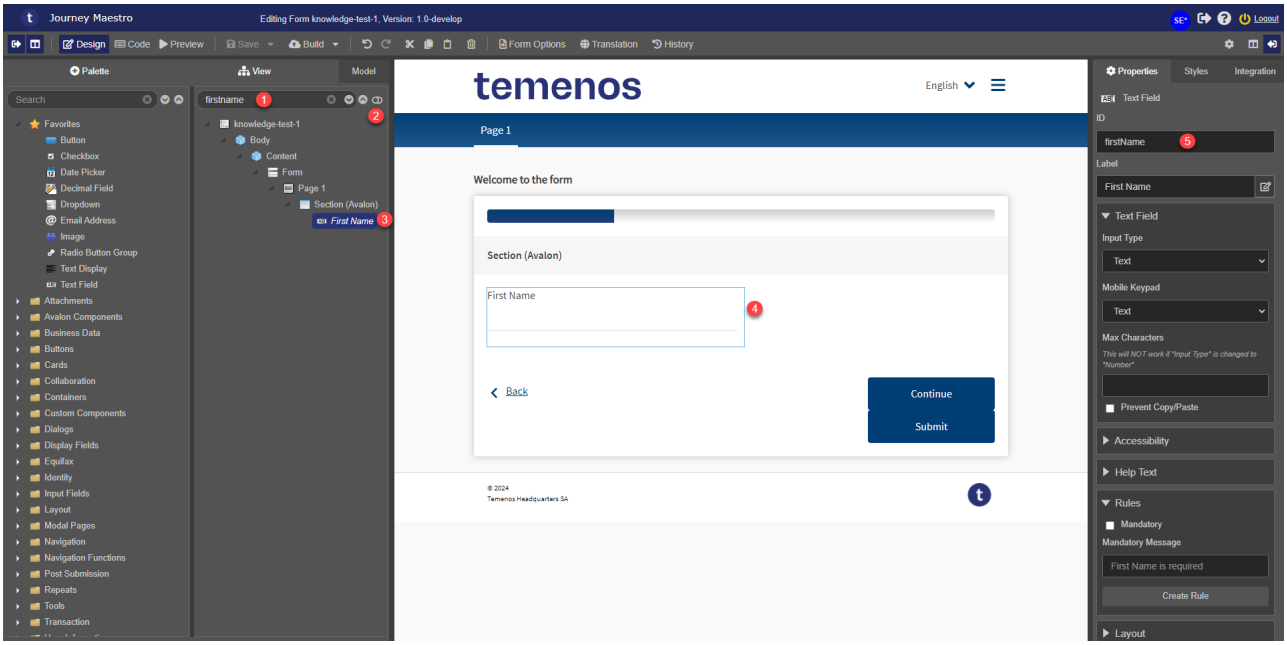
   NOTE

   Some component types must be contained within other component types. For example, a Page can't exist underneath a Dropdown. The Editor will prevent you from moving or creating components under the incorrect parent.

5. Select multiple components by using the keyboard keys SHIFT or CTRL and then apply a required operation to the selection, for example, drag and drop them:
   - To arrange components within the hierarchy, drag and drop them.
   - To select multiple, non-sequential components, hold the CTRL key.
   - To select multiple, sequential components, hold the SHIFT key.
6. Type a component ID or a label name of a component you are looking for in the component hierarchy and press `Enter`. Maestro will search the tree of components comprising the design and display the found component in the tree using labels or IDs depending on a toggle button status, which can be one of the following:

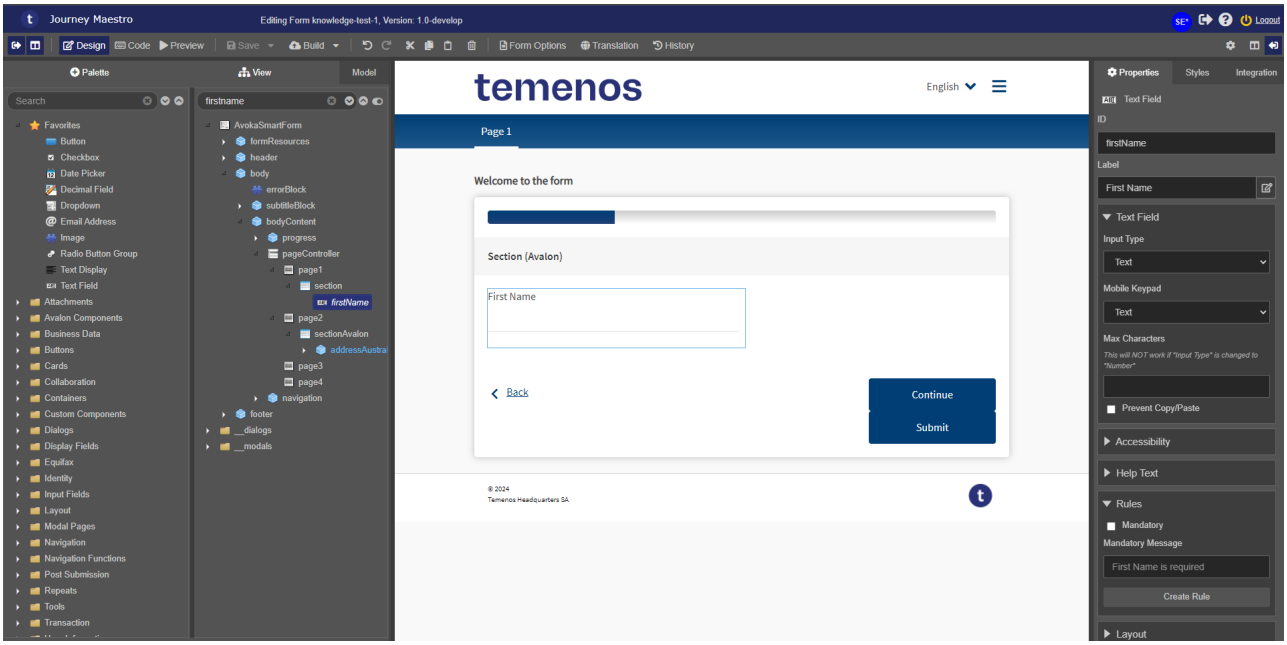
- Use Label - default
- Use ID

| 24.04 This feature was introduced in 24.04

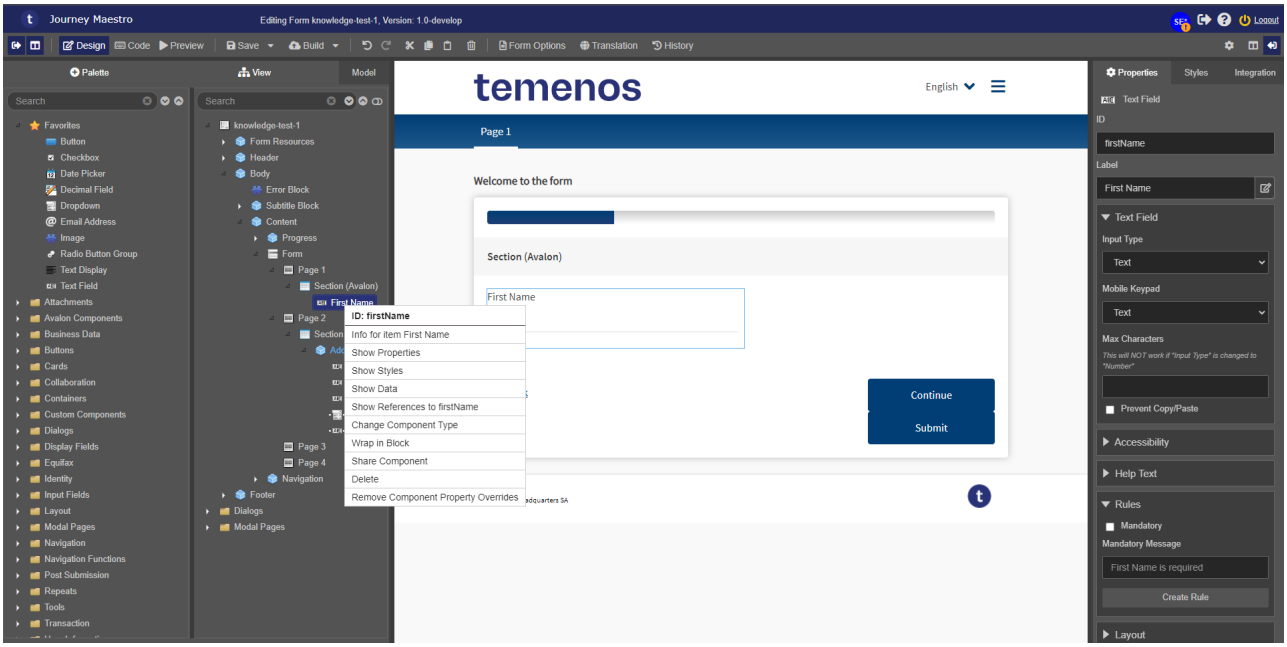


1. Search by a label or an ID.
2. Toggle Use Label or Use ID.
3. A component found by its ID.
4. Same component outlined in the Wireframe.
5. The component's ID shown in the Properties pane.

Toggle Use ID to search with and view the component's hierarchy of component's IDs.



7. Right-click a component and select one of the following options:



- Info for Item [COMPONENT NAME] - to view details about a library the component is published to and the component's properties.
- Show Properties - to open the Properties pane for the selected component.
- Show Styles - to open the Styles pane for the selected component.
- Show Data - to open the Integration pane for the selected component.
- Show References to [COMPONENT ID] - to view references to the selected component, such as references inside rules or labels.

- Change Component Type - to change the selected component to a different component type.
- Wrap in Block - to create a block component and insert the selected component into the block.
- Set as extension point - to add an extension point to the selected component.

  NOTE

  This option is shown for templates only.

- Share Component -to publish the selected component
- Apply Shared Styles to every [COMPONENT NAME] - to apply a customized template's component style to all forms using this template.

  NOTE

  This option is shown for templates only. However, you can apply a shared style to a component at the form level, but it's not a recommended approach.

- Apply Properties to every [COMPONENT NAME] - to apply a customized template's component property to all forms using this template.

  NOTE

  This option is shown for templates only.

  NOTE

  This option only doesn't apply to id, label, rules or layout.

- Delete - to remove the selected component.
- Put on Previous Row - to place the selected component at the end of the previous row. The component will be marked with the Line-Through on both sides of the icon. You should use this option to position several components side by side to each other, for example, 2 text fields next to each other.

  NOTE

  To undo this, drag the component in the design tree to a different position.

- Remove Component Property Overrides - to remove the property override.

  NOTE

  This option doesn't apply to rules, styles and the property's exclude flag.

  NOTE

  You can remove component property overrides using the Component and Property Source dialog.

When editing a template, additional options are available in this menu:

- Set as extension point adds an extension point to the selected component.

Some options are only available if you right-click specific components:

- Add Page Group
- Add Page
- Add Icon Button

If you right-click the **Dialogs** directory, a context menu with an **Add Dialog** option appears.

If you right-click the **Modal Pages** directory, a context menu with an **Add Modal Page** option appears.

8. Click Save to update the component's changes in the form or the template.

Icons

All components have an icon associated with them. These icons are not necessarily unique, but they do make it easier to grasp the structure of a design.

Additional icons are used within the **View** pane to communicate certain behavior. Depending on come component configuration, layout orientation and level of editability to you, an icon can change its background or have additional elements added to it. The list below summarizes these changes:

Icon	Label	Description
	Unlocked	An extension point has been set on this component. This icon will only appear while editing a template.
	Locked	An extension point is preventing you from configuring this com-

Icon	Label	Description
		ponent.
	Line-Through	A component is laid side-by-side with the previous component, meaning it is on the same row as a component above it. For more information, see the Put on Previous Row option.
	Right blue text	A locked down component defined in a form or template, which means you can't add a new field before an existing field inside the component. If you try, the `Can't put an item before a predefined child of a composite block` error is shown.
	Bold text	A child of a component. For example, the Address Block - Info component has the Info Block Image and Block components as a children components. This is shown below: 
		You are not allowed to add a new component to this locked component.
	White text	An open component, which allows you to add a new field before an existing field inside the component. It also indicates that the component has no children in it.

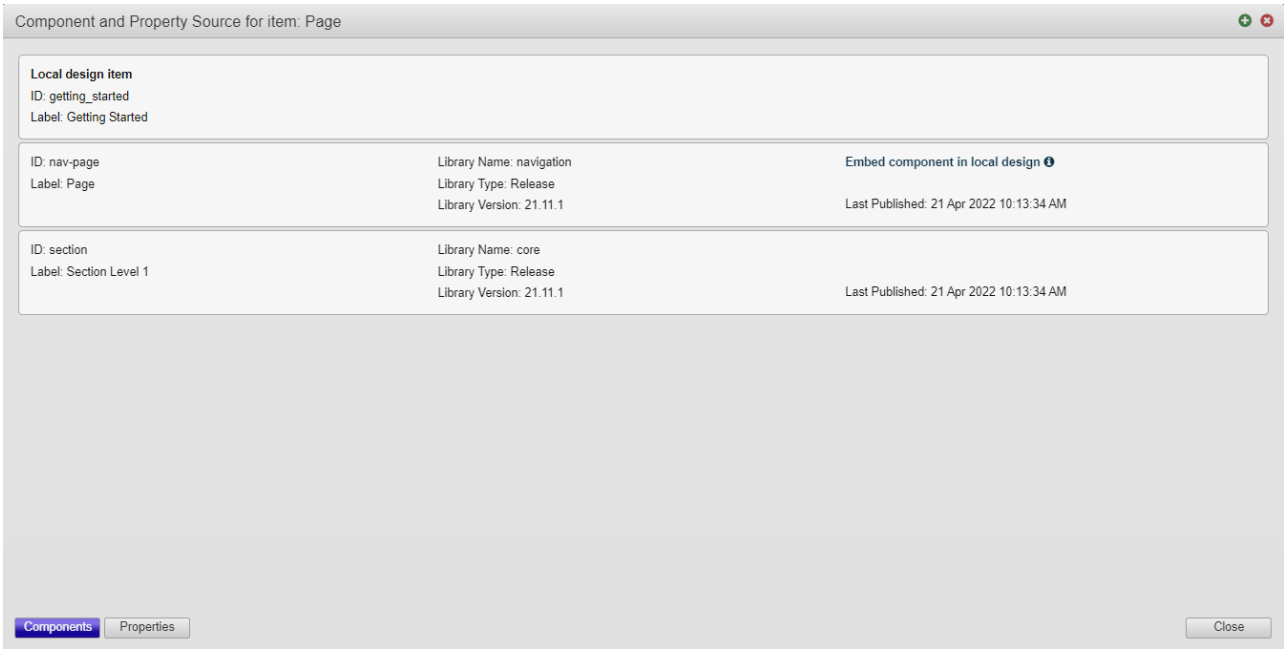
Next, learn about the Model pane.

View Component and Property Source

The Maestro editor allows you to view details about a library where a component is published to and the component's properties. This is handy to understand the component inheritance and properties' source, especially when you create or use shared components.

To view details about component and its properties' source:

1. Open a form or a template in the Maestro editor and click the View tab.
2. Right-click a component in the Wireframe or in the View pane and select Info for Item [COMPONENT NAME].
3. Select Components to see a library or a list of libraries where the selected component is published to.



In this example, we have a local item called getting_started that is a Page component, which is inherited from the nav-page item that is the Page component published in the navigation library. This component in turn is inherited from the section item that is the Section component.

Click Embed components in local design to add a component to your design. This will keep all the properties, rules and styles from the component the same as if you had added and set these properties in the form. This can be used on components shared from a form or built in the Maestro editor. If the option is not present, then this is a native widget which cannot be embedded as they would not be able to function correctly. One use for this is to

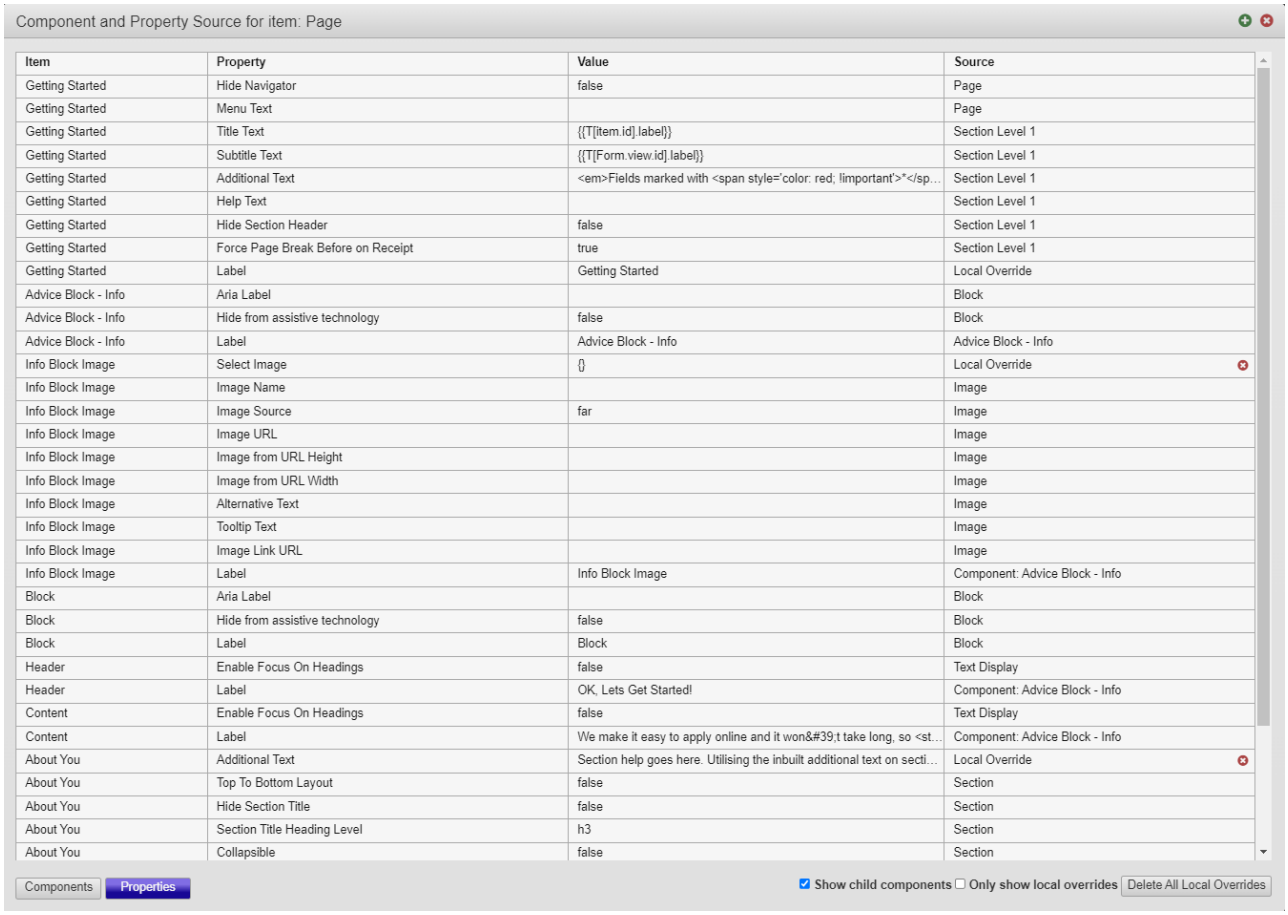
add a block to your form but need to re-arrange the order of the included fields or add new ones then embedding removes this restriction and you can move the fields around.

4. Select Properties to view the list of properties used in the selected component, their values and the source.



In this example, you can see that the Getting Started components has 9 properties, with 2 properties coming from the Page components, 6 properties are from the Section Level 1 component and the Label property is a local override.

5. Select the Show child components checkbox to list the child components.



NOTE

Use View pane to see the child components in the hierarchy.

6. Select the Only show local override checkbox to list only local override. Local overrides are changes to properties and rules in this design from the original widgets. This can be used in components and templates so local overrides will take precedence over changes to the original component.



7. Click Delete All Local Override to remove all local override or click the red cross icon against each property to remove the local override. When you do this, you will restore the properties and rules to the same values as if you dropped in the component from the palette.
8. Click Close.

Next, learn about the Model pane.

Model Pane

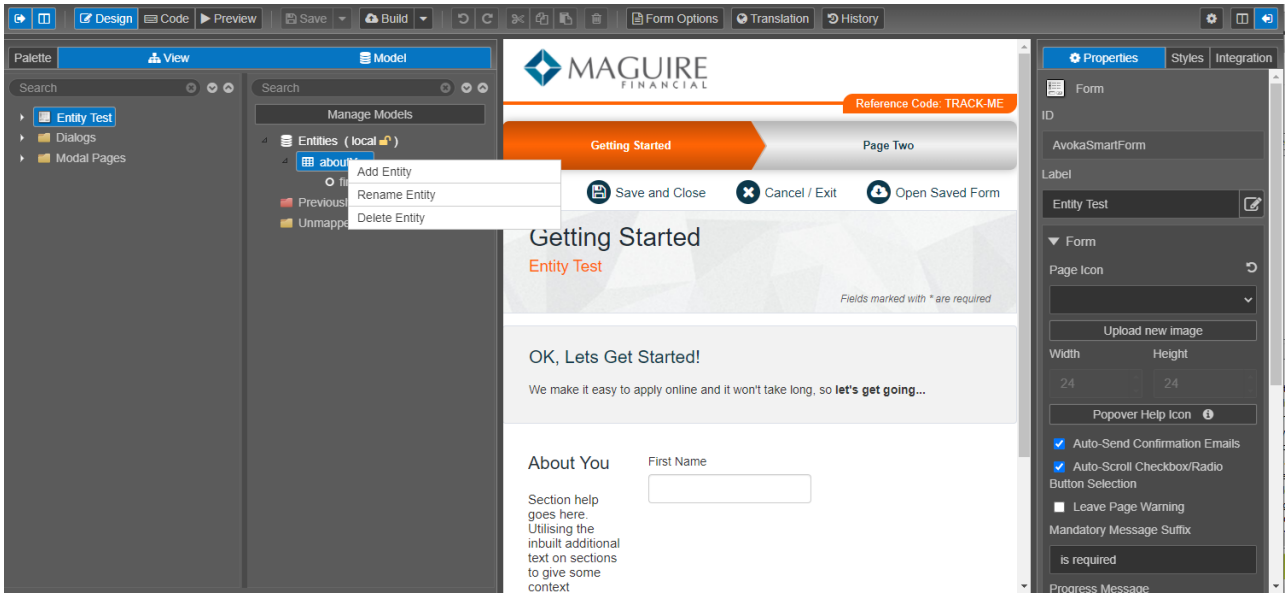
The Maestro editor comes with the Model pane that shows the hierarchical logical structure of a form, consisting of form's components, as their corresponding entities that make up a domain model. The domain model allows you to manage entities and their properties easily.

To view a form in the Model pane:

1. Open a form in the Maestro editor and select the Model tab to see the data elements and their properties that are bound to components, identified by component IDs.

   NOTE

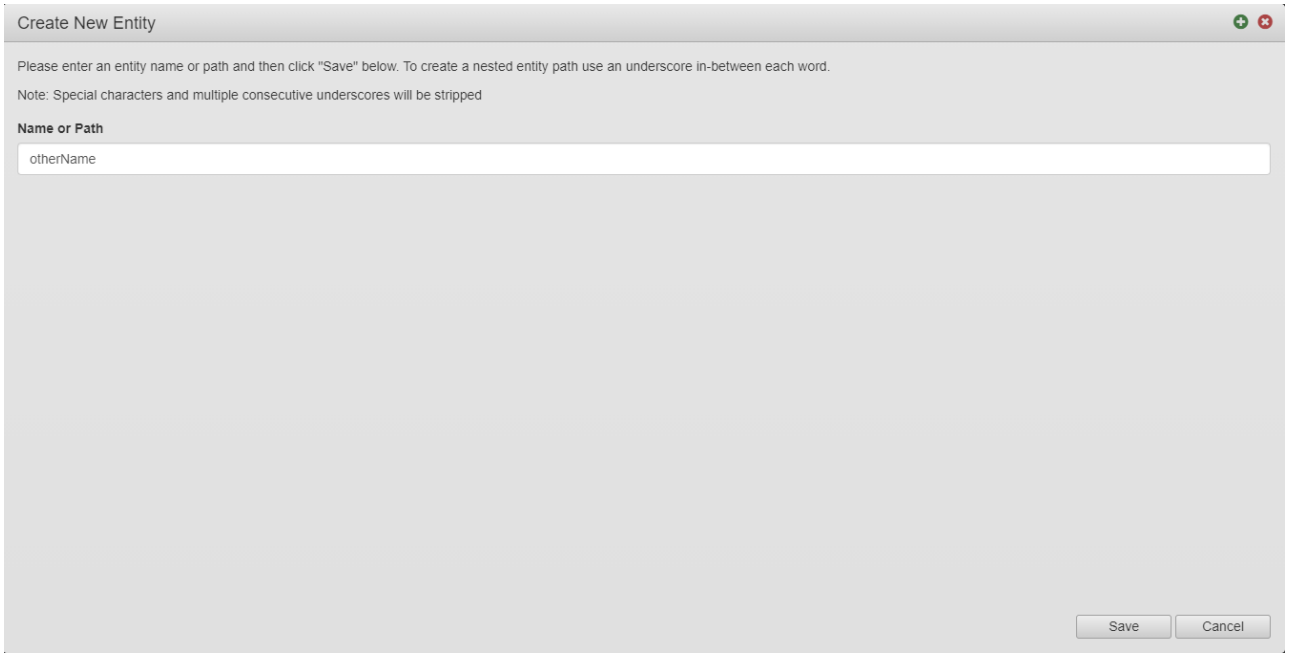
   The Model tab was called the Entity tab in Maestro prior to 18.05.



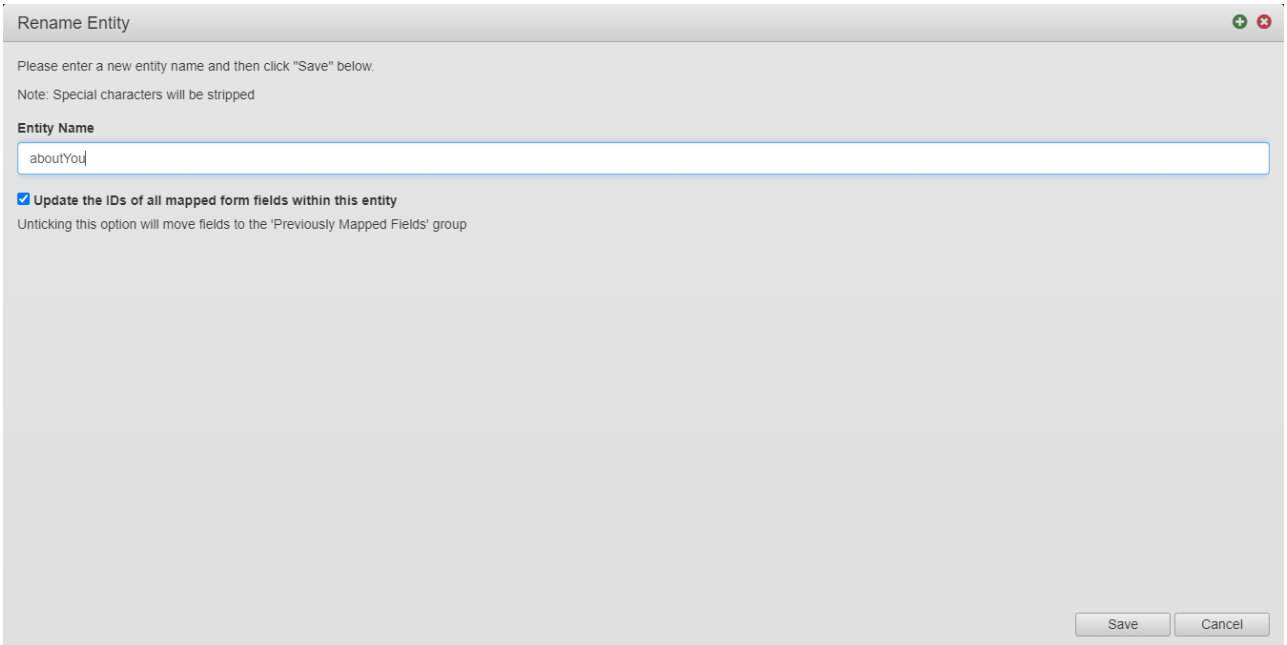
   The Mode pane is broken down into the following sections:

   - The Entities item displays the entities and properties that are defined in the selected form. The name local means that the schema is defined in this form and the open lock implies you can edit the data model. When a domain model is shared, the lock icon changes from open to locked. Any new entities created in a shared (locked) domain model will not be mapped or shared with other forms and libraries.
   - The Previously Mapped Fields item displays components that have previously been mapped to entities but are not mapped in the current domain model.
   - The Unmapped Fields item displays components that are not associated with an entity.

2. Type a entity name in the Search field to look for the entity, which is handy when you have many components in the tree.
3. Expand the Entities section to see any entities configured for this form. If there are no entities in the list, right-click the Entities section and click Add Entity to create one.

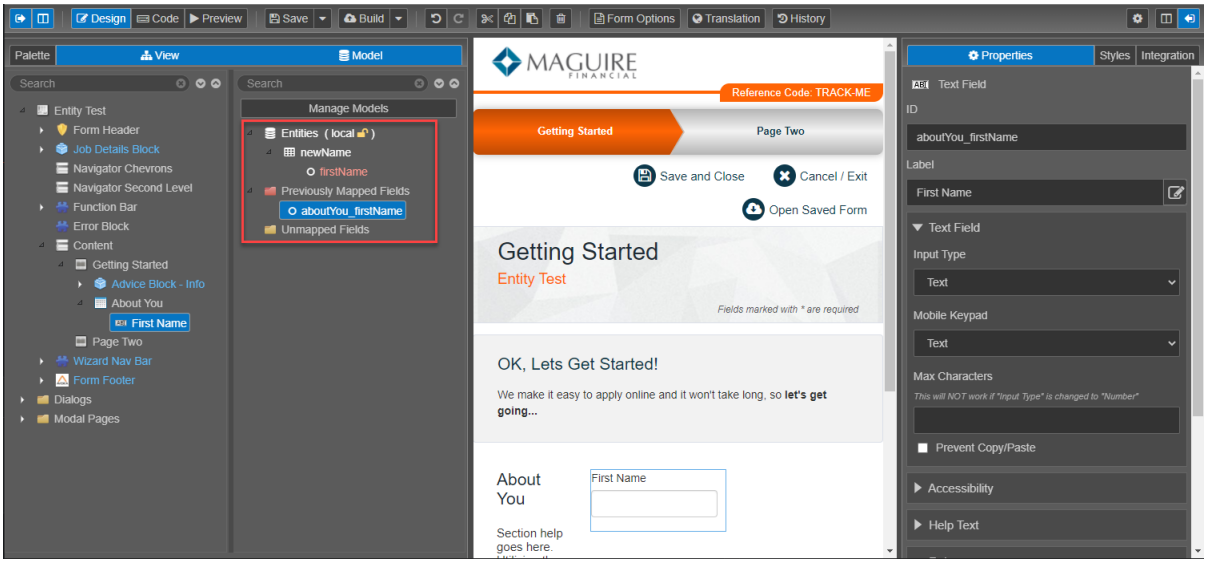


4. Right-click a selected entity and choose Add Entity to create a new entity.
5. If an entity has a property, right-click the property and select Rename Property to rename it or Delete Property to remove it.
6. Right-click a selected entity and choose Rename Entity to rename an entity. | 21.05 This feature was introduced in 21.05.



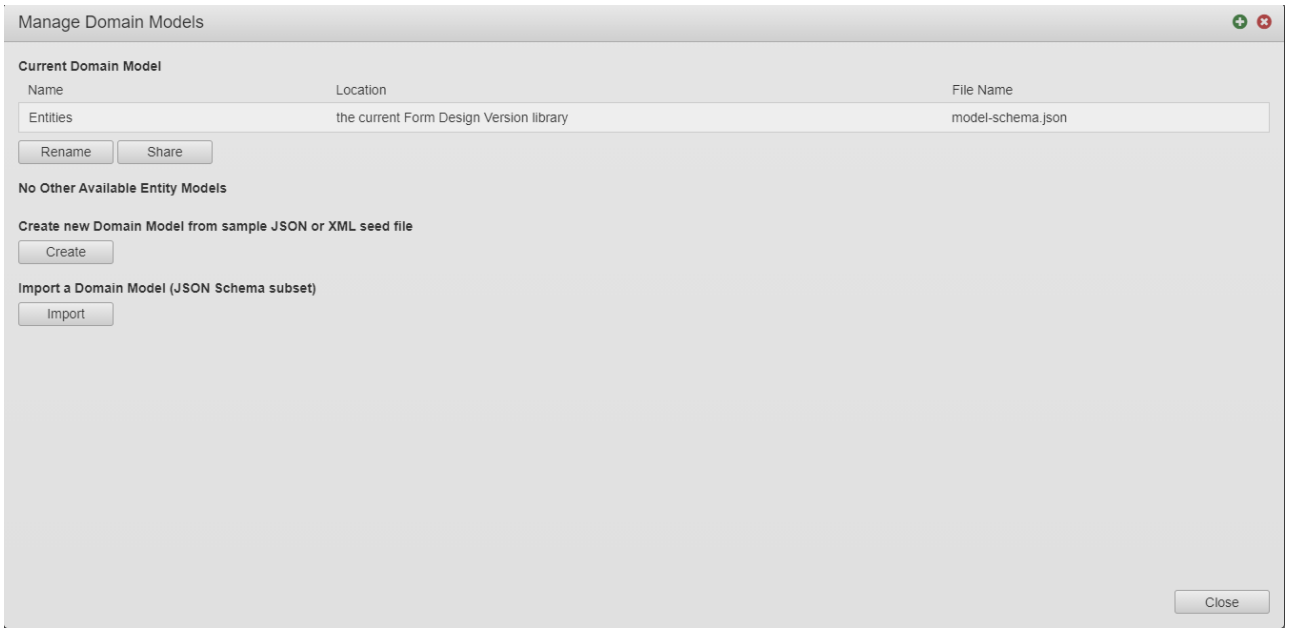
- Provide a new entity name in the Entity Name field.
- Select the Update the IDs of all mapped fields within this entity checkbox to automatically change the ID of the mapped form field (if there is one). If you select this option, the First Name field, as shown above, automatically has it's ID changed according to the new entity name.

  If you clear this option, then the entity name is changed, but the ID of the First Name field is not changed and the field appears in the Previously Mapped Fields section in the entity tree, as shown below.

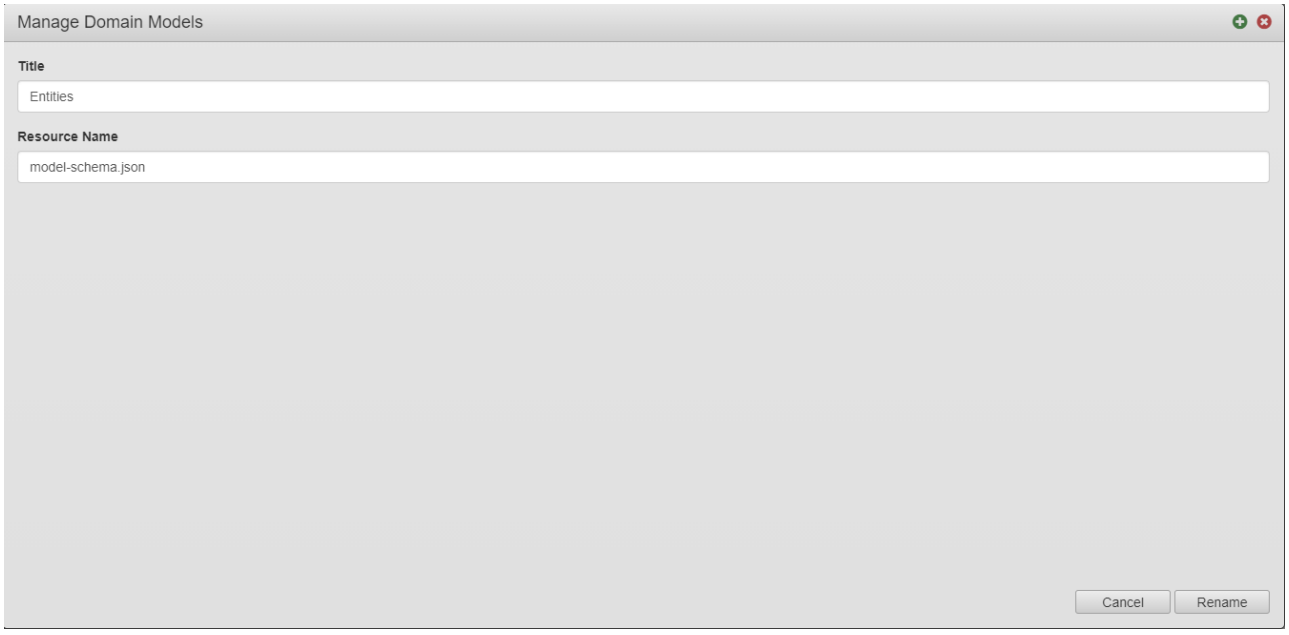


- Click Save.

7. Right-click a selected entity and choose Delete Entity to remove an entity.
8. Click Manage Models to modify the form's model.



9. Click Rename to change the name of the model.



   - Enter a new name in the Title field.
   - Provide a new unique JSON file name in the Resource Name field. Default is `model-schema.json`.
   - Click Rename to update the model.
10. Click Share to share this form's model.



11. Click Create to create a new domain model for your form.
12. Create Import to import an existing domain model as a JSON or XML file.

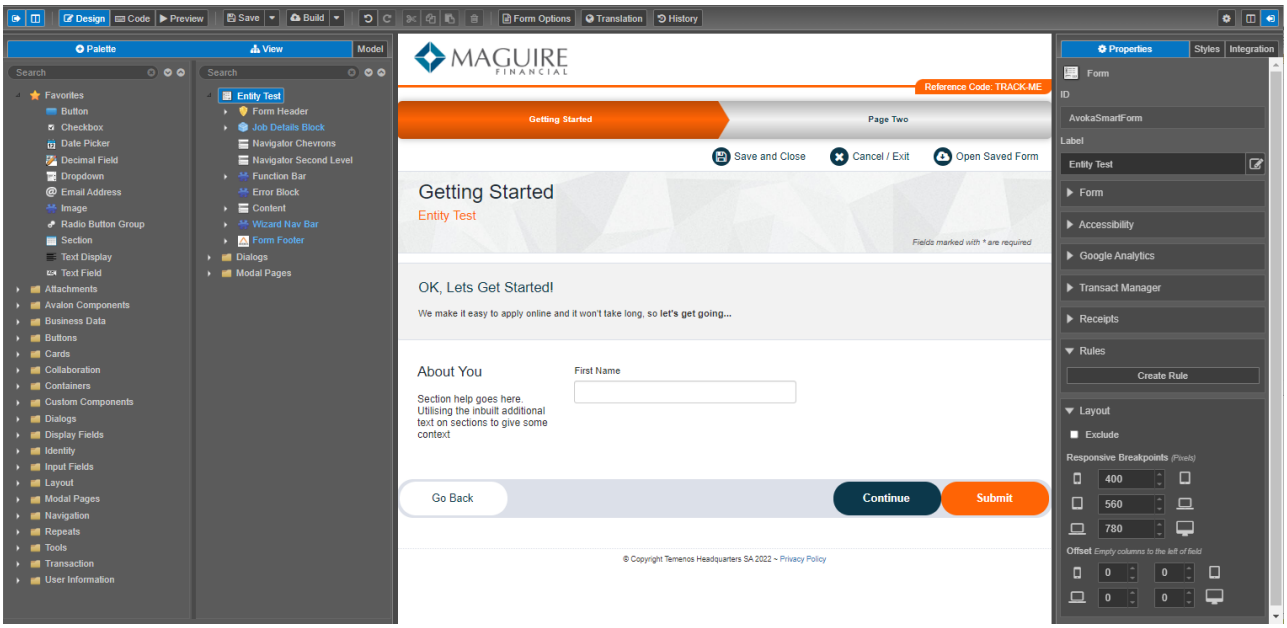
Next, learn about the Properties pane.

Properties Pane

The Maestro editor comes with the Properties pane that allows you to check and modify properties of a selected component. This is where you adjust a component's behavior by updating its properties. Different components have different sets of properties, so the Properties pane dynamically shows them as you select each component.

To view and edit component's properties in the Properties pane:

1. Open a form or a template in the Maestro editor.
2. Select a component and click the Properties tab.



   Every component has its own set of unique properties, which you can check here. However, all components have the following common properties:

   - ID
   - Label
   - Rules
   - Layout

3. Find a property you need. Properties are grouped by related settings so you may need to use the arrow to expand the group to see all available options.

4. Right-click the property field and select one of the following options:

   NOTE

   These options are only available when you edit a template.

   - Add to Brand Options to add the property to a brand.
   - Remove From Brand Options to remove the property from a brand.

     NOTE

     You can only see this option if the property has been added to the brand.

   - Add to Form Options to add the property to Form Options.
   - Remove from Form Options to remove the property from Form Options.

     NOTE

     You can only see this option if the property has been added to Form Options.

   You can also see the additional information about a selected component:

   - Item - for example, Item: Dropdown
   - Property - for example, Property: Add Blank Value
5. Click Create Rule to open the Create Rule dialog to choose a business rule to apply.

   NOTE

   A few specialized components can't have rules added to them, so you won't see the Rules category or any rules displayed in the Properties pane.

6. Expand the Layout section to arrange components on the form according to your device's or browser's screen sizes. For more information, see component layout.
   - Select the Exclude checkbox to exclude the selected component from the XML as well as from the published form so it won't be present in the HTML form.
   - Select the Hide Label to hide or show a component label. Most components should have a label, but sometimes you may want to hide the label from an applicant on a form.
   - Select the Label Placement Left checkbox to change label location to the left. For the sake of usability, labels should generally be placed above input fields. This is how

Maestro's components are configured by default. You can, however, change the placement of a label to the left of an input field. This is typically done on receipts as a way of saving space. For more information, see component labels.

7. Click Save to update the component's changes in the form or the template.

NOTE

You have more control over a component's appearance via the Styles pane.

Next, learn about the Styles pane.

Styles Pane

The Maestro editor comes with the Style pane that allows you to modify the appearance of a component. Although a template used in a Maestro form enforces the majority of the styles, you can use this pane to add minimal modifications to the visual look and feel of forms and components.

Form Builders should not use the Styles pane often, if ever. In most cases, Template Designers manage all styling in the template as it can get complicated. You should always speak to the Template Designer before making any styling changes.

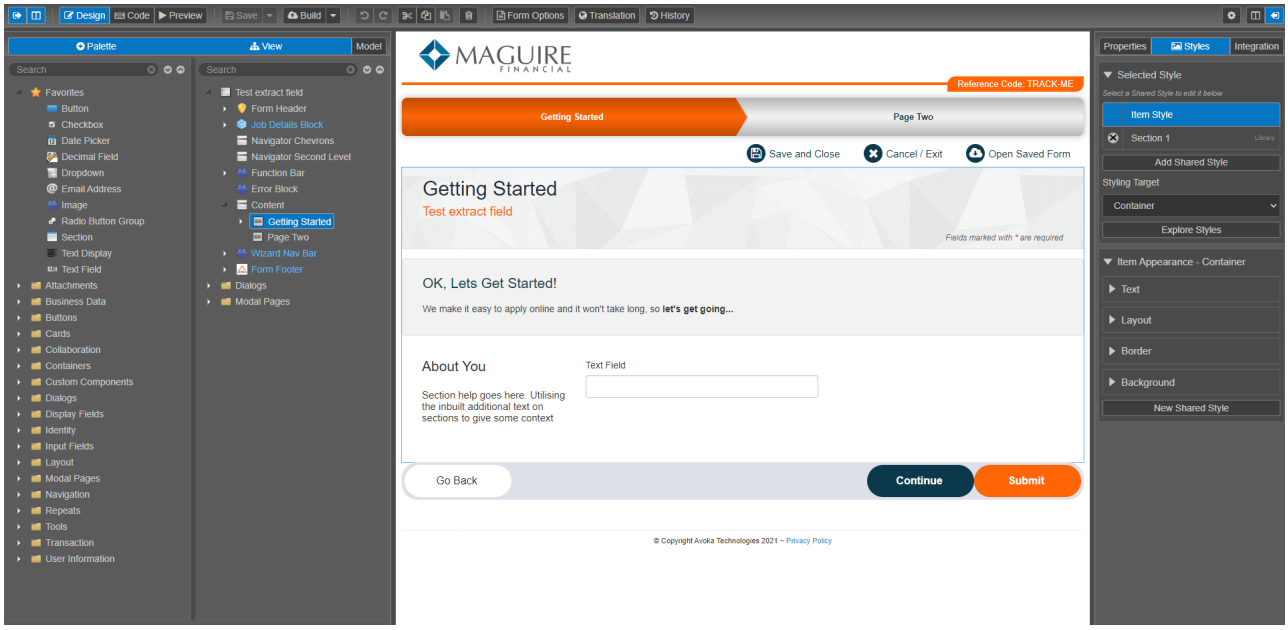
For example, you can apply multiple shared styles and item styles to a particular component. What happens if one of these styles defines the label to be red, and another defines it to be blue? What color will be chosen?

The answer is that the styles will be applied in the order that they are defined in the master stylesheet that is maintained by Maestro. Any style setting that is applied after a previous one will overwrite the previous one. You can't control what order the various styles will appear, except that the item style will always override any shared style settings. Maestro comes with the Explore Styles functionality that allows you quickly find out what the effective style of a component is and in which order CSS is arranged.

Styling uses CSS and LESS, so you should be fairly familiar with the concepts to create effective and reusable styles. For more information, see https://www.w3.org/Style/CSS/learning.

To view and edit component's styles in the Style pane:

1. Open a design in the Maestro editor and select the Style tab.

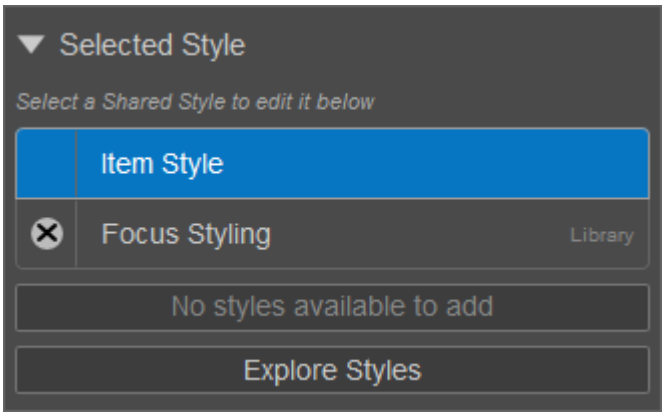


2. Find a style you need to modify. Styles are grouped by related settings so you may need to use the arrow to expand the group to see all available options.
3. Click Save to update the component's changes in the form or the template.

Main Style pane functionality is described in details below.

Selected Style

A list of styles applied to the component appears beneath the **Selected Style** heading.



The first style in this list - **Item Style** - is unique to the selected component and can only be modified via the GUI (using the controls under the **Item Appearance - Container** heading).

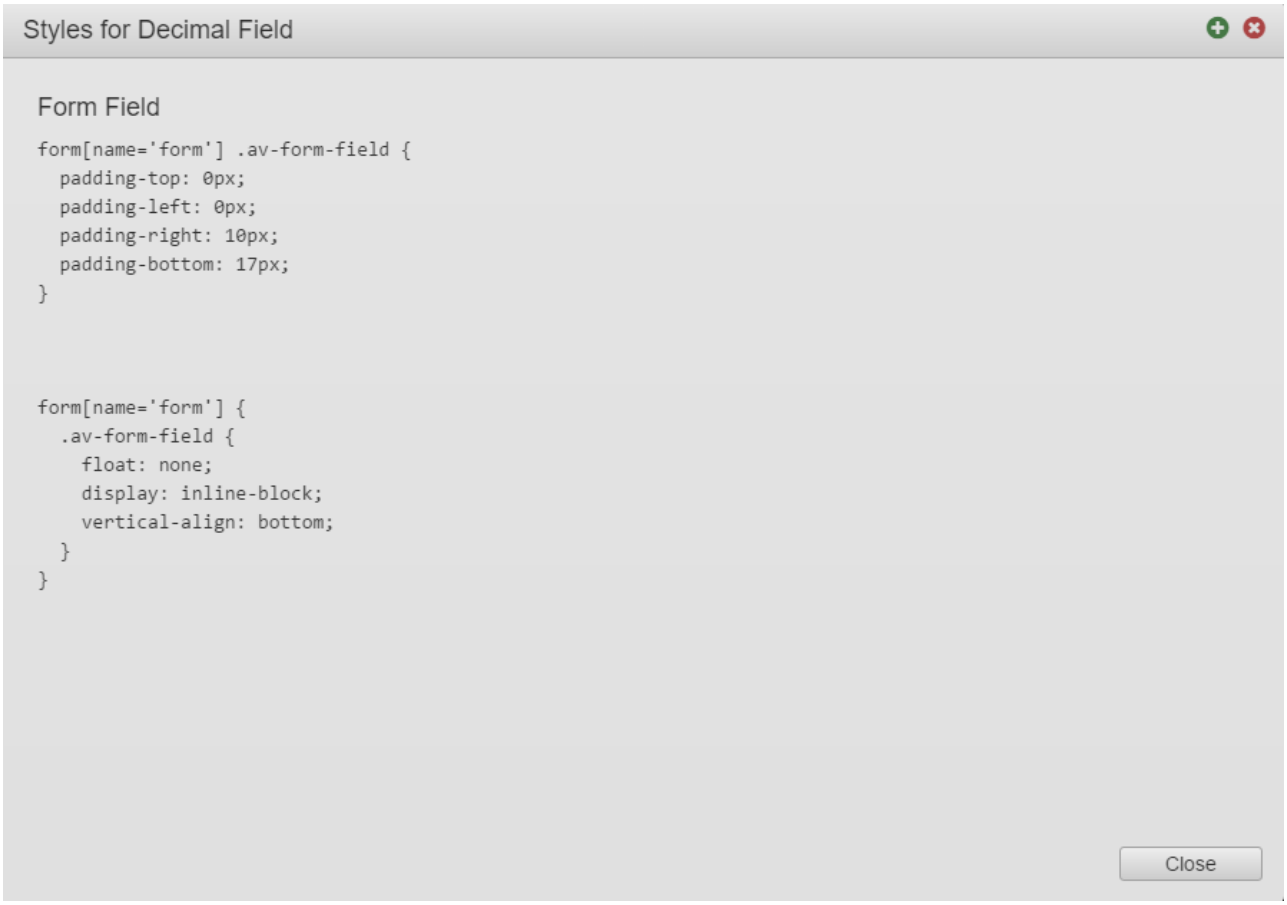
All other styles that appear in this list are shared styles. These are styles that can be used by multiple components and edited as CSS[1] or via the GUI. You always, however, have more control when editing the CSS file.

Beneath the list of styles, the following options are available:

- Add Shared Style - Add an existing shared style to the component. The styles in this list depend on the available component styles.
- Explore Styles - View the CSS and LESS[2] for all of the component's styles, which is the effective CSS for the component. This read-only view is especially useful for Template Designers to quickly check what styles are applied to the selected component.

[1]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form's display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form's assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

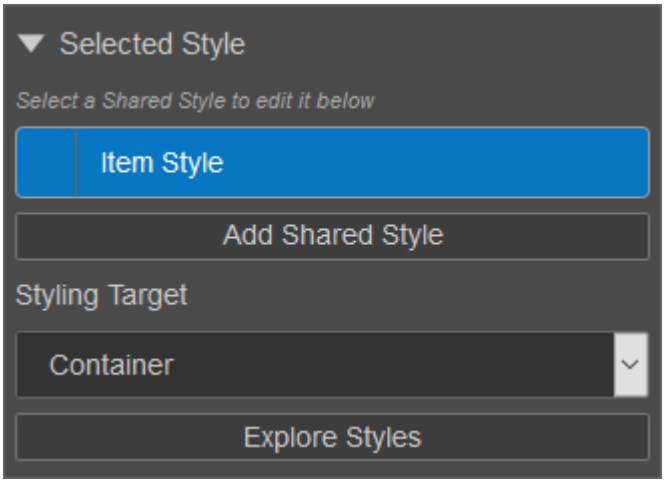
[2]LESS is a dynamic preprocessor style sheet language that can be compiled into Cascading Style Sheets (CSS) and run on the client side or server side.



- Apply to Receipt Only - If enabled, the selected style will only be applied to the component when it's rendered within a receipt.

Styling Target

When a component has multiple styling targets, an additional **Styling Target** property is shown:



This option allows you to adjust the style of an individual part of a component, such as the label of a Text Field component or the input of a Dropdown.

Even the simplest components in Maestro have a reasonable level of complexity. For example, the simple Text Field component consists of three separate parts.

- Label - which is simply a piece of text
- Input - which is the area into which you can type
- Container - which simply groups all elements into one

These separate parts are known as Targets, and you can style each of these separately.

Once you have selected one of these Styling Targets, you can use the Style settings to specify the Styles for each target separately.

For example, the following example shows a Text Field where the Border Style has been set for different targets.

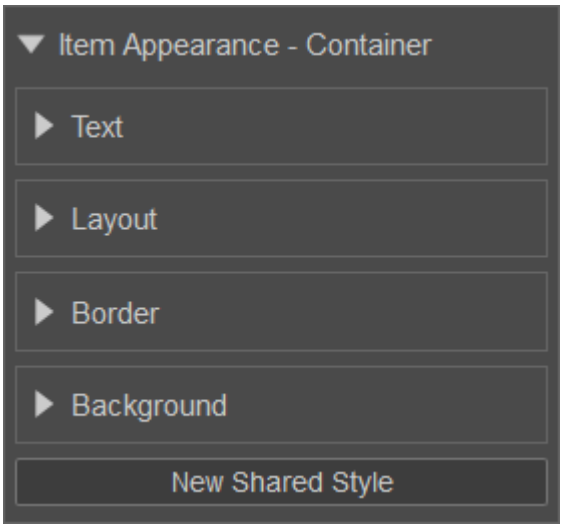
- Container - Border color set to Blue
- Label - Border color set to Red
- Input - Border color set to Yellow



Different types of components will have different targets, and you may need to experiment to understand which target affects which part of the component. Using the border settings, as shown above, can help to identify the different parts of the component. Alternately, you can also look at a form containing that component type in your browser and use the browser "Inspect" function to understand the structure of the component.

Normally, when you click on a component and start modifying its style, you are changing the Item Style, which is the styling for just that one item on the form. This is fine when you want to change the styling of just that one field. However, if you want to create a whole lot of components that all look the same, and you want these to be used consistently, then you need to create a shared style.

Item Appearance - Container



By default, the section that appears beneath the **Selected Style** section is called **Item Appearance - Container**. The first part of this heading refers to the currently selected style -- by default, **Item Style** -- and the second part of the heading refers to the styling target -- by default, the **Container** target.

If you select a different style from the **Selected Style** list, or select a different option from the **Styling Target** dropdown, the name of this section will change.

In addition to this, certain buttons will appear at the bottom of this section when certain conditions are met:

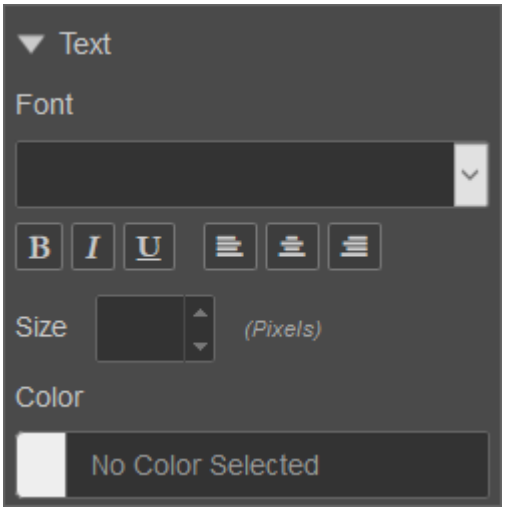
Label	Description
New Shared Style	Appears when an Item Style is selected.
Edit Custom CSS	Appears when a Shared Style is selected. For more information, see edit custom CSS.
Save to Shared Style	Appears when the selected style has been modified via the GUI. This is often the case for forms that use a template with one or multiple brands.
Clear Item Styles	Appears when the selected style has been modified via the GUI.

The Style Editor has many of the standard CSS properties without needing to understand the details of CSS. It allows you to specify styles using the following four options:

- Text. Allows you to specify attributes of text, including the Font or Typeface, bold, italics and underline orientation (left, center or right), and size and color.
- Layout. Allows you to specify the layout of the element within its bounding rectangle. This includes internal padding, and minimum and maximum heights and widths.
- Border. Allows you to specify the border (if any), style of line, width, and color, and the radius of the corner.
- Background. Allows you to specify the background color, either as a flat color or a blend, or to specify an image. It also allows you to specify the alpha transparency.

These options are always visible.

Text



Under the **Text** heading, the following properties are available for adjusting the text in the selected style:

Label	Description
Font	
Size	
Color	

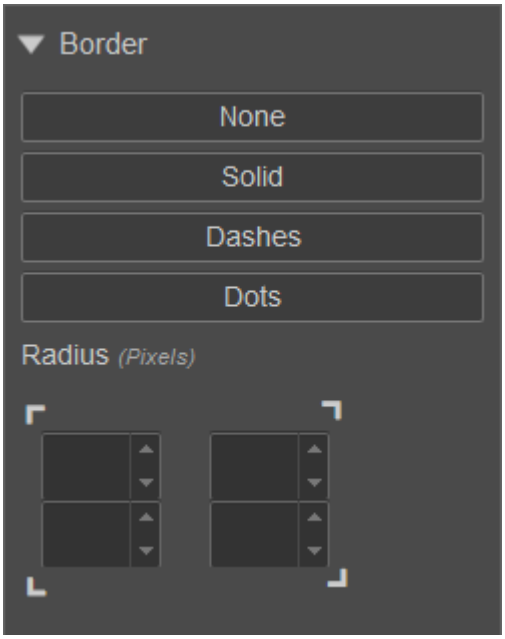
Layout



Under the **Text** heading, the following properties are available for adjusting the layout of the selected style:

Label	Description
Padding	
Min Height	
Max Height	
Min Width	
Max Width	
Vertical Alignment	

Border



Under the **Text** heading, the following properties are available for adjusting the border of the selected style:

Label	Description
Type	
Radius	

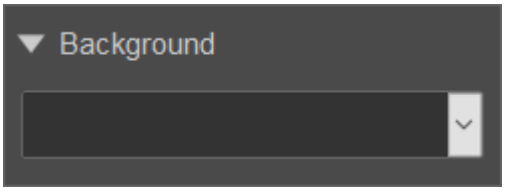
Background

Under the **Background** heading, there's a dropdown with the following options:

- (EMPTY)
- None
- Solid
- Left to Right
- Top to Bottom
- Image

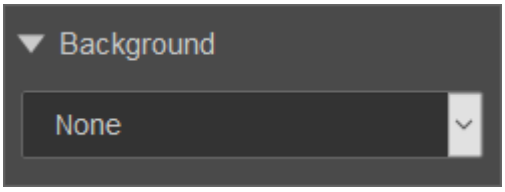
Depending on which option is selected, different properties will become available that affect the background of the selected style.

By default, the dropdown is empty:



In this state, a background will not be applied to the selected style. If a background has been applied by a different style though, it will continue to appear.

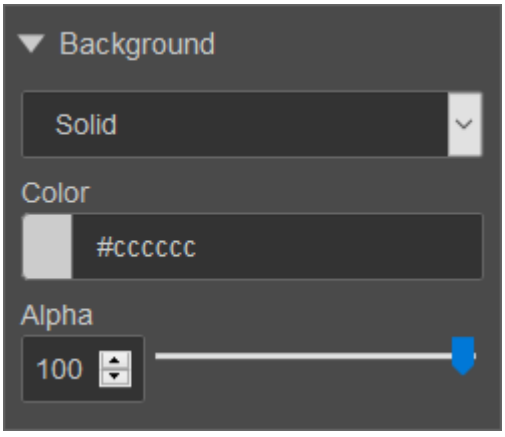
If you select **None**, any existing background on the selected style will be removed.



If you select **Solid**, a solid background color will be applied to the selected style.

The color is defined by two properties:

Label	Description	Default Value
Color		#cccccc
Alpha		100

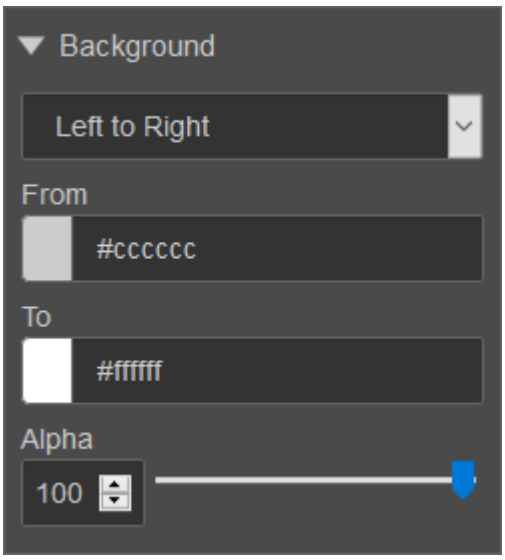


If you select **Left to Right**, a left-to-right gradient background will be applied to the selected style.

The gradient is defined by three properties:

Label	Description	Default Value
From		#cccccc

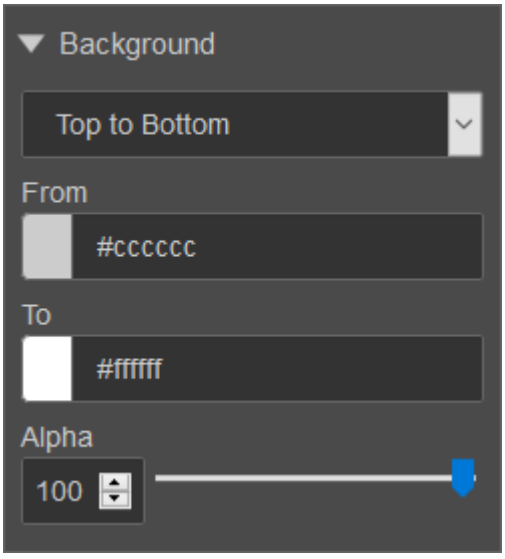
Label	Description	Default Value
To		#ffffff
Alpha		100



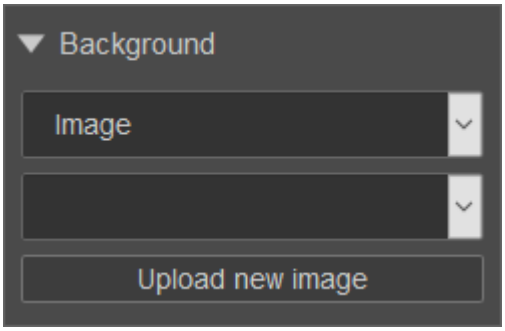
If you select **Top to Bottom**, a top-to-bottom gradient background will be applied to the selected style.

The gradient is defined by three properties:

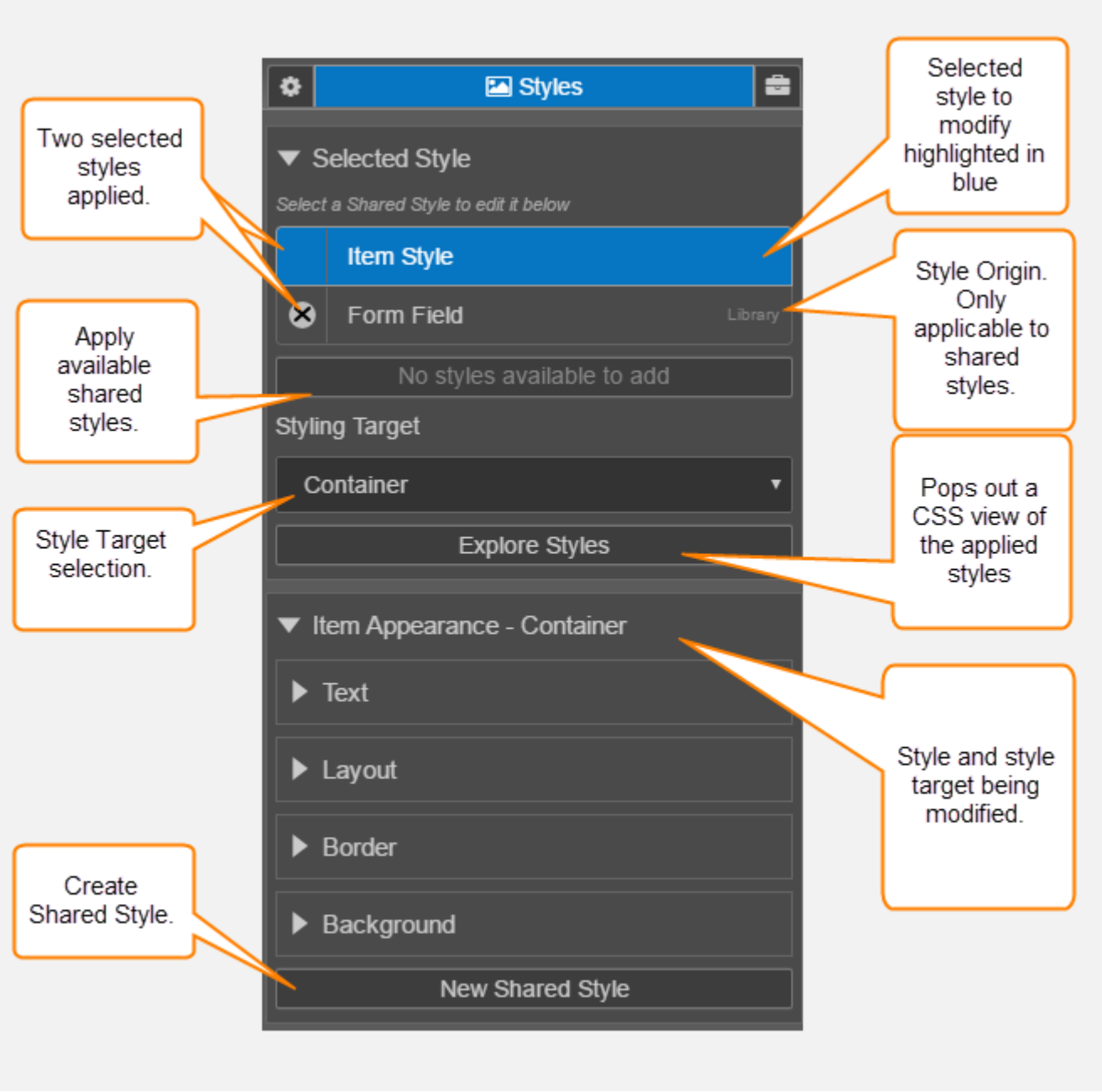
Label	Description	Default Value
From		#cccccc
To		#ffffff
Alpha		100



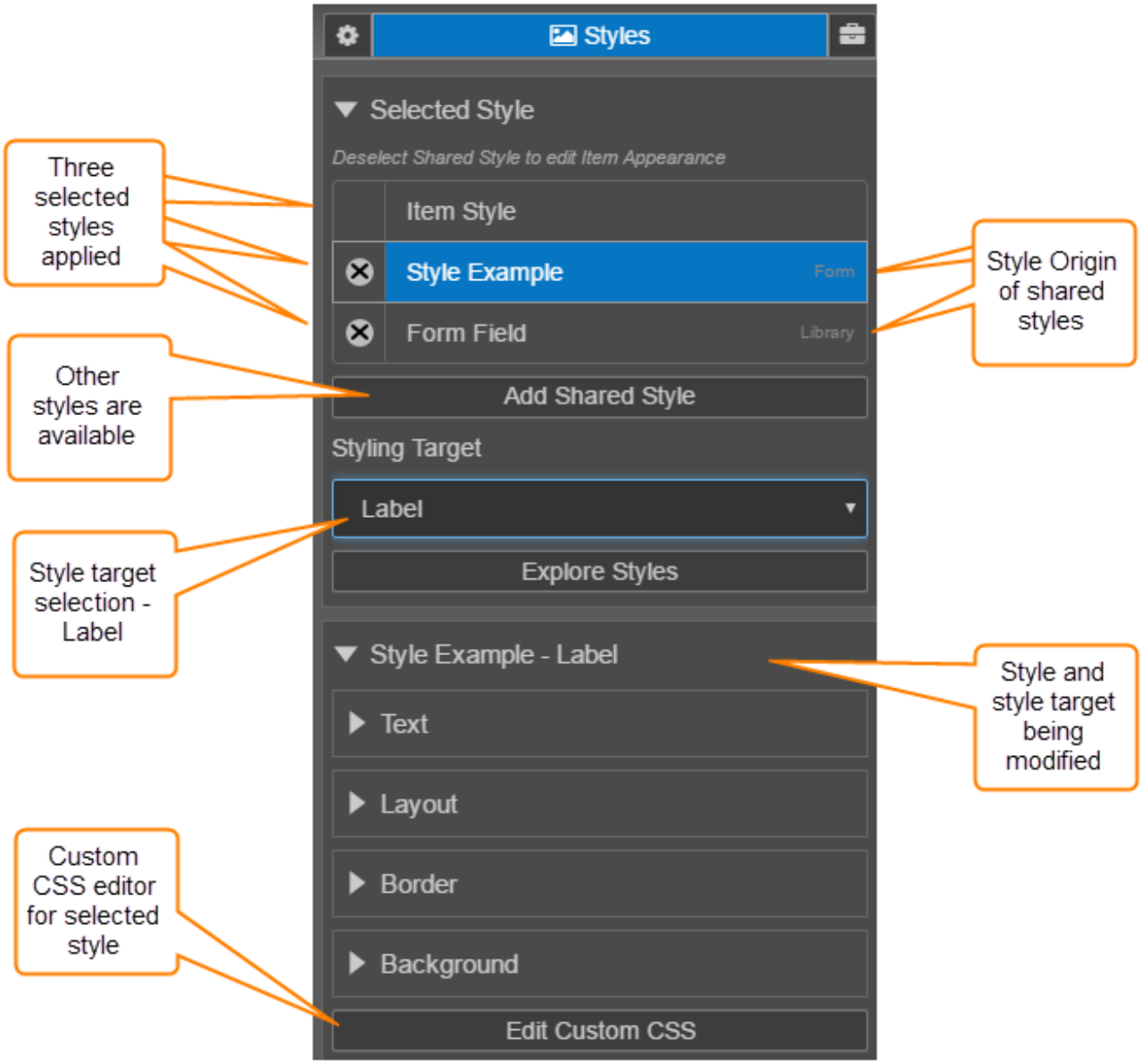
If you select **Image**, you'll be able to choose a background image from a list or upload a new image.



The example below shows the difference between components with the individual and shared styles applied:



A component with the default Item Style modified.



A component with the Shared Style modified.

Next, learn about the Integration pane.

Edit Custom CSS

The Maestro editor allows you to edit a shared style of a selected component in the style editor using CSS[1] and LESS[2] syntax. This is the most efficient way to update a style of a template or a form, so Template Designers and Form Builders are encouraged to use this style editor. The style editor features syntax highlighting, variable insertion and auto-indentation to help you work with CSS code.

NOTE

Any changes you make using the style editor will create a local override for the selected style, as opposed to updating the shared style directly. For more information, see Styles pane.

To edit custom CSS of a shared style:

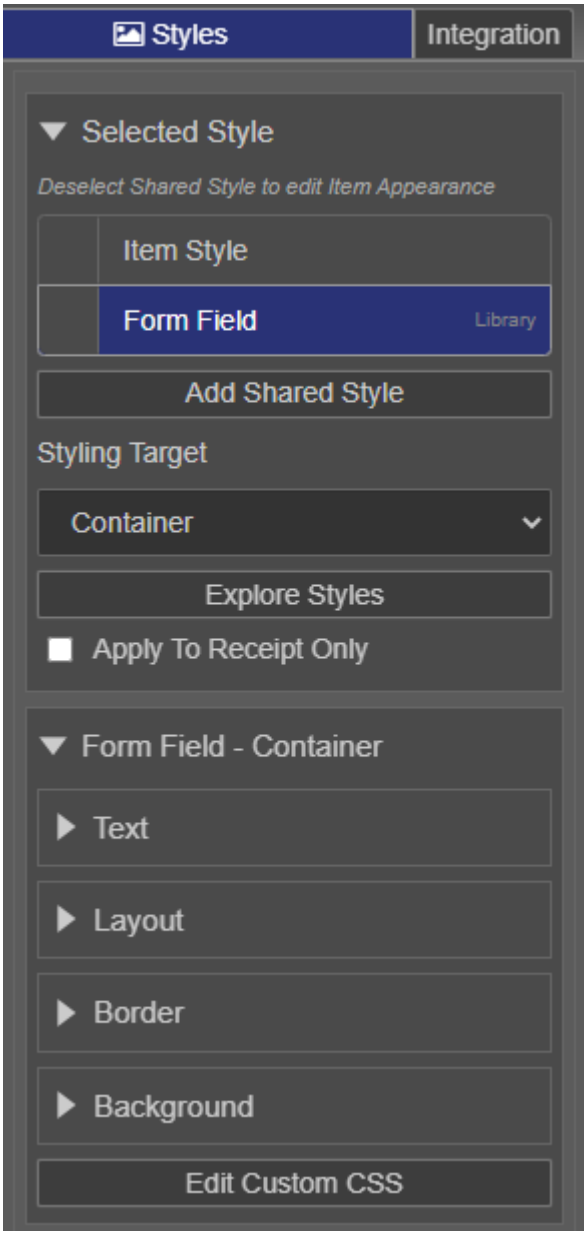
1. Open a design in the Maestro editor.
2. Select a component and click the Styles tab to view available shared styles. For more information, see the Styles pane.
3. Select a shared style under the **Selected Style** heading and click **Edit Custom CSS**.

   NOTE

   The **Edit Custom CSS** button is not available if Item Style is selected.

[1]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form's display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form's assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

[2]LESS is a dynamic preprocessor style sheet language that can be compiled into Cascading Style Sheets (CSS) and run on the client side or server side.



4. Edit a shared style in the text area of the style editor using both the CSS and LESS syntax to benefit from features such as nested selectors, variables, and mixins. You can also double-click an item in the Navigator bar on the left side of the editor to automatically insert a variable into the CSS, for example, `color: @av-slide-menu-item-active-color`. | 19.05 This feature was introduced in 19.05.



5. Click **Save** to persist those changes.
6. Click Preview to verify the design's changes you've made. You can also view a new style override in the Resources tab.

Next, learn about brand theme options.

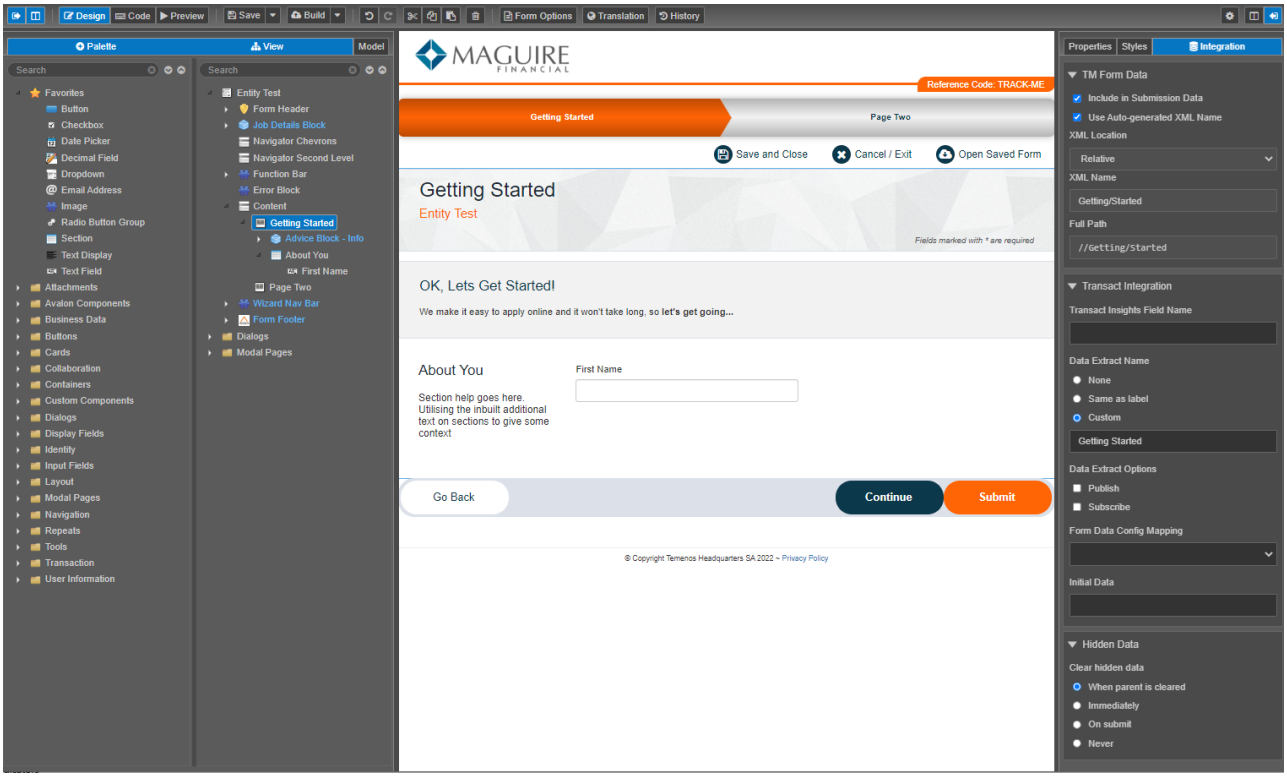
Integration Pane

The Maestro editor comes with the Integration pane that allows you to configure how a form can be integrated with other various modules of the Temenos Journey Manager, mainly Journey Manager.

> NOTE
>
> Prior to Maestro 17.10, the **Integration** pane was known as the **Data** pane, which included Field Reference ID that is now called ID and resides in the Properties tab.

To configure a form or a template in the Integration pane:

1. Open a form or a template in the Maestro editor and select the Integration tab to see the integration options.



The Integration pane is broken down into the following sections:

- TM Form Data
- Transact Integration
- Hidden Data

TM Form Data

This section allows you to configure the data that is sent to Journey Manager. The configuration options vary depending on the data structure of a selected component. For more information, see form XML data payload.

2. Select the Include in Submission Data checkbox to include the component's data in the submission XML.

   NOTE

   Clear the Include in Submission Data checkbox to adjust the relative positions of the component and all its children but keep them in the submission data.

3. Select the Use Auto-generated XML Name or the Use Entity XML Path checkbox to generate the XML Location, XML Name and Full Path properties based on the ID of the component, for example, `//AboutYou/FirstName`.

   NOTE

   You can't see this option unless the Include in Submission Data checkbox is selected.

   Clear the Use Auto-generated XML Name or the Use Entity XML Path checkbox to edit the XML Location, XML Name and Full Path properties manually,

   NOTE

   If the selected component is associated with an entity, for example, `aboutYou_firstName`, the Use Entity XML Path option is shown instead of the Include in Submission Data option.

4. Select an XML location of the component from the XML Location dropdown list, which can be one of the following:

   NOTE

   You can't see this option unless the Include in Submission Data checkbox is selected.
   You can't edit this option unless the Use Auto-generated XML Name or the Use Entity XML Path checkbox is selected.

- Relative - when the component is dragged between sections and blocks, it assumes a hierarchy relative to its location and thus break the data model enforcement.
- Absolute - to guarantee the location of the XML data upon submission of the form, you must ensure that in all cases, other than inside repeating elements, where the component is not associated with an entity, that the XML location is set as Absolute.
- System Data - to place the data element in the SFMData/SystemProfile section of the XML.
- Not Stored - to remove the component and all its children from the XML. This is mainly useful for container elements.

  NOTE

  If you want to readjust relative positions of the component and all its children without removing them from the submission XML, clear the Include in Submission Data instead.
  If you want to exclude the component from both the submission XML and the form HTML layout, select the Exclude checkbox in the Properties tab.

5. Define a custom XML name for the component in the XML Name field, which can be a single level name, for example, `FirstName`, or you can create additional structure in the XML using a two-level name, such as `personalDetails.FirstName` or `personalDetails/FirstName`.

   NOTE

   You can't see this option unless the Include in Submission Data checkbox is selected.
   You can't edit this option unless the Use Auto-generated XML Name or the Use Entity XML Path checkbox is selected.
   You can't edit this option if the Not Stored location is selected.

6. View the complete XML path for the component in the Full Path field. This field is not editable.

   NOTE

   You can't see this option unless the Include in Submission Data checkbox is selected.

Transact Integration

This section allows you to configure how default values are defined for a component and how to set up submission data extract mappings to be used in Journey Manager.

7. Provide a field name in the Transact Insights Field Name field that is used for integration with Journey Analytics. If there are multiple fields in a form with the same label, for example, First Name, and the Insights Field Name is not set, Journey Analytics will combine the data for all fields with the same label.

   NOTE

   By default, Journey Analytics captures data through the field label, if the Transact Insights Field Name field is not filled out with a unique identifier.

8. Select a name of the submission data extract field in Journey Manager from the Data Extract Name, which can be one of the following:
   - None - to exclude the component in the data extract. This is the default option.
   - Same as label - to include the selected component in the data extract and it uses the component's label name as the extract name, for example Save and Close, in the Manager.
   - Custom - select this option to include the selected component in the data extract and provides a text field for you to enter a component name to be used in Manager. Enter a component name, for example, Save and Close.

   For more information, see submissions data extract.

9. Select one of the following options from the Data Extract Options section:
   - Searchable - the whole data extract value can be used for as search criteria in the Manager. | 18.05 This feature was removed in 18.05
   - Publish - is used by Collaboration Jobs in conjunction with the Subscribe option. This is an alternative mechanism to share data between tasks in a Form Bundle - Job Step.
   - Subscribe - it consumes the publish event using the published value. This is an alternative mechanism to share data between tasks in a Form Bundle - Job Ste.
10. Select a system value that is used in Journey Manager processes from the Form Data Config Mapping dropdown list, which can be one of the following:
    - Contact Email
    - Contact Phone

- Save Challenge

For more information, see create save challenge.

11. Specify a default value to be displayed when the form is loaded in the Initial Data field.

> NOTE
>
> You can't see this option unless the Include in Submission Data checkbox is selected.
> You can't see this option if the selected component can't hold data.

Hidden Data

This section allows you to configure the behavior of form data in an item when it is hidden by a visibility rule. The clear hidden data property only checks for visibility on the parent level of the component. It does not check for visibility on the children level of the component if this level is made visible. For the hidden data property to function correctly, the current block which contains the component in the form must be hidden.

12. Select one of the following options from the Clear hidden data section to defines when (or if) the data entered into a component is cleared when the component is hidden:
    - When parent is cleared: use the parent's clearing rule.
    - Immediately: as soon as the component is hidden. For repeat components, such as Repeat and Repeating Block Template, this will remove all elements from the repeat and not just clear the contents of the children. In case, you want to keep the structure of the repeating data but clear its elements, you need to create a JavaScript, which sets an instance count to 1 and clears the children, and add it to a `onChange` rule for a radio button.
    - On submit: when the form is submitted.
    - Never: don't discard the data regardless of the component's visibility. This is the default option.
13. Click Save to update the changes in the form or the template.

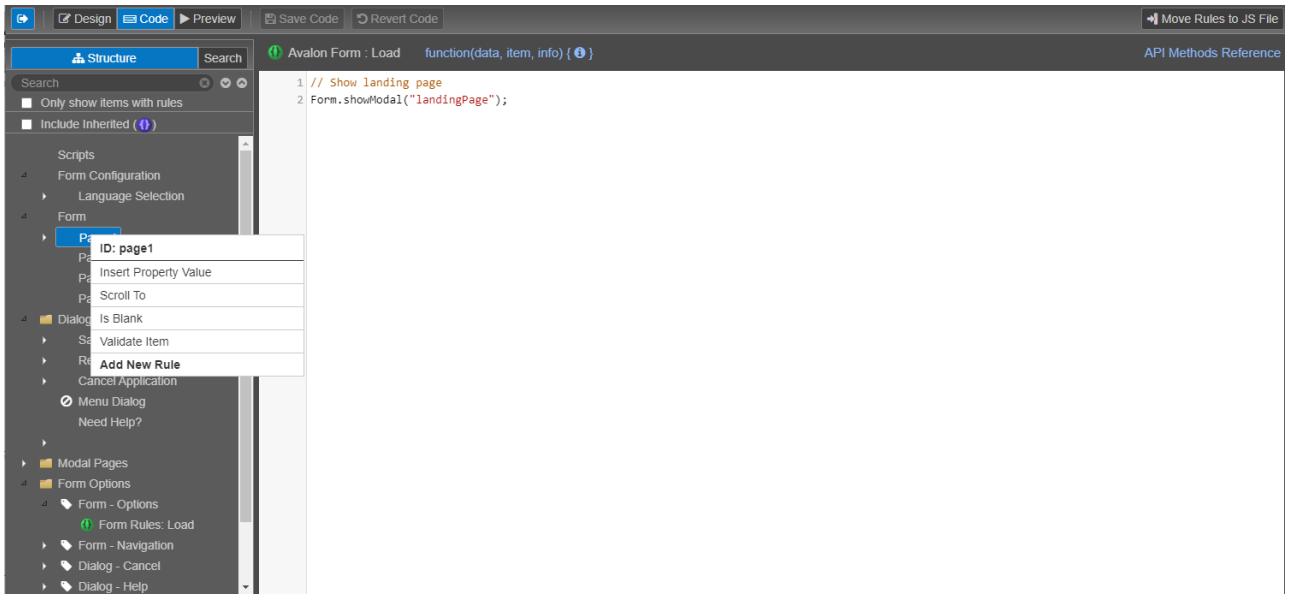
Next, learn about the Code View.

Code View

The Maestro editor comes with the Code View functionality, which allows you to view, create, remove and modify business rules that a Maestro form may require.

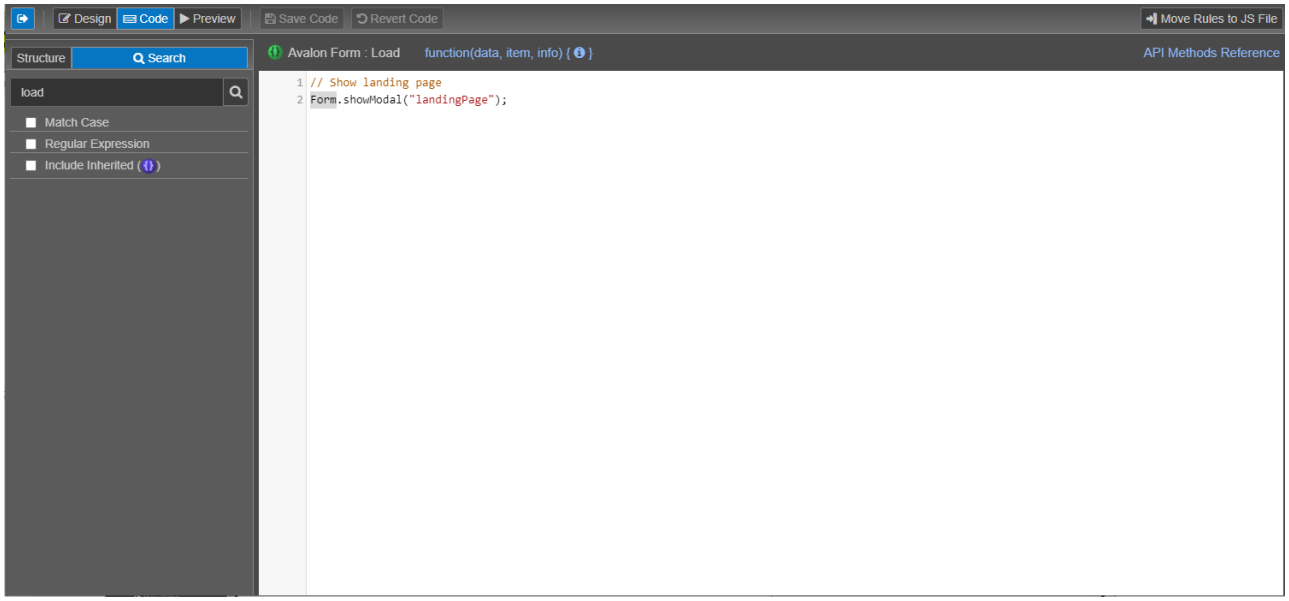
To view business rules associated to form's components in the Code View pane:

1. Open a form in the Maestro editor and click Code.



2. Select the Structure tab to view the components and associated rules in a tree view.
3. Type a component label or rule type in the Search field to look for a rule that was configured for the selected form. It does not search through the actual code, it only looks at the content visible in the design tree.
4. Select the Only show items with rules checkbox to see components with rules only. This significantly reduces the number of components to looking through.
5. Select the Include Inherited checkbox to see rules that are inherited based on the components default options or rules from a template.
6. Open the Form Options category to see more context from the category name and allows you to easily find the rule in the Form Options dialog as well. | 21.05 This feature was introduced in 21.05.
7. Select a rule in the tree to view the source code of the rule in the editor so you can edit it directly or create new rules by right-clicking any component in the displaying pane. You can also edit the rule directly in the code editor, or right-click the component to use any of the code assist options to edit the selected rule. Select Add New Rule to create a new rule for a selected component and choose a rule you want to create in the Create Rule window. For more information, see add a new rule in Code View.

8. Right-click a selected rule and select Delete Rule to remove it.
9. Click Move Rules to JS File to move the selected rules to an external JavaScript file for use in external source code management tools, for example Git. For more information, see move rules to JS file..
10. Select the Search tab to search based on script content. This allows you to filter based on the content within the code, so it doesn't look at the component label or rule name, but rather at the code within the rule. The search results show all methods that match the search criteria, including lines within the method that match the search criteria.



11. Select the Match Case checkbox to filter the search results to only show those that match exactly according to the case structure used in the original search.
12. Select the Regular Expression checkbox to filter the search results to only show regular expressions.
13. Select the Include Inherited checkbox to filter the search results to include any inheritance that exists in the rules.

You can use the following resources from the Code View to create rules:

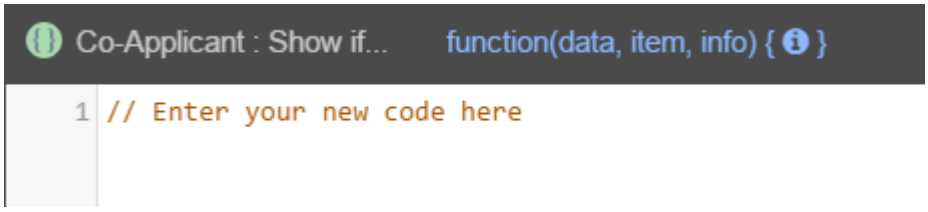
- API Methods Reference - it contains information on API methods published for use in Maestro business rule functions.
- Maestro Rule Functions - these rule functions can be created in the Code View or in the rule editor window accessed from the Rules section of the Properties pane.

Next, learn how to add a new rule.

Add a New Rule in Code View

To add a new business rule to a Maestro form while in the Maestro Code View, follow these steps:

1. Right-click a component.
2. Select Add New Rule.
3. Select a rule you want to create in the Create Rule window. This is the same window displayed when you click the Create Rule button on the Properties pane of the Maestro Editor.
4. Edit your new JavaScript code in the editor. You can type the code directly in the editor, or right-click the component to use the code assist options.



5. Click Save.

For more information on additional Code View resources, see additional Code View resources.

Move Rules to a JavaScript File

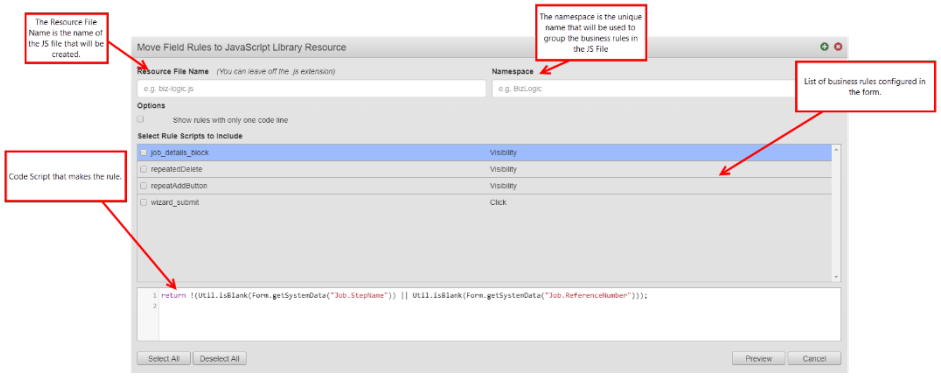
Traditionally, Maestro and other Transact tools relied on built-in code editors to create, edit, and manage Maestro business rules. However, with the move to Source Code Management (SCM) tools into the Transact platform, Maestro has introduced the Move Rules to JS (JavaScript) File feature, which allows you to move all selected business rules from a Maestro form to an external JavaScript file. This file can be later referenced in any Maestro form.

You should use the Move Rules to JS File feature to create a resource that holds all required JavaScript rules for a Maestro form. This file can then be edited in any SCM tool before being referenced into a Maestro form by using the JavaScript library component from the Maestro Palette.

The Move Rules to JS File feature should be used when you are looking to extend the functionality of your form by using Source Code Management (SCM) tools such as Git. Or if you want to consolidate all the rules for your form into one place to make editing easier as your form grows and matures.

To move all configured business rules of a form to an external JavaScript file, follow these steps:

1. Open a form that has multiple business rules configured.
2. Click Code.
3. Click Move Rules to JS File.

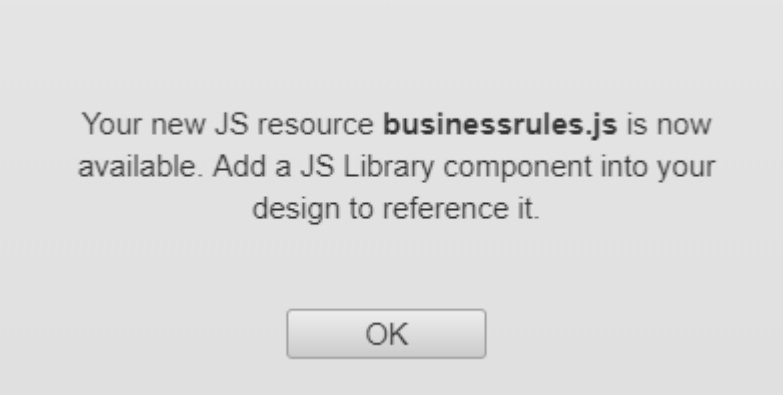


4. This dialog displays all the business rules that have been configured for the selected form. Each rule is identified and if selected, the script that creates the rule is shown as a JavaScript in the code box below the list of the rules. If your form's rule has only 1 line of code, a checkbox is presented that you can select to display these one-line rules.
5. Provide a Resource File Name for the JavaScript file. This is the name of the JavaScript file that is created when you move the selected rules to.
6. Provide a Namespace for the JavaScript File, which is the unique name that is used to group the rules in the JS file.

7. Select the rules that you want to move to a JavaScript File. Click Select All to select all the available rules.
8. Click Preview to display a preview of the JavaScript file. The screenshot below displays an example of a preview for a JS file.



9. Click Continue with Move. If you want to return to the previous dialog and select or clear other rules, click Back to Config. It creates the JS resource and displays the following dialog.



10. Click OK.

Once the Maestro rules have been moved to the JS file, you can then reference the created JS file directly in the form that you just used to create the JS file (using a JavaScript Library component), and then download the JS file and edit it using a SCM tool before uploading the JS file back into Maestro.

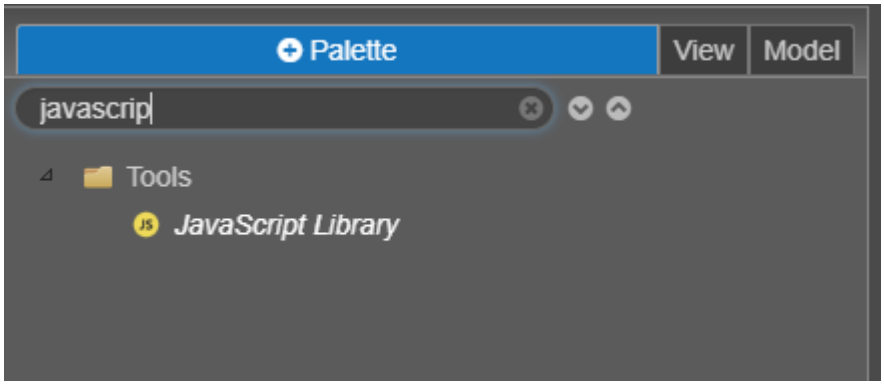
Next, learn how to reference a JavaScript File into a Form.

Reference a JavaScript File into a Form

After you have moved the business rules out of a Maestro form to a JavaScript[1] file using the Code View, it is time to reference this JavaScript file back into the form.

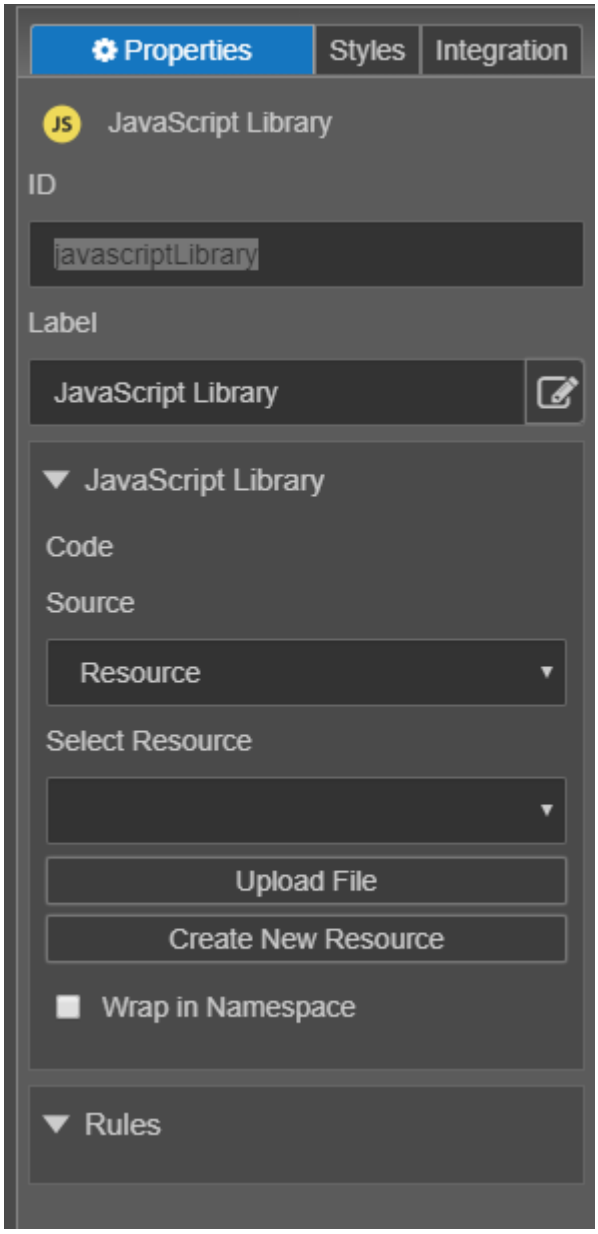
To reference the JavaScript file in a form:

1. Open the form that you moved the JavaScript rules from.
2. Use the Maestro Palette and select the JavaScript Library component.

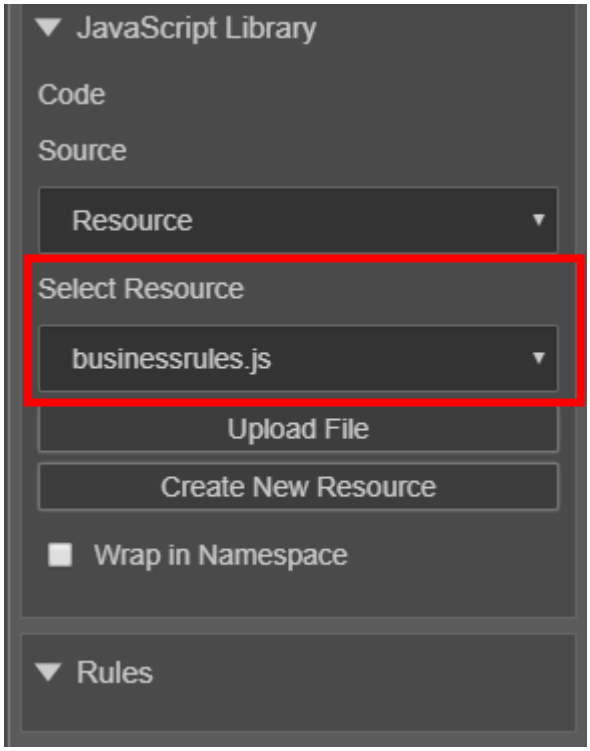


3. Drag and drop the JavaScript Library component onto the form.
   Dropping the JavaScript Library component onto the form will display the JavaScript library properties.

[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.



4. Select the Source of the JavaScript file. For a JS File that is created using the Move Rules to JavaScript File feature, the source will always be, Resource (which is selected by default).
5. Select the Resource from the Resource dropdown menu. This dropdown list will identify each of the JavaScript files and resources that have been created for the form.



6. Save the form to apply the business rules from the JavaScript file to the form.

Once you have referenced a JavaScript file in a form, you can then download the JavaScript file to edit it outside of Maestro before uploading it back into Maestro.

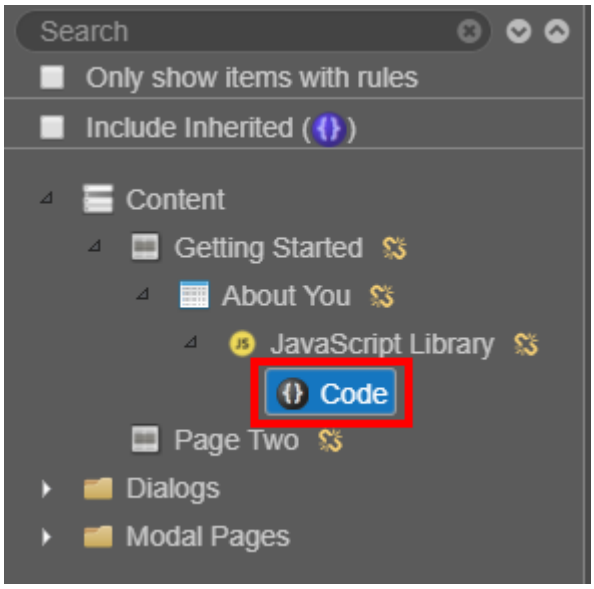
Next, learn how to download a JavaScript file.

Download and Upload a JavaScript File

Once the rules of a Maestro form have been moved to a JavaScript file and referenced in a form, you have the option of downloading the JavaScript file and editing it in a tool outside of Maestro. After editing the form outside of Maestro (in an IDE), you can then upload the JavaScript file back into Maestro before referencing it again in the Maestro form.

To download a JavaScript file:

1. Open a form in Code View.
2. Expand the tree to display the JavaScript library and select Code to display the JavaScript source code.



3. Click Download to download the JavaScript file on your computer.



4. Open the JavaScript file in any IDE[1] or text editor and edit the business rules as required.
5. Click Upload to upload the updated JavaScript file.



Next, learn about Maestro Preview Mode.

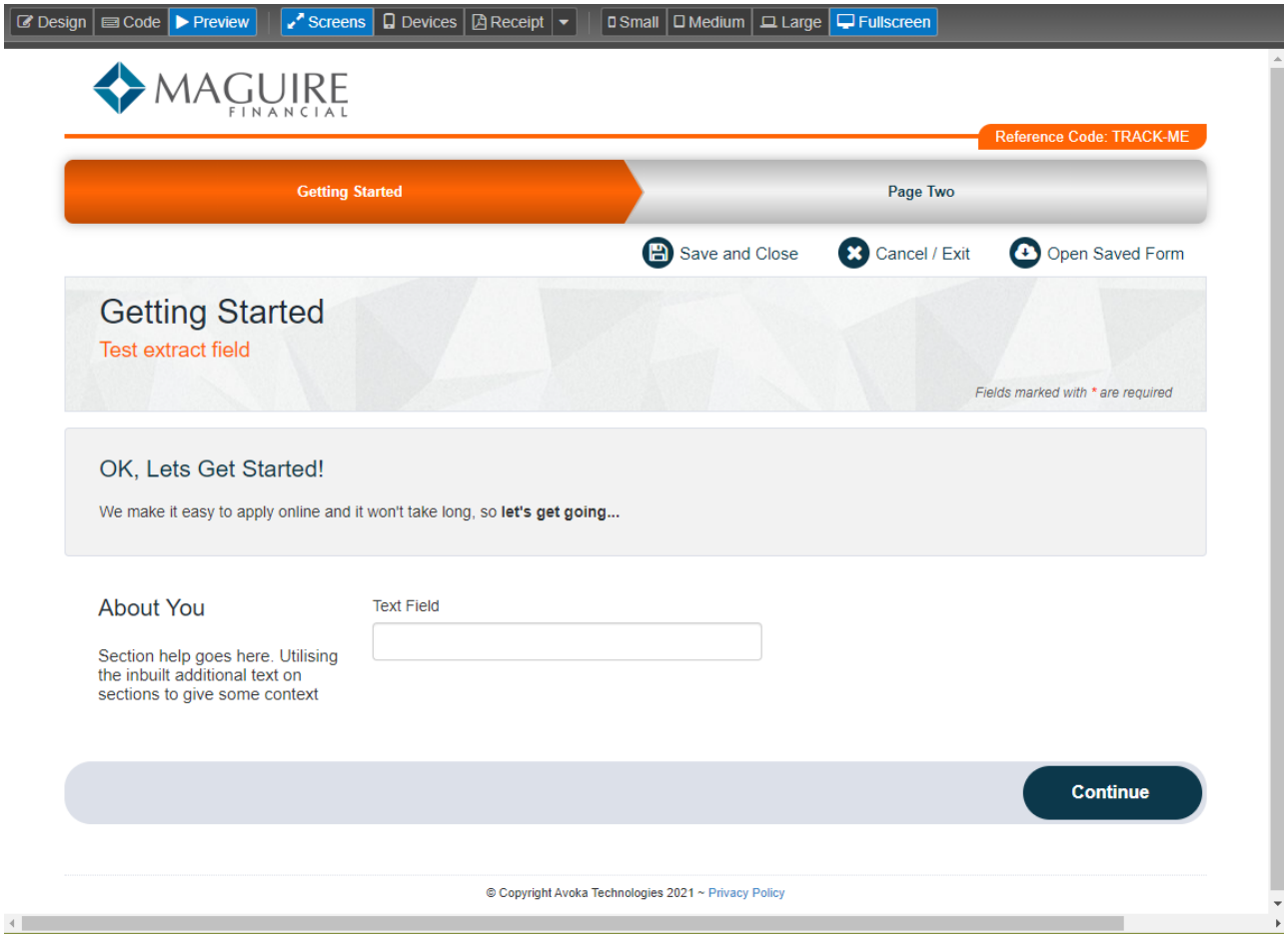
[1] Integrated Development Environment.

Preview Mode

The Maestro editor comes with the preview feature that allows you to quickly render a Maestro form so you can see how it will look when it's built and published, as well as try out some of form's functionality. This is a handy feature for Form Builders who need to render forms often to validate changes they make.

To open a form in the preview mode:

1. Open a form in the Maestro editor and click Preview in the toolbar.



2. Click Screens and select a screen type from the dropdown list to see how the form will look and behave on a selected screen size. The screen type can be one of the following:
    - Small
    - Medium
    - Large
    - Fullscreen
3. Click Devices and select a device from the dropdown list to preview the form on that device. The device can be one of the following:

- Apple iPad
- Apple iPhone 4
- Apple iPhone 6
- Apple iPhone 6s
- Apple iPhone 6 Plus
- Google Nexus 7
- Samsung Galaxy S7

> NOTE
>
> This does not actually run the form on the device, but rather shows how the form will render.

Click Rotate to toggle the orientation of the form between portrait and landscape.

4. Select a receipt type from the Receipt dropdown list, which can be one of the following:
   - PDF Receipt
   - HTML Receipt: An HTML receipt allows you to interactive with form fields in preview which is very useful for debugging forms.
5. Click Design to exit the preview mode.

Next, learn about Maestro's organizations.

Build a JM Form Version

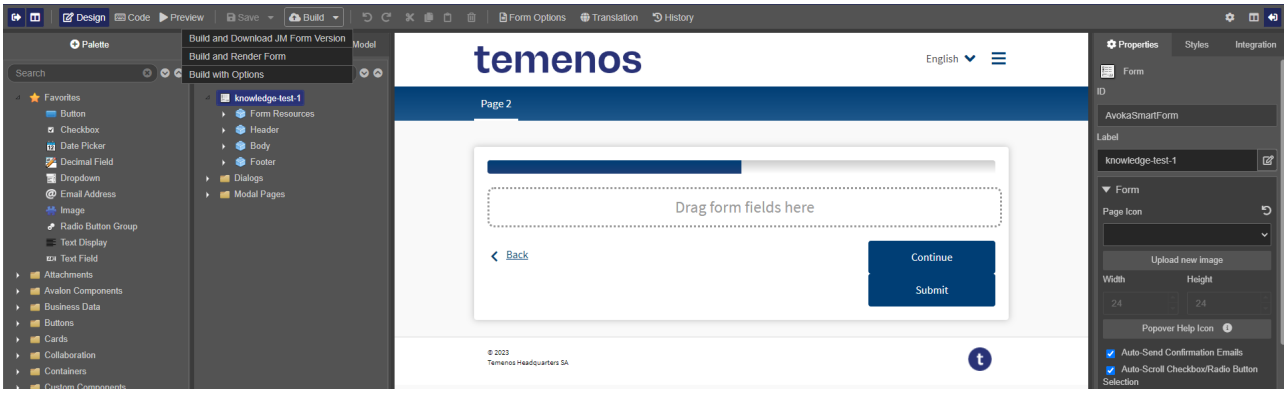
Maestro allows you to build a form version as a ZIP file (further referred as JM Form Version), which includes a FAR file and all related form's assets, so you can easily deploy it in a form space in Journey Manager. You develop and build the form in the same tool - the Maestro editor, which is handy and saves you time.

If the form containing multiple brands, you can build the form using one or many brands available to the form.

If you don't need to deploy a form version ZIP file right away, you can build and review it first, and import it into Manager later, when you need to. Usually, you import the form version ZIP file to Test and UAT environments first, then you promote a form to a production environment by exporting and importing it using Manager's functionality.

To build the JM Form Version of a Maestro form:

1. Open a form in the Maestro editor and select one of the following options from the Build dropdown menu:



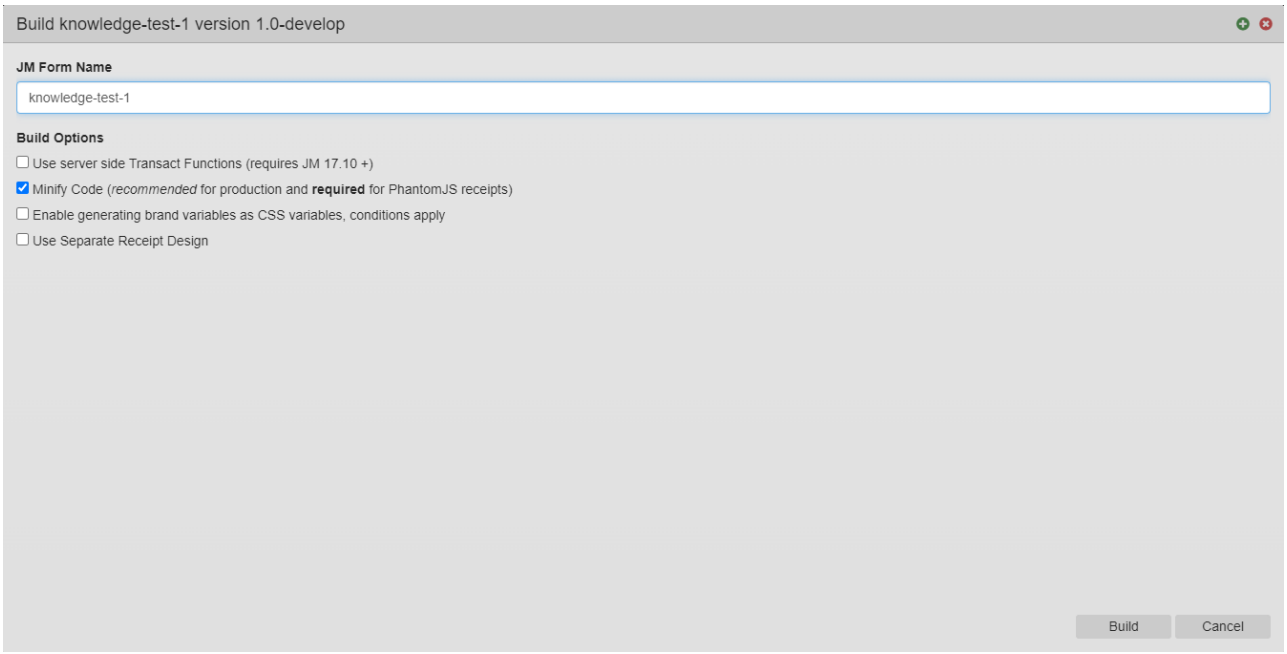
2. Click Build to build a JM Form Version. This doesn't download the ZIP file or display the rendered form, which is useful when you are re-building and updating a JM Form Version that has already been imported into Journey Manager.

   > NOTE
   >
   > Use `Control+Enter` keys on Windows or `Command+Enter` keys on Mac to build the form.

3. Click Build and Download JM Form Version to build a ZIP file and then immediately download it, which is needed to import the form version into Manager.

4. Click Build and Render Form to build a ZIP file and render the form in a new tab. You can download the JM Form Version later from the Management Dashboard. This option is handy when you need to view or test a rendered version of the form.
5. Click Build with Options to apply the build and brand options before building the JM Form Version.

> NOTE
>
> Use `Control+P` keys on Windows or `Command+P` keys on Mac to open the Build modal window.



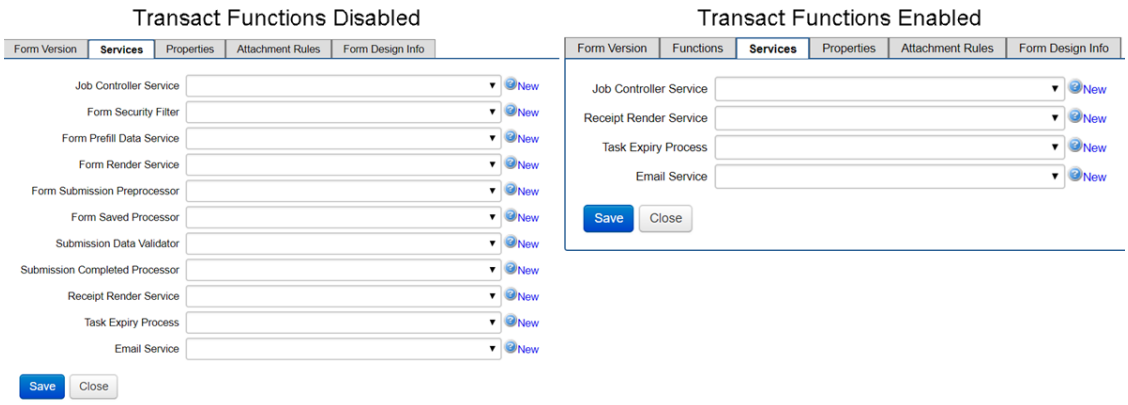
Enter a new name of a ZIP file in the JM Form Version field, in case you want to change it from the default name. The default is the existing name of the form.

Specify Build Options to build the form according to your requirements:

- Select the Use server side Transact Functions (requires JM 17.10 +) checkbox to use Transact functions to call services in Manager. | 17.10 This feature was introduced in 17.10.

  It's important to notice that enabling Transact functions causes the following:

  1. It limits the number of available services you can configure for your form version, as shown below:



2. It removes a number of `SystemProfile` properties, such as `<TestMode>-false</TestMode>`, from the form and from the submission XML data.

However, enabling Transact functions allows you to configure Transact functions, which were not available before that.

> NOTE
>
> You can see whether the Transact function are available in a form when you configure a form version in Manager.

> NOTE
>
> Transact functions require Journey Manager 17.10 and higher.

- Select the Minify Code checkbox to reduce the size of the form and related JavaScript[1] resources without changing its functionality so they can be sent out to a client browser more efficiently.

[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

NOTE

Code minification[1] functionality has been enhanced in the following Maestro versions:

- Prior to 18.05 - JavaScript resources are concatenated into the `app.js` and then minified, but not transpiled[2].
- In 18.05 - JavaScript resources are concatenated into the `app.js`, then minified and transpiled. The transpiling support to the rules, the runtime framework and any widget scripts so that users could use ES6[3] constructs in their rules while maintaining IE 11 support as it is still a supported browser. External JavaScript files are the responsibility of the form developer to maintain for minification and IE 11 compatibility.
- Since 19.05 - JavaScript resources are added as they are as separate resources and provided to the form as-is. External JavaScript files that are loaded with just a URL are not processes at all other than to add the script tag that adds them to the form.
- Since 22.10 - a reference to Internet Explorer 11 was removed from this option.

NOTE

JavaScript resources are the object dropped on to a form and a user has selected a JavaScript resource that is in the form or other available library. External JavaScript files are added through the JavaScript object and setting the URL property.

---

[1]Minification is the process of removing all unnecessary characters from the source code of interpreted programming languages or markup languages without changing its functionality.
[2]Ttranspiler is a source-to-source translator, source-to-source compiler, transcompiler, which is a type of translator that takes the source code of a program written in a programming language as its input and produces an equivalent source code in the same or a different programming language.
[3]ECMAScript (ES6) is a general-purpose programming language, standardized by Ecma International according to the document ECMA-262. It is a JavaScript standard meant to ensure the interoperability of Web pages across different Web browsers.

NOTE

Reducing the code makes it difficult to read it, so you have to consider clearing the Minify Code checkbox when debugging the form.

- Select the Enable generating brand variables as CSS variables, conditions apply checkbox to include CSS variables into a form, so they can be updated at runtime.
  | 23.04 This feature was introduced in 23.04

  NOTE

  This functionality has the following limitations:
  - It won't work with Internet Explorer 11 as it doesn't support CSS variables
  - Your styles should not use `Less` color functions, such as `lighten()` and `darken()`
  - Using `Less` mixins that utilize `iscolor()` will not work as it will be passed a value that looks like `var(--av-primary-color)`, which will not be a color
  - The Maestro editor 23.04+ will attempt to use CSS variables when it loads the form, so if any errors are detected, the form publish options will not allow CSS variables to be enabled

  NOTE

  To view the list of all CSS variables in a generated form:
  1. Click `Preview` to inspect a form.
  2. Click `Inspect` and search for `:root {` from `form-app-styles.css` that should have all the CSS variable declarations. For more information, see Using CSS custom properties (variables).

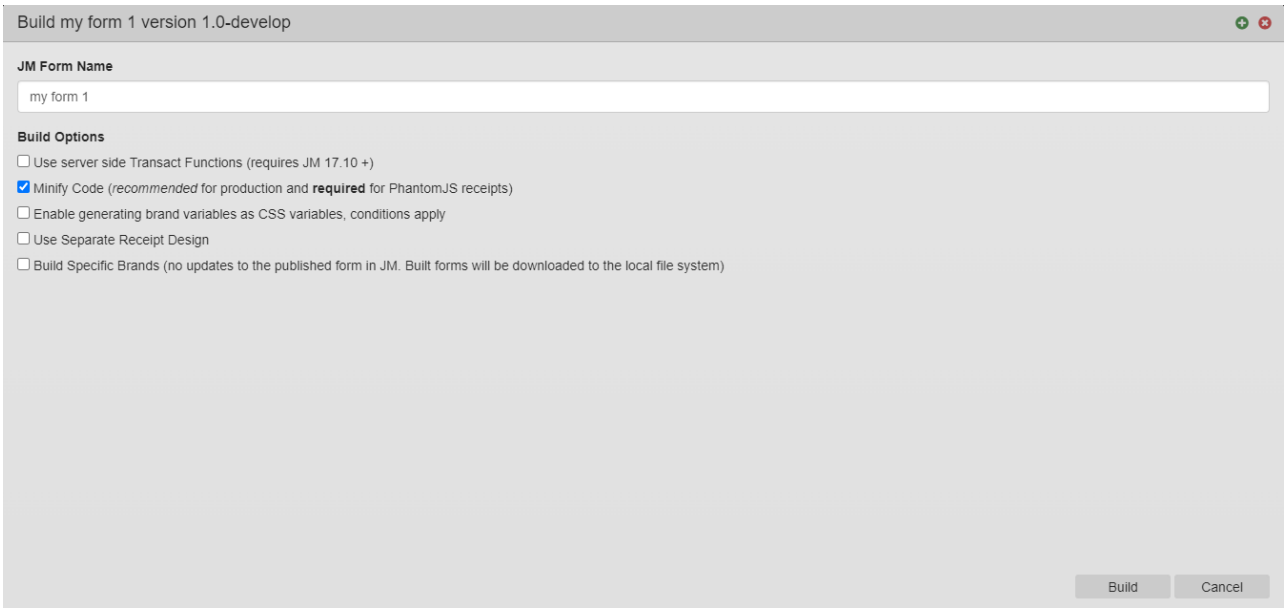
- Select the Use Separate Receipt Design checkbox to use a separate receipt, if a receipt design is available in the form, so all built receipt assets are pulled into the FAR file. This FAR is different as it effectively has two complete Maestro designs - a form and a receipt. There is an XML file in the FAR that tells Manager that the form uses a specific HTML file for the interactive form and a different HTML for the receipt.

NOTE

When Maestro builds the form, it doesn't rebuild the receipt form. It simply takes the latest version of the receipt that has been built and checks whether the last update time on the receipt is after the last built time on the receipt or not. If the receipt has been changed since its last built, Maestro shows a warning that the receipt needs to be republished.

- Select the Remove Automation Framework checkbox to remove the MAF code, which reduces the download size of the form and prevent misuse of the API in production forms. The Maestro Automation Framework (MAF) provides an API which can be used by other tools to automate and investigate the state of a Maestro form. Once a form is ready for production, MAF is not required.

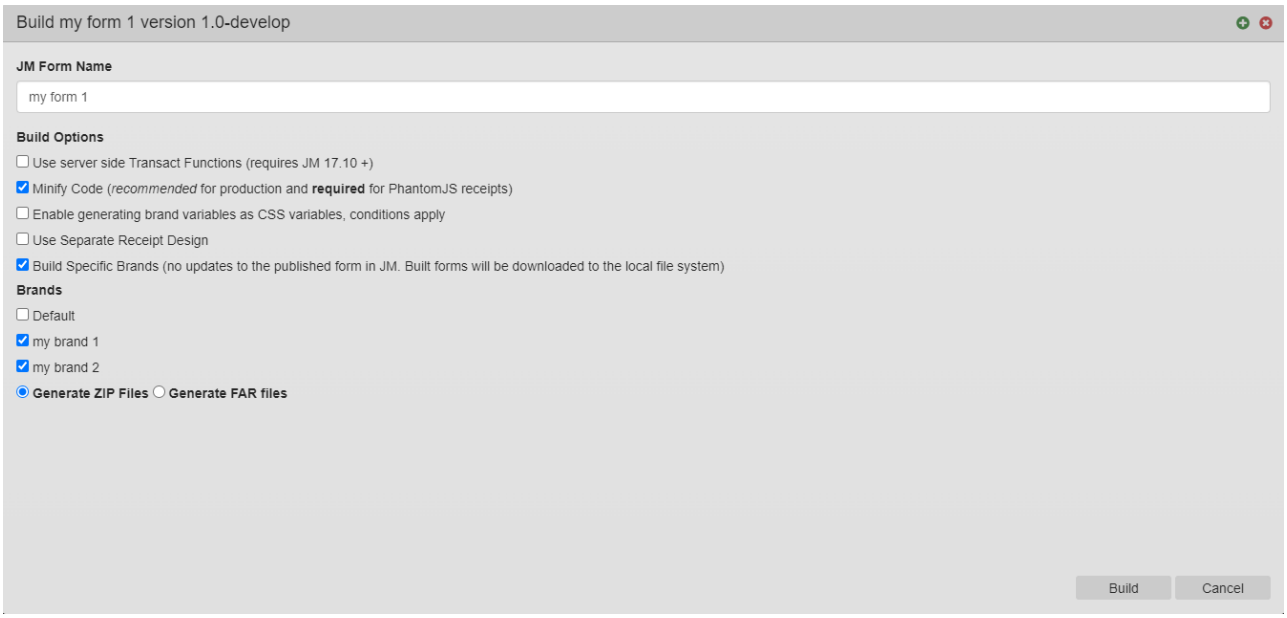
If the form containing multiple brands, Maestro gives you additional options to choose which brand, or all of them, to use to generate a ZIP file.



Select the Build Specific Brands (no updates to the published form in JM. Built forms will be downloaded to the local file system) checkbox to see the the list of brands available to the form.

NOTE

You can't select the Build Specific Brands (no updates to the published form in JM. Built forms will be downloaded to the local file system) checkbox if the form has only one brand.

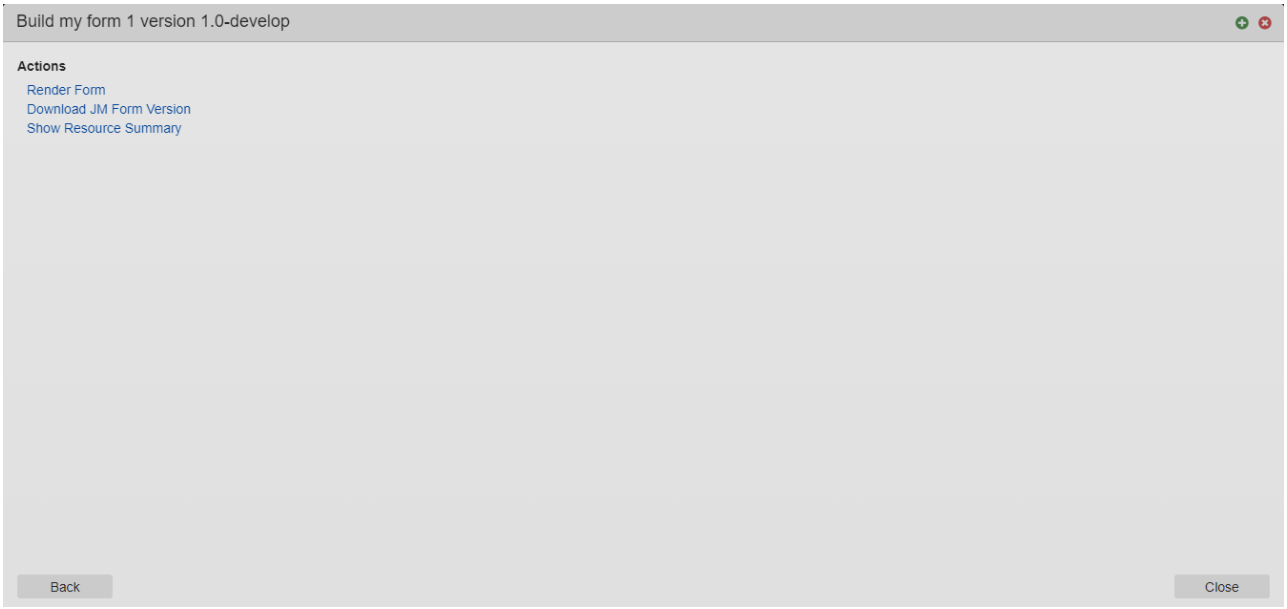


Specify Brands to build the form using specific brand or brands:

- Select one or many brands from the available list of brands defined in your template. The Default brand is always available.
- Select Generate ZIP Files to bundle the form and all relevant resources in a ZIP file, which you can deploy in various Manager environments.
- Select Generate FAR files to bundle the form and all relevant resources in a FAR[1] file, which you can deploy in various Manager environments.

Click Build to build the form. Check the build result and perform some actions as described below.

[1]FAR is a Form Archive that contains a form and all related resources that can be deployed as a package in various Journey Manager environments.



- Click Render Form to render the form in a new tab. It's similar to the Preview Mode.
- Click Download JM Form Version to download the ZIP file on your local PC.
- Click Show Resource Summary to see resources associated with this form and included in this ZIP file.
- Click Back to go to the previous screen.

Once a JM Form Version is built, you can download it at any time from the Maestro Management Dashboard using the Download JM Form Version option.

When building the JM Form Version, you may encounter errors; some of them you can try to resolve yourself, otherwise, contact your Client Services team.

Next, learn how to update JM Form Version.

Update a JM Form Version

You may want to update a Maestro form after it has been deployed to Manager. This is usually the case to accommodate customer feedback or follow continuous improvement processes within your company.

To update a JM Form Version:

1. Open a form in the Maestro editor and edit it as required.
2. Build a new JM Form Version.
3. Log in to a Manager server where you originally uploaded the JM Form Version as a ZIP file.
4. Select Forms > Forms and find the form that you want to update. This form is the same form that you just updated in Maestro.
5. Open the form, select a form version and click Update Design from Maestro to automatically update it form the Maestro server.

NOTE FOR ON-PREMISE AND AMAZON VIRTUAL PRIVATE CLOUD (VPC) MANAGER INSTALLATIONS

If the VPC is not managed by Temenos, in order for the updating process to function correctly, the Manager environment needs to send an outbound request over HTTPS to a Maestro host (for example, `maestro.avoka.com.au`). For this reason, it is recommended that before you attempt any update of a form version using Maestro, you first check your firewall rules and ensure that they allow this outbound request.

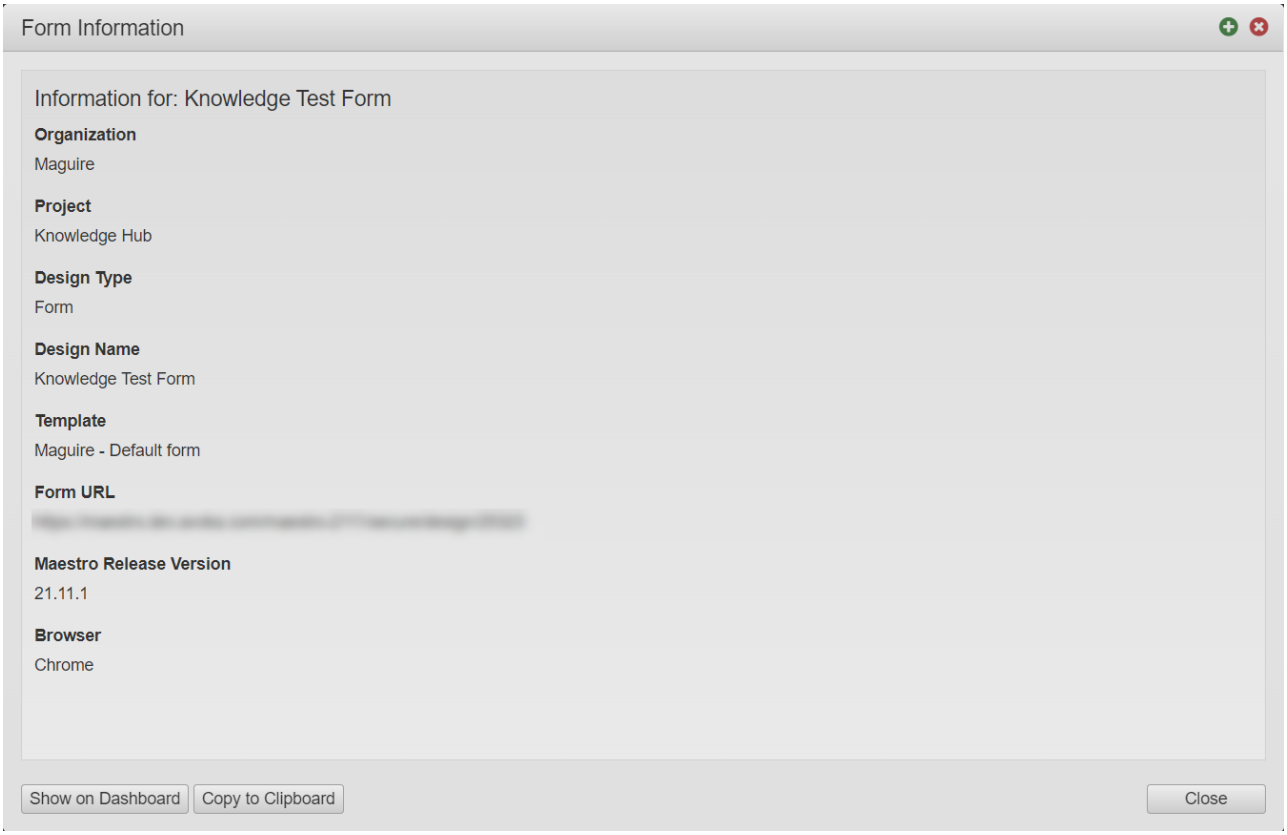
Next, learn about the SCM tool.

Show Form Details

The Maestro editor allows you to view some additional information about an open design, such as, a form, template, receipt or component.

To view a design details:

1. Open a design in the Maestro editor and click Help.
2. Select **Show Form Details** from the dropdown list to view the following design's information:



This information can be useful for troubleshooting purposes, especially when speaking with customer support.

- Organization - The organization that the design belongs to.
- Project - The project that the design belongs to.
- Design Type - The design type of the design. Possible options include Form, Component, Template, or Receipt.
- Design Name - The name of the design.
- Template - The template the design is based upon.
- Form URL - The absolute URL of the design.

    - Maestro Release Version - The version number for the current instance of Maestro.
    - Browser - The name of your web browser.
3. Click Show on Dashboard to locate this design in the Maestro Dashboard.
4. Click **Copy to Clipboard** to copy all of the information from the dialog to the clipboard and then use the `CTRL` + `V` shortcut (or `CMD` + `V` on macOS) to paste it somewhere else, such as, in a support ticket.
5. Click Close.

Next, learn about the Design mode.

Maestro Organizations Overview

Journey Maestro uses the concept of organizations that allows you to structure your application form solutions to implement various customer requirements. An organization is the place to manage application form resources, such styles, images, and components, that your design uses. These resources fall under the following categories and are created and managed by different user roles:

- Shared components - business components shared across different forms, such as an address, contact details, owned by the Form Builder with responsibility for standardization
- Styles - corporate branding and template shared components, owned by the Template Designer
- Forms - various components, owned by the Form Builder

Organizations are the foundation of a three-tier structure including projects and forms. Each tier has an important role to play in building robust application forms. The tiers are:

- Organization - contains projects and organization level libraries
- Project - contains forms, components, templates and project level libraries
- Form - contains components to captured user data and pass it to Manager

The tires and their stricture are illustrated in the diagram below:



In this example, you can see that a customer[1] has 1 organization - the Onboarding organization - containing 4 projects and 3 libraries. It is important to note the 2 projects and 2 libraries - the Onboarding Shared Component and Onboarding Style - are solely for building and maintaining shared components and styles, which are used across all projects in the Onboarding organization. Thus, the Onboarding 1 and 2 projects contain only business specific implementation.

[1]A customer is a person who uses Temenos Journey Manager to create, host and manage application forms. Other names for a customer is a client.

Organization Structure

It's important to understand and create the correct organization structure for an efficient way to package application form resources that provides a clear separation of responsibility between Template Designers and Form Builders. This also enables forms to re-use the corporate styling without unnecessarily inheriting form specific components.

There are three types of projects:

- **Form Project** - These projects contain the forms under development but do not contain any styles or templates. Any shared components in these projects are form specific only, and not intended to be shared across projects. Over time, it is typical for there to be multiple form projects grouped by business line, form type, or geography.
- **Shared Components Project** - There should be only one shared components project per organization, which only contains shared business components to be shared across projects. This should not include template components such as header, footer, etc. Note that shared business components that are first created from a form will be added to the form project component folder by default. It is therefore necessary to move these to the shared component project by exporting and importing. Do not forget to delete from the form project.
- **Style Project** - There should be only one style project per organization, which contains the templates, images, all shared styles, and components needed by the template (e.g. header, footer, navigator). This includes shared styles needed for shared business components.

There are two types of organization libraries:

- **Shared Components Library** - This organization library contains all published shared business components. Only resources from the shared components project are published to this library.
- **Style Library** - This organization library contains all published style resources. Only resources from the style project are published to this library.

NOTE

The Shared Components Project and Style Project should have no project libraries. Their resources are always published to the organization libraries - Shared Components Library and Style Library respectfully.

NOTE

The Form Projects may have project libraries for any form specific shared components created.

Here are some recommended naming conventions for project and library names:

- Name the style project Style, unless the corporate style has a specific name.
- Name the shared component project Shared Components to highlight that this should only contain shared components.
- Prefix the style and shared component projects with the organization name or acronym so that exports are easily identified with the organization.
- Form projects and libraries should be named based on the grouping; for example, Home Loan, Customer Onboarding, US Wealth Management, etc.
- The libraries for these projects should have the same name, ending with the suffix Library.

Organizations must be created and configured in Journey Manager before you can access and use them in Maestro. Manager uses the similar concept of organizations. However, their organizations are more back-end oriented and have extensive configuration to provide a wide range of functions, such as user data storage and integration with 3rd party systems to name a few.

Usually, when a customer starts a new project, for example, an Onboarding application form, a new organization is created for this purpose either by the customer or the Cloud Services team. Also, you need to assign correct permissions to user accounts who will create, modify and delete projects, forms and other associated resources.

We recommend setting up your organization first, then creating a new template, and libraries, before you begin development forms, following the following structure.

After all this sorted out, you must create a project to begin with application form development. We recommend creating two additional projects - shared components and styles - to keep the common, reusable and shared components and styles separate from the business specific implementations. The diagram above shows these additional projects as well as two libraries containing these project artifacts. The libraries are at the organization's level meaning that every project within this organization, for example, Onboarding 1, can automatically use all resources from these libraries.

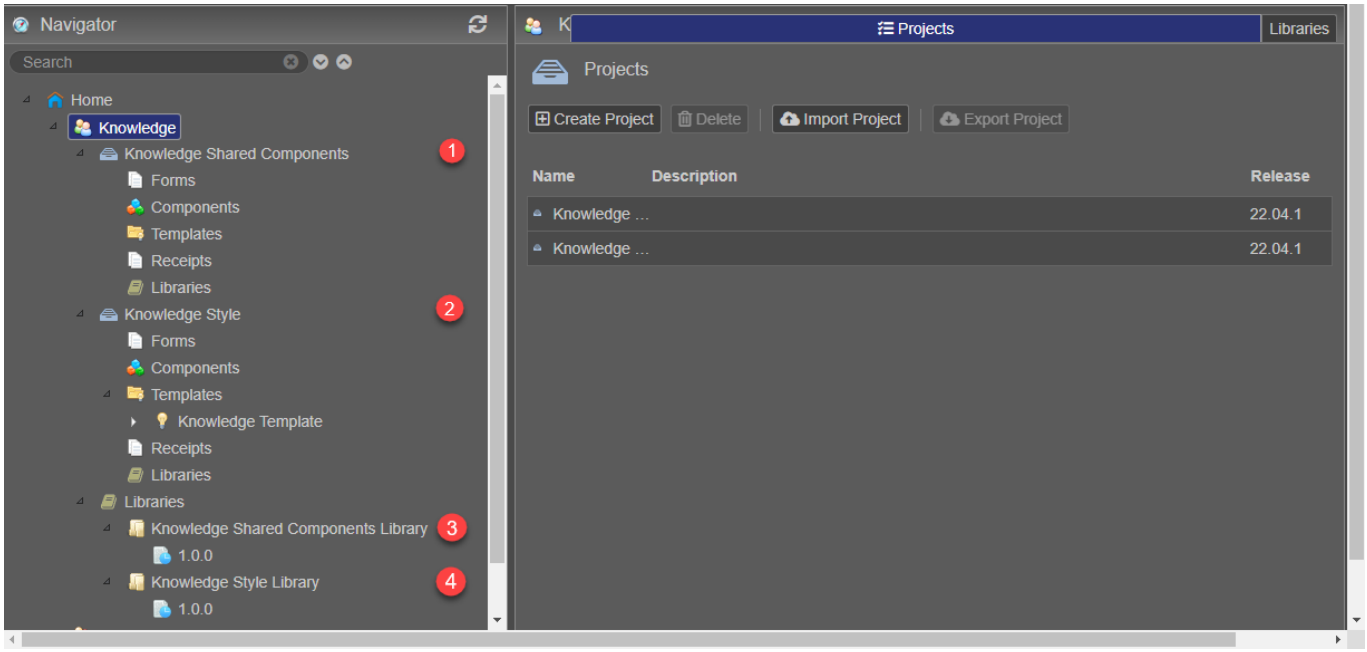
Next, learn how to view organizations.

Organization Set-up

For a new organization or a new project in the existing organization, you must ensure that the organization is set up correctly. You have to do it only once. This step is very important as it provides many benefits in the long run. The set-up is all about creating the number of projects that constitute the structure within the organization:

- Shared Components Project - this project is used for creating and maintaining shared components
- Style Project - this project is used for template styles and all shared components' styles
- Shared Components Library - this organization-level library is used for all artefacts developed in the Shared Components project
- Style Library - this organization-level library is used for all artefacts developed in the Style project

The recommended organization structure is shown below, where the numbers correspond to the step-by-step instruction described in this topic:



This structure enables you to build and maintain application forms efficiently. Maestro doesn't enforce this structure, so it is up to you to implement the best practice and we strongly recommend doing so. For more information about organization structure and resource management, see Maestro Organizations overview.

To set up the organization structure:

Step 1: Create the Shared Components Project

1. Open your organization.
2. Create a project and name it as Your Organization Name followed by Shared Components, for example, Knowledge Shared Components.
3. Open the new project folder and select Libraries to list the default libraries, along with a custom project library.
4. Select the custom project library, for example, Knowledge Shared Components Library and click Delete.

> NOTE
>
> You do not need the project library for the Shared Components project because you will be publishing the project's artefacts to an organization library. This is a very important step as it prevents a lot of errors and confusion in regards to published shared components.

Step 2: Create the Style Project

1. Open your organization.
2. Create a project and name it as Your Organization Name followed by Style, for example, Knowledge Style.
3. Open the new project folder and select Libraries to list the default libraries, along with a custom project library.
4. Select the custom project library, for example, Knowledge Style and click Delete.

> NOTE
>
> You do not need the project library for the Style project because you will be publishing the project's artefacts to an organization library. This is a very important step as it prevents a lot of errors and confusion in regards to published shared styles.

Step 3: Create the Shared Components Library

1. Open your organization.
2. Create a library within the organization.

   NOTE

   This is the organization level library, not the project level library.

3. Name the library as Your Organization Name followed by Shared Components Library, for example, Knowledge Shared Components Library.

Step 4: Create the Style Library

1. Open your organization.
2. Create a library within the organization.

   NOTE

   This is the organization level library, not the project level library.

3. Name the library as Your Organization Name followed by Style Library, for example, Knowledge Style Library.

Now, your organization has been set up correctly. We recommend spending some time on creating templates, shared styles and components before you start creating the form projects. Forms projects are used for creating and maintaining business specific application forms and resources, which are not meant to be shared. So, if you are ready to move to the form development, go ahead and create form projects as required.

VIDEO

For more information, check the Projects Best Practices video.

Next, learn how to view organizations.

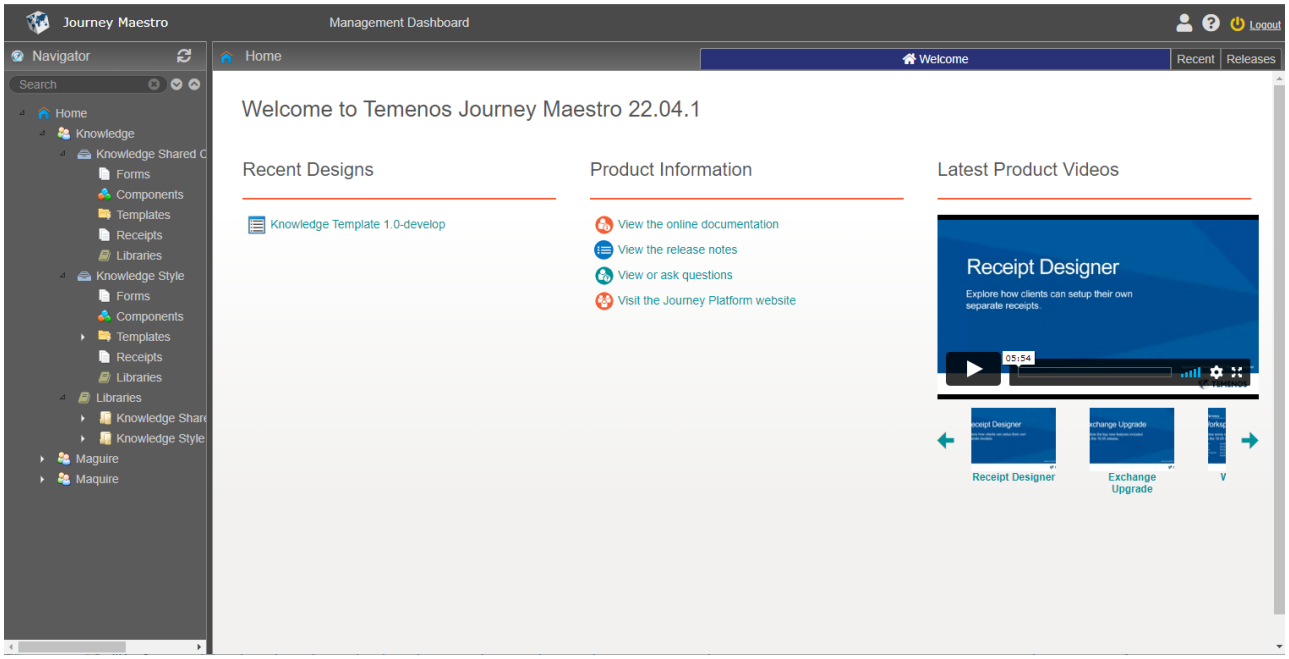
View Organizations

Maestro allows you to view the list of available organizations, so you can easily navigate to projects and their designs, such as forms, receipts, templates and components, and resources.

> NOTE
>
> Organizations are created and configured in Journey Manager so you can't change their configuration in Maestro.

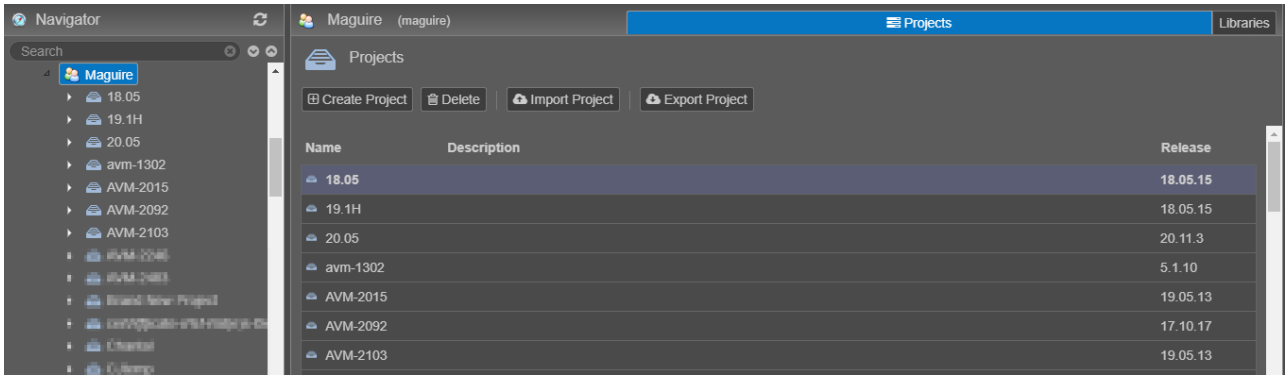
To view organizations in Maestro:

1. Log in to Maestro to access the dashboard.
2. Select Home to view the list of organizations available to you.



> NOTE
>
> Check roles and permissions assigned to your user account if you don't see organizations you require.

3. Select an organization to view and manage its assets and resources.
4. Select the Projects tab to view and manage its projects.



The projects are listed in the order they were created, with latest being on top. The list includes the following information:

- Project type that can be Standard  or SCM  . For more information, see create a project.
- Project name
- Project description
- Release version

5. Click Create Project to create a new project within this organization.
6. Click Delete to delete the selected projects.

> NOTE
>
> Deleting a project will also delete all assets and resources related to the project.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple projects. | 21.05 This feature was introduced in 21.05.

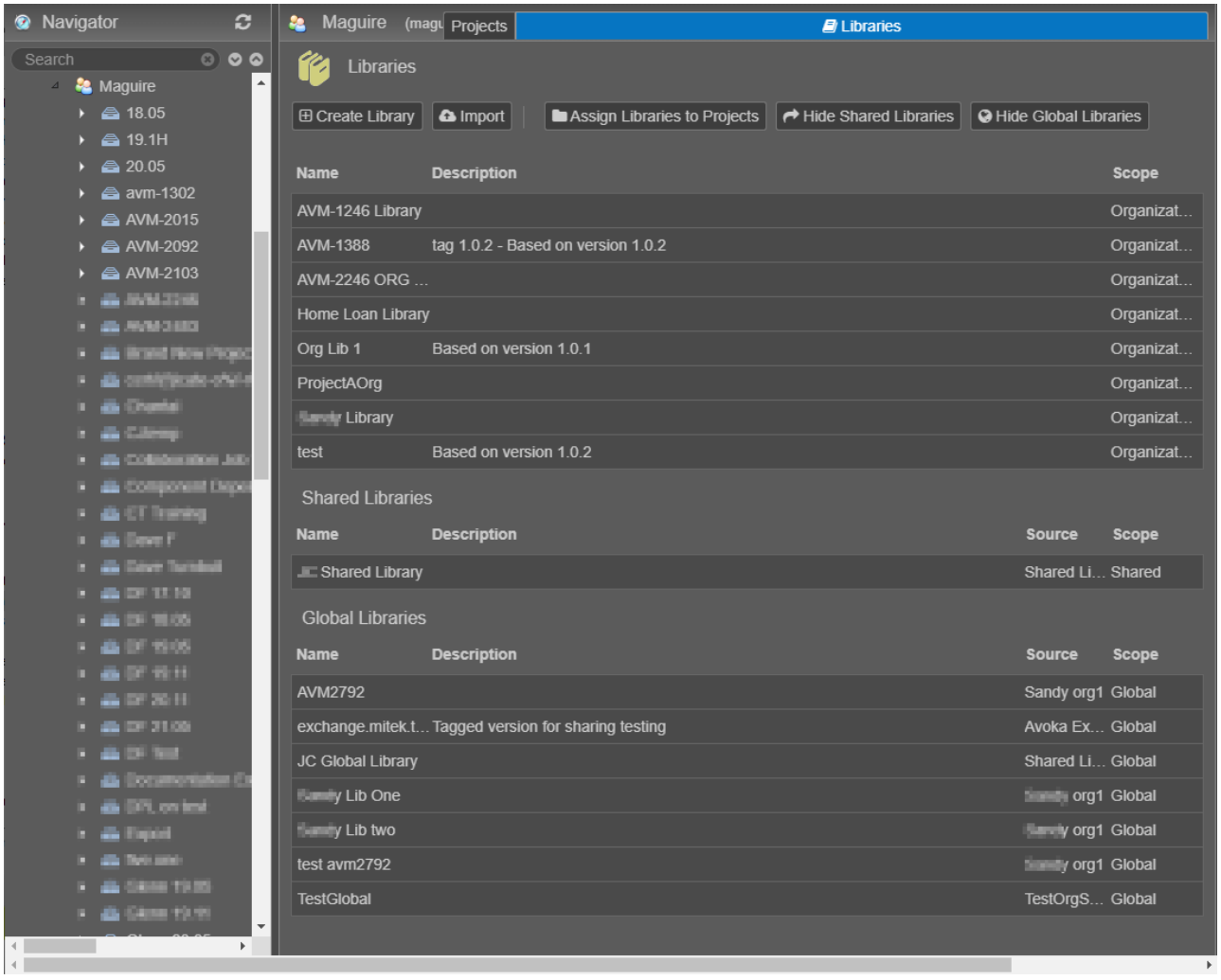
7. Click Import Project to import a project that was exported from other organization or even other Maestro environments.

> NOTE
>
> Use this functionality to move projects between organizations and environments, such as test and production, or perform a rollback or backup.

8. Click Export Project to export the selected projects so you can import them later.

> NOTE
>
> Use this functionality to move projects between organizations and environments, such as test and production, or perform a rollback or backup.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple projects. | 21.05 This feature was introduced in 21.05.

9. Double-click a selected project to view its designs and associated resources and libraries.
10. Select the Libraries tab to view and manage libraries available to this organization.
11. 

The libraries are grouped by several categories, such as organization, shared, and global libraries. The library list includes the following information:

- Library name
- Library description
- Source - provides the additional information to distinguish the origin of a library.
- Scope - the scope can be: Organization, Shared, Global

> NOTE
>
> Libraries stored at the organization level will be available to all projects within the organization.

12. Click Create Library to create a new organization library. Organizations can have as many libraries as needed.
13. Click Import to import libraries from other projects to the organization level.

> NOTE
>
> Use this functionality to move libraries between organizations and environments, such as test and production, or perform a rollback or backup.

14. Click Assign Libraries to Projects to assign a selected library to projects. For more information, see shared libraries.
15. Click Hide Shared Libraries when you don't want to display a list of shared libraries, which is useful when this list is long and therefore clutters the view. Click Show Shared Libraries to display the list of shared libraries, after they were hidden.
16. Click Hide Global Libraries when you don't want to display a list of global libraries, which is useful when this list is long and therefore clutters the view. Click Show Global Libraries to display the list of global libraries, after they were hidden.

Next, learn how to create a project.

Projects Overview

Journey Maestro defines a project as an entity that contains forms, components, templates, receipts and project level libraries, along with all relevant resources, such as styles, images, fonts, and scripts. A projects belongs to an organization. Each organization can have many projects.

A project is the second tier in the organization structure, which enables you to configure forms and resources on the project level, and override the organization level resources, for example, a style.

All project level assets are stored in one of the following folders within the project:

- Forms - contains all available forms in the project. It is the development area for forms, from here you can create new forms or edit existing forms. Once forms are ready to be deployed, the form version needs to be built and imported into Journey Manager.
- Components - contains all editable components in this project. The components folder is the development area for components. It is from the components folder that you can create new components, share components or edit existing components. Components are not available to forms until they are published to a library.
- Templates - contains all editable templates in this project. The templates folder is the development area for templates. It is from the templates folder that the Template Designer can create new templates or edit existing templates. Templates are not available to forms until they are published to a library.
- Receipts - contains all editable receipts in this project.

You can edit assets within these project folders without affecting the published versions of these assets.

The Maestro Dashboard allows you create projects, check project configuration, as well as view project's designs. You can also perform the following actions:

- Rename a project
- Update description for a project
- Select the default template for a project
- Enable automatic release upgrades for a project
- Export a project
- Import a project

If you are about to create the first business project in a new organization, you must set up the organization correctly beforehand. This ensures that all next projects your create will make use of the existing organization's resources. This promotes reuse of shared styles and components as well as other benefits. After that, what you need to do is simply create a new form project as per business requirements.

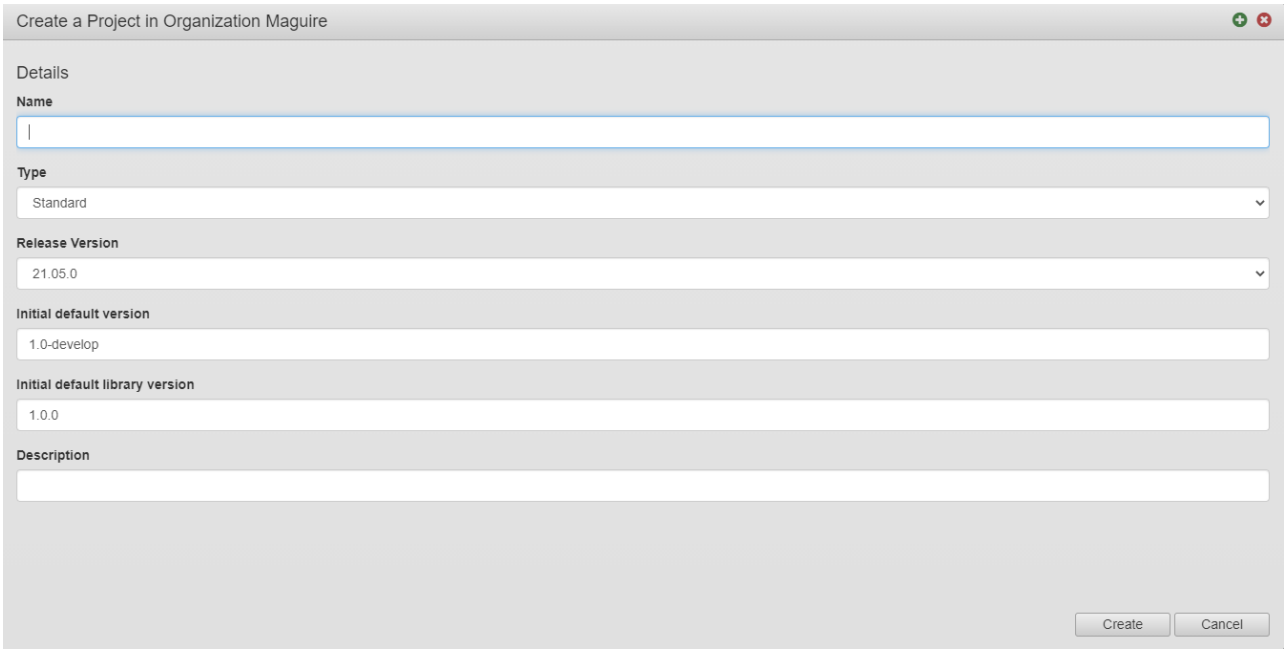
Next, learn how to create a project.

Create a Project

Journey Maestro allows you to create projects within a organization so you can build a complex structure to manage application forms efficiently.

To create a project:

1. Open a project in the Navigator pane and select an organization, where you want to create a new project.
2. Click Create Project.



3. Enter a project's name in the Name field, which should be unique across the organization. We recommend naming a form project based on the type of forms being produced. For example, Commercial Loans.
4. Select a project type from the Type dropdown list, which can be one of the following:
   | 17.10 This feature was introduced in 17.10.
   - Standard - a source code of the project is managed by Maestro
   - SCM - a source code of the project is managed externally using various SCM, such as Git[1]. Use this project type if collaborative work on a project is required.

[1]Git is a version control system for tracking changes in computer files and coordinating work on those files among multiple people. It is primarily used for source code management in software development,[8] but it can be used to keep track of changes in any set of files.

> NOTE
>
> The SCM project type doesn't have any impact on the content of forms. It only affects the versioning options shown in the Management Dashboard.

> NOTE
>
> If you are a Form Builder, you need to have the SCM permissions assigned to you.

- SCM Private - same as SCM but only project owners and Maestro administrators have access to projects of this type.

  > NOTE
  >
  > This type is available only when the project is created with the `scm project add` command.

5. Provide a release version in the Release Version field. By default, the release version is automatically set to the latest minor release of Maestro, but you can select an earlier release version if required.
6. Enter an initial default version and its suffix in the Initial Default Version field, which is used as the initial version for all assets created within this project. If you enter incorrect version value, the Create button will be disabled. This field is optional. For more information, see semantic versioning and tagging.
7. Provide an initial default library version value in the Initial Default Library Version field. When you create a project, the default project library is set up as well. The initial default library version define a version number for all new libraries. This makes it easier to roll back to the previous library version or set up and make changes to the new versions without affecting an organization and projects using older versions.
8. Type a meaningful description for the project in the Description field.
9. Click Create.

The new project will appear under the selected organization and will include default forms, components, and libraries, with the initial library version as you have selected above, in this example, 1.0.0.

VIDEO

For more information, check the Create a New Project video.

Next, learn how to upgrade a project.

Upgrade a Project

When a Journey Maestro environment is upgraded, you can choose whether projects continue using the original software release or have to be upgraded to a desired release, for example, the latest Maestro release. By default, all projects remain with their original version until the project's release version is manually changed in the Project Details.

We strongly recommend using the latest Maestro version as it provides you with the following benefits:

- Projects and forms are built and deployed using the latest libraries, including core libraries
- Forms are free of latest vulnerabilities and other defects related to unpatched libraries
- Form developers use the latest Maestro editor's features that benefits their productivity

When you open a form, component or template, Maestro checks what release version a project is using. The project version determines what version of Maestro and libraries are available to designs.

When the product is upgraded to a later version, Maestro does not force you to upgrade the version, thus providing seamless version compatibility. This allows companies to continue working on the version they were using prior to the upgrade, ensuring there is no change in behavior to their forms.

By default, all Maestro projects are automatically updated with each minor release of Maestro. When creating a new project, the Automatic Release Upgrades dropdown is set to Enabled by default. However, this feature only applies to minor releases. If Maestro is upgraded with a major release, projects always need to be manually upgraded. Also, if you've disabled this feature, you'll need to update your projects manually after each Maestro upgrade. This is described below.

WARNING

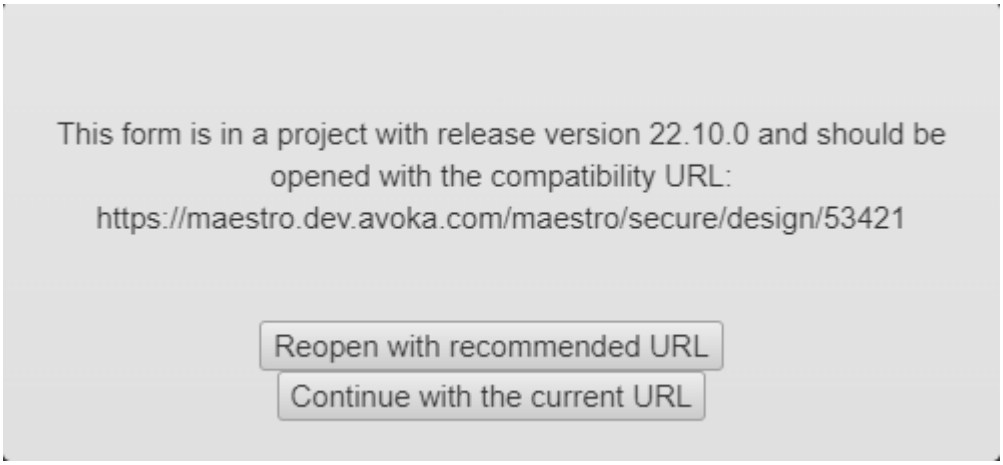
Once you have upgraded a project, you can't return to its previous version. Therefore, we strongly recommend backing up the project using Maestro's export functionality before upgrading it. This enables you to restore the project using Maestro's import.

To update a project manually:

1. Open a project in the Navigator pane and select the Project Details tab.
2. Select a required version of Maestro from the Release Version dropdown list, for example, 22.04.0.
3. Click OK to confirm it.



4. Click Save.
5. Open a form to check it works with the new version of Maestro and review the available options to open the form:



   - Click Reopen with recommended URL to open the form using the new URL.
   - Click Continue with the current URL to open the form using the current URL, which is the URL prior to the upgrade.
6. Rebuild and test each of the forms and artifacts in the project.

Next, learn how to export a project.

Export a Project

Journey Maestro allows you to export projects, so you can easily move or copy them into different organizations or environments.

> NOTE
>
> When you export a project, the export includes all the assets and resources, such as original templates, components, styling, and so on, contained in that project. Therefore, we recommend speaking to the Template Designer before exporting projects as they are responsible for the management of the templates and styles within the projects.

To export a project:

1. Open an organization in the Navigator pane and select the project.
2. Click Export Project.

> NOTE
>
> Also check how to export a Maestro asset.

Next, learn how to import a project.

Import a Project

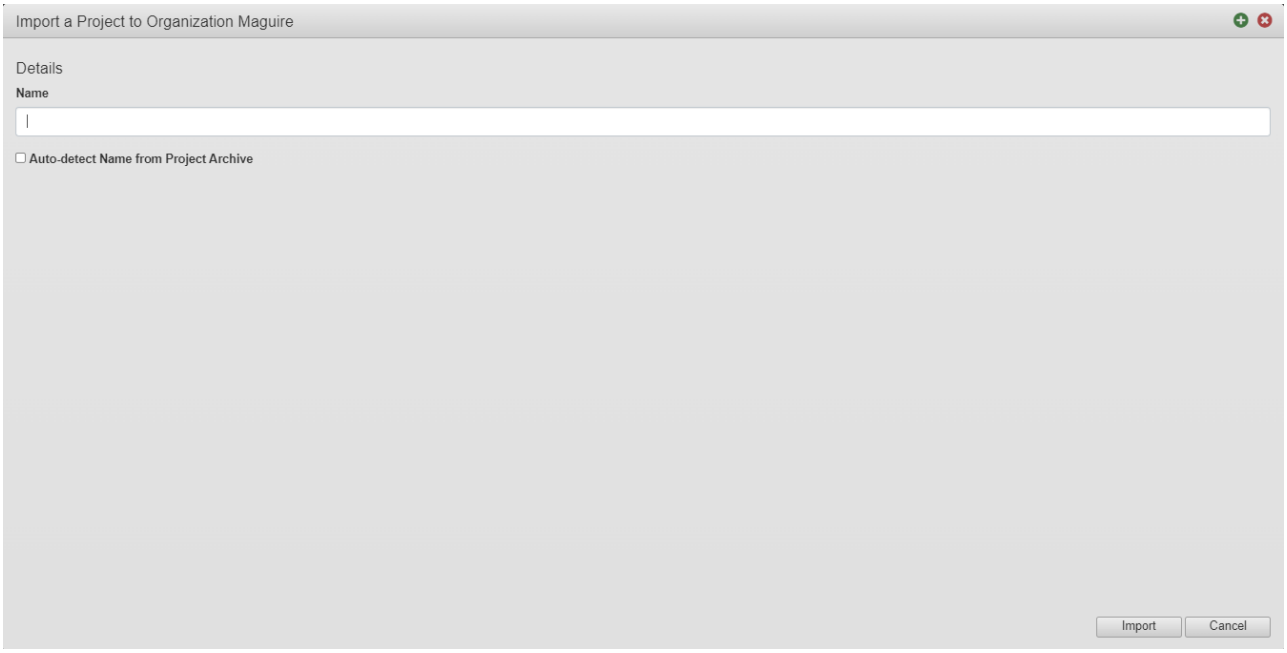
Journey Maestro allows you to import projects, which you can use to move or copy a project to a different organization.

NOTE

We recommend speaking to the Template Designer before importing projects as they are responsible for the management of the templates and styles within the projects.

To import a project:

1. Open an organization in the Navigator pane where you want to import the project to.
2. Click Import Project..



3. Enter a new project name in the Name field or select the Auto-detect Name from Project Archive checkbox to populate the name from the exported project as the archive ZIP file
4. Click Import.
5. Choose the exported project as the archive ZIP file and click Open.

NOTE

Also check how to import a Maestro asset.

Next, learn how to view project details.

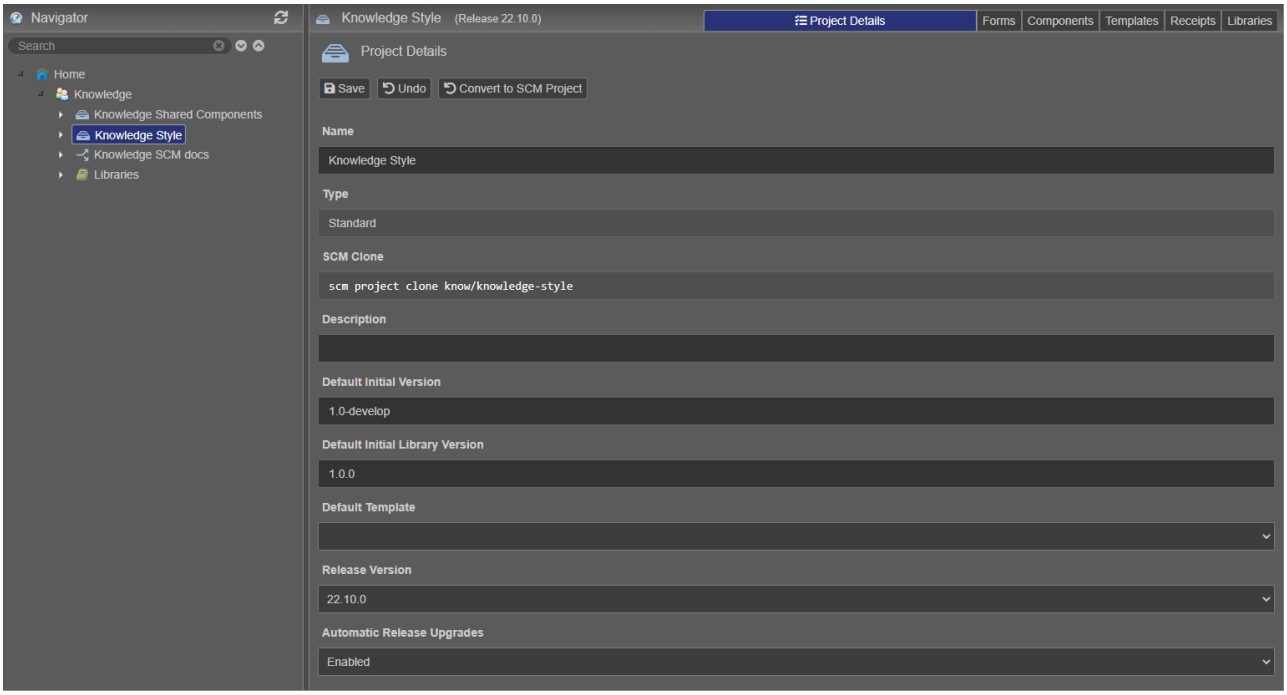
View Project Details

Journey Maestro allows you to view project details as well as update some of its configuration. You may need to do this after the project is created. For example, you may want upgrade your project to the latest Maestro's release version so you can start using the latest product's features.

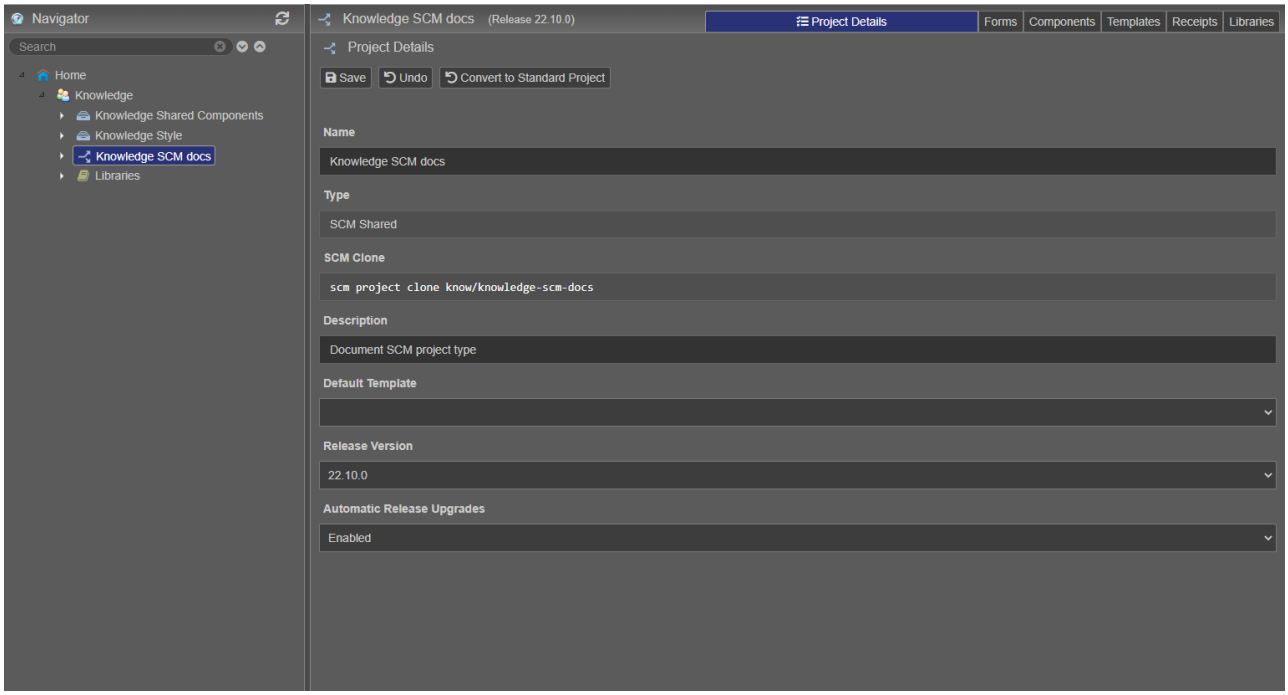
To view the project details:

1. Open a project in the Navigator pane and select the Project Details tab to view project configuration. The configuration is slightly different for the Standard and SCM projects as shown below:

   Standard Project



   SCM Project



2. Check the current Maestro version used by the project. In this example, it is Release 22.10.0.
3. Edit a project name in the Name field.
4. Check a project type in the Type field, which can be one of the following:
   - Standard - a source code of the project is managed by Maestro
   - SCM - a source code of the project is managed externally using various SCM, such as Git[1]. Use this project type if collaborative work on a project is required.

> NOTE
>
> The SCM project type doesn't have any impact on the content of forms. It only affects the versioning options shown in the Management Dashboard.

> NOTE
>
> If you are a Form Builder, you need to have the SCM permissions assigned to you.

[1]Git is a version control system for tracking changes in computer files and coordinating work on those files among multiple people. It is primarily used for source code management in software development,[8] but it can be used to keep track of changes in any set of files.

- SCM Private - same as SCM but only project owners and Maestro administrators have access to projects of this type.

  NOTE

  This type is available only when the project is created with the `scm project add` command.

5. Copy a command from the SCM Clone field and copy it to your SCM tool to clone the project, for example, `scm project clone know/knowledge-style`.
6. Provide a meaningful project description in the Description field.
7. Select a version from the Default Initial Version dropdown list, which is used as a base version when new forms and form versions are created. You can change this value at any time, but this only impacts new forms and assets within this project. Version numbers of existing forms are unaffected.
8. Select a template from the Default Template dropdown list, for example, Avalon Form Template.
9. Select a Maestro version from the Release Version dropdown list to upgrade the project manually. You have to do it when the Automatic Release Upgrade setting is set to Disabled, see below, or then Maestro is upgraded to a major version.
10. Select one of the following options from the Automatic Release Upgrade dropdown list:
    - Enabled - to upgrade the project automatically, meaning whenever Maestro software is upgraded to a new, minor release, the project is automatically upgraded as well, for example, from 21.10.2 to 21.10.3. However, this feature only applies to minor releases. If Maestro is upgraded with a major release, projects always need to be manually upgraded. This is the default option and we recommend using it.
    - Disabled - to upgrade the project manually.
11. Click Save to update the changes.
12. Click Undo to discard the changes.
13. Click Convert to SCM Project to convert the project from the Standard type to the SCM type so you are able to manage its source code using your Source Code Management tools.
14. Click Convert to Standard Project to convert the project from the SCM type to the Standard type so you can use Maestro functionality to manage versioning.

Next, learn how to view project's assets and resources

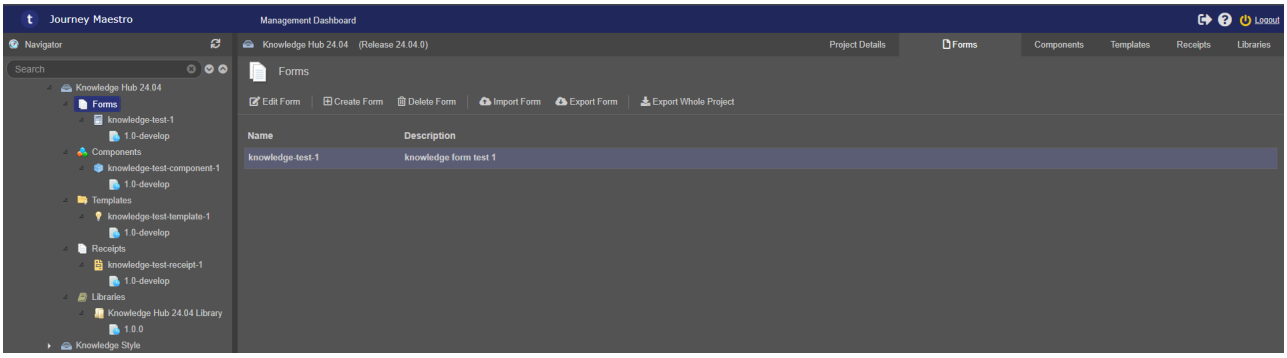
View Project Assets and Resources

Journey Maestro allows you to view and manage projects and their designs and assets, such as forms, components, templates, and receipts, and resources, such as libraries.

Forms, components, templates, and receipts are all designs that you can access from a project. The view UI functionality is identical for all designs, so we illustrate it using a form as a design.

To view the list of forms in an project:

1. Open a project in the Navigator pane.
2. Select the Forms tab to view and manage a list of forms belonging to the project.



   The list includes the following information:

   - Name: a form name.
   - Description: a meaningful description of a design.
3. Click Edit Form to edit a selected form.
4. Click Create Form to create a new form.
5. Click Delete Form to delete the selected forms and all their designs from Maestro. This operation is irreversible.

   > TIP
   >
   > Use `Shift` or `Ctrl` to select multiple designs for bulk operations on actions, such as Delete, Export and Download. | 21.05 This feature was introduced in 21.05.

6. Click Import Form to import a form.
7. Click Export Form to export selected forms.
8. Click Export Whole Project to export the project including all assets and resources.
9. Double-click a selected form to view it.

NOTE

To check project's details and configuration, click Project Details.

Next, learn how to view project's libraries.

Maestromo Libraries Overview

Journey Maestro uses the concept of libraries, where a library is a collection of resources that can be made available to Maestro's forms, components, and templates. Resources can be:

- Images
- Styles
- Fonts
- Scripts
- Components
- Templates
- Languages
- Shared Translations
- Domain Models

Maestro defines resources as stand-alone objects contained by assets like shared components and templates. Resources are identified by their name and by their values, if there are multiple resources with the same name. The version of the resource that is 'live' and shared across forms and templates is the last version to be published to a library (taking into account precedence rules).

You can create libraries for organizations or projects and add (publish) resources to these libraries. This allows anyone with access to these organizations or projects to share and reuse the resources. Maestro comes with the editor that is easy to use when you want to view and manage resources in a library.

The text-based resources, such as styles and scripts, can contain either Windows (`CRLF` or `\r\n`) or UNIX (`LF` or `\n`) new line characters. Importing a resource with one line ending format over the other won't cause any issues.

> NOTE
>
> A resource must be published to a library to make it available to forms, components, or templates that use that library.

We encourage Template Designers and Form Builders to use libraries to avoid resource duplication, streamline resource reuse, and promote changes to multiple forms in a single action thereby enforcing a consistent user experience.

To emphasize the importance of libraries, consider the following use cases.

Use Case 1: Template Designer

As a Template Designer, you want to ensure that corporate branding is consistent across a project or organization. If the resources that implement your brand are used in many different places, it's easy for those resources to diverge as branding guidelines evolve.

To solve this problem, a Template Designer can create a library named "Corporate Brand", for example, containing resources that implement the corporate brand, and make that library available to the organization. This library acts as a single source of truth for corporate branding. All templates, forms, and components within that organization use the resources in the "Corporate Brand" library, thereby ensuring compliance with branding guidelines. If the guidelines change, the Template Designer need only publish the changes to the library for them to be reflected throughout the organization.

Use Case 2: Form Builder

As a Form Builder, you want to ensure that form elements are laid out correctly, behave correctly across multiple device types, and accurately validate a range of data types. If an organization has a number of forms that ask for the customer's address, for example, it makes sense for the form fields that ask for the address to always look and behave the same way. If they don't, the inconsistency can lead to a frustrating user experience.

To solve this problem, a Form Builder can create a range of components that behave as desired and save those components to a common library. This library can be attached to an organization or project, and if those components ever need to be updated, the changes only have to be made once in the library rather than everywhere the components are used.

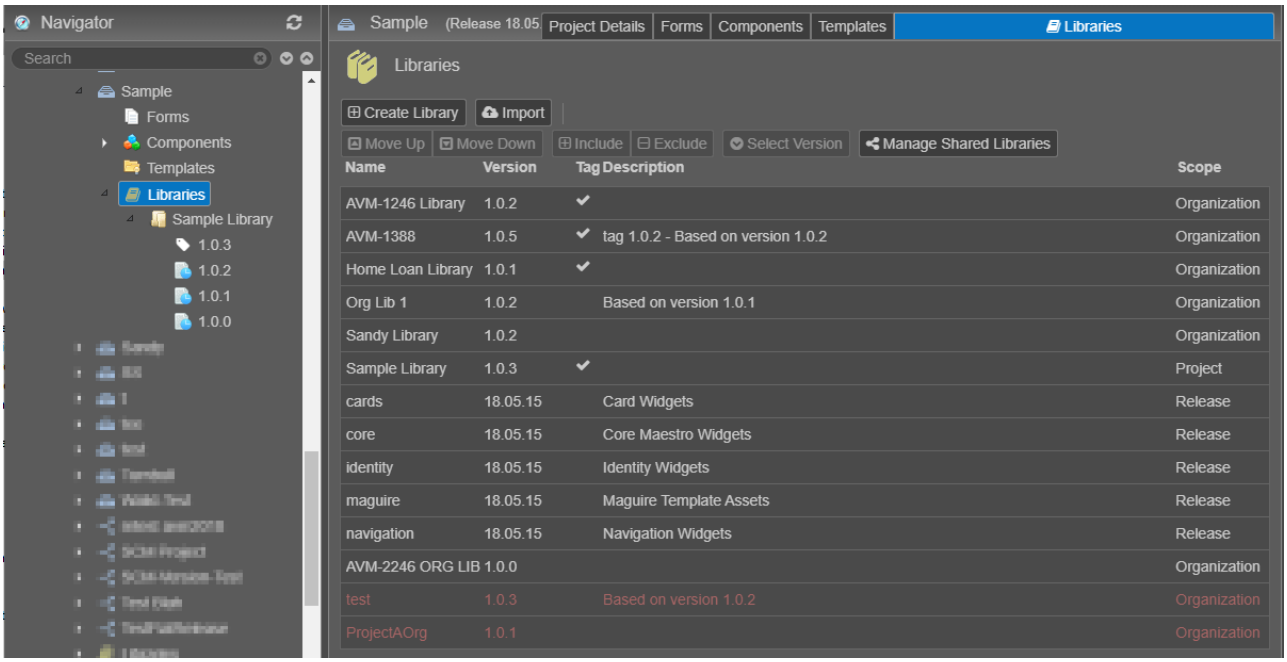
Next, learn how to view libraries.

View Libraries

Journey Maestro allows you to view and manage libraries that you can use to build your forms.

To view and manage libraries:

1. Open your project in the Navigator pane and click Libraries to see the list of libraries available in your project. You can also click your project and select the Library tab.



   The list of libraries is ordered based on library precedence and includes the following information, which helps you use libraries correctly:

   - Name - a name of a library, which is not unique across different organizations
   - Version - a library version
   - Tag - marked with if a library is tagged
   - Description - a meaningful description of a library
   - Scope - a library scope

2. Click Create Library to create a new library.
3. Click Import to import a library.
4. Click Move Up to move the selected library up in the desired order of precedence.

   NOTE

   Use drag and drop to rearrange the order of libraries. | 20.11 This feature was introduced in 20.11.

5. Click Move Down to move the selected library down in the desired order of precedence.

   NOTE

   Use drag and drop to rearrange the order of libraries. | 20.11 This feature was introduced in 20.11.

6. Click Include to include selected libraries to your project and forms. You have to do it to reinstate excluded libraries, see below. The included libraries remain at the bottom of the list, so you may need to move it up to give it the desired precedence.

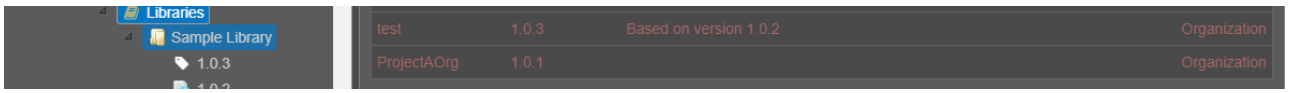
   NOTE

   Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.

7. Click Exclude to make selected libraries unavailable to your project and forms. By default, all organization libraries are available to all projects in the organization. However, for some projects, you may not want some libraries to be available and, thus, need to exclude them. The excluded libraries are moved to the bottom of the library list and displayed with a red font to indicate that the library and its resources are not available to the project.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.



8. Click Select Version to chose a library version to use in your project, for example, change from 1.0.1 to 1.0.2.
9. Click Manage Shared Libraries to manage selected libraries.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.

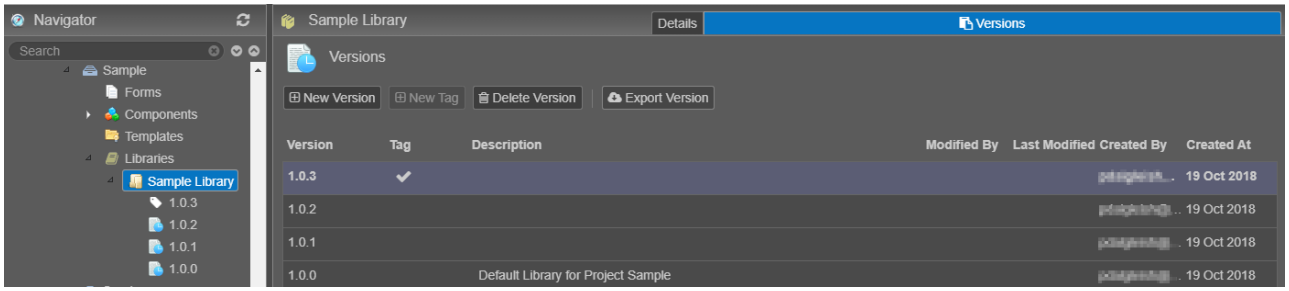
Next, learn how to view library versions.

View Library Versions

Journey Maestro allows you to view and manage library versions that you can use to build your forms.

To view the list of library versions:

1. Open your project in the Navigator pane and click Libraries to view the list of libraries available in your project.
2. Select a project library in the Libraries folder to view available versions of this library.



   The libraries are listed in ascending order based on library version. The list includes the following information, which helps you use libraries correctly:

   - Library version
   - Whether a library version is tagged or not
   - Library version description
   - Who modified and created a library version
   - When a library version was created
3. Click New Version to create a new version of a selected library.
4. Click New Tag to tag a selected library version.
5. Click Delete Version to delete the selected libraries.

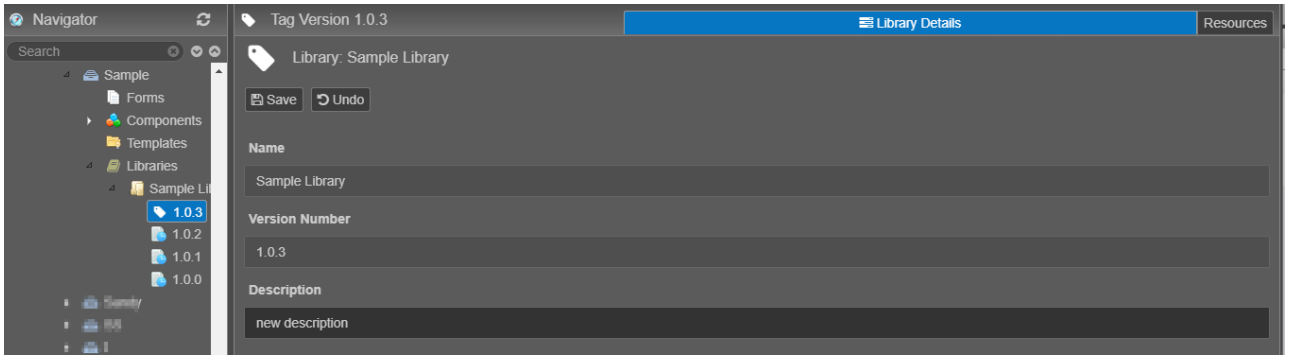
   NOTE

   Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.

6. Click Export Version to export the selected libraries.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple libraries. | 21.05 This feature was introduced in 21.05.

7. Double-click a selected library version to view the library's details where you can update the **Description** field. Click Save to update the changes.



> NOTE
>
> You can't update the name and version number of the library.

8. Select the Resources tab to see the list of resources published into the library.

As you can see, there are a few things you can do to manage libraries. Here's more information on how to use organization libraries.

Next, learn about library precedence.

Library Precedence

When you select a project's Libraries folder, you'll see the list of libraries available to that project. By default, the libraries will be sorted from newest (most recently added to the project) to oldest, with the release libraries at the bottom and user-created libraries at the top. If a new library becomes available to the project, it will be added to the top of the list. This is significant because the order of this list can affect the way your forms look and behave.

Name	Version	Description	Scope
Credit Card Library	1.0.0	Default Library for Project Credit Card	Project
Training Styles Library	1.0.0	A library to publish Training styles.	Organization
exchange.mitek.tiden	1.0.0	Mitek Tiden	Organization
Avoka Library	1.0.0		Organization
cards	18.05.3	Card Widgets	Release
core	18.05.3	Core Maestro Widgets	Release
identity	18.05.3	Identity Widgets	Release
maguire	18.05.3	Maguire Template Assets	Release
navigation	18.05.3	Navigation Widgets	Release

When a form needs a resource, it will look for it by name in the project's libraries and use the first one it finds with the specified name.

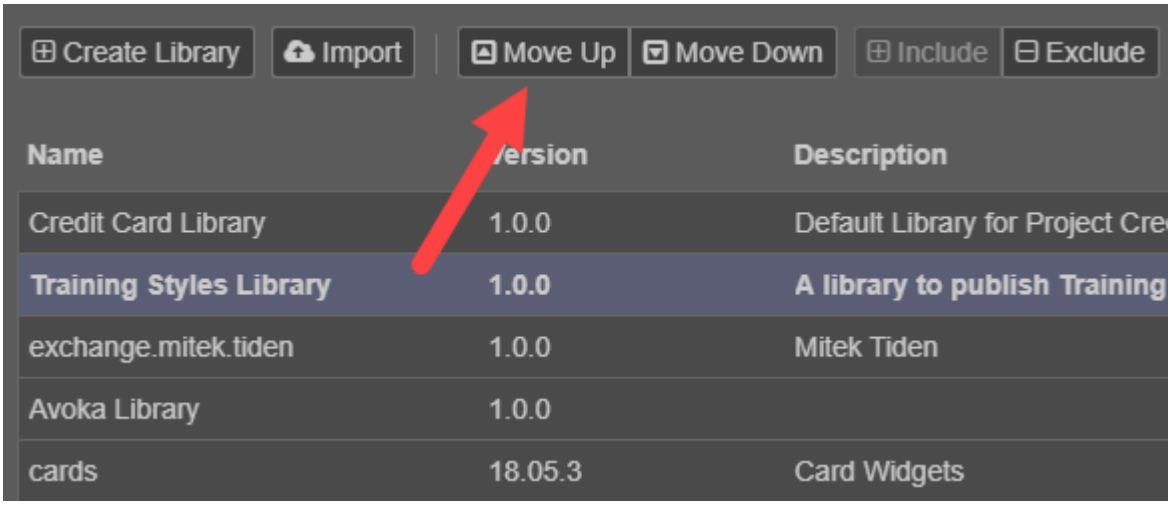
Here's an example:

Imagine there's a style in one of the default libraries that you want to override. If you create your own library with a rule that overrides the style, the rule you've defined will take precedence over the original one. But what happens if you create a second library that also overrides the same rule? Which rule will be used by the form?

The rule inside the most recently created library will be used because libraries are given precedence based on their order in the library list and the most recently created library will be at the top of the list.

In other words, **libraries higher in the library list are considered more important than libraries lower in the list**. If you want the rule from the second library to not take precedence over the first library, you would need to move it further down the list.

To control the precedence of libraries, select a library and use the Move Up and Move Down buttons to adjust its position in the list.



NOTE

The order of the release libraries should not be changed as this may lead to unexpected results.

For similar reasons, it is strongly recommended that you do not change any resources at the form level. Form level resource changes override all library resources, so any form resource change can lead to an inconsistent user experience.

You can publish a shared component in to two different libraries. In this case, the version of the component in the library with higher precedence will be used. This is the library higher up in the list of libraries for your project.

Next, learn about library scope.

Library Scopes

Each Maestro library has a scope that determines which forms have access to that library's resources. Maestro supports the following scopes:

- Release -the libraries are locked down and tied to a specific release. These libraries are global libraries available across the whole Maestro environment.
- Organization - the libraries are tied to an organization and available to its projects.
- Project - the libraries are tired to one project only.
- Shared organization- the organization libraries that can be shared with other organizations. They can even be shared across all organizations in your environment making these libraries global. | 20.11 This feature was introduced in 20.11.

To view a library's scope, navigate to a Maestro project's Libraries tab and look at the Scope column:

Name	Version	Description	Scope
Credit Card Library	1.0.0	Default Library for Project Credit Card	Project
Training Styles Library	1.0.0	A library to publish Training styles.	Organization
exchange.mitek.tiden	1.0.0	Mitek Tiden	Organization
Avoka Library	1.0.0		Organization
cards	18.05.3	Card Widgets	Release
core	18.05.3	Core Maestro Widgets	Release
identity	18.05.3	Identity Widgets	Release
maguire	18.05.3	Maguire Template Assets	Release
navigation	18.05.3	Navigation Widgets	Release

NOTE

If you navigate to the Libraries tab of an organization, you will only see the organization-level libraries.

A **release library** is a built-in library for a specific Maestro release that is always available to your Maestro projects. The resources available in a release library are also backwards-compatible with earlier Maestro releases. Release libraries include:

- Cards
- Core
- Identity

- Maguire
- Navigation

These libraries contain the standard Maestro resources that need to be accessible to every form. They cannot be removed or modified and, because of library precedence, should not be moved out of their original order.

An **organization library** is a user-created library that is attached to an organization. Any projects and forms within the organization will have access to the resources in these libraries. By default, there are no organization libraries.

A **project library** is a library attached to a project. Any forms within a project can access the resources in it's project libraries. When a project is created, a project library is created for it automatically. You can create additional project libraries as you need them.

> NOTE
>
> A project library is visible only to the project in which it was created. Project libraries are never visible under an organization's Libraries folder.

There is no limit to the number of organization and project libraries you can have. However, there are some important considerations that may help you to decide how many libraries you need and what scope they should have:

1. What is the best way to group your assets and resources into separate libraries?
2. Should a library be attached to an organization or a project?
3. Will having too many (or too few) libraries affect their manageability?

Next, learn about shared libraries.

Shared Organization Library

Journey Maestro allows you to create and use libraries containing forms resources, such as components, within a single or across multiple Maestro environments. Each library has a scope or a library level that determines which forms have access to that library's resources. Maestro always has 3 library levels - release, organization, and project libraries.

Maestro version 20.11 has introduced a concept of shared organization libraries, which are centralized organization libraries that can be shared across other organizations. They can even be shared across all organizations in an environment making these libraries global. The shared library is then used by projects within these organizations. From the client's source project, a shared library is similar to a release library with a fine grained control over where this library is shared and used. One of the main advantages of a shared organization library is that you can develop a new library in your own specific organization, make some changes to it and push the changes to other organizations and projects where the library is used.

Shared organization libraries can be used as:

Shared

One client that has multiple organizations wants to share assets across one or more of those organizations. Your company has different business units that each use a different Maestro organization. You are developing and maintaining common components that can be used by all business units.

Global

A site administrator wants to share assets globally across all organizations. You run a Maestro multi-tenanted environment and want to provide your clients with common templates that are centrally maintained.

Shared organization libraries provide the following functionality:

- Share a tagged organization library with one or several other organizations
- Share a tagged organization library globally
- Allow organizations to manage the use of shared libraries in their projects
- Allow projects to manage the use of shared libraries in their project library list
- Restrict removal of libraries that are in use
- Add new permission levels to share and un-share libraries. If you have access to an organization that the library has been shared with, then you can access the library when the form editor loads.

NOTE

When you can use the offline build tool, which supports non SCM projects, with shared and global organization libraries, a client will download them and use them within the build. Thus, sharing libraries needs to be carefully considered, so people don't get libraries that shouldn't have been shared with them.

How to Share Organization Libraries

You can use a separate organization where you develop libraries you want to share. Then, you tag them and share as required.

NOTE

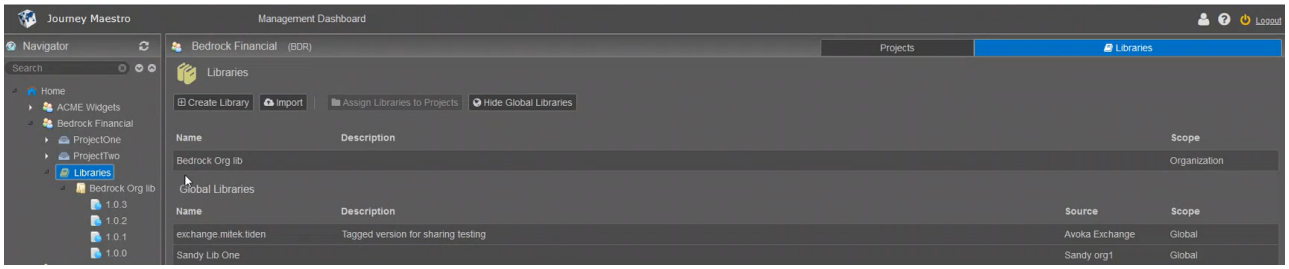
You can share only tagged read-only organization libraries.

NOTE

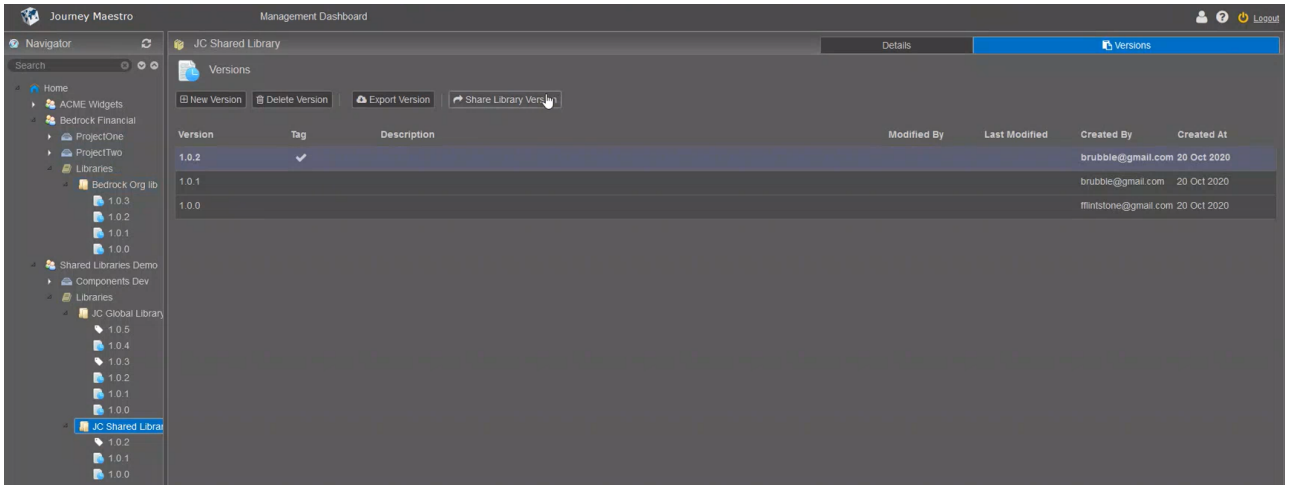
You can't share a library with the source client.

To share a library:

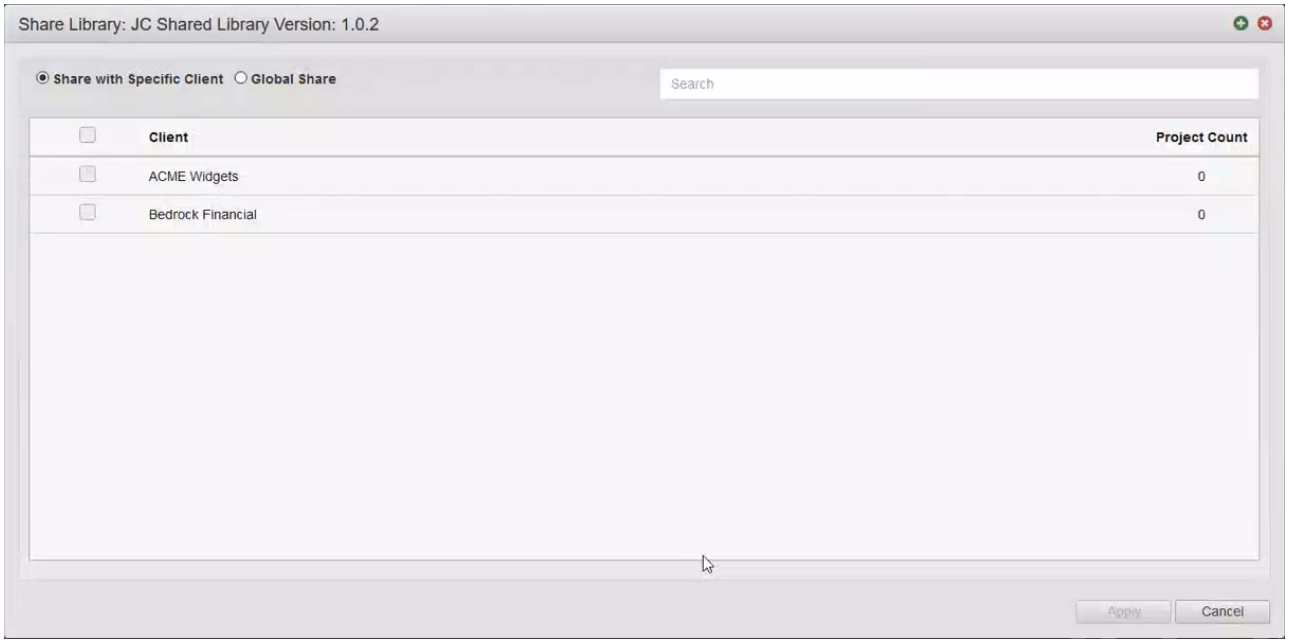
1. Open an organization, in this example it is Shared Libraries Demo, where you develop libraries you want to share.
2. Select a library. This can be a library of components, for example, the second-components.
3. Open an organization you want to share this library with, for example, Bedrock Financial.
4. Select the organization's libraries to view all libraries used by this organization. In this example, there are 2 global libraries but there are no shared libraries in the list.



5. Open the Shared Libraries Demo > Libraries and select your library to share, for example, JC Shared Libraries.
6. Select a version of a library you want to share with the Bedrock Financial organization, for example, version 1.0.2.
7. Tag the library, so it becomes read-only making it more secure to share.



8. Click Share Library Version to specify how and with whom to share the library.

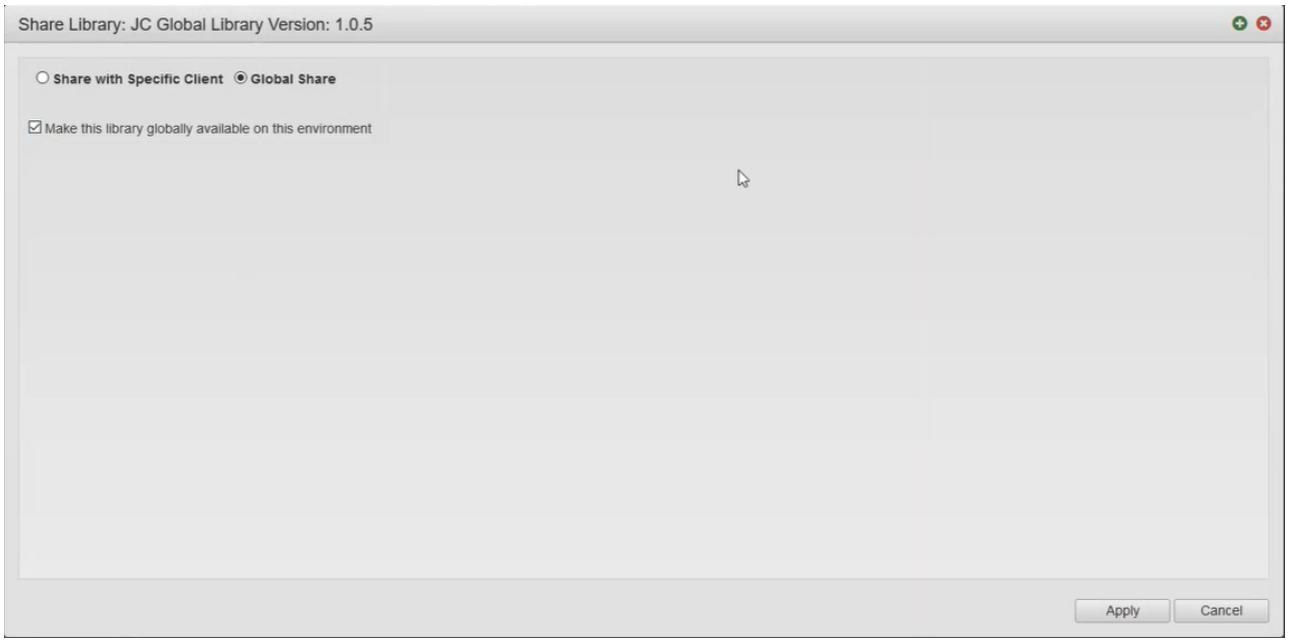


9. Select the Share with Specific Client option to share with specific organizations.
10. Select one, several, or all organizations from the Client column to share the library with. Use the search bar to look for organizations you want to share the library with, for example, Bedrock Financial.



You can see the number of projects that use this shared library in the Project Count column. In this case, there is only 1 project that uses it.

11. Alternatively, select the Global Share option and select the Make this library globally available on this environment checkbox to share it with all organizations globally.

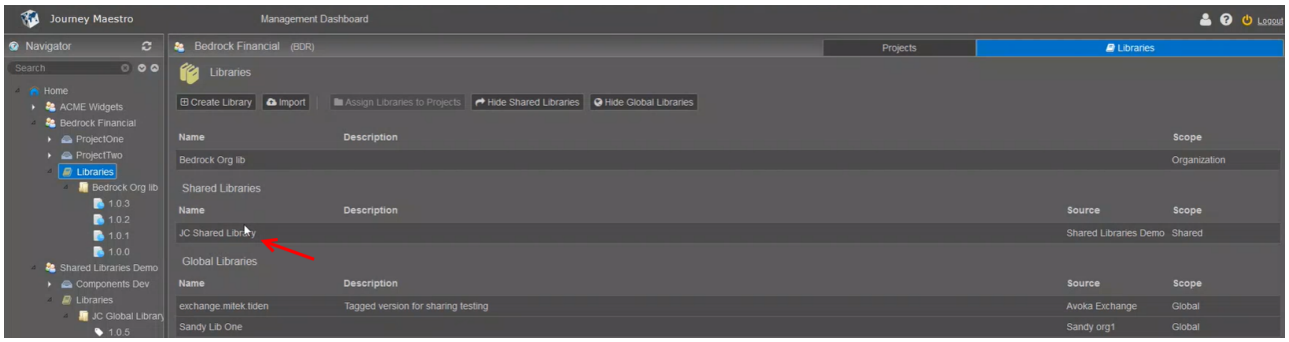


NOTE
You need to have the Library Share Global permission to be able to use the Global Share option.

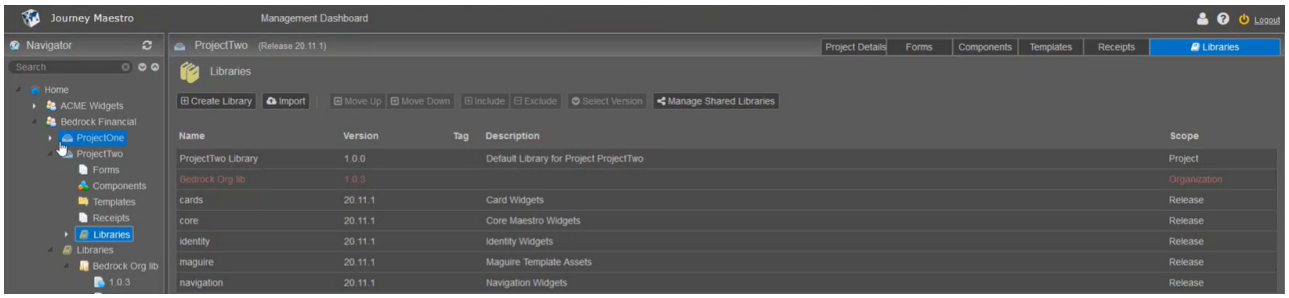
12. Click Apply to share the library with the selected organizations.

> NOTE
>
> You still need to assign the shared library to a project or projects under the selected organizations.

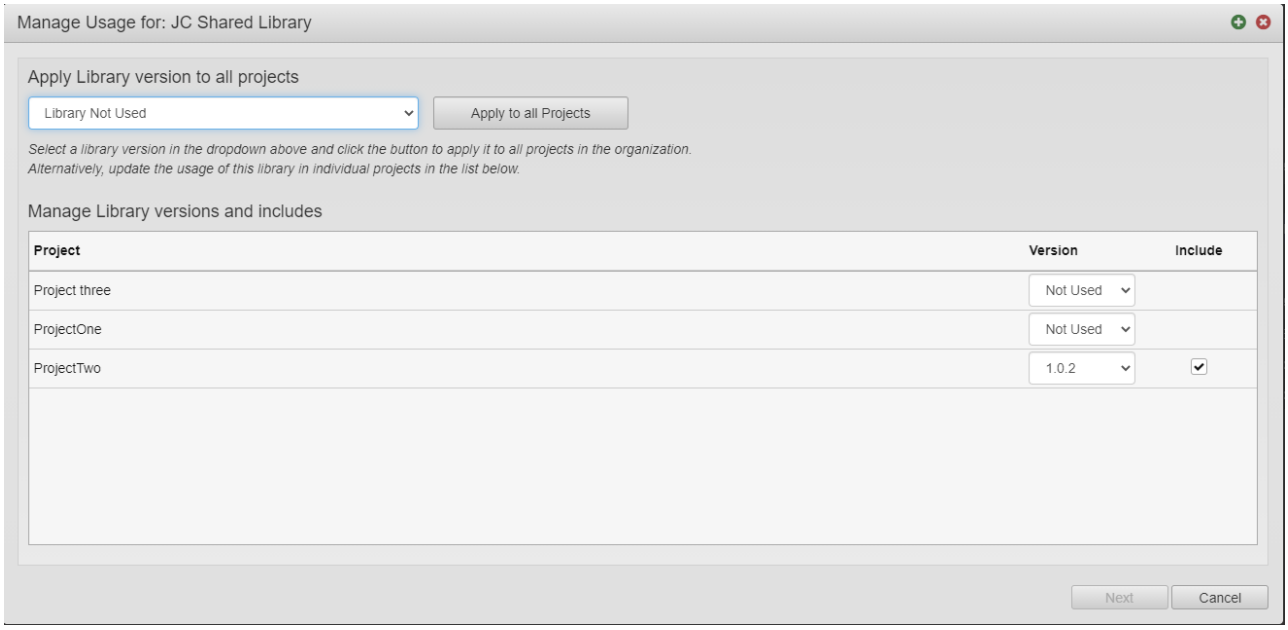
13. Go back to the Bedrock Financial organization and select Libraries to check the new shared library is added to the list of available libraries.



This means the JC Shared Library can be used in this organization, but it still needs to be assigned to projects. You can open a project, for example, ProjectTwo, and select Libraries to see that this shared library is not in there yet.



14. Click Assign Library to Projects to choose projects to assign the library to.

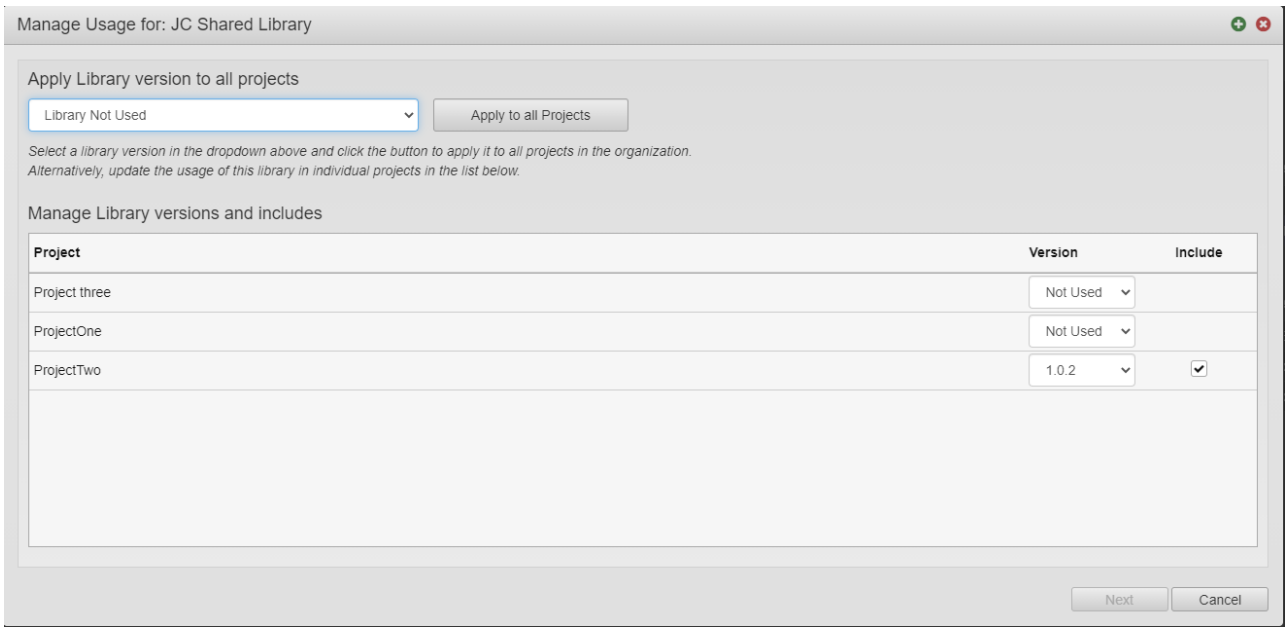


15. Select a library from the dropdown list, for example, JC Shared Library 1.0.2.

> NOTE
>
> Select Library Not Used to un-assign the library.

16. Select a library version from the Version dropdown list for a project you want to share it with. For example, select version 1.0.2 for ProjectTwo.

    If you want to assign the library to all projects in the list, click Apply to all Projects.

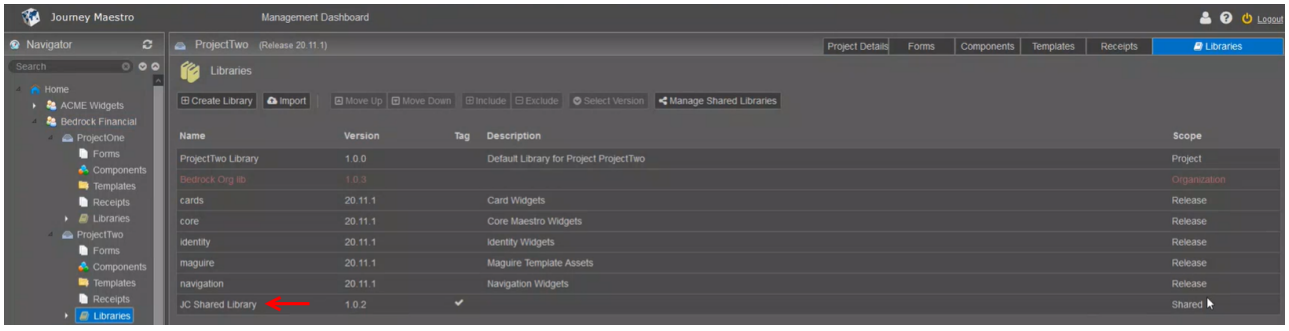


17. Select the Include checkbox to include this library.
18. Click Next to review the changes and confirm the sharing options.

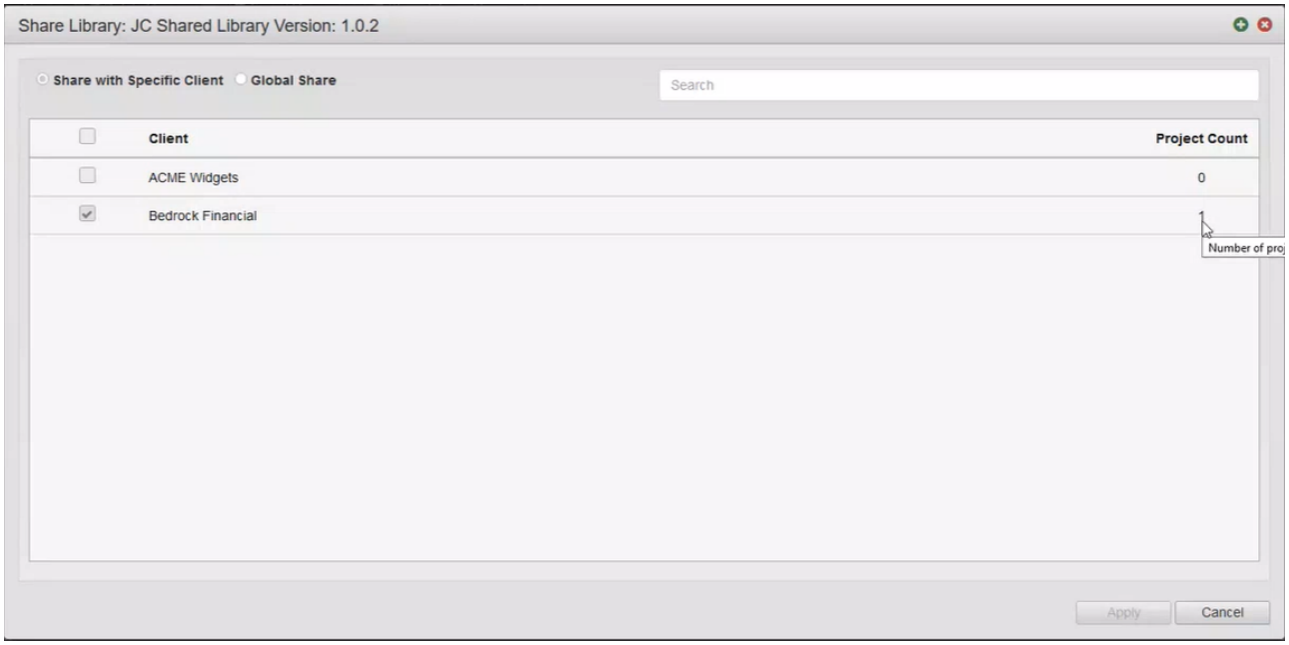


> NOTE
>
> The changed libraries are shown in blue.

19. Click Apply to assign the library to the project. Check the shared library is added to the list of available libraries of this project.



20. Drag and drop the JC Shared Library to change its order in the list of libraries. Alternatively, you can scroll through the list using the Move Up and Move Down buttons.
21. Open the Shared Libraries Demo > Libraries > JC Shared Libraries and click Share Library Version to see in how many projects it is used.



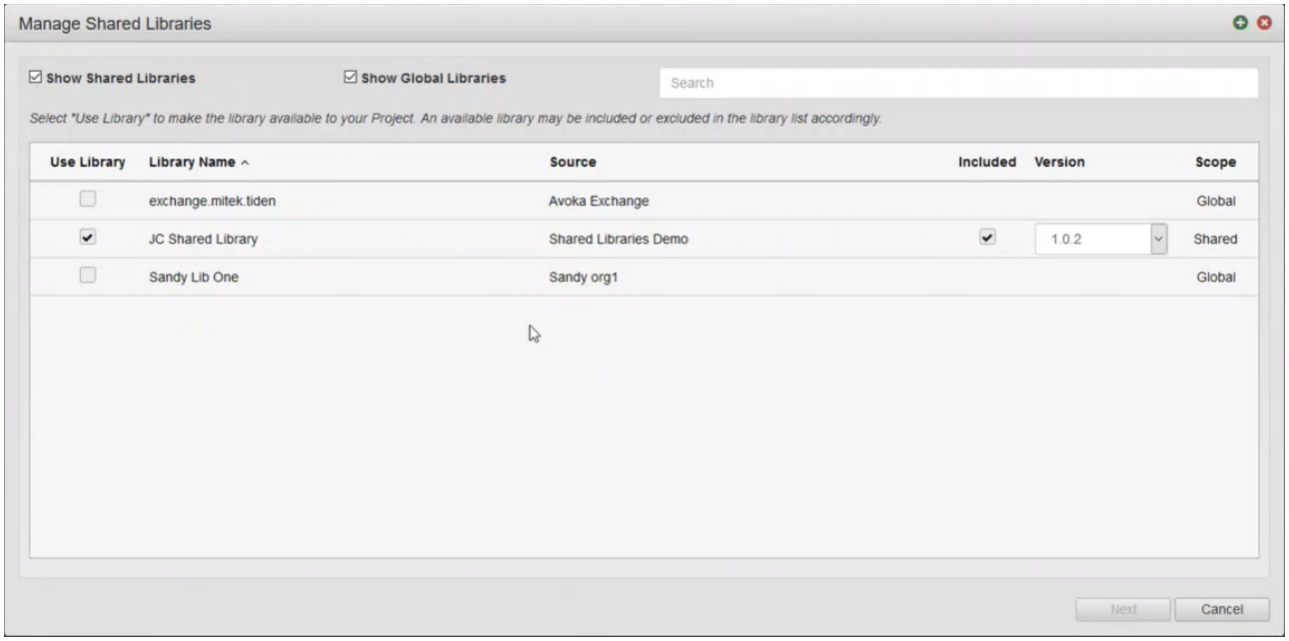
Now, you have a centralized shared library that is shared across the Bedrock Financial organization and it's applied to a project library, so you can use the library in your forms.

> NOTE
>
> You can't remove the shared library from the organization by clearing the checkbox if there are projects within this organization that use it. You need to remove it from the projects first.

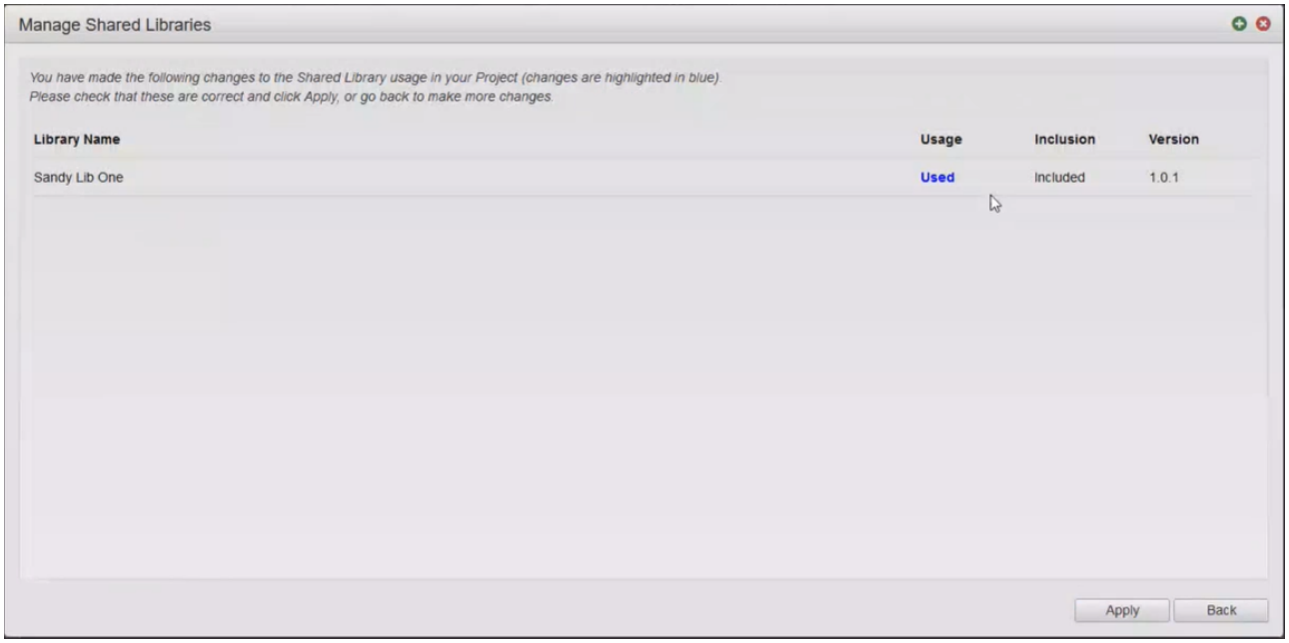
Manage Shared Organization Libraries

To manage shared libraries with individual projects:

1. Open an organization.
2. Select a project and click Libraries.
3. Click Manage Shared Libraries to manage shared libraries from the project.



4. Select the Show Shared Libraries and Show Global Libraries checkboxes to filter the list of shared libraries.
5. Select the Use Library checkbox to make use of a shared library.
6. Check the name of the library in the Library Name column. Different shared libraries can have the same names, so check the Source column to see where the library is coming from.
7. Select or clear the Included checkbox to include or exclude a shared library.
8. Select a library version from the Version dropdown list.
9. Check the scope of a shared library in the Scope column, which can be:
    - Global - Any new organizations created after that will inherit this shared (global) library. You can check the scope of the lib is set to global to confirm this lib is globally shared.
    - Shared
10. Click Next to review and confirm the changes you have done to the library configuration.



11. Click Apply.
12. Check the shared library configuration changes in your project.

Exclude Shared Organization Libraries

To exclude the shared library:

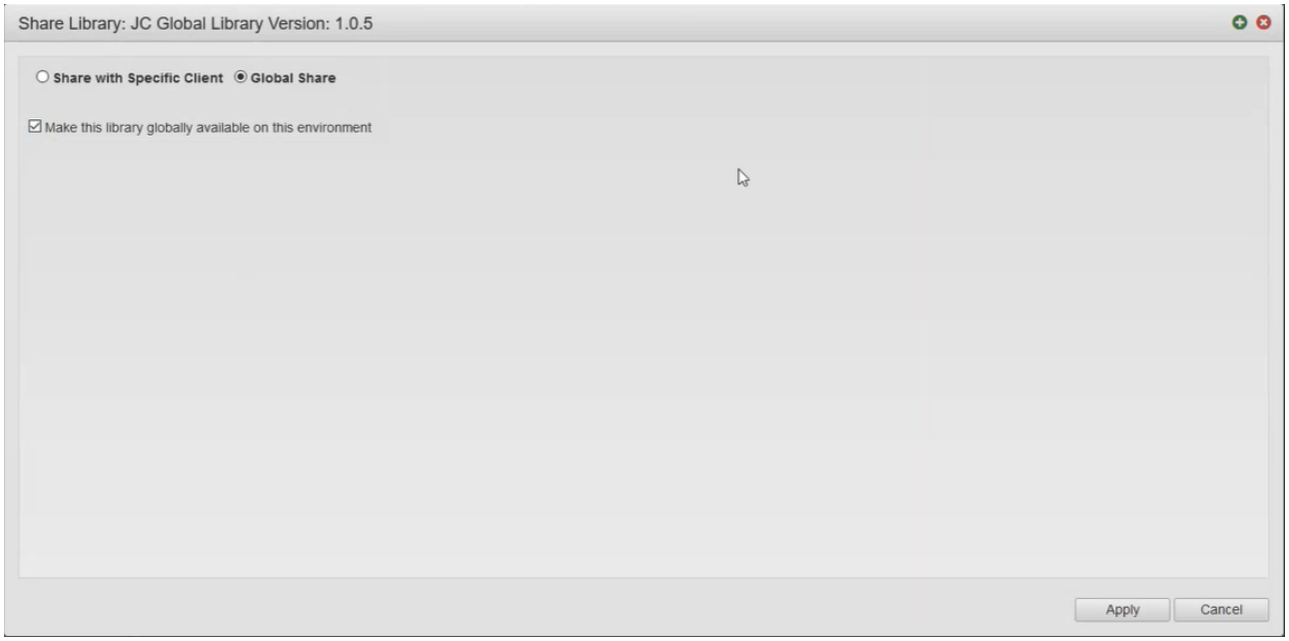
1. Open an organization
2. Select a project and click Libraries.
3. Select a shared library and click Exclude. Th.e excluded library doesn't move down the library list, as it used to do prior to this release.

Un-share Global Organization Libraries

As discussed above, you can share organization libraries across all organizations, which makes them global libraries. Sometimes you need to un-share them. Un-sharing when it is shared with specific clients is about unticking the checkboxes in the list, libraries that are included in projects will be read-only until no more projects have them included, if they are excluded then they can be unshared. However, you can't un-share a library with specific clients that you don't have access to.

To stop using the global organization library:

1. Open an organization.
2. Select a project and click Libraries.
3. Click Share Library Version.



4. Select the Global Share option.
5. Clear the Make this library globally available on this environment checkbox to remove shared library from all organizations.
6. Click Apply.

NOTE

You can't un-share the global library if there are projects that use it. You need to remove it from the projects first.

Add Sharing Permissions

You need to have the following permissions set up in Manager to be able to share libraries:

- Library Share
- Library Share Global

NOTE

When you add sharing permissions to users on multi-tenanted Maestro environments, make sure users can't and don't share content between competitor organizations as it may cause leaks or conflicts of intellectual property.

To add the permissions:

1. Log onto Journey Manager.
2. Assign the following permissions to a role you use to develop or administer Maestro forms.

- Library Share - most developers can have this permission.
- Library Share Global - only admins, for example, the Maestro Global Lib Admin role, should have this permission, because incorrectly shared library can cause leak of intellectual property.

Next, learn about library versions.

Export a Library

Journey Maestro allows you to export libraries, so you can easily move or copy them into different organizations or environments, as well as create a back-up of libraries. However, library resources are exported as published versions, which means that the resources will not be editable when imported. To edit them, you will need the access to the original library and its resources.

To export a library:

1. Open an organization or project in the Navigator and select a library in the Libraries folder.
2. Select the library version you want to export and click Export Version. The library will be downloaded as a ZIP file.

   NOTE

   The library ZIP file name starts with `maestro-org-lib` or `maestro-project-lib`, reflecting the library scope, and includes the library name, and export date.

Next, learn how to import a library.

Import a Library

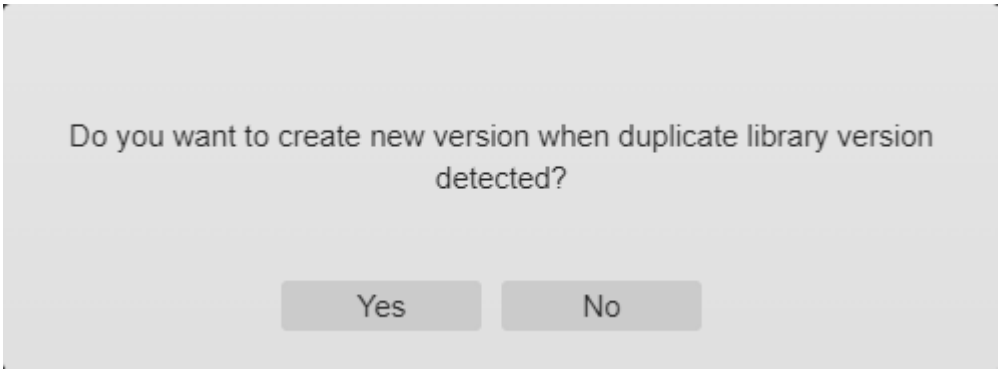
Journey Maestro allows you to import libraries, so you can easily move or copy them into different organizations or environments, as well as create a back-up of libraries. However, library resources are exported as published versions, which means that the resources will not be editable when imported. To edit them, you will need the access to the original library and its resources.

NOTE

If a project library contains resources that need to be used across multiple projects, don't import that library into multiple projects as this will create unnecessary duplication. Instead, move the library to an organization-level library. Any resources in the organization library will become available to all projects within the organization.

To import a library:

1. Open an organization or a project in the Navigator.
2. Select Libraries and click Import.
3. Click Yes to confirm to create a new version of a library if a duplicate version is detected.



4. Select a previously exported library as an archive ZIP file and click Open.

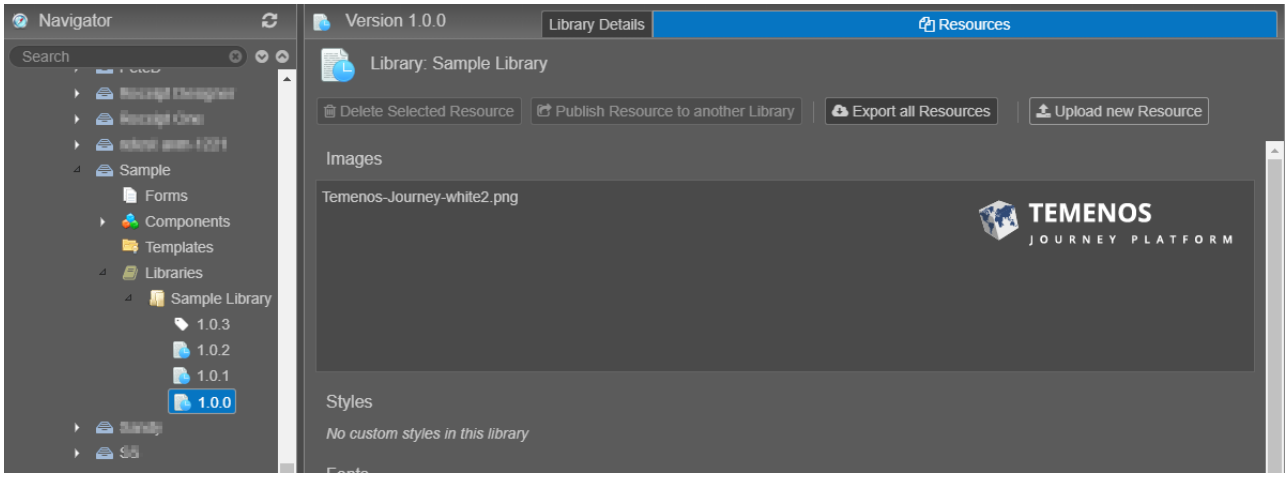
Next, learn how to publish resources to another library.

Publish Resources To Another Library

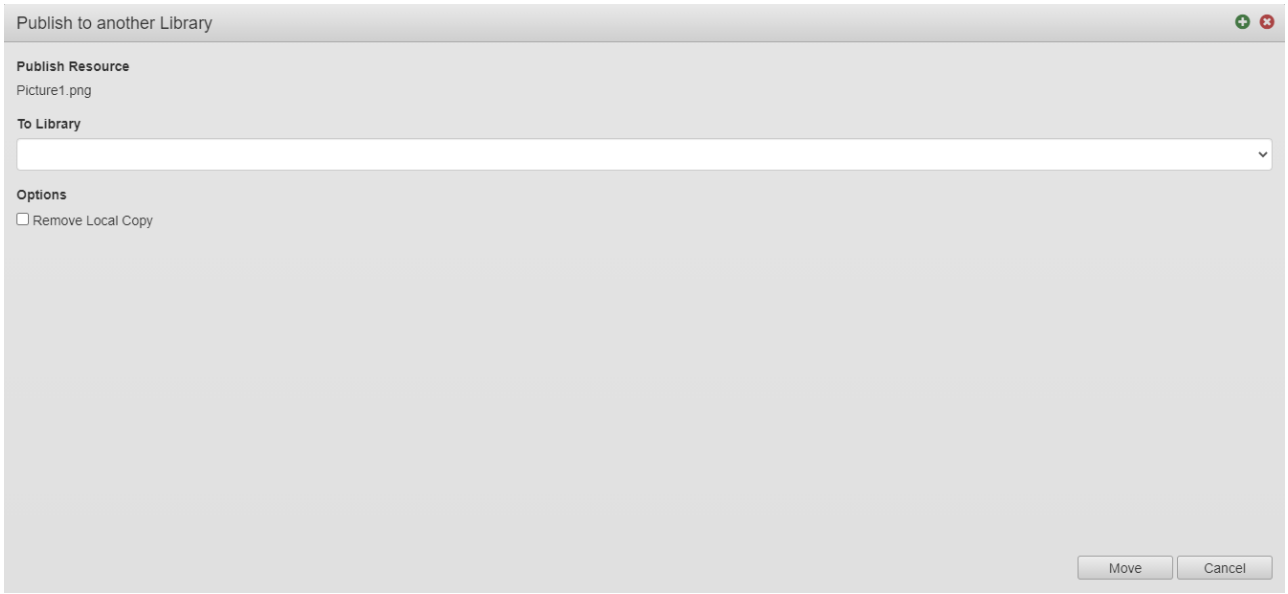
Journey Maestro allows you to publish a resource into a library version. You may want to do this to re-publish already published resource to a different library version, for example, to promote a resource from a project library to an organization library, or to share a project resource in other projects.

To publish a resource to another library version:

1. Open a resource in Maestro.



2. Select the resource and click Publish Resource to Another Library.



3. Select the library to where you want to publish the resource from the To Library dropdown list.

4. Select the Remove Local Copy checkbox to remove the resource from the current library. This ensures that the resource is available only in the destination library, assuming it was previously available only in the current library.

   NOTE

   We recommend selecting Remove Local Copy to prevent resource duplication in multiple libraries.

5. Click Move.

Next, learn about organization libraries.

How to Use Organization Libraries

Maestro allows you to create and update libraries. If you've never used a library before, or if you're not sure how they fit into the Maestro workflow, follow along to see them in action. This guide assumes you understand the basics of libraries; if you don't, you should read the Maestro Libraries Overview first, then come back to this topic.

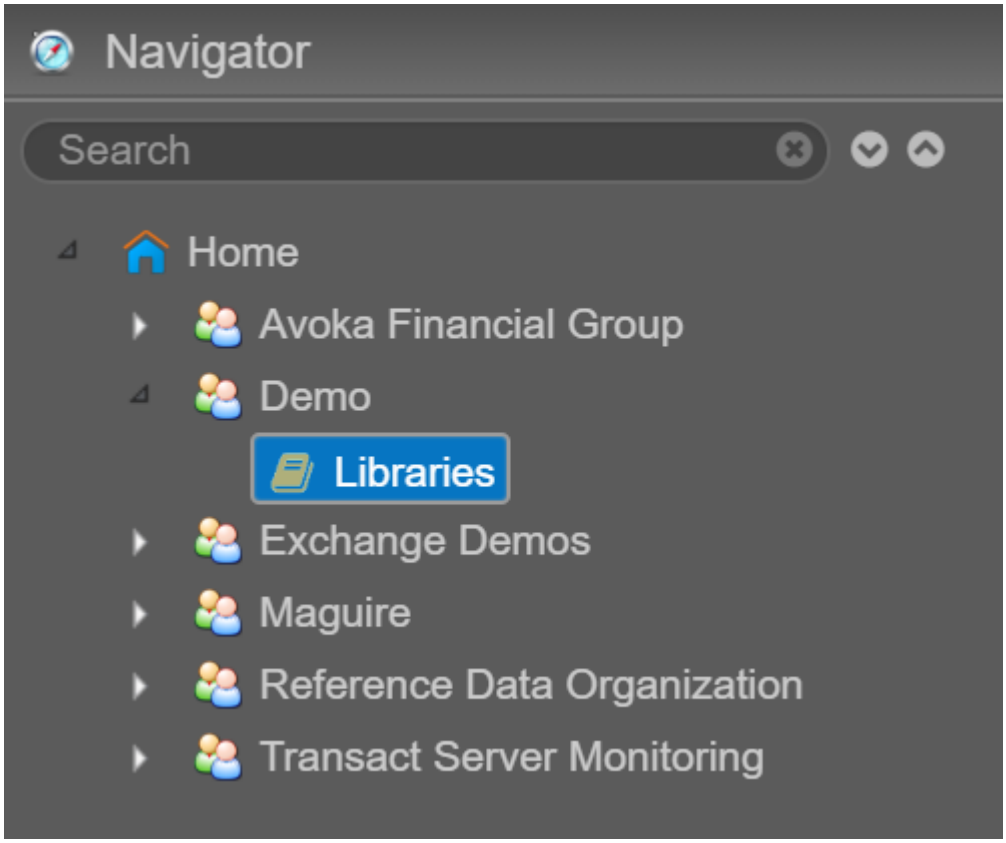
Step 1: Create a Library

You can create a library at the organization or project level. If a library is created for an organization, its resources will be available to every project and form within that organization. If a library is created for a project, its resources will only be available to the forms within that project.

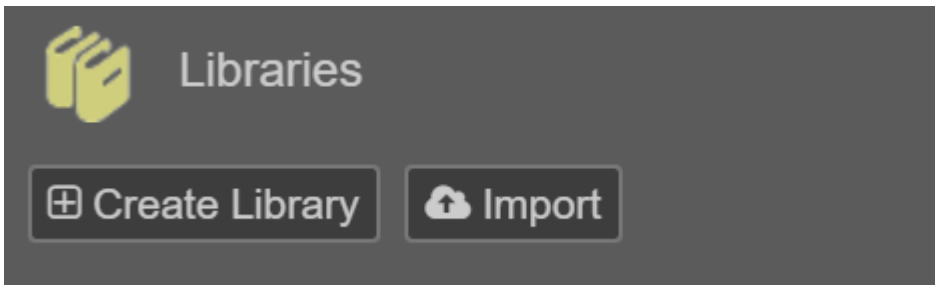
In the following exercise, we're going to create an organization library that makes a component available to all of the projects and forms within that organization. If you were creating a project library instead, you would need to create a project first then create the project library; otherwise, the process is quite similar.

To create a library:

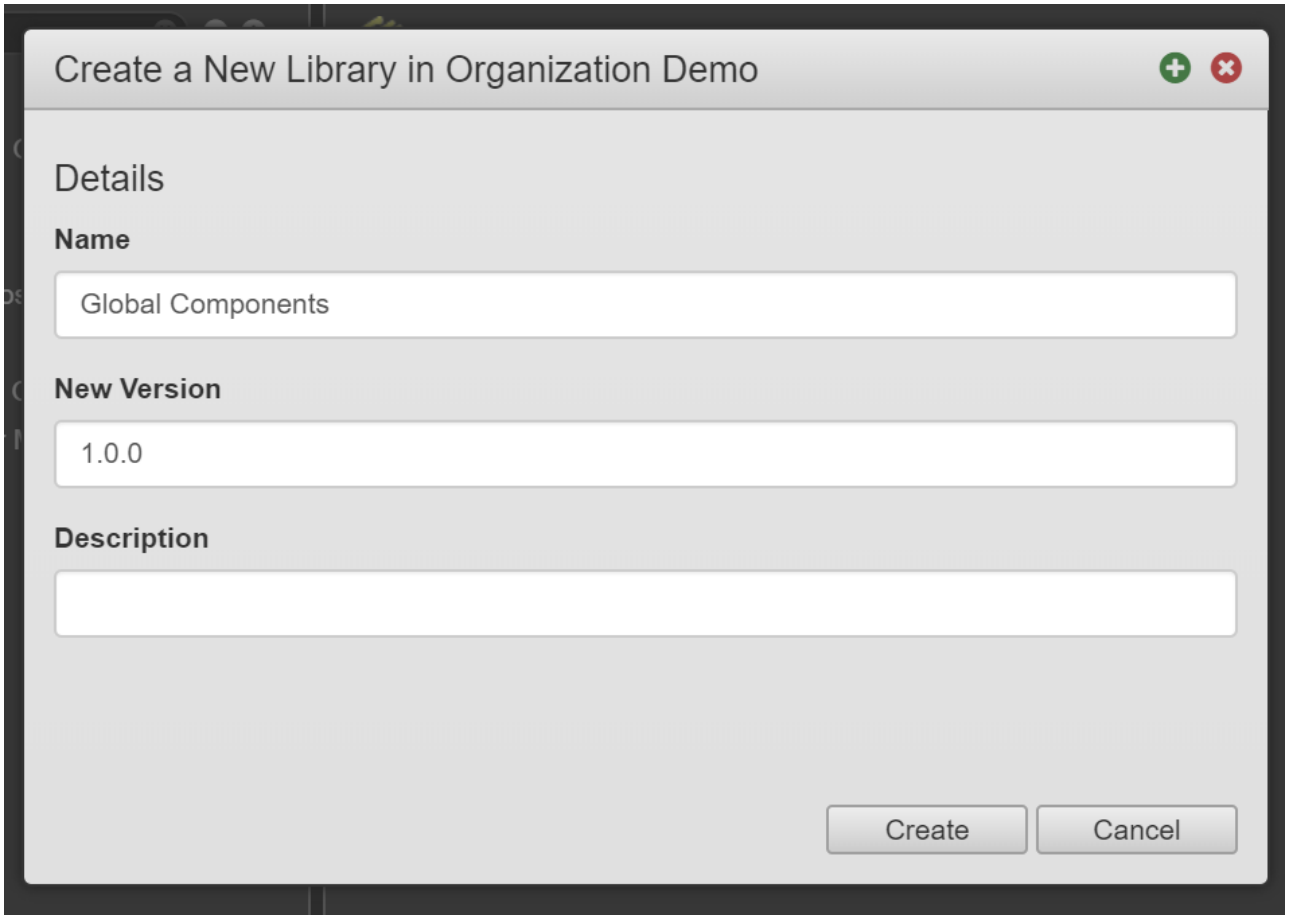
1. Login to Journey Maestro.
2. Expand an organization in the **Navigator** pane and open the **Libraries** item. (If there are no organizations that you can use, you'll need to create one first.) We'll use the same organization throughout this exercise.



3. Click **Create Library**.

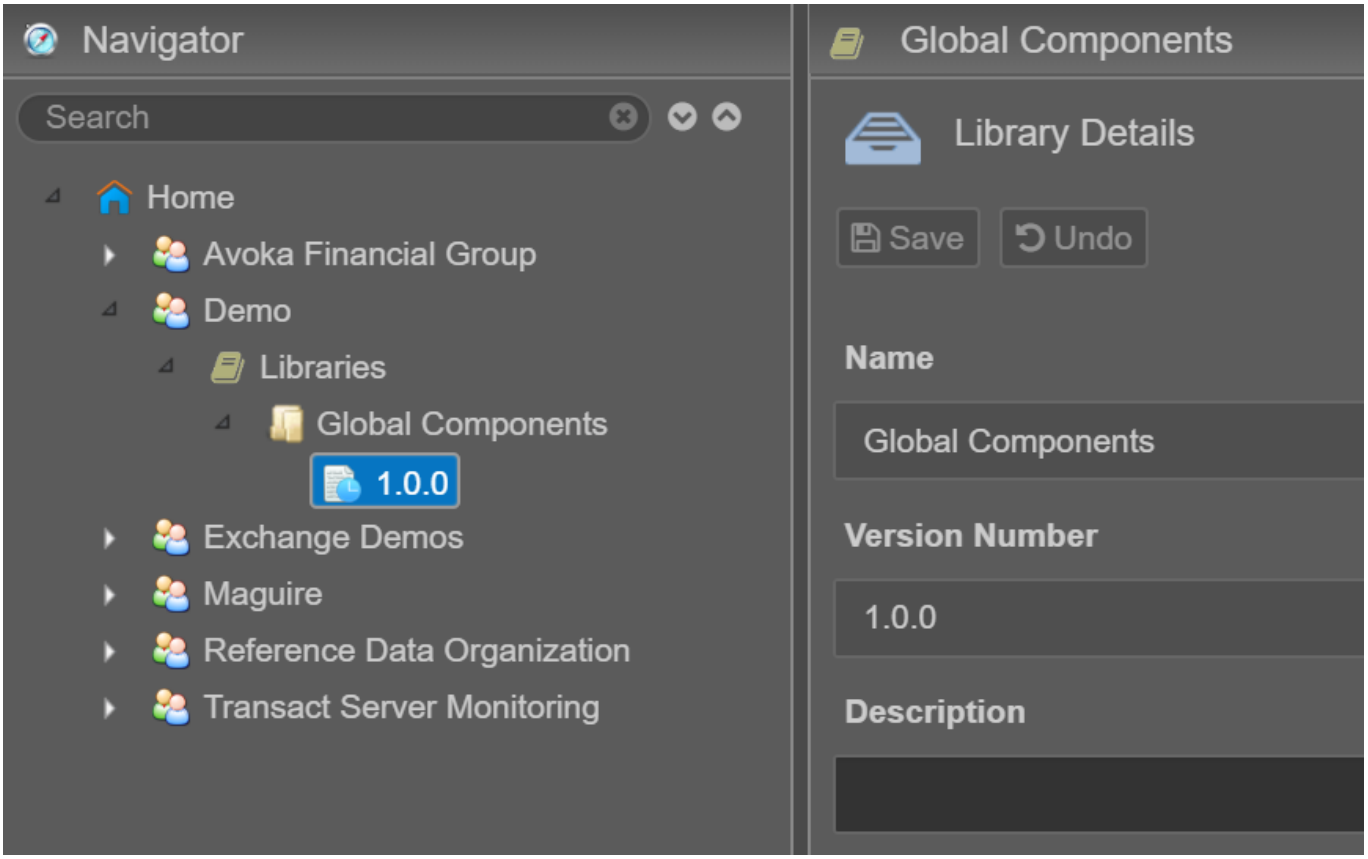


4. In the **Create a New Library** modal window, enter a **Name** for the library and click **Create**. You can ignore the other fields for the time being.



5. After creating the library, you'll be taken to its **Library Details** page. Here you can update the library's**Description**, or switch to the **Resources** tab to view the resources published to this library.

The new library has a version number of 1.0.0 which was entered on the **Create a New Library** modal. You can see the library's **Version Number** on the **Library Details** page, as well as in the Navigator pane under the library.



The library version number is significant because:

- All libraries are automatically versioned. You don't have to use this functionality, but versioning does help in managing form development.
- All libraries must have at least one version. If you delete the last version of a library, you'll be forced to delete the library itself.

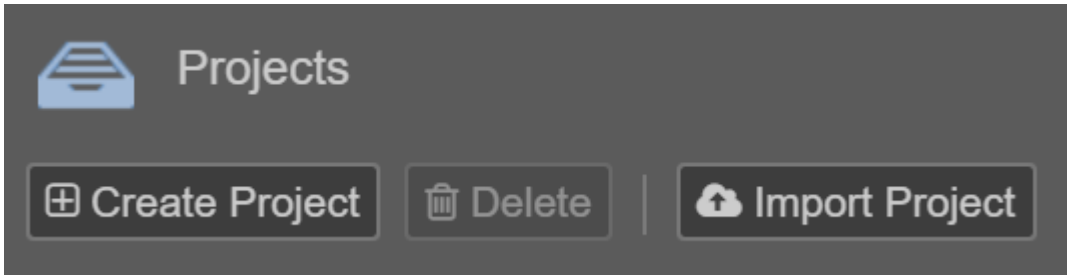
Step 2: Create a Project

We've created a library but there's nothing in it. We'll create a project and work on the resources for our library in that project. Then we'll publish the resources to the library in a later step.

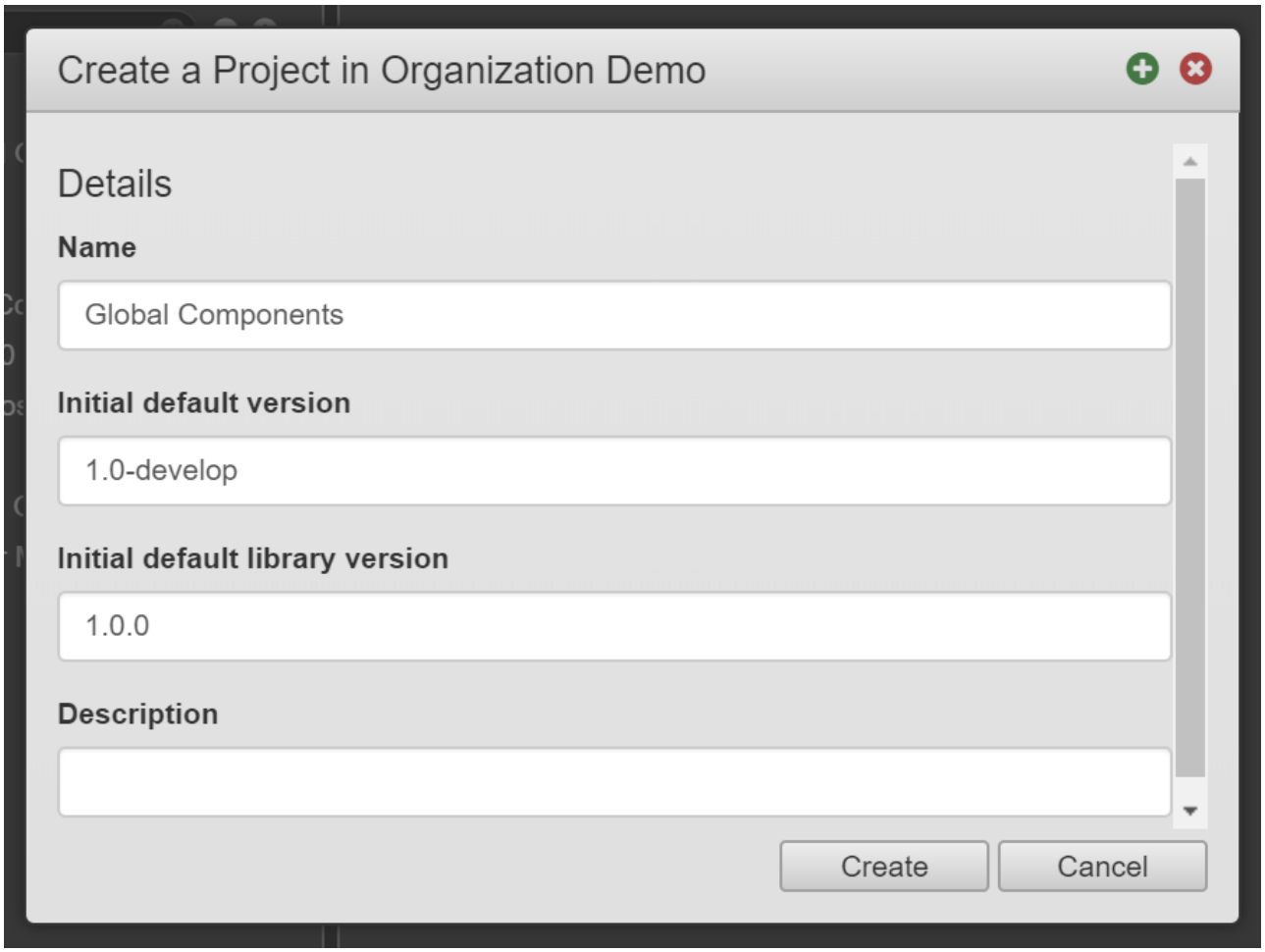
To be clear, we don't have to create a new project for every library we create. We could create a single project and work on all of our library resources in that project. However, this is not recommended as it becomes difficult to keep track of where the resources are stored. Creating one project per library is best practice, with the advantage of being a very scalable approach.

To create a project for our library:

1. Select your organization from the **Navigator** pane.
2. Switch to the **Projects** tab and click **Create Project**.



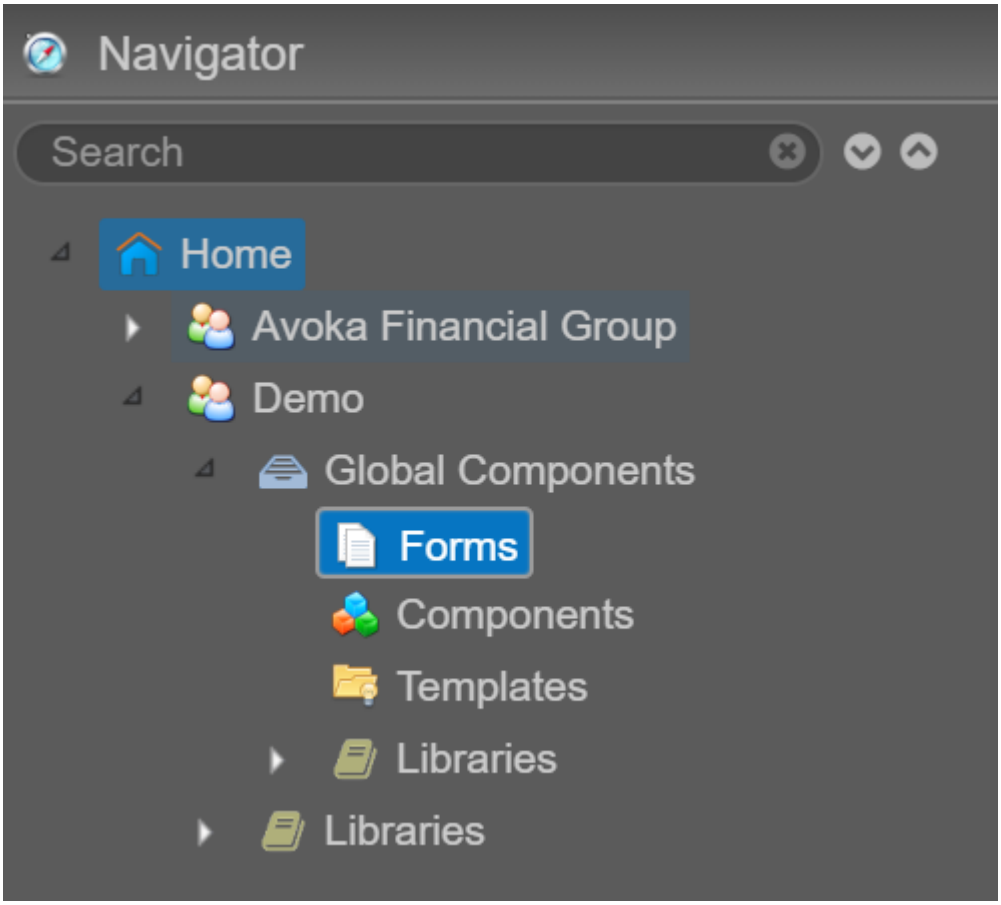
3. In the **Create a Project** modal, enter a **Name** for the project. It's a good idea to make this name similar or identical to the name of the library, so the relationship between the project and the library is apparent. The other fields can be ignored for the time being.
4. Click **Create**.



On the **Navigator** pane, we can see four folders in the project we just created:

- Forms
- Components
- Templates
- Libraries

These four folders are included in every project by default.



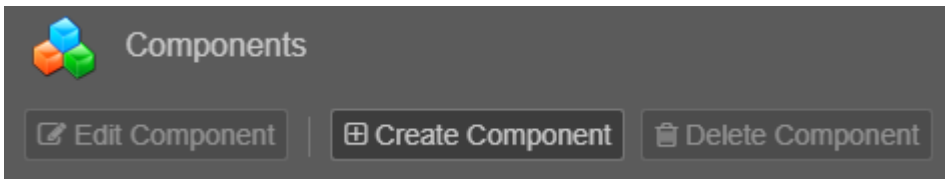
For the purpose of the current exercise, the **Components** folder is the only one that interests us now because a) forms can't be published to a library, b) we don't want to publish resources to our project's library, and c) creating a template is beyond the scope of this topic.

Step 3: Create a Component

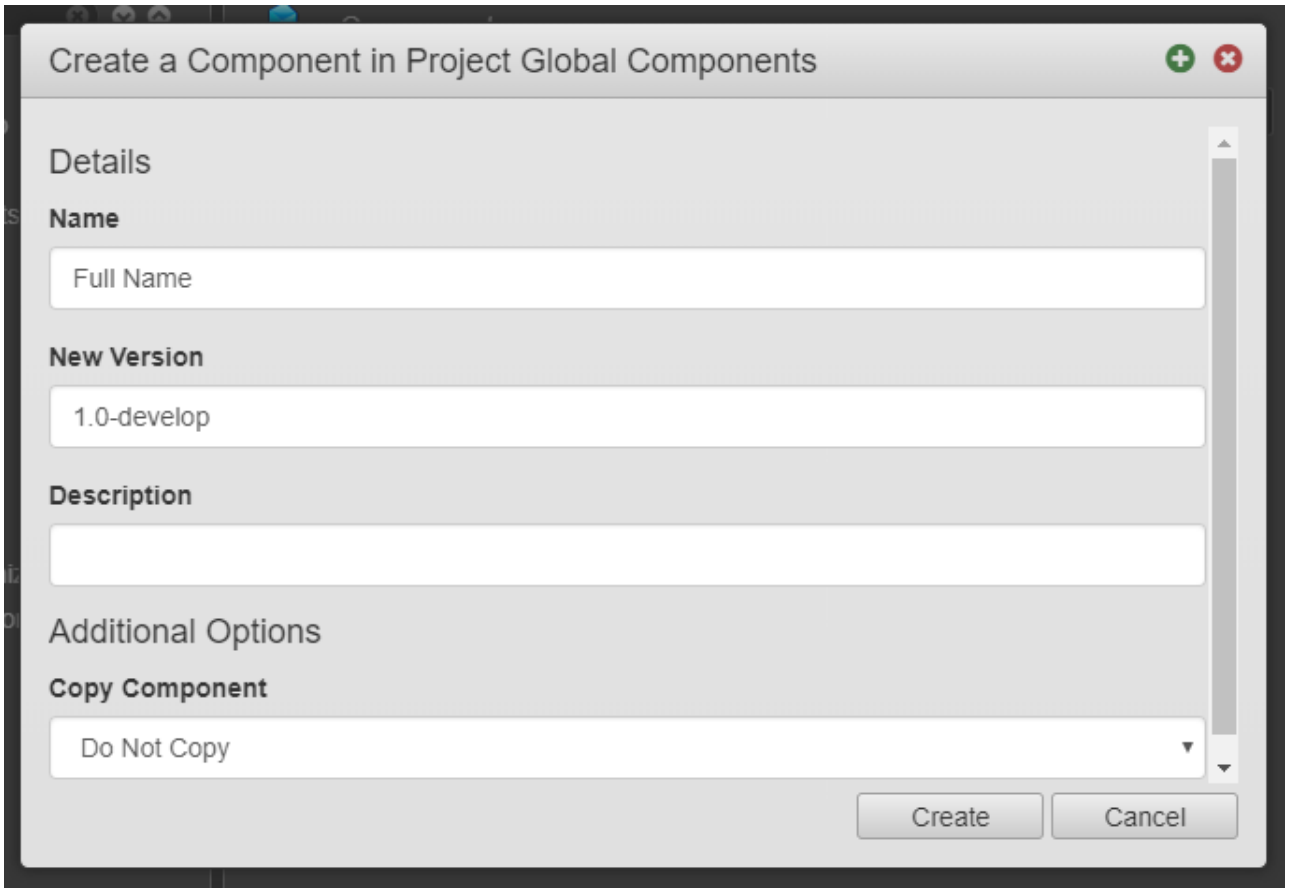
In this section, we're going to create a component. This component will become available to all of the projects in our organization.

To create a component:

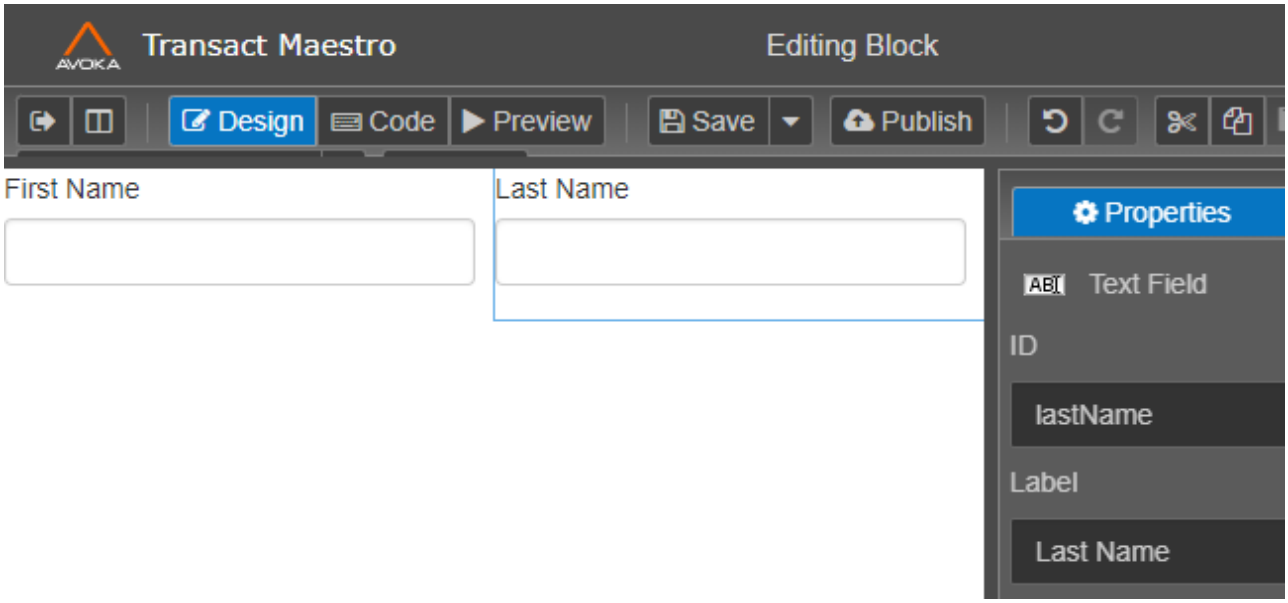
1. From the **Navigator** pane, select the **Components** folder under our project.
2. When the **Components** tab loads, click **Create Component**.



3. Enter a **Name** for our component. To follow along with this example, call it "Full Name".
4. Click **Create**.



5. The **Maestro Editor** opens a new tab for the new component. After the component tab opens, drag two **Text Field** components into the main work area. Set the **ID** of the first text field to "firstName" and the **ID** of the second text field to "lastName".



6. Click **Save**.

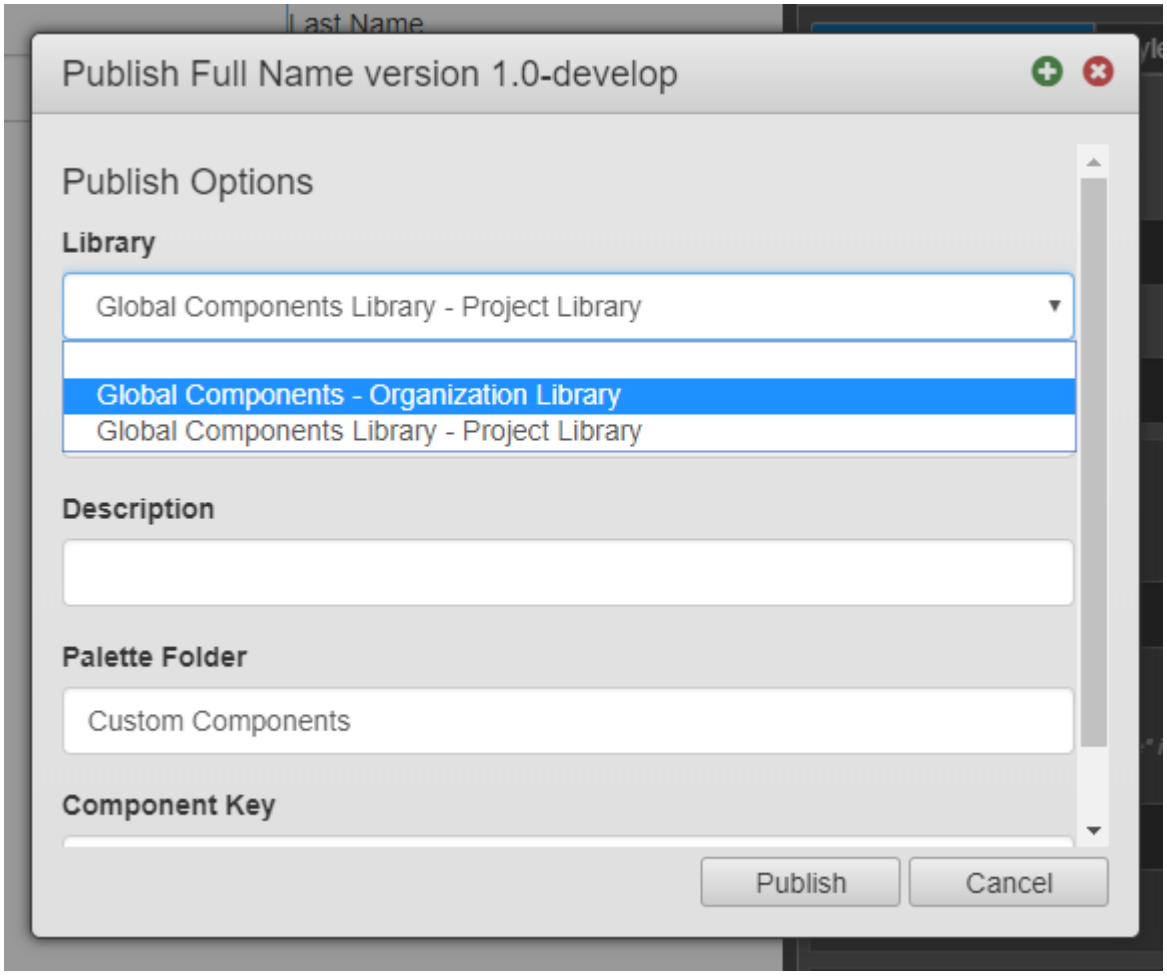
Step 4: Publish a Component

For our component to become available via the library we created earlier, we need to publish it to the library.

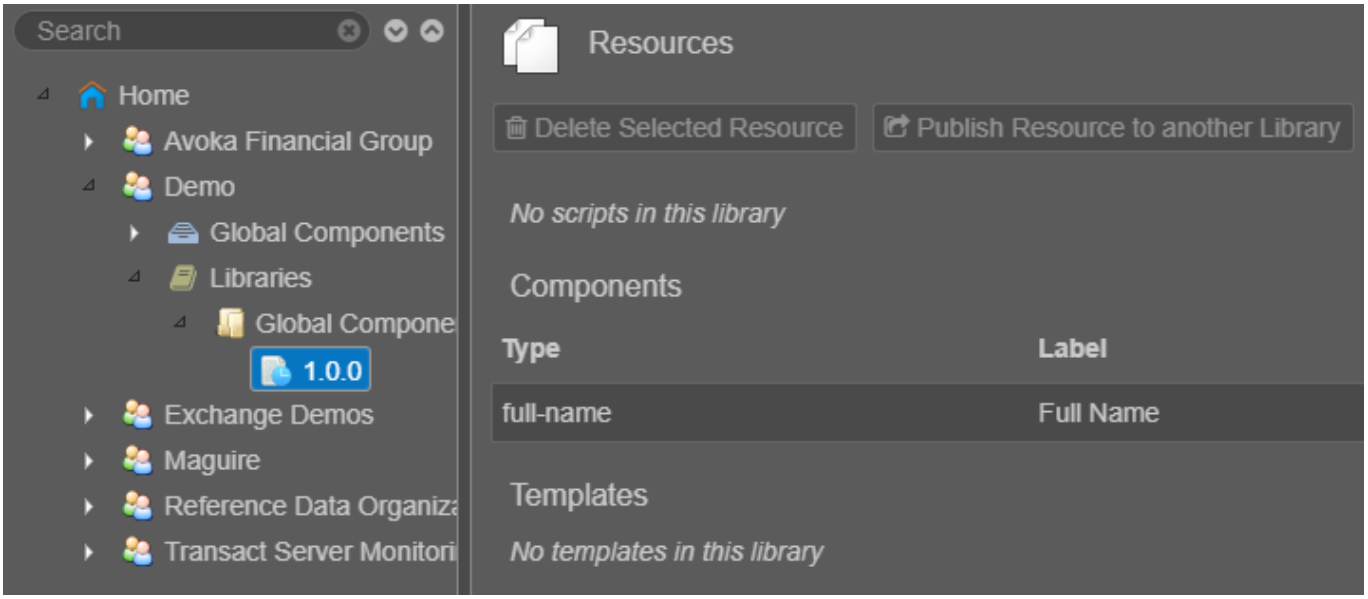
To publish a component:

1. With the component still open in the **Maestro Editor**, click **Publish**.
2. When the **Publish** modal appears, select the organization library from the **Library** drop-down. Note that each library in the drop down list is identified as being either an organization or project library.

3. Click **Publish**.



Select your organization library version in the **Navigator** pane and switch to the **Resources** tab, and you'll see your component included in the library's Component resources, meaning it is now available to be used in any project in your organization.



If the component doesn't appear, verify that you published the component to the organization library, not the project library. You may also need to refresh the page.

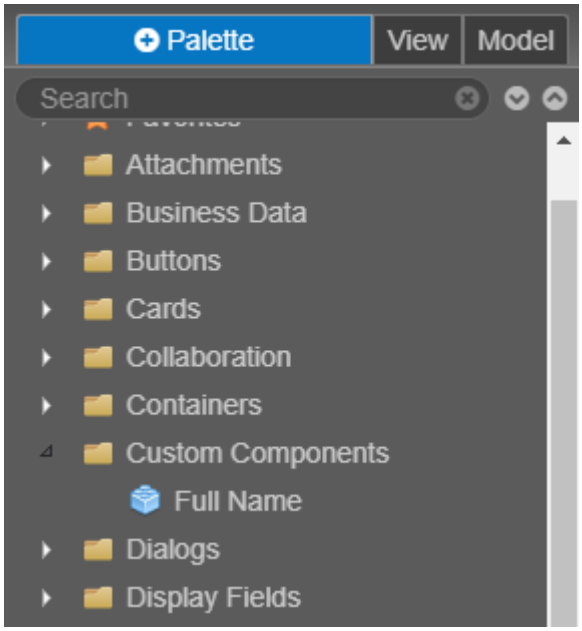
Step 5: Use a Published Component

Using a published component is similar to using any other component. The only difference is that components published to a library are not available everywhere. They're only available within the organization or project they're published to.

To see this in action, follow these steps:

1. Create a new project within your organization.
2. Select the Forms folder in your new project and click **Create Form**.
3. Enter a **Name** for your new form and select a **Template**, then click Create.
4. Your new form will open in the **Maestro Editor** in a new tab.
5. Expand the **Custom Components** folder inside the **Palette** pane. You'll see that the "Full

Name" component is available for use in our form.



The Advantage of This Approach

Let's say you need to change the "Full Name" component, perhaps to add a new feature. You can return to the project where that component exists and make whatever changes you want without worrying about breaking the component. This is because changes are only reflected throughout the organization's forms when the component is re-published. Until then, you can develop components with the peace of mind that the changes you're making are private and will not impact Form Builder's who are using your component.

When you've finished the changes to your component, you just need to re-publish it and every instance of that component is automatically updated. This means the component has a single source of truth that you can evolve as requirements change.

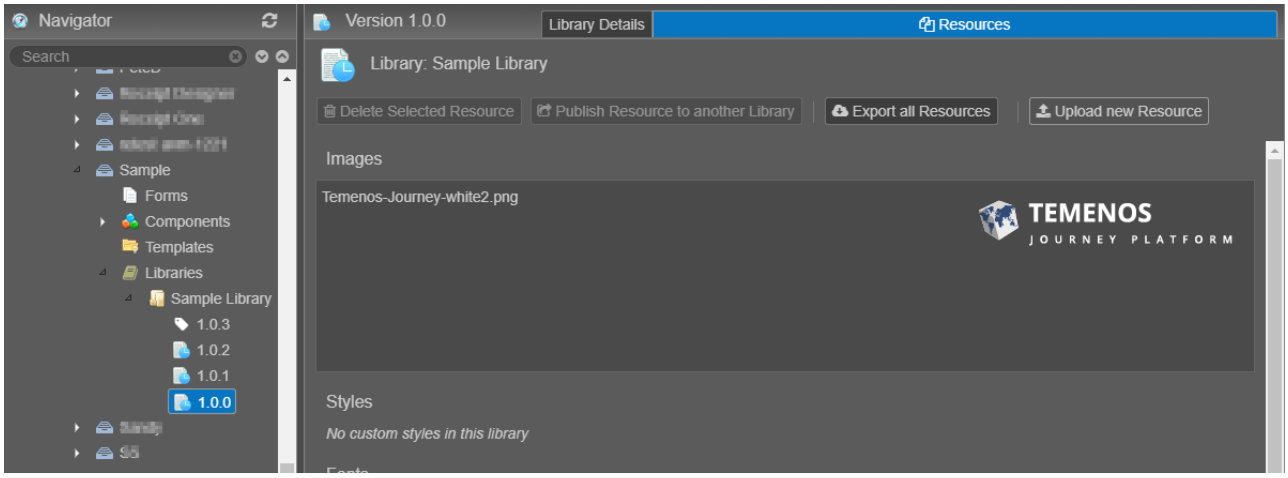
Next, learn about shared libraries.

View Resources

Journey Maestro allows you to view the list of resources published to a design, such as a form, component, template, as well as a library.

To view the list of resources in a design:

1. Open a project in the Navigator pane and select an asset from the list of assets versions, for example, a library version.
2. Double-click an asset version you wish to view resources of.
3. Select the Resources tab to view a list of resources grouped by resource type, as shown below.



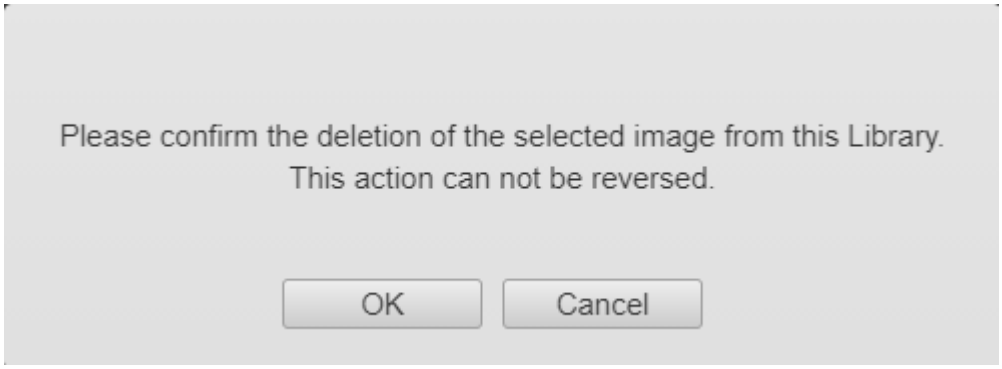
The resources are grouped as follows:

- Images - a list of images
- Styles - a list of styles identified by a Key and a Label
- Fonts - a list of available fonts, such as TTF, EOT, SVG, or WOFF. For more information, see Web Font.
- Scripts - JavaScripts available to forms
- Components - a list of components
- Templates - a list of available templates that have been published into a selected library
- Languages - available languages
- Shared Translations - form's translations
- Domain Models - a list of JSON files describing data models, such as `model-schema.json`
- Runtime CSS Resources - CSS and LESS

4. Click Delete Selected Resource to remove selected resources from the asset.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple resources. | 21.05 This feature was introduced in 21.05.

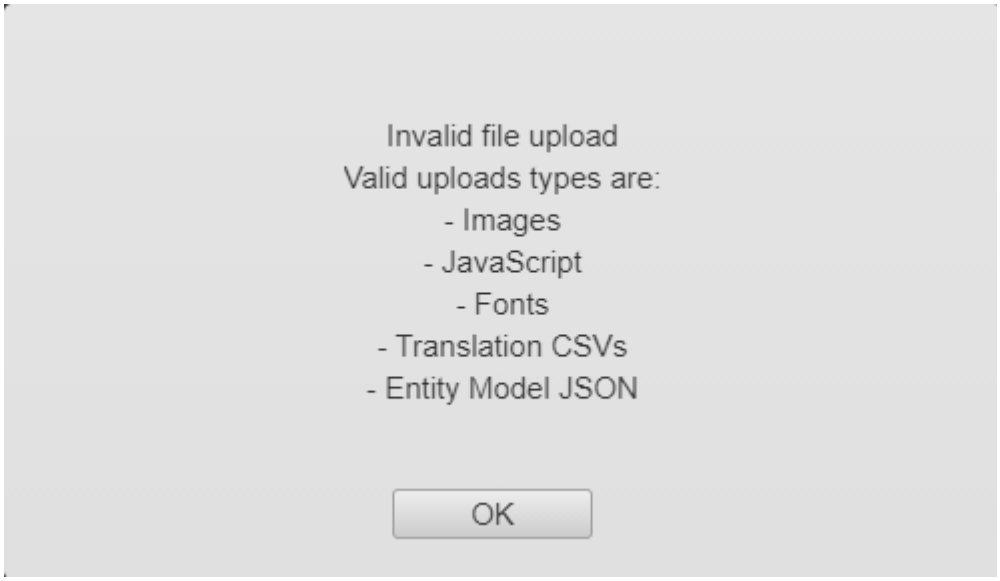
5. Click Publish Resource to another Library to publish selected resources into a library.

   NOTE

   Use `Shift` or `Ctrl` key to select multiple resources. | 21.05 This feature was introduced in 21.05.

6. Click Export all Resources to export all resources in a ZIP file, which you can then import into another form or a project.
7. Click Upload new Resource to add a new resource to the asset. | 21.05 This feature was introduced in 21.05. This is a fast and easy way to publish a resource, as opposed to the traditional way of adding a resource by uploading a new resource in the form when selecting the resource or alternatively using the form's export and import functionality.

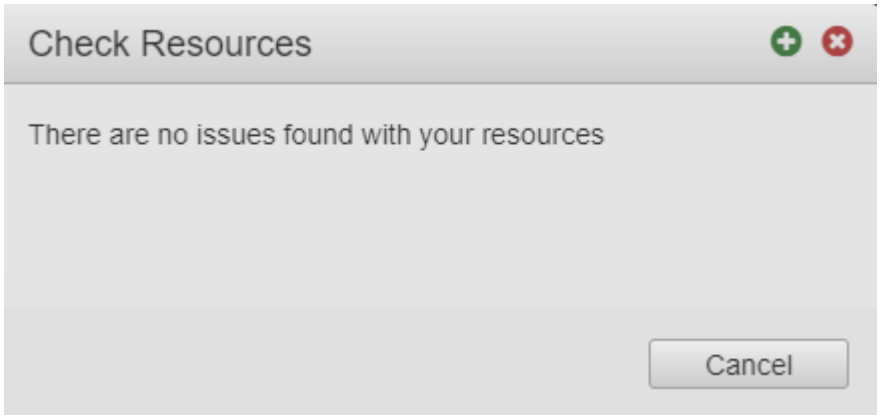
   A resource must be of the several allowed types, otherwise a following error message is shown.



NOTE

Use the Web Font component to add an SVG[1] font as a resource, otherwise it will be added as an image.

8. Click Check All Resources to validate resources. To ensure resources you add to a library are correct and won't cause any run time errors when a form is rendered, you can validate the resources within a library. During this process, Maestro runs a set of validation scripts to ensure that all resources, for example, styles and scripts, have valid structure and syntax. If validation is successful, the following message is displayed.

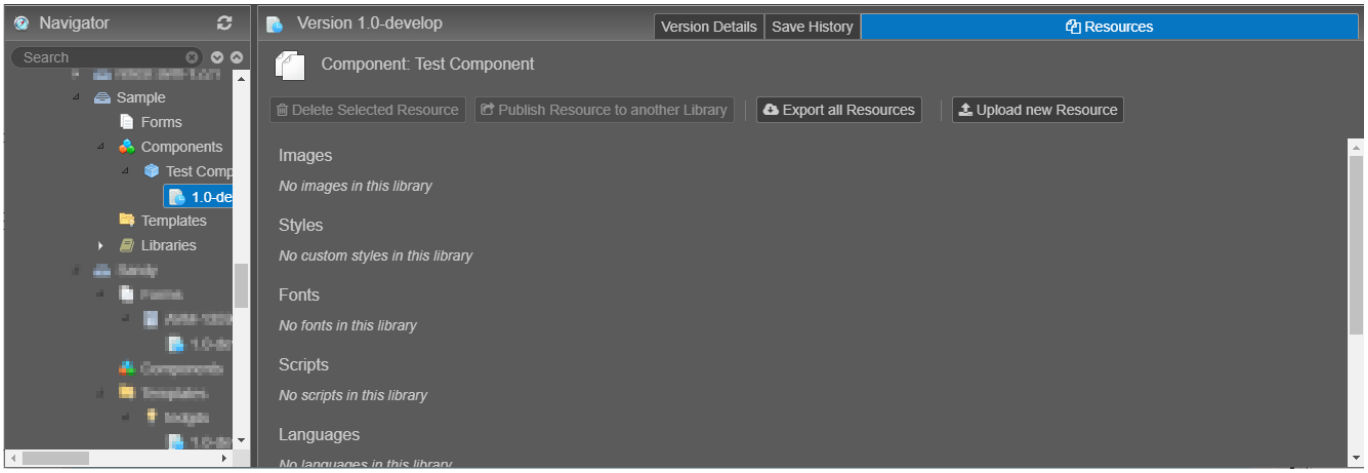


[1]An SVG font is a new version of the OpenType format, with SVG standing for Scalable Vector Graphics. The SVG glyph format allows the characters to be displayed in multiple colors and different transparencies, and some may even be animated.

NOTE

You can't open a release library, so if you don't have any user-created libraries, create one with the Create Library button.

You use the same steps above to view resources of forms, components, and templates.



Next, learn about library versions.

Load External JavaScript Libraries

Maestro allows you to include and load external JavaScript libraries in a form using one of the following:

1. The JavaScript Library component - it includes pre-existing JavaScript libraries in a form, which are loaded on Form Load and the source is included in the `app.js` file.
2. The Page Tracking feature of a form configuration in Manager.
3. Lazy loading the libraries using jQuery.

The last two approaches are commonly used, so Let's look at each of them in more detail.

Use Page Tracking

Although page tracking is designed to add a JavaScript to a form to track it in a web analytics service, you can also use it to add custom JavaScript and HTML content to the application.

To add a library to a Maestro form:

1. Configure a form page tracking using the following options:
    - Use Form Page Tracking - selected.
    - Page Script Include Position - Inside <HEAD>.
    - Form Page Tracking Script - paste your JavaScript library reference, for example, `<script type="text/javascript" async src="https://my-domain.com/resources/js/my-lib.js"></script>`.

However, some JavaScript libraries can't be loaded this way.

> NOTE
>
> Use the `async` attribute to run the script asynchronously, which, in turn, allows the form to load and render faster.

Use jQuery

One benefit of loading JavaScript libraries with jQuery[1] is that the developer has complete control over when the library is loaded. This is important when you want to load a library only when it is required, which decreases the size of the application form footprint.

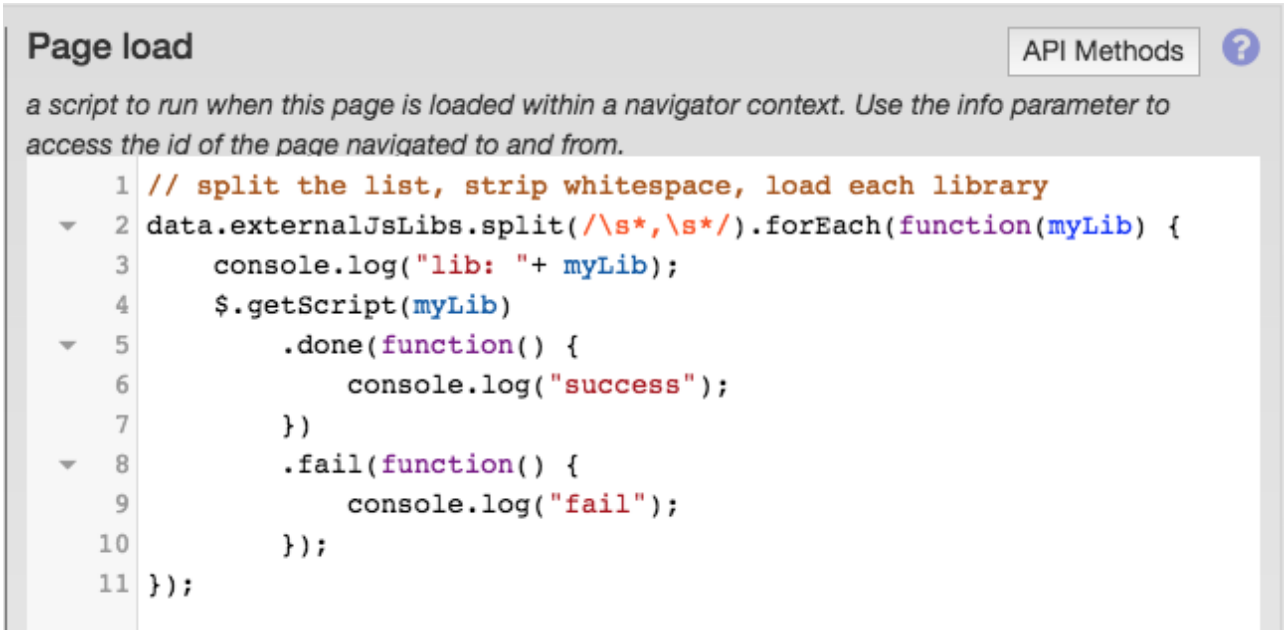
---

[1]jQuery is a JavaScript library designed to simplify HTML DOM tree traversal and manipulation, as well as event handling, CSS animations, and Ajax.

Another benefit of using this approach is that the path and names of the JavaScript libraries is environment-specific, so you can distinguish between production and non-production URLs.

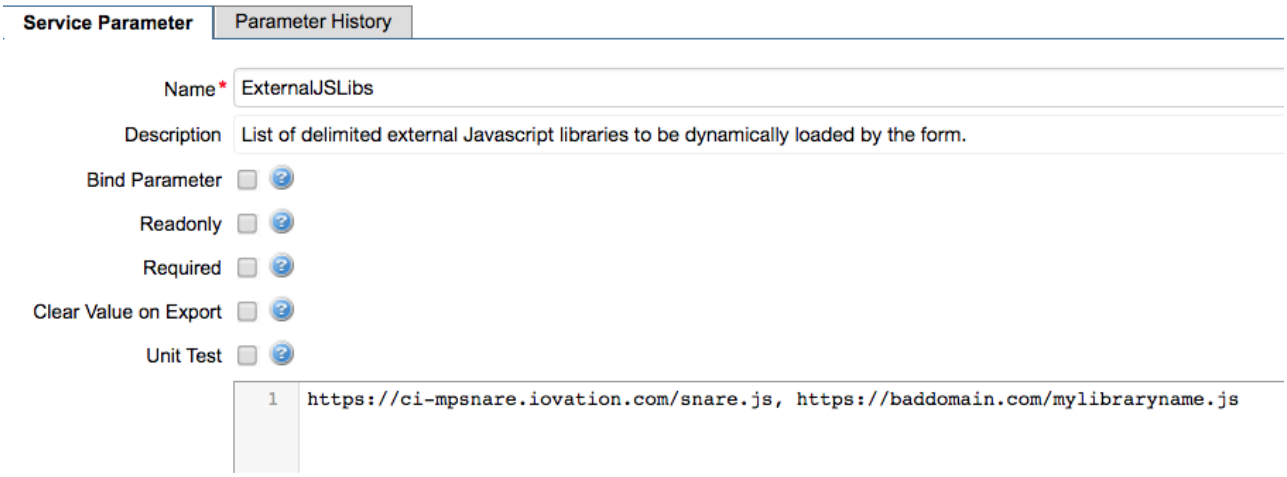
To add a library to a Maestro form:

1. Drag and drop a data field onto the page content of your Maestro form.
2. Click the Integration pane and expand TM Form Data.
3. Select the Include in Submission Data checkbox.
4. Set the XML Location to Absolute.
5. Set XML Name as Config/ExternalJSLibs. The Full Path will be `/AvokaS-martForm/Config/ExternalJSLibs`.
6. Create a rule to dynamically load external JavaScript libraries, for example, a Page load rule as shown below:



   Loading libraries with jQuery provides success and failure handlers. A success handler can be used to invoke a function in the loaded script. Failure can be used to notify the user.

7. Log in to Manager and create a Form Prefill service.
8. Create a service parameter ExternalJSLibs of String type and provide a delimited list of JavaScript resources, as shown below:



9. Create a Groovy script that reads this service parameter and writes it to the Form XML location specified as `/AvokaSmartForm/Config/ExternalJSLibs`. The code snippet is shown below:

```
import com.avoka.core.groovy.GroovyLogger as logger
import com.avoka.component.xml.XmlDoc
import com.avoka.core.util.XmlUtils

XmlUtils.getXPathElement(schemaSeed, "/AvokaSmartForm/Config/ExternalJSLibs")
        .setTextContent(serviceParameters.get('ExternalJSLibs'));

return new XmlDoc(schemaSeed)
```

10. Configure this prefill service as Form Prefill Data Service in the Maestro form.
11. Render the form, open it in a browser and check the Console and the Network tabs of DevTool to see that the libraries loaded both for Page Tracking and jQuery configurations. Note the success and fail messages in the console as one library should load and the other should not.



Next, learn about library scopes.

Library Versions

Journey Maestro allows you to create multiple versions of each library, so you can achieve the following:

- Standardize versioning of Maestro's design artifacts.
- Roll back to previous versions of a library.
- Make changes to a library version without affecting organizations or projects that rely on an older version of the library.

Library Version Numbers

Each new library version has a unique version number. The recommended versioning approach uses version numbers in the format MAJOR.MINOR.PATCH. For example, the first version of a library might have a version number of 1.0.0.

You may have a preferred or mandated scheme that defines how version numbers are allocated. In addition such a scheme, consider the following when you need to select a new library version number:

- If you create a new library version based on a tagged version, it may be appropriate to increment the first (major) part of the version number by one. For example, a new version based on tagged version 1.0.2 might become 2.0.0.
- By default, when you create a new library version, the third (patch) part of the version number will increment by one.
- A version number can include a suffix that contains numbers and letters. Adding a suffix may be useful to indicate non-obvious but important information.

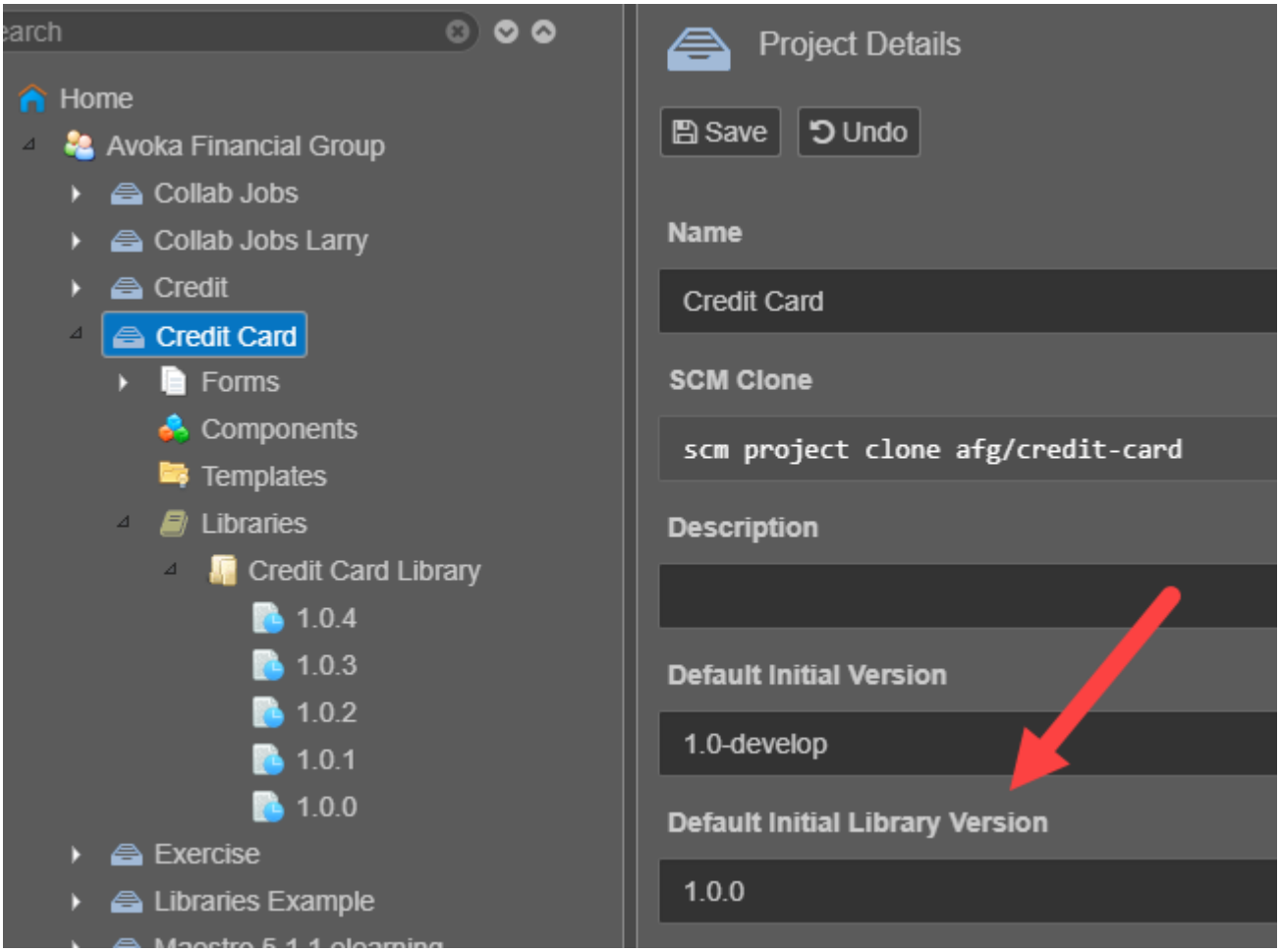
Viewing Library Versions

To view all versions of a library, select a library from the Navigator pane. The versions will be sorted based on their version number, in descending order meaning that more recent library versions appear at the top of the list. For example, version 1.0.2 of a library appears higher in the list than version 1.0.1.

Version	Description	Modified By	Last Modified	Created By	Created At
1.0.4				sjones	13 Dec 2018
1.0.3				sjones	13 Dec 2018
1.0.2				sjones	13 Dec 2018
1.0.1				sjones	13 Dec 2018
1.0.0	Default Library for Project Credit Card			sjones	8 Oct 2018

Default Initial Library Version

When a library is created, a default version number is assigned to it. All libraries created for a project start at the same version, The default version number assigned to a library is the Default Initial Library Version which is defined in the Project Details and has the default value "1.0.0".



To change the Default Initial Library Version:

1. Select a project from the Navigator and open the Project Details tab.
2. Modify the value in the Default Initial Library Version field.
3. Click Save.

After making this change, all libraries created for this project will start with this newly defined version number.

> NOTE
>
> The recommended value for the Default Initial Library Version is "1.0.0".

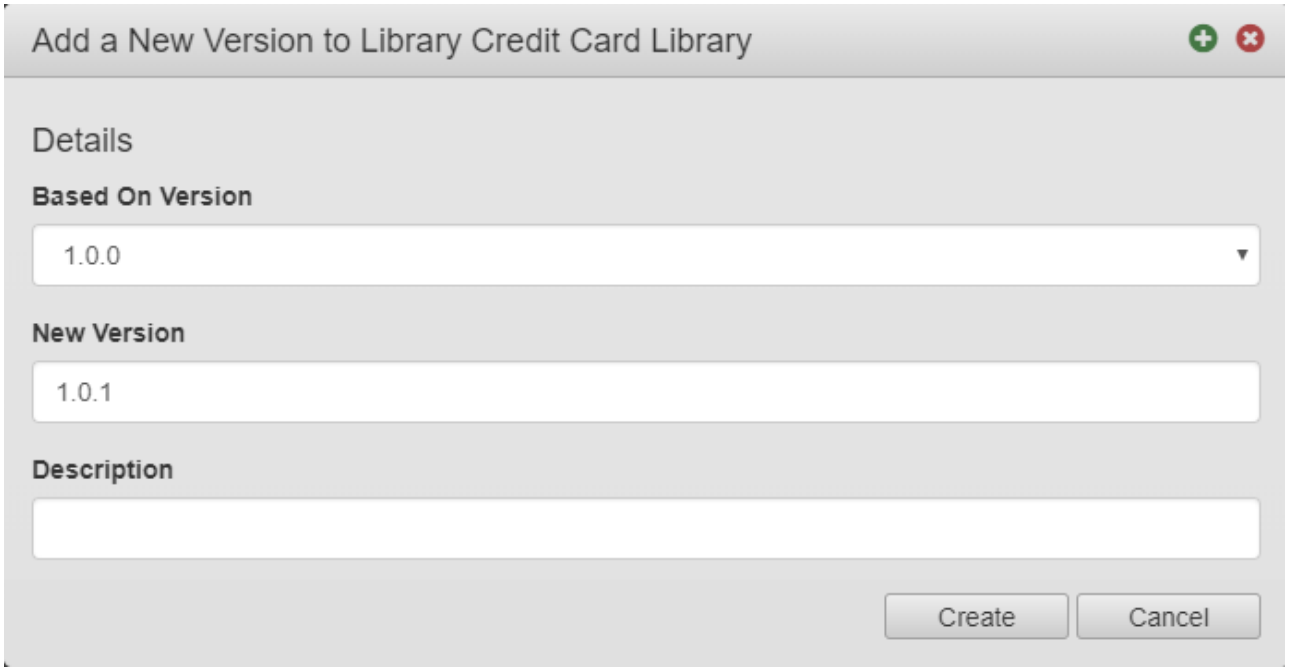
Next, learn how to create a library version.

Create a Library Version

Journey Maestro allows you to create new versions of a library so you can safely change and use them in your projects without any risks of negatively impacting other projects that relay on the same base library. Therefore, every Maestro library should be versioned. Usually, the default version number is `1.0.0`, but it can depend on the Default Initial Library Version.

To create a new library version:

1. Navigate to the Libraries folder to view all libraries for an organization or project.
2. Select a library you want to create a new version for.
3. Click New Version, which displays the Add a New Version to Library modal window.



4. Select a version number from the Based on Version dropdown list, which is used as the basis for the new version. The default value of this field is the most recent version. For example, if you select version `1.0.1`, the assets and resources corresponding to version `1.0.1` will be copied into the new library.
5. Provide a new library version number or name in the New Version field if you are not happy with the default version number, which is an incremented number of the previous version number.
6. Enter a library description in the Description field to make it easier to distinguish between different versions of the same library.
7. Click Create. Check the new library appears in the organization.

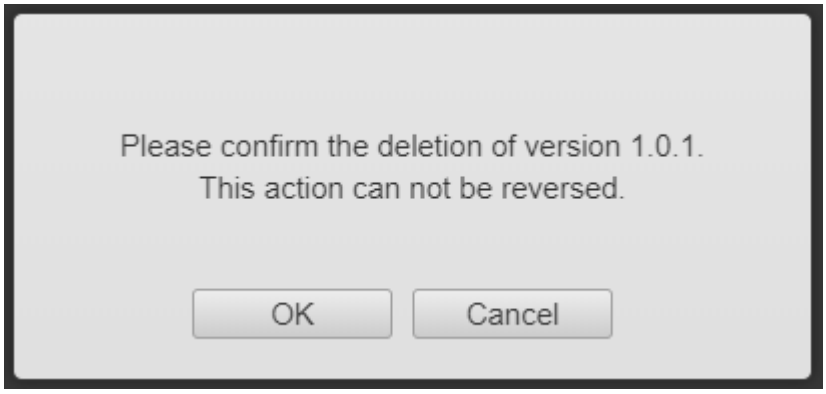
Next, learn how to delete a library version.

Delete a Library Version

Library versions can be deleted at both the organization and project level. Note, however, that only one library version can be deleted at a time.

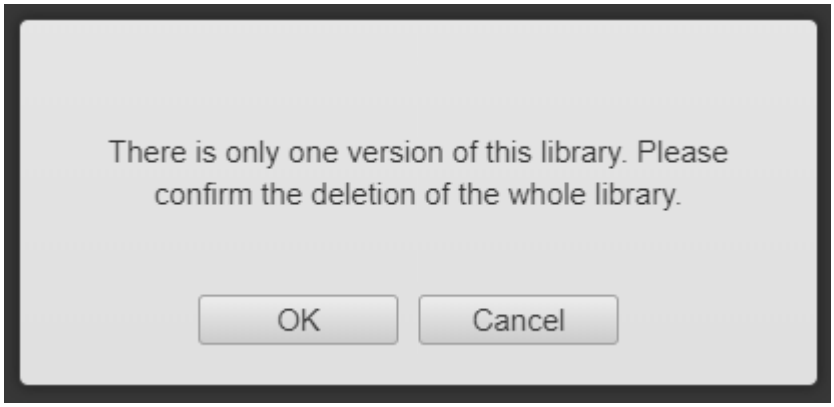
To delete a library version:

1. Select the Libraries folder for a project or organization.
2. Select a library then select the version of that library that you want to delete from the library list, and click Delete Version.
3. What happens next depends on how many library versions there are.
    - If there are multiple library versions, a message is displayed asking you to confirm that you want to delete the selected library version:



      Click OK to confirm the deletion (or Cancel to keep the library version).

    - If there is only one version of a library, a message is displayed asking you to confirm the deletion of the entire library. This is because a library must have at least one version.



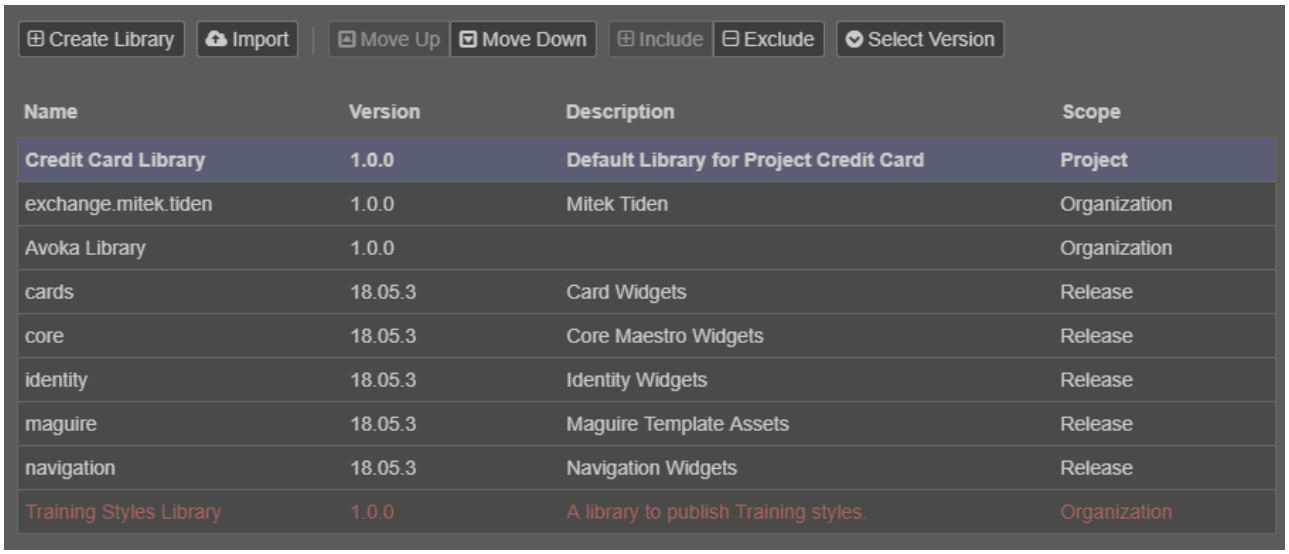
      Click OK to confirm deletion of the whole library (or Cancel to keep the library version).

Map a Library Version to a Project

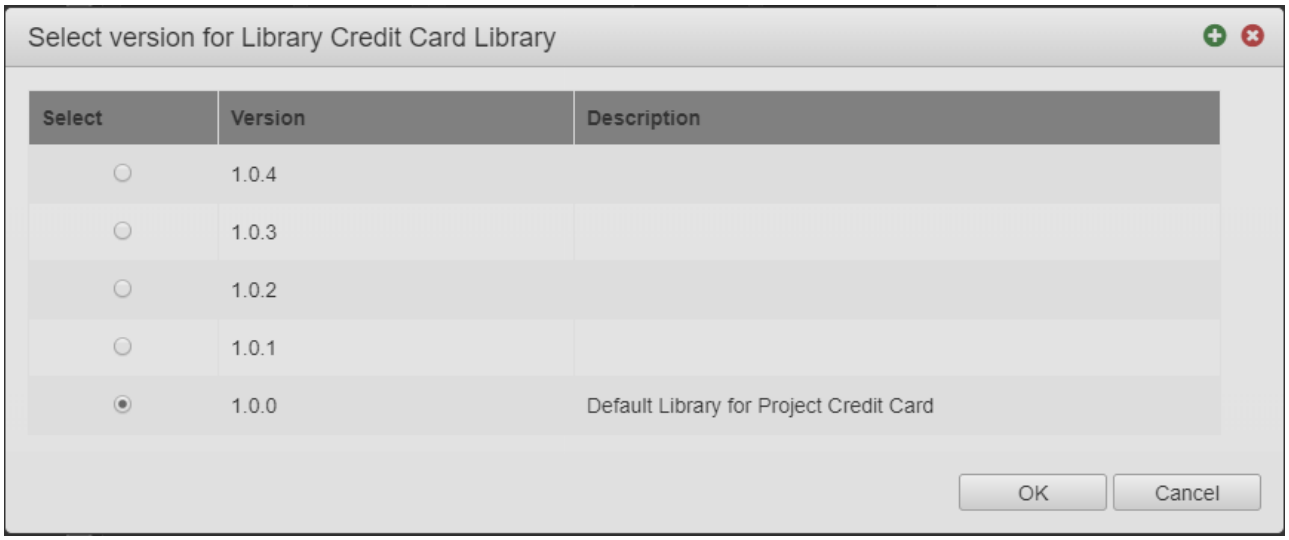
Journey Maestro allows you to specify which version of a library you want to use in a project. When you have multiple versions of the same library, you might not necessarily want the most recent version of the library to be used in the project, so you can map a desired library version to your project.

To map a library version to a project:

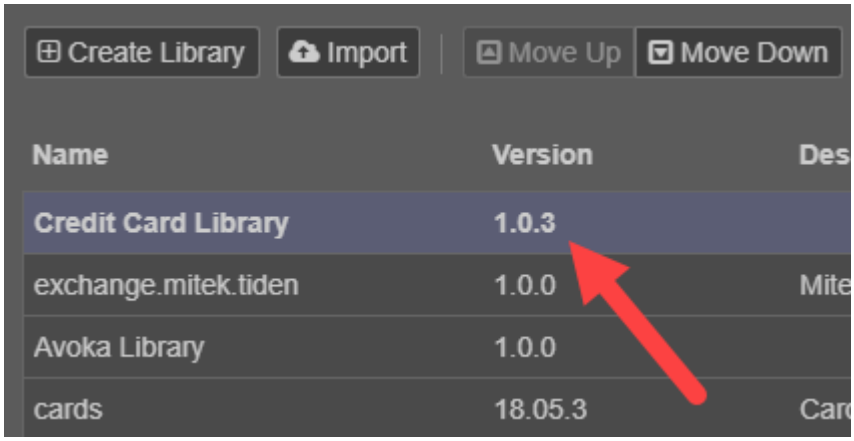
1. Open a project and select the Libraries folder.
2. Select the library that you want to map a version of to the selected project and click Select Version.



3. Select a library version to be mapped to the project from the Select Version for Library modal window.



4. Click OK. The selected version number now appears against the library in the project's library list, as shown below.



Next, learn about how to create a new library version based on a tagged library.

Create a Tagged Library

As a general good development practice, you will want to have known good quality versions of all libraries that Form Builders and others depend on to do their work. Having good quality library versions provides these users with a level of confidence that any issues they encounter are likely to be caused by what they are doing, not by the dependent libraries they rely on. Dependent library versions, therefore, need to be immutable, and tagging a library version satisfies this requirement.

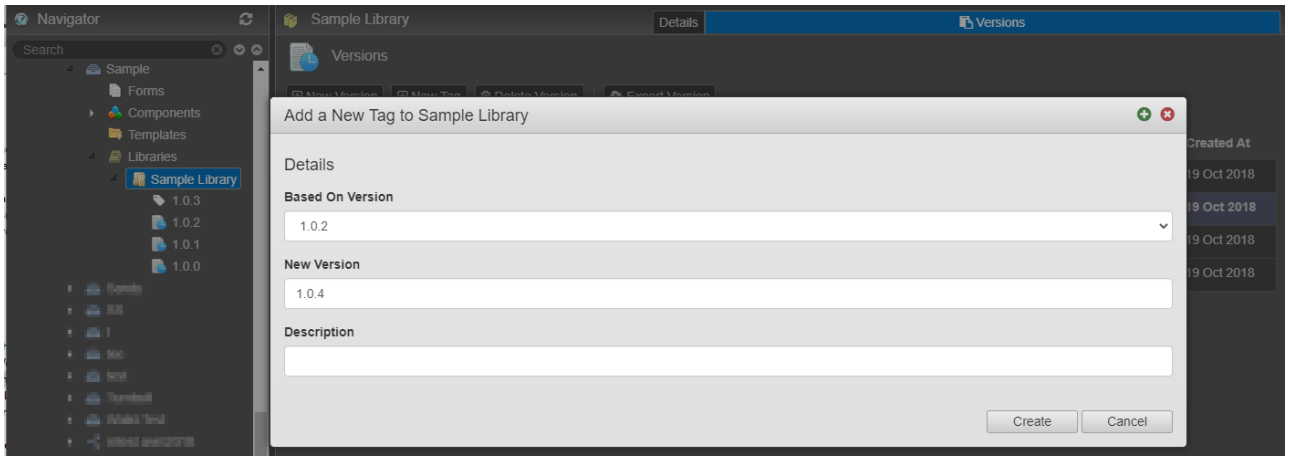
Maestro allows you to create and use tagged libraries.

A tagged library is a read-only library version that prevents any changes from being saved to the library. Tagged library versions provide an effective way of keeping a clean, final record of a library. Once a tagged library is created, it is still possible to create new library versions based on the tagged version.

There are a few things you need to know when you work with tagged libraries:

- You can't publish assets to a tagged library.
- Only Administrator can delete a tagged library.
- If you create a library based on a tagged library version, the new library is editable because it isn't a tagged library version.
- You can export, view, and use tagged libraries as the library version in your project.

To create a tagged library:

1. View the available library versions in the Navigator pane.
2. Select a library version you want to tag and click New Tag. The Add a New Tag modal window appears.
3. 

4. Select the version of the library you want the tagged version to be based on from the Based On Version field.
5. Enter the New Version for the tagged version, and optional Description. For information about library version numbers, see Library Versions Overview.
6. Click Create. Check the tagged version of library is created and there is a check against this version in the Tag column. Also, if you open the tagged library version, you can see a tag icon at the top of the form next to the library name.

Once you have created a tagged version of a library, you may need to create a new version of the library based on this tagged version.

To create a library version based on a tagged library version:

1. Navigate to the Libraries folder within a project.
2. Select a library to view the existing tagged library versions, that is a check against this version in the Tag column.
3. Select a tagged version and click New Version.
4. Complete the Add a New Version modal.
5. From the Based On Version drop-down list, select a library version that you want the new version to be based on.
6. In the New Version field, enter a new library versions number, for example, `2.0.0- develop`.
7. Enter a description into the Description field to help organize the different versions of the library.
8. Click Create.

Next, learn about library precedence.

Maestro Forms

A Maestro form is a web document designed for capturing data from applicants, and form users, and sending it to Journey Manager for processing. A form typically contains page groups, pages, sections, attachments, embedded documents and fields to guide applicants through the data capturing process, which consists of various events of the customer journey experience. The journey is usually configured by a Business Analyst (BA) or Subject Matter Expert (SME) based on requirements. Here, we refer to the BA or SME as the Form Designer.

> NOTE
>
> In this documentation, we use the following terms interchangeably: form, application form, application, user application and customer application.

You create a form in Journey Maestro using various components and libraries. A form design (look and feel) is usually based on a template or a brand that significantly simplifies your life as a Ford Builder. A Template Designer creates a template, which helps you build forms following a specific design. First, you create a form for individual purposes and then extend it and add extra functionality to it by creating new form versions of the original form. Maestro forms are built on the AngularJS[1] framework.

When the Maestro form is ready, you build it as a Form Archive (FAR file), which is a self contained ZIP file with all generated resources in it. Now, you can publish (deploy) it in various Journey Manager environments to make the form available to form users and applicants.

Forms require various types of data, such as user input, form pre-fill, fields' autocomplete and dynamic data lookup, to represent fields' content. Such data is formatted as XML, so when a form is first rendered, an XML document is generated to store data collected by the form. This XML is eventually populated, updated and then saved when the form is submitted to the Manager server. All this implies interaction with Manager, which means you have to configure Maestro forms in Journey Manager before they can be used.

The Maestro editor is hosted on a Manager instance and the version the project uses dictates which version of the editor the form opens in. This allows you to edit your form in the same

---

[1] AngularJS is a structural framework for dynamic web apps. It lets you use HTML as your template language and lets you extend HTML's syntax to express your application's components clearly and succinctly. AngularJS's data binding and dependency injection eliminate much of the code you would otherwise have to write. For more information, see http://angularjs.org/

version you have used to edit your forms to help manage changes to your forms so making a simple text change will not get new features from newer versions. For more information, see Maestro features.

> NOTE
>
> A Maestro's form is represented differently in Manager. For more information, see Manager's form overview.

As mentioned above, a journey experience is a sequence of events that includes data prefill, data capture, save and resume, attachments, payments, assignments, notifications, and collaboration between reviewing and approving staff. Some of these events have an impact on the form design, while others are configured in Manager.

Organizations frequently have high-level concerns before beginning form development, including:

- Branding
- Integration
- Accessibility
- Security

These concerns are translated into action during a form's development that can include:

- Styling
- Validation
- Data Structure
- Usability

Maestro provides the tools to address these concerns using the UX principles embodied in the software.

Although the same interface is used to create templates and forms, a Form Builder will likely have less control over the appearance of a form than a Template Designer has over a template. This is because Template Designers typically define extension points, which prevent Form Builders from introducing inconsistencies across an organization's forms.

When a form is published, all of its assets, such as templates, images, style, components, and so on, are bundled into a single-page AngularJS application and made available via a chosen form space.

When creating a form, a Form Builder will:

1. Choose what template the form should be based on
2. Apply a brand to the form (if more than one brand exists)
3. Add page groups, pages, sections, and fields to the form
4. Create validation rules and other business logic
5. Integrate with third-party services via pre-built Exchange packages
6. Configure what data will be collected via Journey Analytics

Next, learn about a form architecture.

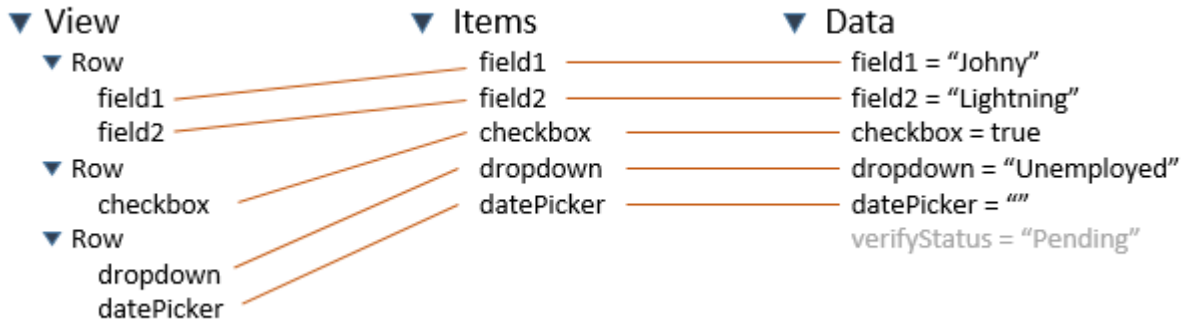
Maestro Form Architecture

A Maestro form is a web document, also known as a web application, designed to capture user's data and perform some synchronous or asynchronous actions. In order to do so, each form is built based on the certain architecture. When you create a form in the Maestro Editor, it applies these architectural principles for you, so you have to understand them to use the tool efficiently.

The architecture of a form consists of the following main elements:

- Form View - a hierarchical structure that defines the visual layout of the form.
- Form Items - each component, such as a Field or a Button, or container, such as a Block or a Section, within the form structure is considered an item. The Form Items is a list containing every item in the form.
- Form Data - a map of key / value pairs. Most data elements are linked to a form item, such as a Field, but data elements can also exist autonomously.

These 3 elements are all closely related. Form items appear in the Form View and have Data elements associated with them, which is show below:



Let's examine each of these elements in details.

Form View

The form view is a hierarchical structure that consists primarily of horizontal rows, each containing one or more components. The hierarchical structure represents the layout of the form and all components within it. The View object describes the design of the form. It includes a range of data, including the form's responsive breakpoints, the available brands, the current brand, the selected template, and the structure of rows and columns that define the layout of the form.



Being hierarchical, rows in the view can be containers for lists of more rows in a recursive manner.

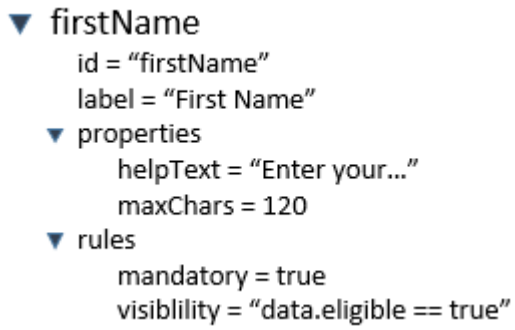
You can find more information about these objects in the Maestro API Guide. To view the API Guide, Open Maestro, click the Help button and select API Guide.

Form Items

Each form item in Maestro is uniquely identified by a field ID. Maestro generates these field Ids based on the name of the field but also allows you to override the generated value and manually specify a field ID so long as they are unique in the context of the form. The Items object describes the components, such as fields and buttons, and containers, such as blocks and sections, within a form. Each component and container is considered an Item.

Having guaranteed unique field IDs for all items within a form allows us to have a flat list (array) representation containing all items in the form, making access to these items much simpler than having to navigate a view hierarchy to find them.

Items can contain UI elements, but also have properties and rules associated with them. By way of demonstration, consider a mandatory first name field that has a maximum length of 120 characters and a visibility rule:



For example, this is what the Items object for the `First Name` text field looks like:

```
firstName: {
        $$parent: {span: {…}, offset: {…}, label: "About You", rows: Array(2), styles: Array(1),
…}
        $fieldSequence: 19
        category: "Input Fields"
        exclude: false
        getData: ƒ ()
        hasCustomId: true
        htmlLabel: "First Name"
        icon: "services/formresources/160/widgets/text-input/text-input.png"
        id: "firstName"
        isDisabled: ƒ ()
        label: "First Name"
        mandatory: true
        mandatoryMsg: "First Name is required"
        offset: {xs: 0, sm: 0, md: 0, lg: 0}
        path: "FirstName"
        properties: {inputType: "text", maxLength: "", preventCopyPaste: false, placeholder: "",
helpText: ""}
        setData: ƒ (value)
        span: {md: 12, lg: 12, xs: 12, sm: 12}
        styles: ["av-form-field"]
        type: "text-input"
}
```

Each item in the Items object is identified by a unique ID. In the above example, `firstName` is the unique ID. Because of this, the items object doesn't need to nest items within a hierarchy. This makes it easier to access specific items. For more information, see Maestro's Item Object.

Form Data

All data in the form is stored in a single object called the Form Data object. Like form items, each form data element must have an ID that is unique in the context of the form. If a data element exists with the same ID as a form item, that form item will read and write its data to that data element. The Data object describes the current state of the form's data. When values are entered in to the fields of a form, the Data object is updated to reflect the new values. Data elements can exist without being bound to a form item.

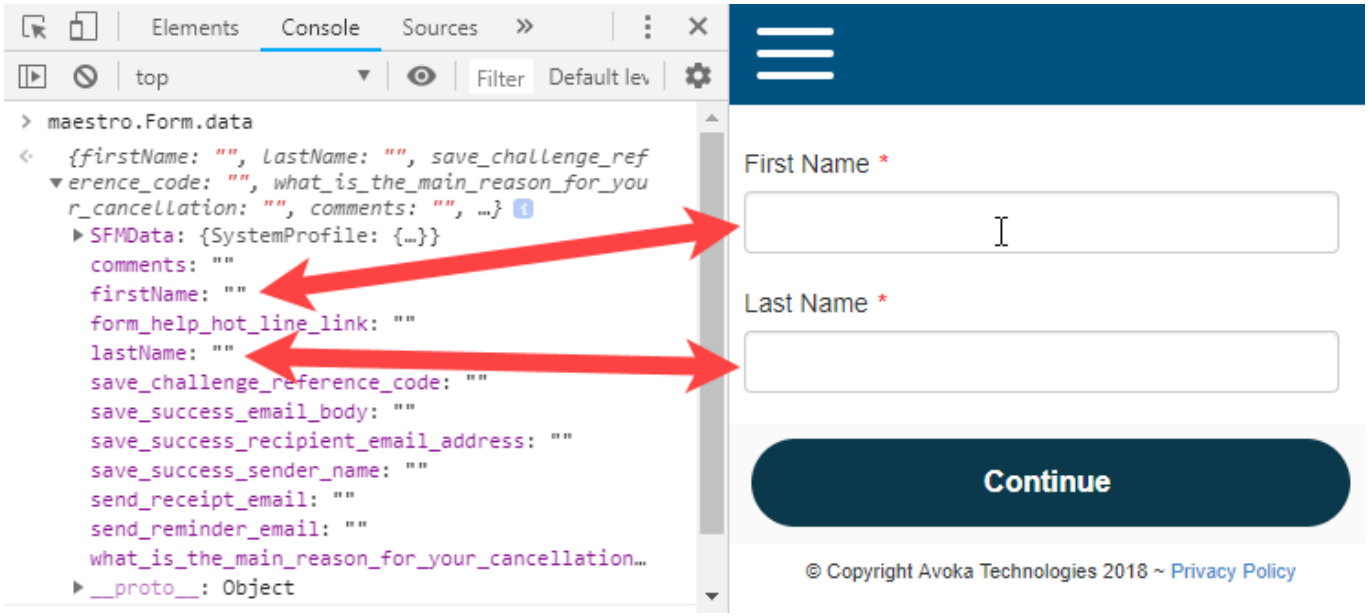
Depicted below is 4 data elements, 3 of which are bound to fields (`Items`) and one that is unbound (`verifyStatus`). The `middleName` data element is blank suggesting that nothing has been entered into the `middleName` field.



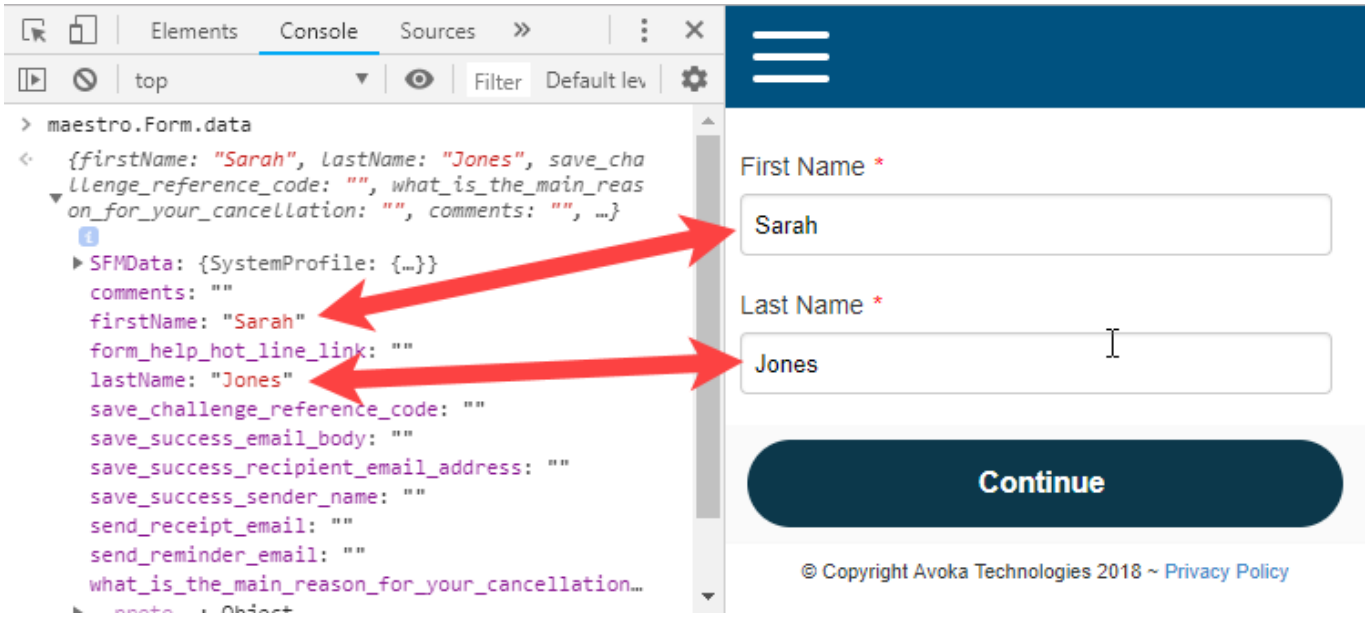
Data elements that are not bound to form items, such as `verifyStatus` in this example, will not be saved or submitted with the form data and thus only exist for the duration of the session.

> NOTE
>
> The Data Field component type can be used to bind data elements without having to display them in the visual layout so that they get persisted with the form data.

For example, if you have an empty form, there won't be any values in the data object's properties:



But if you enter some values into the form, `maestro.Form.data` will contain those values:



For more information, see Maestro's Data Object.

Next, learn how to open a form.

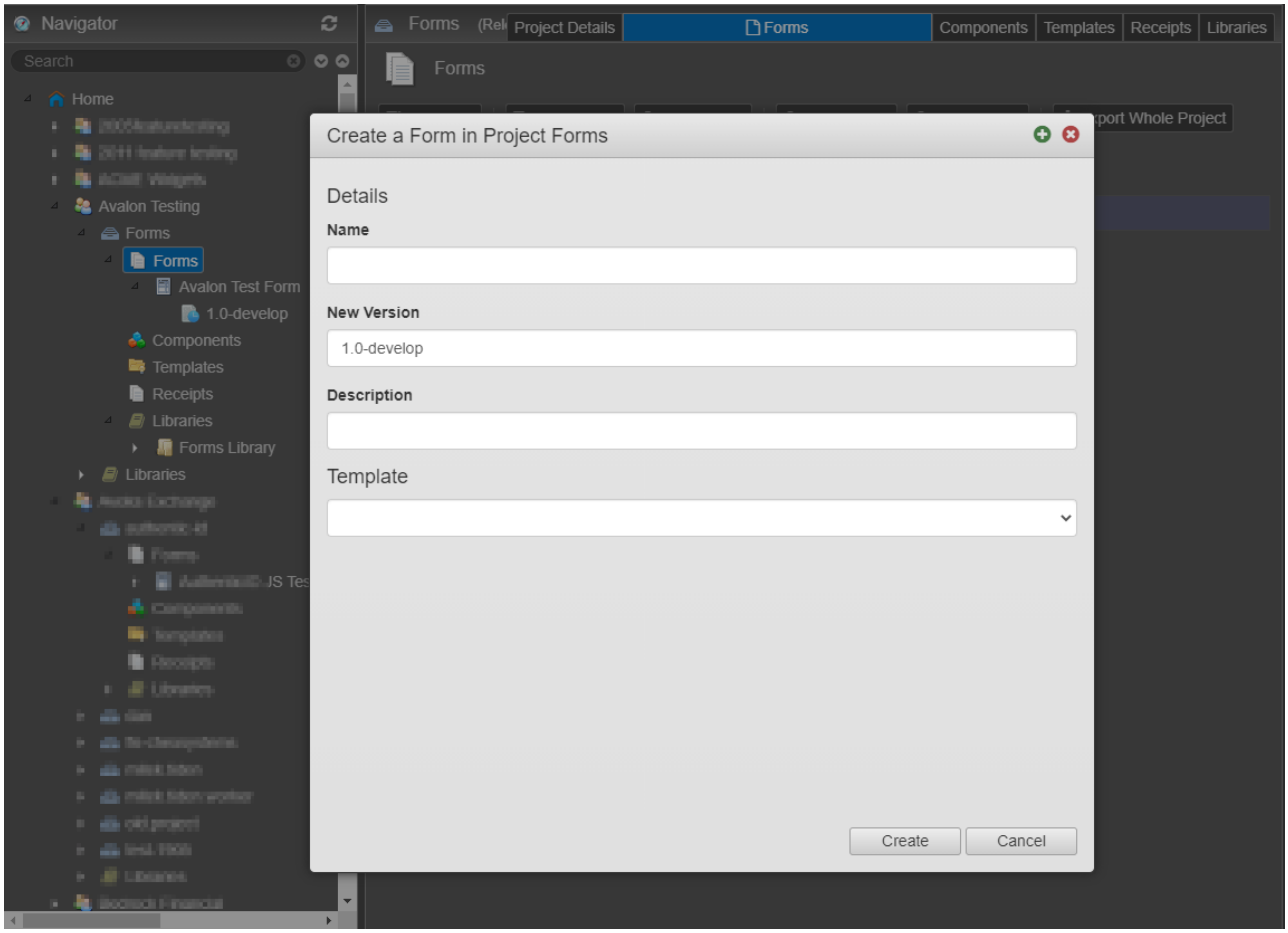
Create a Form

Journey Maestro allows you to create new forms to implement various customer journeys in your applications. This is the first step in creating an onboarding user journey.

> NOTE
>
> As most forms are based on templates, we recommend checking how to create a template as well.

To create a new form:

1. Open a project from the Management Dashboard.
2. Select Forms and click Create Form.



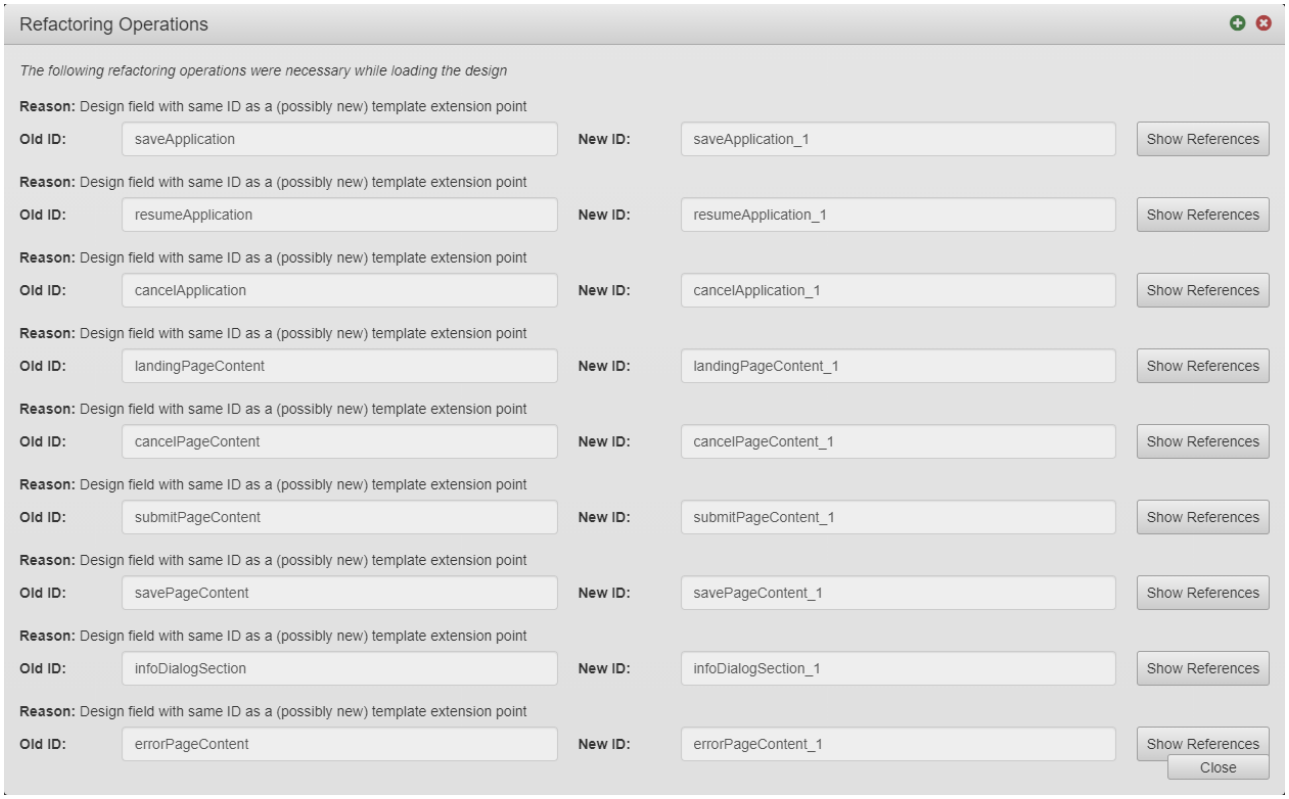
3. Enter a form name in the Name field.
4. Change a system generated version in the New Version field to adjust it to your requirements. Maestro uses semantic versioning.

5. Provide a meaningful description in the Description field so it's clear for others what this form is for and what it does.
6. Select a template from the Template dropdown list. Maestro comes with the following build-in templates:
    - Avalon Form Template | 21.05 This feature was introduced in 21.05.
    - Avalon Receipt Template | 21.05 This feature was introduced in 21.05.
    - Core - Empty Form
    - Core - Empty Receipt
    - Maquire - Default Form
    - Maquire - Default Receipt
    - Maquire - Empty Form
    - Maquire - Empty Receipt

    NOTE

    You should always use a custom template created for your business or project. You should never use the built-in templates to create forms. A Template Designer should use these built-in templates to create new templates for your specific purposes. If you can not find a custom template available in the dropdown list, speak to your Template Designer before creating your form.

7. Click Create.
8. Check a list of refactoring operations Maestro has performed to create a new form and click Close.



Maestro opens the newly created form in the Maestro editor in a new tab in your browser.

> NOTE
>
> If the form does not open after you click Create, check your browser's pop-up blocker settings. When you first open a form or other assets in Maestro, you need to enable the pop-up by selecting a relevant option, for example, the Always allow pop-ups from. Form more information, see help documentation on your browser.

Next, learn how to add components to a form.

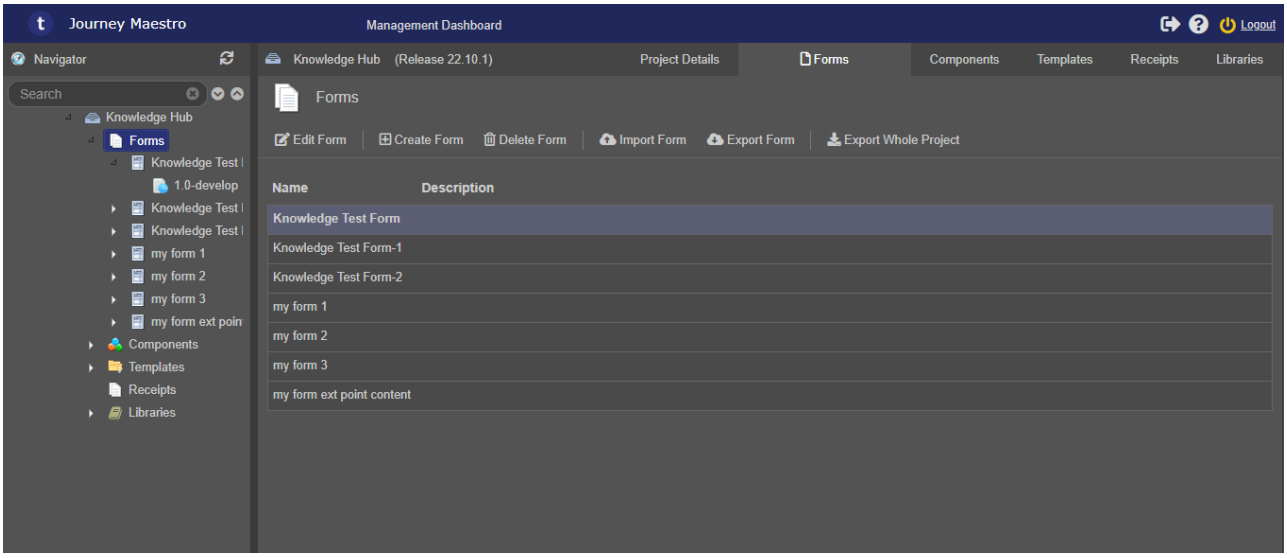
Open a Design

Maestro allows you to open a design, such as a Maestro form , template, receipt, or component, in the Maestro editor. There are several ways you can do it from the Maestro Dashboard, which are explained below.

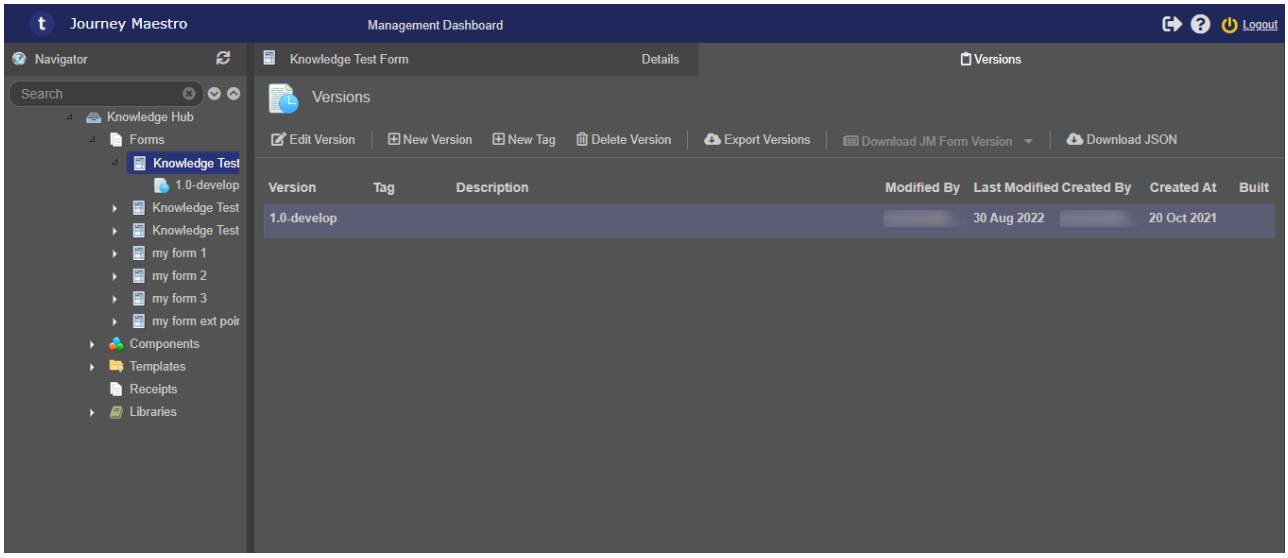
> NOTE
>
> A design could be a form, template, receipt or a component. We'll use a form as an example, but the same steps are applicable to all other design types.

To open a form:

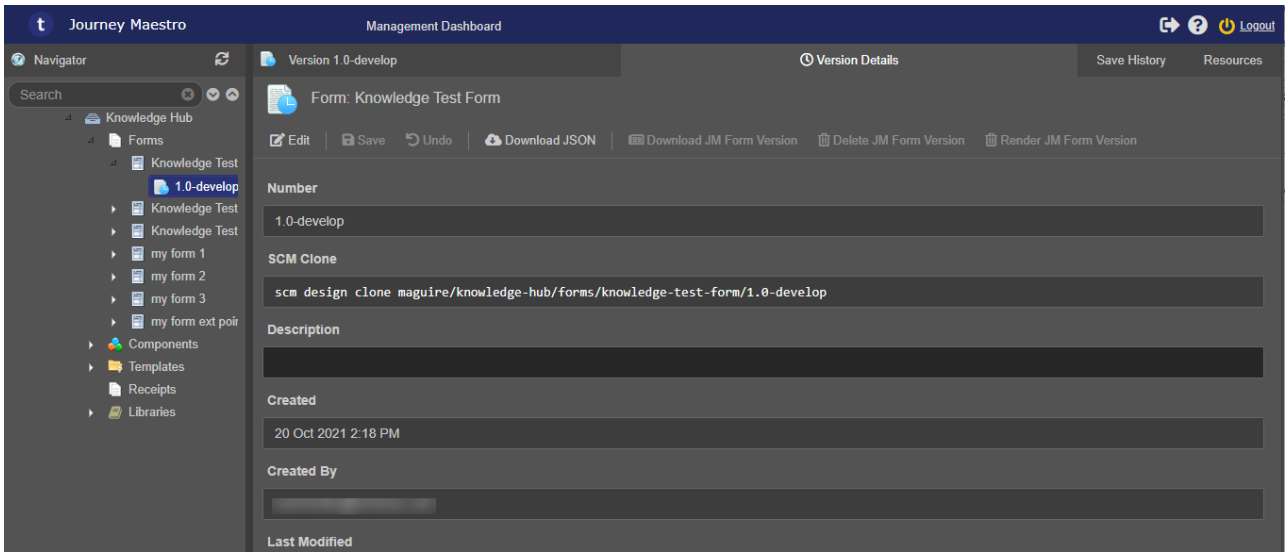
1. Log in to Maestro to access the Dashboard.
2. Go to the Navigator pane.
3. Select Home > Organization > Project > Forms.
4. Select a form from the Forms tab and then click Edit Form.



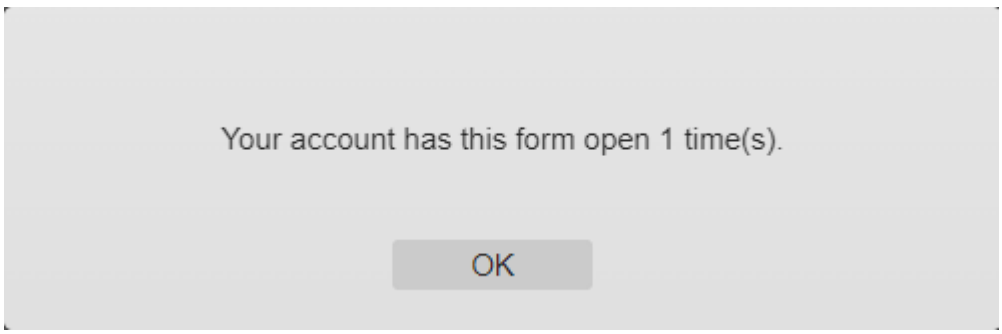
Alternatively, select a form under Forms, select a form version from the Versions tab and click Edit Version.



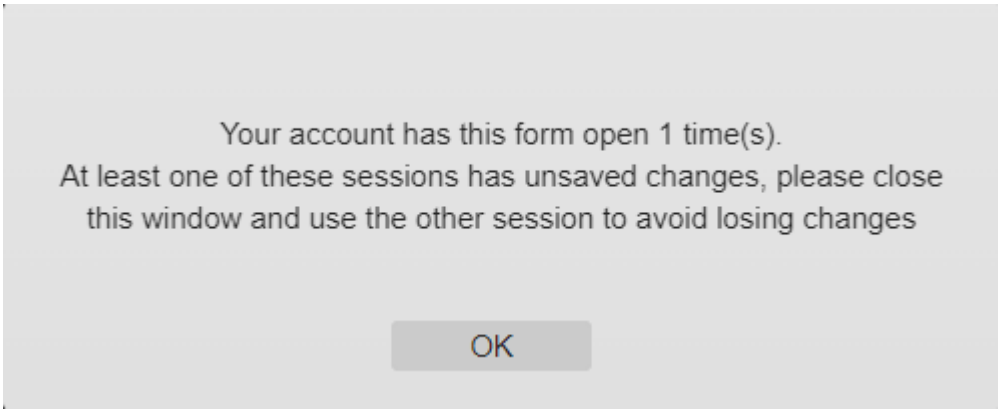
Or, select a form version under a form and click Edit.



5. If someone else has this form open already, Maestro shows the following message, so click OK to acknowledge and proceed.



If the form has not been saved, the following message is displayed:



The form will be open in the Maestro editor in a new tab of a browser where you can edit it.

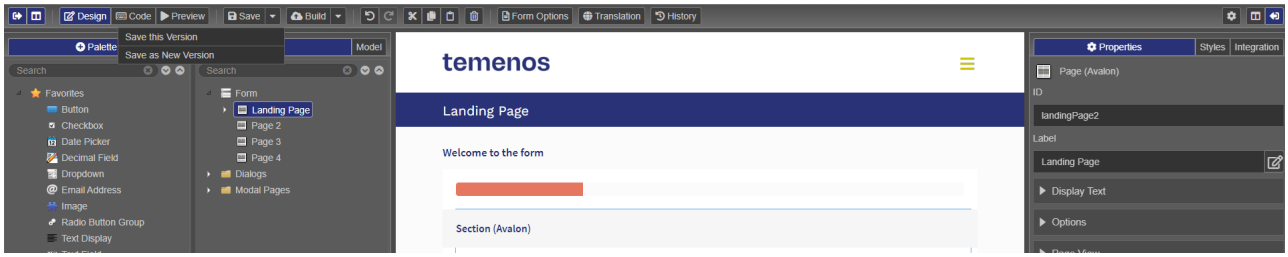
Next, learn how to save a form.

Save a Design

Maestro doesn't automatically save a design, such as a form, template or component, while you are working on its content, so you must do it manually to persist changes to the design.

To save a design:

1. Open a design in the Maestro editor and edit it as required.
2. Click Save to save the changes.



> NOTE
>
> The save button becomes enabled only if there have been changes to a design since it was last saved.

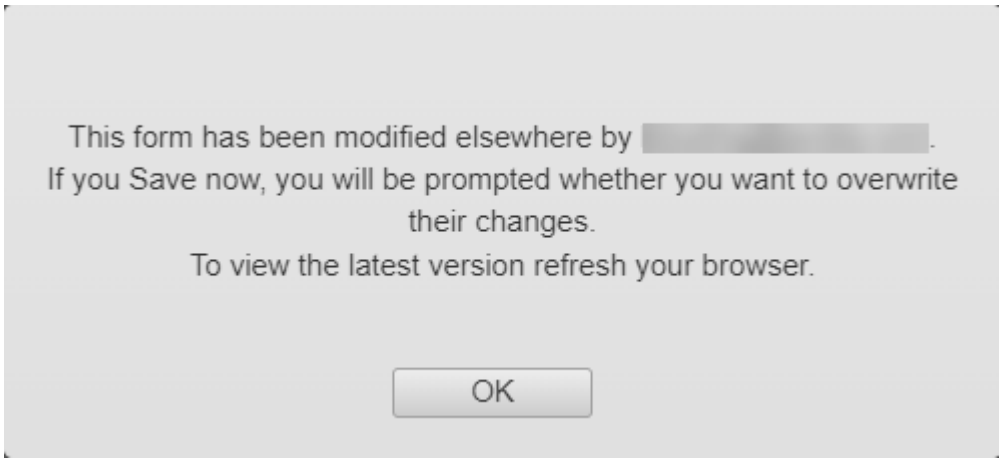
3. Select Save this Version to save the changes to the currently open design version.
4. Select Save as New Version to save the changes to a new design version.



- Enter a new version number in the New Version field.
- Provide a meaningful description in the Description field.
- Click Save.

Maestro comes with the save form notification mechanism. | 17.10 This feature was introduced in 17.10.

If you have saved a desing while other Maestro editor users have the design open or have been working on it, they will see the following warning message:



Should any conflict arise while saving a design, the message displays the user name who has saved the design, so you can reach out to that user to discuss which changes should be saved or rolled back.

NOTE

When a user saves a form, Manager marks it as `userSavedFlag = TRUE`, so this form submissions won't be abandoned.

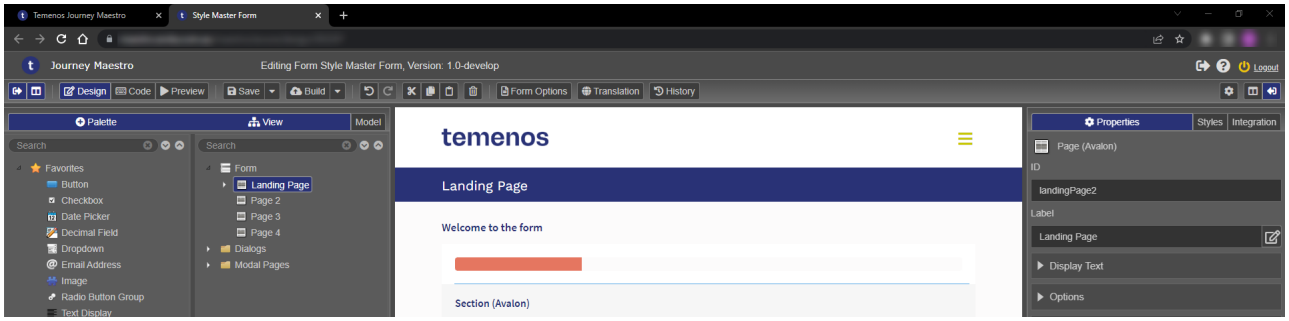
Next, learn how to close a design.

Close a Design

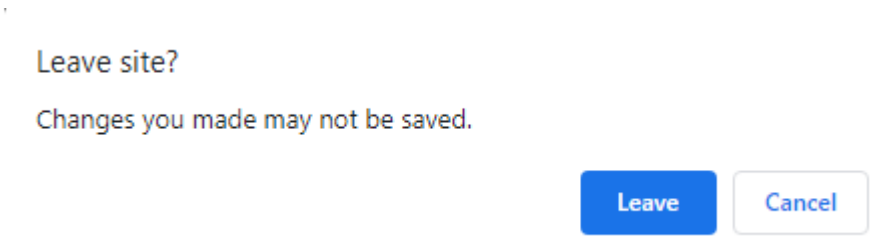
Maestro opens a design, such as a form, template or component, in the Maestro editor in a new browser tab while the Management Dashboard remains open in its original tab. When you are finished editing a design, you can close the relevant tab and return to the Maestro Management Dashboard.

To close a design:

1. Click to close a browser tab you are editing the design in. In this example, this is the Style Master Form tab, where Style Master Form is a name of the open design, which is a form.



2. Review your options as you are prompted.



3. Click Leave to close the design.

> NOTE
>
> If you haven't saved the changes made to the design, they will be lost.

4. Click Cancel to stay on the page so you can continue editing the design or save it and then close the tab.

Next, learn how to export a form.

Export Maestro Forms

Maestro allows you to import and export forms, so you can reuse them across different projects, organizations or environments. This saves you time and effort, as you don't need to create a new form from scratch. This process is also commonly used to migrate forms from one environment to another. You can use this functionality to:

- Rollback one or several forms
- Re-create one or several forms in another Maestro
- Promote one or several forms to other environments

To export a form:

1. Open a project in the Navigator pane where you want to export a form from and click Forms to view the list of forms created in your project.
2. Select the form you wish to export from the list and click Export Form. Maestro exports the form into a form archive ZIP file, which will be downloaded to your machine.

In some cases, you may need to export the whole project.

To export a whole project:

1. Open a project in the Navigator pane where you want to export a form from and click Forms to view the list of forms created in your project.
2. Select the form you wish to export from the list and click Export Whole Project to export the project including all assets and resources. Maestro exports the project into a form archive ZIP file, which will be downloaded to your machine.

Maestro lets you export a form version individually. You can later import the exported form version using the import form functionality described below.

Next, learn how to import forms.

Import Maestro Forms

Maestro allows you to export and import forms, so you can reuse them across different projects, organizations or environments. This saves you time and effort, as you don't need to create a new form from scratch. This process is also commonly used to migrate forms from one environment to another. You can use this functionality to:

- Rollback one or several forms
- Re-create one or several forms in another Maestro
- Promote one or several forms to other environments

To import a form:

1. Open a project in the Navigator pane where you want to import a form to and click Forms to view the list of forms created in your project.
2. Click Import Form and choose a form archive ZIP file.

   NOTE

   You can import a single form version, which was exported using the Export Versions functionality, only if there is no existing form version in a project.

   NOTE

   If you have imported a form to the same organization and the project, the form name will have the same name as the original but with an added suffix, for example, "-1", to differentiate it.

   In case of an error during the import, you can choose one of the following options to proceed:

   - Click Create New to create a new copy of this form.
   - Click Update Existing to update an existing form with the same name.
3. Select the imported form in the Navigator pane and click Details to update the Name and Description of this form.

Next, learn how to migrate a form.

Migrate Maestro Forms

Maestro allows you to migrate and copy forms across different projects, organizations or environments. You can use this functionality to:

- Rollback one or several forms
- Re-create one or several forms in another Maestro
- Promote one or several forms to other environments

Migrating a form is merely using the Maestro export and import functionality, which is explained below.

To migrate a form:

1. Export a form
2. Import a form

Be aware that when you move a form, the resources used within that form will remain in the original project. If you move the form on its own, you may notice the appearance does not match the original and that there are resources missing. This would include the template used to create the form, any shared components, and styles.

To ensure the form displays as originally designed, you need to move the assets used to the new project along with the form. This can be done by moving the individual assets to the relevant project. Another option is to move the library, which contains the published assets and resources. You can move the library to a new project or an organization library where all projects have access to the published assets and resources.

NOTE

It is recommended that you speak to the Template Designer before importing and exporting templates, styles, and libraries.

Forms can also been exported and imported in Manager. For more information, see migrate forms in Manager.

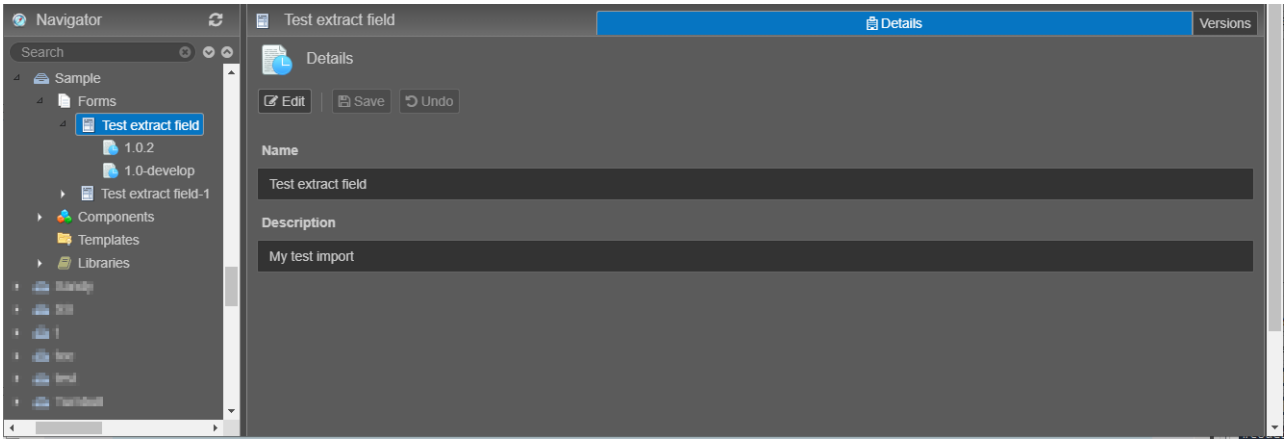
Next, learn how to test forms.

Change a Maestro Form Description

Journey Maestro allows you to change a description of a form, which you may need to do after you have created a form. You can also change a form version's description at any time after the form version is created.

To change a form's description:

1. Open Maestro and locate a form to see its current description.
2. Select the Details tab.



3. Update a form's description in the Description field.
4. Click Save to update the changes.

Next, learn how to open a Maestro form.

Test Maestro Forms

As Maestro allows you to build onboarding user journey forms that incorporate both complex logic and visual representation, form testing is becoming an essential part of the development process. It's paramount that before a form is deployed to a production environment, it must be thoroughly tested. A failure to do so will lead to poor user experience that immediately provides an adverse impact on your organization resulting in revenue-reducing customer experience.

To test forms, we encourage you to create a testing specification, which defines how the forms should look and behave. For example, some fields must be mandatory, certain information must be available, and back-end integrations should operate in a particular way.

There is no universal method for creating specifications, but an intuitive approach is to format each specification as a user story, as shown below:

> As a < type of user >, I want < some goal > so that < some reason >.

For example:

> As a customer, I want my data to be prefilled, so that I don't have to enter data manually.

You can then keep track of these stories as tickets in an issue-tracking system, such as Jira.

> NOTE
>
> User stories don't always need to be from the perspective of the customer. You might, for instance, write user stories for the people who will be analyzing the data that's produced by the form submissions.

Principles of Effective Testing

There are many ways of addressing form testing, which is available on the Internet, so we are not going into details. However, it's important to mention a few principles you should consider while designing your form testing specifications. Here they are:

Budget enough time and money
: Ensure enough resources are allocated to form testing.

Don't leave testing until the end

During the development process, it can often feel like testing is less of a priority than implementing new features. As a result, testing can become an afterthought that is squeezed into the final stages of development.

The problem with this mindset is that it can compound issues that might have been avoided had testing been properly valued earlier in the process. There may be fundamental issues with how something is designed, for instance, and it may require that numerous elements of the form are ripped out and replaced before going into production. Soon, the time saved earlier in development pale in comparison to the time lost later in the process.

Run tests on various browsers, devices, and resolutions

These days, it's impossible to predict how your form will look to every customer. The amount of browsers, devices, and display resolutions on the market is so diverse that the only solution is to be mindful of the possibilities.

To make informed decisions, refer to your organization's analytics software and identify the primary browsers and devices that customers use to navigate your websites. This will provide a starting point what to test first.

To run tests on a wider range of device configurations, use a tool such as BrowserStack or SmartBear.

Use a blend of manual and automated testing

In a perfect world, all testing could be automated. Unfortunately, creating automated tests at a certain level of granularity can become more time-consuming than simply performing the tests manually.

To strike the right balance, identify:

- What can be automated with third-party testing tools
- What can be automated with custom-built tests
- What doesn't fall into the above categories

Continue testing throughout development

As you can see, there are no universal tests that can be applied to every form. However, we've identified the following set of tests that can be applied to most forms so you can safely use them as a starting point for form testing:

Functional Tests

- When supplying valid data, you can complete the form from start to finish. If you can't complete this test, the rest of the tests is too granular to be useful. Ensure this test passes before continuing.

- There are no errors or warnings in the JavaScript Console
- Fields marked as mandatory are actually mandatory
- Fields reject invalid data
- The Add and Remove buttons for repeating block components work as expected
- You can enter data in an unusual order, for example, from bottom to top, randomly, and so on
- After submitting a form, the Submission XML contains the data entered in the form

Visual Tests

- Fields are aligned correctly as per a wireframe of the form design
- Fields are arranged in a logical order, for example, from left to right, and top to bottom
- Long labels or text don't cause wrapping or alignment issues
- Dropdown lists are wide enough to fit the content they contain
- Different types of fields align correctly when placed in the same row
- Mandatory fields are identified as mandatory, for example, with
- Optional fields are identified as optional
- Fields look consistent between pages and across the whole application
- Spelling, punctuation, and grammar are correct
- Error messages are relevant and easily understood

Receipt Tests

- Fields are shown or hidden as per a wireframe of the form design
- Receipt is flat and uneditable. Here, flat refers to all the content being displayed together, from top to bottom - unlike in an interactive form, where content gets shown and hidden as a user navigates through it .

Accessibility Tests

- You can navigate through a form using only the keyboard
- Using the keyboard navigates the fields in a logical order
- Images have `alt` attributes

For more information, see Accessibility for Journey Maestro Form Developers.

Dynamic Data Tests

- Dynamic data look-ups retrieve requested data
- Third-party integrations, such as identity verification, operate as expected
- When 3rd party integrations don't work, manual alternatives are available

- Data is prefilled
- Attachments can be uploaded
- Attachments must be scanned for viruses
- Forms can be signed digitally

Devices and Browsers Tests

- Layout responds to different view-port sizes
- Fields are touch-friendly
- All tests pass on primary browsers and devices

Next, learn how to debug Maestro forms with Chrome DevTools.

Debug Maestro Forms

If a Maestro form doesn't behave as expected, it might be related to one of the business rules you've created using the Maestro script editor. It's very important to understand the form architecture before you delve into form debugging, as there are certain assumptions of how the 3 form elements are used in interact within the form.

Tracking down problems in business rules can be tricky, so we've summarized several useful techniques for finding and fixing problems using Chrome DevTools. which are available when you open a form in a Google Chrome browser. Most modern browsers come with good developer tools these days. We prefer to use Google Chrome, but Firefox and Microsoft Edge can also be used.

Maestro forms are built on the AngularJS framework and plugins are available to provide specific support for AngularJS web applications. For example, in Chrome, you can use AngularJS Batarang.

Debugging application forms in the browser is a technical task and requires some understanding of web application development in general, specifically the web standards of HTML, CSS and JavaScript. We recommend getting familiar with HTML, CSS, and JavaScript technologies to be able to debug forms. Also, as Maestro runs on the AngularJS JavaScript framework, AngularJS experience is useful if you'll be debugging on a regular basis, but it is not required. If you want to know more about AngularJS, read the official tutorial.

The debugging process includes the following steps:

1. Build a form
2. Open Chrome DevTools
3. Inspect the Form object
4. Debug JavaScript Rules
5. Set Breakpoints

Build a Form

Before you can start debugging a Maestro, you need to build it with the Minify Code checkbox unselected, so unnecessary characters, such as white space, new lines, and comments, are not removed.

NOTE

If the Minify Code is selected, the result of minification is a single line of code that is very long and difficult to read and debug.

After that, you render the form so it's opened in a new Google Chrome browser. If a new browser tab doesn't open, check if your browser is blocking pop-ups and, if so, allow them from the Maestro URL.

Whenever you make a change to the form, you'll need to rebuild it.

NOTE

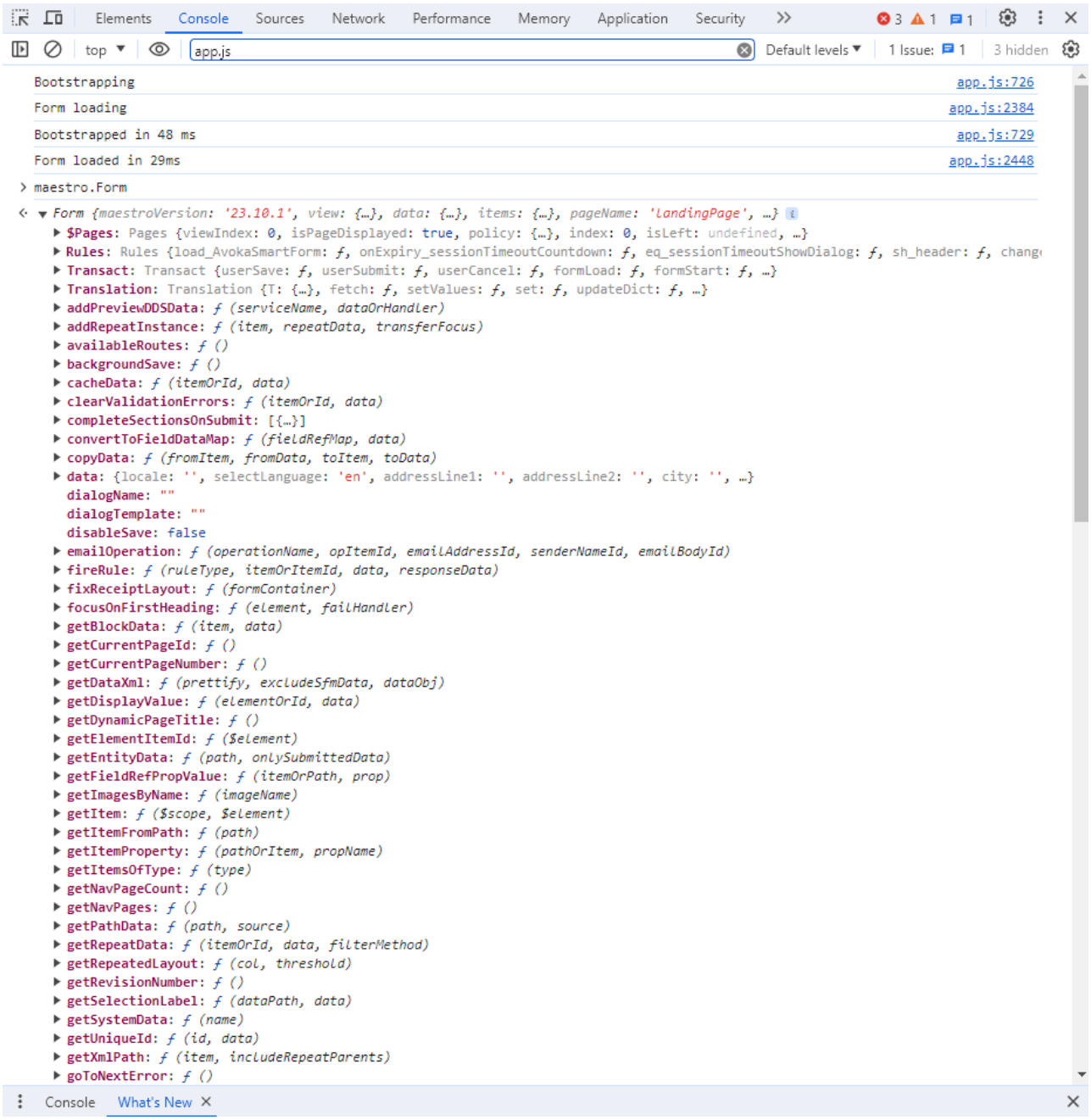
You can't debug a Maestro form in the Design, Code, or Preview modes.

Open Chrome DevTools

Chrome DevTools provide access to a range of features for diving into the look and feel, functionality, and performance of web applications. Once the published form is loaded in the browser you can activate the browser's developer tools.

To open Chrome DevTools:

1. Select the browser tab that contains the rendered Maestro form.
2. Click `F12` or `Control+Shift+I` to open the DevTools pane, as shown below:



For more information, see Google's Chrome DevTools.

Inspect the Form Object

When you load a Maestro form in your browser, a Form object, which contains the data required to render the form, is initialized. In the Maestro framework, the Form object contains everything else you might need to access for debugging including the View, Items and Data, so to access any of these elements you need to scope the Form object. There are a number of ways to do this from the Console tab in the browser developer tools.

To inspect the Form object:

1. Selecting the Console tab and executing one of the following queries to retrieve a Form object:
    - Using JQuery:

      ```
      $("Form").scope().Form
      ```

    - Using the Maestro root element included with the framework:

      ```
      maestro.Form
      ```

    - Using AngularJS Batarang, if installed:

      ```
      $scope.Form
      ```

      This may also allow you to access the Form object by way of the `$scope` object. However, you need to select an element in the Elements tab first, for example, a body or form.

2. Expand the Form object to see all elements. Usually, the object is quite large, so you need to know that there are three objects within the Form object that are worth exploring: `data`, `items`, and `view`. For more information, see Maestro Form Architecture.
3. Check these 3 main objects. If you have a JavaScript debugging session active, as described below, you will have access to the Form Data object in the function scope and can readily inspect its content.

Debug JavaScript Rules

All business rules in Maestro are implemented in JavaScript. As a result, a straightforward way to debug these rules is by using `console.log` statements in the script editor: `console.log("Hello world...");`.

To distinguish between different types of output, you can also use the `console.warn("This message will have a yellow background");` and `console.error("This message will have a red background");` methods:

Below are some useful snippets for outputting relevant data inside a business rule:

```
// Inside a business rule, "value" refers to the data attached to the current field:
console.log(value);

// The "data" object, explained above, can be output from inside a business rule:
console.log(data)

// You can access any field value via the data object by referring to its ID:
console.log(data.lastName)

// The "item" object, explained above, can be output from inside a business rule:
console.log(item)

// Some components, such as the Page Controller component, output extra information via
the "info" object:
console.log(info)
```

You can run various commands in the console to print form's data. For example, you can use `console.log(maestro.Form.getDataXml(true))` to list the `/SFMData/SystemProfile` content as an XML file, as shown below:

```
<AvokaSmartForm>
       <AboutYou>
               <FirstName>
               </FirstName>
       </AboutYou>
       <SFMData>
               <SystemProfile>
                   <FormCode>Test 1</FormCode>
                       <RequestLogKey>12345</RequestLogKey>
                       <DisplayMode>Entry</DisplayMode>
                       <ServerBuildNumber>22.4.0</ServerBuildNumber>
                       <RevisionNumber>0</RevisionNumber>
                       <FormDataServiceURL>https:/[/YOUR-SERVER-HOST-NAME]/web-plu-
gin/servlet/FormDynamicDataServlet</FormDataServiceURL>
                       <TrackingCode>ABCD1234</TrackingCode>
                       <AbandonmentReason>
                       </AbandonmentReason>
                       <AbandonmentComments>
                       </AbandonmentComments>
               </SystemProfile>
       </SFMData>
</AvokaSmartForm>
```

There is a handy Util function to generate a printable representation of an item and then log it to the console: `$scope.Util.logItem($scope.Form.items.personalDetailsBlock)`. The output is shown below:

```
"personalDetailsBlock
┌ firstName
└ middleNames
- lastName
- dateOfBirth
 ┌ day
 │ month
 └ year
 — date
 — daysData
- emailAddress
- mobileNumber
"
```

While `console.log` statements are easy to use, you'll need to rebuild and reload the form every time you make a change. This makes it a fairly slow method of debugging. For more productive debugging, we recommend using breakpoints.

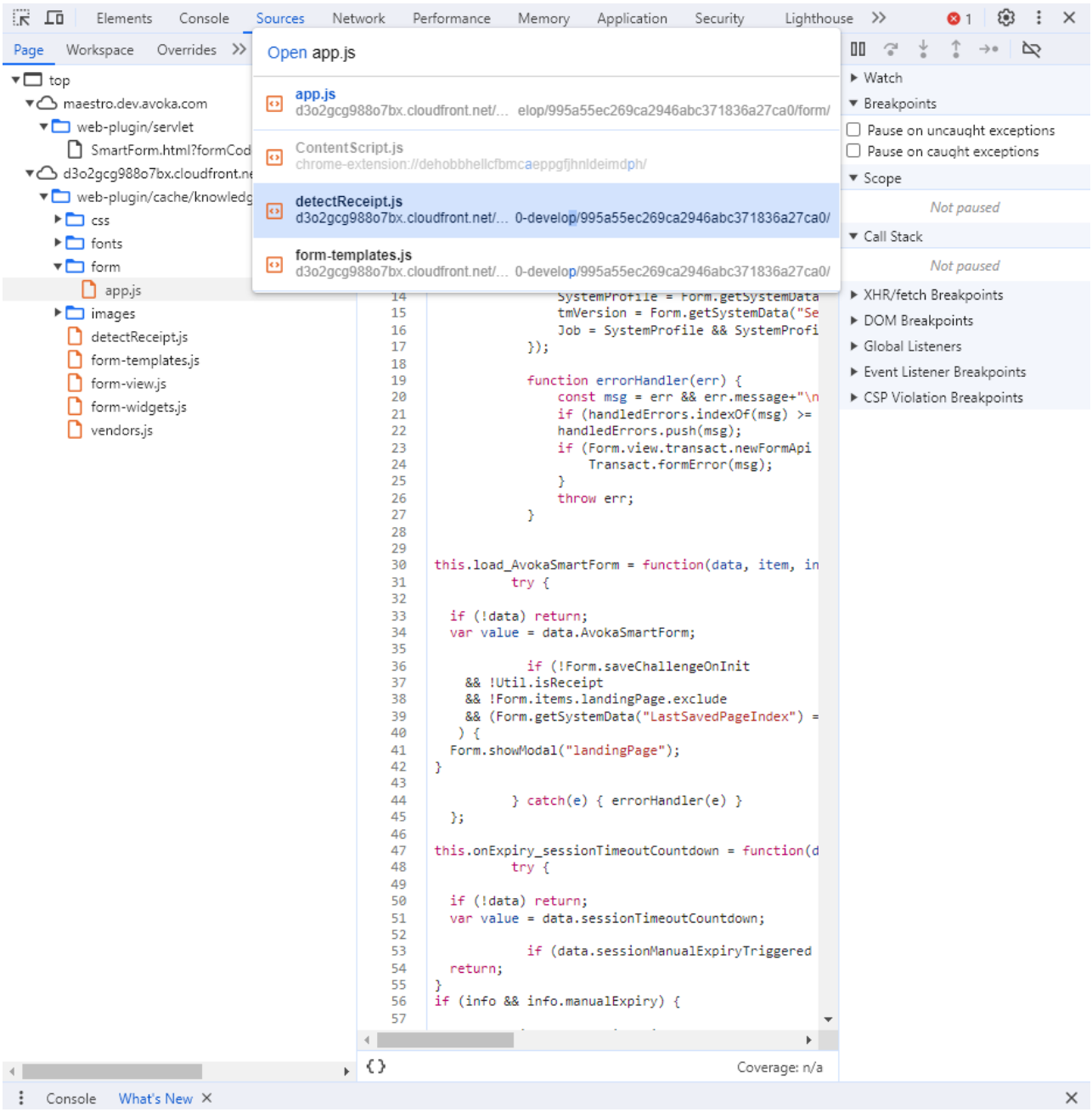
Set Breakpoints

Breakpoints allow you to define places in your JavaScript where the script execution must pause, so you can investigate where exactly your code breaks without having to write a bunch of `console.log` statements or continually rebuild and refresh the form.

All JavaScript code used by form's business rules are stored in the `app.js` file, so you must locate this file and set breakpoints there.

To set breakpoints:

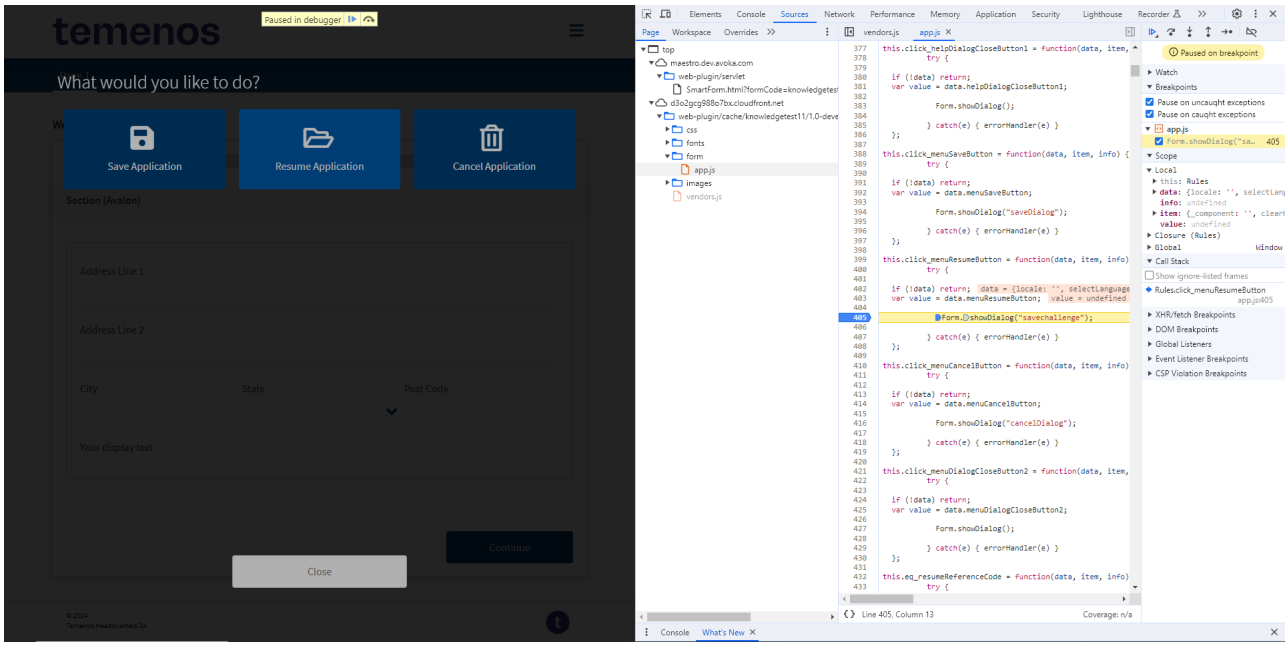
1. Select the Sources tab in Chrome DevTools.
2. Click `Control+O` (`Command+O` on a Mac) and type `app.js` to find all references to the `app.js` file. Alternatively, navigate through the Page hierarchy on the left until you see the `app.js` file.



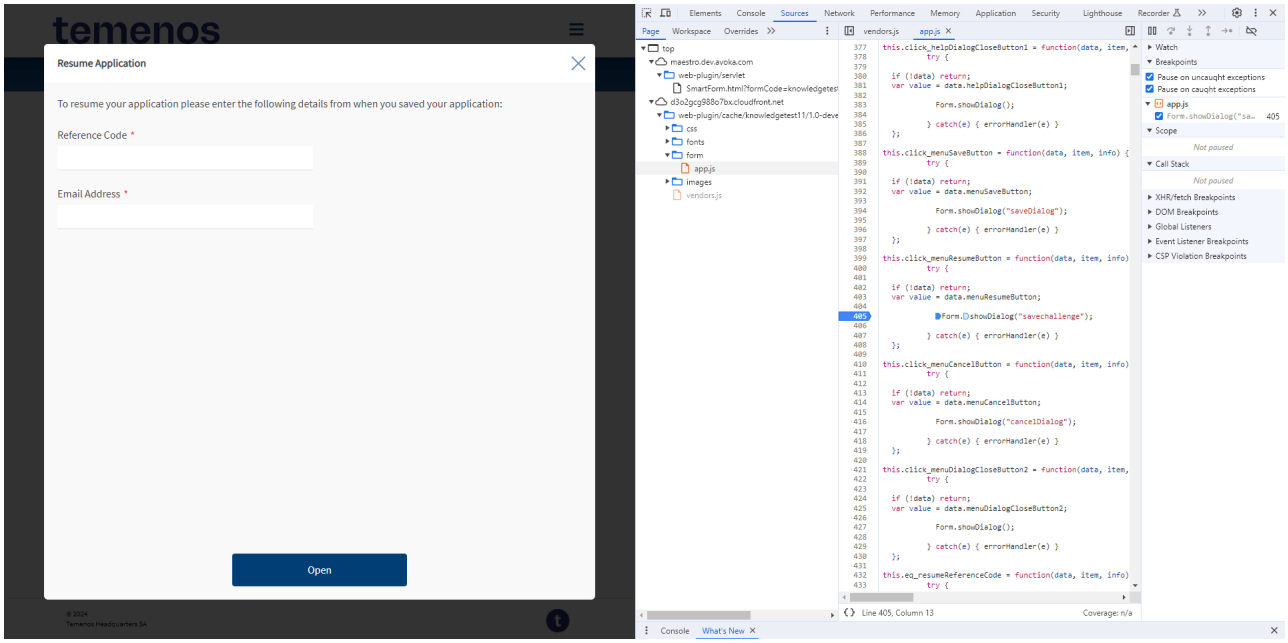
3. Select the `app.js` and click it.
4. Click `Control+F` on Windows or `Command+F` on Mac to find the `Form.showDialog ("savechallenge")` line of code and set a breakpoint there. In this example, the code opens the modal window allowing form users to re-open a previously saved form to resume the application. If you're debugging more complicated logic, you can set multiple breakpoints. For more information, see Pause your code with breakpoints.
5. Select Pause on uncaught exceptions or Pause on caught exceptions to stop a script execution depending on exceptions. Now you are ready to debug the rule. You can return to

your form window and perform the action that will trigger the rule to execute and step through your rule script using the standard JavaScript debug functions.

6. Click Resume Application to execute the `Form.showDialog("savechallenge")` method. However, the modal window doesn't appear. Instead, the line of code where the breakpoint is set is highlighted and the Paused in debugger message is displayed to indicate that the execution of the JavaScript has paused on that line. This is illustrated below:

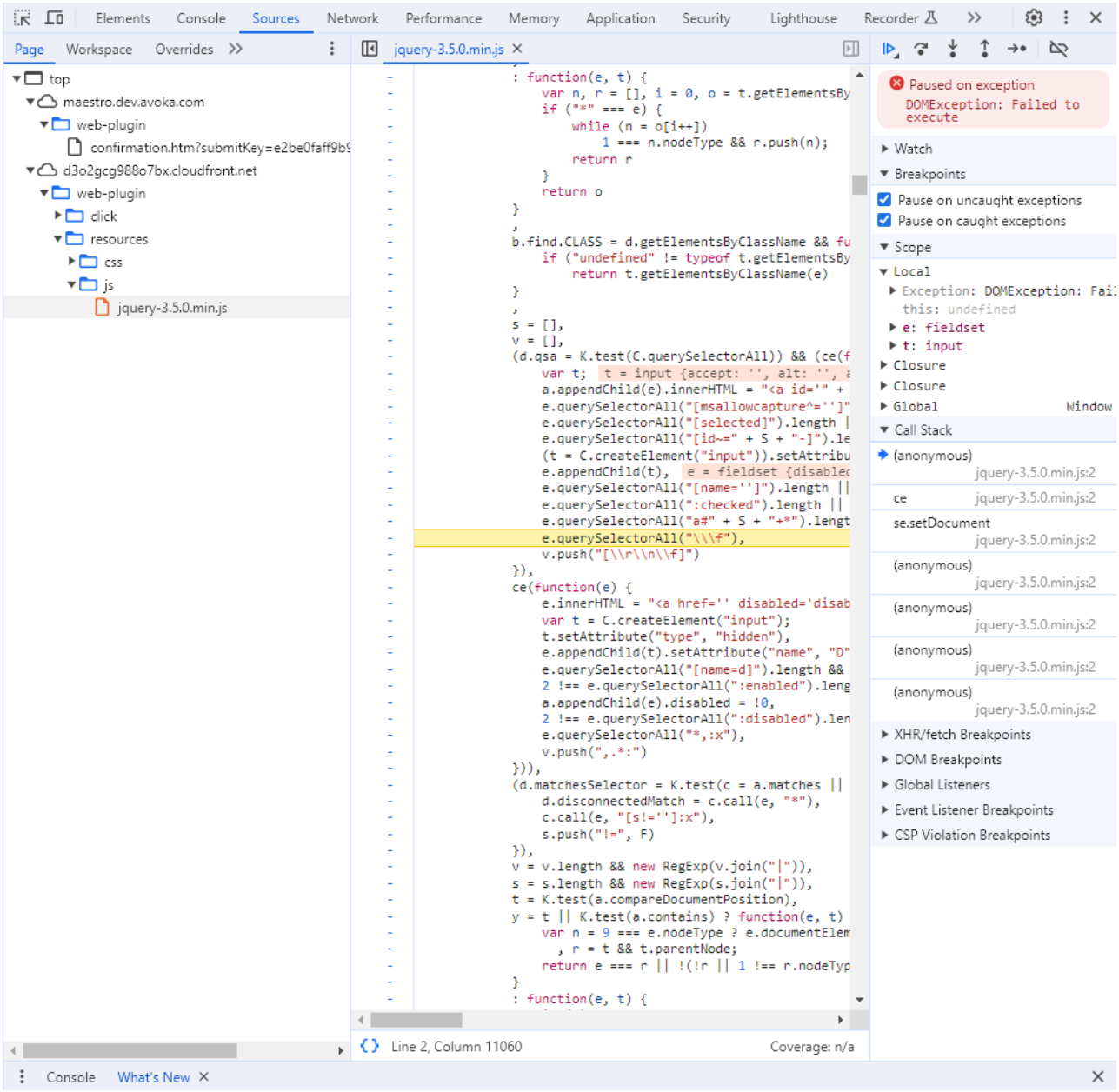


7. Click Play to continue executing the script, thereby allowing the modal window to open.



When you continue after each breakpoint, execution of the script will stop at the next breakpoint, allowing you to move step-by-step through a script.

While moving between breakpoints, pay attention to the Scope section, as it shows the current state of the form's data that may provide insight into why something isn't behaving as expected.



As you saw above, it's not difficult to find the `app.js` file. In an actual form though, the file may contain hundreds of rules, which can make it difficult to find and debug the code for a specific rule. One way is to use the `Control+F` shortcut to search for a statement from one of the rules. For example, if you know there is a `console.log` statement in the rule, you can search for `console.log`.

But if you have many rules, which contain similar statements, this maks this approach less convenient. Fortunately, every rule in Maestro has a corresponding JavaScript function that follows a strict naming convention. The functions are named using a rule type code and the ID of the field, with an underscore between them - `<rule-type-code>_<field-id>`. For more information, see List of Maestro Rules.

You may need to review your rule script in the Maestro Code editor and select a snippet that is likely to be unique. For example, if you search for the snippet `Form.getItemFromPath('data.buttonGroup')` and located the function `eq_ddLabel` that contains the business rule script.

> NOTE
>
> We don't recommend modifying JavaScript in-line in the browser debug tools because results are often unreliable. Instead, you should rebuild and republish a form each time you want to change a business rule.

Debug Form Styles

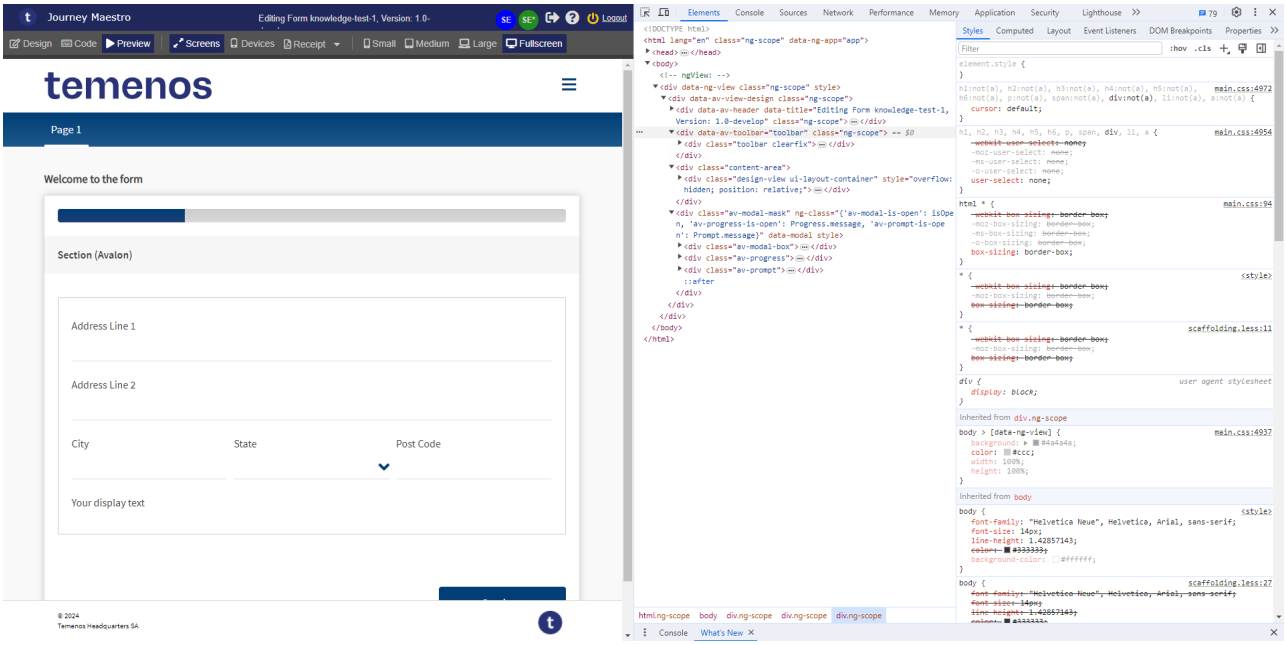
Maestro forms and templates use CSS extensively. CSS styling can become complicated for big form application. In particular, if two different CSS statements provide conflicting instructions about how to style a particular item, it can be very confusing to debug why your changes do not appear to be working.

To debug styling problems, we recommend using the native debugging features built into your browser of choice, rather than attempting to understand this entirely within Maestro. You need to have a moderate to advanced understanding of CSS to debug styles.

To debug form's styles:

1. Select Preview and open Chrome DevTools.
2. Select Elements > Styles to explore a style of a selected element of the HTML form. This is

shown below:



When there are style conflicts, the usual CSS rules apply:

- If two identical instructions are processed, the one that is later in the CSS definition will override the earlier one.
- The more specific the CSS selector, the higher it's precedence.
- Precedence can be fine-tuned by adding the `!Important` declaration.

Next, learn about UI test automation.

UI Test Automation Overview

Many customers choose Journey Maestro because of the speed to market advantages the platform offers. Underpinning speed to market is a successful DevOps[1] strategy and the key to DevOps is a comprehensive regression test suite.

Maestro provides the compelling set of features that enables UI testers to dramatically accelerate the creation and maintenance of UI test suites for forms as well as solving one the most pressing issues of web-testing - non-deterministic test[2] results.

Before we delve into details, we recommend becoming familiar with a WebDriver based test automation framework and Maestro debugging techniques.

Selenium & WebDriver

Talking about UI test automation, we assume you use a WebDriver derived UI automation framework. We also provide all examples for Selenium[3] in Java[4]. Although that may not be your company's preferred UI testing framework, the concepts are valid for any WebDriver derived framework.

WebDriver is a standard maintained by the Worldwide Web Consortium (W3C), which defines it as follows:

---

[1]DevOps is a software development methodology that combines software development (Dev) with information technology operations (Ops). The goal of DevOps is to shorten the systems development life cycle while also delivering features, fixes, and updates frequently in close alignment with business objectives.

[2]A test is non-deterministic when it passes sometimes and fails sometimes, without any noticeable change in the code, tests, or environment. Such tests fail, then you re-run them and they pass. Test failures for such tests are seemingly random.

[3]The Selenium testing software tool is used to automate tests across browsers for web applications. It's used to ensure high-quality web applications — whether they are responsive, progressive, or regular. Selenium is an open-source tool.

[4]Java is a programming language that produces software for multiple platforms. When a programmer writes a Java application, the compiled code (known as bytecode) runs on most operating systems (OS), including Windows, Linux and Mac OS. Java derives much of its syntax from the C and C++ programming languages.

- WebDriver is a remote control interface that enables introspection and control of user agents. It provides a platform- and language-neutral wire protocol as a way for out-of-process programs to remotely instruct the behavior of web browsers.
- Provided is a set of interfaces to discover and manipulate DOM elements in web documents and to control the behavior of a user agent. It is primarily intended to allow web authors to write tests that automate a user agent from a separate controlling process, but may also be used in such a way as to allow in-browser scripts to control a — possibly separate — browser.

In short, it allows for the remote control of a browser application, you write tests that 'drive' the web application.

It is beyond the scope of this document to explain the intricacies of testing, but a short overview of the key concepts is appropriate.

UI Testing Key Concepts

To control an element in the browser, you must locate it in the browser's DOM[1]. Since the original Selenium framework, on which WebDriver is derived, was written in JavaScript and ran in the browser, locators closely match familiar `ID`, `CSS` and `XPath` based selectors. For example, all of the following Java code snippets locate an element and then click on it:

- `driver.findElement(By.id( "element-id" )).click();`
- `driver.findElement(By.cssSelector( "#element-id" )).click();`
- `driver.findElement(By.xpath( "//*[@id='element-id'" )).click();`

Each call follows the same structure:

- `driver` - is the WebDriver, an object that provides the means to connect to, introspect, and control a browser session.
- `findElement` - is a method that finds the first element using the given `By` locator or throws if no element can be located matching the locator. The return value is a WebElement that provides methods to query and interact with the remote DOM object.
- `By` - is a class that provides the means to lookup an element in the DOM by a specific locator scheme. As noted, conceptually, these should be familiar with anyone who uses CSS Selectors. In each example we select by the element's ID but, obviously, this isn't how

[1]The Document Object Model is a cross-platform and language-independent interface that treats an XML or HTML document as a tree structure wherein each node is an object representing a part of the document. The DOM represents a document with a logical tree.

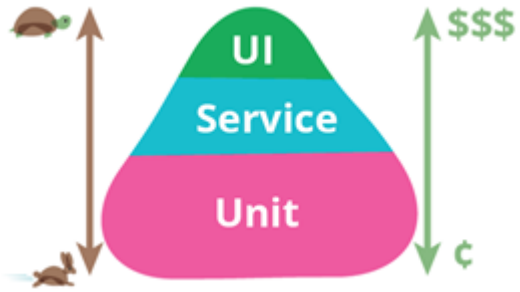
`cssSelector` and `xPath` would typically be used. Note that `By.name`, `By.tagName`, `By.linkText`, and `By.partialTagName` are also supported, but we do not need to use them.

- `click()` - is a method on the WebElement that clicks on the element if it is visible and has a height and width of greater than zero. (Selenium is a test framework that tries to behave as a human would: a DOM element may exist but not be visible.)

To create a test, every element in the DOM must be identified and then code written that introspects and interacts with these elements, asserting that the correct behaviour is observed.

Issues in UI Testing

Martin Fowler popularized the idea of the Test Pyramid that was first espoused by Mike Cohn as a way of thinking about different kinds of automated tests. This is illustrated below.



Martin Fowler's Test Pyramid. For more information, see https://-martinfowler.com/bliki/TestPyramid.html

This neatly captures the fact that UI testing is costly and slow. From the code examples above, one reason why this is true should be obvious: identifying elements in the DOM is time consuming and fragile. During development, element types change, element IDs change, element structure in the DOM changes, and CSS changes. Changes introduce non-deterministic results into test suites.

To quote Fowler - "Most importantly such tests are very brittle. An enhancement to the system can easily end up breaking lots of such tests, which then have to be re-recorded. You can reduce this problem by abandoning record-playback tools, but that makes the tests harder to write. Even with good practices on writing them, end-to-end tests are more prone to non-determinism problems, which can undermine trust in them. In short, tests that run end-to-end through the UI are: brittle, expensive to write, and time consuming to run"

Non-deterministic[1] failures are the pernicious false negatives – for example, tests that exercise a web based GUI and fail, but fail because of a tiny CSS change.

So much for the bad news. The good news is that using Maestro, most of these problems can be solved:

- Locator instability can be eliminated
- Non-deterministic run time failures can be moved to test build time (with a statically typed language)
- Timing issues can be reduced

Next, learn how to perform UI test automation of Maestro forms.

[1]A test is non-deterministic when it passes sometimes and fails sometimes, without any noticeable change in the code, tests, or environment. Such tests fail, then you re-run them and they pass. Test failures for such tests are seemingly random.

UI Test Automation of Maestro Forms

As we explained in UI test automation overview, UI testing of application forms can be a daunting task. However, Journey Maestro can help you with that. Let's look at how you can achieve this.

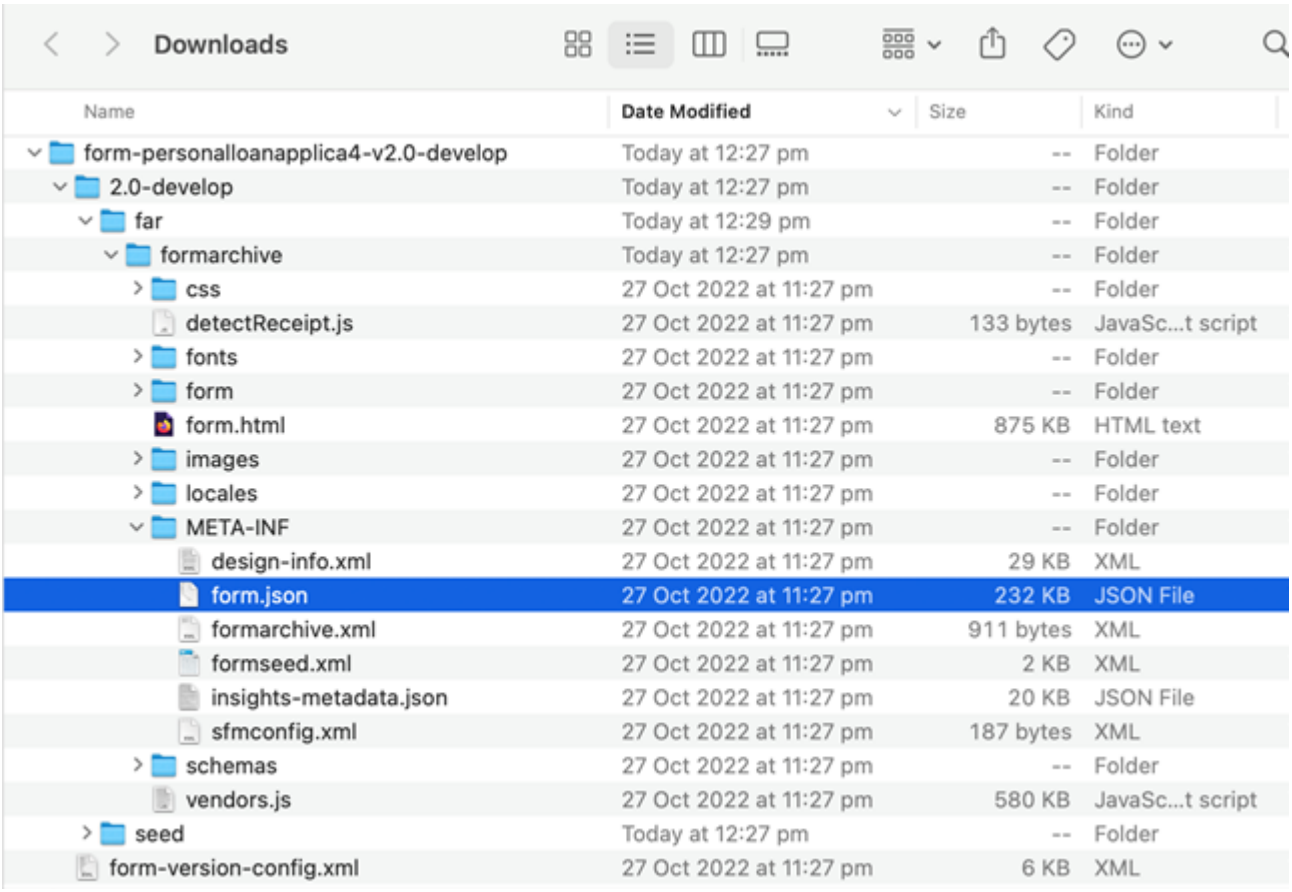
Maestro is a design tool that generates single page web applications[1]. These application are Maestro forms, which are packaged during a build process. How it does this is key to solving the test automation puzzle:

- The Maestro build process generates an artefact containing a machine-readable definition of a form.
- Maestro enforces certain constraints on a form developer, ensuring that every element has a unique identifier.
- Every form element always generates the same HTML structure. The structure varies according to the element type, but the pattern is always the same.
- Form elements with validation rules generate elements that can be reliably linked back to the parent input element.
- There is a simple mapping between form element identities and both the runtime representation of form data (JSON[2]) and the submission format (XML[3]).

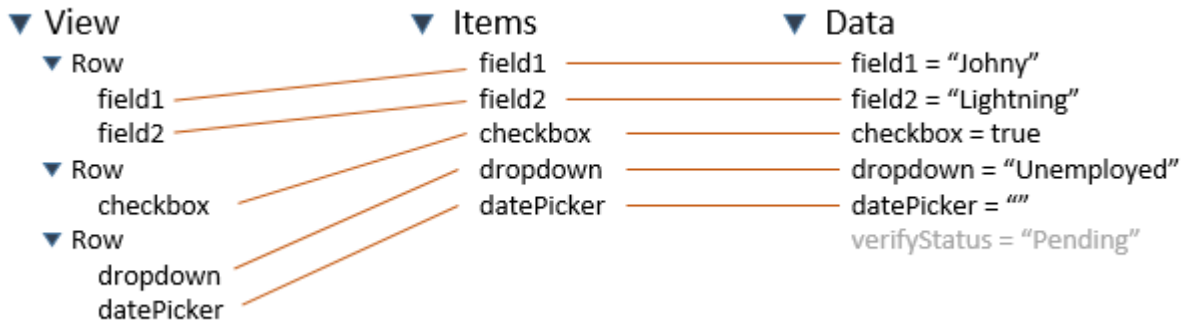
The machine readable file is called `form.json` and it's packaged in the `META-INF` directory of the Form Archive (FAR) build artefact, which is itself packages within a ZIP file. This is illustrated below.

---

[1]A single-page application (SPA) is a web application or website that interacts with the user by dynamically rewriting the current web page with new data from the web server, instead of the default method of a web browser loading entire new pages.
[2]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.
[3]XML (Extensible Markup Language) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.



The `form.json` provides the Form View definition, as shown below:



This structure is unsterilized into a browser DOM:



Maestro Form.json

Look inside the `form.json` and you will see a structure that represents the rows and items that define the UI elements. However, this data exists in a complex structure, most of which is superfluous for our testing needs.

Three objects are of importance:

- rows - contains the form UI page definitions, which are often deeply recursive - there are rows withing rows that represent the hierarchical structure of the `<div>` elements in the rendered form. The UI elements themselves are all leaf nodes and we will exploit this fact when extracting the definitions.
- dialogs - contain dialog definitions, each of which is represented as a named object, each of which has a rows property which conforms to the structure discussed, above.
- modals - contains modal definitions and has an identical structure to the dialogs object.

Writing code that parses this structure is challenging. Therefore, in our framework, we sidestepped this issue and used JsonPath. JsonPath expressions are analogous to XPath expressions, allowing the user to query complex structures using simple expressions. For more information, see https://goessner.net/articles/JsonPath/index.html#e2 and https://-github.com/json-path/JsonPath.

Three expressions are needed to get you started, one for each of rows, dialogs and modals:

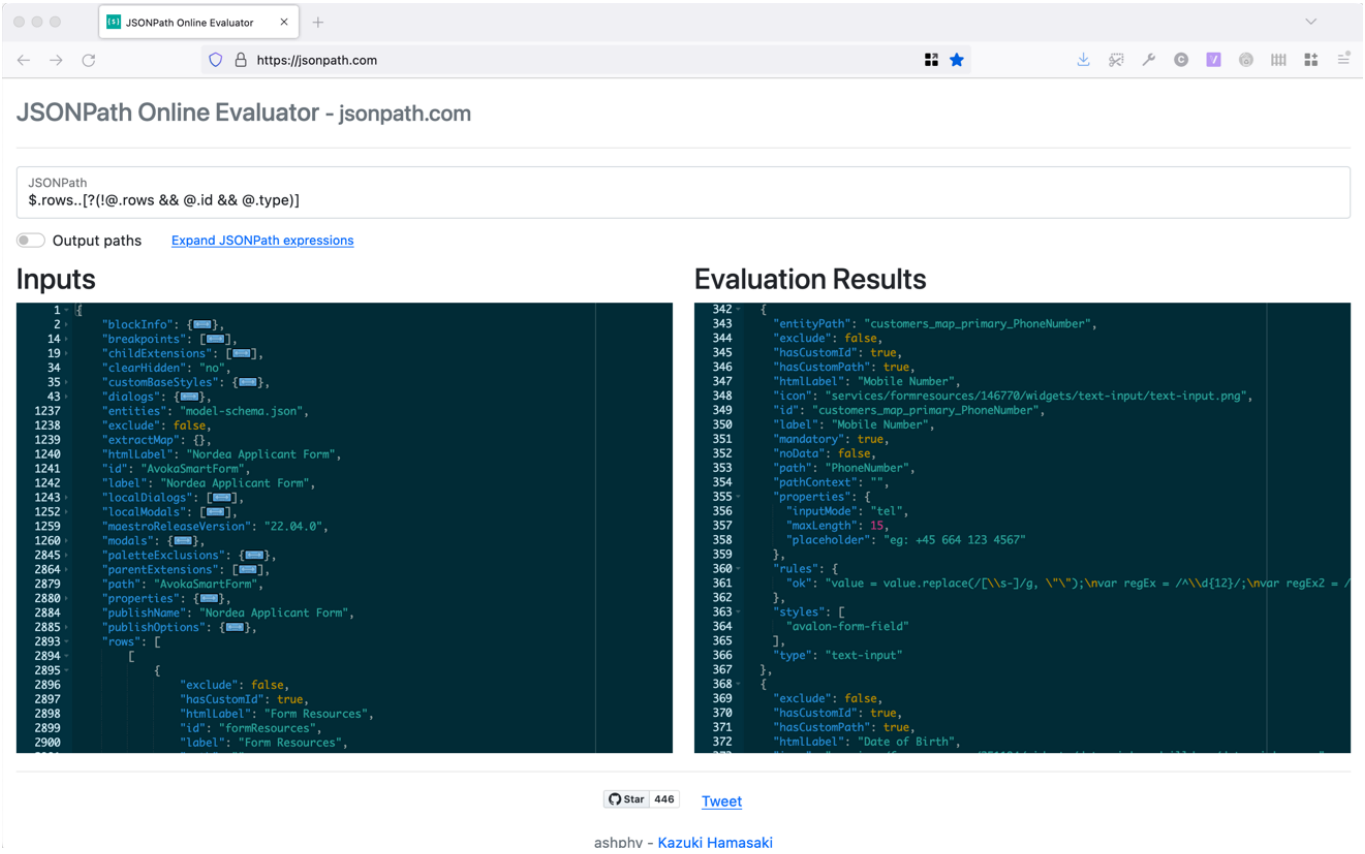
- `$.rows..[?(!@.rows && @.id && @.type)]` - This recursively searches all children of the root rows object, filtering children that do not have a rows element themselves, but do have both an id and a type property.
- `$.dialogs..[?(!@.rows && @.id && @.type)]` - Same as above but start the search at a different root location in the JSON structure.
- `$.modals..[?(!@.rows && @.id && @.type)]` - Same as above but start the search at a different root location in the JSON structure.

The result will be returned as an array of Form Item definitions.

NOTE

We use item and element interchangeably.

When testing these expressions, we found the JSONPath Online Evaluator to be invaluable. This tool is easy to use. What you need to do is to paste a `form.json` file on the left side of the main window, as shown below, and collapse all of the nodes except rows. We used the JSONPath expression to return form elements, namely, leaf elements under the rows object that have an id and a type.



Form Item Definition

The form item definition, shown in an image above, is replicated below verbatim. We scrolled the display to show a complete item and we will use this to explain the structure and how it maps to a Selenium object locator.

```
{
  "entityPath": "customers_map_primary_PhoneNumber",
  "exclude": false,
  "hasCustomId": true,
  "hasCustomPath": true,
  "htmlLabel": "Mobile Number",
  "icon": "services/formresources/146770/widgets/text-input/text-input.png",
  "id": "customers_map_primary_PhoneNumber",
  "label": "Mobile Number",
  "mandatory": true,
  "noData": false,
  "path": "PhoneNumber",
  "pathContext": "",
  "properties": {
    "inputMode": "tel",
    "maxLength": 15,
    "placeholder": "eg: +45 664 123 4567"
  },
  "rules": {
    "ok": "value = value.replace(/[\\s-]/g, \"\");\nvar regEx = /^\\d{12}/;\nvar regEx2 =
/^\\d{11}/; \nvar regEx3 = /^\\d{10}/; \nvar number =  value.replace(/[\\s-+]/g,
\"\");\nif(value.indexOf(\"+\") == 0 && (number.length >= 10 || number.length <= 12) &&
(regEx.test(number) || regEx2.test(number) || regEx3.test(number))) {\n\tdata[item.id] =
value;\n\treturn true;\n} else {\n  if (data.selectLanguage == \"de\") {\n    return
\"Bitte geben Sie Ihre \"+item.label+\" im Format +439999999999 ein.\";\n  } else {\n\tre-
turn \"Please enter your \"+item.label+\" in the format +439999999999.\";\n  }\n}"
  },
  "styles": [
    "avalon-form-field"
  ],
  "type": "text-input"
}
```


The structure of a form definition is fairly self-explanatory, if we ignore the rules element, and consists of the following elements:

- `id` - is the unique identity for the element.
- `type` - is the Maestro type and, as we shall see, this type plus the ID is the key to test generation.
- `entityPath` - is the entity path into the Maestro data model in the browser.

- `hasCustomId` - is a Boolean indicating whether the system or the user has generated the Id (and is therefore useful in linting applications).
- `mandatory` - is a Boolean indicating whether this item must be provided if the element is visible.
- `properties` - provides a type specific container for additional properties. In the example above, the mobile keyboard type is set to telephone, the maximum number of characters that can be input is set to 15 and the placeholder for text used by a screen reader is set.

Item Definitions and Selenium Locators

We're now in a position to bring together all of the threads in this discussion and explain how the item definition is used to generate Selenium identifiers.

Maestro generates HTML code, the code varies according to the item type, but is always predictable. Using the example of a text-field we see the element rendered in a form with the DOM Inspector showing:



We can see that the element id is exactly that from the item definition in the `form.json`. Because all text-field items are treated the same way by the Maestro compiler, we can safely and reliably generate locators:

Framework	Example code
Selenium Java	`By.id("customers_map_primary_PhoneNumber");`
Selenium C#	`By.id("customers_map_primary_PhoneNumber");`
Selenium JavaScript	`By.id("customers_map_primary_PhoneNumber")`
Protractor	`by.id("#customers_map_primary_PhoneNumber")`
Cypress	`cy.get("#customers_map_primary_PhoneNumber")`
Galen	`phoneNumber id customers_map_primary_PhoneNumber`

By generate, we mean that a piece of code reads the form.json definition and writes the Locator code itself by iterating over the array of items extracted from the form.json as explained earlier.

A simplistic implementation of a method that generates Java code for the text-field type is:

```
/**
 * Build a By statement for any of the Text Field types
 *
 * @param maestroElementDefinition The element definition from the form.jsor
 * @return Java source for a By selector that will locate this element
 */
private static String builtTextFieldSelector(final JSONObject maestroElementDefinition) {
  final String TEXT_FIELD_TEMPLATE = """
      // Maestro type: %s
      static final By %s = By.id(\"%s\");
      """;

  final String id = maestroElementDefinition.getAsString("id");
  final String type = maestroElementDefinition.getAsString("type");
  final String by = String.format(TEXT_FIELD_TEMPLATE, type, id, id);
  return by;
}
```

Given the JSON object used earlier as an argument, this would return:

```
// Maestro type: text-field
static final By customers_map_primary_PhoneNumber = By.id("customers_map_primary_PhoneNum-
ber");
```

Sadly, different Maestro element types have different code generation strategies. Testers must also deal with Repeats, which are blocks containing Form elements that can be repeated an arbitrary number of times. Finally, all we have used is the id and type properties; we have ignored the rich source of metadata about the element including in the property object. We will deal with each of these issues later in this documentation.

Statically Typed Definitions

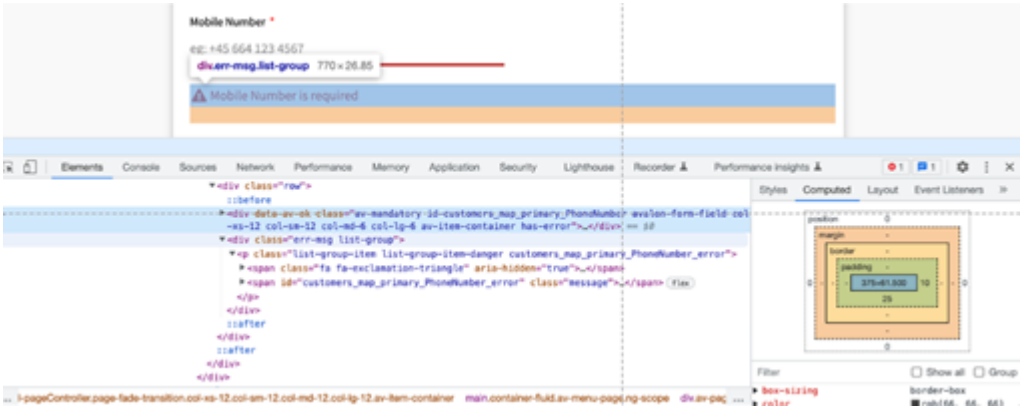
In the generated code example above, we used the property name as the member name and we made the field `static final`. This brings us to why a statically typed language is so valuable. If a

developer changes the id of an element, then the test that relies on this element name will fail with a compilation error, immediately on regeneration of the locators.

It is hard to overstate how important this is to tester productivity. By generating code in a statically typed language, we eliminate the major cause of non-deterministic runtime test failures. However, as noted, we have not yet used all the metadata available to us to produce a truly strongly typed model. To do this, we would have to write a Maestro aware framework on top of Selenium.

Field Validation

Maestro provides validation rules and, where these fail, an error message is displayed.



Once again, the same rule always applies for the generation of these messages. The id of the `<span>` containing the error message is created from `{id}_error`. Where `{id}` is the id of the Maestro element to which this message is bound, in this case it is `customers_map_primary_PhoneNumber`.

In testing terms, this grants us a major advantage - by checking whether the error block is displayed, we have a reliable means of testing whether the value input is valid. These selectors can be generated from our JSON.

Data Model Lookup

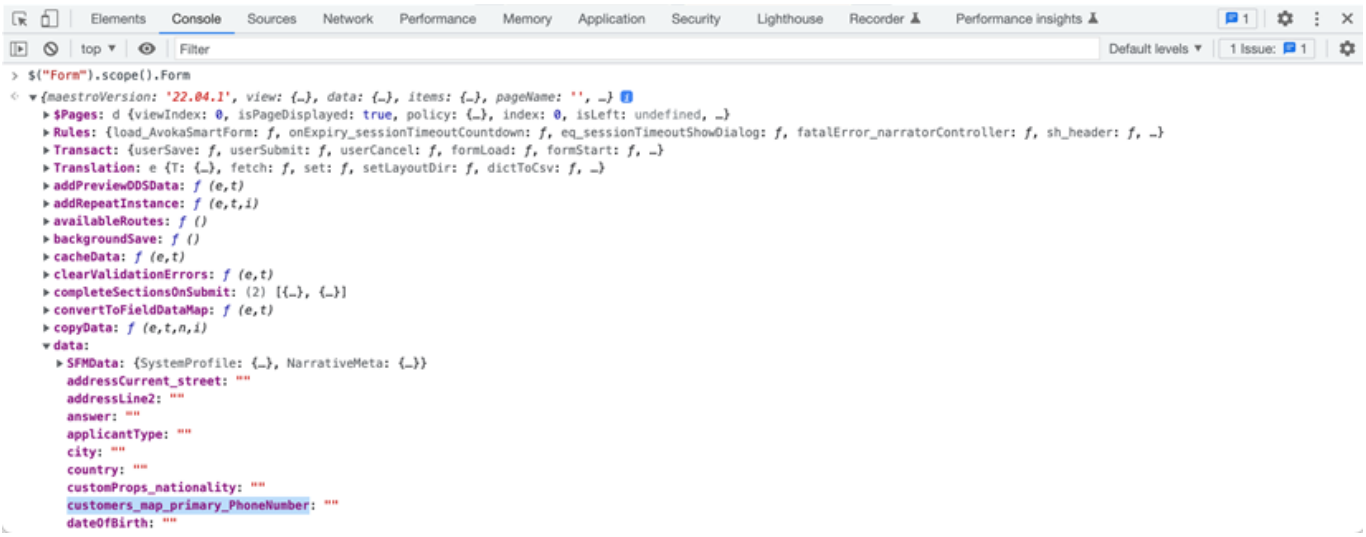
Thus far, we have concerned ourselves with the DOM elements for our form. In Maestro, each item has an associated entry in the form data model. In our item definition we have:

```
"entityPath": "customers_map_primary_PhoneNumber"
```

This key can be used to get or set the data value bound to the element. Maestro exposes the following API to access this data:

```
$("Form").scope().Form
```

You can check it in your browser's console, as shown below. We have expanded the return value to show the data entry and highlighted the phone number field.



A test that exploit this by using the Selenium driver's `executeScript` method of the `JavaScriptExecutor` class:

```
((JavaScriptExecutor)driver).executeScript(
  "return $('Form').scope().Form.data.customers_map_primary_PhoneNumber" );
```

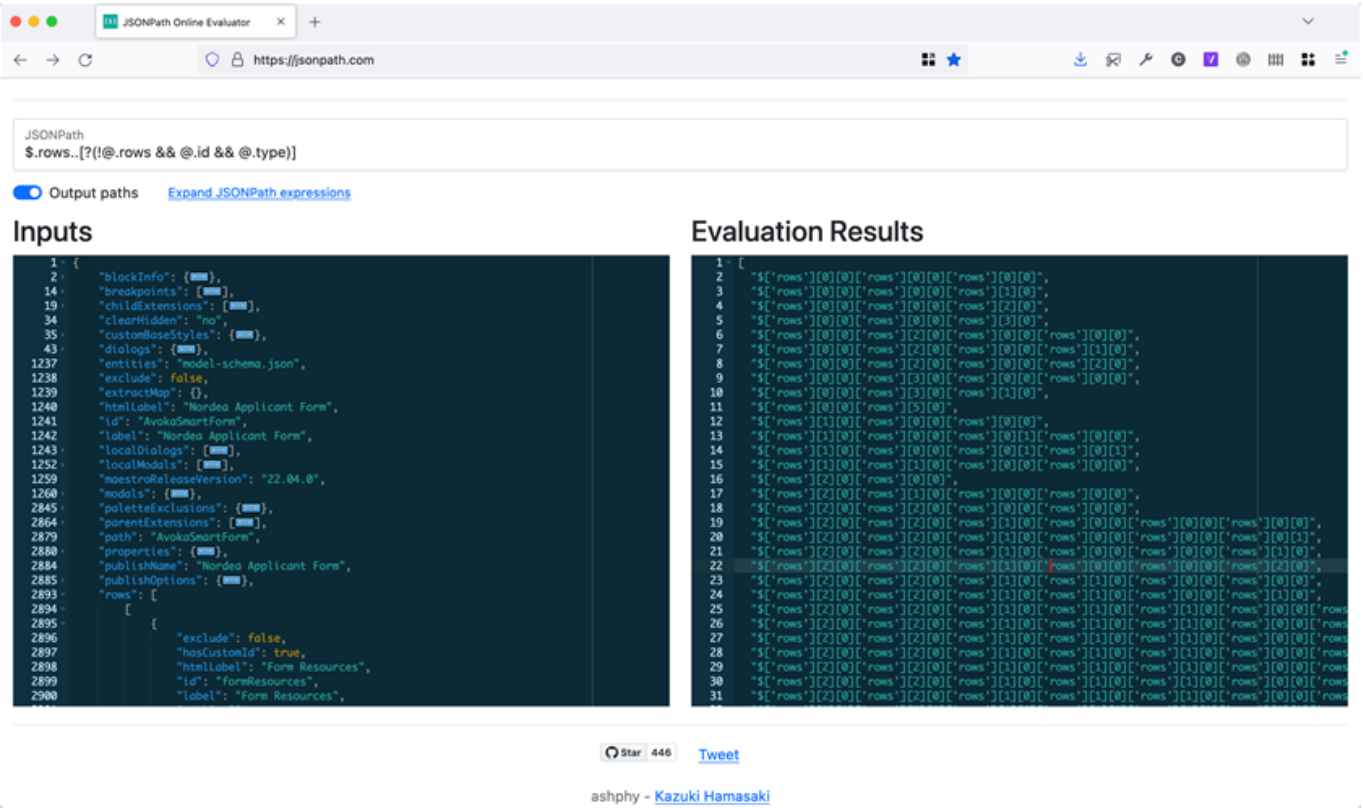
You can see that an automated test can not only set and validate elements via the UI, it can also verify that the underlying data model is updated as expected for the element type, which is a vital step requirement when dealing with elements like Social Security Numbers that require masking.

Page Object Model Generation

A Page Object Model is a collection of the locators or higher-level elements, grouped logically by page. However, looking back, you can see that the item's JSON definition doesn't contain any information identifying the parent page / dialog / modal.

To solve this problem, we need to resort to some coding so that an item is aware of where it sits in the hierarchy. As an aside, the runtime form engine provides this feature, decorating each item with a parent property. This is one of the few things done at runtime and so we must do this by hand in our code generation framework.

Once again, JSONPath can assist us. In this case, you use the Output Paths feature of the tool, which outputs the path to a JSON object matched by the query expression. This is illustrated below:



You use this information as follows:

```
gather the list of JSON Path elements for the page
gather the list of JSON elements for the page
loop for each target JSON element
  get the matching JSON Path element for the target JSON element from the JSON Path list
  loop for each path element in the JSON Path
    remove the last path element from the JSON Path
    lookup the JSON element from this JSON Path
    if the type of this JSON Path is page, then break
  continue
  add the page name as a property on the JSON element
end loop
```

NOTE

You can implement this pseudo code in your preferred programming language.

Once you have the page information, you can output a true Page Object model.

Conclusion

You could rightfully ask - "Why doesn't Temenos Provide a Testing Tool that does this for us?"

We asked our customers "What UI test framework and language do you use?" There were almost as many answers as we have customers.

For this reason, we've decided to publish this guidance for how to exploit the data we provide. We're also looking at open sourcing our own internal Proof of Concept (POC) that we use to demonstrate the techniques we discuss here.

Next, learn how to debug Maestro forms.

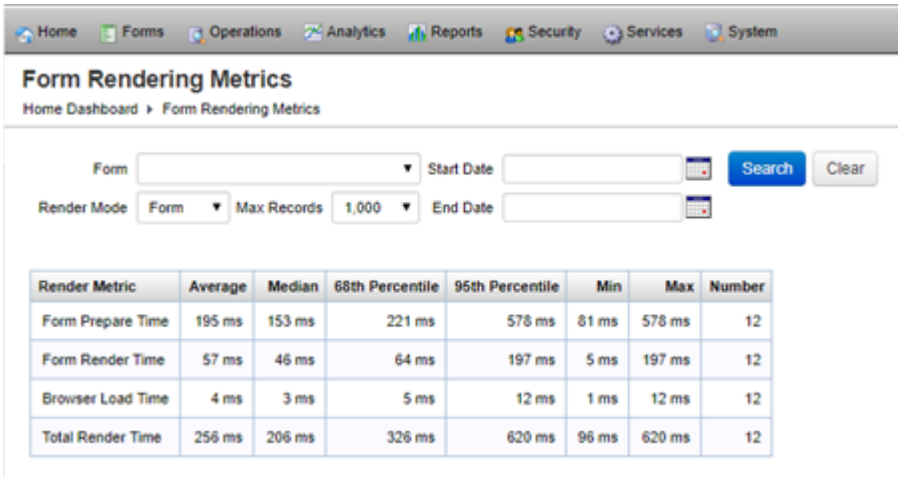
Improve Page Load Time of Maestro Forms

Studies have shown that page load time has a significant impact on conversion rates. In short, the faster your forms load, the less likely they will suffer from high rates of abandonment. As a result, the performance of your forms has a direct impact on your organization's bottom-line.

In the topic, we're going to explore a few simple methods for improving page load times by analyzing your forms in their current state and by enabling or tweaking features available to you right now.

Check Form Rendering Metrics

If you already have forms in development or production environments, Manager provides you with form rendering metrics to see how forms are performing.

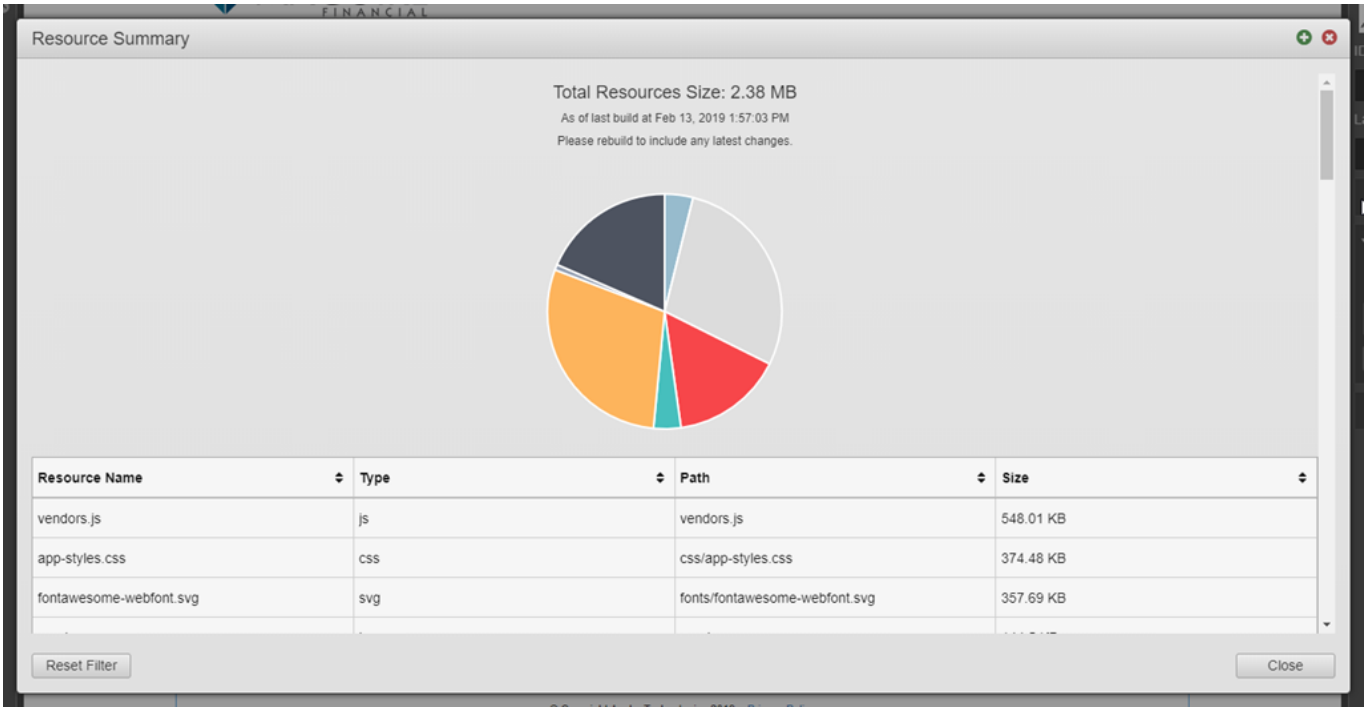


Render Metric	Average	Median	68th Percentile	95th Percentile	Min	Max	Number
Form Prepare Time	195 ms	153 ms	221 ms	578 ms	81 ms	578 ms	12
Form Render Time	57 ms	46 ms	64 ms	197 ms	5 ms	197 ms	12
Browser Load Time	4 ms	3 ms	5 ms	12 ms	1 ms	12 ms	12
Total Render Time	256 ms	206 ms	326 ms	620 ms	96 ms	620 ms	12

This should help you ping point the forms that have the slowest load times, so you can do something about it.

Check Form Resource Summary

Now, when you know which forms are loaded slowest, you can open each form in Maestro to check what resources it uses. This is a quick way to identify which parts of a form might be causing performance issues.



You can sort by the Size column to identify the largest resources.

Analyze Page Load Time

There's a number of tools available for analyzing the page load time of web pages. These are useful for understanding how different users might experience your forms.

Here's a few of the most popular options:

- GTMetrix
- PageSpeed Insights
- Pingdom
- Web Page Test

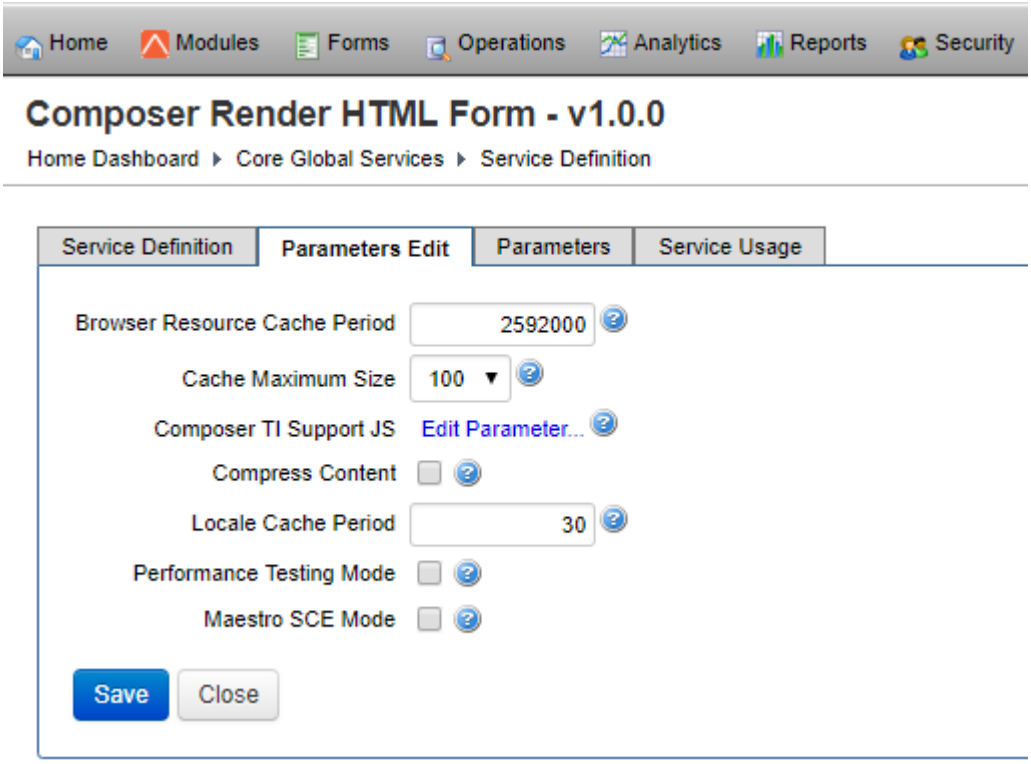
Each tool offers different metrics and ways of displaying those metrics, so it's worth running your forms through all of them to gain the most insight into their performance. In particular, look for large resources, unnecessary resources, resources that could be combined into a single HTTP request, and resources that aren't loading.

Enable Static Content Externalization

Manager 18.11 introduced a feature known as Static Content Externalization. When enabled, this feature serves most of a form's content via content distribution networks. As a result, content is delivered to the end-user in parallel and from servers closer to where they live. In some cases, enabling this feature has immediately t page load times in half.

Enable GZIP Compression

Another option worth enabling is the Compress Content option, which uses GZIP compression to reduce the size of HTML, CSS, and JavaScript before it's delivered to users. This compression happens server-side, which means it does place more load on the server, but the significant reduction in page load time makes it a worthwhile trade-off.



Load Reference Data via Dynamic Data Calls

Forms often rely on a significant amount of reference data, such as a list of countries or states. Depending on the type of form you're creating, you might be able to load some of this data when the form loads, but consider the following scenario:

1. A user arrives at the form.
2. They select their country from a dropdown.
3. A different dropdown is populated with states from the user's country.

In this situation, not only would all of the countries need to be loaded as the form renders, but also all of the states for all of the countries. If there are other fields that rely on reference data, such as cities, a very large amount of data will need to be loaded upfront.

To reduce the impact of this, use dynamic data calls to load the relevant subsets of reference data after the form loads. You could, for instance, load a list of a country's states after the user

has selected the country they live in. The time it takes for this additional HTTP request to complete will be significantly shorter than loading all of the data upfront.

Use Correct Image Formats

Image formats are designed for different purposes. If you use a format for the correct purpose, image sizes will be as small as possible while retaining their quality. If you use an incorrect format, the end-user will wonder why low-quality images are taking so long to render.

Here's a quick reference to understand when certain formats are appropriate:

Format	When To Use
JPEG	Images with large color palettes, such as photos.
PNG	Web graphics with a small color palette or transparency.
GIF	Animated images.

Other formats are available, such as Google's WebP format, but the formats in the above table are the easiest to implement without having to consider browser compatibility.

Compress Images

To further reduce the file size of images, use a compression tool such as ImageOptim.

Image compression tools work by removing unnecessary meta-data embedded in image files and running clever algorithms that imperceptibly lower the quality of images while drastically reducing their file sizes.

> NOTE
>
> You can use ImageOptim via the command line, allowing you to integrate image optimization into your development workflow.

Perform Load Testing

Analyzing the page load time of a form is an excellent way to establish a baseline of your form's performance, but it doesn't necessarily indicate how your form will stand-up under real-world use. Once a form (and the server on which it's hosted) is placed under the load of simultaneous users, its performance can degrade.

To prepare for this, consider using a load-testing service:

- Eggplant
- Load Impact
- Loader

These services direct a large amount of traffic to a server in a small amount of time, allowing you to determine how your form will perform under heavy use. This makes it easier to discover bottlenecks that need to be accounted for before putting a form in front of customers.

What Else?

It's rare for any web page to load as fast as it can possibly load. There is almost always something else that can be done to save a few extra milliseconds here and there. With this in mind, a priority should be to monitor the performance of your forms using the tools listed in this topic. As the tools evolve, technologies improve, and best practices shift, this ongoing awareness will pay dividends.

Next, learn about the Maestro form accessibility.

Maestro Form Accessibility

Journey Maestro provides some basic, component-level accessibility automatically. For instance, linking a component's label text with its input field. However, a Maestro Template Designer and Form Builder need to perform the following additional tasks to achieve maximum form's accessibility:

- Use Sequential Page Navigation
- Use Page and Section Headers
- Mark-up Lists
- Add Alternative Text to Images
- Do Not Use Background Images
- Use Fieldsets
- Do Not Use Label Placement Left
- Check Color Contrast
- Do Not Use Placeholder Text
- Do Not Replace Component Labels with Text
- Do Not Disable Anything
- Use Aria Label

NOTE

We recommend configuring as much accessibility features in a template as possible.

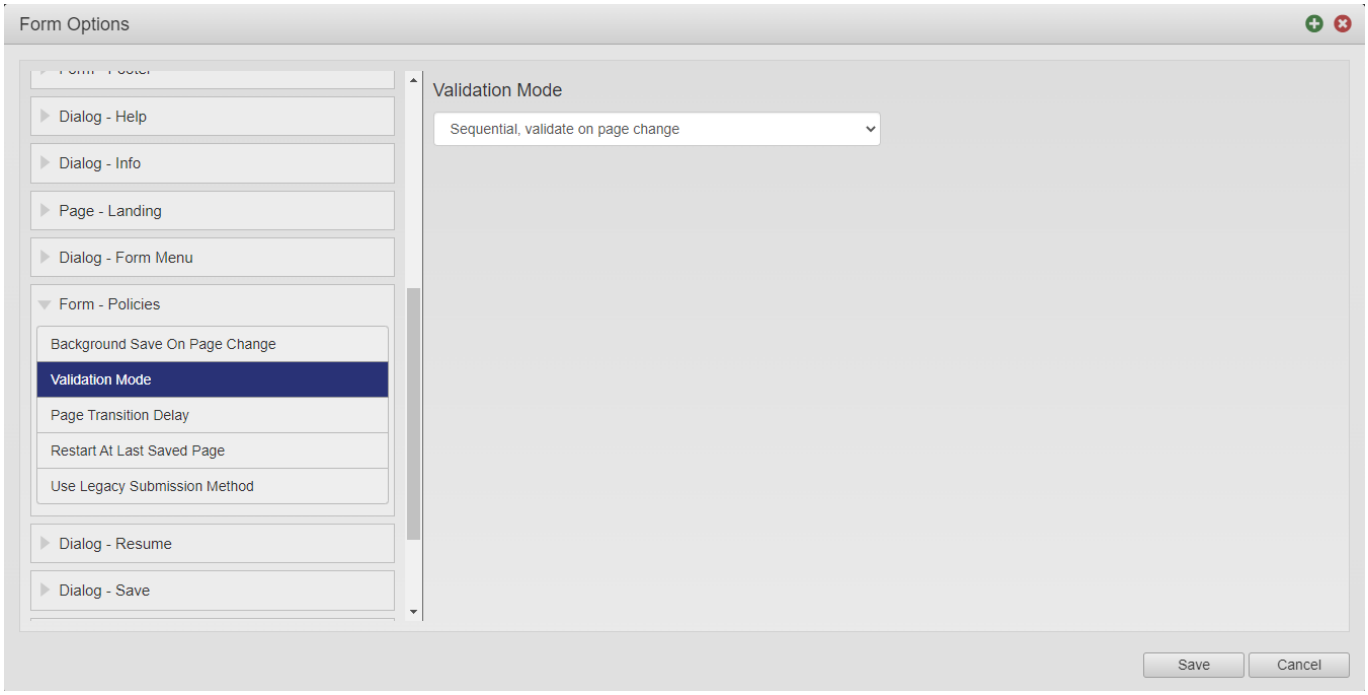
Let's look at each accessibility configuration in details.

Use Sequential Page Navigation

This policy property defines how validation and navigation operates for the form as a whole. Sequential page navigation is better for accessibility as it provides a simpler experience where users navigate through the form sequentially, one page at a time, and does not allow them to progress until the current page passes validation.

Unconstrained page navigation allows the user to navigate to any page, in any order, which can be confusing particularly on mobile devices, and doesn't perform full form validation until they attempt to submit it from the final page. This can cause a potential problem that will be difficult to correct for multi-page forms.

To configure Sequential Page Navigation, select Form Options > Form - Policies > Validation Mode.



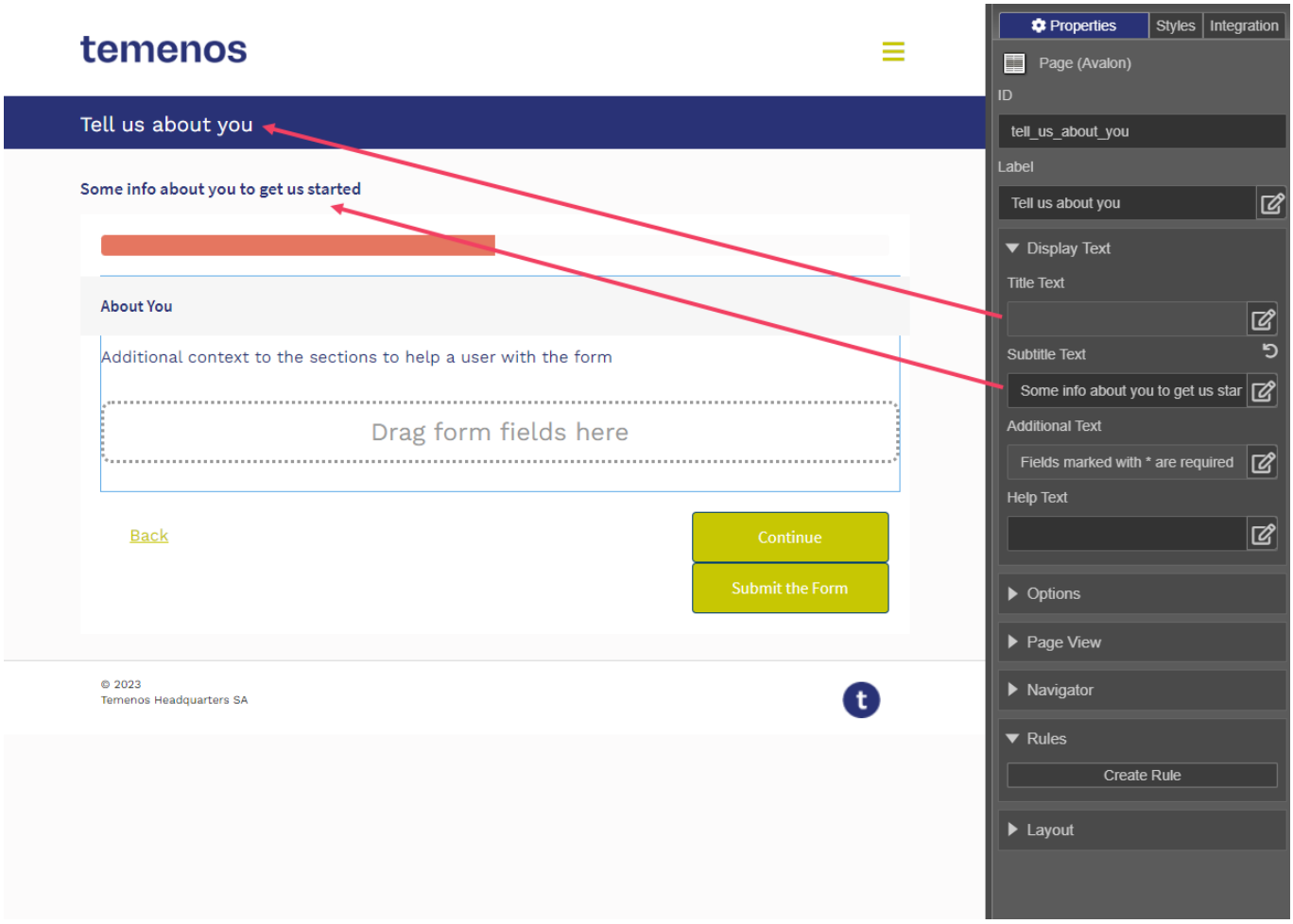
NOTE

In this example, we use the Avalon template. The Maguire template has a slightly different form option's categories.

Use Page and Section Headers

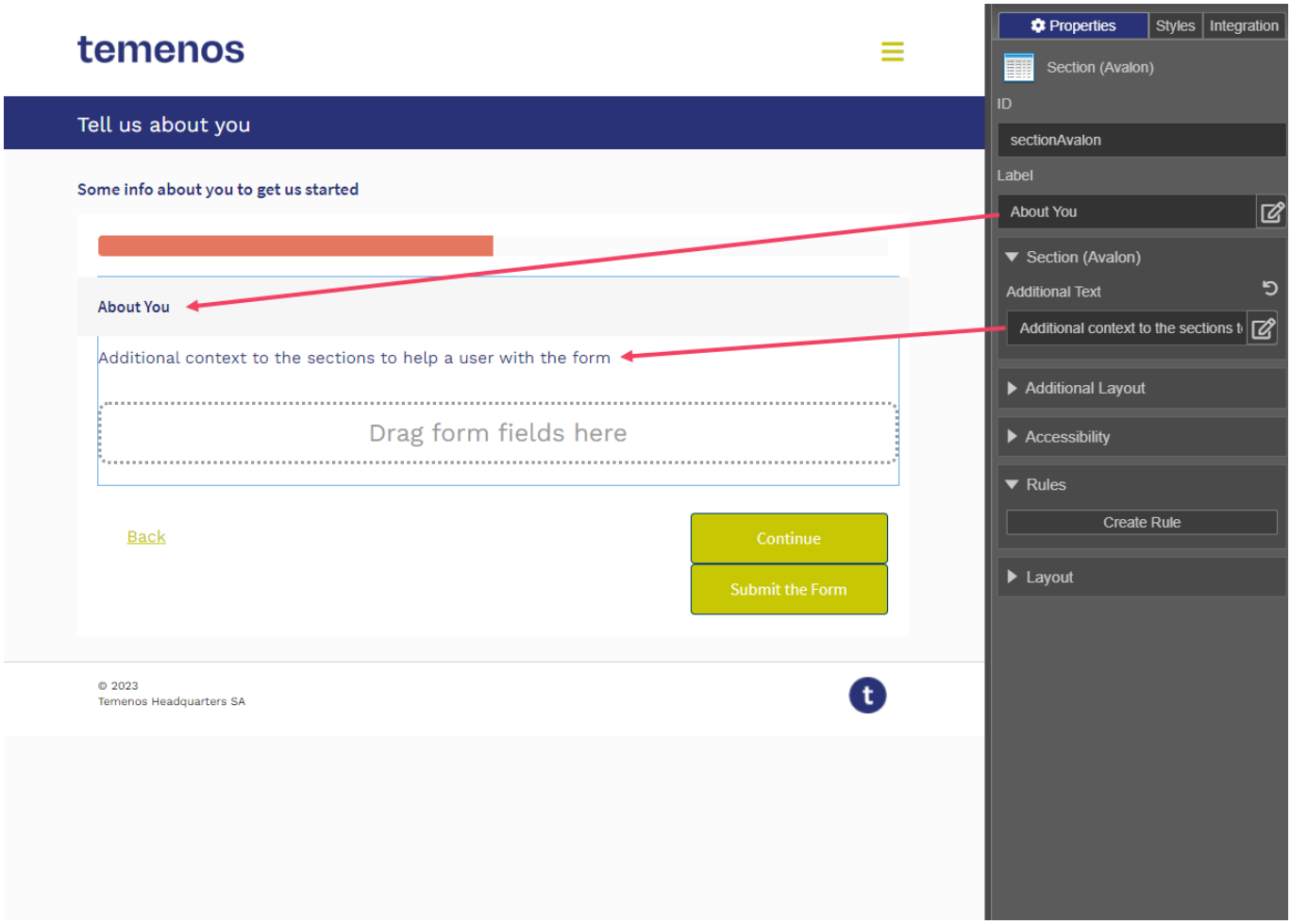
Headings with correct mark-ups are automatically provided by the page and section headers at levels 1, 2 and 3, so do not create them manually using text display fields.

To configure page's headers, select Page > Properties > Display Text and use the Title Text and Subtitle Text fields.



In this example, the Tell us about you will be rendered as the `<h1>` element. The Subtitle Text will be rendered as the `<h1>` element as well.

To configure section's headers, select Section > Properties > Label. Also, use the Additional Text field to specify any extra content for a form user.



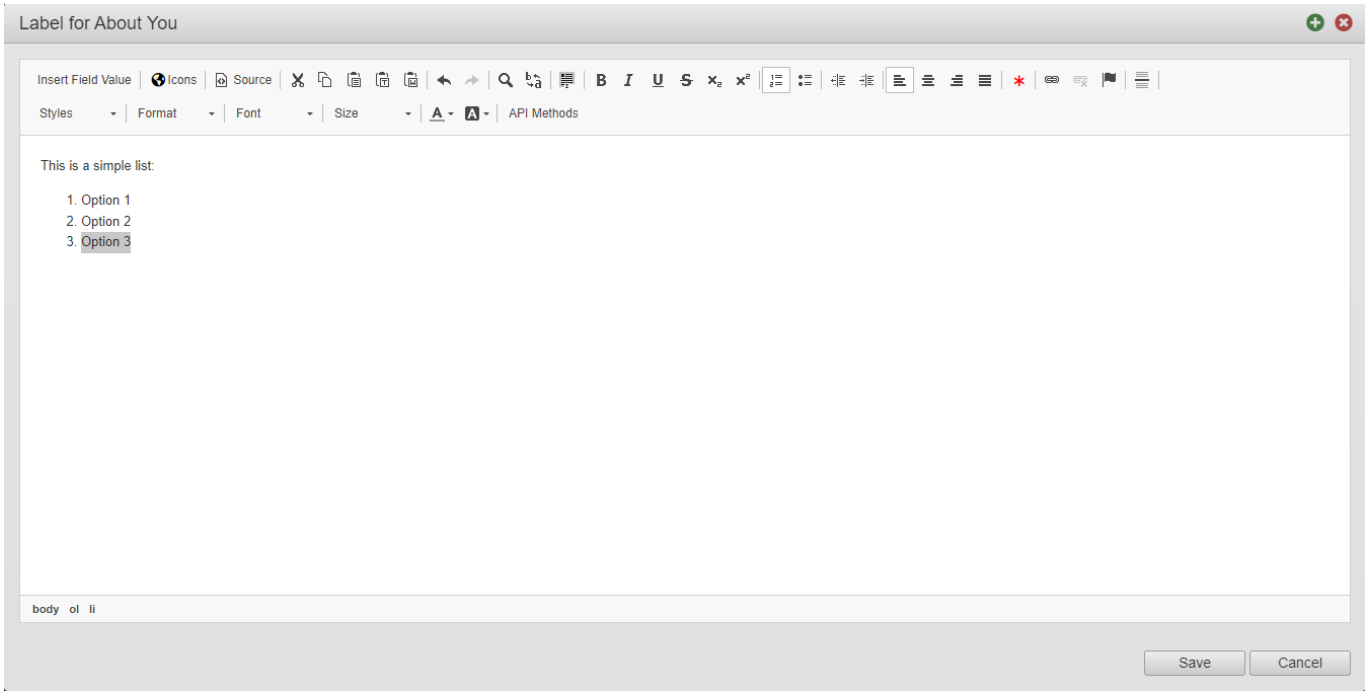
In this example, the About You label will be rendered as the `<h3>` element, whilst the Additional Text will be rendered as the `<div>` element.

Mark-up Lists

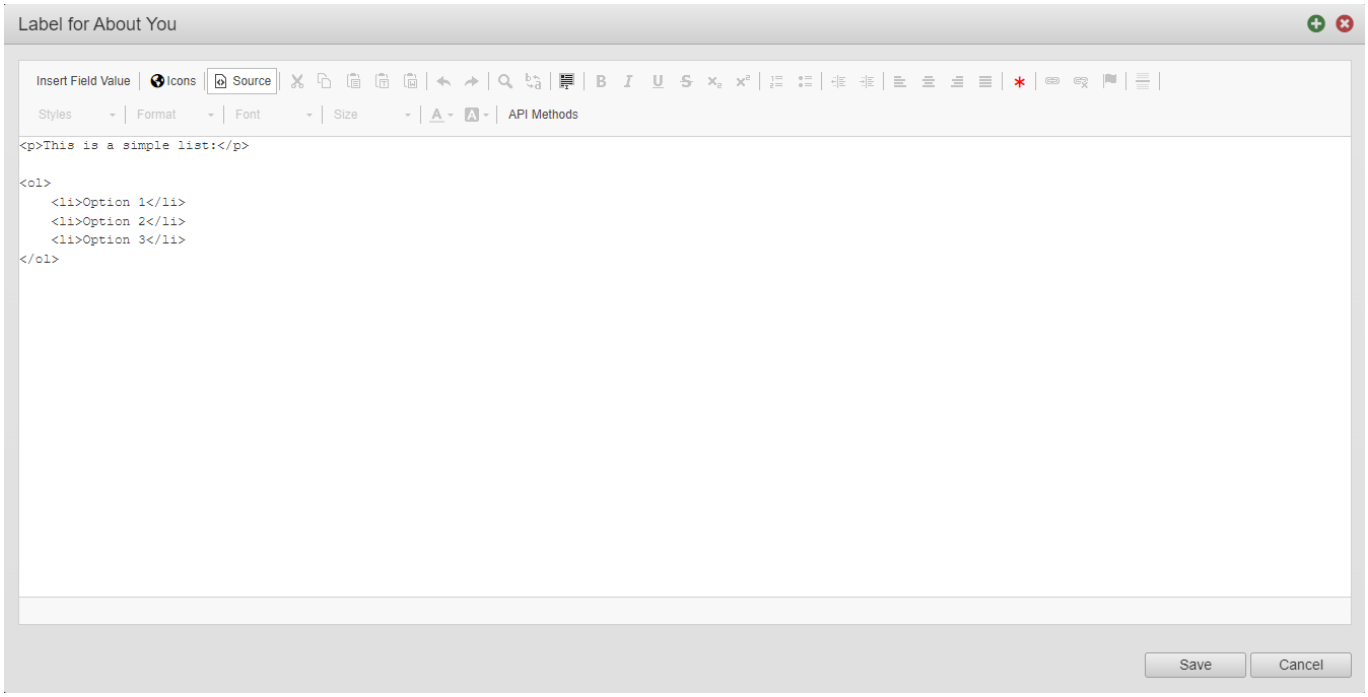
When creating lists, it is important to ensure that the correct HTML mark-up is used so assistive technologies read the lists out properly. When copying and pasting content from external sources, such as Word Documents, the mark-up is often lost and replaced by characters representing the numbers or bullets in the list. Whilst visually this may look fine, the lack of correct HTML mark-up will prevent screen readers from interpreting the list as an HTML list.

The Maestro editor provides the built-in rich text editor so you can add lists.

To add a list HTML element, select Text Display > Label and click Insert / Remove Numbered List or Insert / Remove Bulleted List as required



Click Source to review the source code and verify that correct HTML mark-up is used:



Add Alternative Text to Images

Images can be one of the following:

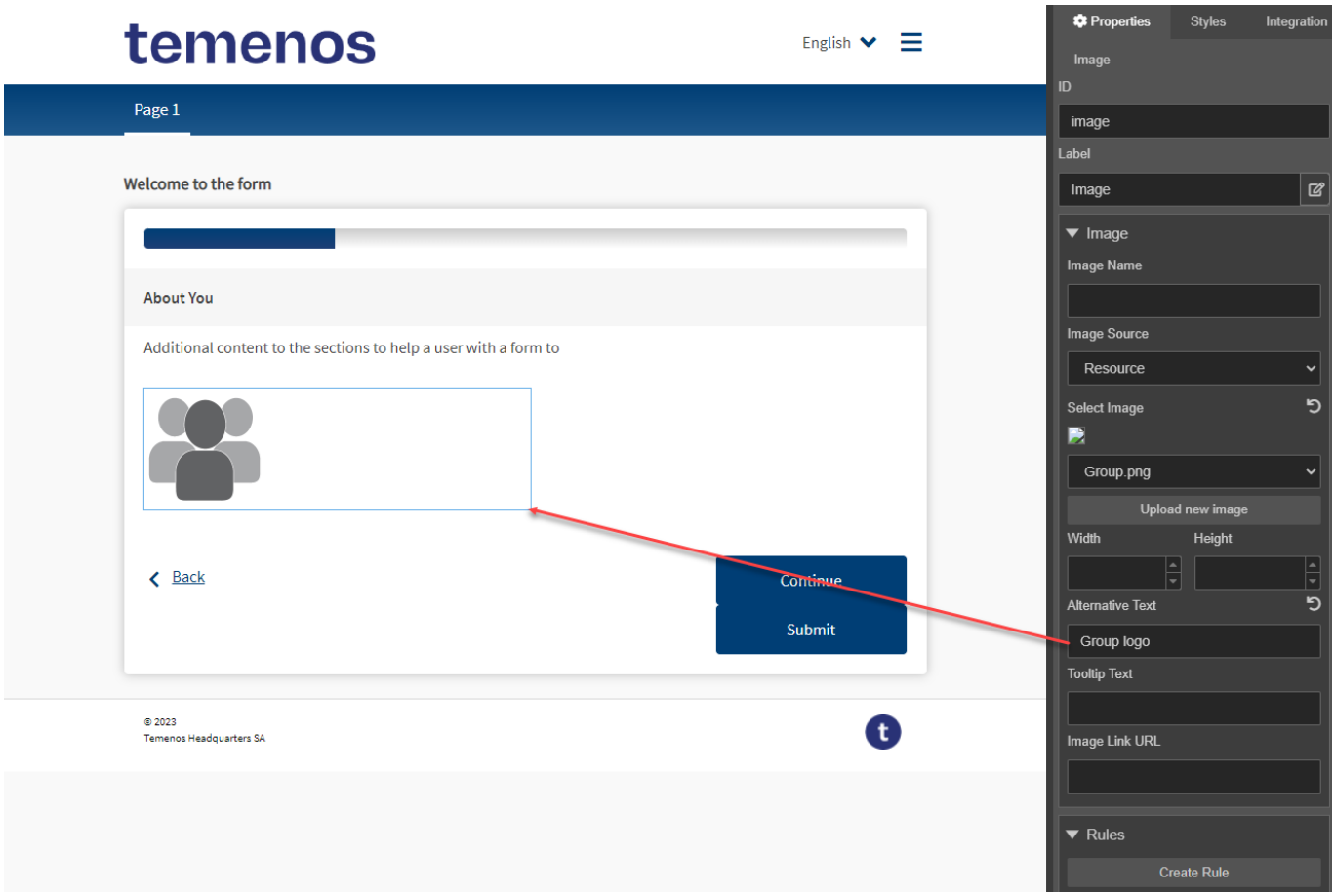
- Decorative: these images do not convey information to the user and are typically used to make the form more visually attractive by adding visual components, such as separators and textured backgrounds. An image is also considered decorative if it conveys

information that is also fully provided by surrounding text. Decorative images should not have alternative texts.

- Informative: these images do convey information to the user that is not provided by surrounding text and should have alternative text that conveys the meaning or content of the image. The alternative text need not be a literal description of the image and should be as succinct as possible.

Usually, it's up to a form developer to decide whether an image should be treated as decorative or informative.

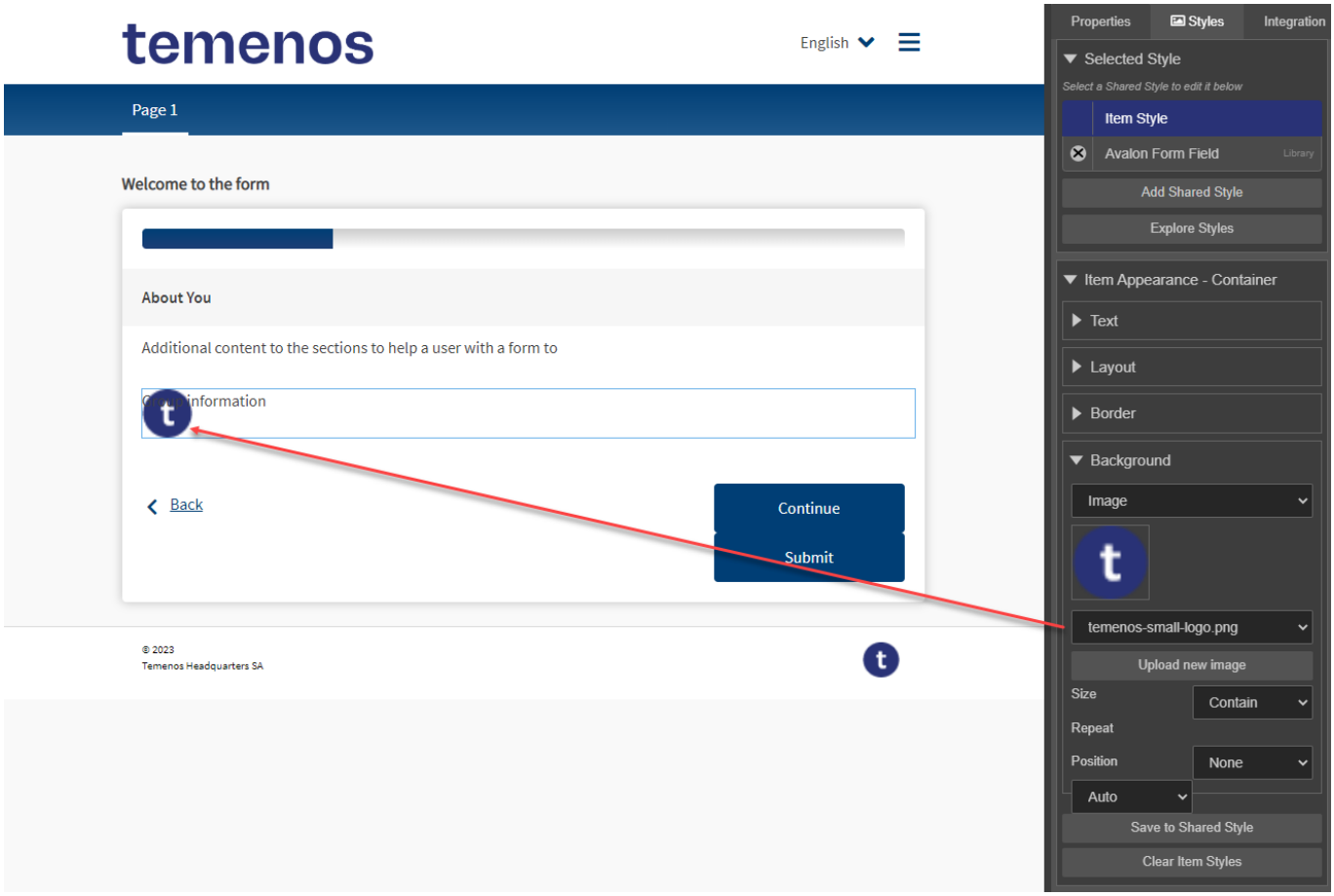
To add an inattentive text to an image, select Image > Properties > Image > Alternative Text



Do Not Use Background Images

Informative images should not be used as a background image as it is not possible to provide them with alternative text and some browsers remove background images when put in high contrast mode. It is fine to use decorative images as a background image.

To set up a background image, select Component > Styles > Background.



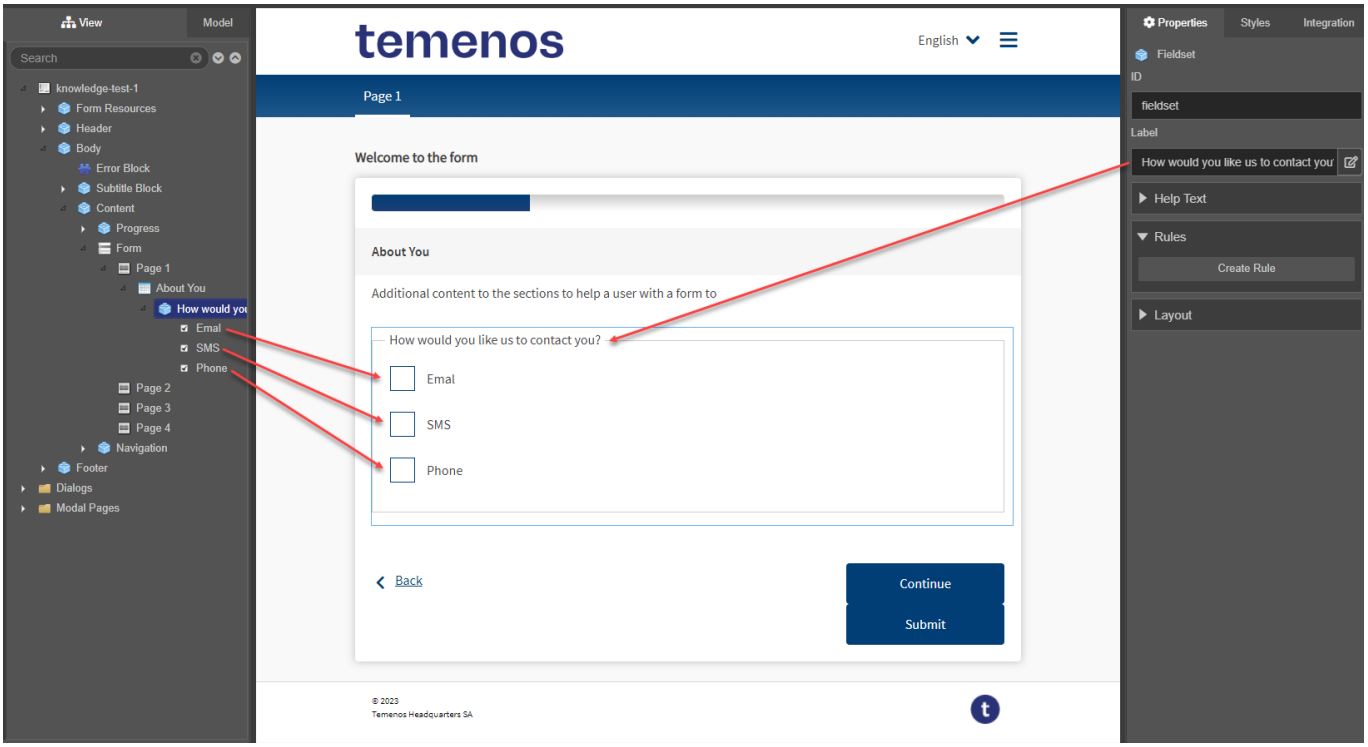
Use Fieldsets

Fields that are not stand-alone and only make sense in the context of a group of fields should be contained within a Fieldset component. For instance, when using:

- Multiple Checkbox components, such as contact preferences
- Multiple components, such as telephone region code and number, home address and so on

You should provide a meaningful description of the group in the Label of the Fieldset, which is a legend text and is displayed a heading. The legend text will be used by assistive technologies to inform the user of the context for fields within the fieldset. For instance, tabbing to a checkbox button whilst a screen-reader is running might inform the user that they are currently focused on a checkbox button with caption Email for the fieldset How would you like us to contact you?:

To set up a description, select Fieldset > Properties > Label:



Without the fieldset, the user would only be informed that they are focused on a checkbox button with caption Email which is clearly insufficient. To avoid repetition, the majority of assistive technology will only inform the user of the fieldset legend for the first field focused within the group, regardless of which field that is, namely, not necessarily the first field in the group by position.

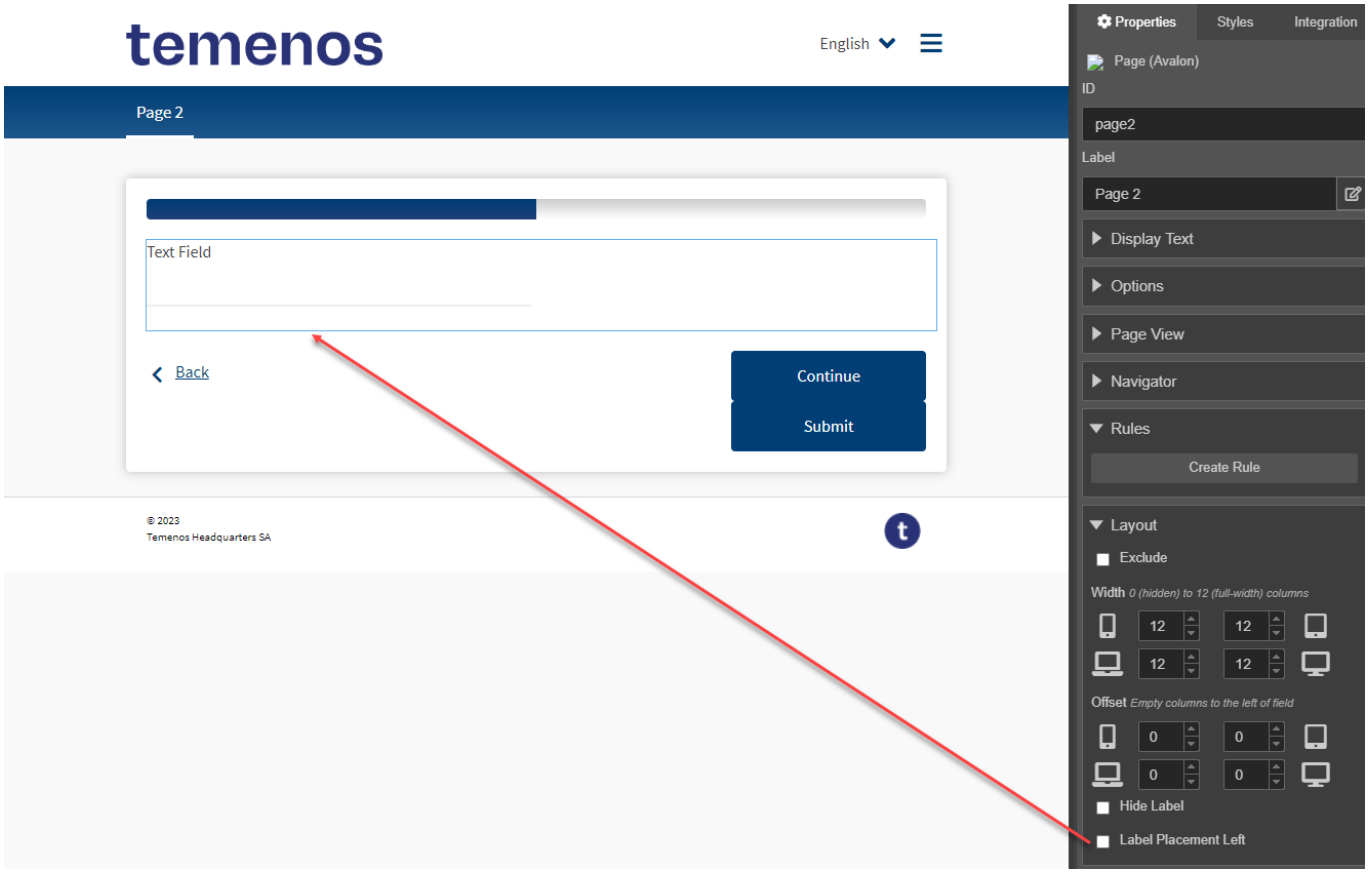
NOTE

The Radio Button Group component already includes fieldset so you don't need to add it.

Do Not Use Label Placement Left

For the sake of usability, labels should generally be placed above input fields. This is how Maestro's components are configured by default. You can, however, change the placement of a label to the left of an input field. This is typically done on receipts as a way of saving space. However, you can change label location to the left.

To change label location to the left, select Field > Properties > Layout > Label Placement Left.



Check Color Contrast

Colors used in a form must meet accessibility requirements for contrast of foreground and background objects for partially sighted and color-blind users.

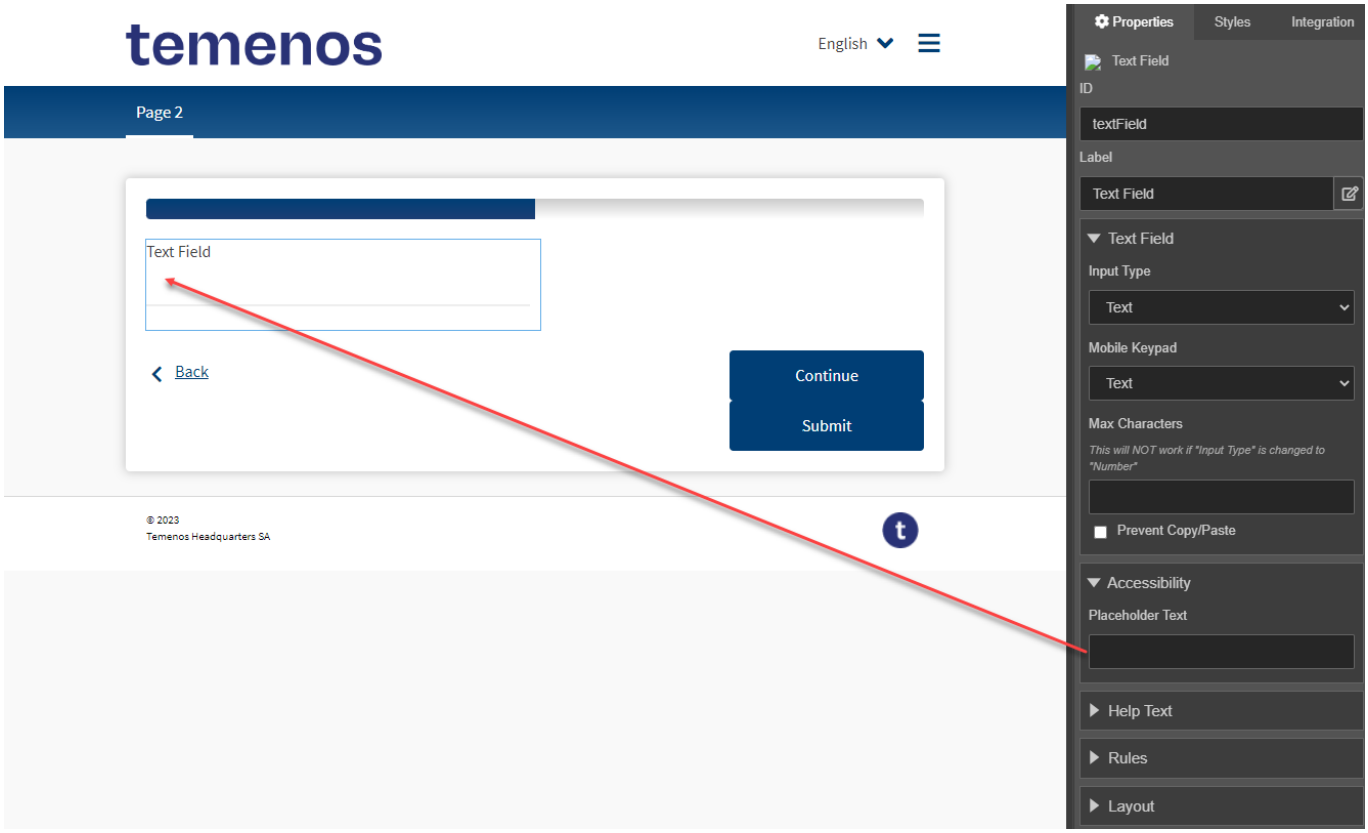
You can check your form using a contrast tool such as TPGi's Color Contrast Analyser.

Do Not Use Placeholder Text

We recommend adding a Label above the field, which is the default in Maestro, because it is best for accessibility as it keeps the caption closest to its field. In particular, this makes it easier for users of magnifier software to locate the field associated with a label without having to move the cursor too far and reduces the chances of finding the wrong field by mistake.

Top placement also provides the best scan line between captions and inputs for fields. A scan line refers to eye movement along a straight line as a sighted user browses a form or searches for a specific field. Other label placement results in additional, unnecessary movement as the sighted user's eye jumps around between labels and inputs that are less aligned.

To clear the placeholder text, select Field > Properties > Accessibility > Placeholder Text.



Placeholder text is the light grey text that is displayed in a field until data is entered at which point it is removed.

Placeholder text is not accessibility compliant due to the lack of consistent support in assistive technologies. Some assistive technologies ignore placeholder text entirely. Some always notify the user of the placeholder text regardless of whether there is data in the field or not and makes no differentiation between the placeholder text versus the entered data.

Only a small proportion of assistive technologies do the correct thing in only notifying the user of the placeholder text when it is visible on-screen.

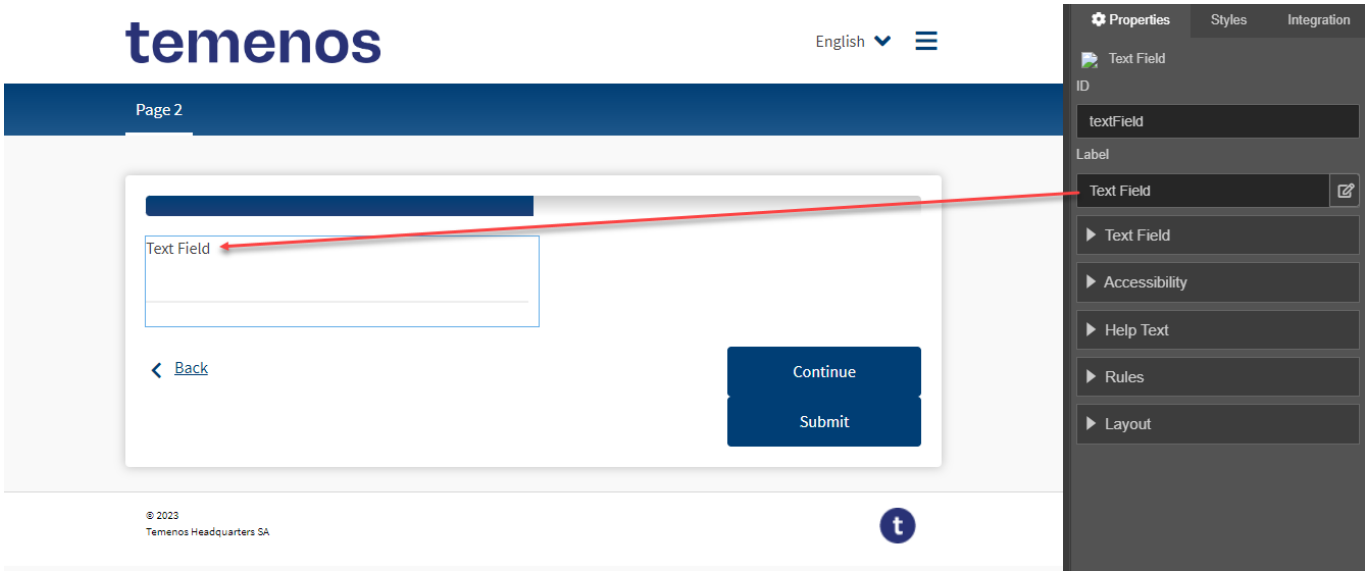
Do Not Replace Component Labels with Text

It can be tempting to hide the built-in field label and create a replacement with a separate text display component in order to achieve a layouts,such as a label, that is wider than its field.

Although, this approach may look identical on-screen to sighted users, this does not provide the browser functionality where selecting a label sets focus to its field.

To resolve the specific case of long labels, it is better for accessibility to use a combination of shortening the label, widening the component and moving non-critical information from the label to a popover tooltip or a message box located close to the component.

To edit component's label, select Component > Properties > Label.



Do Not Disable Anything

Disabled form content is problematic for accessibility and should be avoided.

Typically, disabled content is visible on-screen for sighted users but not active and visually indicated as disabled with grey-out styling. Disabled content is not discoverable for users of assistive technology which results in a mismatch of information. For instance, in the case of disabling the continue button for a page until certain actions are performed a sighted user can see that the button is disabled and may be able to deduce that they need to perform an action before it will be enabled.

However, a user of assistive technologies will have no knowledge of the existence of the continue button at all which is likely to lead to confusion of what action is expected of them in order to progress.

In this case, it is better for all users to keep the continue button enabled and inform the user what is expected of them with error messaging if they attempt to progress without completing necessary actions.

The other common alternative approach to disabling components is to hide them.

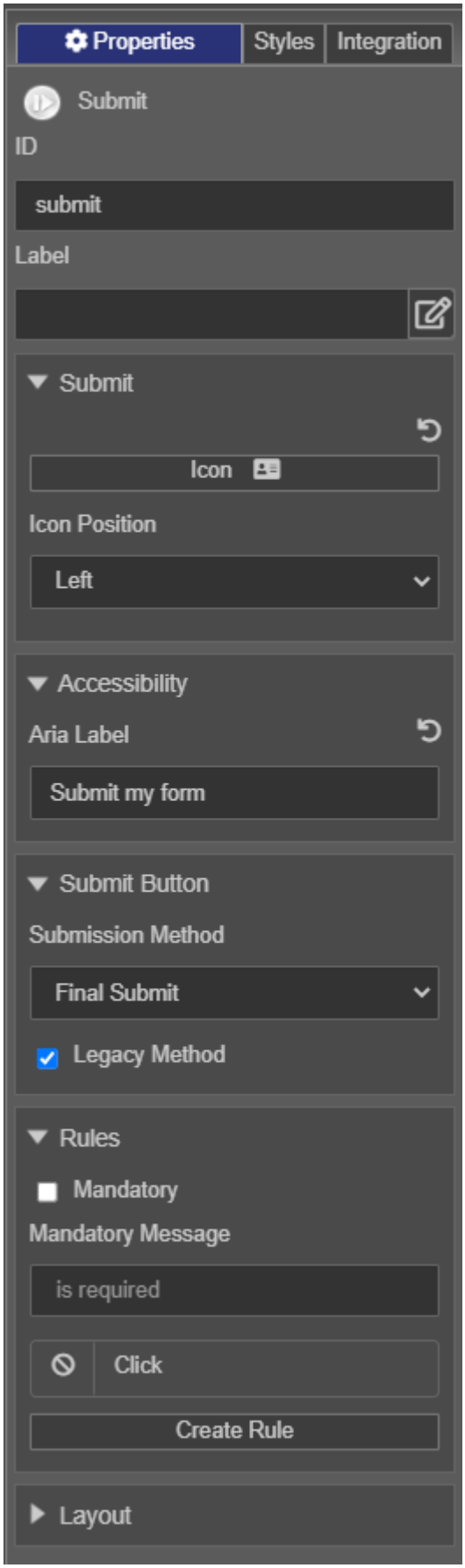
Use Aria Label

The `aria-label` HTML attribute allows you to provide an accessible name for an element so users of assistive technology will be able to recognize it. You should use `aria-label` if the element doesn't have a visible name you can reference, for example, `aria-label="Submit my form"`. For

more information, see ARIA (Accessible Rich Internet Applications) documentation and ARIA specification.

Most of Maestro's components, for example, Icon Button, Second Level Navigator, and Submit, have the Aria Label property, which you can use to add text description.

To configure `aria-label`, select Component > Properties > Accessibility >Aria Label:


Properties
Styles
Integration
Submit
ID
submit
Label
Submit
Icon
Icon Position
Left
Accessibility
Aria Label
Submit my form
Submit Button
Submission Method
Final Submit
Legacy Method
Rules
Mandatory
Mandatory Message
is required
Click
Create Rule
Layout

In this example, we use the Submit component with an empty label and an icon to show on a Submit button. After you publish the form, the `aria-label="Submit my form"` property is added to the `<button>` element so assistive technology, such as a screen reader, will interpret it accordingly.

Next, learn about rule templates and rule helpers in a form.

Form Options

Maestro gives you flexibility to configure component's properties differently for each form in your template using the Form Options functionality.

> NOTE
>
> Compare this to brand's Item Properties where you can set component's properties differently for each brand.

When it comes to using Form Options, the best practice is that a Template Designer creates form options with some default values in a template and group them logically under various categories, so a Form Builder can easily find them. The Form Builder updates form options' values to implement required form functionality. You can think about a form option as a shortcut to a particular property of a component. The property name of a component doesn't change while you create the form option, so you can always find out what that component is.

Let's illustrate it with an example. Imagine you need to remove the navigator from forms that only contain one or two pages. Since the navigator is configured in the template by the Template Designer, you are not able to customize its appearance or properties, but you are able to hide it from the form.

When the Template Designer locks down a form by setting extension points at the template level, it is likely that these extension points will still give the Form Builder access to basic form option configuration, such as hiding the navigator or save button, so the Form Builder can select these options in the Form Options window.

Another benefits of using Form Options is that it allows a single form option to set the properties on multiple template's components at the same time. For example, the Template Designer can use the Logo form option to configure the company logo, which appears in many places in a form and all modal pages, in one place, instead of creating multiple options and asking the Form Builder to set all of them to the same image. Using the form option allows to link all these places to a single option, so changing it once updates all of the image properties through the form that display the company logo.

Here are a few more notes on working with Form Options:

- If you create a form option in the template, the form will have the ability to override the template, which can lead to inconsistencies between forms

- If you remove a form option, this may or may not remove the property override from the form. Ideally you would want it to remove the override from the form, but the JSON may remain in the form and this required some manual updates.
- You can not and should not add form options to components that exist within extension points - the form developer will already have a local copy of these components and will be able to make all the changes they need.

The Form Options interface allows you to:

- Add properties
- Configure properties
- Remove properties

Next, learn how to add a form option.

Add a Form Option

Maestro allows you to create and add new form options to a template. Usually, a Template Designer creates form options with some default values in a template and group them logically under various categories, so a Form Builder can easily find them. Then, when a form option is not needed any longer, a Template Designer can delete it.

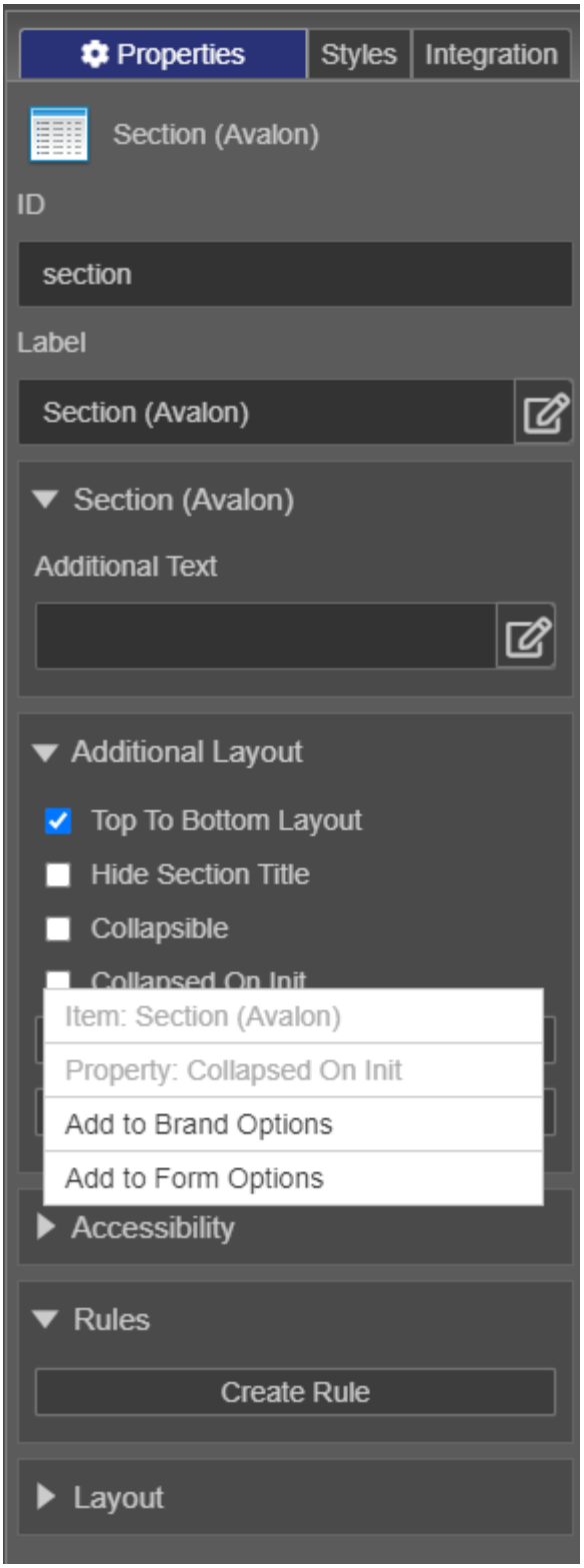
When you create a new form option in a template, Maestro adds it to a template JSON file.

> NOTE
>
> Compare this to brand's Item Properties where you can set component's properties differently for each brand.

Add Properties

To add a component's property to Form Options in a template:

1. Open a template in the Maestro editor.
2. Select a component in the Design mode and click the Properties tab.
3. Right click on a non-rules property you want to add, for example, Label or Hide Section Header, and select Add to Form Options.



For rules properties, right click on the Create Rule button and select Add to Form Options.

NOTE

You also have a choice of adding a component's property to brands. However, if you've already added the property to Form Options, you can't add it to brands. You must remove it from Form Options first.

4. Select how you want to add a property from the Add as a radio button group:



   - New Option to add as a new property. You can use this option in most cases.
   - Linked Item to Existing Option to add as linked to an existing property and then select an existing property from the Select Existing Option dropdown list. You can use this option if the property you are adding needs to be linked to another property that has already been added, for example, an image component used to show the logo in the form might have the Image property linked to other instances of the image component used to show the logo on modal pages. This allows you to create 1 form option which will update the property of multiple components.
5. Select a category to use for the property from the Category radio button group:
   - New Category to create a new category for the new property and type a category name in the field.
   - Existing Category to add a new property to the already existing category and then select an existing category from the dropdown list.

> NOTE
>
> Different templates may have different categories to group form options.

> NOTE
>
> Adding categories help you group and navigate properties, especially, when there are many of them.

6. Type a name for the property in the Label field
7. Click Save. The property is added to Form Options, where you can edit it.
8. Click Save in the Maestro toolbar to save the template.
9. Click Publish to make the template changes to be available to forms that use it.

> NOTE
>
> The template changes may not be available to a forms depending on where the extension points are in the template - anything that's inside the extension point (that can be changed in the form) can't be updated by the template

Remove Properties

If a property has already been added as a form option, then you'll have the option to remove it. The default Avalon and Maguire templates have form option created for you, so you can only remove them, not to add them.

> NOTE
>
> When you delete a form option, Maestro removes it from the template JSON file.

To remove a property from Form Options:

1. Open a template in the Maestro editor.
2. Select a component in the Design mode and click the Properties tab.
3. Right click on Label and select Remove from Form Options. The property is removed from Form Options in the template.

Next, learn how to configure a form option.

Configure a Form Option

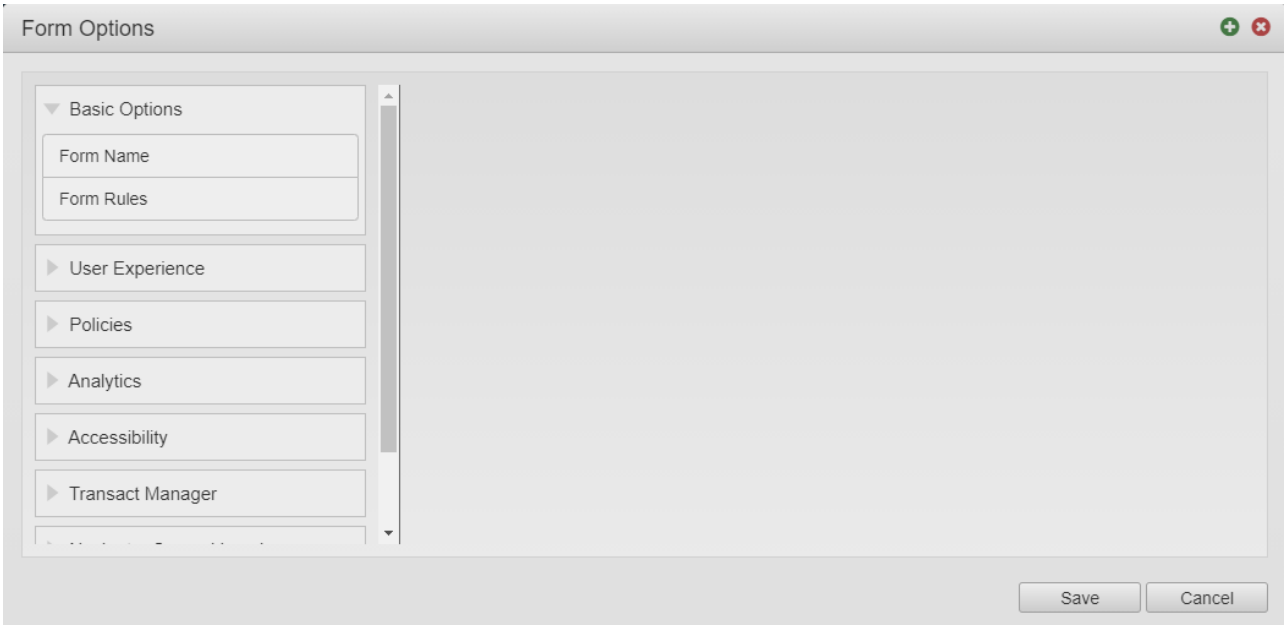
Maestro allows you to configure form options in a form. Usually, after a Template Designer created form options with some default values in a template, a Form Builder can updates their values to implement required form functionality. When you change form option's property in your form, Maestro directly updates its form JSON file with the component's property value, which overrides the template's form option.

Configure Properties

To configure a form using the Form Options:

1. Open the form in the Maestro editor and select Design.
2. Click Form Options to view all available form options to your form. Different templates may have different categories that a Template Designer used to group form options, which is illustrated with the Maguire Template and Avalon template below:

   Maguire Template



   Avalon Template



NOTE

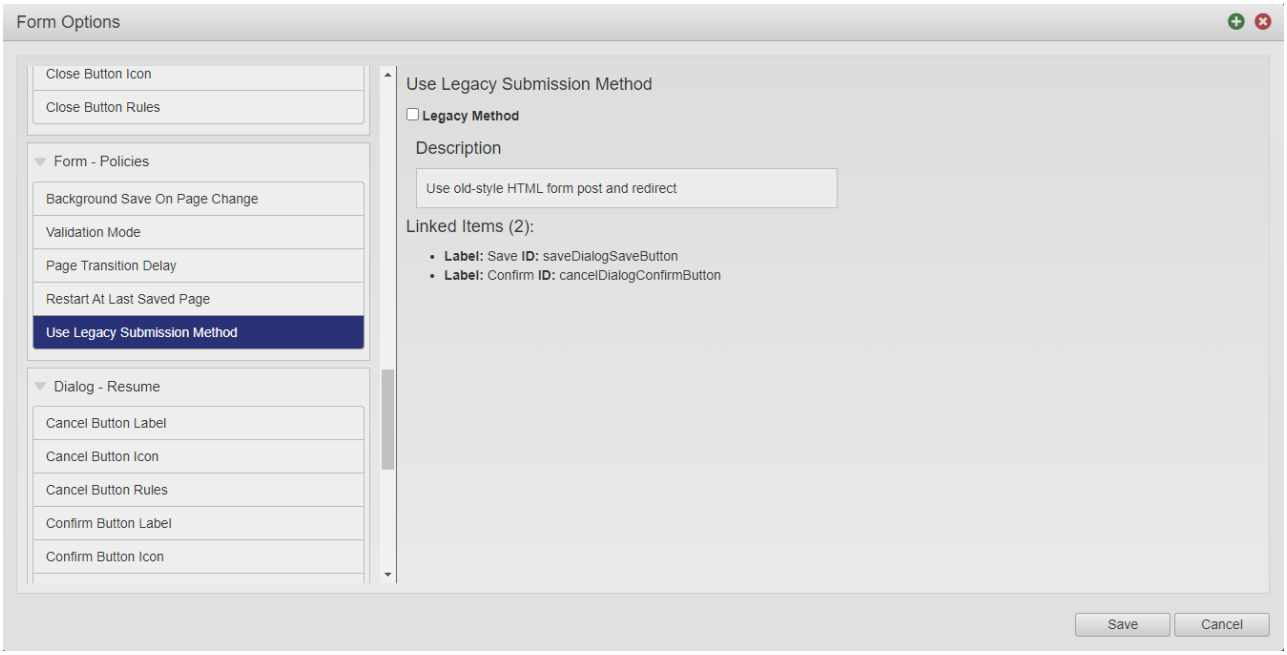
The list of categories you can see also depends on your access rights, which are set by the Template Designer in the template.

3. Expand the relevant category and select the option you want to view and update. The most common form options are:
    - Form Options > Form Name
    - Form Options > Form Rules
    - User Experience
    - Form - Policies
    - Analytics
    - Accessibility
    - Transact Manager
    - Navigation
    - Navigator Second Level
    - Wizard Navigation Bar

NOTE

If a form option that you require is not available, speak to your Template Designer to add it to your template.

4. Update the property as required. Check if the form option is used in other components, which will be listed in the Linked Items sections, as shown below:



   In this example, the Use Legacy Submission Method form option is used by 2 components identified by:

   - Components' label names - Save ID and Confirm ID
   - Components' IDs - `saveDialogSaveButton` and `cancelDialogConfirmButton`

5. Click Save to update the configuration.

NOTE

We recommend building and rendering a form to see how your changes are displayed to form users.

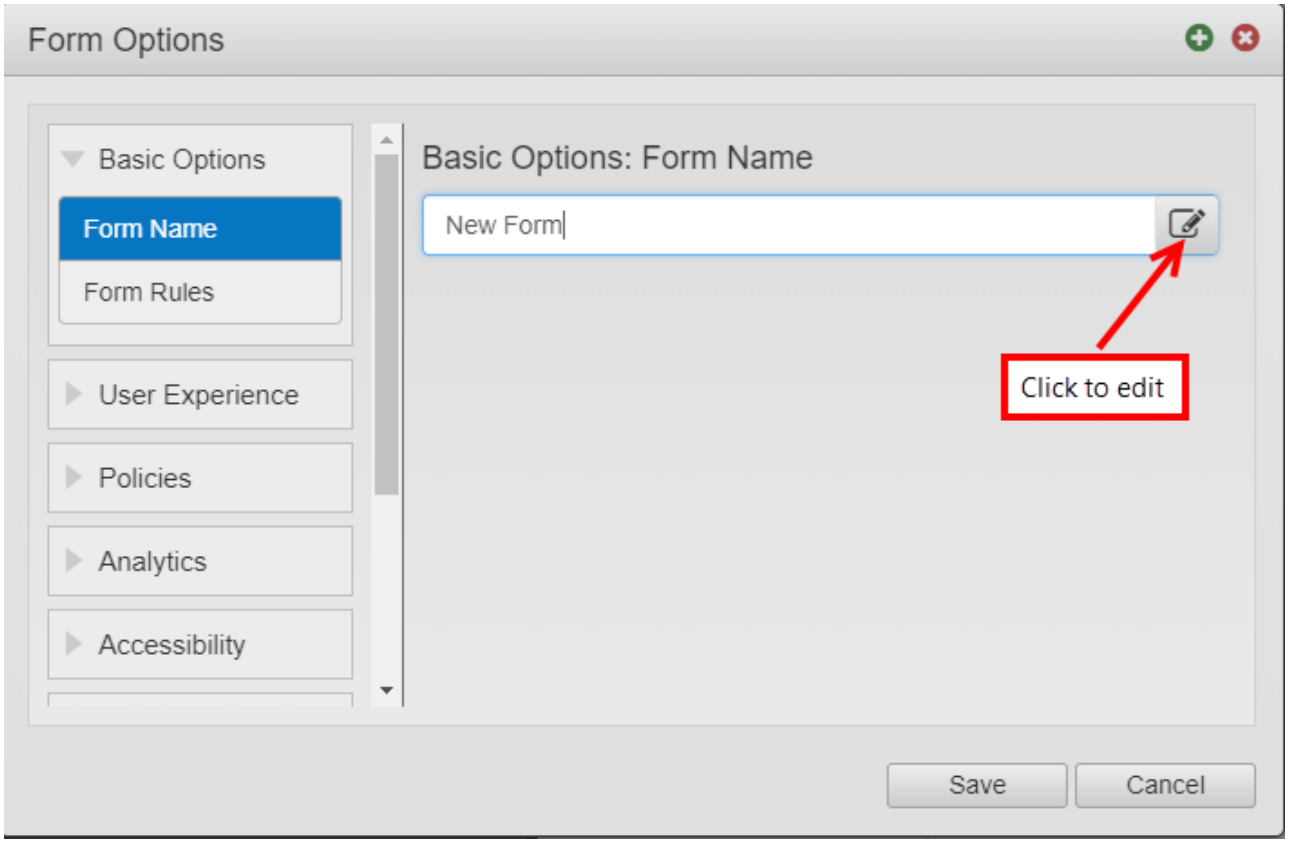
Next, learn how to change a form name.

Form Name

From the form options window, you can configure a form name for a Maestro form. The Form Name basic option is used to edit a name of a form, which is a part of the form metadata[1]. However, the form name only impacts areas on the form that reference the form name metadata.

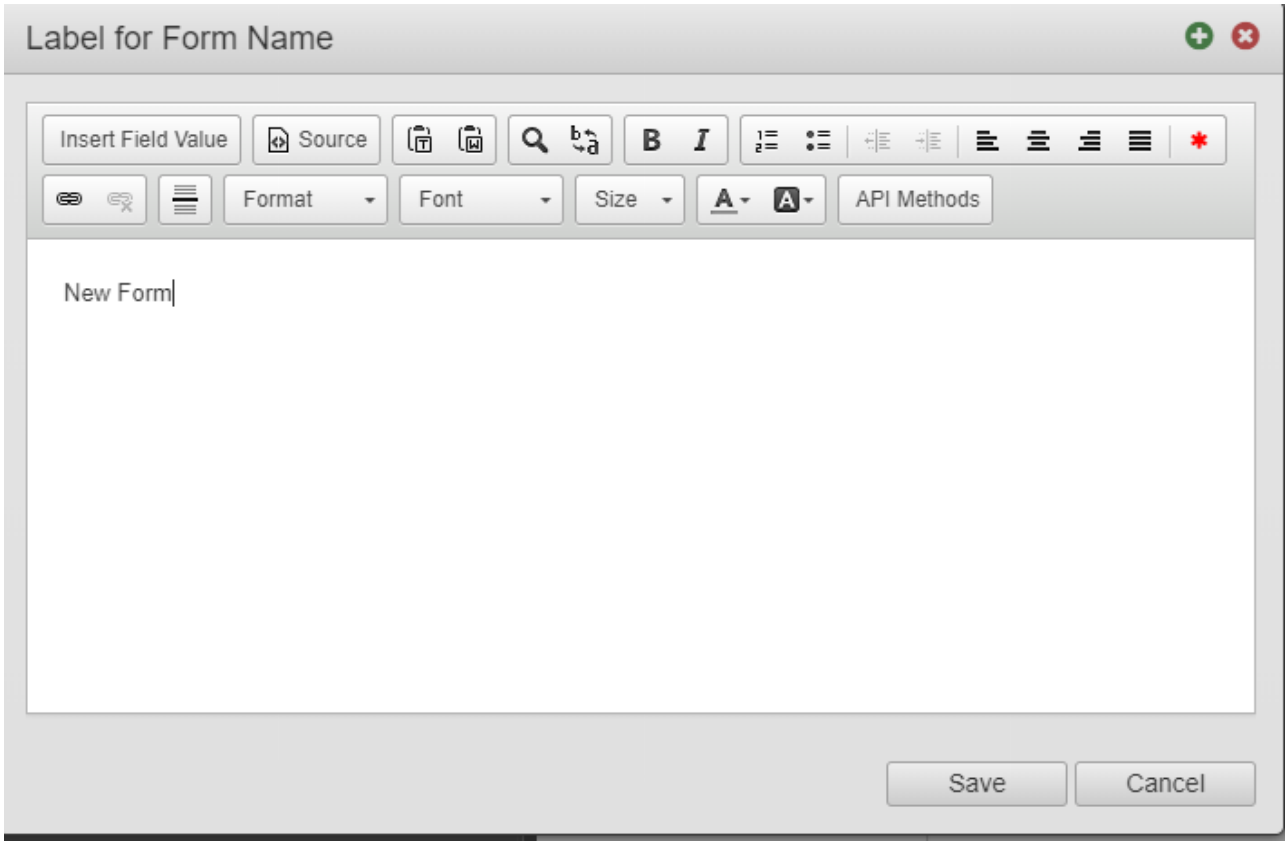
To change a form name from the form options window

1. Open a Maestro form and select Form Options.
2. Select Form Name.

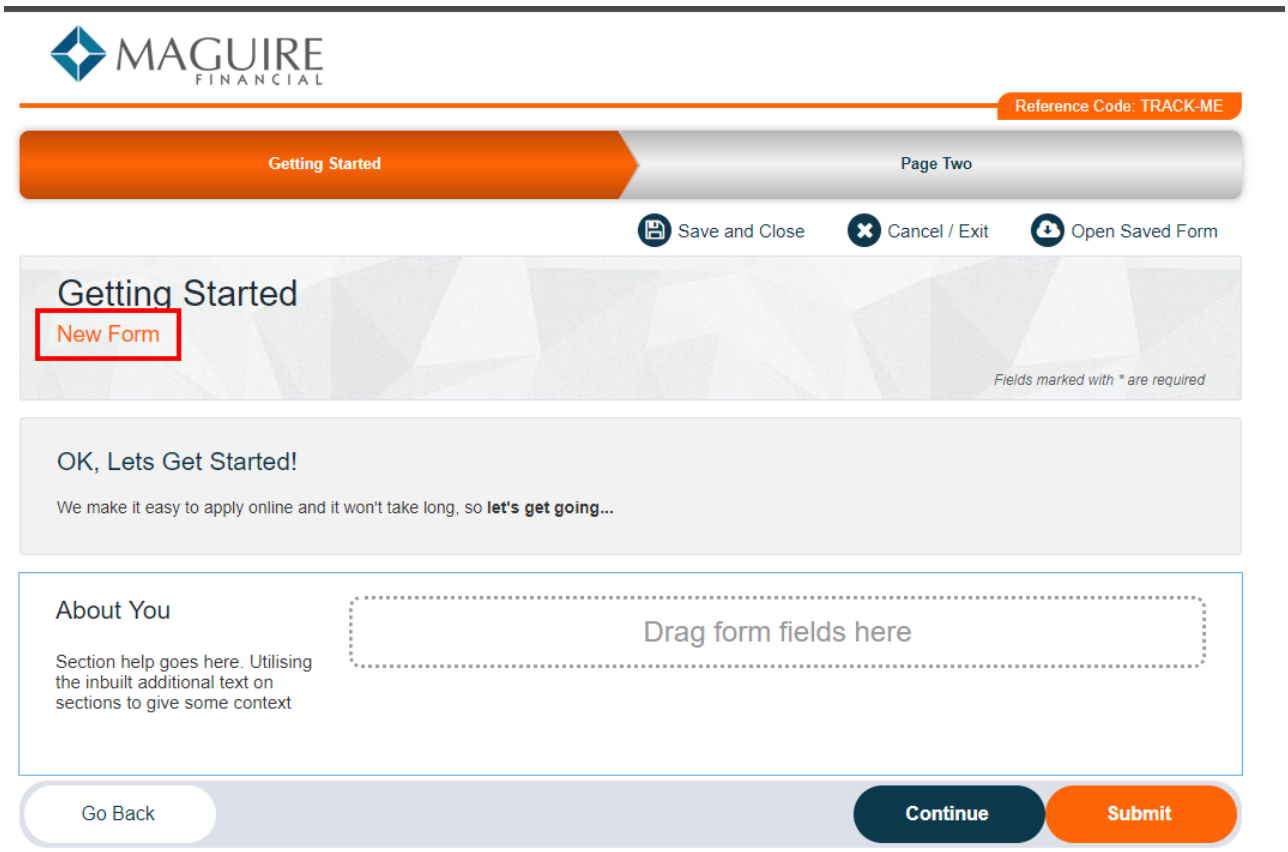


3. Click Edit.

[1]Metadata is data that describes other data. Meta is a prefix that in most information technology usages means "an underlying definition or description." Metadata summarizes basic information about data, which can make finding and working with particular instances of data easier. For example, author, date created and date modified and file size are examples of very basic document metadata. Having the abilty to filter through that metadata makes it much easier for someone to locate a specific document.



4. Edit the name of the form and click Save.
5. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. In the default template the form name displays near the top of the form. This display may be different in your form depending on the template used.



Changing the form name in the Form Options doesn't change the form name displayed in the Maestro Dashboard. Likewise, editing the form name in the dashboard doesn't change the form name displayed and referenced in the form.

To configure the form name in the Maestro Dashboard:

1. Open a form in the Maestro Dashboard and click Details.
2. Edit the form name and description and click Save.

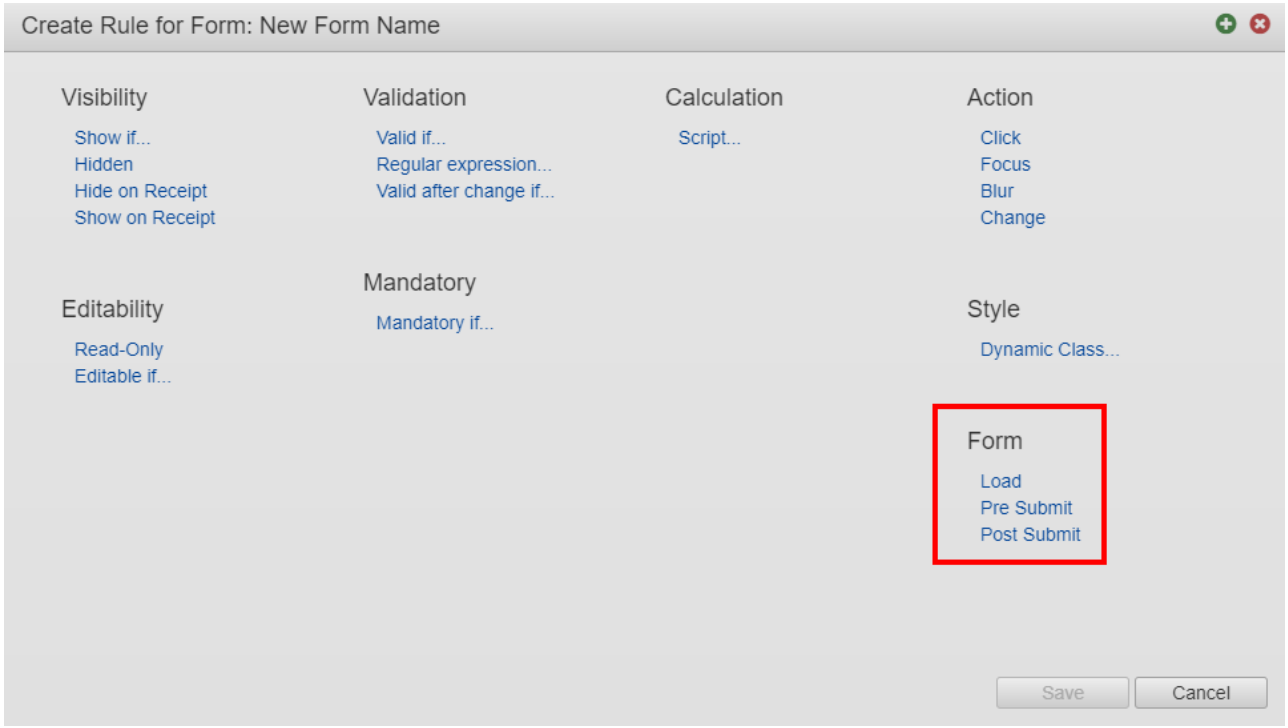
Next, learn how to create a form rule.

Form Rules

Maestro allows you to create business rules for a Maestro form using Form Options.

To create a business rule using the Form Options:

1. Open a Maestro form and click Form Options.
2. Select Basic Options > Form Rules and click Create Rule.



3. Select a rule from the available options:
   - Load – this rule is invoked when a form is loaded by a browser.
   - Pre Submit - this rule is invoked before the submit action is fired.
   - Post Submit - this rule is invoked after the submit action is fired.
4. Edit the JavaScript that implements the rule.
5. Click Save.

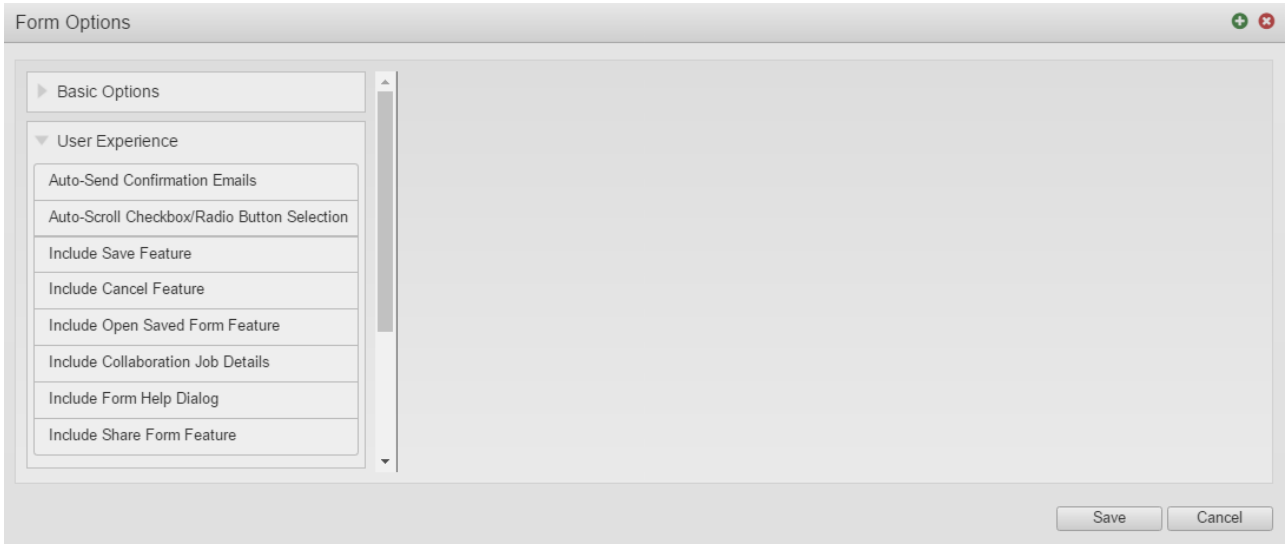
Next, learn how to configure user experience.

User Experience

Maestro allows you to configure User Experience using Form Options.

To configure User Experience using the Form Options:

1. Open a Maestro form and select Form Options.
2. Select User Experience.



3. Select Auto-Send Confirmation Emails to automatically send emails to the user when the form is submitted and/or saved.
4. Select Auto-Scroll Checkbox/Radio Button Selection to enable the auto-scroll feature for checkboxes and radio button groups. If the user selects a checkbox or radio button group the page will auto-scroll so that the selected component is in the middle of the screen.
5. Select Include Save Feature to allow the user to save the form. The Linked Items list displays the areas within the form that are related to the save feature. Items may include Dialogs, Modal Pages or buttons.
6. Select Include Cancel Feature to enable the user to cancel the form without saving or submitting it. The Linked Items list shows features related to the cancel.
7. Select Include Open Saved Form Feature to enable the user to open a saved form. The Linked Items list shows features related to the resume.
8. Select Include Collaboration Job Details to include collaboration job details.
9. Select Include Form Help Dialog to include the form help dialog.
10. Select Include Share Form Feature to include share form feature.
11. Click Save.

Next, learn how to configure form's policies.

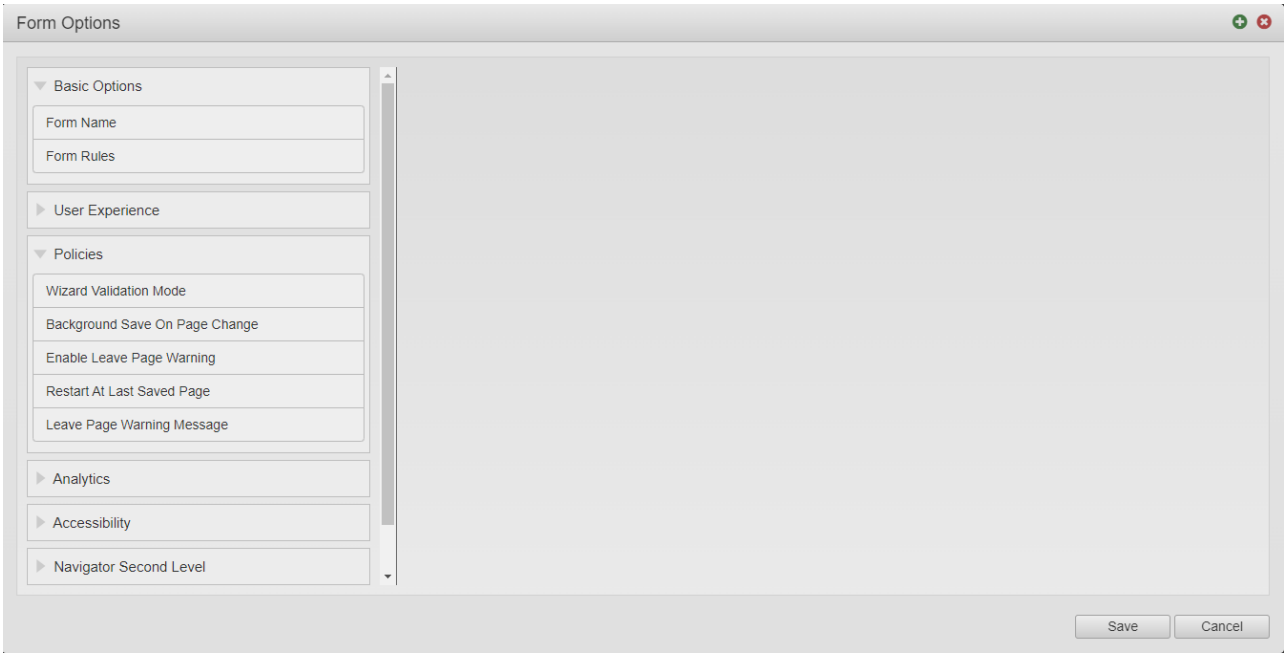
Policies

Maestro allows you to configure various form's policies using Form Options.

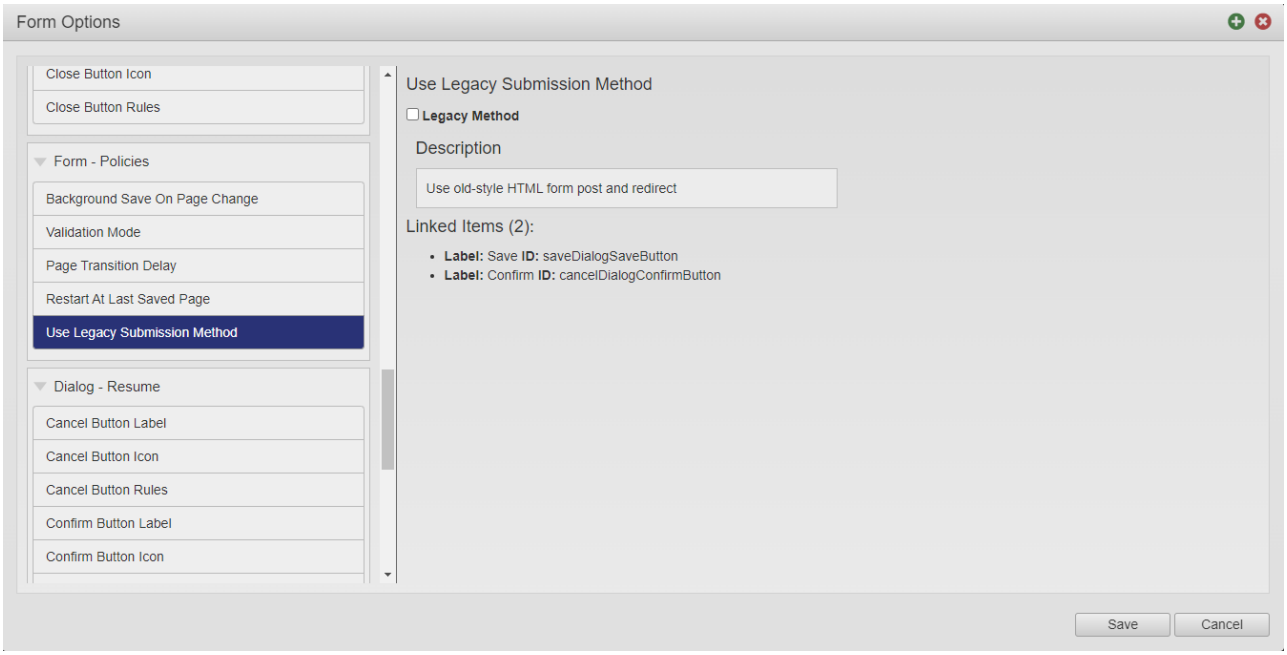
To configure form's policies:

1. Open a form and select Form Options.
2. Expand Policies or Form - Policies, as shown below for 2 most popular templates we provide:

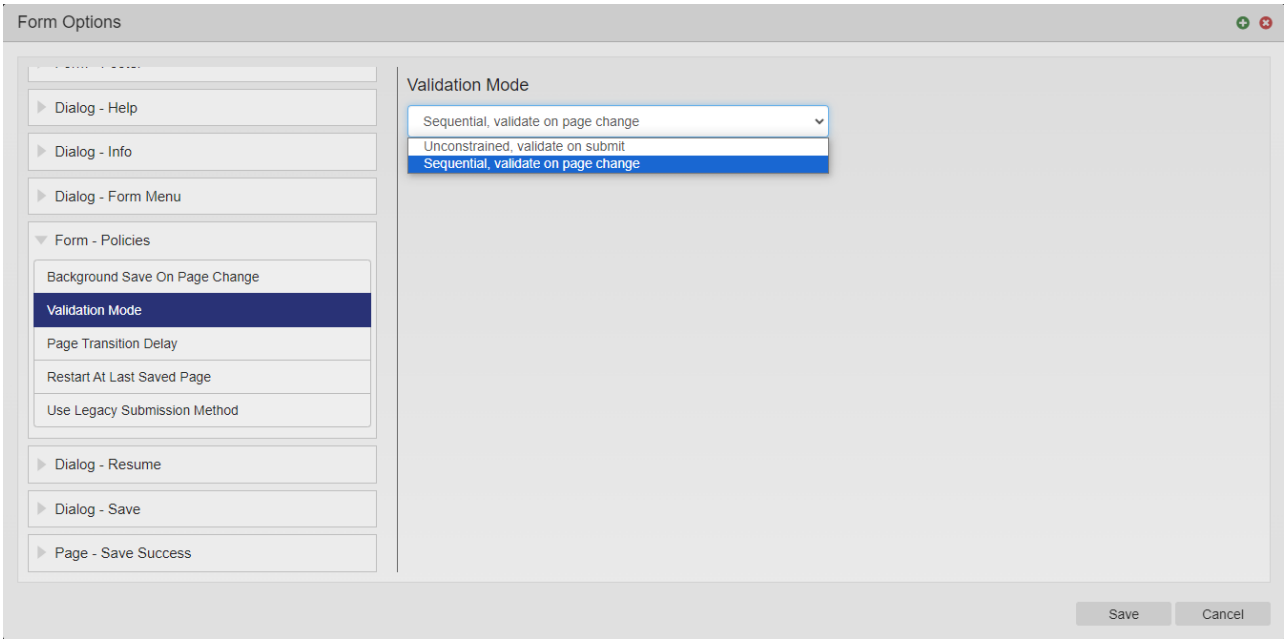
   Maguire Template



Avalon Template



3. Select Validation Mode to configure a page validation mode, which can be:
   - Unconstrained, validate on submit
   - Sequential, validate on page change



4. Select Page Transition Delay to update the default value for page transition delay.
5. Select Background Save On Page Change to enable a background form save on page change.

6. Select Enable Leave Page Warning to show a confirm dialog when a form user tries to leave a page.
7. Select Restart At Last Saved Page to make a form return to a page it was on after save and resume.
8. Select Leave Page Warning Message to update the default message for the leave page warning defined with the Enable Leave Page Warning setting.
9. Select Use Legacy Submission Method to use old-style HTML form post and redirect.
10. Click Save.

Next, learn how to enable analytics.

Analytics

Maestro allows you to add Analytics properties to a Maestro form using Form Options. You usually do this after you have updated the form's standard page tracking configuration in Manager.

Maestro has limited support for GTM[1], so it only checks for `window.gtag` or `window.ga` presence in the Page Controller and a Modal Page (when it is visible). For more information, see how to add Google Tag Manager in a Maestro form. However, Maestro is fully integrated with the Journey Analytics module where it send all analytics events t.

To add Analytics properties using the Form Options:

1. Open a Maestro form and select Form Options.
2. Select Analytics > Google Analytics Tracking ID and enter the Google Analytics Tracking ID. | 21.11 This feature was removed in 21.11
3. Select Analytics > Google Analytics Base URL and enter the Google Analytics Base URL, which is used to tag an event in GMT within a Page Controller and a Modal Page. The example of the GA script is shown below:

```
// Google Analytics - Page Tracking can add GA to the global window scope
if (!!window.gtag) {
	gtag('event', 'page_view', {
		page_title: newPage.label,
		page_path: baseUrl + newPage.id
	});
} else if (!!window.ga) {
	ga("set", {
		page: baseUrl + newPage.id,
		title: newPage.label
	});
	ga("send", "pageview");
}
```

Next, learn how to configure form accessibility.

[1]Google Tag Manager (GTM) is a tag management system (TMS) that allows you to quickly and easily update tracking codes and related code fragments collectively known as tags on your website or mobile app.

Accessibility

Maestro allows you to configure form's accessibility using Form Options. The correct design and configuration of form's accessibility is crucial to ensure that more users have equal access to the form.

To configure accessibility using the Form Options:

1. Open a Maestro form and select Form Options.
2. Select Accessibility.
3. Select Enable Mobile Zooming to enable pinch-to-zoom on mobile devices. This is not normally needed with good responsive design, but some accessibility reviews require it.
4. Click Save.

NOTE

Each component has its own accessibility configuration with various set of options depending on a type of component. See the list of components to find a component you need and check what accessibility options it provides.

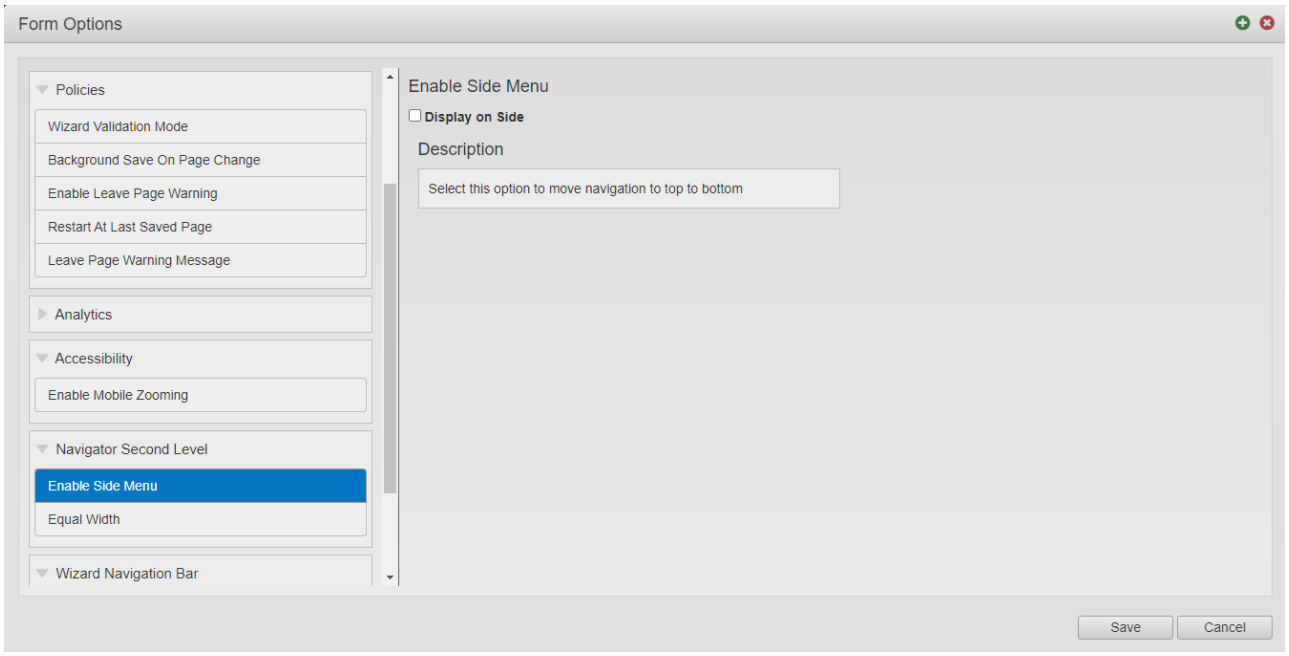
Next, learn how to configure Navigator Second Level.

Navigator Second Level

Maestro allows you to configure Navigator Second Level in a Maestro form using Form Options.

To configure Navigator Second Level using the Form Options:

1. Open a Maestro form and select Form Options.
2. Select Navigator Second Level.



3. Select Enable Side Menu and select the Display on Side checkbox to move navigation to top to bottom.
4. Select Equal Width and select the Equal Width checkbox to ensure equal item width.
5. Click Save.

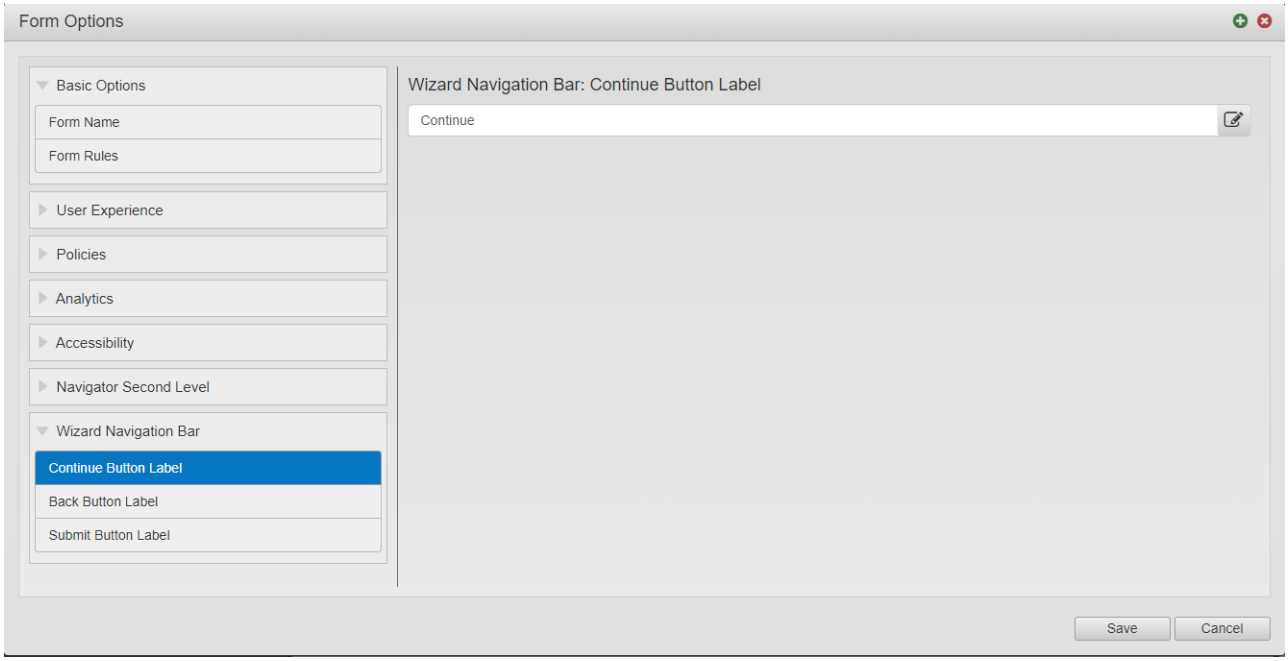
Next, learn how to configure Wizard Navigation Bar.

Wizard Navigation Bar

Maestro allows you to configure a Navigation Wizard Bar component for a Maestro form using Form Options.

To configure Wizard Navigation Bar using the Form Options:

1. Open a Maestro form and select Form Options.
2. Select Wizard Navigation Bar.



3. Select Continue Button Label to edit the text displayed on the Continue button.
4. Select Back Button Label to edit the text displayed on the Back button.
5. Select Submit Button Label to edit the text displayed on the Submit button.
6. Click Save.

Next, learn about all Form Options.

Form Background Save

Journey Maestro has the background save functionality that automatically saves a form to a Journey Manager server in the background, without a user having to explicitly click the Save button. The background save option must be enabled for the form to be saved each time the user moves from one page to another.

Background save allows a user to return to a form even if something goes wrong while they are entering data. For example, the user is completing a 10-page form and they get to page 8 and all of a sudden, their computer locks up and closes the browser. With background save enabled, this data can be recovered using the form reference code, so the user can return to page 8 of the form. Though the user may lose the data of the page they were currently on when the computer locked up, redoing one page of data is much better than having to redo all 7 of the previous pages.

If the user did not record their reference code, our support team can provide you with a form link.

You can configure the background save using:

- Form Options
- Content Container

You can also configure a background save intervals for forms.

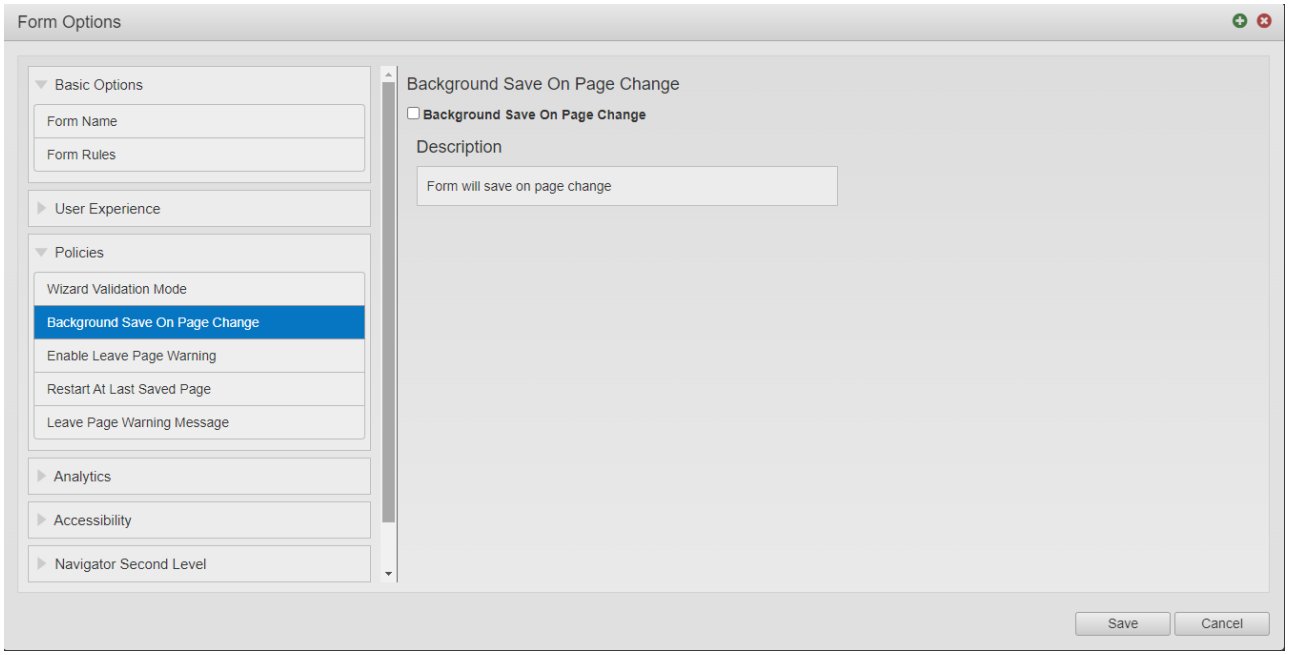
Next, learn how to enable form background saves.

Enable Form Background Save from Form Options

Maestro allows you to enable the background save feature using Form Options.

To enable a form background save using Form Options:

1. Open a Maestro form and click Form Options. and select Policies.
2. Click Background Save on Page Change.



3. Select the Background Save on Page Change checkbox to enable the background save.
4. Check the message in the Description field.
5. Click Save.

NOTE

Click Build and Render Form to see how this rule is displayed when the form is built and rendered. The form is now saved each time the user changes to a different page. This feature is exposed through Form Options in the standard Maguire template, although your Template Designer may or may not have exposed this capability to your forms.

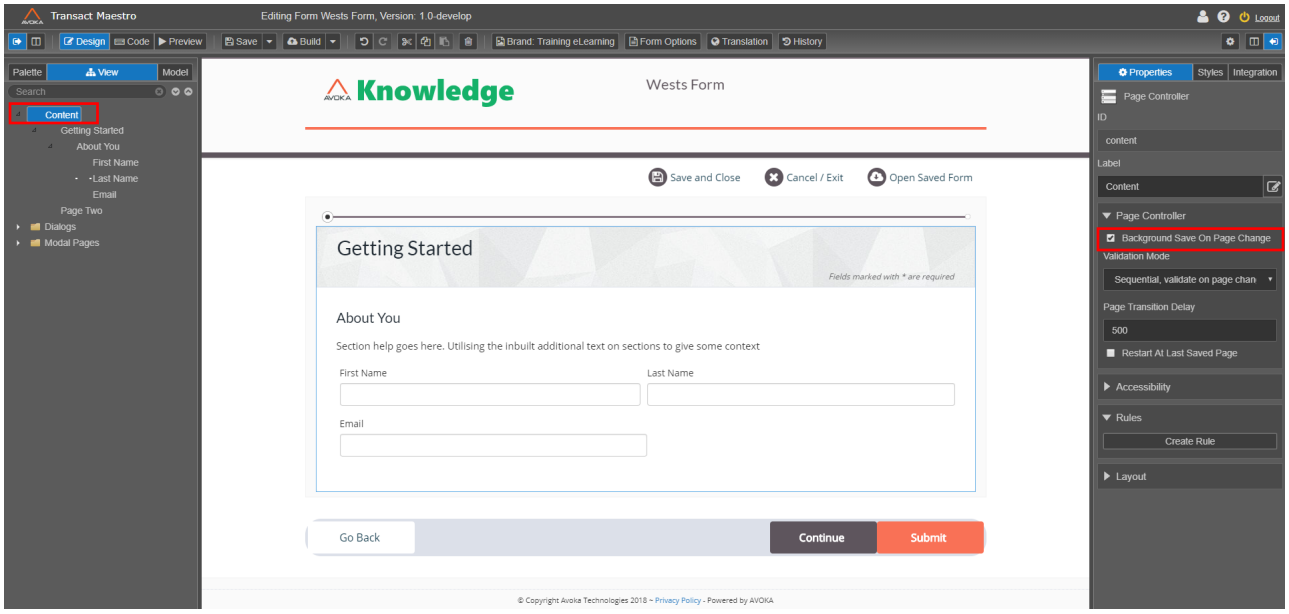
Next, learn how to enable form background save from content container.

Enable Form Background Save from Content Container

A Maestro form can have the background save feature enabled from the Content Container.

To enable a form background save from the Content Container:

1. Open a Maestro form.
2. Select the Content container directory where all form pages are located.



3. Click the Properties tab.
4. Click Options.
5. Select the Background Save on Page Change checkbox.
6. Click Save.
7. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. The form is now saved each time the user changes to a different page. This feature is exposed through Form Options in the standard Maguire template, although your Template Designer may or may not have exposed this capability to your forms.

You can also enable the form background save feature from the form options window.

Next, learn about ?

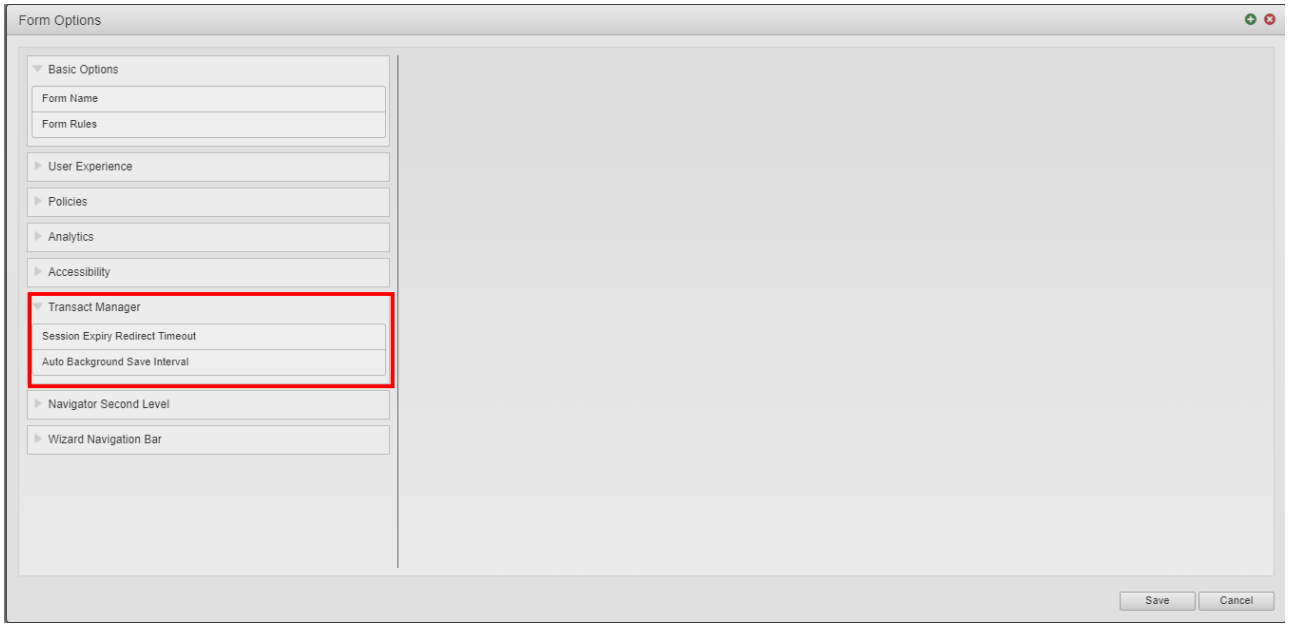
Configure Form Background Save Interval

Journey Maestro allows you to configure time intervals, in seconds, when a form is automatically saved in the background. Configuring background save intervals means that the form is saved at these defined intervals, for example every 40 seconds. This can be extremely useful when you are building large Maestro forms.

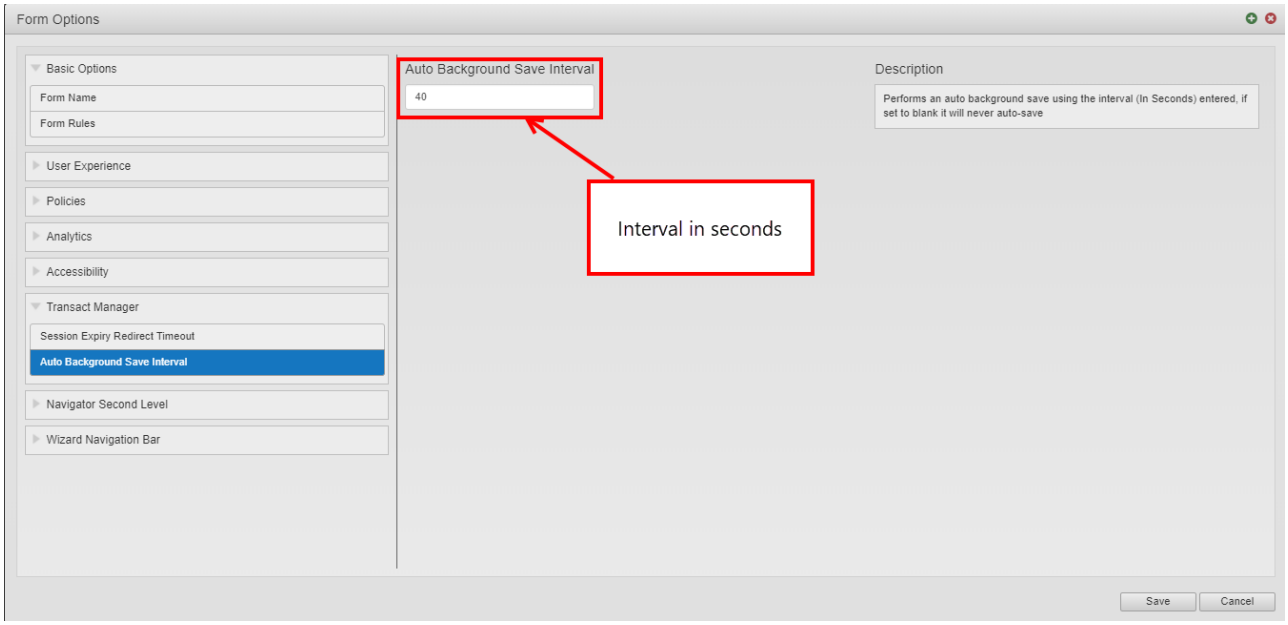
Once background save has been enabled for a Maestro form, a save interval can be configured.

To configure form background save intervals using Form Options:

1. Open a Maestro form and click Form Options and select
2. Select Transact Manager



3. Click Auto Background Save Interval.



4. Enter an interval duration in seconds, for example 40. Alternatively, use the arrow buttons in the textbox.
5. Click Save.
6. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Next, learn about ?

Form Save on Page Change vs Timed Save

The Fluent Function model uses triggers to initiate functions or services during form processing. These functions or services can be bound to these triggers for each form version. One of these triggers, Form Update, is ambiguous because it can be initiated by either:

- A page change within the form.
- A timed background save.

In most cases, this ambiguity is not a problem. However, because the former is triggered by the user, with validation taking place on the page data, and the latter is passive, with no validation, some applications need to distinguish between these events. For example, pushing the XML form data to a 3rd-party application, for example, Salesforce, might work fine at a page change, but might contain invalid data for a timed save. To address this problem you can use the solution described below.

Make a Place to Store the New Metadata

In the Form XML Data, add an element `/AvokaSmartForm/Meta/AutoSaveType`.

If you are using Value Objects to map the Form Data to a Java object, add a String variable `autoSaveType` to the Meta value object class.

Update the Metadata Before Calling the Service

In Maestro, in Form Options / Policies / Background Save On Page Change, disable the Background Save on Page Change option .

In Maestro, replace the functionality disabled in step 1 with the following: on each page, add a "Page change" rule that executes code similar to the following:

```
/* Let the save function know that this background save is due to a
   page change, to distinguish it from one triggered by a timed background save. */
data.autoSaveType = "PageChange";

var promise = Form.backgroundSave();

/* Settle the promise before resetting the state. */
promise.then(
    function(result) {
        console.debug('Form Background Save Result: ' + result);
    }).catch(function (error) {
        console.log('Form Background Save Error: ' + error);
    }).finally(function () {
        /* Reset the state. */
        data.autoSaveType = "";
    })
```

Update the Service to Use the New Metadata

The Groovy code below is contrived and for illustration purposes only. It assumes that the XML Form Data element `/AvokaSmartForm/Meta` has been unmarshalled into the `appMeta` value object.

```
boolean isFormUpdateForPageChange(FuncParam param, Meta appMeta) {
    logger.debug("Trigger: " + param.trigger)
    if (FuncParam.TRIGGER_FORM_UPDATE.equals(param.trigger)) {
        logger.debug("meta.AutoSaveType: " + appMeta.autoSaveType)
        return "PageChange".equals(appMeta.autoSaveType)
    }
    return false
}
```

Next, learn about the content container.

Form Pages

Forms, built in Journey Maestro, can contain many components and therefore can become rather long. Navigating long forms can become daunting experience that can cause issues for end-users. To address these issues, Journey Maestro allows you to use page and section components in forms to improve the form user journey by grouping fields into logical areas. You can add a page to a form as frequently as you add new areas to it to provide users with concise data collection tasks.

If you use a template with a navigator, most templates do, then adding a page will automatically add a new item in the navigator menu.

Add a Page to a Form

When creating or editing a form in Maestro, you may want to extend the form functionality by adding multiple pages.

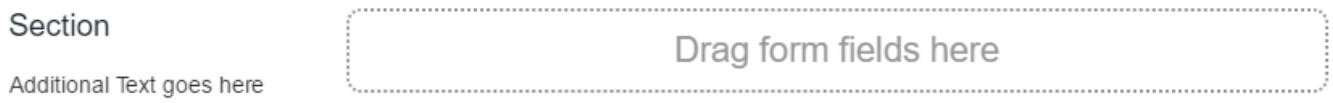
To add a page:

1. Open a form in the Design mode.
2. Select the Page component from the Palette and drag and add it to the form.
3. Add new components to the page.

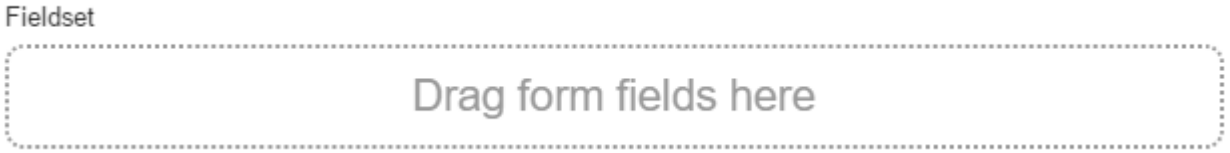
> NOTE
>
> Alternatively, you can right-click the Contents item and select Add Page from the menu before dragging the page onto the form.

Form Sections and Fieldsets

If you want to further break up form content in a page, you can use section components. A section includes a heading and optional explanatory text as shown below.



You can break up your fields even further by grouping them into fieldsets. This is the recommended approach of grouping several related fields together.



As well as using sections and fieldsets, you can also configure a form to use two-level navigation.

NOTE

For pages to operate correctly, they must be inserted under the Content container in the hierarchy. Dropping the page component onto the form design may result in incorrect placement.

Form Two-Level Navigation

To improve the user experience of large forms, you can add two-level navigation to a form, which is a form sub-menu.

To create two-level navigation:

1. Open a Maestro form.
2. Select the Page Group component from the Palette. Make ensure that all pages are located within the Page Group, otherwise, it may be confusing for end-users. Page Groups will appear on the first level navigator, and pages within the Page Groups will appear on the second level navigator.
3. Add it to the Content.
4. Drag a new or existing Page to the Page Group.



NOTE

You can also use pages and sections to improve the user journey on long forms.

Form Versions Overview

Journey Maestro allows you to save a unique copy of a form by using form versions. You may want to create a new form version each time the TM Form Version is built, or when you are making significant changes to a form.

Creating a new form version at these points may save you the hassle of fixing your form should something go wrong. For example, say you're adding a feature or changing the behavior of existing form items but while making these changes something goes wrong. Form versions allow you to easily return to a previous working version of the form.

Maestro provides a convenient interface to create, edit, delete, tag, and export form versions.

Since 17.10, the Temenos Journey Manager platform follows open source semantic versioning conventions. Following this convention, all new form version names are recommended to start at version 1.0-develop until they reach production. In versions of Maestro prior to 17.10, form versions are incremented by whole numbers (for example version 1, version 2, version 3, etc.).

When you create a new form, the initial form version depends on the Default Initial Version specified in the Project Details tab of a project. You can change the Default Initial Version at any time by switching to the Project Details tab and changing its value. However, this only impacts new forms and assets within this project; version numbers of existing forms are unaffected.

> NOTE
>
> Form versions are sorted and displayed in descending order based on major, minor and patch release numbers.

Semantic versioning provides the following benefits:

- Standardize versioning of Maestro design artifacts which in turn makes management of different versions easier
- Align more closely with Manager's versioning scheme
- Assist Form Builders who are developing forms concurrently
- Lock down a form version using tags

When working on any form, it is recommended that you do all your work on version `1.0-develop`, which is the initial form version, until the form is ready for production. When a form is ready for production, you should create a tagged version of the form.

NOTE

When you create a SCM project, Maestro disables the form version feature, so you must create and later maintain form versions using a Git[1] version control.

NOTE

If you are using Maestro 17.10.x with a Journey Manager 5.x environment, and your form version number is longer than 10 digits (e.g. "1.0-develop"), you will get an error when you attempt to import the Manager 17.10.x form to the Manager 5.x environment. In this case, it is recommended that you shorten the default suffix when creating new form versions in Maestro 17.10.x.

Next, learn how Manager handles form versions.

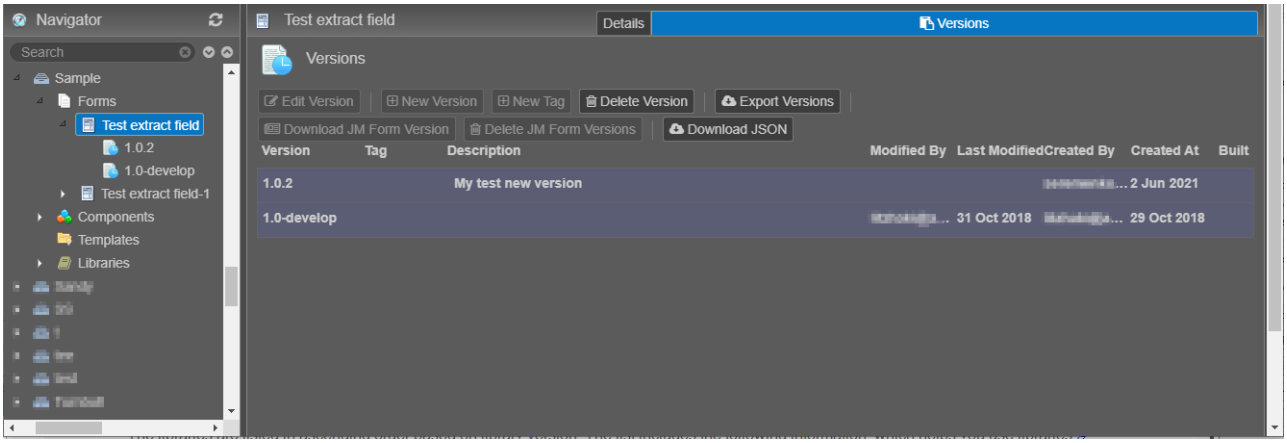
[1]Git is a version control system for tracking changes in computer files and coordinating work on those files among multiple people. It is primarily used for source code management in software development,[8] but it can be used to keep track of changes in any set of files.

View Form Versions

Maestro allows you to view and manage form versions.

To view the list of form versions:

1. Open your project in the Navigator pane and click Forms to view the list of forms created in your project.
2. Select a form in the Forms folder to view available versions of this form.



The forms are listed in ascending order by form versions. The list includes the following information, which helps you use forms correctly:

- Version: a form version.
- Tag: whether a form version is tagged or not.
- Description: a meaningful description of a form version.
- Modified By: who modified a form version.
- Last Modified: when a form version was modified.
- Created By: who created a form version.
- Created At: when a form version was created.
- Built: this flag is set when there is a corresponding published form, which happens when a form developer has edited a form version and clicked Build in the editor and there is a Manager's form version.

  Also, if you use the Delete JM Form Versions functionality, described below, it will delete the published form and deleting the form design version will also delete the built version as well. If the Built checkbox is selected, the Download JM Form Version button is available, so you can use it. Otherwise, you need to open the form version in Maestro and build the TM Form Version of the form.

3. Click Edit Version to open a selected form version in the Maestro editor for editing.
4. Click New Version to create a new version of a selected form.
5. Click New Tag to tag a selected form version.
6. Click Delete Version to delete the selected form versions.

   TIP

   Use `Shift` or `Ctrl` to select multiple designs for bulk operations on actions, such as Delete, Export and Download. | 21.05 This feature was introduced in 21.05.

   This operation is irreversible, so you must click OK to confirm. For more information, see how to delete a form.

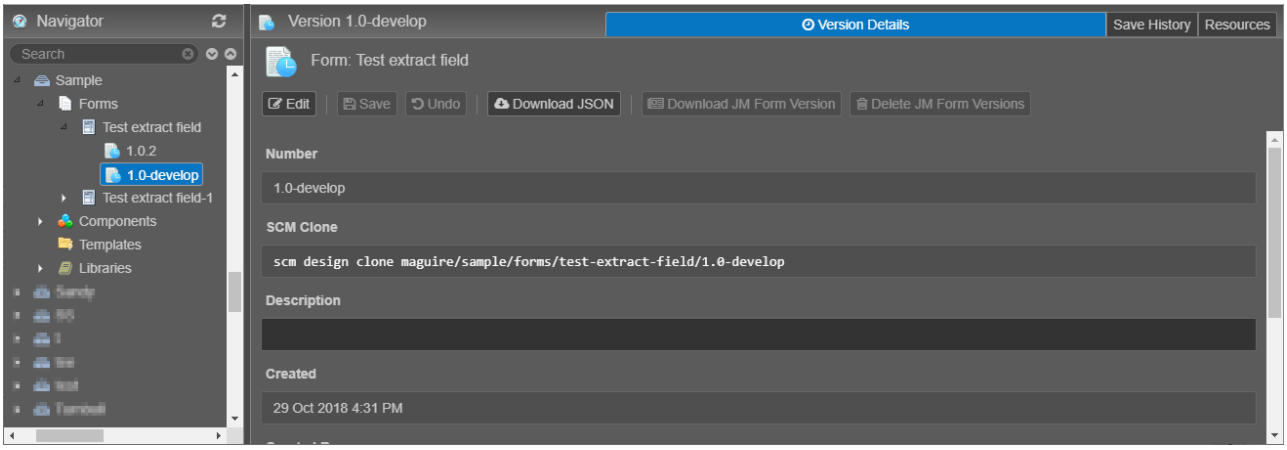
7. Click Export Versions to export the selected form versions.
8. Click Download JM Form Version to download a form version deployed in Manager. This button is only available for selection once the form version has been built at least once. | 21.05 This feature was introduced in 21.05.
9. Click Delete JM Form Versions to delete the selected form versions. This only deletes the published form from a Manager instance that Maestro is hosted on and it leaves the form design in Maestro so it can be rebuilt again.

   In Manager, each form name is unique per organization and publishing a form with the same name will throw an error. In order to re-use the same form name in an organization, the existing form using that name needs to have the published form deleted, for example, My Application Form, then open the form design that you want to use this name and using the Build with Options in the editor to set the form name.

   Deleting a project, form design or form design version will delete the published form associated with the asset being deleted.

10. Click Render JM Form Version to open a form version, that has previously been built and deployed in the host Manager, in a new tab of your browser. | 21.05 This feature was introduced in 21.05.

11. Click Download JSON to download JSON files of the selected form versions. If you have multiple versions of a form, you can download a JSON[1] file of each version and use an external tool to compare them to see the differences between the versions.
12. Double-click a selected form version to view the form version's details.



Update a form description in the Description field. Click Save to persist the changes.

> NOTE
>
> You can't update the name and version number of the form.

13. Select the Details tab to see and update the form's name and description in the corresponding Name and Description fields.

Next, learn how to export form versions.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

Form Version Number

A form version can contain numbers and periods (.) and can only be up to three levels. Form version numbers are based on major, minor and patch releases. For example, if a form version number is 1.1.3, it means that 1 is major, 1 is minor, and 3 is patch number. If a version number includes less than three levels, Maestro will add the missing levels as "0". For example, if "1" is entered, the new form version will become "1.0.0" when you navigate away from the field.

Since 17.10, the Temenos Journey Manager platform follows open source semantic versioning conventions. Following this convention, all new form version names are recommended to start at version 1.0-develop until they reach production. In versions of Maestro prior to 17.10, form versions are incremented by whole numbers (for example version 1, version 2, version 3, etc.).

VIDEO

For more information, check the Introduction to Semantic Versioning video.

Next, learn how to compare form versions.

Delete a MaestroForm Version

Maestro allows you to delete form versions when they are not required any more or when you want to re-use a form's name.

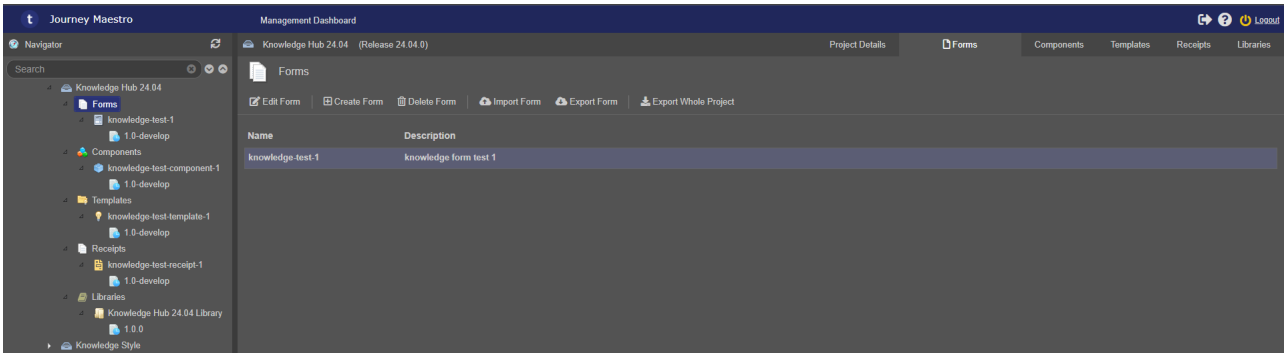
When you delete a form version from Maestro, it's also removes a published form version and all transactions, associated with creating and populating that form version, from a Manager instance where this form version is deployed. As the number of transactions can be large, this operation might take some time. Also, this is an irreversible operation and can affect a number of applications that make use of that form version.

Same applies when you delete a form, so all its form versions are removed from Maestro and the Manager instance, where the Maestro WAR is deployed and is running.

Typically, you develop a form in Maestro and then deploy it to the Manager instance where Maestro is running. After that, you build and download a form version ZIP file which you deploy to your target environments, such as development, testing and production Manager instances. In this case, Maestro has no knowledge of these environments and therefore won't delete these forms when you delete them in Maestro.

To delete a form version:

1. Select a form from the Navigator panel.

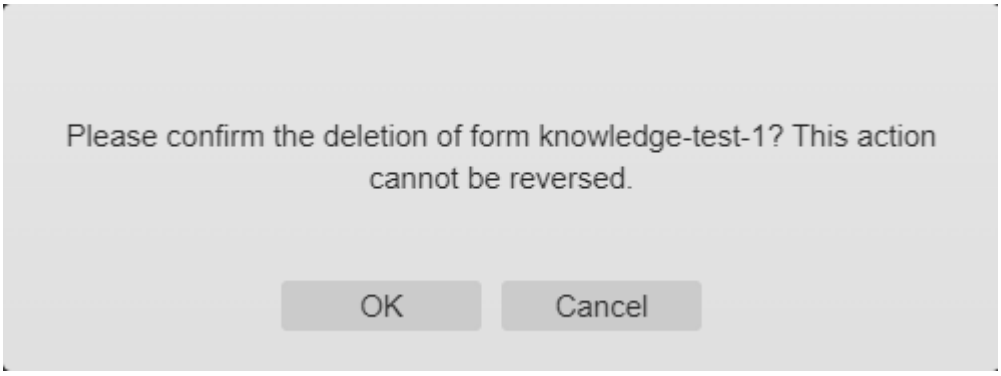


2. Locate and select form versions you wish to remove and click Delete Version.

> TIP
>
> Use `Shift` or `Ctrl` to select multiple designs for bulk operations on actions, such as Delete, Export and Download. | 21.05 This feature was introduced in 21.05.

3. Click OK to confirm the deletion of the selected form versions as this operation is irre-

versible



Next, learn how to delete form versions in Manager.

Export Form Versions

Maestro allows you to export form versions. You can use this functionality to:

- Migrate a single form version to a Manager production environment, as either a new or updated form version.
- Back up form versions.

To export a current form version:

1. Select a form.
2. Click Export Current Form Version to export the current form version.

To export any other (not current) form version:

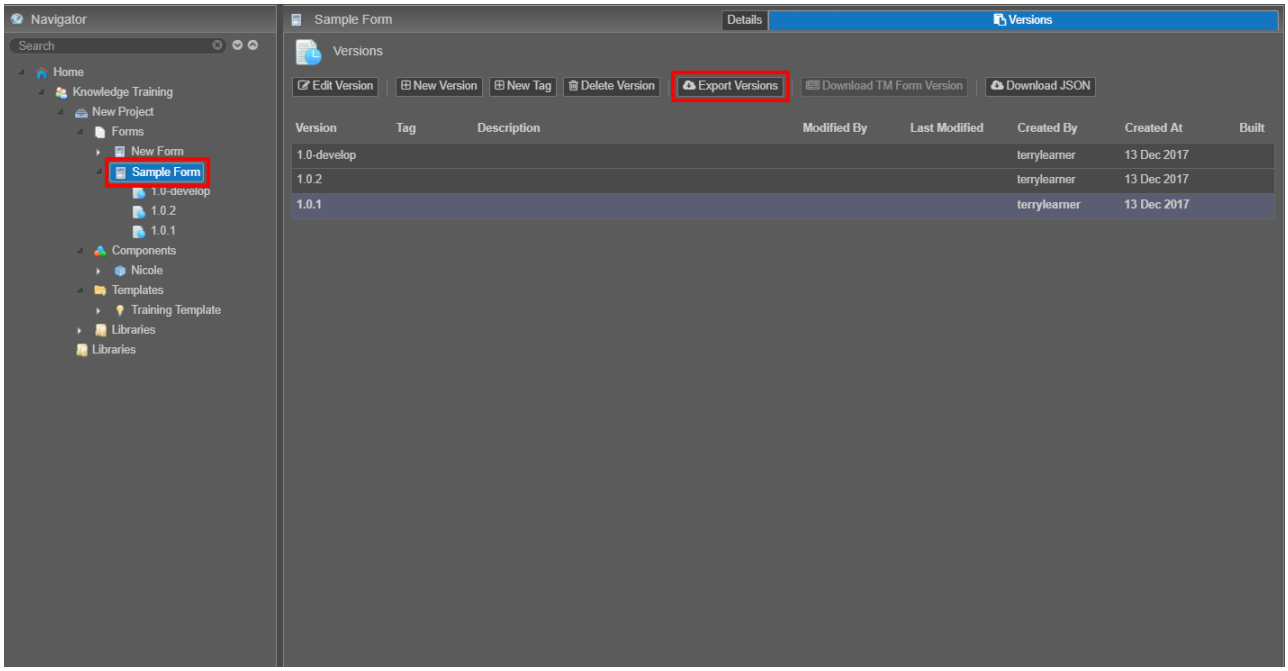
1. Select the form version.
2. Click Export .
3. Click OK to confirm your decision.

Maestro also allows you to export all versions, or selected versions of a form.

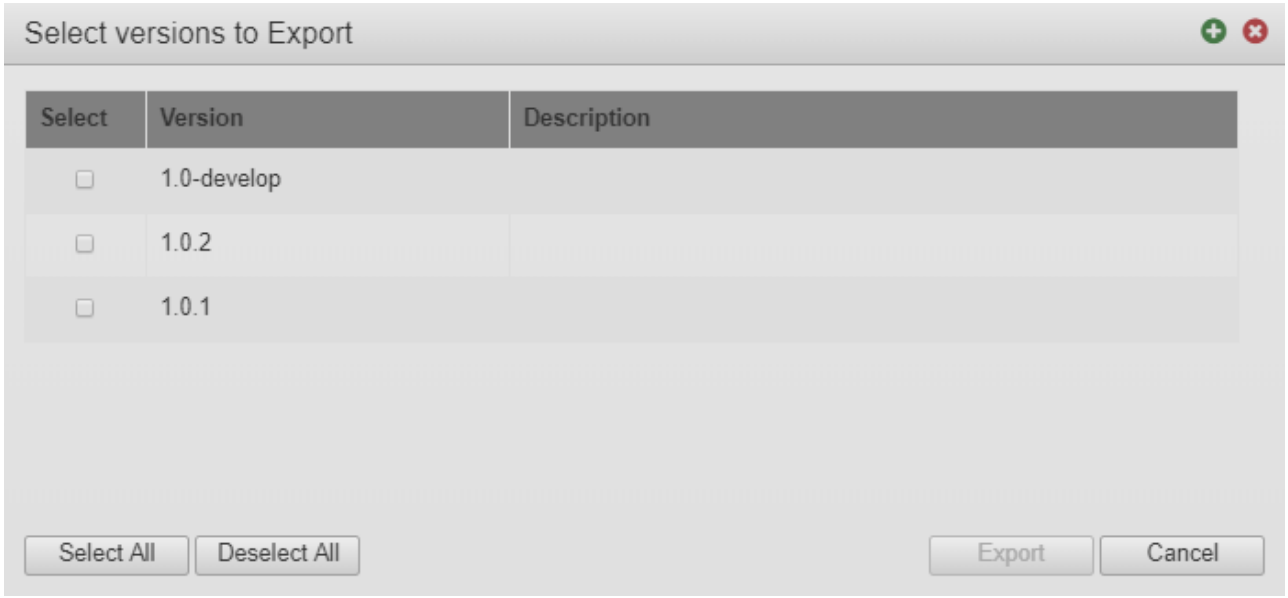
Since 17.10, the Temenos Journey Manager platform follows open source semantic versioning conventions. Following this convention, all new form version names are recommended to start at version 1.0-develop until they reach production. In versions of Maestro prior to 17.10, form versions are incremented by whole numbers (for example version 1, version 2, version 3, etc.).

To export a single or multiple form versions of the same form:

1. Select the form from the Navigator pane.
2. Click Export Versions.



3. Select the versions you want to export. You can select one or more versions to include in the export. You can also use the Select All option to select all versions of the form.



4. Click Export. The selected form versions will be packaged into a single zip file and the zip file will be downloaded to your computer.

Next, learn how to import a form.

Nominate the Current Form Version

The current form version is the form version that is rendered when the form is requested by the user. When there is only one form version, that version is considered the current form version.

Nominating the current form version can be done through the Manager's Form Dashboard tab.

To nominate the current Form Version of your form, select your form and then:

1. Select the Form Versions tab.

   The current Form Version is the one that is listed with a tick in Current Version column of the table.

   To nominate a different form version to be the current form version:

2. Click **Make Current link** next to the newly nominated current form version.

   This may also be done in the same way from the Form Dashboard tab in the Form Versions section.

NOTE

When a form has been configured for A/B Testing, it is now in the control of the A/B Testing regime instead of the current version. Only on A/B Testing completion, will the current version be enforced.

Open an Earlier Version of a Maestro Form

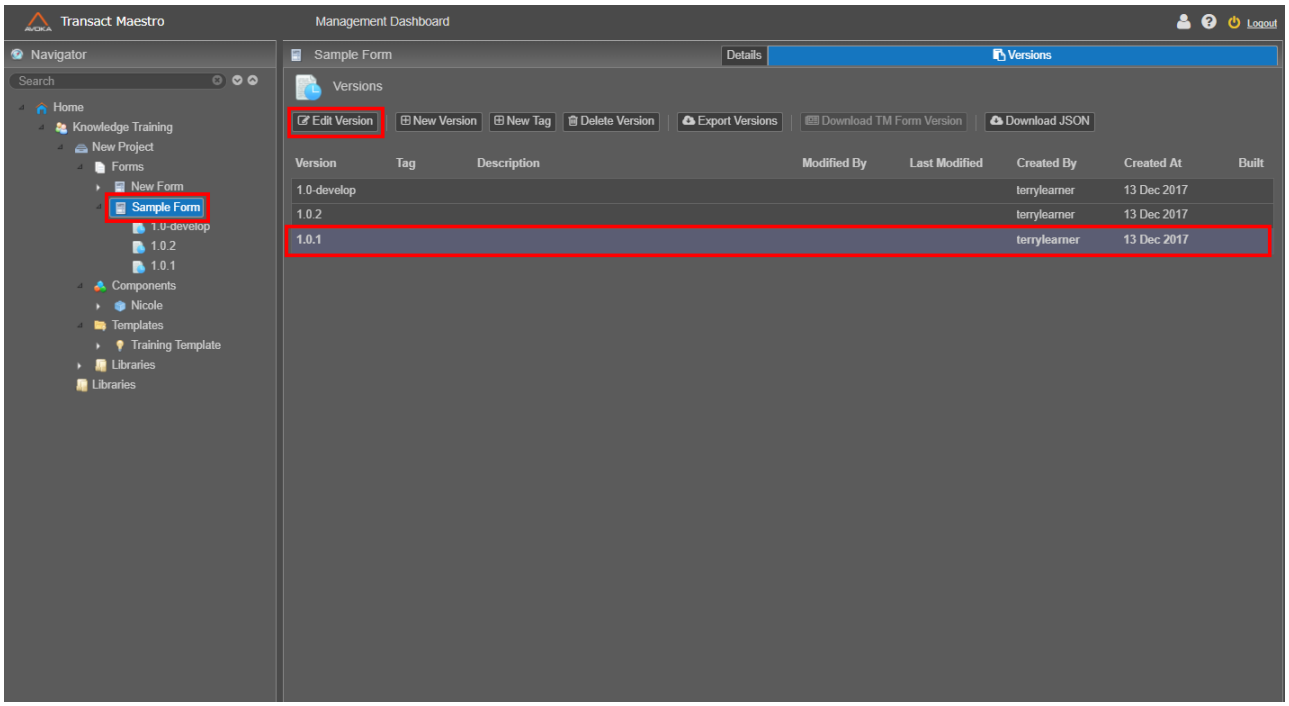
When you open a form version from the Maestro dashboard, the latest version of the form will be opened. Though this is normally what you want to do, sometimes you may want to open a previous version of the form. After a previous version of the form has been selected and edited, you can choose to set it as the current version of the form.

Since 17.10, the Temenos Journey Manager platform follows open source semantic versioning conventions. Following this convention, all new form version names are recommended to start at version 1.0-develop until they reach production. In versions of Maestro prior to 17.10, form versions are incremented by whole numbers (for example version 1, version 2, version 3, etc.).

There are two methods available to open an earlier version of a form in Maestro.

Method 1

1. Select a form from the Navigator pane.
2. Select a form version.
3. Click Edit Version.



Method 2

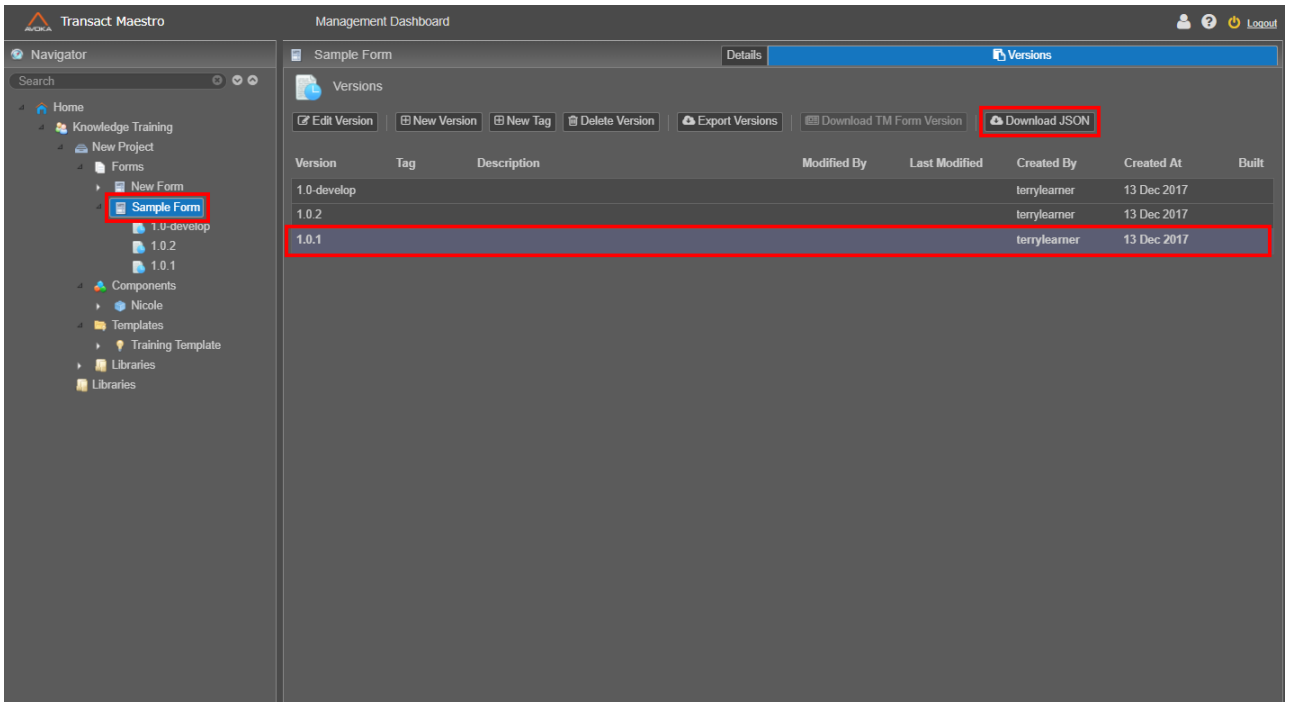
Expand the form in the Navigator pane, select the form version that you want to open, and click Edit.

Compare Form Versions

If you have multiple versions of a form, you can download the JSON[1] file of each version, and use an external tool to compare the differences between the downloaded form versions. There are two methods of downloading the JSON file of a form version.

Method 1

1. Select the form from the Navigator pane.
2. Select a form version.
3. Click Download JSON.



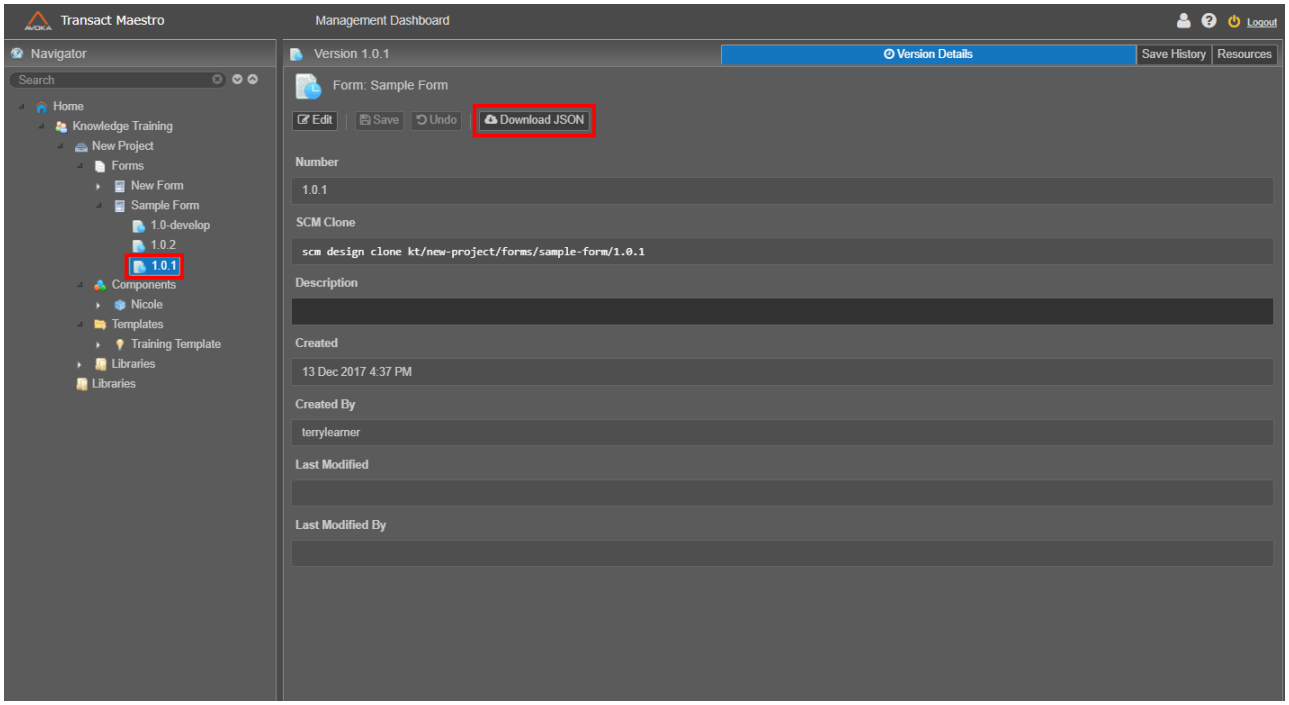
4. Select a different version from the list and download its JSON file.
5. Using an external tool, you can then compare the differences between the two downloaded JSON files.

Method 2

1. Select a form version from the Navigator pane
2. Click Download JSON.

---

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.



3. Select a different version from the list and download its JSON file.
4. Using an external tool, you can then compare the differences between the two downloaded JSON files.

Tagged (locked version) Form Version Overview

A tagged version of a form is a read-only form version that prevents any changes from being saved to the form. A tagged version is an effective way of keeping a clean, final record of a form. It is recommended that you create a tagged version each time a form is deployed to an environment. For instance, while you are developing a form, you should be using the "1.0-develop" form version; once this version of the form is ready for production and deployment to an environment, it is time to create a tagged version of the form. Once a new tagged version of a form has been created, it is possible to create new form versions based on a tagged version.

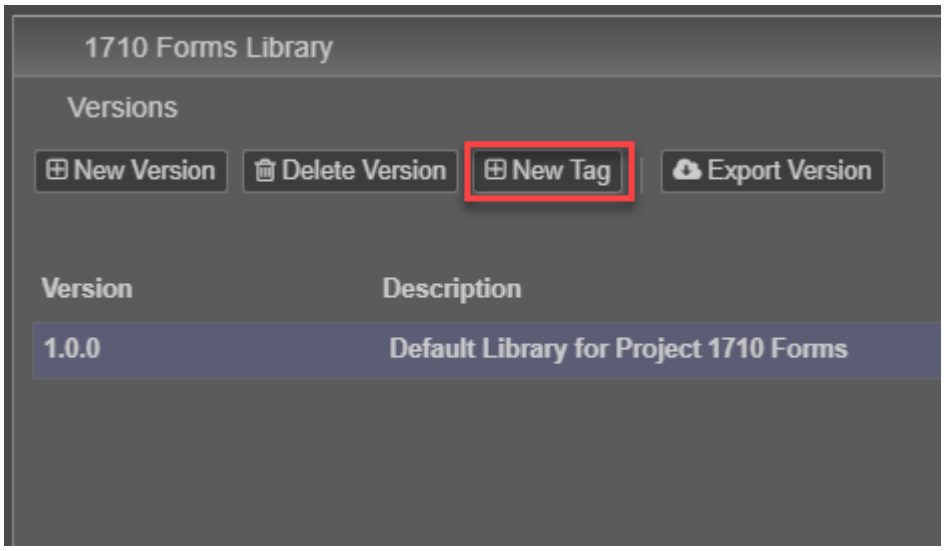
Since 17.10, the Temenos Journey Manager platform follows open source semantic versioning conventions. Following this convention, all new form version names are recommended to start at version 1.0-develop until they reach production. In versions of Maestro prior to 17.10, form versions are incremented by whole numbers (for example version 1, version 2, version 3, etc.).

Create A Tagged Version of a Form

Maestro allows you to tag a form version.

To create a tagged version of a form:

1. Select the form from the Navigator on the Dashboard.
2. Click New Tag.



3. Complete the options in the New Tag window.
4. Select which version of the form you want the tagged version to be based on from the Based On Version dropdown list.
5. Enter a version number for the tagged version in the New Version field.
6. Click Create.

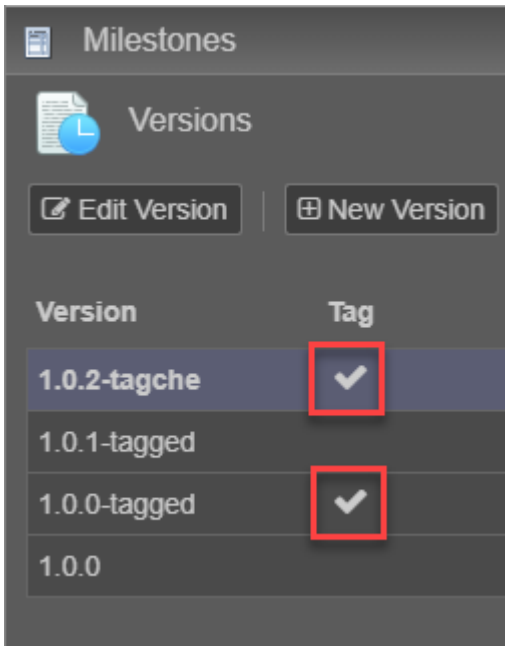
From the Versions list, you can see a check mark in the column next to the tagged version. If you open the tagged version in the Maestro Editor, you can see the read-only text at the top of the form. In the read-only version, you notice that you are not able to add new components to the form, and there is no option to save any changes you make.

Once you have created a tagged version of a form, you may need to create a new version of the form based on the tagged version.

Create a New Form Version based on a Tagged Version

To create a new form version based on a tagged version:

1. Navigate to the Forms folder within the project.
2. Select a form to view the existing versions (you can also expand a form from the Navigator pane to see all form versions). If the form contains any tagged versions, each tagged version will be identified by a check mark.



3. Select a Tagged Version (in the above screenshot, the tagged version "1.0.2-tagche" has been selected).
4. Click New Version.
5. Complete the Add a New Version dialog.
6. Select a previous form version that you want the new version based on from the Based On Version dropdown list. By selecting the tagged version "1.0.2-tagche" before clicking New Version, this will be the form version that the new form version will be based on.



7. Enter the version number you want to use in the New Version field. You can also include a suffix that contains numbers and letters. When creating a new version, the third (the patch) part of the version number will be incremented by one to the previous version of the form. Since you are creating a new version of the form based on a tagged version, it may be appropriate to increment the first (major) part of the version number by one. Ffor example, version 1.0.2-tagche will become 2.0.0- develop.



8. Enter a description text to help organize the different versions of a form in the Description field.
9. Click Create.

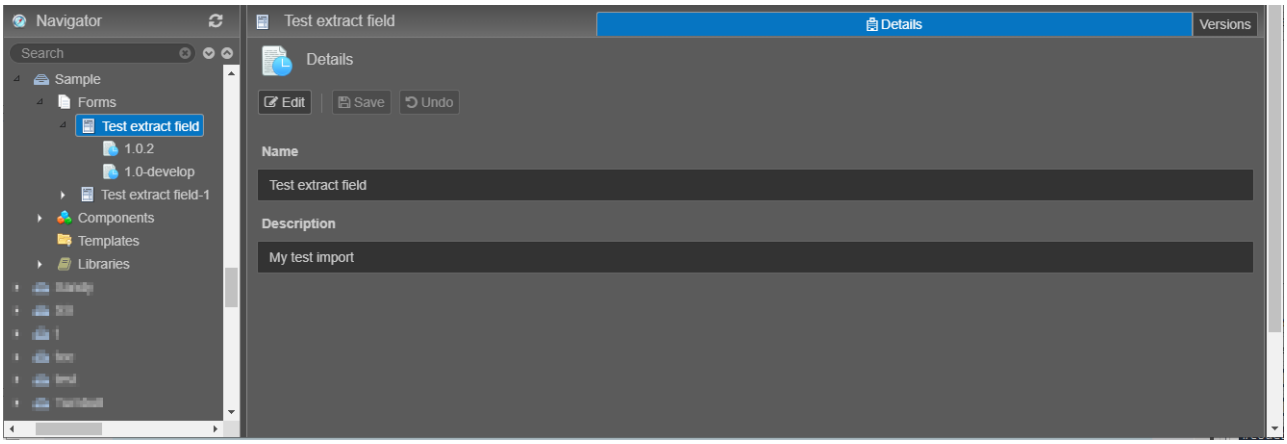
The new form version will be created, and its details displayed in the Maestro Dashboard. You will also see the new version listed under the form in the Navigator panel. Even though the new form version is based on a tagged version,you can edit it because it wasn't created as a tagged version. You can edit the new form version in the usual ways; for example, select the new form version in the Navigator and click Edit to open it in the Maestro editor.

Change a Maestro Form Version Description

Journey Maestro allows you to change a description of a form version, which you may need to do after you have created a new form version. You can also change a form's description at any time after the form is created.

To change a form version's description:

1. Open Maestro and locate a form version to see its current description.
2. Click the version directly in the Navigator pane. Or, select the form in the Navigator pane and then double-click the form version in the Version pane.



3. Update a form version's description in the Description field.
4. Click Save to update the changes.

Next, learn how to open a Maestro form.

Maestro Form User Experience

Maestro forms are highly configurable, which means you build forms to satisfy desired user experience as per your organization's requirements. There are several patterns and best practices, which we listed below, that you can incorporate into forms to create great user experiences.

Load a form

When an applicant loads a form, what they see is determined by the Template Designer and Form Builder. They might be immediately presented with form fields to complete, or if the applicant needs certain things to complete the form (such as identification or proof of income), they might be presented with a landing page that describes these requirements.

Forms are published as single-page AngularJS applications, which means the entire forms are loaded up-front. This impacts the initial load time, but the user won't have to wait between page transitions once the form is loaded.

> NOTE
>
> To improve the initial load time of a form, enable Static Content Externalization.

Data is prefilled

Data prefilling is the process of automatically inserting applicant data into a form, such as their name or email address, thereby reducing the amount of effort required by the customer to complete the form.

For example, if the applicant is authenticated, many of their details can be pulled in via a HTTP request. Even if an applicant is not authenticated though, details such as their latitude and longitude can be retrieved (with their permission). This is possible with the `Util.getGeoLocation()` method:

```
Util.getGeoLocation().then(function(result) {
       console.log("Latitude: " + result.latitude);
       console.log("Longitude: " + result.longitude);
});
```

Prefilling streamlines the user experience and can significantly reduce the abandonment rate of a form. For more information, see Form Prefill Options.

Enter data into fields

The applicant spends most of their time in this part of the process, entering data into fields and ensuring they meet whatever requirements the Form Builder has configured. Typically, applicants can expect to see:

- A range of different field types, such as text fields, date pickers, and dropdowns.
- Errors when invalid data is entered into a field (or when required data is missing).
- Fields spread across multiple pages and organized into logical sections.

When more advanced functionality is required, users may also interact with third-party services. Many of these services can be integrated with Maestro by using pre-built Exchange packages.

Save and resume

When a form is opened, a tracking code is created. This code allows applicants to complete forms across multiple sessions, which is useful for long forms or forms that have complex requirements. The typical implementation is for applicants to answer a security question when saving the form. This answer can then be paired with the tracking code to re-open the form at a later time.

To learn how to implement a save and resume feature, refer to Create a Save Challenge.

5. Submit the form

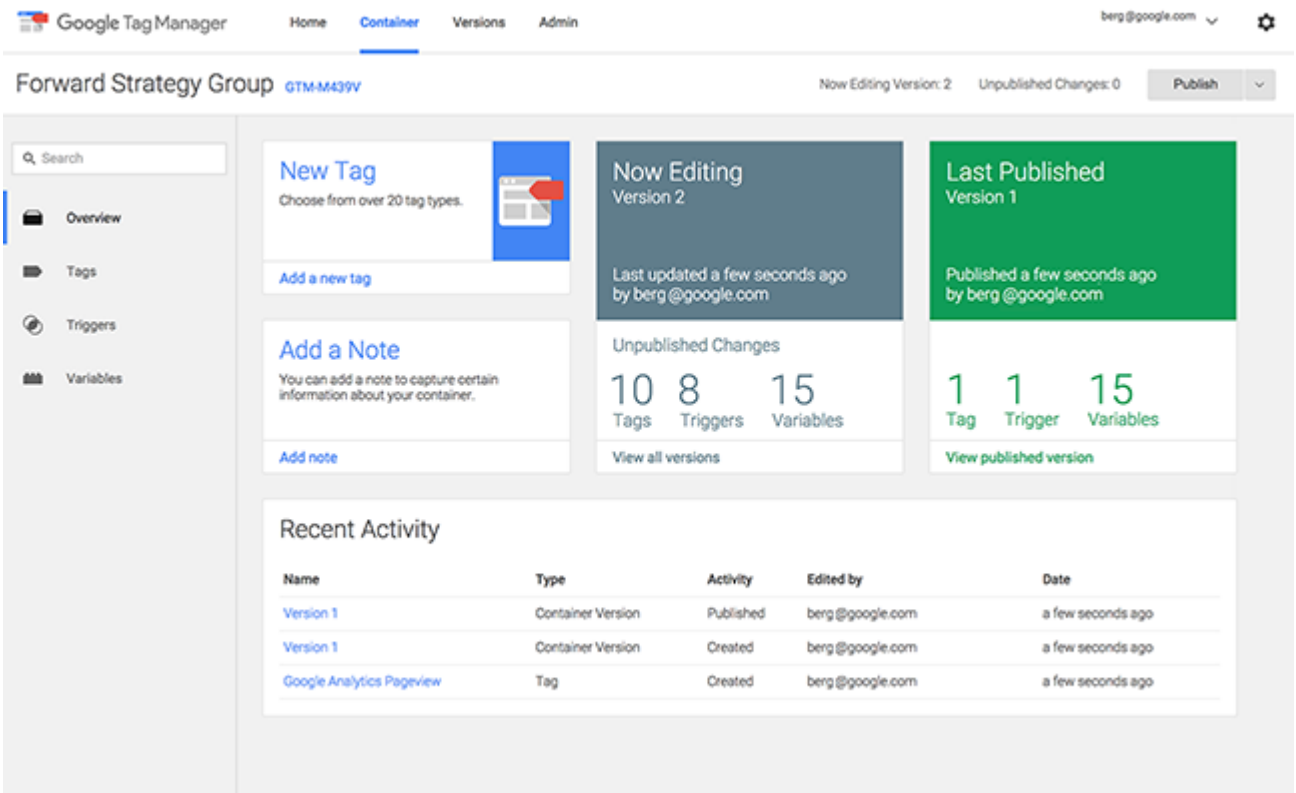
When an applicant submits a Maestro form, they are usually presented with a page that confirms their data has been submitted. This page is often implemented as a Modal Page component, rather than a regular Page component. This prevents the final page from automatically appearing in the navigation menu. If further steps are required by the user, or if some form of approval is required before the applicant can proceed to the next step, this page is an ideal place to explain to the applicant the next step of the process.

Upon submission, Maestro sends the form data to Manager. Once there, a wide range of actions can be performed using the data. For example, Manager can send a confirmation email to the form user about their submission, generate a PDF receipt, or trigger a collaboration job. Other functionality can be implemented via services or Groovy scripts. Some functionality is enabled by default, such as logging and purging of personally identifiable information (PII).

Add Google Tag Manager to a Maestro Form

When you create an onboarding web application forms using Maestro, a Maestro form has a single-page architecture, that is all the content exists in a single rendered HTML page, but the user navigation flow is controlled through hide and show logic of different sections, also known as logical form pages.

Google Tag Manager (GTM) lets you launch new tags easily so you can have good control over your digital marketing and analytics software.

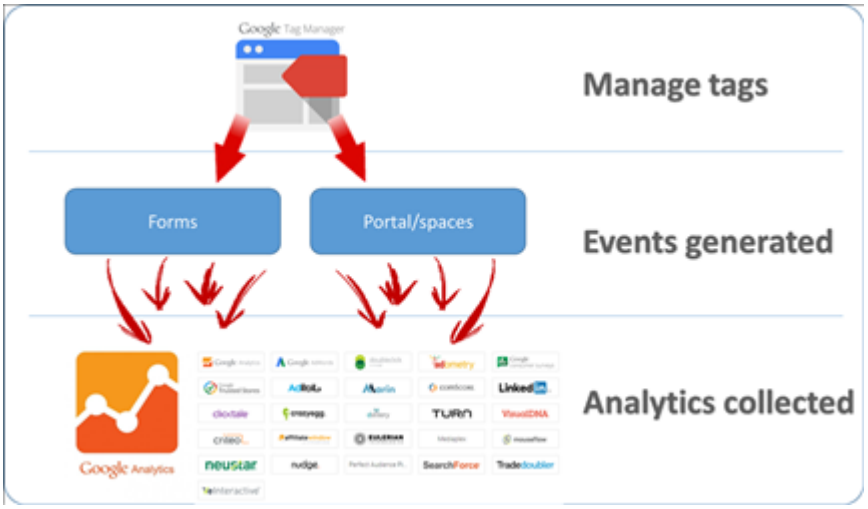


Whilst providing a better user experience, any standard Google Tag Manager (GTM)[1] configurations that utilize page views to track web-site traffic will stop tracking the user movement once the form is opened meaning none of the in-form navigation will be tracked.

To go around this constrain, you must correctly configure GTM in a Maestro form that enables virtual navigation events to be tracked for user navigation, which is described below. Additionally,

[1]Google Tag Manager (GTM) is a tag management system (TMS) that allows you to quickly and easily update tracking codes and related code fragments collectively known as tags on your web-site or mobile app.

you need to understand what events will be created in GTM as a user navigates through a live Maestro form, and how they can be captured in tags to generate analytics data.



NOTE

There is a pre-built GTM container for the Google Analytics framework that can be used as an example, or even in a production environment, if you decide to go with Google Analytics. Alternatively, we recommend using our Journey Analytics product, which is fully integrated with Maestro forms.

To enable a Maestro form to send virtual navigation events, you need to:

1. Import a GTM widget library into Maestro. You do it once per each Organization.
2. Add the GTM widget to the relevant form in Maestro. You do it once per form.
3. Connect the form to GTM in Manager. You do it once per form per Manager instance.

Let's look at each step in details.

Import the Library into Maestro

NOTE

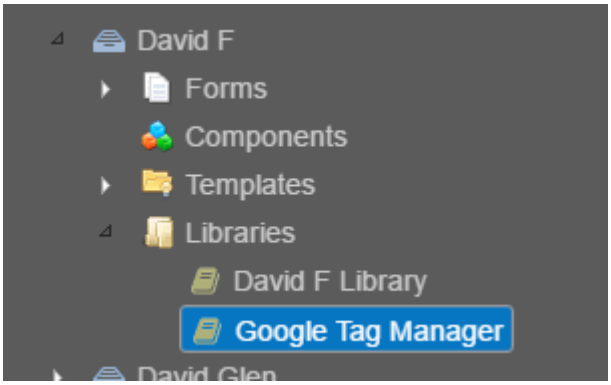
The GTM library is not part of the Maestro standard widgets, so you may need to develop it yourself or request the Client Services team to provide you with one.

The GTM widget is a default implementation of a connector between any Maestro form and Google Analytics, via Google Tag Manager. The main purpose of having the connector that goes via GTM, instead of using GA directly as the core product can do, is to enable customers (or pro-

ject teams) to take the GTM solution and adapt it, if needed, to integrate into other Analytics engines, or use it as a starting point to gather more fine grained information.

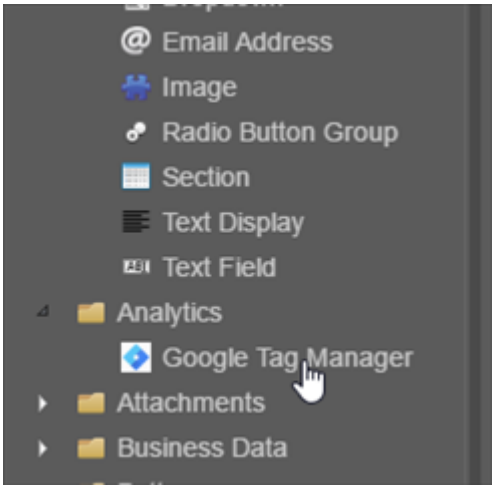
To import the widget:

1. Log into Maestro.
2. Import a GTM library into Maestro.
3. Check that Google Tag Manager entry appeared in the Libraries folder, as shown below.

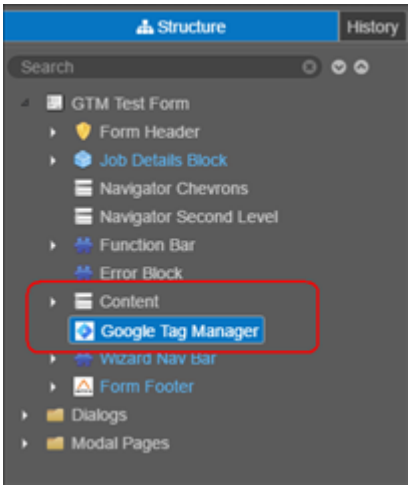


Add the GTM Widget to a Form

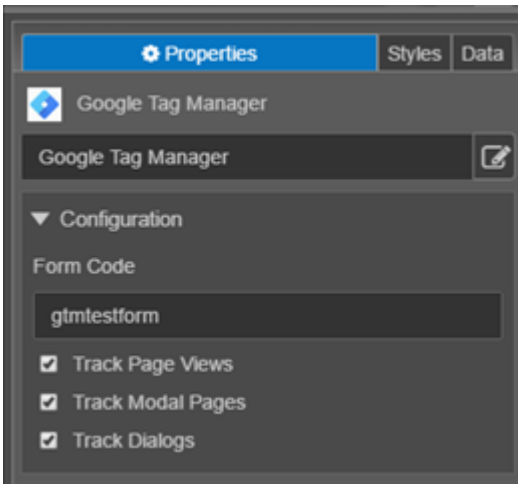
1. Create a new form or open an already existing form.
2. In the palette on the left-side of the screen, locate the Analytics folder, and the Google Tag Manager widget inside.



3. Drag this Google Tag Manager widget to the top level of the form in the structure panel. It is recommended to place it immediately after the Content element in the structure panel.



4. With the Google Tag Manager element selected in the Structure panel, expand the Configuration menu in the Properties panel.



5. Provide an unique form identifier in the Form Code field, which is passed to GTM to identify this form as separate to any other forms using the same GTM container. Alternatively, you may leave this field blank, so the default `form-code` assigned by Manager will be used.
6. Select the Track Page Views checkbox so section-level navigation will be sent to GTM as page change events. This is selected by default.
7. Select the Track Modal Pages checkbox so any modal pages, such as Submission confirmation page, Saved confirmation page or any custom modal windows, will be sent to GTM as page change events. This is selected by default.
8. Select the Track Dialogs checkbox so the opening of a dialog, such as Save challenge dialog, Are you sure dialogs, or any other custom dialogs, will be sent to GTM as a page change event. This is selected by default.
9. Click Save and then build and publish the form.

Configure Manager to Enable Analytics

As mentioned before, a Maestro form is built using a single-page architecture, where all of the content added to the form in the Maestro tool is rendered in a single HTML page. However, the actual form content only forms part of the user-experience picture.

Landing pages, Save and Resume pages, Attachments pages and Submission Complete pages that may be presented to the user before or after they have filled in the form. These pages are also critical to deriving useful data from an analytics engine, and therefore need to be included in the GTM implementation.

Manager maintains global versions of these pages that are used by all forms by default, so it becomes important to be able to identify which form the page has been opened for. For the most part this can be achieved by using the formCode URL request parameter that is required to open the form, however for some of the post-form pages, such as Submission Complete, Attachments, Save Confirmation, this parameter is not provided. In these cases GTM has been setup to look for a form code within the HTML of the page that's been rendered, by finding a hidden element with the id of `submission_formCode`. The pages do not automatically include this hidden element, so you need to add it manually.

To add the HTML element to a form:

1. Log into Manager.
2. Select System > Form Spaces.
3. Find the form space that contains the form you would like to add GTM capability to, and click on the name of the space.
4. Find the page to be updated, and click Edit.
5. Select the Pages tab.

   NOTE

   You need the Portal Edit permission to be able to edit the page.

6. Place the following HTML code inside the page content. The location is not critical:

```
<input type="hidden" name="formCode" id="submission_formCode" value-
e="$form.formCode"/>
```

NOTE

Do not put this code inside any conditional logic that has the markup such as `#if ($session.emailed)`.

7. Click Save.
8. Repeat the same updates to the all pages that need to be tracked.

Connect the Form to GTM in Manager

You need to configure a form in Manager with the correct GTM container configuration, including a JavaScript.

To add the GTM container script to the form:

1. Select Forms -> Forms and locate a form you want to track.
2. Click Edit and select the Page Tracking tab to enable page tracking.
3. Select the Use Form Page Tracking checkbox.
4. Select the Inside HEAD in the Page Script Include Position dropdown list. Keep the Tracking Script Template blank.
5. Paste the GTM script in the Form Page Tracking Script text field to enable tracking of the form.

   NOTE

   You can find the GTM script from your Google Tag Manager account by selecting Admin > Install Google Tag Manager. For more information, see how to set up and install Tag Manager.

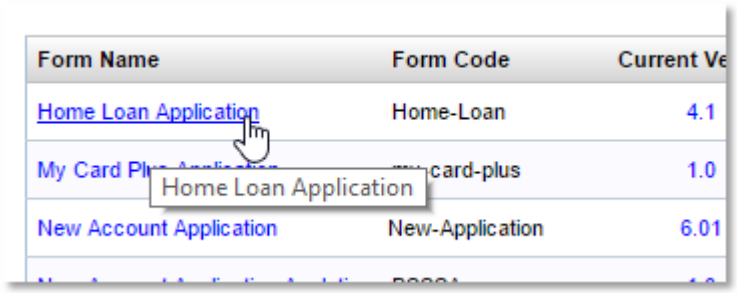
6. Click Save to update the changes.

Additional Forms Pages

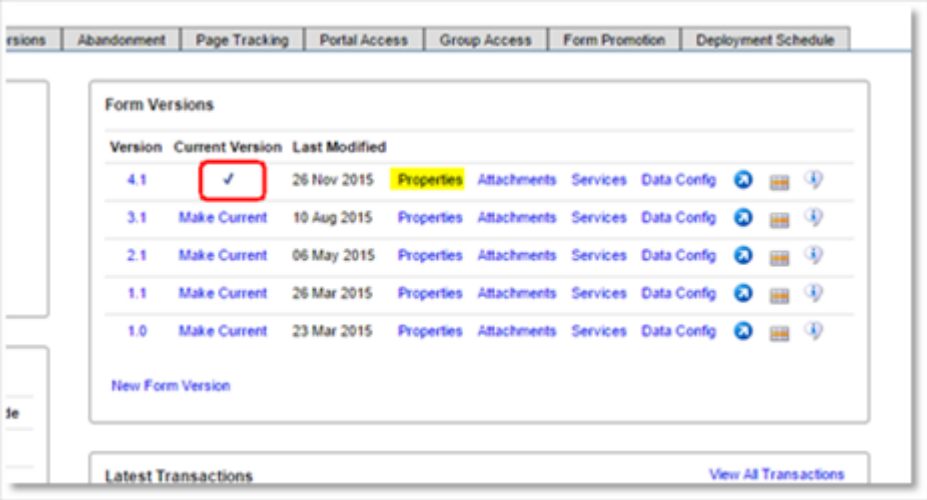
Manager has the ability for a form to maintain its own version of these pages - so that different content may be displayed to the user for a particular form. However, this setup is optional, and if not configured, the default pages referred above are used.

Every time a form is being enabled for GTM it is therefore necessary to check whether any custom pages have been configured, and to edit these.

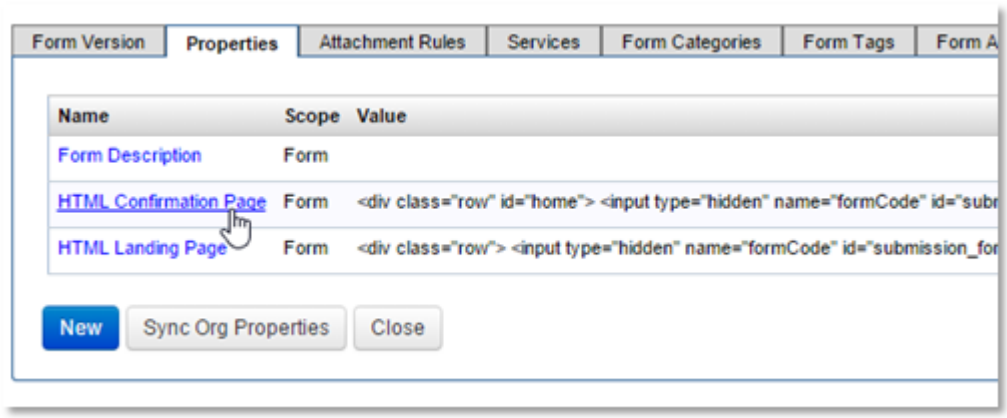
1. Select Forms -> Forms and Locate the relevant form and click on the name entry.



2. In the Form Versions box, locate the version that is ticked as the default, and click on the Properties link for that version



3. In the list of properties, if you see an entry for any of the relevant pages, they will need to be edited. The list of possible entries that will require editing are:
    - HTML Confirmation Page
    - HTML Saved Page
4. If present, click on the name of the relevant property



5. Place the following html inside the page content. The location is not critical, but ensure it is not inside any conditional logic (with markup such as `#if ($session.emailed)`:

```
<input type="hidden" name="formCode" id="submission_formCode" value-
e="$form.formCode"/>
```

6. Click Save.

Content Security Policy (CSP) Settings

GTM, by its very nature, relies on the use of third party JavaScripts, so you must adjust the Content Security Policy (CSP)[1] at the organization level in Manager. This needs to be done for every organization that contains forms using GTM.

To configure CSP:

1. Open your organization security configuration.
2. Select the Override System Default checkbox.
3. Add the following policy values in the Organization CSP Header field:
   - `'unsafe-eval'`
   - `'unsafe-inline'`
   - `tagmanager.google.com`
   - `www.googletagmanager.com`
   - `www.google-analytics.com` - it is required if you use Google Analytics with GTM

   For example, CSP Header might look like this: `script-src 'self' 'unsafe-inline' 'unsafe-eval' www.googletagmanager.com tagmanager.google.com; object-src 'none'`.
4. Click Save.

This configuration will allow the form to connect to GTM. However, depending on the GTM implementation, there may also be additional CSP adjustments. For example, if the GTM container is

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[1]Content Security Policy (CSP) is a computer security standard introduced to prevent cross-site scripting (XSS), clickjacking and other code injection attacks resulting from execution of malicious content in the trusted web page context. CSP provides a standard method for website owners to declare approved origins of content that browsers should be allowed to load on that website—covered types are JavaScript, CSS, HTML frames, web workers, fonts, images, embeddable objects such as Java applets, ActiveX, audio and video files, and other HTML5 features. For more information, see https://www.w3.org/TR/CSP/

to send data to Google Analytics, then the host name of the GA server (www.google-analytics.com) will be also required. Similarly, if we use any other server-send data (like for GA), we will need to add host name of that particular server.

Configure a GTM account

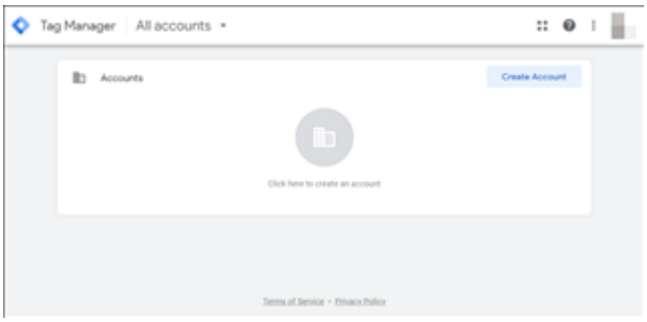
Once you have done all the steps above, the form will begin sending events to GTM when users open and navigate it. At this point, the GTM administrator needs to create their own container to use these events and send information to their chosen analytics engine. For more information, see which events are created, and what other relevant information is set in the data layer for these events.

Alternatively, Temenos has created a GTM container that is pre-configured to listen for these events, and act accordingly. By default, this container sends a page-view to Google Analytics, but could easily be adapted for other analytics engines.

You need a GTM account to use Google Analytics and Google account is mandatory to use GTM

To create a GTM account:

1. Go to https://tagmanager.google.com/
2. Click Create Account if you do not already have a Google account, otherwise, log in to your Google account, so you can access the GTM home page.
3. Click Create Account to create a Tag Manager account.



For more information, watch https://youtu.be/P4suvDuj0kI.

Import the Maestro GTM Container

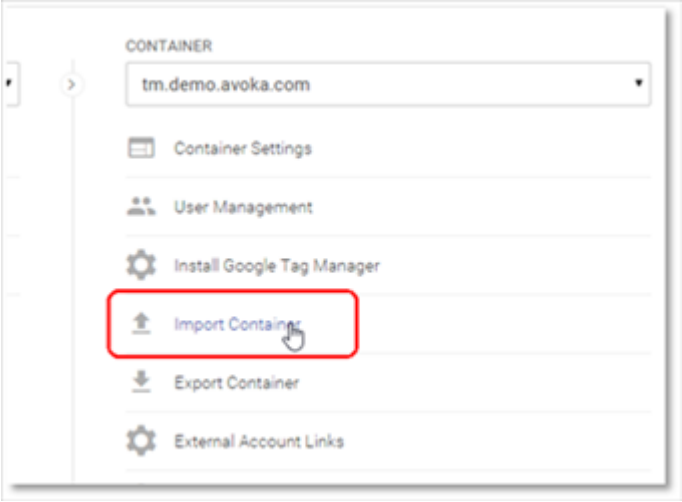
The Maestro GTM Container is designed to run in isolation – the tags pre-configured within it will only produce page views for Maestro forms and their related pages. For this reason, it is safe to use either option for importing the container into GTM – either merge it into an existing container, or create a new one.

If you are choosing to merge it into an existing container, care should be taken that existing tags and triggers do not adversely affect the Maestro form pages. Additionally, if new tags are being created for Maestro forms, correct use of triggers should be maintained to ensure that the tags only fire in the correct places – not in other pages that may be connecting to the same GTM container.

> NOTE
>
> It is also recommended that if the GTM container for Composer forms has been or is still being used, then the Maestro container must be installed separately.

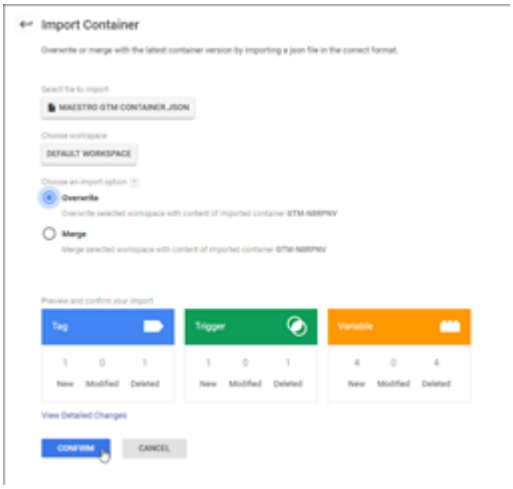
To import the GTM container:

1. Log in to GTM
2. Select the Accounts tab and choose a container to import into. You may need to create a new container if required.
3. Select the Admin tab and click Import Container in the Container section.



4. Under Select File to Import, select Choose Container File and navigate to the Maestro container file on your PC. You can also use the example of Maestro GTM container file.

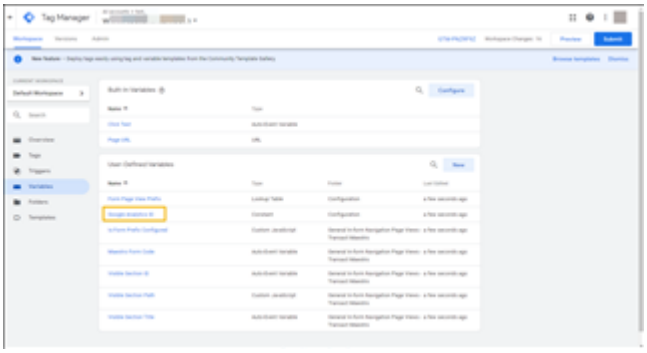
5. Select whether to use an existing Workspace or create a new one.



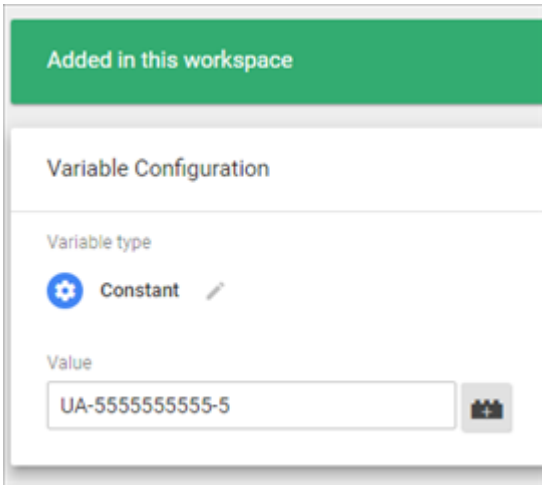
6. Select to either overwrite the existing container (for new containers only) or merge it.
7. Click Confirm.

Configure GTM to connect to Google Analytics

1. Select Container -> Variables > Google Analytics Id as a variable.



2. Enter the Google Analytics Tracking Id in the Value field.



3. Verify that page views are being sent to the correct Google Analytics account.

Specify the Virtual Page View URL Location

You also need to configure a meaningful URL location for each form page views that the down-stream analytics engine (GA) can use to correctly associate the views with a business process, as well as implementing Goals, Funnels, and so on.

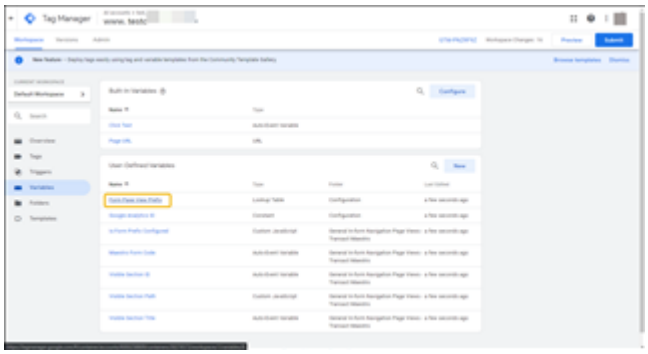
For example, if the form is a credit card application, then when the user navigates to the About You section of the form, rather than a page-view in GA on the location `/aboutyou/`, it could be more informative for it to be something like this: `/cards/credit/application/aboutyou/`.

For this reason, a look-up table has been provided in our pre-designed Maestro GTM that links the form code to a user-defined URL.

> NOTE
>
> It's important that this configuration is correct, otherwise, the form will never send page-views to Google Analytics.

To configure the virtual page view URL:

1. Select Workspace > Variables > Form Page View Prefix.

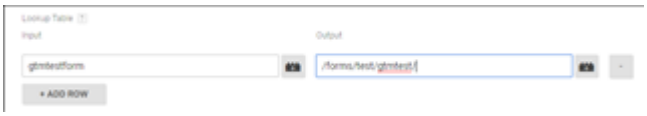


2. Click inside the Variable Configuration section to allow editing, and add a row to the Lookup Table.

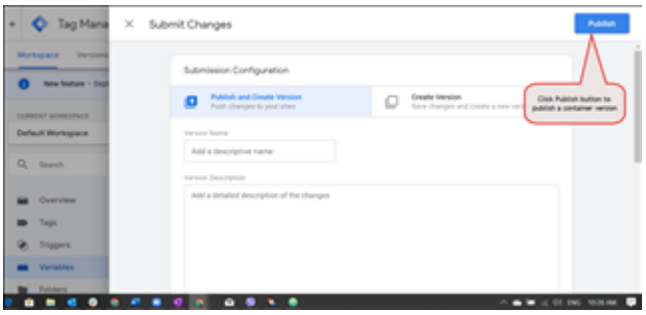


3. Type the form code In the Input field.

4. Enter the page view prefix in the Output field. This prefix will be used for all Page Views generated by this form, and is a unique path that will identify the form in the Analytics engine.

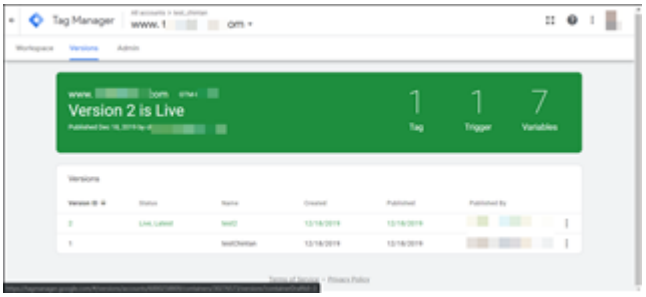


5. Click Save to save the variable.
6. Click Submit to apply the changes after all changes have been made.
7. Click Publish to publish the updated version of container. You also might need to create and publish a new version of a container.

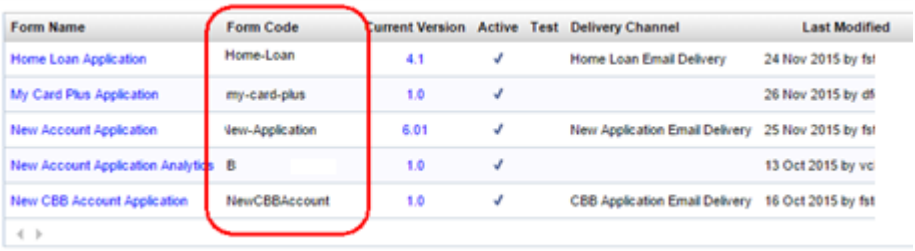


Once published, traffic on that form will generate the new page views, which will be sent to Google Analytics.

8. Select the Versions tab to see all published containers and all associated traffic from forms.



9. Log in to Manager and select Forms -> Forms to see the form codes for all published forms in that environment:



Now, you have completed all necessary GTM related configuration.

The following sections include some useful information for GTM administrators that may be wishing to maintain the container, or make changes going forward.

Navigate and Locate Items in GTM

A folder structure has been setup inside the container to group relevant items together. By navigating to the Folders section (in the left-hand menu structure) items can be located a little more easily. The folder structure consists of the following folders:

- Configuration - Maestro Page Views - contains variables that relate to the changeable configuration. In particular, the Form Page View Prefix variable that an administrator needs to edit to add or change a form's analytics settings is located here.
- General In-form Navigation Page Views - Maestro - contains Variables, Triggers and Tags that are involved in generating the page views for in-form navigation - such as registering to receive custom events when a user changes sections, as well as the variables that resolve the section name from the custom event, to be used in the page view Tag.
- Specific Page Views - Maestro - contains Variables, Triggers and Tags for the page views that are to be generated for all pages outside of the actual Maestro form - such as confirmation pages, attachments pages and landing pages.

In-form Page Views

To enable page views to be generated as a user navigates through the Maestro form, a few key GTM elements have been configured.

- Register Page Change Form Events (Tag)
  - Custom HTML tag type
  - Injects some JavaScript that utilizes the Maestro libraries to detect when a user has changed pages, and sends a custom event to GTM - the custom event contains information relating to which section has been opened.
  - Fires on Document Ready, but only in the `SmartForm.html` page, and if the form being viewed has been configured with a page view prefix.

- Section Level Page View (Tag)
  - Google Analytics (Universal) tag type
  - Actually creates the Google Analytics page view with the relevant prefix and section information
  - Fires on the custom `page.change` event that is generated by the user action

The other elements in this In-form Navigation folder in GTM are triggers and variables that support these two tags - mainly for extracting details from the generated custom event, as well as ensuring the page views only fire in relevant Maestro form pages.

Other Page Views

For all other page views, a fairly simple paradigm has been followed of a single Trigger and single Tag. It should be noted though that these items also rely on other existing Variables, but going forward it is unlikely that these supporting variables would need to change.

As an example, the Submission Complete page views are configured as follows (and the other pages follow the same

- Submission Complete Page Opened (Trigger)
  - Page View Trigger
  - Fires on DOM Ready
  - Checks that the Page URL contains `confirmation.htm` and that a form prefix has been configured for this form - which automatically ensures the page is a TM form confirmation page, and that the form has been set to use Google Analytics
- Submission Complete Page View (Tag)
  - Google Analytics (Universal) tag type
  - Uses the configured form prefix with a hard-coded page name - i.e. `{{Form Page View Prefix}}submission`
  - Fires on the Submission Complete Page Opened trigger

Next, learn how to Autocomplete Fields for Dynamic Data Services.

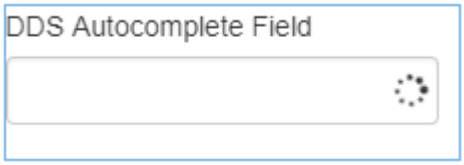
Autocomplete Fields for Dynamic Data Services

The Maestro Autocomplete Field Component is very flexible, and with that can come complexity. Especially as the Component is now compatible with the newer Transact Functions. We'll show here how to connect Autocomplete Fields to Dynamic Data Services.

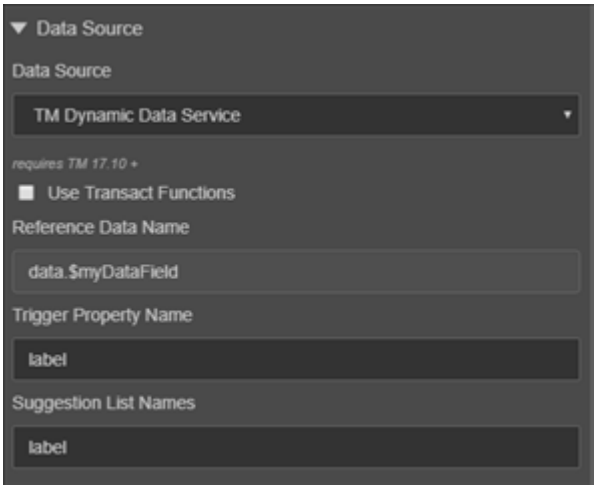
Maestro Component Properties

The Autocomplete Field Properties that we'll cover are separated into Data Source, and DDS Configuration. Second DDS Configuration will be reviewed later.

Obviously, you have to add an Autocomplete Field Component to your Form first.



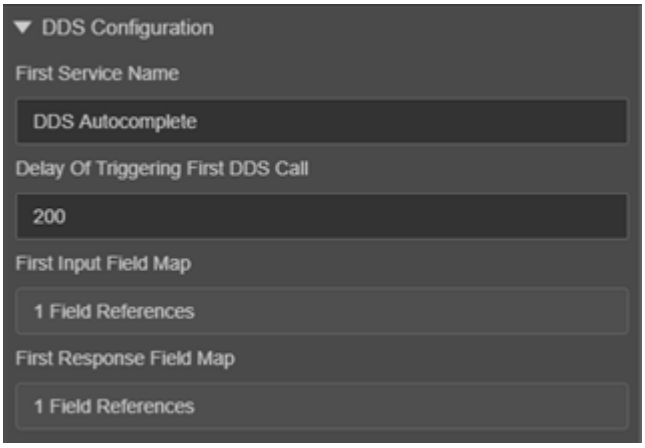
Then expand the Data Source panel on the Component Properties, shown below.



Set the Data Source dropdown to TM Dynamic Data Service, and then for this example set both the Trigger Property Name and the Suggestion List Names to "label". These names are used inside the Transact Dynamic Data Service.

Note: Do not check the "Use Transact Functions" checkbox! That is not compatible with Dynamic Data Services. How to use Transact Functions with Autocomplete Fields is a separate article.

Next, expand the DDS Configuration panel.



The first field is the name of the Transact Dynamic Data Service to be called - type that in. It must match the service name exactly.

Next, click the First Input Field Map control. Type the Key, our sample uses "searchString".



Then click in the Field Reference field, and double-click the Autocomplete Field in the tree on the left side of the dialog. This auto-populates the field data reference - you can type this manually if you like.

The First Response Field Map is set similarly, using "label" as the key.



Note that the response is being mapped back into the Autocomplete Field. In a single-DDS setup, the Autocomplete Field provides input to the DDS, and accepts the selected output!

Save, Build, and Deploy the form to Transact Manager. You should be able to open the form now, but of course the Autocomplete Field's DDS needs to be created.

For this article, a DDS was created that reads a list of animals from a Service Parameter, returning the ones that match what has been typed so far. The source is:

```
import com.avoka.tm.util.*
import com.avoka.tm.vo.*
import groovy.transform.TypeChecked
import groovy.json.JsonBuilder
import javax.servlet.http.*

@TypeChecked
class FluentDynamicData {

  // Injected at runtime
  public Logger logger

  /*
  * Perform Form Dynamic Data service call.
  *
  * returns: REST response text data
  */
  String invoke(SvcDef svcDef, Txn txn, HttpServletRequest request, User user) {
    String searchString = request.getParameter("searchString")
    logger.info "searchString == ${searchString}"
    String searchData = svcDef.paramsMap["searchData"];
    logger.info "searchData == ${searchData}"
    List searchList = searchData.tokenize(',')
    List baseResults = searchList.findAll { it.startsWith(searchString) }
    logger.info "baseResults == ${baseResults}"
    List results = []
    baseResults.each {
      results.push( ['label':it, 'data':it] )
    }
    logger.info results
    String data = new JsonBuilder(results).toString()
    return data
  }
}
```

The input into the service is the request parameter "searchString", which was mapped in the First Input Field Map on the DDS Configuration panel, shown above.

The output is the "results" object, which is a List containing maps with a "label" and a "data" elements. The "results" object is converted to JSON and sent back to the Form.

The use of "label" in the return from the service ties in to the use of "label" as the "Suggestion List Names" value in the Data Source panel shown above.

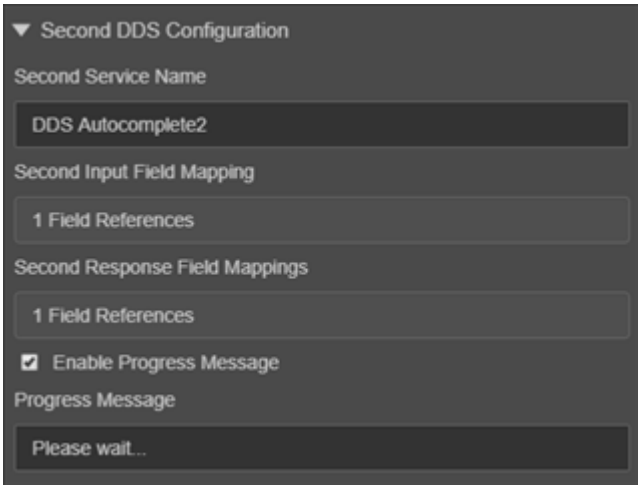
If you test the form now, it should populate with values from the service as you type.

Now, let's add the second DDS

The Autocomplete Field Component can be configured with a second DDS, which is called after the user makes a selection from the options and the output is delivered per the mappings configured. To use this functionality, add a Text Field to the Form.



Then open the Properties for the Autocomplete Field and update the Second DDS Configuration panel. Add a second service name, and use that name to create a new DDS on Transact Manager. Some sample code will be provided below.



The Second Input Field Mapping should be setup to look like the First Input Field Mapping.



The Second Response Field Mapping should be set to map the data keyed "label" to the new Text Field.

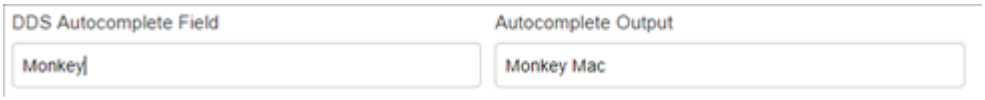


For this article, the second DDS, named "DDS Autocomplete2", uses another Service Parameter to find a name based on the first letter of the input "searchString". This creates a little alliteration to send back to the form.

```
import com.avoka.tm.util.*
import com.avoka.tm.vo.*
import groovy.transform.TypeChecked
import groovy.json.JsonBuilder
import javax.servlet.http.*

@TypeChecked
class FluentDynamicData {
  // Injected at runtime
  public Logger logger
  /*
  * Perform Form Dynamic Data service call.
  *
  * returns: REST response text data
  */
  String invoke(SvcDef svcDef, Txn txn, HttpServletRequest request, User user) {
  String searchString = request.getParameter("searchString")
   logger.info "searchString == ${searchString}"
   String searchData = svcDef.paramsMap["secondarySearchData"];
   logger.info "searchData == ${searchData}"
   List searchList = searchData.tokenize(',')
   List baseResults = searchList.findAll { it.startsWith(searchString[0]) }
   logger.info "baseResults == ${baseResults}"
   List results = []
   results.push( ["label":"${searchString} ${baseResults[0]}", "data":"${searchString}
${baseResults[0]}"] )
   logger.info results
   String data = new JsonBuilder(results).toString()
   return data
  }
}
```

Save and deploy everything, and the Autocomplete Field should repeatedly call the first DDS to find values that match the typed letters. When a returned value is selected, the second DDS is called and the return displayed in the Text Field.



The Service Parameter value used for `searchData` is:

```
Aard-
vark,Al-
batross,Al-
lig-
ator,Alpaca,Ant,Ar-
teat-
er,Ante-
lope,Ape,Ar-
madillo,B-
aboon,Badger-
,Bar-
racuda,Bat,Bear,Beaver-
,Bee,Bis-
on,Boar,But-
ter-
fly,Camel,Capy-
bara,Cari-
bou,Cas-
sowary,Cat,Cater-
pil-
lar,Cow,Chamois,Chee-
tah,Chick-
en,Chim-
pan-
zee,Chinchil-
la,Chough,Clam,Co-
bra,Cock-
roach,Cod,Cor-
mor-
ant,Coyote,Cr-
ab,Crane,Croc-
codile,Crow,Cur-
lew,Deer-
,Dino-
saur-
,Do-
g,Dog-
fish,Dol-
phin,Dor-
key,Dot-
```

```
terel,Dove,Dragor-
fly,Duck-
,Dugong,Dur-
lin,Eagle,Echid-
na,Eel,Eland,Elephant,Elk,Emu,Fal-
con-
,Fer-
ret,Finch,Fish,Flamin-
go,Fly,Fox,Frc-
g,Gaur,Gazelle,Ger-
bil,Gir-
affe,Gr-
at,Gnu,Goat,Goose,Goldfinch,Goldfish,Gorilla,Goshawk,Grasshopper,Grouse,Guanaco,Guinea
fowl,Guinea pig,Gull,Ham-
ster-
,Hare,Hawk,Hedge-
hog,Her-
on,Her-
ring,Hip-
popot-
amus,Hor-
net,Horse,Hum-
mingbird,Hyena,Ibex,Ibis,Jackal,Jaguar,Jay,Jellyfish,Kangaroo,Kingfisher,Koala,Komodo
Dragon,Kooka-
bur-
a,Kouprey,Ku-
du,Lap-
wing,Lark,Lemur,Lec-
pard,Lion,Llama,Lob-
ster-
,Lc-
cust,Lor-
is,Louse,Lyre-
bird,Mag-
pie,Mal-
lard,Manatee,Mandrill,Mantis,Marten,Meerkat,Mink,Mole,Mor-
goose,Mor-
key,Moose,Mouse,Mos-
quito,Mule,Nar-
whal,Newt,Nightir-
```

```
gale,Octopus,Okapi,C-
pos-
sum,Oryx,Ostrich,Ot-
ter-
,Owl,Ox,Oyster,Panther,Parrot,Partridge,Peafowl,Pelican,Penguin,Pheasant,Pig,Pigeon,Polar
Bear,Pony,Porcupine,Porpoise,Prairie Dog,Quail,Quelea,Quet-
zal,Rabbit,Raccoon,Rail,Ram,Rat,Raven,Red Panda,Reindeer-
,Rhinoceros,Rook,Salamander,Salmon,Sand Dollar,Sandpiper,Sardine,Scorpion,Sea Lion,Sea
Urch-
in,Seahorse,Seal,Shark,Sheep-
,Shrew,Skunk,S-
nail,Snake,S-
par-
row,Spider-
,Spoor-
bill,Squid,S-
quir-
rel,Starling,St-
ingray,Stink-
bug,St-
ork,Swal-
low,Swan,Ta-
pir,Tar-
sier,Termite,Tiger,Toad,Trout,Turkey,Turtle,Viper,Vulture,Wallaby,Walrus,Wasp,Water
Buffalo,Weasel,Whale,Wolf,Wolverine,Wombat,Woodcock,Woodpecker,Worm,Wren,Yak,Zebra
```

And the Service Parameter value used for `secondarySearchData` is:

```
Abby,Ace,Al-
lie,Ar-
gel,Ar-
nie,A-
pol-
lo,Archie,Ather-
a,Ava,Baby,Bailey,Bailey,Bandit,Baxter,Bear,Beau,Bella,Belle,Benji,Benny,Bentley,
Blue,Bo,Bonnie,Boomer,Brady,Brody,Bruce,Bruno,Brutus,Buddy,Buster,Cali,Callie,Cash,
Chance,Charlie,Charlie,Chase,Chester,Chewy,Chico,Chloe,Cleo,Coco,Coco,Cody,Cookie,
Cooper,Copper,Daisy,Dakota,Delilah,Dexter,Diesel,Dixie,Duke,Ella,Ellie,Emma,
Finn,Fiona,Frankie,George,Georgia,Gigi,Ginger,Gizmo,Grace,Gracie,Gunner,Gus,
Hank,Harley,Harley,Harper,Hazel,Heidi,Henry,Holly,Honey,Hunter,Ivy,Izzy,Jack,
Jackson,Jake,Jasmine,Jasper,Jax,Joey,Josie,King,Kobe,Koda,Kona,Lacey,Lady,Layla,
Leia,Leo,Lexi,Lilly,Lily,Loki,Lola,Louie,Lucky,Lucy,Luke,Lulu,Luna,Mac,Macy,Maddie,
Panut,Peanut,Pearl,Penelope,Penny,Pepper,Phoebe,Piper,Poppy,Prince,Princess,Ranger,
Remi,Rex,Riley,Riley,Rocco,Rocky,Romeo,Roscoe,Rosie,Roxie,Roxy,Ruby,Rudy,Rusty,
Sadie,Sam,Sammy,Samson,Sandy,Sasha,Scout,Scout,Shadow,Shadow,Shelby,Simba,Sophie,
Stella,Sugar,Tank,Teddy,Theo,Thor,Toby,Trixie,Tucker,Tyson,Willow,Winnie,Winston,
Xena,Zeke,Zeus,Ziggy,Zoe,Zoey
```

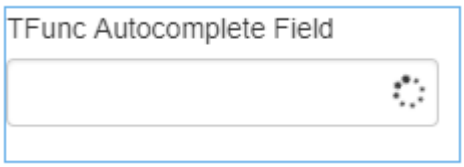
Autocomplete Fields for Transact Functions

The Maestro Autocomplete Field Component is very flexible, and with that can come complexity. Especially as the Component is now compatible with the newer Transact Functions. We'll show here how to connect Autocomplete Fields to a Form Function-triggered Transact Function.

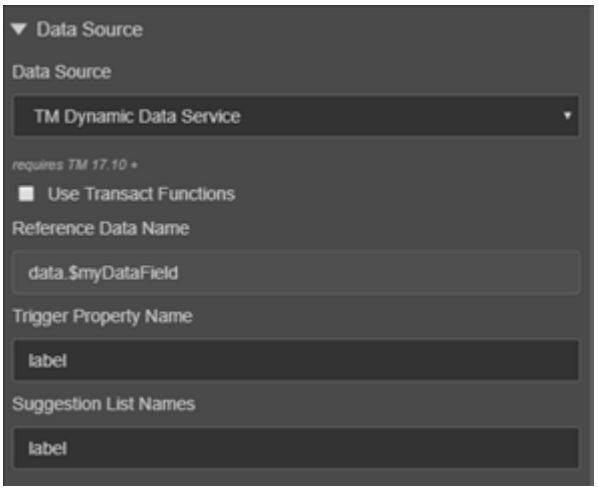
Maestro Component Properties

The Autocomplete Field Properties that we'll cover are separated into Data Source, and DDS Configuration. Second DDS Configuration will be reviewed later.

Obviously, you have to add an Autocomplete Field Component to your Form first!

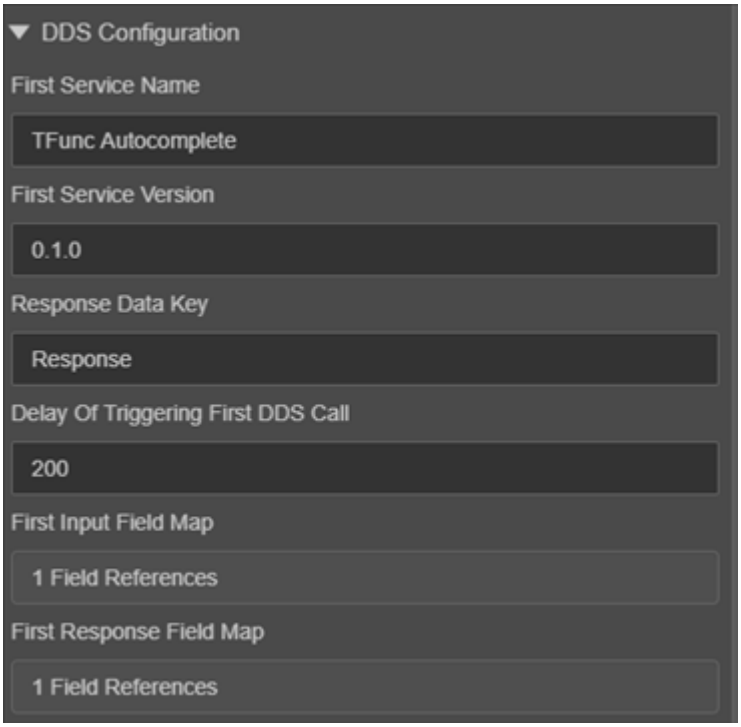


Then expand the Data Source panel on the Component Properties, shown below.



Set the Data Source dropdown to TM Dynamic Data Service. That seems counter-intuitive, but the other option, Reference Data, does not call any service. To make use of a Transact Function rather than a legacy Dynamic Data Service, check the box for "Use Transact Functions". For this example also set both the Trigger Property Name and the Suggestion List Names to "label". These names are used inside the Transact Dynamic Data Service.

Next, expand the DDS Configuration panel.



The first field is the name of the Transact Function to be called - type that in. It must match the service name exactly.

Similarly, type in the version of the service. The Response Data Key can be left as Response -- it is used in the Groovy code to identify the returned values in the FormFuncResult.

Next, click the First Input Field Map control. Type the Key, our sample uses "searchString".



Then click in the Field Reference field, and double-click the Autocomplete Field in the tree on the left side of the dialog. This auto-populates the field data reference - you can type this manually if you like.

The First Response Field Map is set similarly, using "label" as the key.



Note that the response is being mapped back into the Autocomplete Field. In a single-DDS setup, the Autocomplete Field provides input to the Transact Function, and accepts the selected output!

Save, Build, and Deploy the form to Manager. You should be able to open the form now, but of course the Autocomplete Field's Transact Function needs to be created.

For this article, a Transact Function was created that reads a list of animals from a Service Parameter, returning the ones that match what has been typed so far. The source is:

```
import com.avoka.tm.func.*
import com.avoka.tm.svc.*
import com.avoka.tm.util.*
import com.avoka.tm.vo.*
import groovy.transform.TypeChecked
import groovy.json.JsonBuilder
import javax.servlet.http.*

@TypeChecked
class FluentFunction {
  // Injected at runtime
  public Logger logger

  /*
  * Perform Fluent Function call.
  *
  * returns: FuncResult
  */
  FuncResult invoke(FuncParam param) {
    String searchString = param.params.get('searchString').toString()
    logger.info "searchString == ${searchString}"
    String searchData = param.svcDef.paramsMap["searchData"];
    logger.info "searchData == ${searchData}"
    List searchList = searchData.tokenize(',')
    List baseResults = searchList.findAll { it.startsWith(searchString) }
    logger.info "baseResults == ${baseResults}"
    List results = []
    baseResults.each {
      results.push( ['label':it, 'data':it] )
    }
    logger.info results
    String data = new JsonBuilder(results).toString()
    FormFuncResult result = new FormFuncResult()
    result.data["Response"] = results
    return result
  }
}
```

The input into the service is the parameter "searchString", which was mapped in the First Input Field Map on the DDS Configuration panel, shown above.

The output is the "results" object, which is a List containing maps with a "label" and a "data" elements. The "results" object is added to the FormFuncRetsult object and sent back to the Form.

The use of "label" in the return from the service ties in to the use of "label" as the "Suggestion List Names" value in the Data Source panel shown above.

Lastly, with Transact Functions, the Function and its Trigger must be added to the Form Version. Navigate Transact Manager to the deployed Form, and in the Version add this Transact Function with a Form Function Trigger and a Sequence of 1.



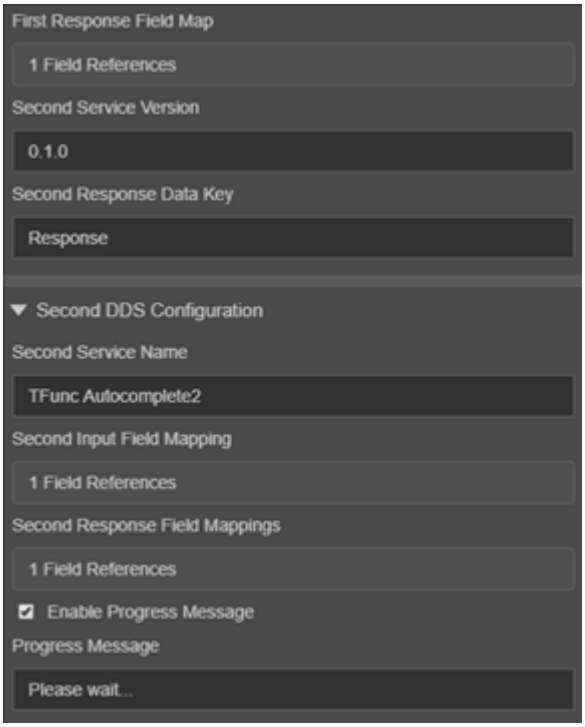
If you test the form now, it should populate with values from the service as you type.

Let's look how to add a second DDS

The Autocomplete Field Component can be configured with a second Transact Function, which is called after the user makes a selection from the options and the output is delivered per the mappings configured. To use this functionality, add a Text Field to the Form.



Then open the Properties for the Autocomplete Field and update the bottom of the DDS Configuration panel and Second DDS Configuration panel. Add a second service name, and use that name to create a new DDS on Transact Manager. Some sample code will be provided below for the second service.



Note that the DDS Configuration panel has some settings for the second service -- Second Service Version and Second Response Data Key. These two fields are NOT in the Second DDS Configuration Panel!

The Second Input Field Mapping should be setup to look like the First Input Field Mapping.



The Second Response Field Mapping should be set to map the data keyed "label" to the new Text Field.



For this article, the second Transact Function, named "TFunc Autocomplete2", uses another Service Parameter to find a name based on the first letter of the input "searchString". This creates a little alliteration to send back to the form.

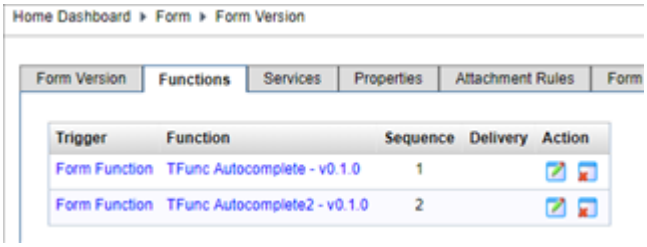
```
import com.avoka.tm.func.*
import com.avoka.tm.svc.*
import com.avoka.tm.util.*
import com.avoka.tm.vo.*
import groovy.transform.TypeChecked
import groovy.json.JsonBuilder
import javax.servlet.http.*

@TypeChecked
class FluentFunction {

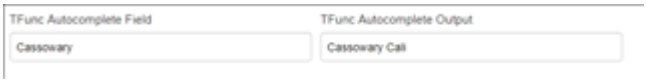
// Injected at runtime
public Logger logger

/*
* Perform Fluent Function call.
*
* returns: FuncResult
*/
FuncResult invoke(FuncParam param) {
String searchString = param.params.get('searchString').toString()
logger.info "searchString == ${searchString}"
String searchData = param.svcDef.paramsMap["secondarySearchData"];
logger.info "searchData == ${searchData}"
List searchList = searchData.tokenize(',')
List baseResults = searchList.findAll { it.startsWith(searchString[0]) }
logger.info "baseResults == ${baseResults}"
List myresults = []
String comboName = "${searchString} ${baseResults[0]}".toString()
myresults.push( ['label':comboName, 'data':comboName] )
FormFuncResult result = new FormFuncResult()
result.data["Response"] = myresults
logger.info result.data.Response
return result
}
}
```

Go back to the Form Version deployed on Transact, and add this new Transact Function to the Form Version. The trigger is Form Function again, and Sequence can be 2.



Save and deploy everything, and the Autocomplete Field should repeatedly call the first Transact Function to find values that match the typed letters. When a returned value is selected, the second Transact Function is called and the return displayed in the Text Field.



The Service Parameter value used for searchData is:

```
Aard-
vark,Al-
batross,Al-
lig-
ator,Alpaca,Ant,Ar-
teat-
er,Ante-
lope,Ape,Ar-
madillo,B-
aboon,Badger-
,Bar-
racuda,Bat,Bear,Beaver-
,Bee,Bis-
on,Boar,But-
ter-
fly,Camel,Capy-
bara,Cari-
bou,Cas-
sowary,Cat,Cater-
pil-
lar,Cow,Chamois,Chee-
tah,Chick-
en,Chim-
pan-
zee,Chinchil-
la,Chough,Clam,Co-
bra,Cock-
roach,Cod,Cor-
mor-
ant,Coyote,Cr-
ab,Crane,Croc-
codile,Crow,Cur-
lew,Deer-
,Dino-
saur-
,Do-
g,Dog-
fish,Dol-
phin,Dor-
key,Dot-
```

```
terel,Dove,Dragor-
fly,Duck-
,Dugong,Dur-
lin,Eagle,Echid-
na,Eel,Eland,Elephant,Elk,Emu,Fal-
con-
,Fer-
ret,Finch,Fish,Flamin-
go,Fly,Fox,Frc-
g,Gaur,Gazelle,Ger-
bil,Gir-
affe,Gr-
at,Gnu,Goat,Goose,Goldfinch,Goldfish,Gorilla,Goshawk,Grasshopper,Grouse,Guanaco,Guinea
fowl,Guinea pig,Gull,Ham-
ster-
,Hare,Hawk,Hedge-
hog,Her-
on,Her-
ring,Hip-
popot-
amus,Hor-
net,Horse,Hum-
mingbird,Hyena,Ibex,Ibis,Jackal,Jaguar,Jay,Jellyfish,Kangaroo,Kingfisher,Koala,Komodo
Dragon,Kooka-
bur-
a,Kouprey,Ku-
du,Lap-
wing,Lark,Lemur,Lec-
pard,Lion,Llama,Lob-
ster-
,Lc-
cust,Lor-
is,Louse,Lyre-
bird,Mag-
pie,Mal-
lard,Manatee,Mandrill,Mantis,Marten,Meerkat,Mink,Mole,Mor-
goose,Mor-
key,Moose,Mouse,Mos-
quito,Mule,Nar-
whal,Newt,Nightir-
```

```
gale,Octopus,Okapi,C-
pos-
sum,Oryx,Ostrich,Ot-
ter-
,Owl,Ox,Oyster,Panther,Parrot,Partridge,Peafowl,Pelican,Penguin,Pheasant,Pig,Pigeon,Polar
Bear,Pony,Porcupine,Porpoise,Prairie Dog,Quail,Quelea,Quet-
zal,Rabbit,Raccoon,Rail,Ram,Rat,Raven,Red Panda,Reindeer-
,Rhinoceros,Rook,Salamander,Salmon,Sand Dollar,Sandpiper,Sardine,Scorpion,Sea Lion,Sea
Urch-
in,Seahorse,Seal,Shark,Sheep-
,Shrew,Skunk,S-
nail,Snake,S-
par-
row,Spider-
,Spoor-
bill,Squid,S-
quir-
rel,Starling,St-
ingray,Stink-
bug,St-
ork,Swal-
low,Swan,Ta-
pir,Tar-
sier,Termite,Tiger,Toad,Trout,Turkey,Turtle,Viper,Vulture,Wallaby,Walrus,Wasp,Water
Buffalo,Weasel,Whale,Wolf,Wolverine,Wombat,Woodcock,Woodpecker,Worm,Wren,Yak,Zebra
```

And the Service Parameter value used for secondarySearchData is:

```
Abby,Ace,Al-
lie,Ar-
gel,Ar-
nie,A-
pol-
lo,Archie,Ather-
a,Ava,Baby,Bailey,Bailey,Bar-
dit,Bax-
ter-
,Bear,Beau-
,Bel-
la,Belle,Benji,Benny,Bent-
ley,Blue,Bo,Bor-
nie,Boomer-
,Brady,Brody,Bruce,Brur-
o,Bru-
tus,Buddy,Buster-
,Cali,Cal-
lie,Cash,Chance,Charlie,Charlie,Chase,Chester-
,Chewy,Chico,Chloe,Cleo,Cc-
co,Cc-
co,Cody,Cook-
ie,Coop-
er,Cop-
per-
,Daisy,Dakota,De-
lil-
ah,Dex-
ter-
,Dies-
el,Dix-
ie,Duke,El-
la,El-
lie,Em-
ma,Fir-
n,Fior-
a,Frankie,Ge-
orge,Ge-
orgi-
a,Gi-
```

```
gi,Ginger-
,Giz-
mo,Grace,Gra-
cie,Gur-
ner-
,Gus,Hank,Har-
ley,Har-
ley,Harper-
,Hazel,Heidi,Henry,Holly,Honey,Hur-
ter-
,Ivy,Izzy,Jack-
,Jack-
son,Jake,Jas-
mine,Jasper-
,Jax,Joey,Josie,King,Kobe,Koda,Kor-
a,Lacey,Lady,Lay-
la,Lei-
a,Leo,Lex-
i,Lilly,Lily,Loki,Lola,Louie,Luck-
y,Lucy,Luke,Lu-
lu,Lur-
a,Mac,Macy,Mad-
die,Mag-
gie,Mar-
ley,Mar-
ley,Mav-
erick-
,Max,May-
a,Mi-
a,Mil-
a,Mil-
lie,Milo,Mir-
nie,Mis-
sy,Mocha,Molly,Moose,Murphy,Nala,Nova,Od-
in,Olive,Oliv-
er,Ol-
lie,Oreo,Oreo,Os-
car,Ot-
is,Pais-
ley,Pea-
```

```
nut,Pea-
nut,Pearl,Penelope,Penny,Pep-
per-
,Phoe-
be,Piper-
,Poppy,Prince,Prin-
cess,Ranger-
,Remi,Rex,Ri-
ley,Ri-
ley,Roc-
co,Rock-
y,Romeo,Ro-
scoe,Rosie,Rox-
ie,Roxy,Ruby,Rudy,Rusty,Sadie,Sam,Sammy,Sam-
son,Sandy,Sasha,S-
cout,S-
cout,Shad-
ow,Shad-
ow,Shelby,Sim-
ba,Sophie,S-
tel-
la,Sugar,Tank,Teddy,Theo,Thor,Toby,Trix-
ie,Tucker,Tyson,Willow,Winnie,Winston,Xena,Zeke,Zeus,Ziggy,Zoe,Zoey
```

Deep clearing of Chrome browser cache

Sometimes no matter how you try to clear it, Chrome's cache seems to just hang on for dear life.

This article will show you a method of deep clearing Chrome's cache that seems to work consistently, especially when dealing with new releases of Maestro.

Try this method when you have not had success with the common means of clearing Chrome's cache such as:

Menu item: More tools... Clear browsing data, then selecting 'the beginning of time' and at least 'Cached images and files'

Clicking refresh icon while holding `Ctrl` key down.

We will use Chrome's developer tools panel to get to the Network tab where we can see the list of files the browser is fetching and caching.

1. Navigate to the Maestro Management Dashboard:
2. Press `F12` to bring up the Developer Tools panel
3. Click on the Network tab
4. Check the Disable Cache checkbox, your screen should now look a bit like this:
5. Hold down the `Ctrl` key and click the refresh icon in the URL bar , then wait for the file downloads to complete
6. Scroll through the list of files that were downloaded and look for ones that have '(from disk cache)' in the Size column
7. Right click the filename in the Name column and select 'Clear browser cache':
8. Hold the Ctrl key down and click the Refresh icon again
9. Close Developer Tools panel by clicking the X on top right of the panel, or just press `F12`

Your persistent Chrome cache should now be cleared more thoroughly than before and you should be able to eliminate browser caching as the root cause of odd behaviour you might have been experiencing.

Maestro File Sizes

Maestro file sizes can become quite large when the HTML file that is used to create the form and the assets that are used to extend the functionality of the form are mismanaged. The file size of a Maestro form can affect the efficiency of the form when it is published and deployed to an environment. Large file sizes can also lead to forms that are slow and unresponsive when being edited by form builders and developers.

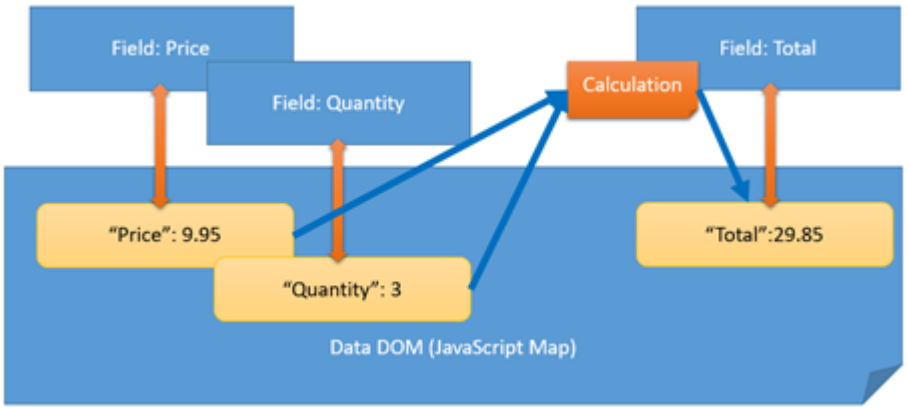
There are several approaches to take to keep Maestro file sizes down. The list below identifies several approaches that are recommended to minimize the file size of a Maestro form.

- When publishing a form, ALWAYS select the Minify Code build option checkbox. Selecting this build option will reduce the size of your form without any extra work and will ensure that your form is efficient to transmit across different deployment environments. The screenshot below highlights the Minify Code build option checkbox.
- Never publish a form that still has comments in the code. Publishing a form with comments will increase the size of the Maestro HTML file and extend the time it takes the form to load each time you want to edit the form.
- Use the Repeating Block Template when multiple instances of the same component are required. For example, when asking for multiple family members names, use a single repeating block template rather than hard-coded text inputs for each family member. Using repeats can decrease the size of the HTML file by 50%.
- Where possible, use a common JavaScript Library to store Maestro business rules, DO NOT repeat the same lines of code when the same rule is used in multiple places in the form.
- Where possible, do not hardcode long dropdown list options, instead, use other means to populate long dropdown list options. For example, do not hardcode a list of countries.

Maestro Data Model

The Maestro data model is a powerful yet simple abstraction that allows you to use much of the Journey Maestro functionality when you are developing a form, so it is important to understand it.

When you type a piece of data into a component in Journey Maestro, the data is not only displayed in the component itself but is also copied to an internal data structure known as the data model, or the data DOM[1]. The component and its value are sometimes known as the view. These terms both derive from well-known programming pattern Model-View-Controller. In our case, the controller is any business rule that is defined in Maestro, as shown below.



Maestro uses a unique field ID to identify both the component and its value in the data model. Internally, the data model is implemented as a JavaScript map. You can think of the data model as being a spreadsheet with two columns: the ID of the component and its value. This is illustrated with a sample table.

Field ID	Value
"Price"	9.95
"Quantity"	3
"Total"	29.85

[1]The Document Object Model (DOM) is a cross-platform and language-independent application programming interface that treats an HTML, XHTML, or XML document as a tree structure wherein each node is an object representing a part of the document. The objects can be manipulated programmatically and any visible changes occurring as a result may then be reflected in the display of the document.

The component's value and the value in the data model are automatically synchronized in both directions. Therefore, when you are programming in Maestro, it is usually much easier to modify the data in the data model and let the automatic synchronization take care of updating the visible values in the components themselves. If you refer to the above diagram, you will see that the calculations refer to the values in the data model, rather than referring directly to the components themselves.

For example, when you are in the Script Editor, and double-click on the price component, what is inserted into your script is "data.price". This is not actually referring to the component itself, but rather referring directly to the component's value in the data model. The "data." is the clue that you are referring to the data model. The values in the data model can be both read and written, and the synchronization will take care of updating all the components in the view automatically.

To learn how to use Data Mapper in Journey Maestro, see data mapper.

It is important to ratify your data model upfront as much as possible before setting out - and do not assume that a model which represents a downstream integration is a good way to operate.

For example, if you are integrating with Vendor A, and Vendor A requires the following format of output for "pets":

```
<Classification>
   <PartA>
      <Pets>
         <Pet>
            <Name/>
            <Type/>
         <Pet>
      </Pets>
   </PartA>
<Classification/>
```

It may be tempting to include this structure as part of your form. This has the benefit of making the payload meet the requirements for integration with little work. However, the forms will suffer as small tweaks to the schema for output require republishing every form.

Consider a client data dictionary, as it has several benefits, including:

- Ownership - is in the client's estate, they have to agree on data definitions up front and it removes uncertainty.

- Integration – switching vendors in and out becomes less problematic as you have one working model and various translation layers.
- Certainty – over time, model ownership synthesizes to good working practice, extensibility, and surety of operation.

When working with complex data structures, you can't set complex JSON (arrays, nested structures) into a data field bound to the payload XML (saved data to Manager) and expect it being prefilled back on resume as a JSON object value. This is not supported in Maestro. Any value stored in an XML bound data field must be of a primitive type which can be easily serialized as a string (int, float, string, boolean). If you do store a complex JSON to a bound data field, Maestro will try to recreate the JSON structure as XML nodes with elements structure. It will be still saved to Manager as form XML but when resuming a form, Maestro won't recreate the JSON object from the XML data.

To go around this, you can choose one of the following recommendations:

- Try to use repeats which mimic your JSON structure using Maestro widgets and bindings for data storage and have unbound data field as the data source for your data drive implementing calculate rules from the data in the repeat.
- Store the JSON to a bound data field as a serialized JSON string via JSON.stringify() but you would need to decentralize it back from the bound data field into another one used as the data source for you data driven widget on form load.

The Maestro editor comes with the Integration pane so you can easily configure component's data extracts and integration with Manager.

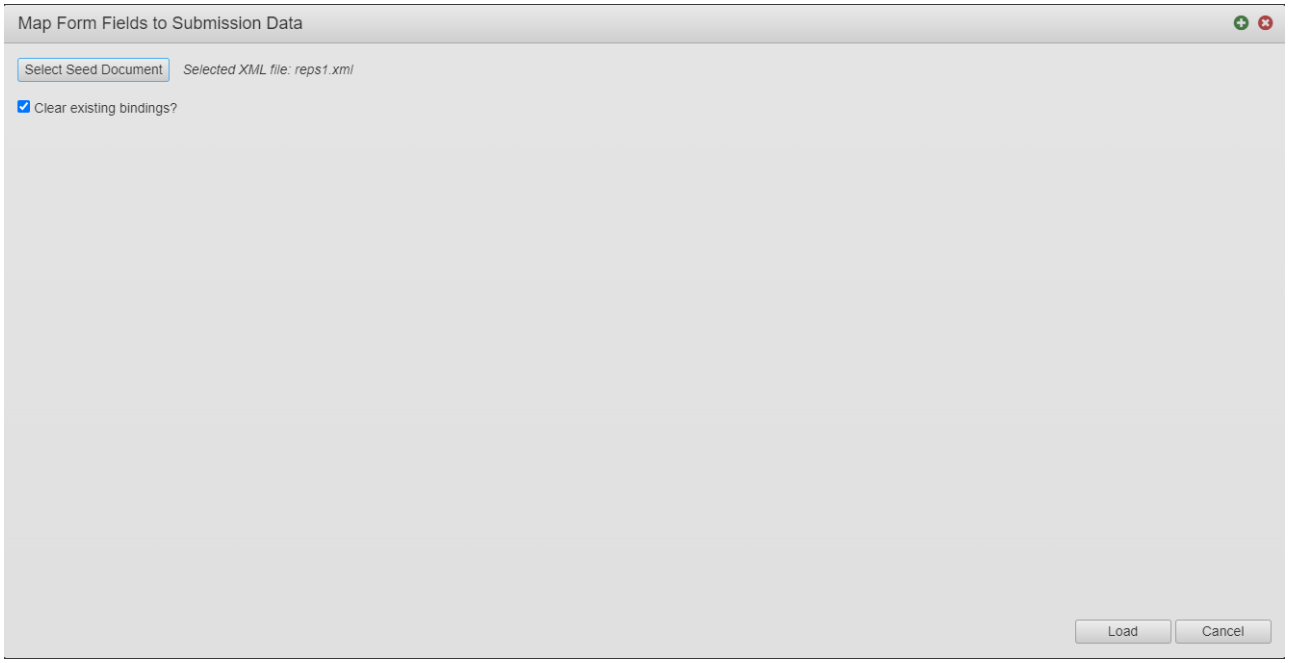
Next, learn about the unified application data document model.

Data Mapper

The Maestro editor allows you to map an existing client schema, represented with an XML file, into a form. This is a quick and easy way to set up a form compatible the desired submission output. For more information, see form data XML.

To map form fields to submission data:

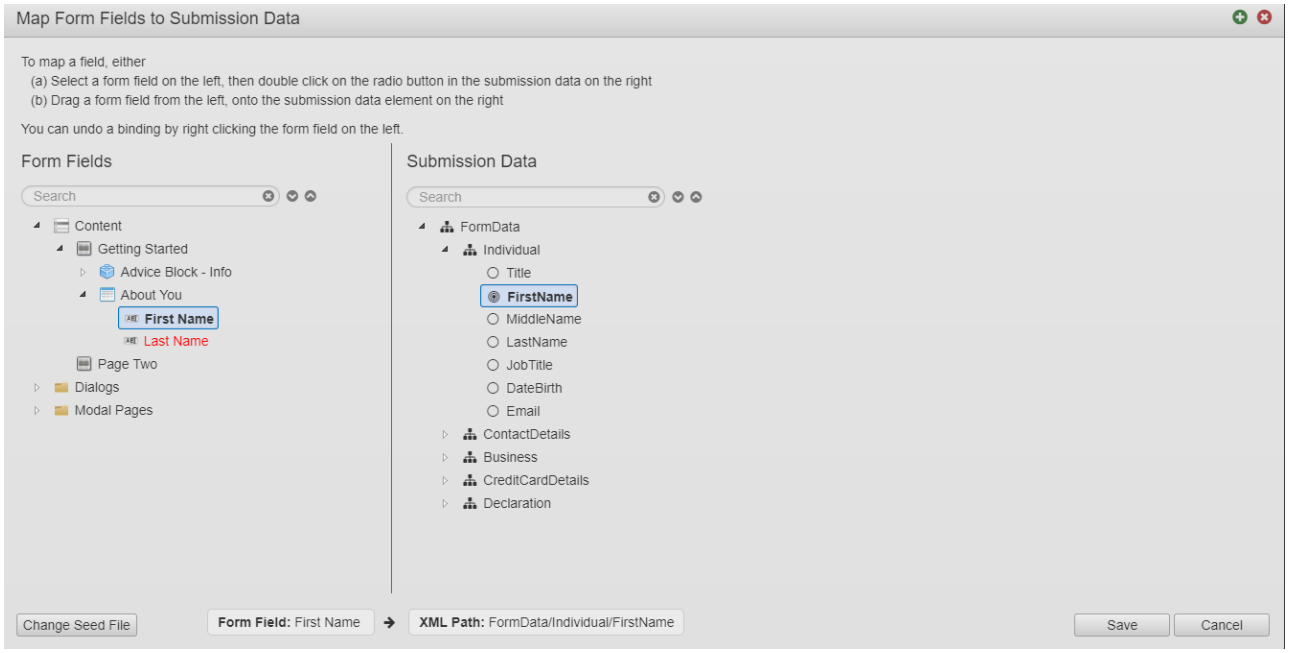
1. Open a form in the Maestro editor and click Settings Menu.
2. Select Open Data Mapper to map form fields to submission data.



3. Click Select Seed Document to choose an XML file to upload from your PC. A file content can be like one shown below:

```
<root>
	<firstName/>
	<lastName/>
</root>
```

4. Select the Clear existing bindings checkbox to clear data bindings.
5. Click Load to upload the file.



6. Map the components from the Form Fields column to the Submission Data column by dragging it across.
7. Click Save.
8. Click Build and Render Form to see how this mapping affects the form

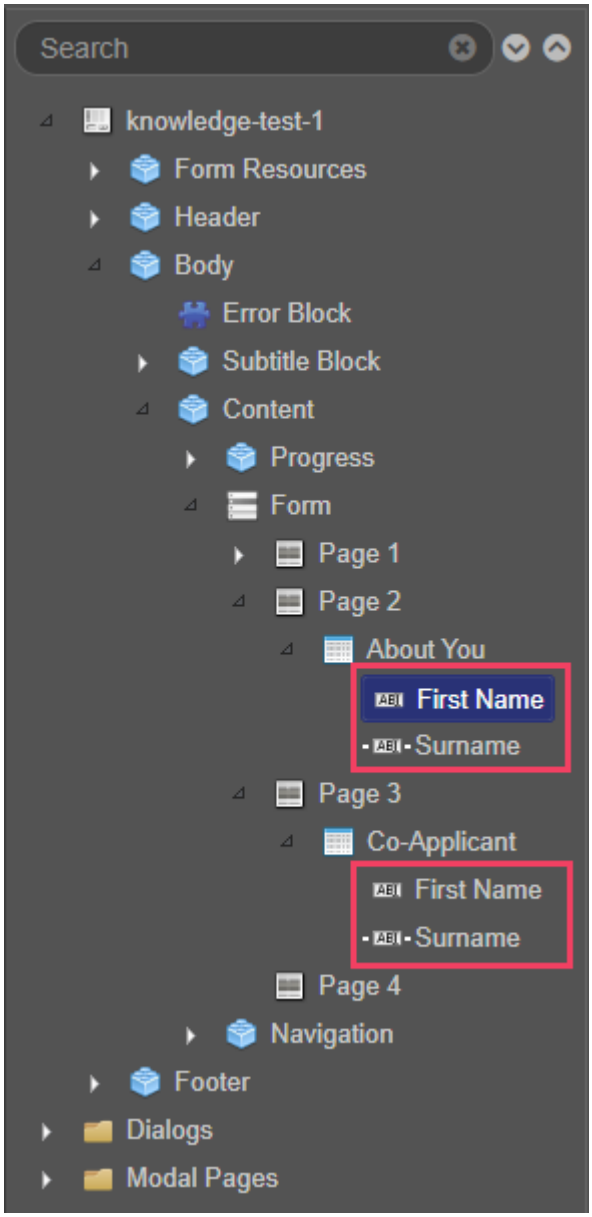
Next, learn about form XML data payload.

Form XML Data Payload

Each Journey Maestro form has an XML data payload, which is the XML layer that represents data pertinent to a form as well as user's input into the form. This XML is used to pass data between Manager and a form application and for external systems integrations. The XML layer is created when you build a form when most components are added to the XML layer by default, except for pages, sections, blocks, and data fields. For more information, see data model overview.

The form XML data payload is an XML document with a flat structure that includes only components, but not the hierarchy they belong to. That is, when you add a component to a form, its ID is auto-generated in a way it's unique across the form. When you add another component, even with the same Label, its generated item's ID will be different. This is reflected in the form XML data payload.

Let's illustrate it with a form which has 2 TextFields - First Name and Surname - that are used in 2 different sections of the form - About You and Co-Applicant.



The default, an XML tag is based on the item's ID, which can't be the same in two different items. When adding the second First Name item, its ID is automatically set to `firstName_1`, which means its XML tag is `//FirstName_1`. The resulting form XML data payload looks like this:

```
<AvokaSmartForm>
   ...
   <FirstName/>
   <Surname/>
   <FirstName_1/>
   <Surname_1/>
   ...
</AvokaSmartForm>
```

Even though the Maestro editor never allows two items in the same form to have the same ID, the user can manually change the binding path for any item. However, care should be taken not to duplicate binding paths, as this can lead to data loss. For example, if you decide to change the binding path of the second item to `//FirstName` in the Integration pane, this will result in the duplicate bindings error message while building the form.

> NOTE
>
> The Maestro editor allows you to check for duplicate data bindings as well as resolve them while in design mode.

The structure of the form XML data changes depending whether you set blocks to Include in Submission Data or not, which adds layers to the structure. In this example, we selected the Include in Submission Data checkbox of the About You and Co-Applicant Section components, so the new structure looks like this:

```
<AvokaSmartForm>
   ...
   <AboutYou>
       <FirstName/>
       <Surname/>
    </AboutYou>
    <Coapplicant>
        <FirstName_1/>
        <Surname_1/>
    </Coapplicant>
   ...
</AvokaSmartForm>
```

If you would like to have the second elements as FirstName and Surname as well, they just have to be in different parents inside the XML, namely a binding path of `//AboutYou/FirstName` and `//Coapplicant/FirstName`. In this case, the XML structure is shown below:

```
<AvokaSmartForm>
   ...
   <AboutYou>
      <FirstName/>
      <Surname/>
   </AboutYou>
   <Coapplicant>
      <FirstName/>
      <Surname/>
   </Coapplicant>
   ...
</AvokaSmartForm>
```

Also, you can easily achieve this by using entities so the item's ID are like these `AboutYou_FirstName` and `Coapplicant_FirstName`, which is the easiest way to handle this binding.

Next, learn about component data binding.

Reference Data Overview

While building onboarding application forms, you can use various reference data to pre-fill and autocomplete form's fields, as well as validate user input against this data. Reference data is static data that is created and stored in Manager and it is pertinent to an organization, which Maestro forms, belonging to that organization, can access.

Journey Maestro provides the `Transact.referenceData` function for a form to call to retrieve a set of reference data. Also, you can use the following techniques to access reference data:

- JavaScript Library component
- Property prefill
- Dynamic Data service
- Cascading Dropdowns

Let's compares the features of each technique in the table below:

Feature	JavaScript Library	Property Pre-fill	Dynamic Data Service
Works in Pre-view mode	Yes	No	No
Version control	Managed by form versioning.	None	Determined by a service
Use When	Form-specific data, infrequent data changes and no sharing required; or static data required work entirely in Maestro	Sharing required static data need to be overridden at organization, form or user levels.	Filtering required Sharing required
Manager content validation	N/A	Yes	Determined by code
Supports lazy-loading	No	No	Yes
Share-ability	No	Yes	Yes
Security	No	No	Determined by code
Re-publish required after	Yes	No	No

change			
No-code implementation	No	Only for simple data type	No
Impact on save/retrieved forms	No	May break	None
Impact on review task forms	None	May break	None
Pros	• Easy to implement • No Manager configuration required • Versioned by a form • No server calls needed	• Content maintained in Manager • Hierarchical organization, form or user overrides • No server calls needed	• Most flexible • Lazy initialization • Filterable • Secure
Cons	• Re-publish on change • Scope directly to form • Can't be shared • Static data only	• Complex setup in Manager • Review / retrieved forms code required for object conversion initially, but contaminates form XML • Static data only	• Higher coding requirement • Overkill for simple cases
Filterable data source	No	No	Yes, if coded
Data variability	Static	Static	Dynamic
Data type	Object	String, can be converted to Object in code	Object
Data source	Embedded in	TM Properties	Determined by

	JavaScript code		service
Data instance location	Global context	Form XML	Determined by code
Data associated with	Form	Organization / Form / User	Determined by service
Complexity of TM setup	Not required	Medium	Complex

Each of the following guides details how to gain access to reference data using the techniques discussed above. In each case, we populate an initial Data Field with some data. In this example, we use data from motorcycle manufacturers.

You can also use the reference data to build cascading data dropdowns with any of the methods mentioned above. The approach is exactly the same with the only difference is how you initially obtain the reference data.

Generally speaking, there are the following steps you need to complete to be able to use reference data in your application form:

1. Create reference data in Manager.
2. Test reference data filters in Manager.
3. Create the form.
4. Test the form.

Next, learn how to populate fields lookup with reference data.

Fields Lookup with Reference Data

Journey Maestro allows you to build forms that automatically prefills some fields with reference data that is stored in Manager.

There are the following steps you need to complete to be able to do this:

1. Create reference data in Manager
2. Test reference data filters in Manager
3. Create the form
4. Test the form

Let's look at them in more detail.

Create Reference Data in Manager

First, you need to create reference data in Manager for an organization where the form is deployed. In this example, we use the following resources, which you can download as a reference-data.zip file.

- Australian Postcodes CSV
- Australian Postcodes JSON
- Australian Postcodes XML

Then, for each resource, create a reference data object using this template:

1. Enter a Name for the new reference data object.
2. Enter en_AU in the Locale box.
3. Select the appropriate Data Type as per a file extension.
4. Click Choose File and select the sample reference data file that matches the Data Type.

Test Reference Data Filters in Manager

After that, you should test the reference data in Manager to filters subsets of data that you are going to use in your form. The sample query for reference data created from the Australian Postcodes CSV file is shown below:

```
{
        "select": ["postcode","suburb","state","dc"],
        "filter": [
                {"field": "state", "operation": "startsWith", "value": "NSW"},
                {"field": "suburb", "operation": "contains", "value": "belrose"}
        ],
        "order": [
                {"field": "suburb", "sortAsc": false},
                {"field": "state", "sortAsc": true}
        ],
        "fetchLimit": 50
}
```

The query result is shown below:

```
[
  {
    "postcode": "2085",
    "suburb": "BELROSE WEST",
    "state": "NSW",
    "dc": "BELROSE WEST LPO"
  },
  {
    "postcode": "2085",
    "suburb": "BELROSE",
    "state": "NSW",
    "dc": "FRENCHS FOREST DEL FAC-DEL"
  }
]
```

Create the Form

Let's assume you need to build a Maestro form to perform a filtered lookup of postcode reference data, using a pre-defined list of Australian postcodes. In this case, the sample reference data of a form has the following features:

- Suburb and state lookup fields to allow selection of optional filter values.
- A data driven drop-down to show the lookup results.
- Suburb, state and postcode display fields that show values pertaining to a row selected from the lookup results drop-down.

- A button to perform the lookup that:
  - Fetch filtered suburbs by calling `Transact.referenceData`.
  - Manipulate the returned results to add id and label fields with a better display format.
  - Populate the data-driven drop-down with the manipulated results, using the id field as the key value.
- A change rule on the lookup results drop-down that populates the state, suburb and post-code fields based on the selected result.
- A button to clear all form fields.

To build such an application form, you need to:

1. Create a new template.
2. Create a new form based on that template.
3. Add the following components to your form.

ID	Label	Component Type	Tab	Attribute	Value
suburbLookup	Suburb Lookup	Text Field	Integration	TM Form Data > Include in Submission Data	Clear
stateLookup	State Lookup	Drop-down	Properties	Dropdown > Options > Values	ACT, NSW, NT, QLD, SA, TAS, VIC, WA
			Properties	Dropdown > Add Blank Value	Select
			Integration	TM Form Data > Include in Submission Data	Clear
suburbs	Suburbs Found	Data-Driven Drop-down	Properties	Data-Driven Dropdown > Data Source	data.$-postcodes

			Properties	Data-Driven Dropdown > Value Field	id
			Properties	Data-Driven Dropdown > Add Blank Value	Clear
			Integration	TM Form Data > Include in Submission Data	Clear
suburb	Suburb	Text Field	Properties	Rules > Create Rule	Read-Only
state	State	Text Field	Properties	Rules > Create Rule	Read-Only
postcode	Postcode	Text Field	Properties	Rules > Create Rule	Read-Only
lookup	Lookup	Button	A Click rule is added to this component in a later step.		
clear	Clear	Button	A Click rule is added to this component in a later step.		

NOTE

You must clear the Include in Submission Data checkbox on the Suburb Lookup, State Lookup and Suburbs Found fields, so that data in these fields is not sent back with the form XML data.

4. Select the Lookup button and create a Click rule with the following code. For an explanation of this code, see Lookup Button Click Rule below.

```
var query = {
        "select": ["postcode","suburb","state"],
        "filter": [],
        "order": [
                {"field": "suburb", "sortAsc": true},
                {"field": "state", "sortAsc": true}
                ],
        "fetchLimit": 50
        }

if (!Util.isBlank(data.stateLookup)) {
        query.filter.push({"field": "state", "operation": "startsWith", "value":
data.stateLookup});
        }
if (!Util.isBlank(data.suburbLookup)) {
        query.filter.push({"field": "suburb", "operation": "startsWith", "value": data.sub
urbLookup});
        }

Transact.referenceData("Australian Postcodes CSV", query, "en_AU").then(functior
(response){
        var id = 1;
        data.$postcodes = response.filter(function(row) {
                row.id = id++;
                row.label = row.suburb + ', ' + row.state + ' ' + row.postcode;
                return true;
                })
        var dropdownLabel = data.$postcodes.length > 0 ? 'Select...' : 'No results found';
        data.$postcodes.unshift({label:dropdownLabel, id:0});
        data.suburbs = 0;
        }).catch(function(error) {
        });

data.state = data.suburb = data.postcode = '';
```

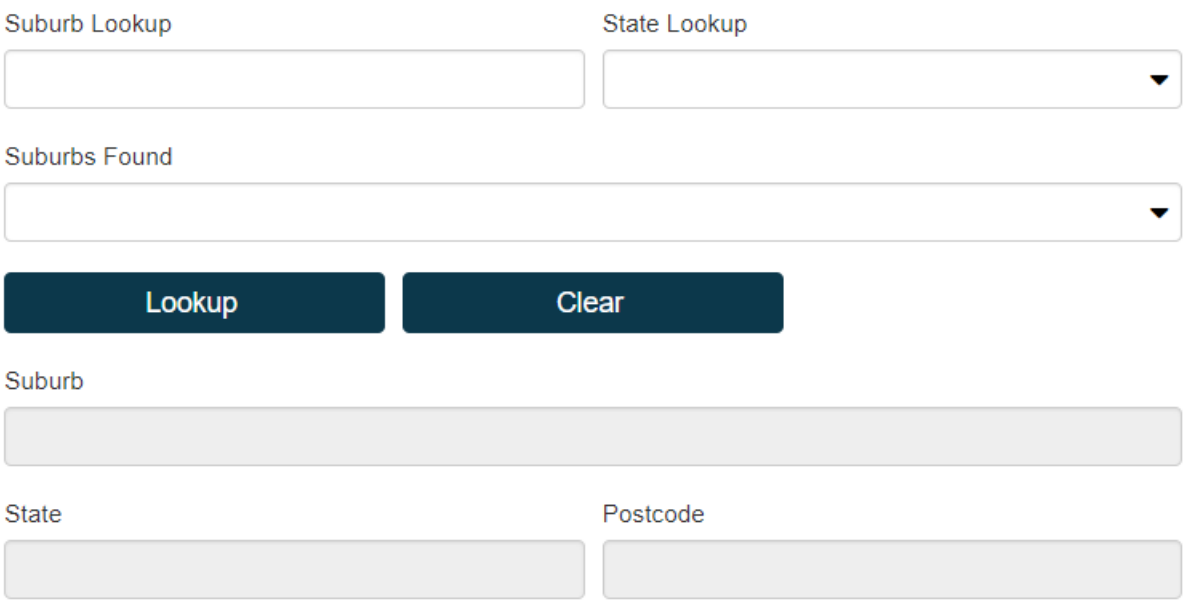
5. Select the 'Suburbs Found' data-driven dropdown and create a Change rule with the following code. For an explanation of this code, see Suburbs Found Dropdown Change Rule below:

```
var selectedSuburb = data.$postcodes[value];
data.state = selectedSuburb.state;
data.suburb = selectedSuburb.suburb;
data.postcode = selectedSuburb.postcode;
```

6. Select the Clear button and create a Click rule with the following code. For an explanation of this code, see Clear Button Click Rule below:

```
data.state = data.suburb = data.postcode = '';
data.suburbs = 0;
data.$postcodes = [];
data.stateLookup = data.suburbLookup = '';
```

7. Build and render the form, ensuring you select the Use Transact Functions option.
8. The rendered form should resemble this.



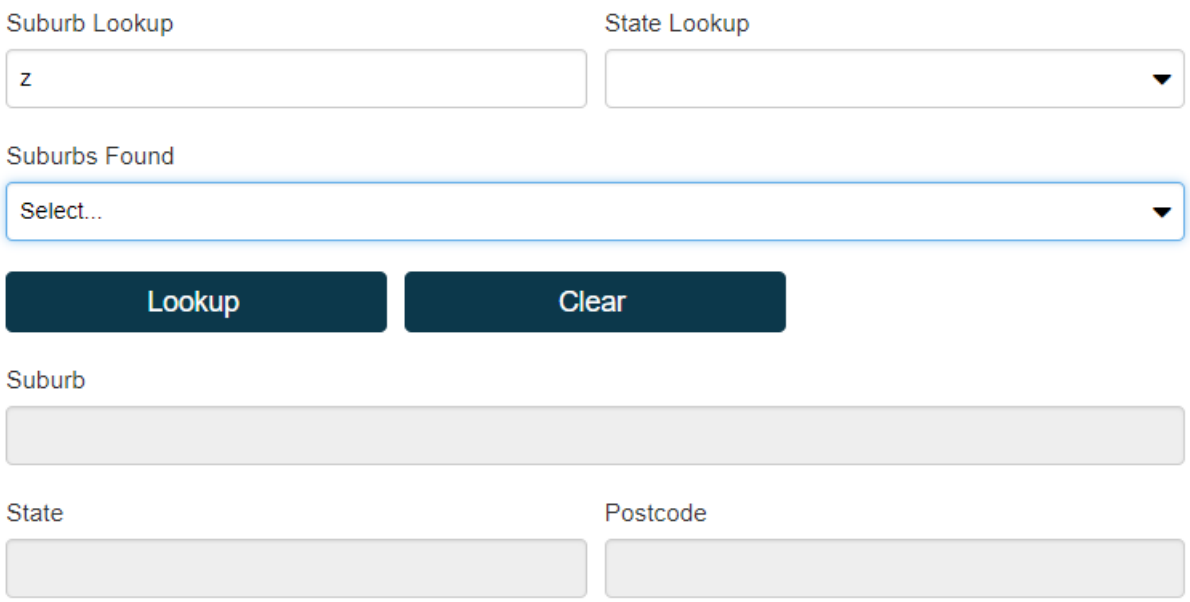
Test the Form

Now, you have to test the form to ensure that reference data can be filtered as expected.

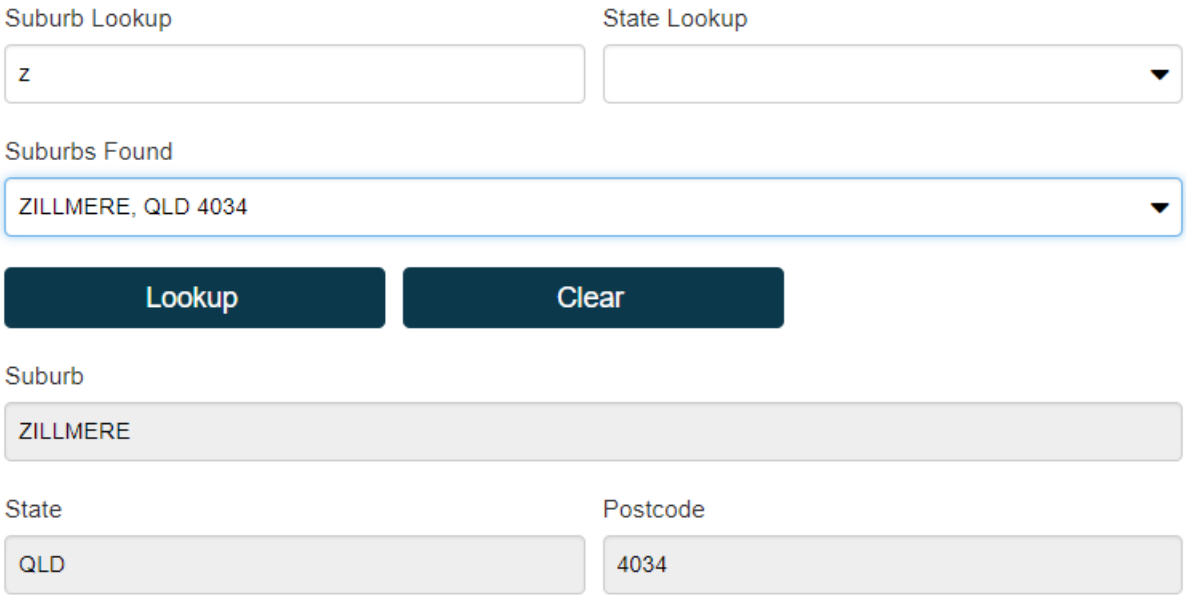
To test the form:

1. Enter 'z' in the Suburb Lookup box and leave State Lookup empty. This will return a few results from the sample data provided with this article.

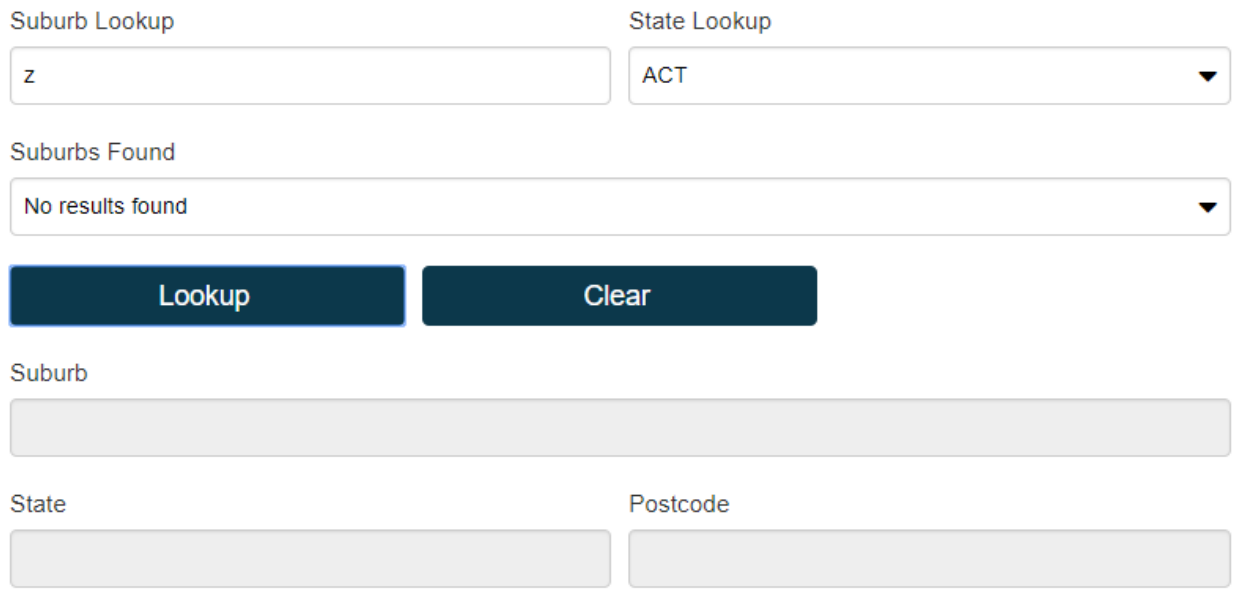
2. Click Lookup. 'Select...' is displayed in Suburbs Found.



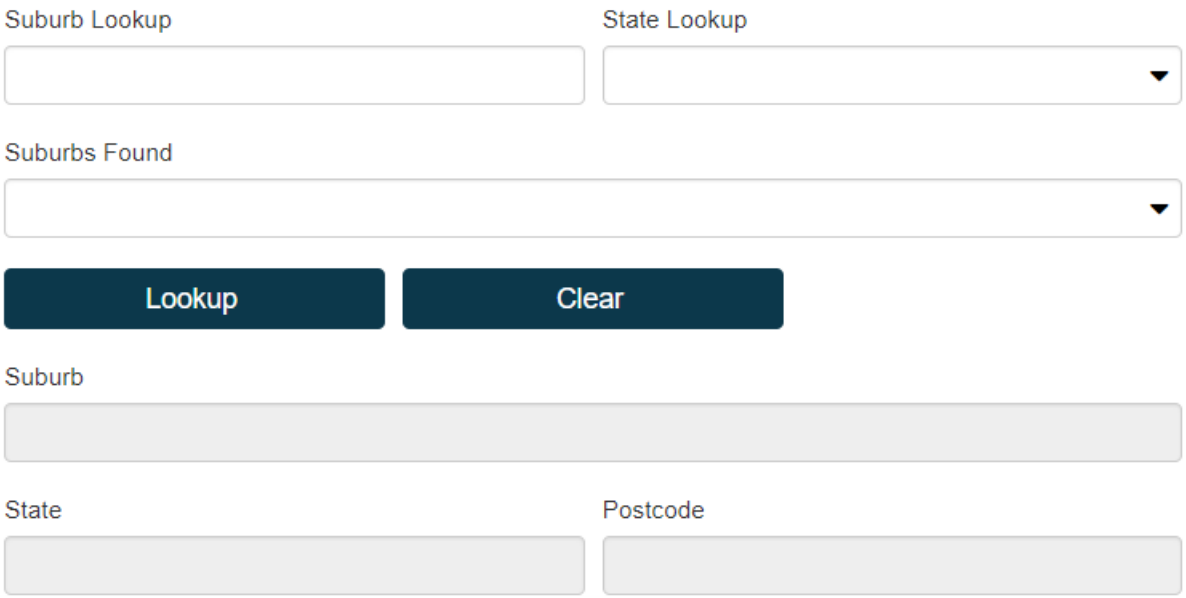
3. Select a suburb from Suburbs Found. Suburb, State and Postcode are populated with the values corresponding to the selected suburb.



4. Select ‘ACT’ from State and click Lookup. Suburbs Found shows 'No results found' and Suburb, State and Postcode are cleared.



5. Click Clear at any time to clear all form fields.



As the form makes use of several business rule, let's look at them in detail.

Lookup Button Click Rule

Clicking the Lookup button causes its Click rule to be executed, retrieving the 'Australian Post-codes CSV' reference data which is filtered and stored as temporary form data and which is used to populate the Suburbs dropdown.

The Lookup button's Click rule code starts by creating a basic query object with an empty filter array. Other properties of the query object sort the results by ascending suburb and state, and limit the returned results to 500 rows.

```
var query = {
        "select": ["postcode","suburb","state"],
        "filter": [],
        "order": [
                {"field": "suburb", "sortAsc": true},
                {"field": "state", "sortAsc": true}
                ],
        "fetchLimit": 500
        }
```

Suburb and state filters are added to the query object according to values entered in Suburb Lookup and State Lookup. The filter objects added use the format specified in Query Filter Syntax above.

```
if (!Util.isBlank(data.stateLookup)) {
        query.filter.push({"field": "state", "operation": "startsWith", "value":
data.stateLookup});
        }
if (!Util.isBlank(data.suburbLookup)) {
        query.filter.push({"field": "suburb", "operation": "startsWith", "value": data.sub-
urbLookup});
        }
```

The ‘Australian Postcodes AU’ reference data is retrieved by calling the `Transact.referenceData` function, passing the name of the reference data, the query object just constructed, and the locale.

```
Transact.referenceData("Australian Postcodes CSV", query, "en_AU").then(function
(response){
        ...
}).catch(function(error) {
});
```

`Transact.referenceData` returns a promise, to which we add a `then` method which will be called when the promise is fulfilled. A`catch` method is also appended to handle any unexpected fail conditions.

```
...
var id = 1;
data.$postcodes = response.filter(function(row) {
       row.id = id++;
       row.label = row.suburb + ', ' + row.state + ' ' + row.postcode;
       return true;
       })

var dropdownLabel = data.$postcodes.length > 0 ? 'Select...' : 'No results found';
data.$postcodes.unshift({label:dropdownLabel, id:0});

data.suburbs = 0;
...
```

In the `then` handler, a results array is constructed which will populate the list in the Suburbs Found data-driven drop-down. The JavaScript array filter method is used to generate a display value for each row in the query results (that is, the response data) by combining the suburb, state and postcode into a single display field, and assigning a unique numeric id to each row.

The `unshift` method is used to insert a row with id 0 at the start of the results array. This row will have a different label depending on whether query results were returned ('Select...') or not ('No results found'), so that the drop-down will initially show an appropriate value. The results array is stored in `data.$postcodes` so it can be accessed elsewhere when needed.

> NOTE
>
> Prefixing a property name with '$' on the form's data object prevents that property from being sent with the submission XML.

0 is assigned to `data.suburbs` so that the Suburbs Found drop-down will initially display the label of the dynamically constructed first row.

Note that each row in the result set has a unique id starting from 0, and id is the value used by the drop-down's Value property, so we can use this as an index into our result set (returned by the reference data query) when we select an item from Suburbs Found.

Finally, the state, suburb and postcode fields are cleared pending the results of the lookup.

```
data.state = data.suburb = data.postcode = '';
```

If there are no results, we want to clear these fields. This code should be placed at the top of the rule, but having it at the bottom demonstrates this code executing before the code inside the promise's .then method executes.

Suburbs Found Dropdown Change Rule

When a row is selected from Suburbs Found, the Suburbs Found drop-down's Change rule populates form fields with values from the selected row.

```
var selectedSuburb = data.$postcodes[value];
data.state = selectedSuburb.state;
data.suburb = selectedSuburb.suburb;
data.postcode = selectedSuburb.postcode;
```

The local variable `value` is pre-populated with the value of the field defined in the Suburbs Found dropdown's Value Field property, which is the `id` property added to each of the result rows returned by the `Transact.referenceData` call. This value is used as a numeric index into the results array to retrieve the item selected from the drop-down list and to store it in the local variable `selectedSuburb`. The other data fields on our form are then populated with values from the selected row.

> NOTE
>
> By assigning the appropriate value to the form's data object, Angular takes care of updating the HTML input fields.

Clear Button Click Rule

When the Clear button is clicked, all form fields are cleared, ready for another lookup.

```
data.state = data.suburb = data.postcode = '';
data.suburbs = 0;
data.$postcodes = [];
data.stateLookup = data.suburbLookup = '';
```

This code clears state, suburb and postcode data values, resets the Suburbs Found drop-down to display the first item, and empties the saved postcode lookup data array. The overall result is that the entire form is cleared, including both drop-downs.

Next, learn how to populate fields autocomplete with reference data.

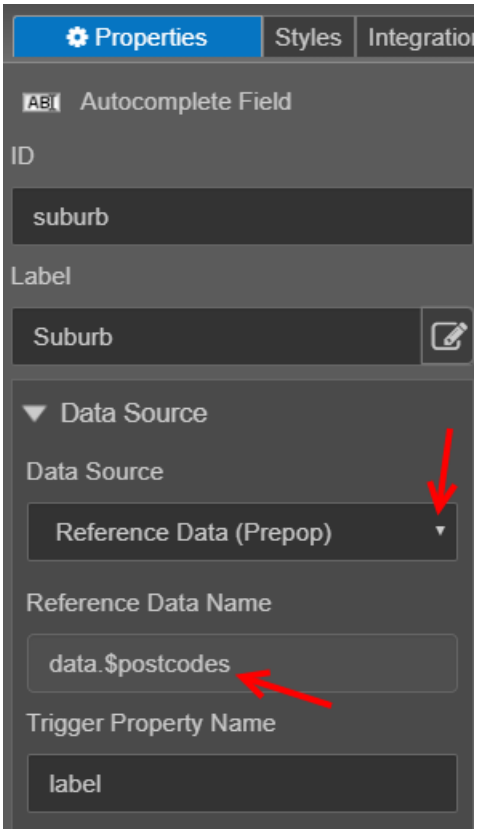
Fields Autocomplete with Reference Data

Maestro allows you to use reference data to implement autocomplete of fields in Maestro forms. For this to happen, you must create reference data in Manager first.

Let's illustrate this with a simple Maestro form that has a single autocomplete field pre-populated with a list of Australian postcodes by the Form Load rule. We use the sample postcode reference data created with the Australian Postcodes JSON file and the en_AU locale. For more information, see Fields Lookup with Reference Data.

Create the Form

1. Create a new form based on your template.
2. Add an Autocomplete Field component with ID as `suburb`.
3. Set the Data Source property to Reference Data (Prepop) and the Reference Data Name property to `data.$postcodes` as shown below:



4. Select the form and create a Form Load rule that set a value to `data.$postcodes`:

```
Transact.referenceData("Australian Postcodes JSON", null, "en_AU").then(functior
(response){
   data.$postcodes = JSON.stringify(response.filter(function(row) {
      row.label = row.suburb + ', ' + row.state + ' ' + row.code;
      return true;
   }));
}).catch(function(error) {
   // handle the exceptior
});
```

   The Form Load rule JavaScript calls `Transact.referenceData` to fetch the JSON-formatted reference data stored in Manager.

   When the promise fulfills, the code in the `then` handler receives an array in the response parameter and filters each row o the array to produce an additional composite property called `label`, which formats the `suburb`, `state` and `code` properties into a well-formatted string. The filtered array is stored in `data.$postcodes`.

   > NOTE
   >
   > Properties in the form data object that begin with `$` are not sent to Manager with the form XML.

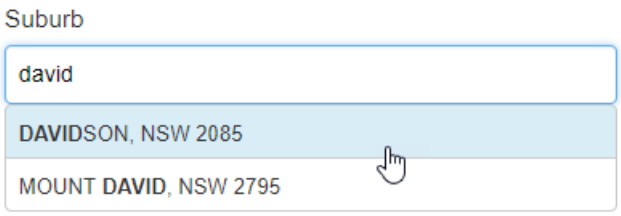
5. Build and render the form, ensuring Use Transact Functions is selected.
6. Open the rendered form as shown below:



Now, you can check that autocomplete functionality works.

Test the Form

1. Start typing in the Suburb field. You should see a list of suburbs matching your text input as you go. In this example, we typed david that produced two matches, as shown below:



2. Select a value from the listof suggestions to populate the Suburb field with the selected value.



Next, learn how to use reference data with JavaScript Library.

JavaScript Library to Access Reference Data

While building onboarding application forms, you can use various reference data to pre-fill and autocomplete form's fields, as well as validate user input against this data. Reference data is static data that is created and stored in Manager and it is pertinent to an organization, which Maestro forms, belonging to that organization, can access.

Journey Maestro allows you to access reference data, which is embedded directly into a form, as a JavaScript Library component. In this case, reference data stays with the form and has no external dependencies, which makes data versioning easier as it is managed by Maestro as part of the form content. Usually, a Form Designer supplies that JavaScript source.

Let's consider sample data with the property names `label` and `value` as a JSON object. These property names are the default values for displaying in Data Driven Dropdown components. By using these names, we can accept the default values for the dropdown's `Label Field` and `Value Field` properties. We can use any names we want in our JSON though, and simply change the dropdown properties to suit.

To use reference data with JavaScript Library:

1. Create a JavaScript file that contains a variable holding your reference data as a JSON object. You can have as many variables as you want, but for this example, we will only use one, `motorCyclesReferenceData`.
2. Open a Maestro form in the Maestro editor.
3. Add the JavaScript Library component to your form and upload a JavaScript file into it. The sample JavaScript object is shown below:

```
var motorCyclesReferenceData = [
    {
        "label": "BMW",
        "value": "bmw",
        "models": [
            {"label": "F802GT", "value": f802gt, "years": [
            {"label": "2008", "value": 2008},
            {"label": "2017", "value": 2017},
            {"label": "2021", "value": 2021}
        ]}
    },
    {
        ...
    }
];
```

4. Add a Data Field component to hold each variable that the JavaScript file contains.
5. Name the Data Field component as `manufacturers`.
6. Add a Calculation rule to the `manufacturers` Data Field, for example, `motorCyclesReferenceData`, which is the name of the plain JavaScript object used to initialize that Data Field.
7. Add a Data Driven Dropdown component to the form and name it as Manufacturer.
8. Double-click the `manufacturers` Data Field in the Data Source property.
9. Preview the form to see values from reference data the Manufacturer dropdown component.

You can reference the Data Field component in other parts of the form.

Next, learn how to use reference data with property prefill.

Property Prefill to Access Reference Data

While building onboarding application forms, you can use various reference data to pre-fill and autocomplete form's fields, as well as validate user input against this data. Reference data is static data that is created and stored in Manager and it is pertinent to an organization, which Maestro forms, belonging to that organization, can access.

As we showed in Use Reference Data with JavaScript Library, you can access reference data using the JavaScript Library component. However, Journey Maestro also allows you to access reference data using property prefill. In this case, reference data is stored and managed by Journey Manager and injected into the form's XML data at the time of the rendering of the form. There is a non-trivial setup process required in Manager, but one benefit is that reference data remains external to the form. For more information, see form prefill for anonymous users. Be aware that prefilled data is returned along with other data fields in the submission XML, which can increase the size of data passed between a client and a server. For this reason, using prefill for reference data is not the ideal choice. For example, if your reference data is a list of country codes, you don't really what to have this data come back in the submission XML.

The reference data here is held in Manager as a Form Property. Before you can assign a value to a 'Property', you need to create a Property Type for it. To do this, follow these steps:

1. Open a Maestro form in the Maestro editor.
2. Add a ManufacturersPropertyData Data Field component to the form.
3. Click the Integration tab and select the Include in Submission Data checkbox to be able to map property data into the ManufacturersPropertyData field using the Property Mapping functionality of Manager. This also causes the data field to be sent back with the submission XML data. However, we don't want to do this for reference data, so we can prevent this from happening by using the following code.
4. Add a ManufacturersPropertyDropdown Data Driven Dropdown component to the form.
5. Change the Data Source to `data.$tempManufacturers`.
6. Add the following Form Load rule to the form:

```
data.$tempManufacturers = JSON.parse(data.manufacturerspropertydata);
delete data.manufacturerspropertydata;
delete data.prefill.manufacturerspropertydata;
```

   This rule converts the JSON formatted text value that is injected into the `ManufacturersPropertyData` data field into a JSON object. Then, it saves the converted JSON

object into a temporary data field `$tempManufacturers`. It removes the `manufacturerspropertydata` field from the form data object, so it will not be sent back in the submission XML. It also removes the `manufacturerspropertydata` field from the form prefill data object, otherwise it will be merged back into the form data object before submission.

> NOTE
>
> Form fields with names beginning with `$` are not sent back in the submission XML data.

7. Save and publish the form to Manager.
8. Log on to Manager.
9. Select Forms > Property Types and click New to create a new property type using the following configuration:
   - Name: ReferenceData
   - Scope: Client
   - Data type: JSON
10. Select Forms > Forms and find and open the form in the Dashboard.
11. Click the Properties link in the Form Versions section.
12. Click New to create a new property.
13. Name it as ReferenceData.
14. Choose ReferenceData from the Property Type dropdown list.
15. Paste your JSON data into the Value field, which you can copy from the `Motorcycles.json` file.

> NOTE
>
> If you try to create a new property of the same Property Type in your form, you cannot do that. A Property Type can only be given a value by one Property in the same form.

16. Click Save.
17. Re-open your form in the Dashboard window.
18. Click Data Config link in the Form Versions section and select the Property Prefill Mapping tab.
19. Click Edit.
20. Scroll the left pane down until you can see the ReferenceData property

21. From the right pane 'Target: Form Data XML', drag 'ManufacturersPropertyData' into the 'Form Data XPath' column and drop it beside 'ReferenceData'
22. Click Save
23. In some browsers, you may now be left with a blank screen. If so, press F5 to refresh the page.
24. Open the form and select the Dashboard tab.
25. Test the form by clicking the icon under 'Direct' in the Form URLs box
26. Your form should now show data in the dropdown

Next, learn how to use reference data with a dynamic data service.

Dynamic Data Service to Access Reference Data

While building onboarding application forms, you can use various reference data to pre-fill and autocomplete form's fields, as well as validate user input against this data. Reference data is static data that is created and stored in Manager and it is pertinent to an organization, which Maestro forms, belonging to that organization, can access.

As we showed in Use Reference Data with Property Prefill, you can access reference data using property prefill. However, Journey Maestro also allows you to access reference data using the dynamic data service. In this case, reference data is stored and managed by running a custom Fluent Groovy service in Manager so it's made available at run-time when the form needs to fetch it as per a customer onboarding flow.

An advantage of this method is the potential ability to dynamically filter data. Reference data is still external to the form using this method, but it does require the creation of a service in Manager. A form builder needs to write code to persist the data and deal with different responses.

To illustrate how to use a dynamic data service, let's create a new Manager service which returns a JSON as a text, so you can call the new service from a form, using the form's load event, to populate a dropdown.

To use reference data with the dynamic data service:

1. Log on to Manager.
2. Create a new service using the following configuration:
    - Service Type - Dynamic Data.
    - Service Template - Fluent Dynamic Data.
    - Service Name - Motorcycle Manufacturers.
    - Select a required organization.
3. Edit a Groovy Script using the following snippet. You need to replace all the existing JSON text between the pairs of triple single-quotes (''') with text from the `Motorcycles.json` file as shown below:

```
String data = ''' [
	{
		"label": "BMW",
		"value": "bmw",
		"models": [
			{"label": "F802GT", "value": f802gt, "years": [
			{"label": "2008", "value": 2008},
			{"label": "2017", "value": 2017},
			{"label": "2021", "value": 2021}
		]}
	},
	{
		...
	}]
	'''
return data
```

4. Lo on to Maestro.
5. Create a new form using the following configuration:
   - Drop a Data Field onto the form and name it as `ManufacturersDDS`.
   - Drop a Data Driven Dropdown onto the form and name it as `Manufacturers From DDS`.
   - Double-clicking on `ManufacturersDDS` and change its Data Source to `data.-manufacturersdds`.
6. Click Form Options and click Form Rules.
7. Click Create Rule and select Load under Form.
8. Enter the following JavaScript code:

```
DynamicData.call("Motorcycle Manufacturers", {}).then(function(response) {data.-
manufacturersdds = response;});
```

9. Click Save to update the rule.
10. Click Save to save the form.
11. Publish the form and render it to see data fetched by the dynamic data service in the drop-down

Next, learn how to use a cascading dropdown.

Use Reference Data with Cascading Dropdowns

While building onboarding application forms, you can use various reference data to pre-fill and autocomplete form's fields, as well as validate user input against this data. Reference data is static data that is created and stored in Manager and it is pertinent to an organization, which Maestro forms, belonging to that organization, can access.

Journey Maestro allows Form Builders to access reference data using Cascading Dropdowns. For more information, see Prefill a Cascading Dropdown in Composer

To complete your reference data implementation, you need to add cascading dropdowns. Here we will add additional dropdowns for Model and Year to the form. When the value selected in the manufacturer dropdown changes, the model will be re-populated with the models available from the chosen manufacturer. Similarly, when the model dropdown selection changes, the years dropdown will be re-populated.

Because we have continued to use the 'label' and 'value' properties throughout all levels of our JSON data, we don't need to change the 'Label Field' and 'Value Field' properties on any of the dropdowns.

The instructions here relate to the initial Data Field named 'manufacturers' and Dynamic Data Dropdown called 'manufacturer'. We created these components in the JavaScript library method. If you followed the JavaScript Library instructions and saved your form, re-use that form here so that your data fields and dropdown names match these instructions.

1. Open a Maestro form, which you created using the JavaScript Library, in the Maestro editor.
2. Check the Calculation rule on the 'manufacturers' Data Field... it should already contain `motorCyclesReferenceData` from the JavaScript Library method instructions
3. Add 2 more Data Field components to your form, name them 'models' and 'years'
4. Add 2 more Dynamic Data Dropdown components, name them 'Model' and 'Year'
5. Change the Data Source properties of Model and Year dropdowns to the Data Fields 'models' and 'years'

6. Add a Change rule to the Manufacturer dropdown, with the code:

```
var selected = data.manufacturer;
data.manufacturers.some(function(element) {
    if (element.value === selected) {
        data.models = element.models;
        data.years = undefined;
        return true;
    }
});
return undefined;
```

7. The code above will execute when the Manufacturer dropdown selection is changed. The code just replaces the Data Fields 'models' with the child property 'models' from the selected manufacturer, and also sets 'years' to undefined.
8. At this stage, you could Publish and render your form and see the Model dropdown populates on a change of Manufacturer, but the Year dropdown is always empty. We will implement a Model Change rule to bring the Year dropdown into play.
9. Now add a Change rule to the Model dropdown, with the code:

```
data.years = data.models.filter(function(element) {
    return element.value === data.model
})[0].years;
```

10. The code above just sets the 'years' Data Field to the years property of the currently select model. It closely follows the Manufacturer change rule code but is implemented slightly differently to demonstrate there are different methods that can be used to achieve the same result. In this case, we use the JavaScript filter function to find the matching data from the models Data Field.
11. Save and Publish your form so you can see the cascading behavior between the Manufacturer, Model, and Year dropdowns.

Next, learn about pre-submit validation.

Dynamic Data Overview

Maestro forms are made up of HTML, CSS, and JavaScript, and are executed when the form is deployed in a web browser. You can think of Maestro forms as AngularJS[1] single page applications that run in a browser. Almost every form interacts with a form user who, at some stage, is required to enter some data into the form.

Data, which Maestro forms use to represent fields' content, is formatted as XML. When a form is first rendered, an XML document is generated to store data collected by the form. This XML is eventually populated, updated and then saved when the form is submitted to the Manager server.

A Maestro form has the concept of repeats to model real-world repeatable data, such as lists of addresses, applicants and so on. These fields can be wrapped inside repeating components, with various means of controlling the number of repeats dynamically.

A form generally needs access to some type of dynamic data, including personal data contact details, reference data lists of city names, and volatile data, such as current interest or exchange rates. This data is regarded as dynamic as its nature changes according to the information the form is designed to collect, and who is the form.

A well-designed Maestro form should make use of dynamic data that is external to the form itself. You should not hard-code data into the form, but rather access it dynamically when the form is run. Keeping data outside of the form definition leads to a form that can dynamically adapt to changing circumstances. This adaptability can reduce the overall impact of any changes to the data content, or the business rules that govern the data.

A form still needs its supporting data, regardless of where it's kept, so either the form must be given all the data it needs, or the form must collect the data itself. This can be done using one of the following methods:

- Prefill – data is given to the form by Manager, which writes values into the form's XML file during rendering.

---

[1]AngularJS is a structural framework for dynamic web apps. It lets you use HTML as your template language and lets you extend HTML's syntax to express your application's components clearly and succinctly. AngularJS's data binding and dependency injection eliminate much of the code you would otherwise have to write. For more information, see http://angularjs.org/

- Dynamic Data Services – the form pulls its own data when it is required by executing JavaScript code, which calls Manager dynamic data services.

Dynamic data can be used for several different purposes in a form, including:

- Presentation – to display information to a form user completing the form, for example, displaying terms and conditions that may vary according to circumstance.
- Calculation – to calculate real values based on volatile variables such as current interest rates, share prices, or currency exchange rates.
- Experience – to help a form user enjoy a better user experience by allowing them to pick from lists, or provide auto-completion of, for example, country or city names.
- Validation – to ensure forms contain data that is not only correctly formatted but conforms to business rules and data relationships.
- Decision-making – to determine the behavior of the form in response to user input, for example, directing users to additional pages for confirming eligibility or entitlement.

This document describes the Prefill and Dynamic Data Services methods of working with dynamic data.

Prefill Dynamic Data

Manager applies form prefills from all enabled prefill sources in the order listed in the table below.

Source	Managed By [1]	Mapped By [2]
XML Seed file (enable) [3]	Forms/Forms/form/Form Dashboard/Form Versions box/Data Config link/Form XML Data tab	Input XML Prefill Mapping
Organization properties	Forms/Organizations/organization/Properties tab	Property Prefill Mapping
Form properties	Forms/Forms/form/Form Dashboard/Form Versions box/Properties link	Property Prefill Mapping
URL request parameters	Form Dashboard/Form Versions/Data Config link/Request Param Prefill Mapping tab	Request Param Prefill Mapping
User profile properties	Security/User Accounts/User/User Profiles tab/profile name/User Properties tab	Property Prefill Mapping

Form Prefill Service (XML)	Forms/Forms/form/Form Dashboard/Form Versions box/Services link/Services tab/Form Prefill Data Service dropdown Services/All Services/service/Groovy Script tab	Not required

NOTE

[1] - The Managed By column shows where to go in Manager to manage the prefill source content.
[2] - The Mapped By column shows where to apply mappings for that source. The destination for all prefill data is the form XML.
[3] - XML seed prefill is not enabled in a form space by default, so it needs to be enabled in the Form Space >Properties Edit tab

Prefill data applied at higher rows, shown in the table, will be overwritten by enabled lower rows if there are multiple mappings from prefill sources to the same form field.
A Maestro form designer does not need to do anything extra or special to have a form's fields prefilled. It's just 'there' as though it was given an initial value by the form designer at design time. Manager does all the work to configure mappings and push values into the form XML without the form even being aware of what has occurred.

Form Prefill Service

Form field content in a Maestro form is formatted as XML. The initial XML of a form can be provided at render time by a custom Groovy service – a Form Prefill Service. The service to be used for a form is specified in the Form version Services tab. XML from the Form Prefill Service is directly pushed into the form XML, without the need to map values from source to destination. If the XML contains repeating elements, repeating components are dynamically created in the form.

Prefill Mapping

All other prefill sources require mapping to direct their values into the structure of the form XML. A mapping target form field is specified by an XPath expression. The source field of each mapping is specified differently according to the prefill source:

- Property – source is specified by property name.
- Input XML – source is specified by another XPath expression.
- Request Parameter – source is specified by URL request parameter name.

In the case of input XML mapping, repeating components in a form are automatically set to the number of repeated elements of the input XML, provided that the mapping is made between the parent items of the repeated content.

Property Prefill

Properties are defined at the following scopes, where each scope has slightly different rules regarding properties:

Property Types

Except for untyped form properties, all properties must be associated with a 'Property Type'. A property type defines the nature of a property but does not provide a value for one.
Property types are a combination of:

- A unique name within the Manager instance.
- A scope – Organization, Form or User.
- A data type - Boolean, HTML, Image, JSON, List, Long Text, Number or String.
- An optional organization – if not provided, the property type will be global and be available to all organizations that want to use it.

Organization Properties

An organization can define only one property of a given property type, but It is not necessary to define a property for each property type if one is not needed.

Form Properties

Each form property may be of a defined property type or may be un-typed. A form can define only one property of a given property type, but It is not necessary to define a property for each property type if one is not needed. An untyped form property must have a property name which is unique within the form, a data type - Boolean, HTML, Image, JSON, List, Long Text, Number or String, and a value.

User Profile Properties

A user profile property must be of a defined property type, or one of the pre-defined property names: Email, Family Name, Given Name, or Mobile.

Prefill Caveats

The list below identifies several of the caveats surrounding the use of form prefill.

- A form is only prefilled when it is first rendered.
- A form that is saved and retrieved is not prefilled again, even if property or seed values in Manager have changed since the initial render.
- You can prefill form fields only with string values.
- A field cannot be prefilled unless it's represented in the form XML – which means its property 'Include in submission data' must be ticked while designing the form in Maestro.

Dynamic Data Services

Unlike prefill, which happens like magic, a form must implement its own logic to fetch data from a dynamic data service. A form is in absolute control over if, when and how it calls dynamic data services. While it is executing, a Maestro form is always able to stay in communication with the server that rendered it, so it's quite easy for a form to ask for more data when it decides it needs it. Manager supports two types of dynamic data service, both of which are implemented in the Groovy language:

- Groovy Dynamic Data Services.
- Fluent Dynamic Data Services.

The difference between the two is in the way that the Groovy APIs are designed. Both choices have no impact on the way that a Maestro form calls them. 'Fluent' is a style of designing APIs. See towards the end of this document for a brief explanation. A Maestro form can call either service type, and in fact, has no knowledge of which type has been used to implement the Dynamic Data Services. When code in a Maestro form makes calls to dynamic data services, complex parameters in JSON format can be passed. Complex values may also be returned in the response, again typically in JSON format, although the exact format returned is up to the service author.
Dynamic data services are called using two different techniques:

- Dynamic Data Button – a Maestro component that can be configured to call any dynamic data service. It is a visual component you configure with point and click using the Maestro user interface but can be hidden and activated by code instead, if required.
- DynamicData.call – a Maestro API method that requires more effort to implement, and some more JavaScript programming knowledge to use. The Dynamic Data Button uses this API method to do its work behind the scenes.

Dynamic Data Button

This Maestro component provides all the capability a Maestro form needs to call dynamic data services. You configure it entirely within the Maestro user interface, where you can take

advantage of input and output mapping dialogs to collect input parameters and distribute results. You can also write code in the On Success and On Failure rules that the component provides. The Dynamic Data Button is a visual component, so it will be visible in the Maestro design mode, unless it is excluded, and will be visible at runtime unless it is hidden with a visibility rule.

DynamicData.call

This method calls a Manager dynamic data service, passing in any parameters you provide, and returns a Promise object from which you can obtain the response, so you need to know a little more about JavaScript programming to use it.

You will need to acquire the parameter values, marshal them into method parameters, call the API method, then deal with the returned Promise to retrieve the returned value when it is ready. You will then need to un-marshal the values from the response and distribute them to other components on your form. You will also need to write code to deal with errors. Unless you have a good reason, it's preferable in almost all cases to use Dynamic Data Buttons to call dynamic data services, because it reduces the overall amount of custom JavaScript code you need to write.

One case where you will need to use DynamicData.call is if the response returned from a service call contains nested properties, as the Dynamic Data Button can only map output properties at the top level of the response object. The following example show an JSON response with a nested object `bsb`, which is a child of `data` and not a child of the root, so it can't be output-mapped by a Dynamic Data Button.

Nested JSON object:

```
{
	"success": true,
	"data":{
		"bsb": "012-002",
		"bank": "ANZ"
	}
}
```

You will need to use DynamicData.call in this case, unless you can have the service changed to return a flat JSON object like:

Flat JSON object:

```
{
        "success": true,
        "bsb": "012-002",
        "bank": "ANZ"
}
```

What to fetch

A dynamic data service can return data from absolutely any source, including data held within Manager, as well as data from external sources, such as public or private web services. One source of data that can be easily accessed is organization property values. Complex JSON objects can be returned. from Is there supposed to be more here?

When to fetch dynamic data

From an efficiency aspect, it is preferable as much as possible to fetch data only once, when a form loads, in the Form Load Rule. Such data can then be retained for the lifetime of the form. However, not all data lends itself to this usage pattern.

Consider that when a new form loads, for example, nothing may be known about the person filling the form in, so you cannot yet ask for their personal data. It is important to consider that you may not want to load a list of all city names in the world until you at least know what country you need city names for. There are choices that need to be made about exactly when and how often to fetch dynamic data, which largely depend on the type of dynamic data required.

> NOTE
>
> Do not call DDS in a calculation rule.

Dynamic data can be loosely categorized as:

- Personal Data.
- Reference Data.
- Volatile Data.

How to test dynamic data

When developing a Maestro form, you can't call services for the following reasons:

1. It is likely that your form is located on one of the shared Maestro instances which will not have the service available. On the shared instances we do not install services as this

should be done on your organization Journey Manager instances.

2. Even if it was available on the same environment, previewing the form generates the form and injects it into an iFrame and only is running in your browser, it is not part of a transaction so Journey Manager would not acknowledge the service call it would not have a valid request key that Manager requires to handle a dynamic service call.

This means that you can't invoke `DynamicData.call()` in preview without adding preview data.

You can add the following script to your code that does something like:

```
if (Resource.preview) {
  Form.addPreviewDDSData("myService", {name: "Glenn", team: "Journey Maestro"})
}
```

Or

```
if (Resource.preview) {
  Form.addPreviewDDSData("myOtherService", function(params) {
    if (params.name) {
      return {message: "Hello "+params.name }
    } else {
      return {message: "Hello unnamed person"}
    }
  });
}
```

This way you can test your function calls while providing stub data as publishing the form and pushing it to your Journey Manager instance and then testing your form does have a longer round trip than using preview. For more information, see the API documentation for `Form.addPreviewDDSData(serviceName, dataOrHandler)`

Personal Data

Personal data is related to the individual(s) interacting with the form. By definition, you can only fetch personal data once you have identified the individual(s) concerned. This data could include:

- Existing policies or accounts.
- Employment history.
- Contact details.

In this case, personal data can be fetched only once enough identifying information has been captured to perform a data lookup. It should not be necessary to fetch that same data again during the form's lifetime.

Reference Data

Reference data typically consists of values or lists that don't change all that often, so you can probably safely obtain it when the form first loads and keep it for the entire form session. This type of data is typically used to allow applicants to pick from dropdown lists, to validate form content and to provide fixed values on forms, such as:

- Lists of countries.
- Vehicle models.
- Insurance or finance products.
- Phone numbers.

It is quite a common scenario to select an initial value from a reference data list of, say countries, and make further calls for more specific data such as city names. Similarly, selecting a vehicle manufacturer may require further calls for models, years, colors or related options.

Volatile Data

This is data that is constantly changing and should be called for as late as possible, just before you need use in a calculation, such as:

- Share prices.
- Exchange rates.
- Interest rates.
- Number of seats remaining for a flight.
- Account balances.

In this case, volatile data may need to be fetched more than once, immediately before use each time.

Accessing Prefill Data

It's useful to understand the data processing pipeline that Maestro goes through when populating a form (at least at a high level).

- The prefill XML (provided by prefill services in Transact Manager) is parsed and turned into an in-memory Javascript object graph with the same structure as the XML.

- An object graph called "data" is constructed, using the fields in the form to determine the structure of this object graph.
- The "data" object is initialized from the prefill object.
- The data object is further modified as calculation rules fire.

The "data" object is live, in that it is continually changing as the user interacts with the form, and calculation rules fire. The "prefill" object never changes. In some scenarios, it may be helpful to refer to the original prefill information.

We may want a display field to show the original value of a prefill value, and not change if that value is changed by the user. In this case, you can directly reference the prefill object like this: `{{Form.prefil.TestText}}`.

If you would like to see the prefill data object in your browser's debugger, type: `maestro.Form.prefill` at the console prompt.

Next, learn about component data binding.

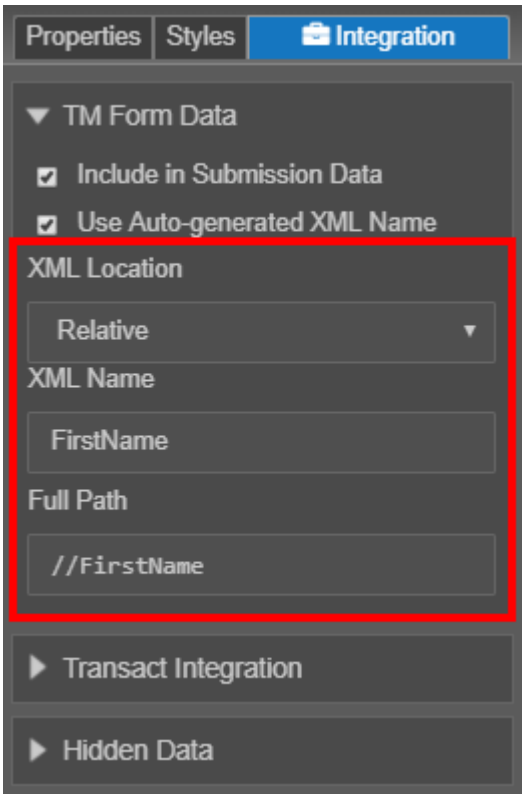
Component Data Binding

The Maestro editor allows you to link a component in a form to the XML data layer using the Integration pane. This process is known as data binding.

Relative Binding

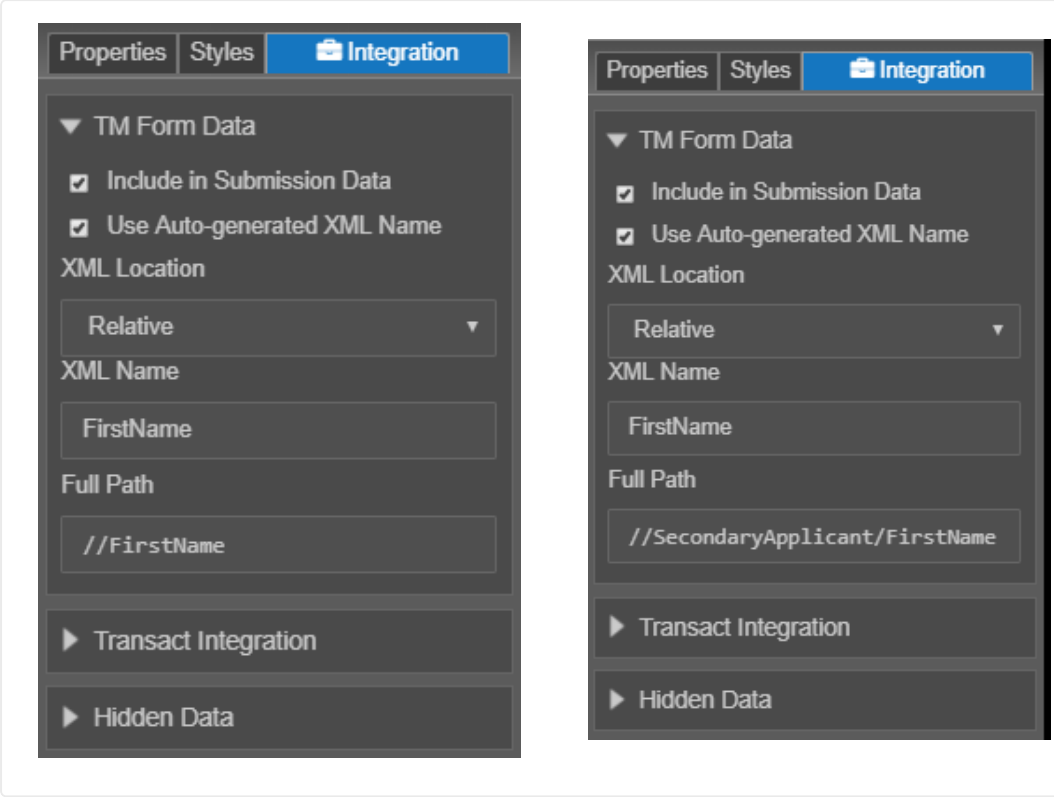
By default, most items (exceptions include pages, sections, blocks, and data fields) are bound under the root element in the XML layer, unless their parent container has been included in the submission data. This is known as Relative binding. If an item's hierarchy changes, the XML Name will automatically be updated to reflect this.

On the Integration panel, you will find the XML Location, XML Name, and Full Path. These options will only display if the component is not part of an entity.



Notice, the Full Path in the images below.

Parent not included in submission data	Parent is included in submission data



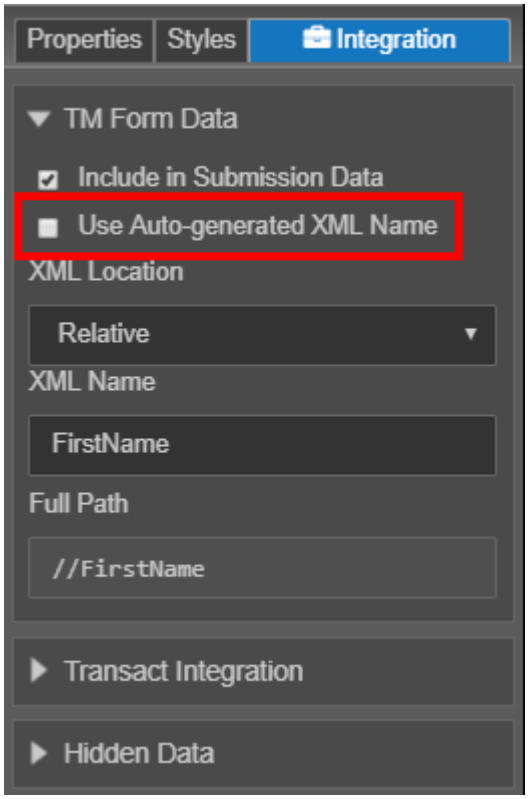
You can include components in the submission data, by selecting the component and then selecting "Include in Submission Data".

Absolute Binding

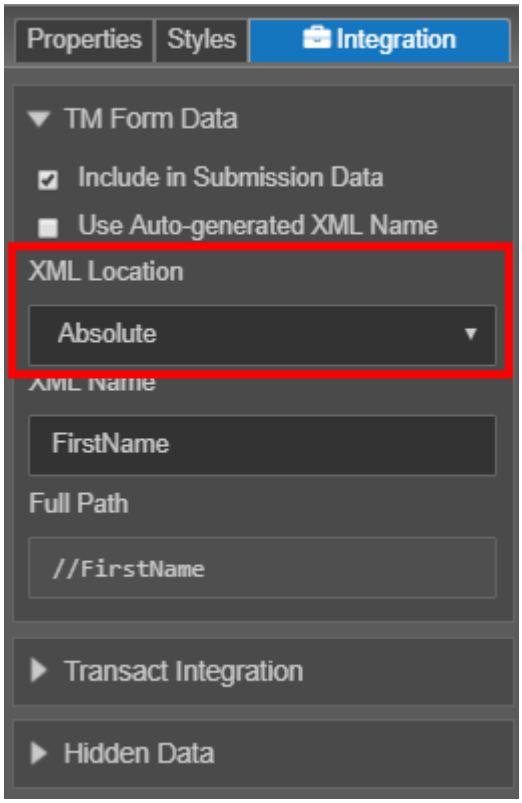
If you want to ensure that an item is always going to be bound to a particular XML tag, use "Absolute" binding.

To change to absolute binding, follow these steps:

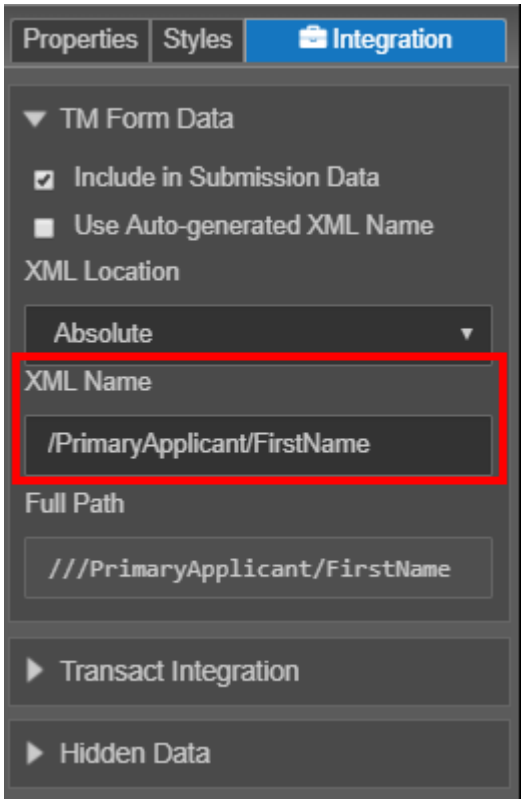
1. Select the component and switch to the Integration panel
2. Clear the Use Auto-generated XML Name checkbox to change the XML Location.



3. Select Absolute from the XML Location dropdown list.



4. Change the XML Name to include the component you want to bind the selected component to. This will update the Full Path.



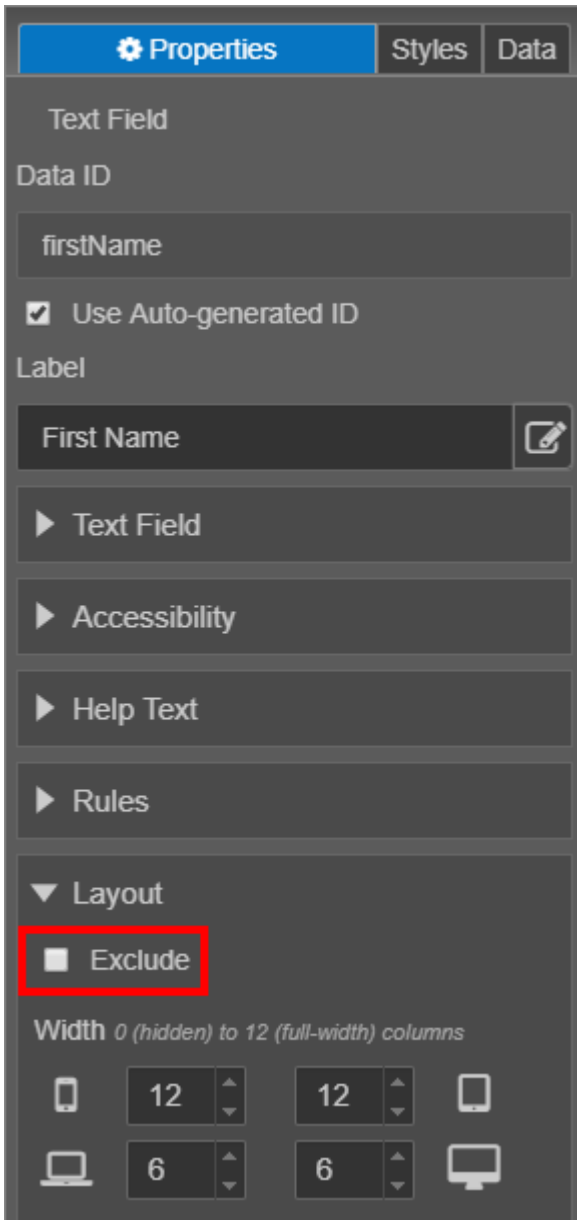
You should also use Absolute binding when you are binding to externally generated XML. It is safer to use Absolute binding to ensure the structure remains as you expect. For more information, see data model.

Exclude a Component

You can exclude a component from the form's XML if needed.

1. Select the component.
2. Switch to the Properties panel.
3. Expand Layout.

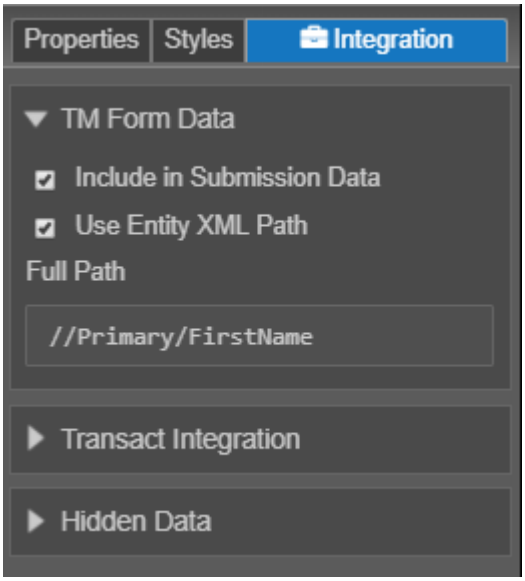
4. Select Exclude.



Components Using Entity XML Path

When a component ID contains an entity the Integration panel options will be different.

The XML Location and XML Name properties will not be available. The location will be based on the entity included in the ID property as displayed in the Full Path property. You can deselect Use Entity XML Path to enter a different Full Path.



We recommend checking Submission Data Extract

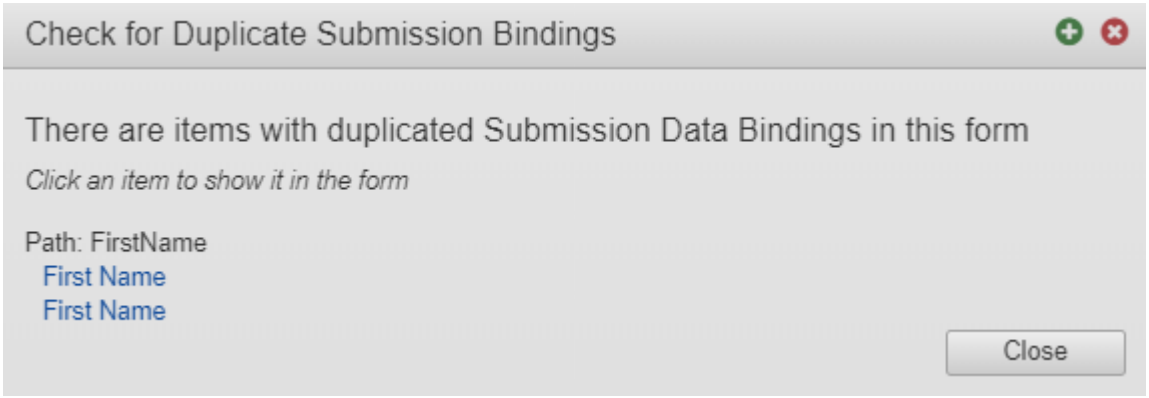
Next, learn about XML data payload.

Check for Duplicate Data Bindings

The Maestro editor allows you to check for duplicate data bindings of components that may occur in a form while you are working on it. When you add a component on a form, an item's ID is auto-generated in a way it's unique across the form. However, you can still override its ID and that's when a duplication error may happen. The Maestro editor will warn you about it while you are in design mode, for example: Value generates to a duplicate ID. Unable to assign the ID "firstName" as it already exists in this design. It has been changed to "firstName_1". If you still try to build the form with a duplication, the Maestro editor will show the duplicate bindings message as well.

To check for duplicate data bindings:

1. Open a form in the Maestro editor and click Settings Menu.
2. Select Check for Duplicate Bindings.



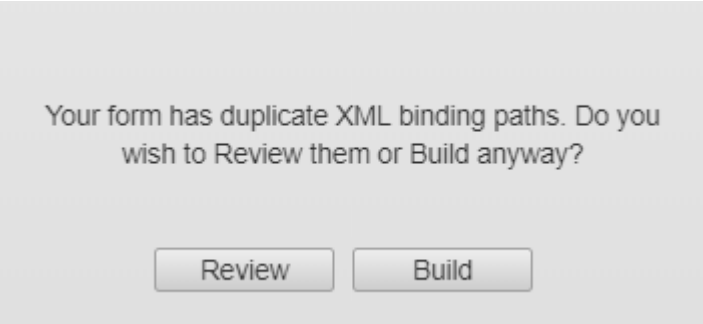
3. Check the list of the components that contain a duplicate binding and resolve the issues.
4. Click Close.

Next, learn how to resolve duplicate data bindings.

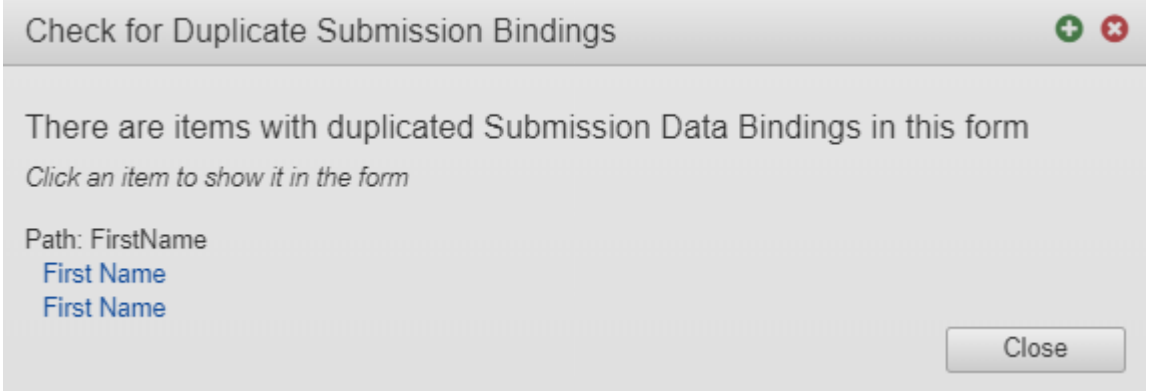
Resolve Duplicate Data Bindings

Duplicate bindings occur when more than one component shares the same XML Name. This can be caused by using the Accept button when a duplicate ID occurs, or when the XML Name is manually updated by editing the XML Name from the Integration panel. If you enter the same XML Name as another component you will not receive an error message until you use the Check for Duplicate Binding Errors option or build the form version. For more information, see form data configurations.

When you add components to a form, Maestro will automatically add this component to the underlying XML layer. Parent containers are not automatically added so the default XML structure is flat. Therefore, you may inadvertently, or purposely, bind two components to the same location. The dialog shown below displays when Maestro detects that two components have the same XML binding location when you build the form version.



Click Review to view the components that contain the same ID.

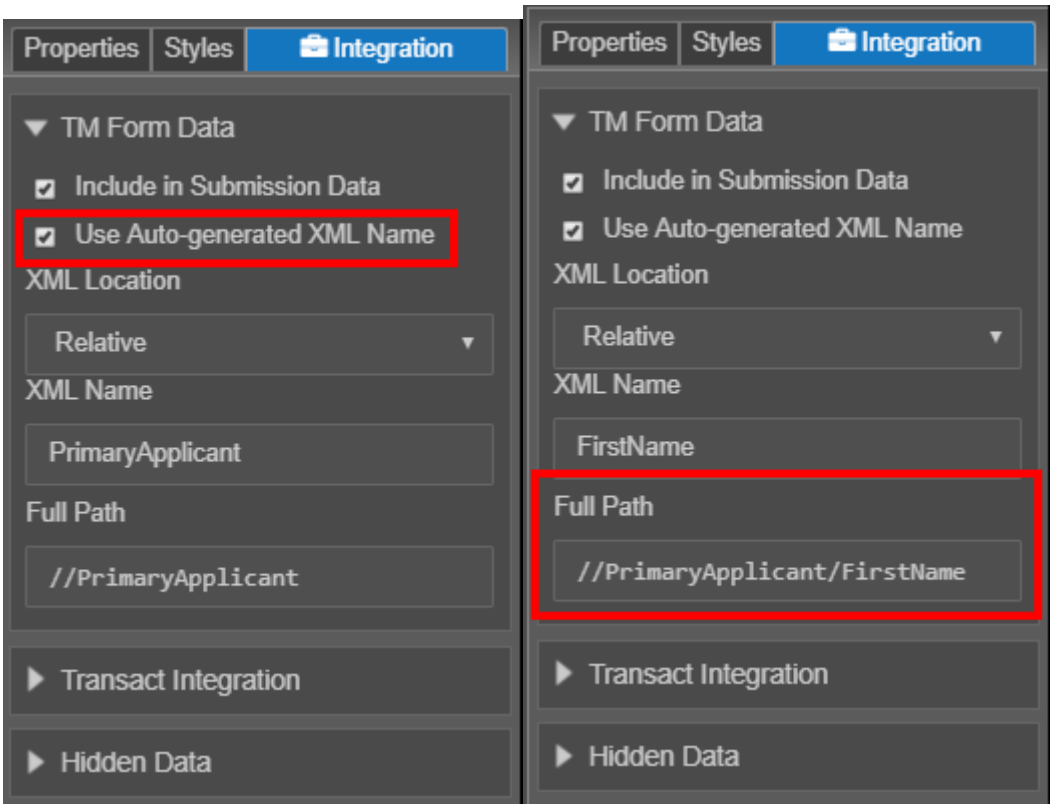


Click Build to continue building the form version. However, that can cause unexpected issues.

You can check for duplicate bindings at any time while developing the form.

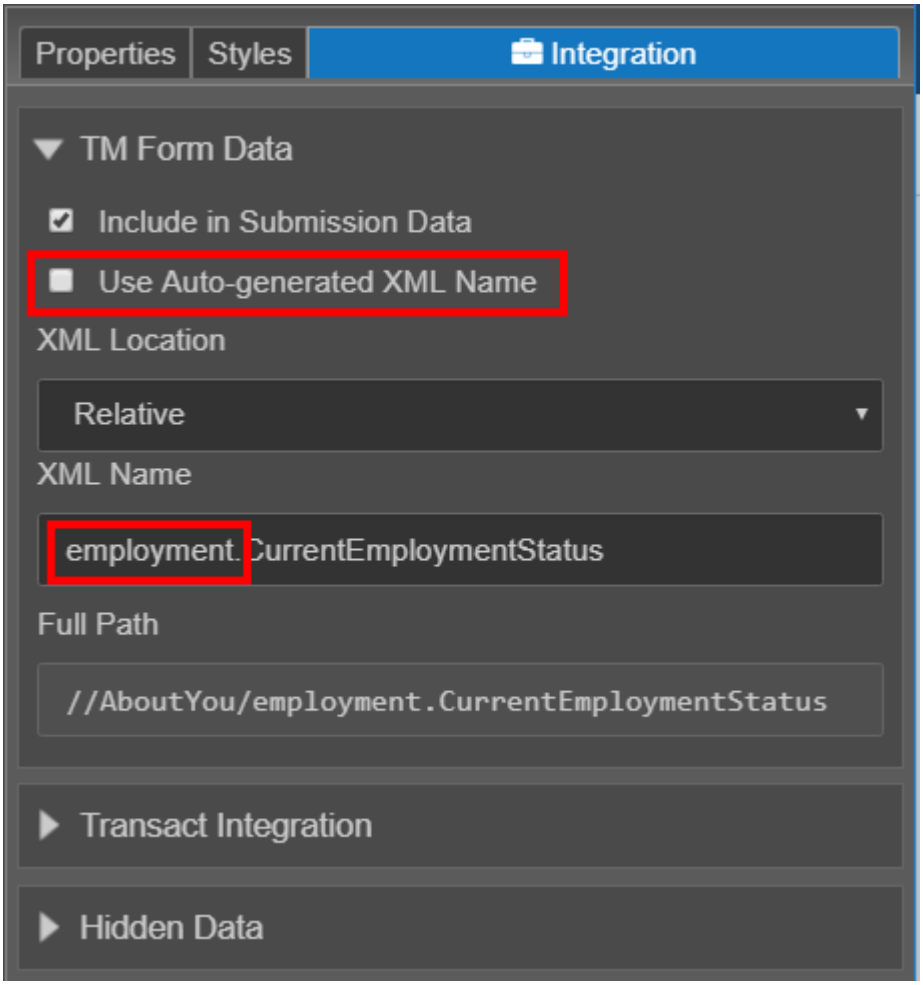
One way to resolve this issue, is to modify the component's parent's binding to ensure the components with the conflicting binding have different paths.

To achieve this, select the parent container of the component, select the Integration tab and select the "Include in Submission Data" option and ensure the XML Location option is set to Relative.



Updating the container component will update the Full Path of components within the container that are set to a Related XML Location.

Another option is to select the component and manually update its XML Name property to include an additional parent level.



You may use either a dot (.) as above or a backslash (/) to create the additional parent in the component's hierarchy.

User Mobile Device Detection

When building adaptive UX in Maestro you may run into a requirement to present different content to users depending on whether they are on a mobile or desktop client. For example, it is unlikely that desktop users will utilize their camera to snap a photo of their driver's license so you may want to down-play this capability for desktop users and promote it for mobile users.

Unfortunately there is no standard way to determine if a user is on a mobile device and a Google search will uncover strong debate over the best way to achieve this. This example provides one simple option that searches the user agent string for a set of known mobile or tablet identifiers.

Let's look at the example of 'Is Mobile' Detected

The following JavaScript snippet demonstrates a simple example on how to detect if the user is on a mobile (or tablet) device. This will not give 100% coverage but should cover most of the commonly encountered devices.

> NOTE
>
> var isMobile = navigator.userAgent.match(/(iPhone|iPod|iPad|Android-|webOS|BlackBerry|IEMobile|Opera Mini)/i)

You could add this code directly into your rule scripts, or create a reusable JavaScript library that you can distribute among your teams.

For more fine-grained detects you may want to review the Modernizr library which provides a comprehensive analysis of the HTML, CSS and JavaScript features the user's browser has to offer https://modernizr.com/

To using Modernizr in Maestro:

1. Build your custom modernizr-custom.js file on their website and download it.
2. Add a JavaScript library to your form and upload your Modernizr JS file.
3. Now in your rule scripts you can use the Modernizr detects, for example, `if (Modernizr.touchevents)`

Components Overview

Maestro comes with a wide range of components, also known as widgets, that you use to build forms. Components are the modular building blocks that can be dragged and dropped into all types of designs, including forms, receipts, templates, and even other components. Some components are simple elements, such as the Text Field component or the Image, while others provide more complex functionality, such as the LinkedIn Auto-Fill component.

You can access all available components from the Palette pane of the Maestro editor where you can create, add, edit and delete them. Each component has a set of properties, rules and styles allowing you to configure it and its behavior to your requirements. A component inherits some of properties, rules and stiles from a parent component as well as it has its own configuration set, which gives you extra flexibility in building highly reusable components and templates.

Components are organized within category folders. You can browse each category to find the component you want to use on your form, or you can use the search box at the top of the Palette.

At the top of the component list, you find the favorites category, which displays the most commonly used components. You can add or remove components from the favorite list based on your own personal preferences. The changes you make to the Favorites list are stored in your Maestroaccount, not within the form. The components you add to or remove from favorites are displayed each time you open a form in the Maestro editor.

Maestro distinguishes between the following types of components:

- Core (Native) components
- Custom shared components
- Custom native components
- Exchange components

Now, let's look at each component type in detail.

Core (Native) Components

Core components, also known as Native components, are fundamental components and are shipped with Maestro software so you can use them out of the box. They are the low level components and include HTML, CSS and JS. Native components can be customized and combined to create shared components or added directly into forms, templates, and receipts.

Native components are the basic widgets that are supplied with Maestro. These include components for entering a single data value, such as data entry fields, checkboxes, radio buttons,

and dropdown lists. There are also a number of more sophisticated components such as numeric and number fields, and more. Many components have at least two sub-parts, the label and the data entry area. Some also include an icon (such as a currency indicator), and most will allow for an optional help icon to display help text. A date field is arguably a more complex component, because it includes a pop-up calendar control - but is still really just a simple component.Under the covers, a simple component consists of an HTML definition, a Maestro descriptor that tells Maestro what properties to display in the Properties tab, and optional JavaScript and CSS. However, as a Maestro user, you are shielded from the underlying complexity, and simply drag and drop the component into your form. These components are usually shipped in the product, although they can be built by anyone with HTML, CSS and JavaScript skills.

A component can have translation settings which are used to translate error messages, calender entries, display format, and right-to-left formatting when displayed to form users.

NOTE

We recommend getting familiar with the complete list of components so you know what is available to you while creating a form.

KEYBOARD SHORTCUT

Most of native component have a keyboard shortcut assigned to them.

Custom Shared Components

Custom shared components are the components that you can create using the Maestro editor to implement your business requirements. Usually, you use existing core components, create specific business rules for them, bundle them as a resource, and finally publish it. This makes the resource shared so you can use it across your forms. Shared components are not native components, so they have some limitations. Shared components are the components that users can build in the editor when they create a component that can use native components or other shared components.

In other words, shared components are combinations of existing components. You can, for instance, create a "Full Name" component that contains two Text Field components -- one for the first name and one for the last name. This component would be visible via the Palette pane, configurable via the Properties pane, and completely reusable -- just like any of the components included with Maestro.

Custom Native Components

Custom native components are the components that you or somebody else can create, package and import as a Maestro library. These components are an advanced type of components that are created outside of the Maestro editor Custom Native components should only be created when absolutely necessary. In most cases, a custom shared component will meet your business requirements and should be used prior to creating custom native components. Custom native components are native components built outside the product team and are usually client specific, but could be, for example, Exchange components.

You can embed non-native components in your form, like address, you can add it and then right click on it and select embed and it will remove the component reference and add the properties, etc to the definition used in the form.

> NOTE
>
> As with all design types, components support versioning. To learn more, refer to Versions.

Maestro distinguishes two types of complex, composite components - Dialogs and Modal Pages - which are designed to perform specific actions:

- Dialogs: display to or request some action from a form user
- Modal Pages: represents a start or an end point where a form user must perform a task, an action, or make a decision

Next, learn how to add a component to a form.

Component Common Properties

A component can have many configurable properties, which you can adjust to control its behavior. Different components have different sets of properties, which you can check here. However, all components have the following common properties:

- Name
- XML Name
- ID
- Label
- Rules
- Layout

Let's take a look at each of these common properties.

Name

Each field also has a name. The name is usually the same as the caption. The field's name is displayed in the Structure tab, as well as at the top of the Properties tab. The name is usually the same as the label. The only time you might be aware of the name is when a field's label is very long. In this case, Maestro will give the field a truncated name. The example of Name is First Name.

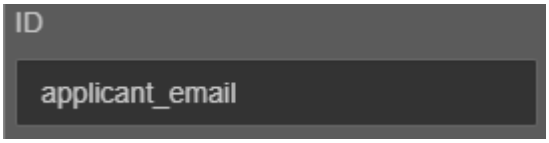
XML Name

The XML name is used by Maestro to construct the XML payload for the form. The XML name will be used as the element name for this field in the XML structure. By default the XML Name is calculated from the Name. It has spaces removed, and will capitalize the individual words within the name. This naming convention more closely follows what many people use in XML Schemas. If you use the Data Mapper to bind fields to a seed file, then the XML Name will be updated accordingly. The example of XML Name is FirstName

ID

The ID is a unique identifier for the component. This is an internal name, which is used in calculations. Every widget also has an ID. By default the ID is calculated from the Name. It has spaces and other prohibited JavaScript characters replaced with underscores, and truncated. You can override the default generated value and use your own, more meaningful name. The example of ID is `first_name`.

You can change the ID as required.

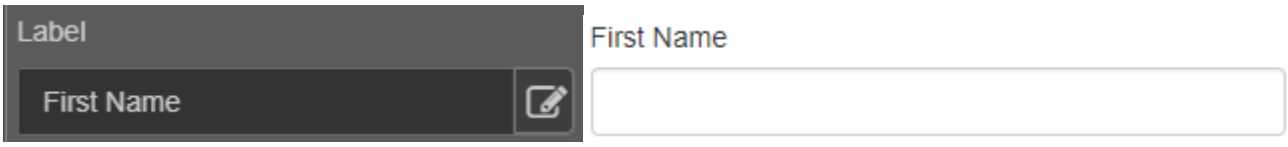


NOTE

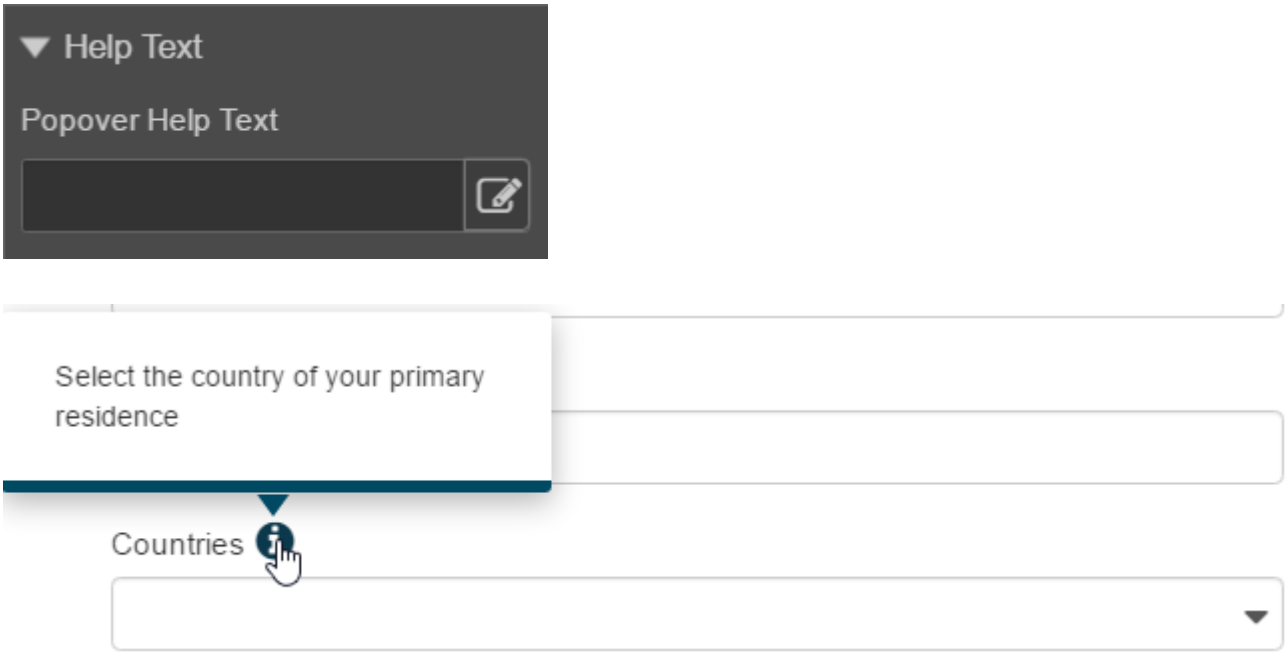
You are strongly recommended to override the default values of both the ID and XML Name of any fields which have a long or non-meaningful labels. This will assist greatly when you are writing calculations or working with the data.

Label

The first property of every component is the Label. It is displayed to the user on the form, but you may choose to leave the label empty. The subsequent properties vary depending on what type of component is selected. The example of Label is First Name.



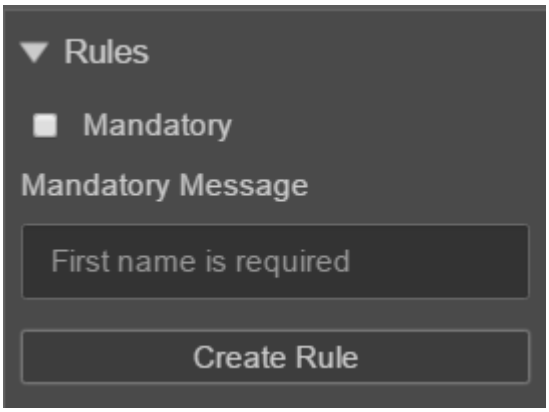
Help Text > Popover Help Text: When you enter text in the Popover Help Text, an information icon will display next to the component. The form user will be able to select the icon or roll their mouse over the icon to display the entered help text.



Some properties, such as help text, labels, and text display, can contain rich text. The Maestro editor comes with the rich test editor which you can use to create rich textual content including various styles and images. The editor has the Icon Picker functionality allowing you to choose an icon for the label. | 21.05 This feature was introduced in 21.05.

Rules

The Rules section is where you can mark components as mandatory and create additional rules such as visibility, validation, calculation, or editability.

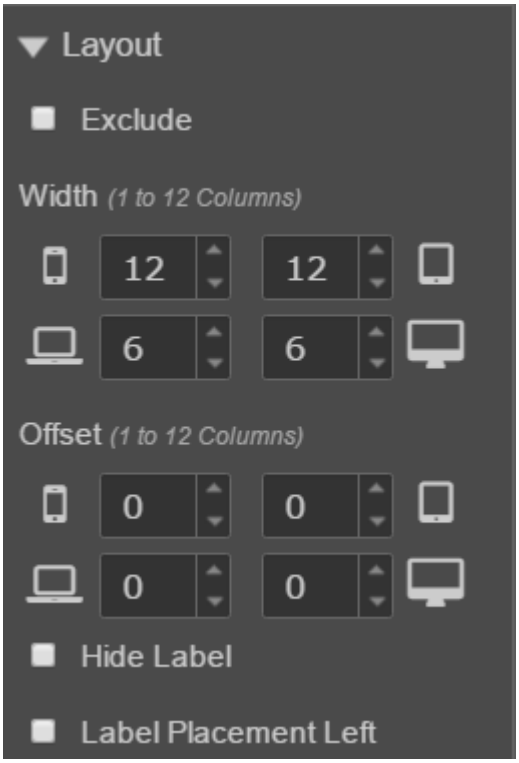


Under the **Rules** heading, properties are available for affecting the rules assigned to the component:

- Animate Visibility - this option will only be available if a Visibility rule exists on the component.
- Create Rule - open the Create Rule dialog to assign a rule to the component.

Layout

The Layout section is where you can change the position and width of a selected component.



Under the **Layout** heading, properties are available for affecting the appearance of the component:

- Exclude allows you to remove the component from the form, without deleting it. It removes the component from the form without removing it from the View pane. This is useful for disabling parts of a design without deleting them.
- Width allows you to set the width of the component based on the breakpoints, or screen size of the device used to view a form. It adjusts the number of columns available to a component.
- Offset allows you to set the horizontal position of the component based on the breakpoints of the device used to view a form. It adds empty columns to the left of the component.
- Hide Label allows you to hide the label of the component on the form.
- Label Placement Left moves the label to the left of the selected component. The default position of label components is above the selected component. Label Placement Left

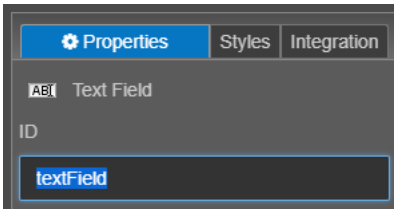
The Properties pane of the Maestro editor allows you to view and edit a component's properties.

Next, learn about component form dependencies.

Component ID Overview

Every component on a form has a unique identifier, also known a component ID, which you can use to refer to the component. This ID is initialized when you create a component, but you can changed it at any time in the ID field on the Properties panel.

When you add a new component to a form, the ID property is assigned a default value and is highlighted automatically so that you can start typing into the field. The ID's default value is based on the component type; for example, the default ID for a Text Field is "textField".



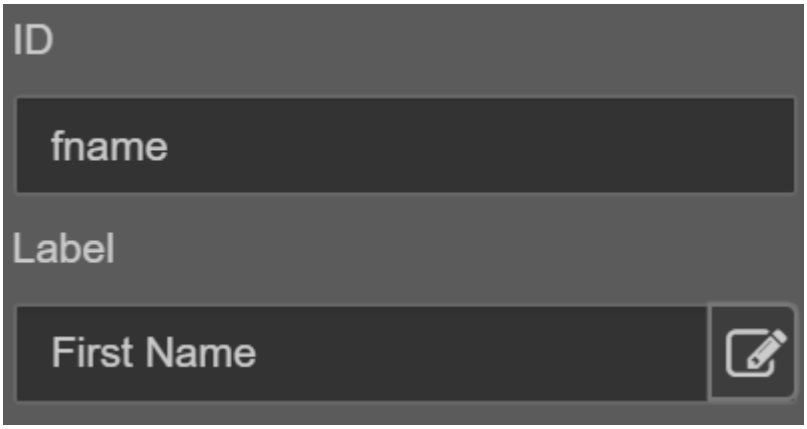
You can change the component ID from this default value at any time. Changes to ID are reflected in other properties.

- The first time you change the ID property, the Label property is updated based on the ID. The value for Label is the ID with spaces removed and converted to camel-case. For example, if you enter "firstName" as the ID of a new Text Field, Label is updated to display "First Name". Any subsequent change to ID does not update Label. However, you can change the Label property directly if needed.
- Every time you update the ID property, the XML Name and/or Full Path properties on the Integration tab are also updated to match the ID.

The screenshot below shows a partial view of the Properties pane with a new component added to a form. ID was initialized with the value "firstName", causing Label to be updated automatically with the value "First Name".



The screenshot below shows that Label remains as “First Name” when ID is updated to “fname”.



The ID property is also linked to the XML Name and Full Path properties. When ID changes, XML Name and/or Full Path are updated if Use Auto-generated XML Name or Use Entity XML Path on the Integration tab is selected. If these options are not selected, the XML Name and/or Full Path will not be updated automatically when ID changes but can be changed directly as required.

As you type a value into the component ID property field, Maestro checks whether there is an existing component with the same name and reports a duplicate ID if one is found. In this case, you have to change the component ID.

You can use entities in the component IDs.

Next, learn about component XML Name and Entity XML Path.

Component Identity Properties

Every Journey Maestro component has the following properties that uniquely identifies it so the component can be refered to from within the form.

- ID – Every component has an ID. The ID is an internal name, which is used in calculations. The ID can also include an Entity which will allow you to group the structure of the related component. The ID is used to create the Label and the XML Name. The default value of the label is always the same as the name of the field type - but this is almost always immediately updated by the form designer. It is recommended that you always change the ID as soon as the new component is added to the form.The ID cannot include spaces and other prohibited JavaScript characters. If these characters are used, the ID will be truncated.Examples are: `firstName` and `PrimaryApplicant_firstName`.
- Label – The label is a human-readable name used to represent the component.The default value of the label is based on the ID entered. You can change the Label so that it is not related to the ID. The label usually appears above the component when displayed in the form. For a more complex element such as a header, the label may be just one of several pieces of text that are contained in the component.Examples are: First name and My Postal Address is the same as my Residential Address.
- Name – Each component also has a name. The name is usually the same as the caption. The field's name is displayed in the Structure tab, as well as at the top of the Properties tab. The name is usually the same as the label. The only time you might be aware of the name is when a component's label is very long. In this case, Maestro will give the component a truncated name. Examples are: First name and My Postal Address.
- XML Name – The XML Name is used by Maestro to construct the XML payload for the form. The XML Name will be used as the element name for this component in the XML structure.By default, the XML Name is calculated from the ID. It has spaces removed and will capitalize the individual words within the name. This naming convention more closely follows what many people use in XML Schemas. If you use the Data Mapper to bind fields to a seed file, then the XML Name will be updated accordingly. Examples are: FirstName and MyPostalAddressIsTheSameAs.

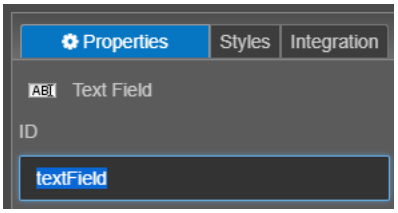
NOTE

It's recommended to override the default values of both the ID and XML Name of any component with long or non-meaningful labels. This assists greatly in writing calculations or working with the component data.

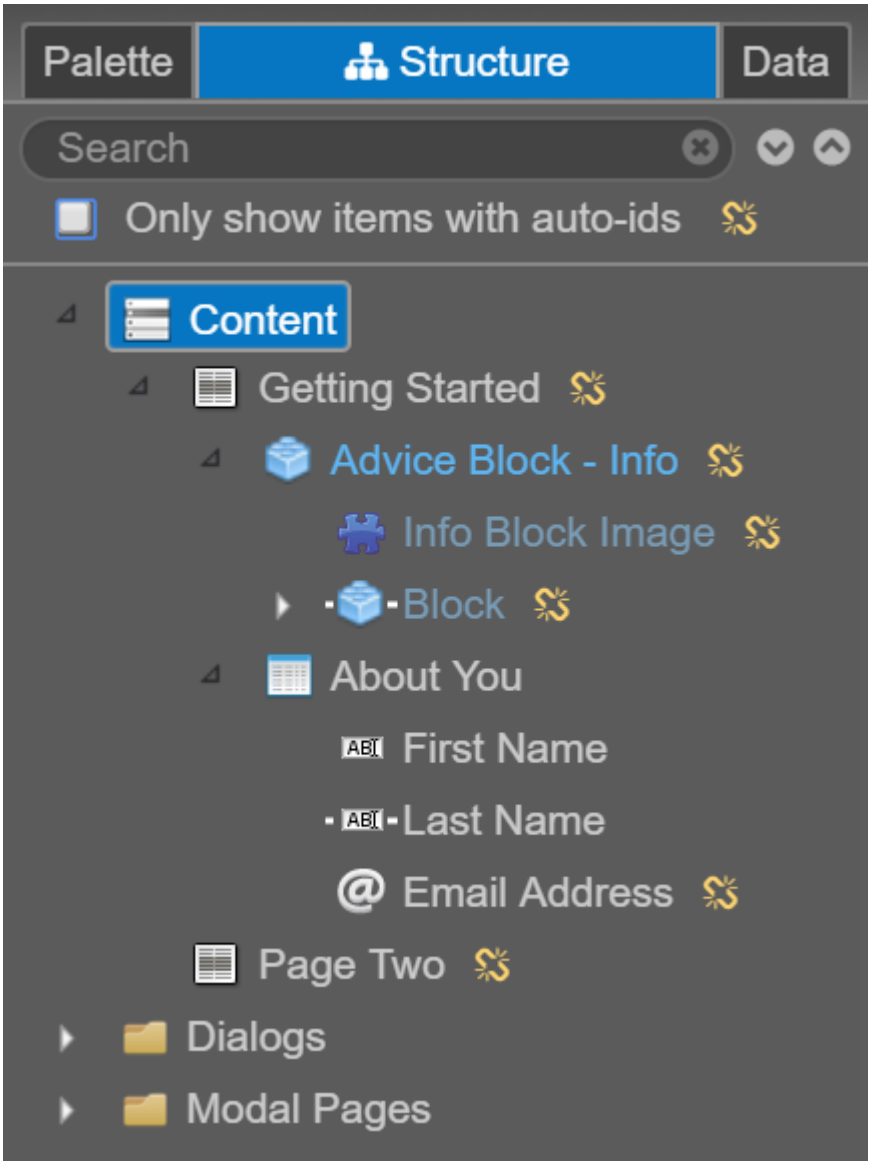
Change a Component ID

Every component in a form must have a unique identifier, also known a component ID, which you can use to refer to the component. This ID is initialized when you create a component, but you can change it at any time using the ID field in the Properties panel.

When you add a new component to a form, the ID property is assigned a default value and is highlighted automatically so that you can start typing into the field. The ID's default value is based on the component type. For example, the default ID for a Text Field is `textField`.



Maestro comes with the Auto-ID functionality that automatically generates a component ID and assigns it to the new component when you add it to a form. | 17.10 This feature was introduced in 17.10. On the Structure pane, a link icon appears next to each component that has an auto-matically generated ID, or Auto-ID.



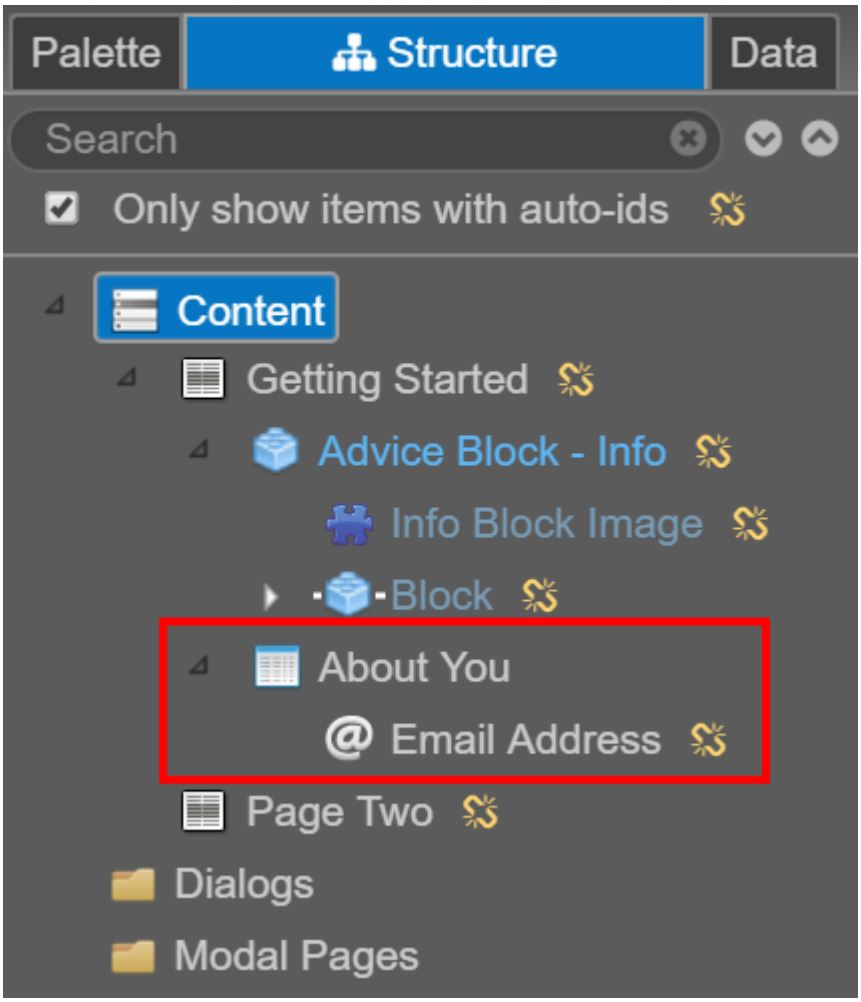
NOTE

It is recommended to limit the use of auto-ids on a form.

You may need to create a form quickly and choose to save time now by letting Maestro generate auto-ids that you can update later with better IDs. Being able to view only the components on a form with auto-ids allows you to find all components that need their IDs updated. You can select the Structure pane option Only show items with auto-ids to show only components that use an auto-generated ID name.

If a container is not using an auto-generated ID, but at least one of the child components is, you will still see the container listed in the Structure panel when Only show items with auto-ids is selected.

The example below shows the About You section when Only show items with auto-ids is selected. Even though About You does not have an auto-id, the child component Email Address does, so the About You section is also displayed.



Change Component ID

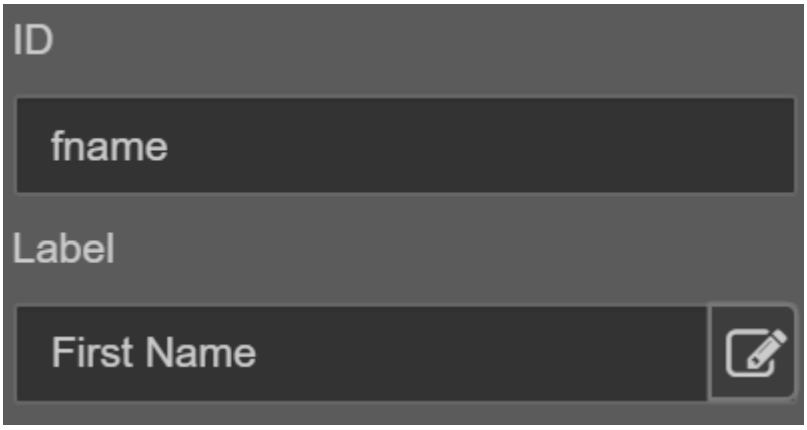
You can change the component ID from this default value at any time. Changes to ID are reflected in other properties.

- The first time you change the ID property, the Label property is updated based on the ID. The value for Label is the ID with spaces removed and converted to camel-case. For example, if you enter “firstName” as the ID of a new Text Field, Label is updated to display “First Name”. Any subsequent change to ID does not update Label. However, you can change the Label property directly if needed.
- Every time you update the ID property, the XML Name and/or Full Path properties on the Integration tab are also updated to match the ID.

The example below shows a partial view of the Properties pane with a new component added to a form. ID was initialized with the value `firstName`, causing Label to be updated automatically with the value `First Name`.

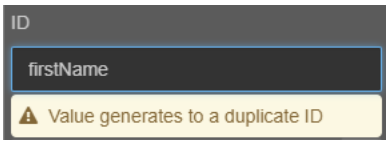


The following example shows that Label remains as `First Name` when ID is updated to `fname`.



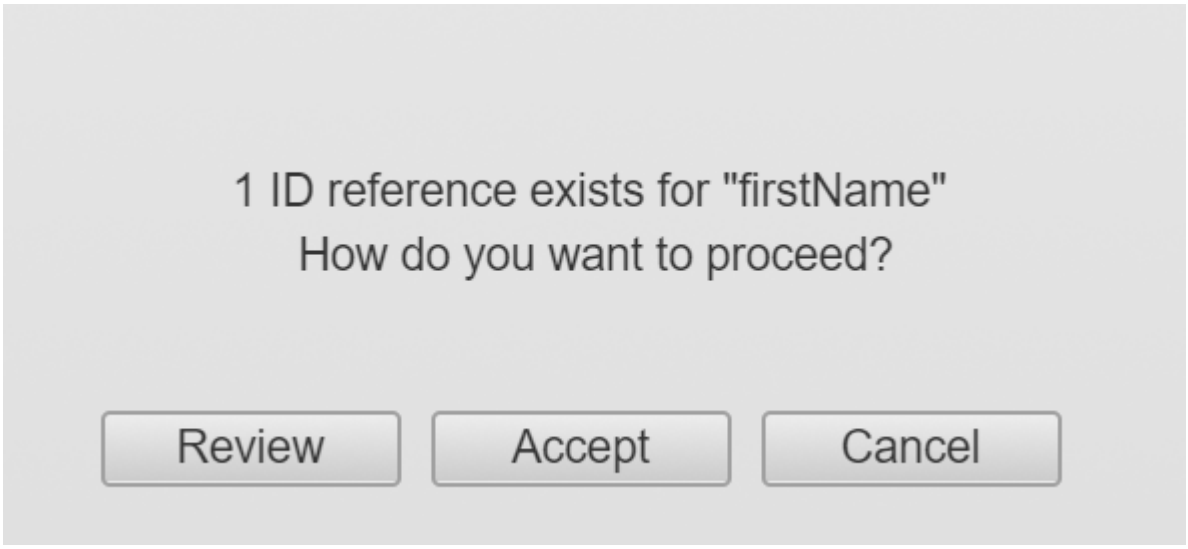
The ID property is also linked to the XML Name and Full Path properties. When ID changes, XML Name and/or Full Path are updated if Use Auto-generated XML Name or Use Entity XML Path on the Integration tab is selected. If these options are not selected, the XML Name and/or Full Path will not be updated automatically when ID changes but can be changed directly as required.

As you type a value into the component ID property field, Maestro checks whether there is an existing component with the same name and reports a duplicate ID if one is found.



When you leave the component ID property field, Maestro checks whether there are any references to the existing ID. If any such references are found, a dialog box is displayed with options to review or accept your change.

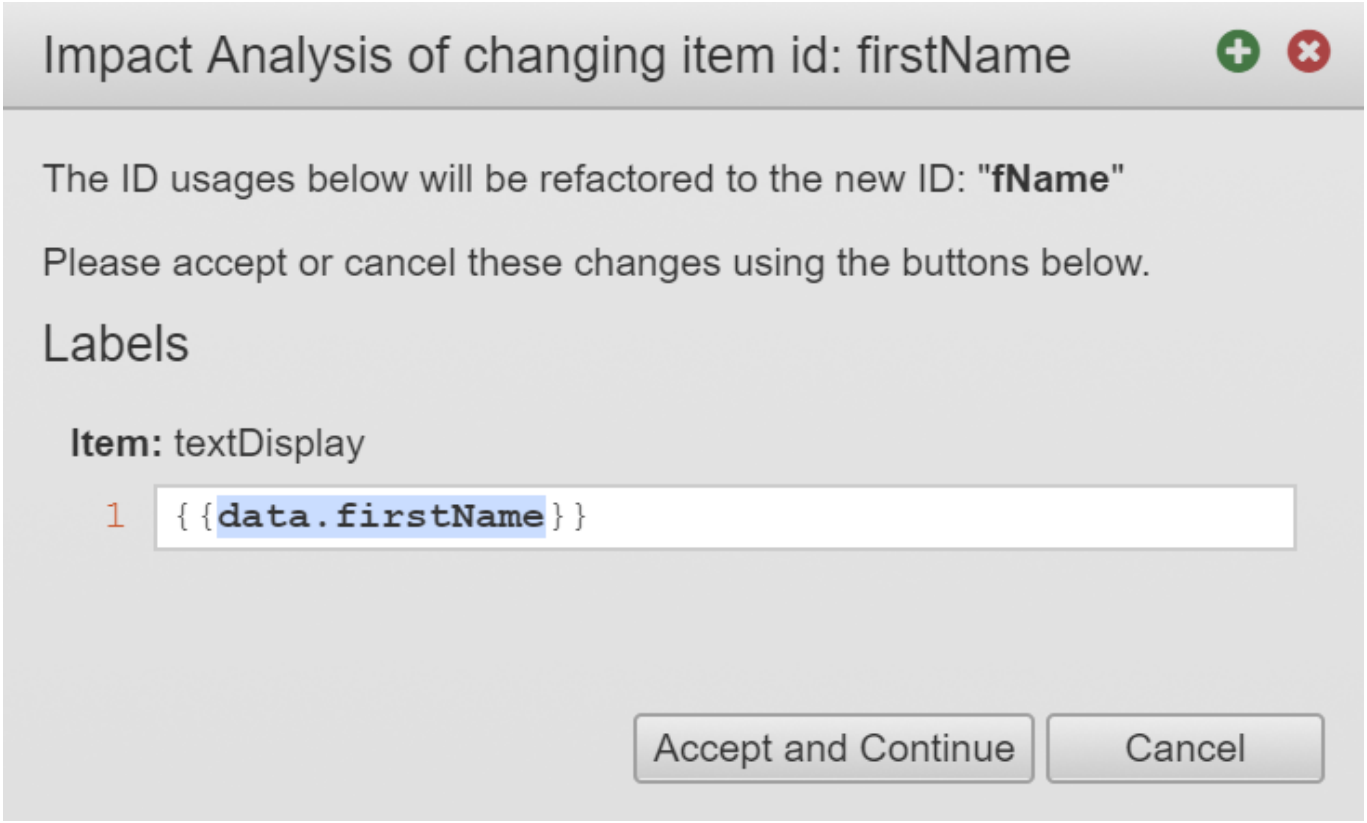




You can do one of the followings:

- Click Review to view a brief analysis of the impact of changing the component ID.
- Click Accept to change the component ID and update all references.
- Click Cancel to close the dialog and leave the component ID unchanged.

If you decide to review your change, the Impact Analysis dialog is displayed showing a list of references to the original component ID prior to the change. The Impact Analysis dialog provides options to accept or cancel your change.



You can do one of the followings:

- Click Accept and Continue to change the ID and refactor all the references listed.
- Click Cancel to close the Impact Analysis dialog and return to the Maestro Editor without changing the ID.

Component Labels

Maestro requires every component to have a Label property containing a human-readable name used to represent the field, which will give form users an indication of what this UI element is for and what user's input it requires. You can change the labels at any time as needed. However, we recommend choosing easily understandable names at the design time.

The default value of the label is always the same as the name of the field type - but this is almost always immediately updated by the form designer. The label usually appears at the top or left of a field. In some cases, a field may only have a label, for example, the Text Display field, or it may not have a label. For a more complex element such as a header, the label may be just one of several pieces of text that are contained in the field.

Maestro comes with two types of component's labels:

- Static
- Dynamic

Static Component Label

The static label is the basic unformatted text label, where the formatting is done by the default form styles. Most labels are static labels. You have to configure a static component label in the Properties pane manually and this configuration can't be changed dynamically, for example with a JavaScript.

To change a static label:

1. Open a form in the Maestro editor.
2. Select a component in the form and click the Properties pane.
3. Change the label name in the field or click Edit to type a longer label's name or include some formatting options using he rich text editor.



4. Click Save.

The text within this property appears within the component and is used to identify the data that the applicant needs to enter into the component. For example, this Text Field component has a label of "First Name":



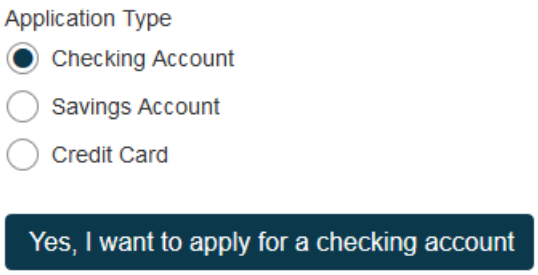
Dynamic Component Label

A dynamic component label allows its text to be dynamically changed at any time, often with a JavaScript. However, a form developer can directly apply custom HTML, or AngularJS expressions in the label to derive the text from other fields in the form. If a dynamic label contains a JavaScript expression, it is evaluated as the applicant interacts with a form, so the label can change accordingly.

For example, a dynamic label for a Button component might be defined with the following content:

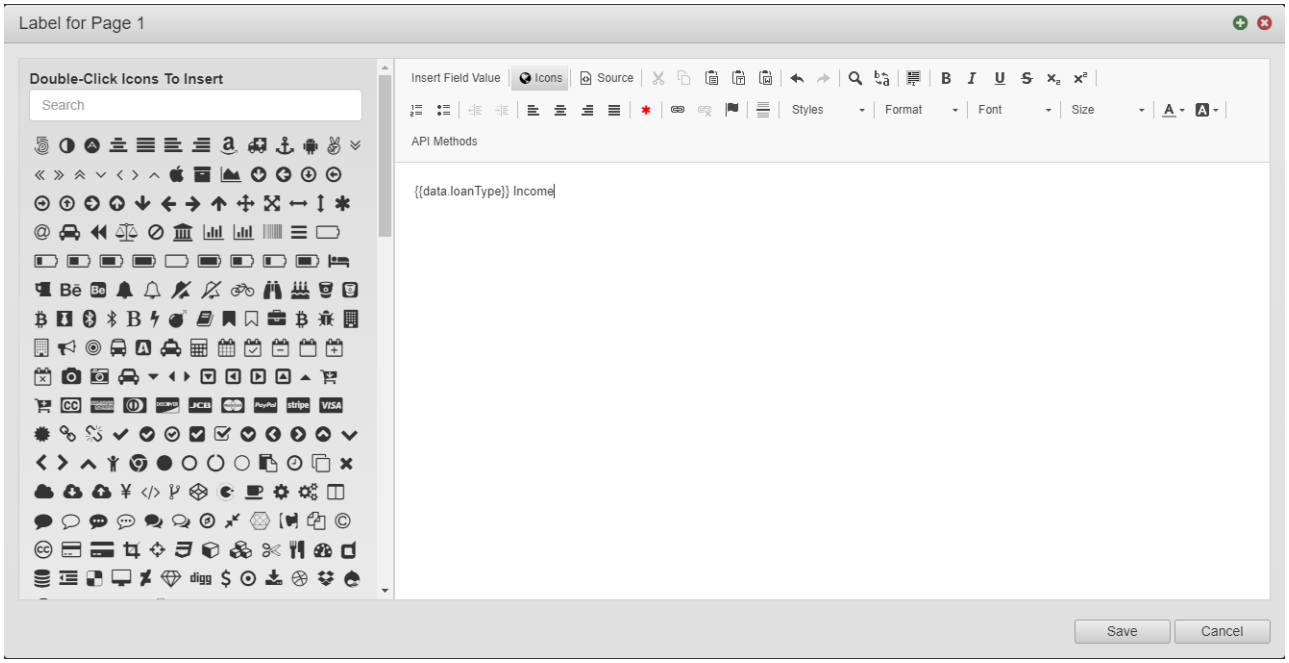
```
Yes, I want to apply for a {{ data.applicationType }}
```

This label refers to the data of a "applicationType" component. As the data of that component changes, the label of the button changes.



To change a dynamic label:

1. Open a form in the Maestro editor.
2. Select a component in the form and click the Properties pane.
3. Click Edit to access the rich text editor where you can reference other component's values to make this label name change dynamically.



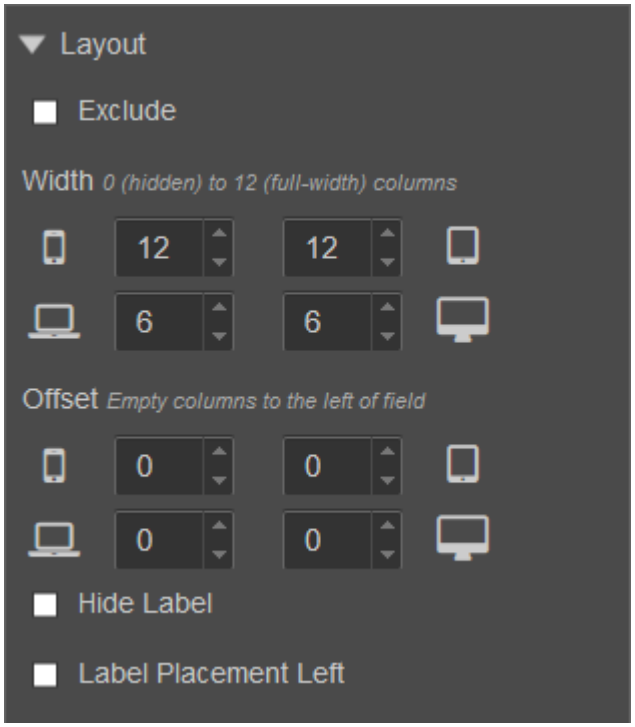
4. Click Icons to select an icon using the Icon Picker and insert it into the component. You can use search to find an icon you need. | 21.05 This feature was introduced in 21.05.
5. Click Save.

Hide a Label

Most components should have a label. There are, however, times where you might like to hide the label from the applicant.

To hide a label:

1. Select a component via the **View** pane or **Wireframe**.
2. Inside the **Properties** pane, expand the **Layout** properties.



3. Enable the **Hide Label** option.

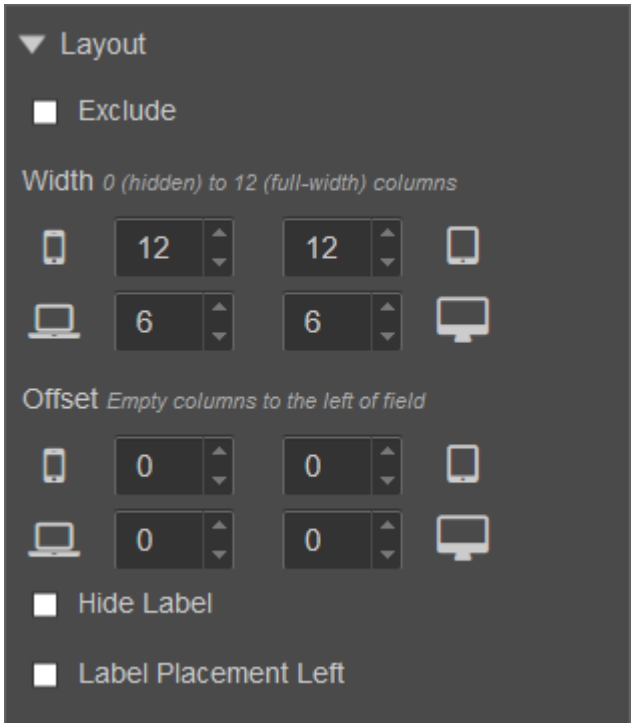
To show a label, disable the **Hide Label** option.

Change Label Placement

For the sake of usability, labels should generally be placed above input fields. This is how Maestro's components are configured by default. You can, however, change the placement of a label to the left of an input field. This is typically done on receipts as a way of saving space.

To change the placement of the label:

1. Select a component via the **View** pane or **Wireframe**.
2. Inside the **Properties** pane, expand the **Layout** properties.



3. Enable the **Label Placement Left** option.

Next, learn about a component layout.

Component Layout

A layout is a way to arrange Journey Maestro components on a form, so they are laid out according to device or browser screen sizes.

The layout allows you to configure the following aspects of components on the form.

- The width of each component.
- The location of components relative to each other, for example, a field appears to the side or below a field that precedes it.
- The adjustment of both the component and placement of fields when the overall width of the screen changes.

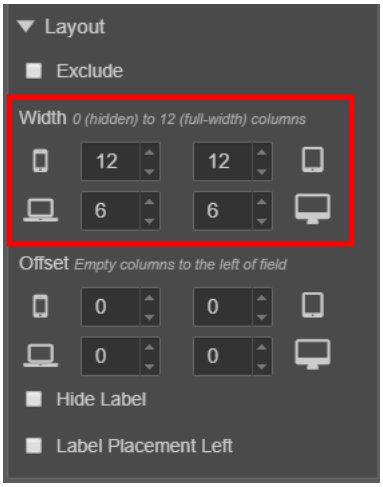
Configure a Component Layout

A good component layout is extremely important for creating a good user journey. A layout can be the difference between a positive or a negative user experience, so it's crucial to choose the most appropriate component layout for each of your forms.

You can use the following powerful techniques for creating good component layouts:

- The form itself defines three responsive breakpoints, creating four standard screen sizes. Since modern devices come in many sizes, and because devices can also be rotated into either portrait or landscape mode, these standard screen sizes are only roughly indicative of actual devices. However, the four screen sizes equate to: SmartPhone, Tablet, Small Desktop Screen and Large Desktop Screen.
- Each container in the form is broken down into a 12-column grid. 12 is a useful number because it can be divided in half, thirds, quarters, and in other ways, making it flexible but simple. (It's no coincidence that many historical measurement systems use twelve as a base.)
- Each field can be configured to use any number of columns, from 1 to 12. This determines the field's width.
- You can continue placing additional fields to the right of other fields. However, as soon as the total column count of all the fields on a row exceeds 12, that field and any subsequent fields will be moved to the next line.

The layout configuration is shown below.



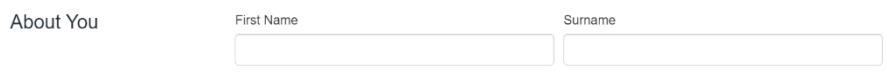
In this example, a text field takes up half the available space on larger devices. However, on smaller devices, the user is likely having issues reading the field labels or being able to enter data into the small field areas. Hence the default size on smaller devices is to take up all the space on a row. This is also why the default location of the field's label is always on the top of the field – this ensures that the label and field don't spread out too much on narrower devices.

The breakpoints for screen sizes are determined at the template level. These are set to appropriate defaults which usually cover the standard screen sizes that are available in the market today, but your Template Designer may change them if desired.

In several of the Avoka-approved templates, the breakpoint between a small screen and medium is 400 pixels (px), between medium and large is 560px and large to full screen is 780px. This means that any screen size under 400 pixels is considered a small screen, screen sizes between 400px and 560 is medium, 560px to 780px is large and anything over 780 is an extra-large screen.

The screen size will always equate to 12 columns, no matter the actual pixel width. So 400px equals 12 columns, 560px equals 12 columns, and so on. The only thing that changes is the width of the columns. Dividing 12 columns across 560 pixels would mean that the columns are wider than when you divide 12 columns across 400 pixels.

Basically, each row in your form contains 12 columns. When designing a form, you can decide how the 12 columns are divided. To get two equal text fields on one line you would need to change both text fields to 6 columns: 6 + 6 = 12.



If you don’t want them to be equal, you could set one to 7 columns and the other to 5 columns: 7 + 5 = 12.

Another possibility with the 12-column grid is to use multiple blocks on a row to give more flexibility.

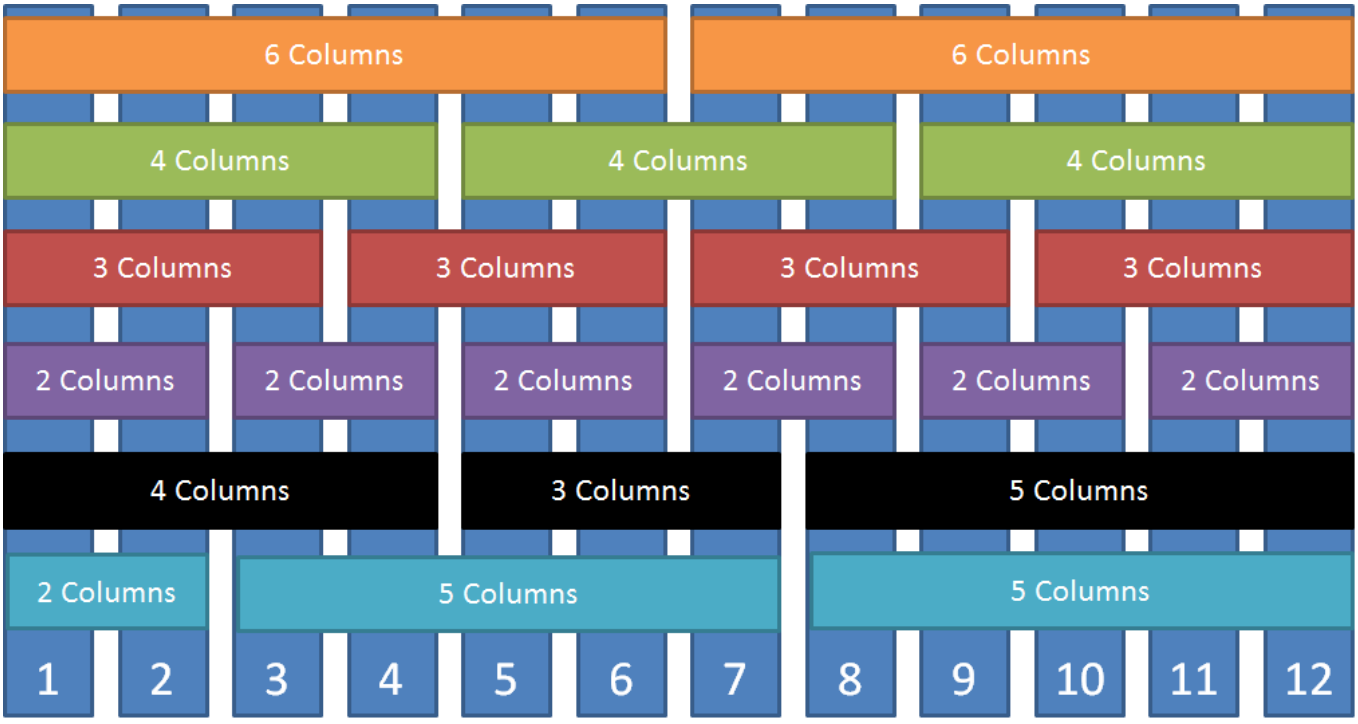
In the screenshot below, there are two blocks on a row, each block containing components. The blocks are both set to 6 columns wide. The components within the block have their own 12 column grid which allows them to be arranged within the available space of the block. In block one there are two text fields both set to 6 columns wide. In the second block, there are three text fields, all three set to 4 columns wide.



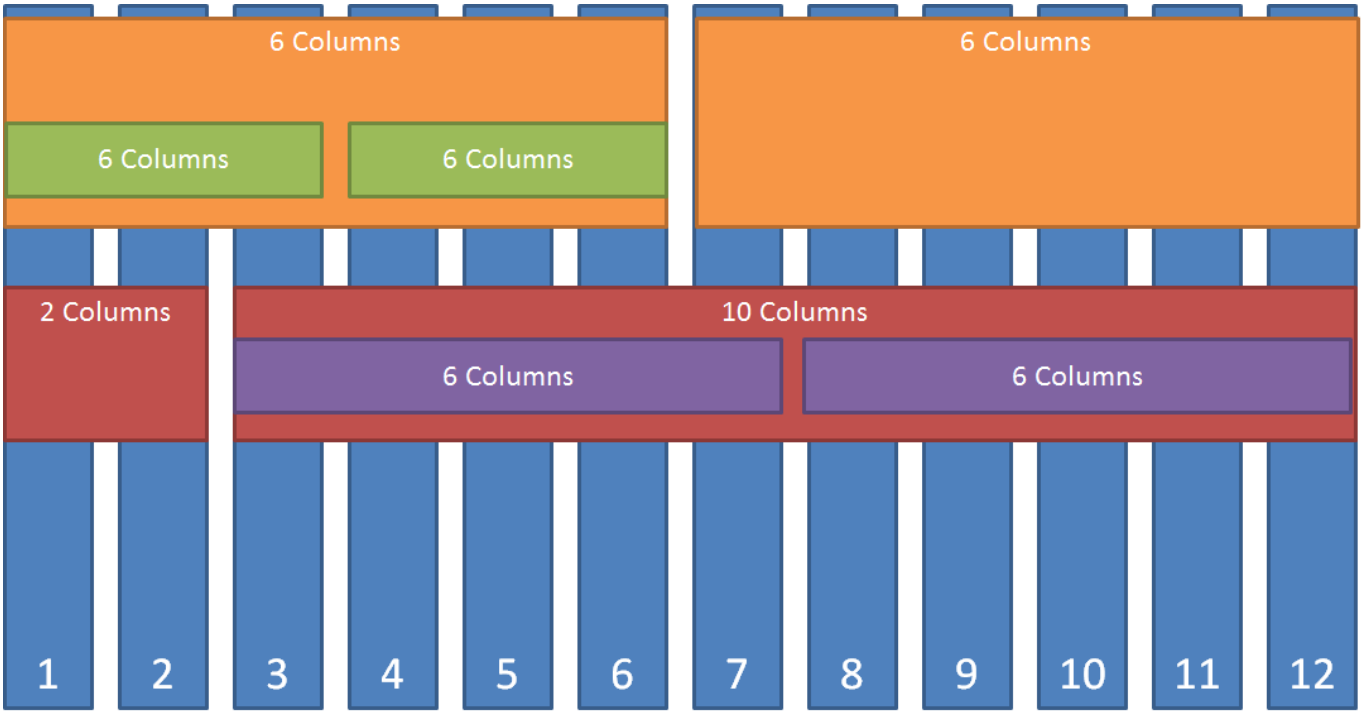
Example Layouts

The following examples illustrate several different Journey Maestro component layouts.

Example 1



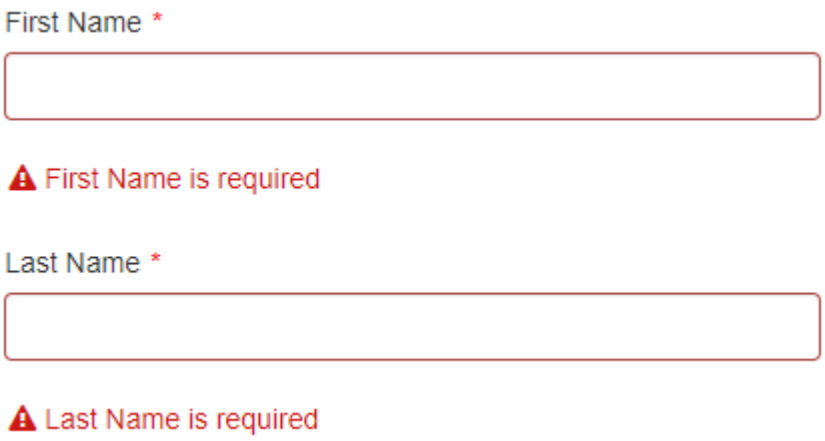
Example 2



Next, learn how to validate a component layout.

Validation Message Layouts

If a user tries to submit a form with invalid fields, such as empty mandatory fields, an error message will appear beneath each field:



But if two or more fields are side-by-side, the error messages will appear in a list beneath both fields:



Some people find this behavior surprising as it doesn't show the clearest possible relationship between the error message and the invalid field. They would prefer the error messages to appear beneath the fields:



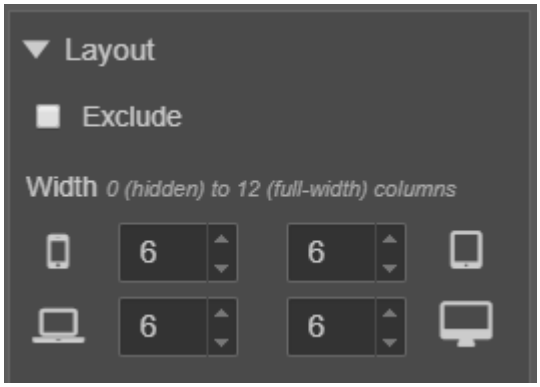
The above style isn't the default approach because, if you have longer error messages or if there are more than a couple of fields in a single row, the error messages can appear crowded:



But there are arguments in favor of this style. It's just one of those details where there isn't a completely correct answer, so the standard behavior has to be settled on. Just because error messages don't always appear beneath their fields by default though, doesn't mean it isn't possible. It does, however, require a few extra steps.

To force error messages to appear beneath their fields:

1. Right-click a component in the **Navigator** pane.
2. Click **Wrap in Block**.
3. Repeat the above steps for all relevant components.
4. Adjust the **Layout** properties for the **Block** components so they can fit in the same row.



5. Drag and drop the **Block** components into the same row.



If, for example, you have a couple of **Text Field** components, you should end up with a component hierarchy that looks like this:

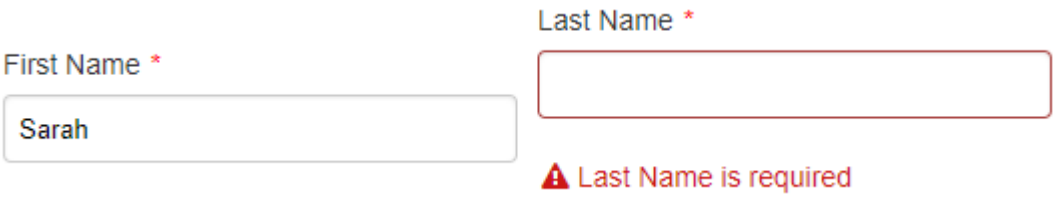


Based on these changes, the text fields will be side-by-side, and because they're wrapped in **Block** components, any error messages will appear within the blocks. The blocks force the error messages to appear directly beneath the relevant field:



Fixing Vertical Alignment

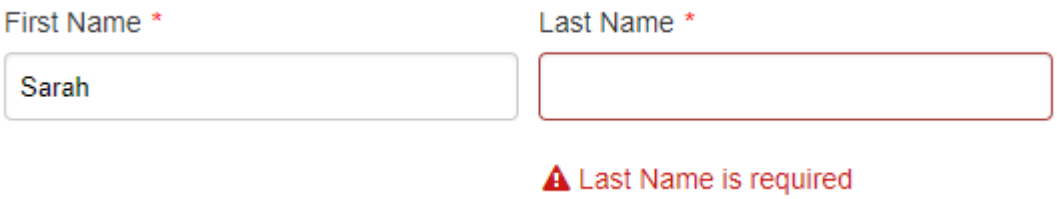
By solving the first problem, we've created another one. To see what's wrong, enter valid data into one of the fields and submit the form. You'll see that the error message beneath the invalid field breaks the alignment with the valid field:



Fortunately, the solution is simple:

1. Inside the Maestro Editor, select a **Block** component.
2. Open the **Styles** pane on the right side of the screen.
3. Open the **Item Appearance > Layout** panel.
4. Set the **Vertical Alignment** dropdown to **Top**.
5. Repeat this process for all other **Block** elements.

After re-building the form, the alignment issue should be fixed.



Next, learn about component versions.

Component Versions

Component versions work similarly to Form Versions. Once an initial version of a component is built, new versions of this component can be created to keep track of any changes made to the component as it grows and matures.

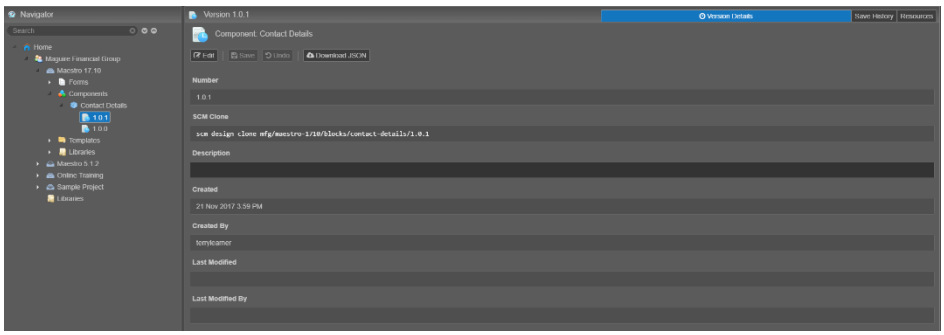
You can use the Maestro editor and the Maestro Dashboard to manage component versions:

- Create a new version of a component.
- Open a specific version of a component.
- Delete a specific version of a component.

Create a Component Version from the Maestro Dashboard

To create a new component version from the Maestro Dashboard:

1. Open a project in your organization.
2. Navigate to the Components folder within a project.
3. Select a component to view the existing versions. You can also expand a component from the Navigator pane to see its versions.



4. Click New Version.
5. Enter a Description for the new version of this component.
6. Click Create. The new version is created, and the version details are displayed in the Dashboard. You can also see the new version listed under the component in the Navigator panel.
7. Select this version and click Edit to open in the Maestro editor.

NOTE

Journey Maestro prior to v17.10 doesn't use semantic versioning[1], so components version numbers are increased incrementally by whole values, for example: version 1, version 2, version 3, and so on.

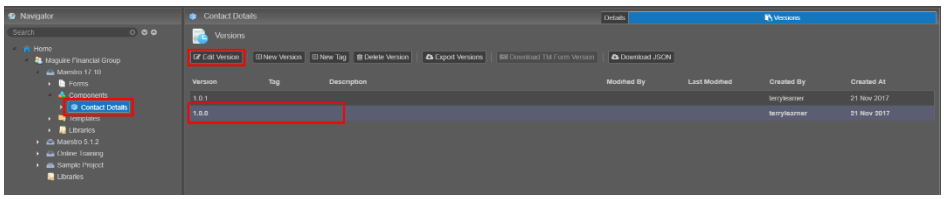
Open a Specific Component Version

Journey Maestro allows you to choose which component version to open. When you double-click an existing component in the Maestro Dashboard, the latest version of the component is opened. However, sometimes you may want to open an earlier version of the component. This is usually the case when there are bugs or issues with the current version of a component and you want to open the working version to compare the configurations or even revert the changes.

There are two methods to open an existing version of a component in Maestro:

Method 1

1. Open a project in your organization.
2. Select the component in the Navigator pane of the Maestro Dashboard.
3. Select the earlier version you want to open in the Versions tab.
4. Click Edit Version.



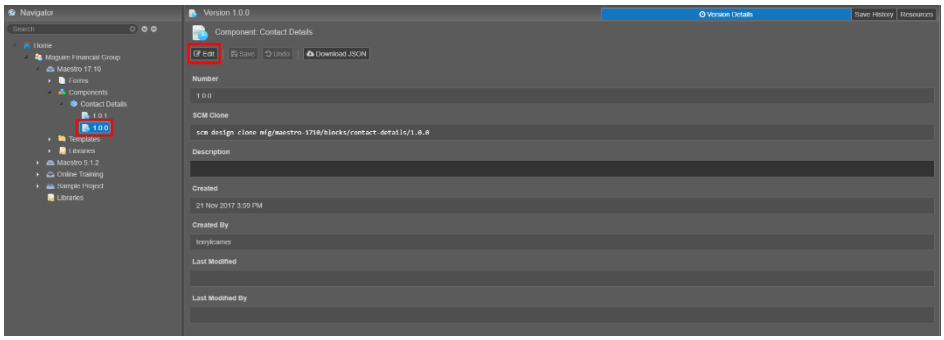
Method 2

1. Open a project in your organization.
2. Expand the component in the Navigator pane.

---

[1]Semantic Versioning is a formal convention for specifying compatibility using a three-part version number: major version; minor version; and patch. The patch number is incremented for minor changes and bug fixes which do not change the software's application programming interface (API). The minor version is incremented for releases which add new, but backward-compatible, API features, and the major version is incremented for API changes which are not backward-compatible. For example, software which relies on version 2.1.5 of an API is compatible with version 2.2.3, but not necessarily with 3.2.4.

3. Select the version you want to open.
4. Click Edit.



NOTE

Journey Maestro prior to v17.10 doesn't use semantic versioning[1], so components version numbers are increased incrementally by whole values, for example: version 1, version 2, version 3, and so on.

Next, learn how to add a component.

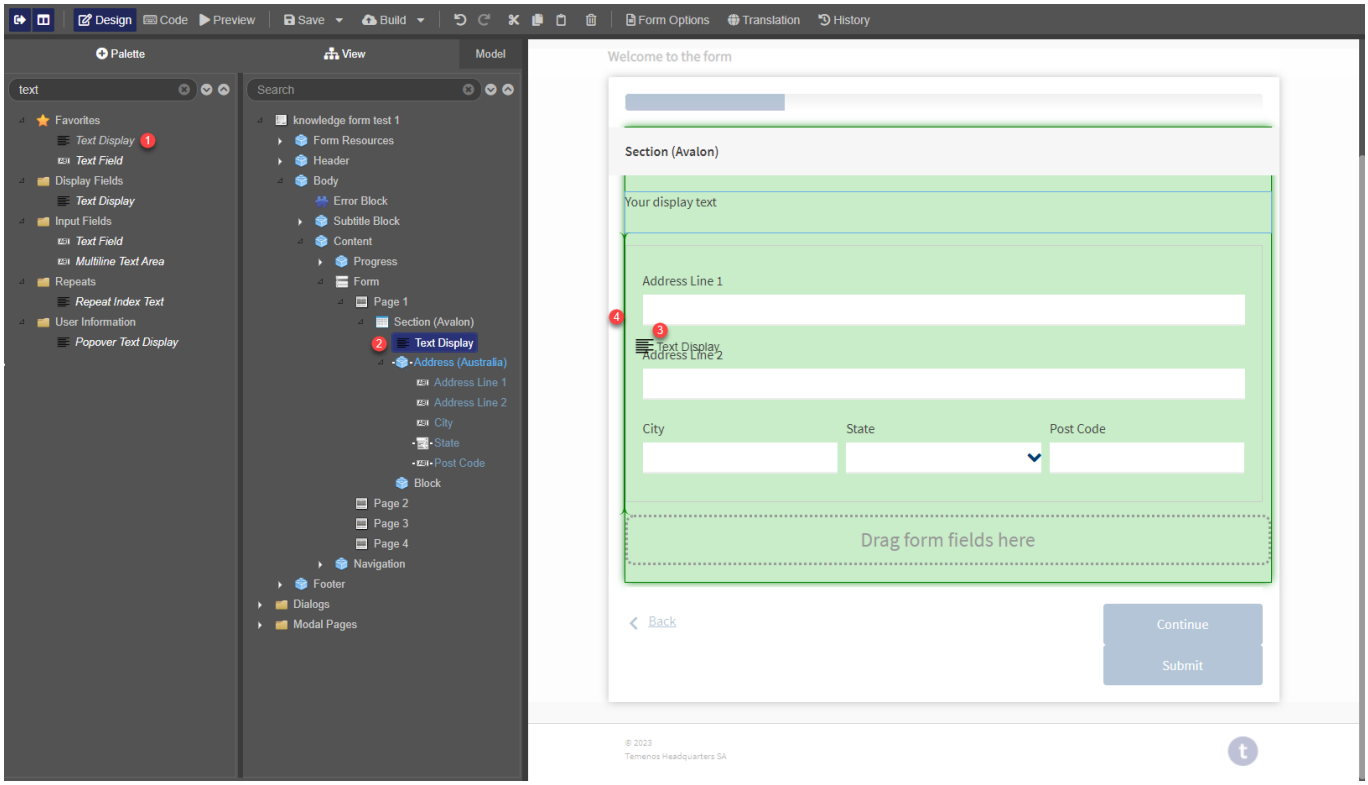
[1]Semantic Versioning is a formal convention for specifying compatibility using a three-part version number: major version; minor version; and patch. The patch number is incremented for minor changes and bug fixes which do not change the software's application programming interface (API). The minor version is incremented for releases which add new, but backward-compatible, API features, and the major version is incremented for API changes which are not backward-compatible. For example, software which relies on version 2.1.5 of an API is compatible with version 2.2.3, but not necessarily with 3.2.4.

Add a Component

Maestro allows you to add components to a design, such as a form, template or another component, so you can capture various types of form data required to implement customer onboarding journeys.

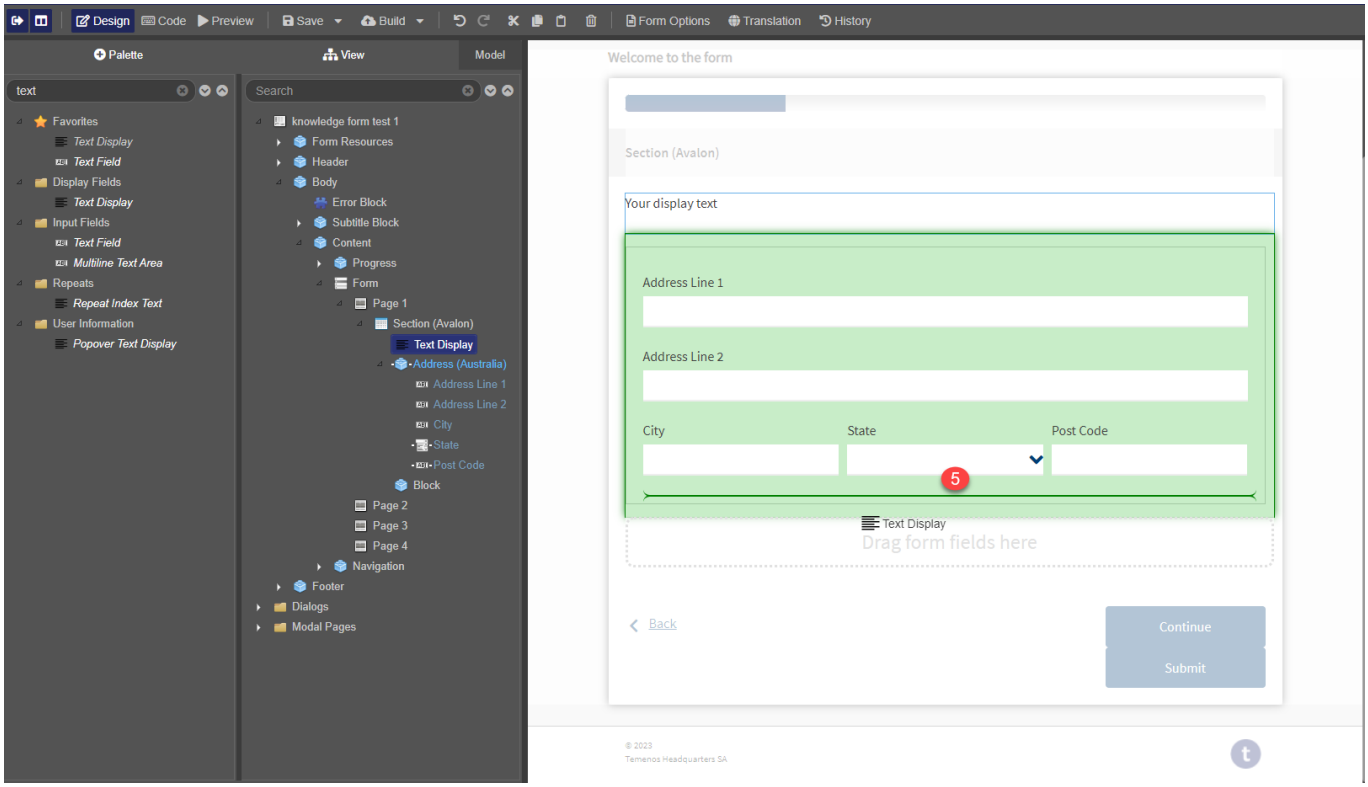
When you work on a design in the Maestro editor, adding components is a frequent operation you will do, so our tool provides you with 2 efficient ways of doing this by using the wireframe or component hierarchy. In both cases, you either drag and drop a component or select an action from a component's menu.

The Maestro editor uses the insertion bar to show you where the component is going to be inserted at, as well as, warns you where you are not allowed to put it. This is illustrated with numbered elements on the images below.

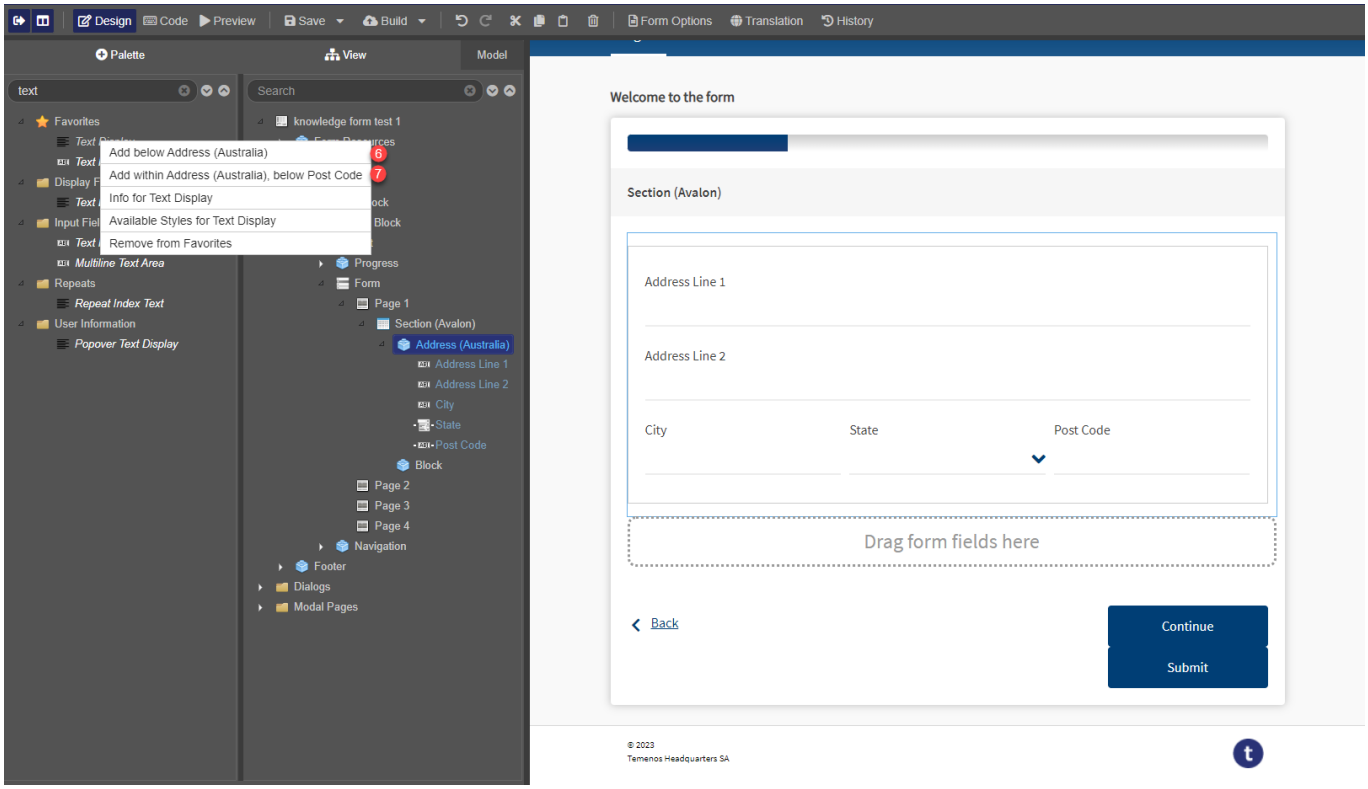


1. A component you want to add to a form, for example, the Text Display component.
2. A location of the Text Display component in the component hierarchy as you are dragging it over the component tree to find a suitable location to drop it off.
3. A location of the Text Display component in the wireframe as you are dragging it over the form to find a suitable location to drop it off.

4. The vertical insertion bar (darker green vertical line) indicating where the component will be located.



5. The horizontal insertion bar indicating where the component will be located.



6. The action menu - Add below Address (Australia).
7. The action menu - Add within Address (Australia).

Let's look at this in more detail.

Add a Component Using the Wireframe

To add a component to the Wireframe, use one of the following:

Drag a component from the Palette to the wireframe

Choose a component from the Palette pane and drag it onto the form near where you want it to appear.

Check the shape and orientation of the insertion bar and drop the component when the insertion bar indicates the desired location.

Double-click a component

Select the component or container in the form where you want a component to be inserted.

Double-click a component in the Palette. The component is inserted directly below the selected component or at the bottom of the selected container.

> NOTE
>
> If you have multiple components to add, you can keep double-clicking – each new component is added below the previous component that was added.

Add below an existing component

Select a component in the design above the location where you want to insert a new component to.

Locate a component in the Palette pane, right-click on it and select Add below <Existing Component Name>. The component is inserted directly below the component which you selected in the design. For more information, see Palette pane.

Add within an existing component

> NOTE
>
> You can see this option only if the selected component is a container component, for example, the Address (Australia) component.

Select a component in the design where you want to insert a new component to.

Locate a component in the Palette pane, right-click on it and select Add within<Existing Component Name>. The component is inserted as the last child of the component which you selected in the design. In this example, the Text Display component will be added after the Post Code component of the parent's Address (Australia) component. For more information, see Add a Component to an Existing Component.

The insertion bar indicates a wide variety of possible insert locations by using different positions, sizes and shapes to represent the insertion point. The insertion point is represented by a selection area, which indicates the parent layout of the component, and an insertion bar which indicates its position to its siblings.

The insertion bar appears either as a vertical or horizontal bar. A horizontal insertion bar means that a component will be inserted vertically between two other components, and a vertical bar means that a component will be inserted horizontally between two components.

If the insertion point is at the beginning or end of the list of siblings, then the component will be inserted regardless of the insertion points horizontal or vertical orientation. If the insertion point is vertical, and there is space for the new component to occupy within the layout, the new component will appear on the same line as an previously placed components. If there isn't sufficient space to accommodate the component, it will be placed on the following line.

Add a Component Using the Component Hierarchy

If the Palette and View panes are displayed side by side, you can drag a component from the Palette pane and drop it in the View pane. The new component is added to the form at a position determined by where in the View pane you dropped the component. If you drop the component on a container, the new component appears at the bottom of the container. Otherwise, the new component is positioned where you dropped it relative to the other components.

Similar to the wireframe, an insertion point is displayed when you drag a component from the Palette panel to the View panel.

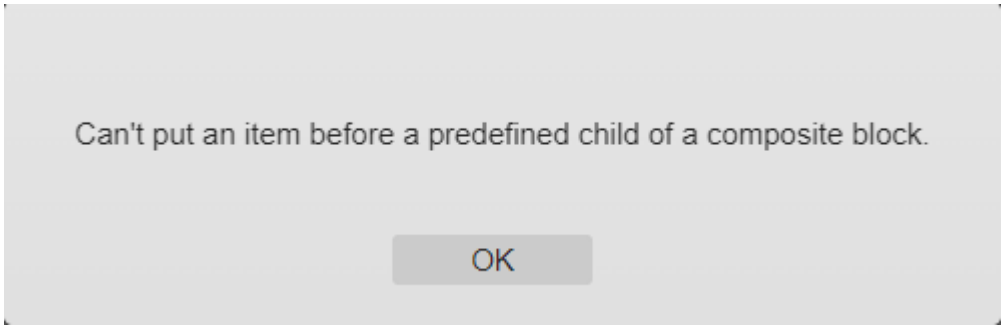
In the View panel, the insertion point appears as a triangle above, below or on the desired component if it's a container. You can change the insertion point while dragging by moving up and down the hierarchy. If the drag target is a component, the insertion point will appear above indicating the dragged component will be inserted before the drag target, and the same is true for below and after.

Add a Component to an Existing Component

In some situations, you want to add a simple component to an existing pre-defined component, such as a container of components. You can do this by dragging and dropping a component over the target component. Releasing the dragged component will add the component to end of the children. If you drag a component onto a container that is collapsed, the container will expand, displaying any children it contains, allowing you to navigate deeper into the structure without releasing the dragged component.

You can only add new components to a predefined component at the end of the component, for example, the last row, or to a block as a new column to the right. Some components can be embedded and modified but some are not. For example, the wizard navigator bar can get buttons added to it but they have to be at the end.

The Maestro editor warns you if you can't add the component with this dialog displaying the error message: Can't put an item before a predefined child of a composite block.



Move a Component

You can always change a component's location by dragging it to where you need it to be. All the above rules apply so you will see the insertion bar as you are moving the component to a new place.

> NOTE
>
> You can select multiple components in the component hierarchy and drag and drop them where you wish to put them.

If you places or moved a component by mistake, you can click the Undo button or use the History functionality to revert the action. Also, you can simply delete the component in the wireframe or the component hierarchy and try to add it again.

Next, learn how to change a component's ID.

Delete a Component

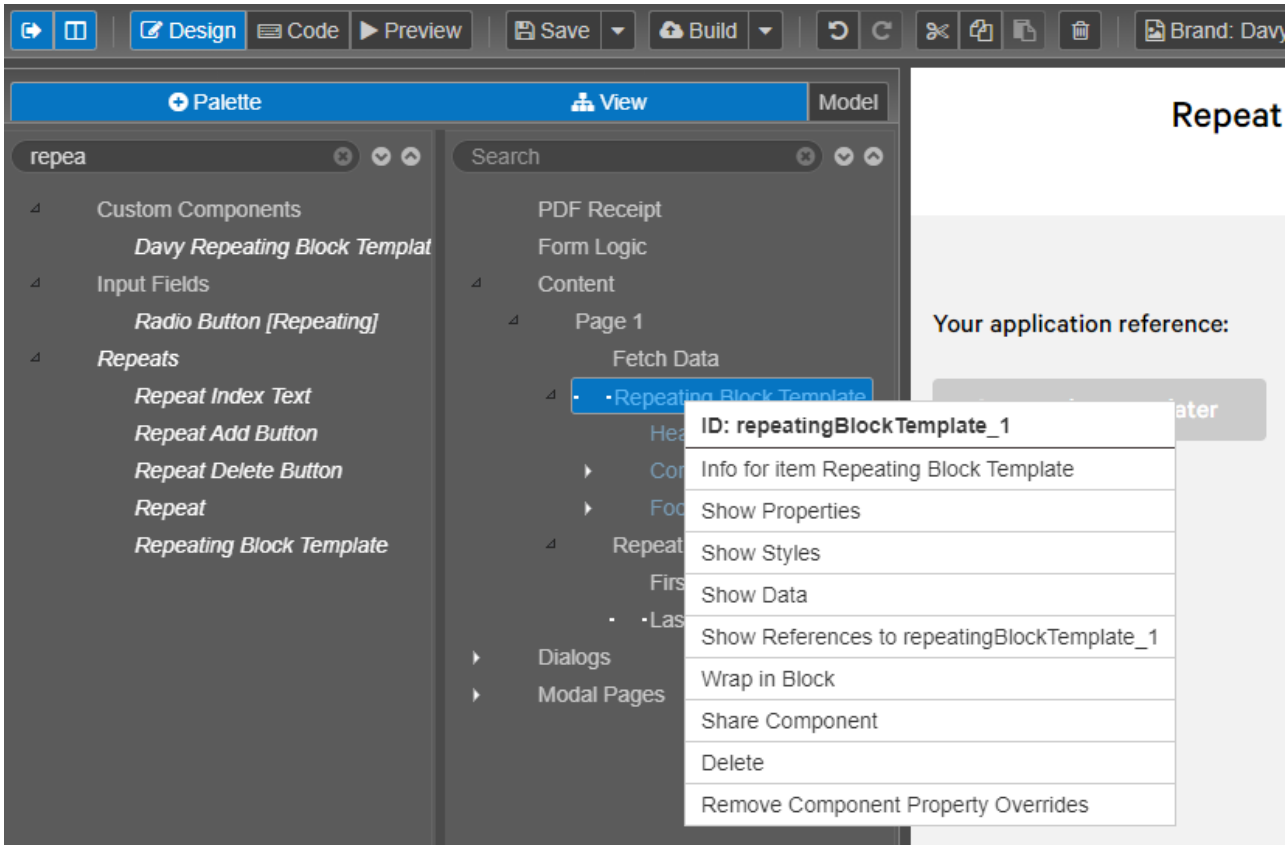
Maestro allows you to remove a specific component or a component version from a form, if it is not required any more.

> NOTE
>
> Once you have deleted a component, you can't undo this, because Journey Maestro removes the component permanently. Therefore, you should consider all possible impact of deleting a component because it can affect many, or even all, forms using this component.

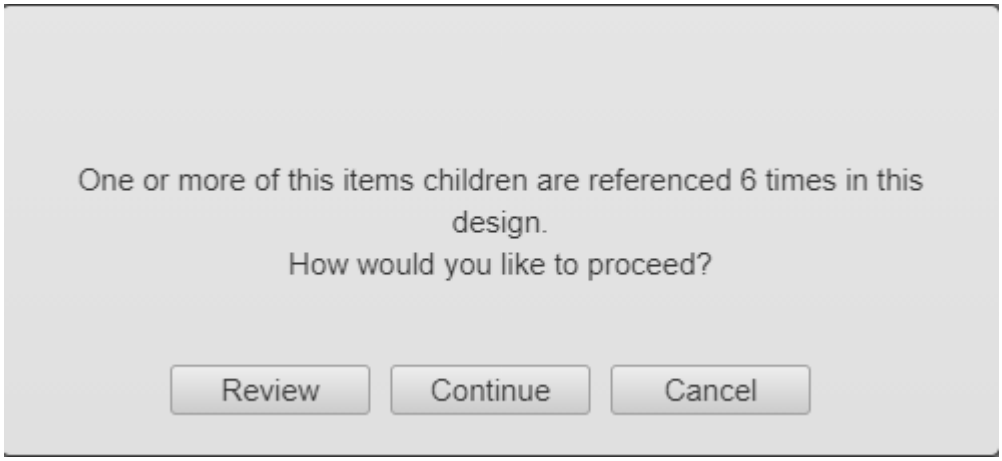
Journey Maestro provides several methods to delete a component from a form.

Delete a component using the context menu

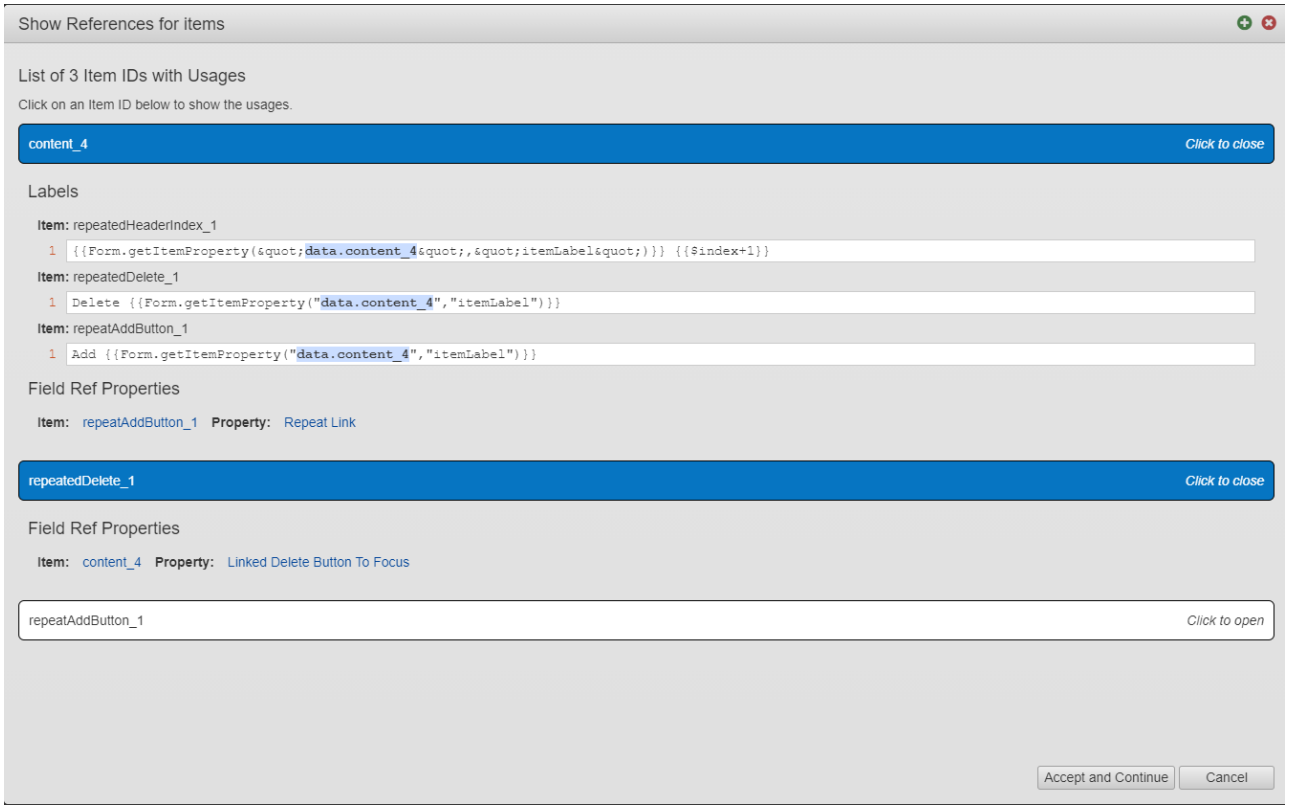
1. Right-click the component in the View panel (the Structure panel for Maestro prior to v18.10) or right-click it directly on the form.



2. Click Delete. If the component is referenced by any other component, you must review it and confirm deletion as shown below.



3. Click Reviewto check an impact analysis that lists any references to the component you are deleting. Click on each Item ID to check how it's used



4. Click Accept and Continue to delete the selected component. Any references to the deleted component on the form are unchanged, so you need to make changes in the form as required. Click Cancel to close the dialog without deleting the component.
5. Click Continue to delete the component, without reviewing the current references. Any references to the deleted component remain in the form, so you need to update or remove these references manually. Click Cancel to close the dialog without deleting the component.

Delete a component using the toolbar

1. Select the component from the View panel (the Structure panel for Maestro prior to v18.10) or select it directly on the form.



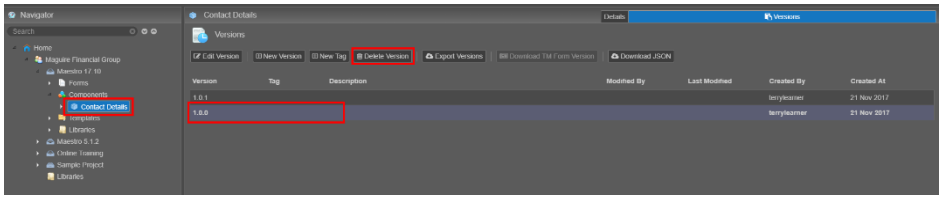
2. Click Delete on the toolbar. If the component is referenced by any other component, you must review it and confirm deletion as described above.

Delete a component using the keyboard

1. Select the component from the View panel (Structure panel prior to Maestro v18.05) or directly on the form
2. Click Delete on your keyboard. If the component is referenced by any other component, you must review it and confirm deletion as described above.

Delete a component version

1. Open a project in your organization.
2. Select the component in the Navigator panel.
3. Select the version to delete in the Versions tab.



4. Click Delete Version and click OK to confirm your decision. If the component is referenced by any other component, you must review it and confirm deletion as described above.

Next, learn how to add a component.

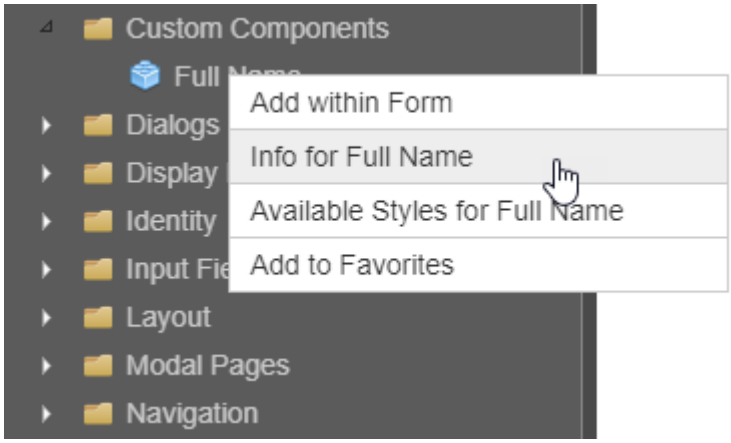
Component Form Dependencies

As a form is developed, it begins to depend on a range of libraries and components. The more projects and forms a single organization is working on however, the more difficult it can be to keep track of these dependencies.

To assist with this, Maestro provides a Component Details modal that allows Template Designers and Form Builders to keep track of where components are located.

To access the Component Details modal:

1. Right-click a component via the Navigator pane.



2. Click Info for <component name>.

If you view the details for a component that hasn't been published to a library, such as the default Email Address component, you'll only see the following details under the Published Library heading:

Property	Description
Library Name	The name of the library.
Library Type	This is also known as the Library Scope. Options include Release, Organization, and Project.
Version Number	The version number of the library.



When a component has been published to an organization or project-level library, however, additional details will be available under the Source Details heading:

Property	Description
Organization	The organization that owns the component.
Project Name	The project that contains the original component.
Design Type	This value will always be "Components".
Component Name	The name of the component.
Version	The version number of the component.
URL	A direct link to the original, editable component.



NOTE

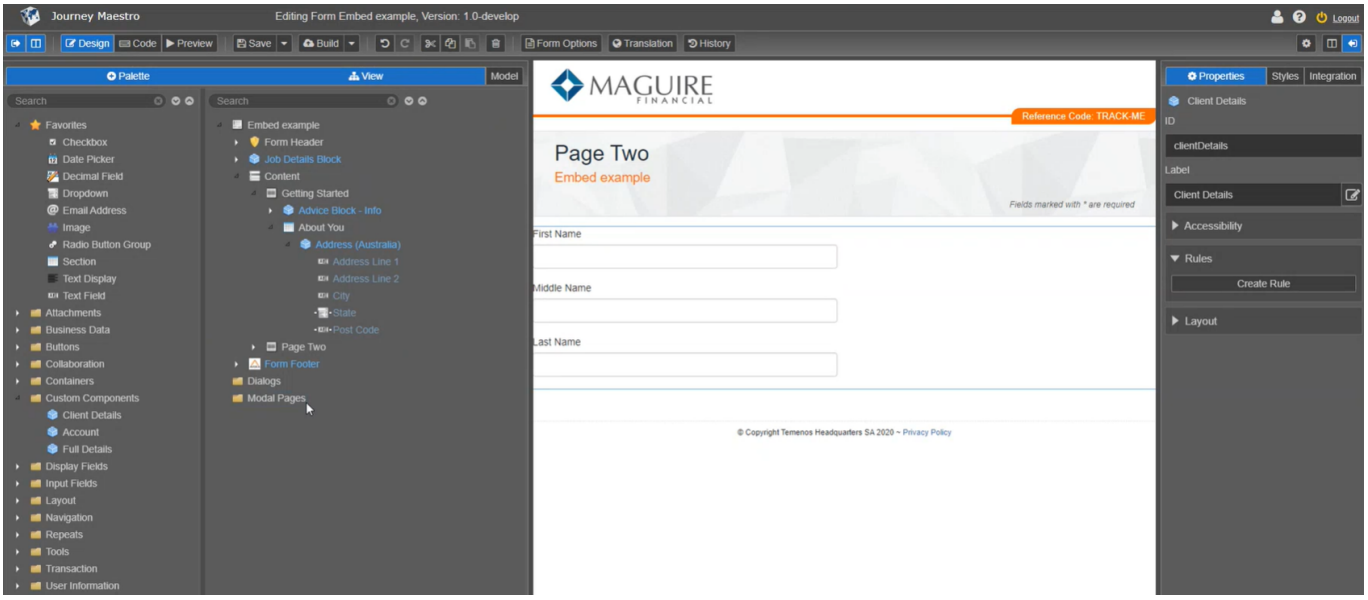
As the above image shows, a message will appear beneath the URL if the editable version of the component is located in a separate project.

Next, learn about Embedded Component Inheritance.

Embedded Component Inheritance

Journey Maestro gives you an ability to embed shared components into the form, introduce impact analysis for component modifications and detect possible conflicts when publishing to a library. This functionality is built on our previous work, release 19.11, making the inheritance relationships between forms, templates, components and libraries more transparent.

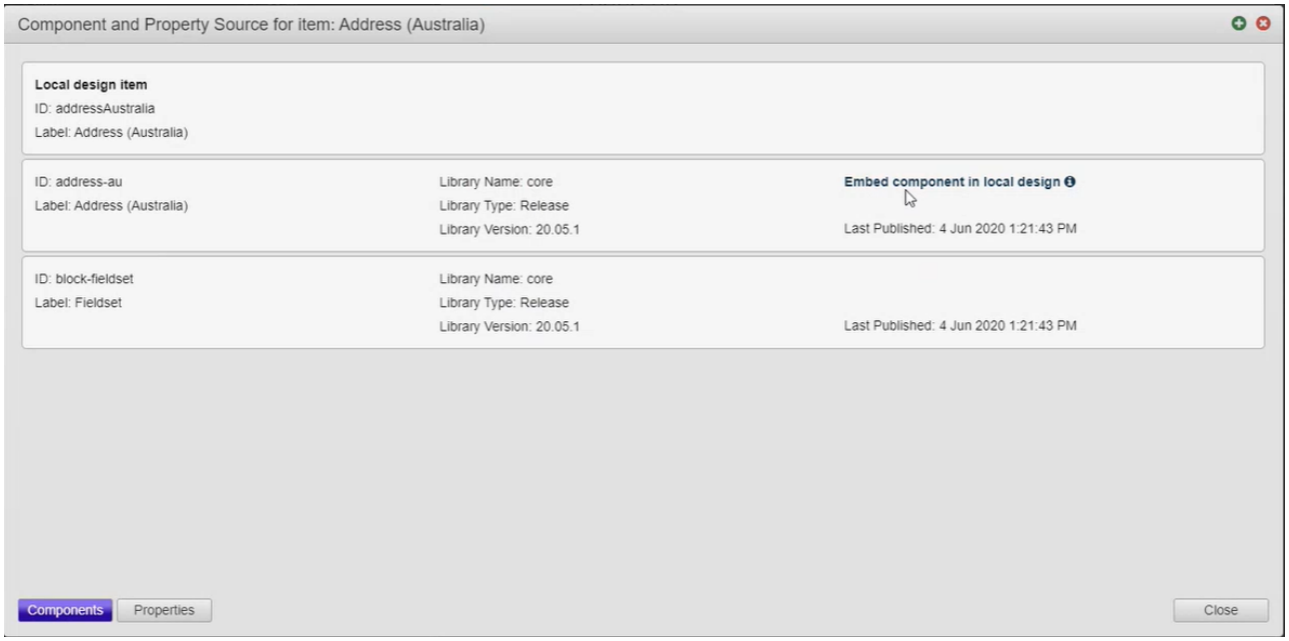
To demonstrate the new functionality, let's open a simple form that uses the Address (Australia) core component.



In the past, to add a component to the existing elements, you can only do it at the end of the list. If you try to insert it somewhere else, say in the middle, it won't work and you'll get the Can't insert before pre-defined component children error message. Now, you can embed this Address (Australia) component into a form, so you can edit it and it won't be updated when this core component is updated.

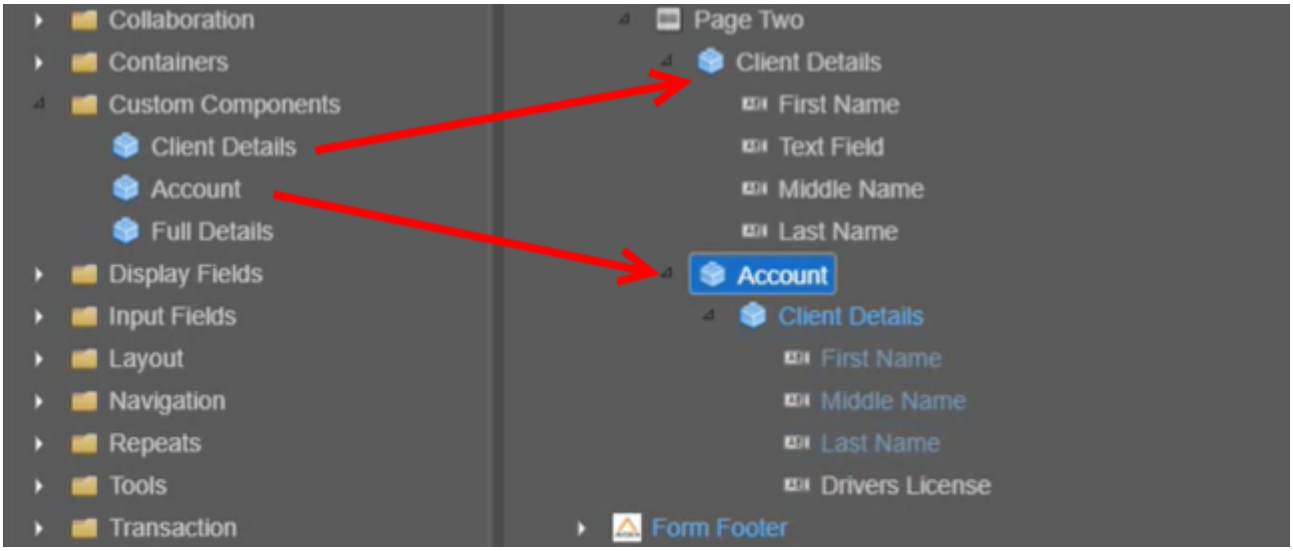
To embed a component into a form:

1. Open a form.
2. Select the component (it's highlighted blue).
3. Right click on the component and select Info for item Address (Australia).



4. Select Embed component in local design to make this component a part of your form. Now, you can add new elements to the embedded component. There is no linking between the core component and this embedded one anymore, so any update of the core component won't change your form.

You can do the same for custom components, so your can use them as templates. You can also embed nested custom components, which keep their structure as shown below.



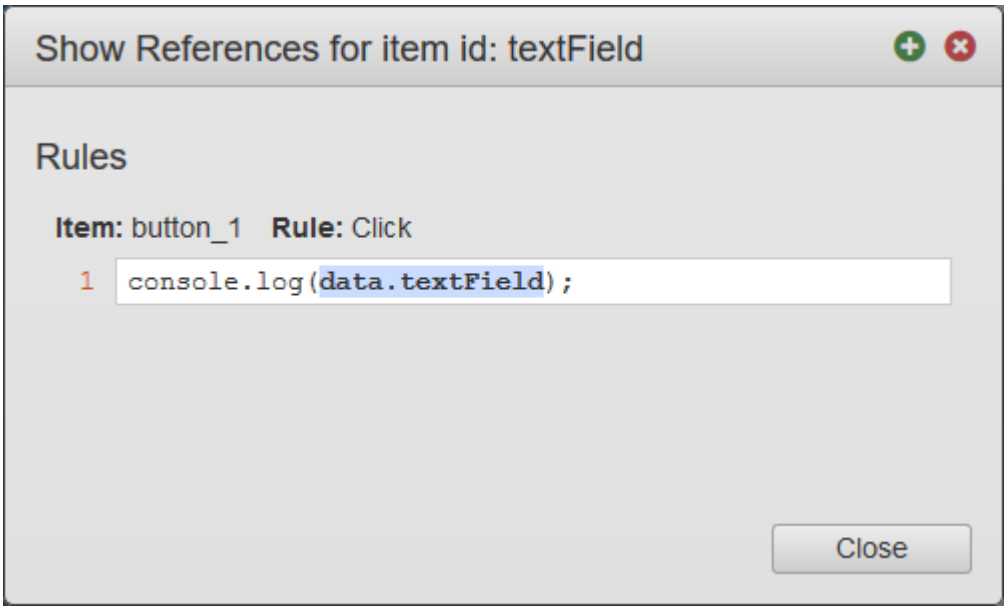
If a component has properties, select the component, right click, select properties, and embed it. Properties injected into a labels, they are substituted into a binding. If they are referenced in the rules, they are substituted too.

If you build widgets in the component editor, they are almost always embeddable. However, you can't embed native widgets into a form and the embed component link will not be available, if the widget has additional resources, such as an HTML template, CSS or JavaScript, etc. The footer, for example, has a separate CSS file so is classed as a native widget.

Next, check our components best practices.

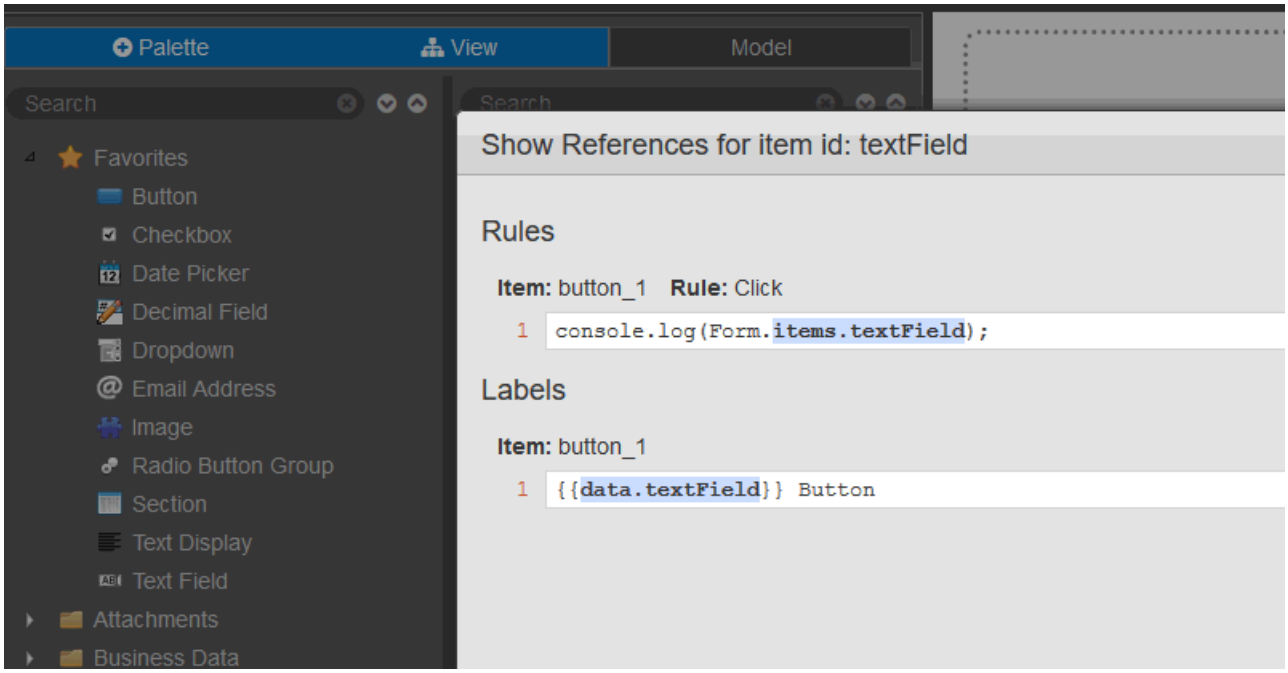
Show References

The Maestro editor allows you to view all references to a selected component so you can find out where the component is used from. Maestro does it by scanning the component code and properties for matching field references using the component's ID. For example, if there's a component with an ID of `textField` and a rule that contains a reference to `data.textField`, that rule will appear in the **Show References** dialog for the `textField` component.

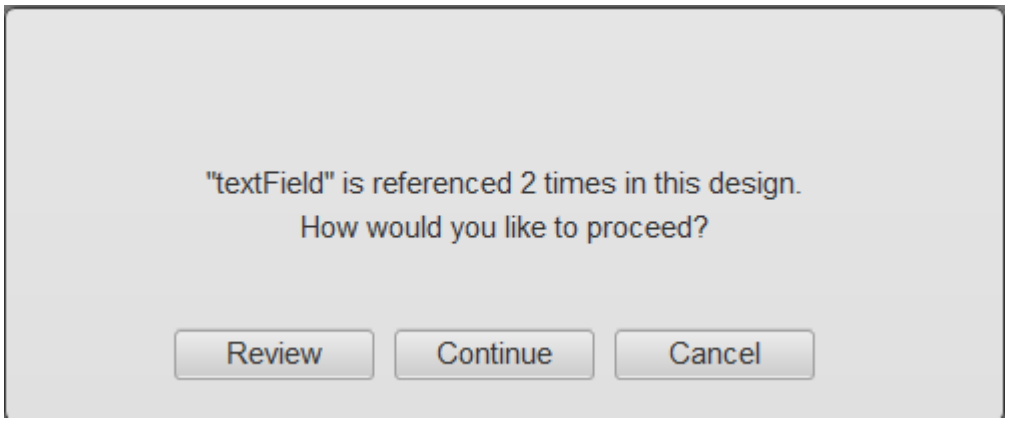


To view component references:

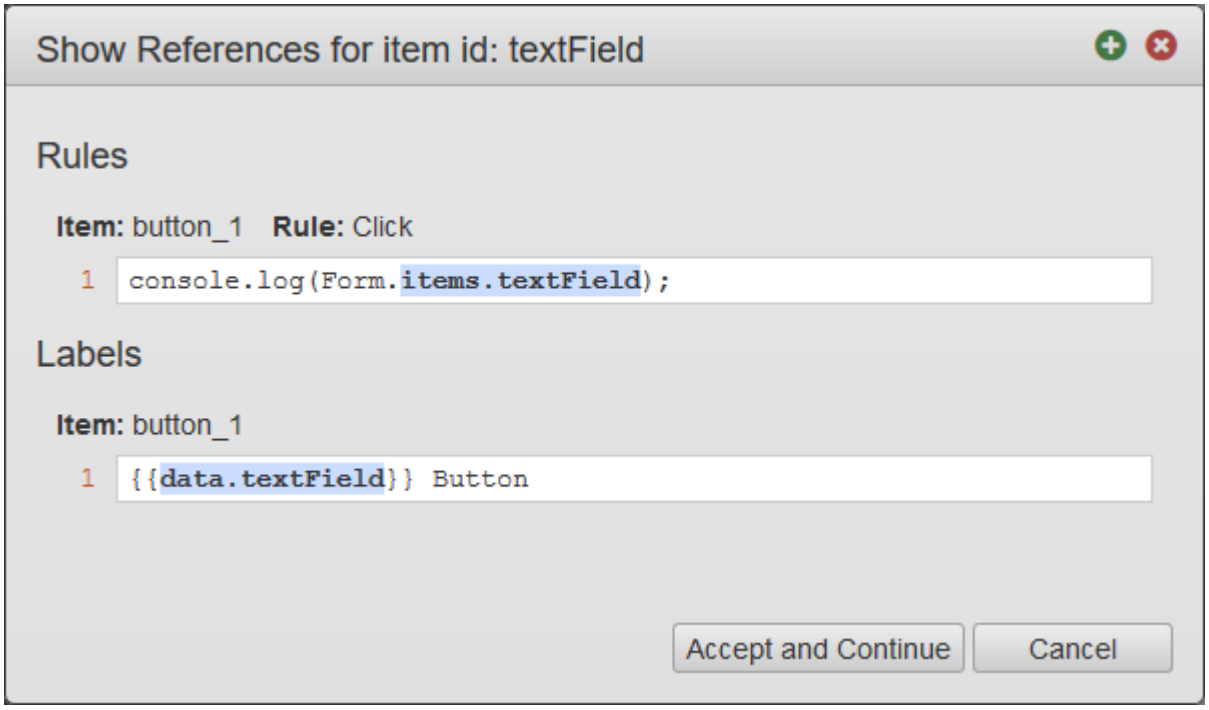
1. Open a form or a template in the Maestro editor and click the View tab.
2. Right-click the component in the Palette pane or Wireframe and select Show References to [COMPONENT ID].
3. Click the reference content to be taken to where the reference is defined. For example, if a component is referenced in a rule, clicking the reference content will open that rule in Code Mode.



4. Right-click the component and select Delete to remove the component that is referenced elsewhere. The following warning will appear.



5. Click **Review** to open the **Show References** dialog for the component you're attempting to delete, allowing you to view the references that will be affected by deleting the component. In this case though, it will also include an **Accept and Continue** button.



6. Click **Accept and Continue** to delete the component. The references to the component will no longer work.
7. Click **Continue** to delete the component. The references to the component will no longer work.
8. Click **Cancel**, so the component won't be deleted.

Next, learn about the component ID.

Import and Export a Component

Maestro components belong to Maestro assets and resources. When you create a new component, it is stored in a project you are working in. However, you can move or copy it to other projects, which is a simple way to reuse the component, see shared components. You can export and then import a component to achieve this.

To export a component, select the component from the Maestro Dashboard and click Export. Once you have exported the component, you can import it to a different location.

To import a component, select the component from the Maestro Dashboard and click Import.

> NOTE
>
> When moving or copying a component, be aware that the component is not available within the project until it is published into a library.

If you have imported the entire project or the library, the published version of the components in the imported project is already available. However, if a component is imported on its own, you need to publish it first, so it is available to forms within the project.

Repeating Components

Journey Maestro provides the repeating components that allow you to add (repeat) multiple instances of a component to a form so that you can implement various business requirements, for example, to sum up a total of values stored in repeating components in a form. There are the following repeating components, which you can find on the Palette tab in the Repeats folder:

- Repeat
- Repeat Add Button
- Repeat Delete Button
- Repeat Index Text
- Repeating Block Template

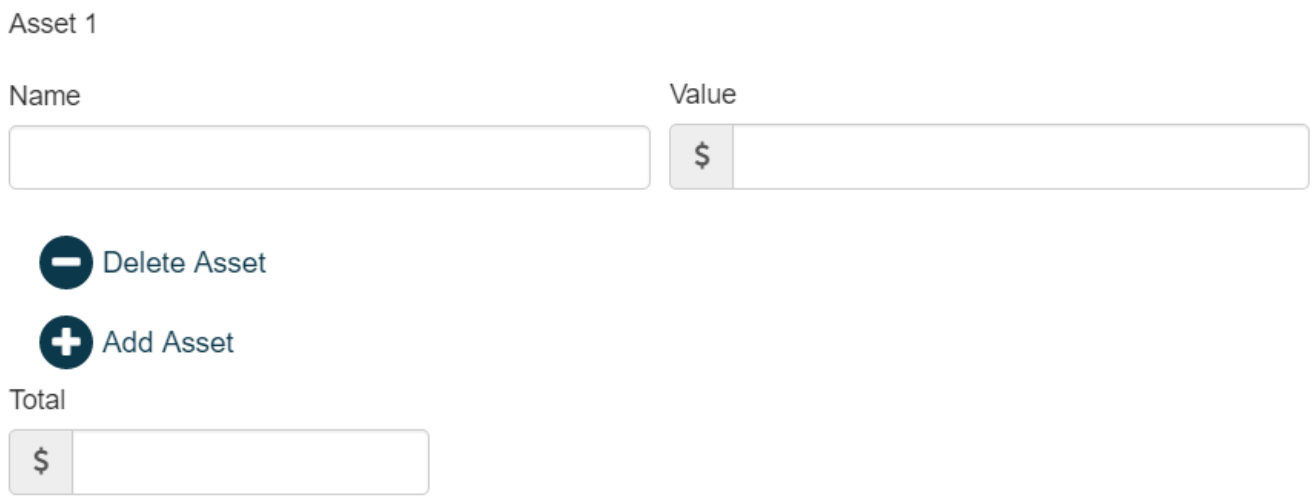
You can directly access and inspect the data model of a repeating component after you build and render a form. Type `maestro.Form.data` into the browser console to see the repeats that are an array with each child element in the array having the following 3 properties:

- `$r` is the array
- `$i` is the array index of a row
- `$p` is the parent data scope

Next, learn about the repeat component.

Repeating Block Calculations

Journey Maestro allows you to apply Calculation rules, see calculation rules overview, to a Repeating Block component to implement customer requirements. You can use this functionality to calculate the sum of specific components within a repeating block. For example, a form requires a user to provide asset's name and its values in dollars ($). Once values have been entered, a total sum of all assets is calculated and displayed as the Total.



A user can add more assets to the form as required. The total amount is then re-calculated to reflect the additional component in the block.

To create a calculation rule on a repeating block, follow these steps:

1. Open a project in your organization.
2. Open the component in the Maestro editor.
3. Add a component outside of the repeating block template.
4. Select the component and click Create Rule in the Properties pane.
5. Select Script under Calculation.
6. Navigate to Repeating Block Template > Content > Repeated Content.
7. Select the component to hold the result of calculation, which is the total in this example.
8. Right-click the component and select Get sum of repeating data.
9. Click Save. The calculation rule is added to the Properties pane.

Re-usable Components

Journey Maestro provides a variety of different types of re-usable assets you can use to build many forms that require a high degree of consistency. Re-usable components are one of the more frequently reused assets, which allow Form Builders to create forms that encapsulate the same functionality.

Re-usable components can be anything from a customized address to a large multilayer component built using a repeating block template. You can apply them many times in various scenarios across different forms and projects.

Journey Maestro allows you to reuse components at the following levels:

- Component level
- Form level
- Style level

Re-use Components at the Component Level

You can reuse the following Journey Maestrocomponents at a component level.

- Native components

  Native components are the basic widgets that are supplied with Maestro. These include components for entering a single data value, such as data entry fields, checkboxes, radio buttons, and dropdown lists. There are also a number of more sophisticated components such as numeric and number fields, and more. Many components have at least two subparts, the label and the data entry area. Some also include an icon (such as a currency indicator), and most will allow for an optional help icon to display help text. A date field is arguably a more complex component, because it includes a pop-up calendar control - but is still really just a simple component.Under the covers, a simple component consists of an HTML definition, a Maestro descriptor that tells Maestro what properties to display in the Properties tab, and optional JavaScript and CSS. However, as a Maestro user, you are shielded from the underlying complexity, and simply drag and drop the component into your form. These components are usually shipped in the product, although they can be built by anyone with HTML, CSS and JavaScript skills.

- Custom Native components

A custom native component is often made up of more sub-parts than a simple component. For example, a Heading consists of not only the Heading text, but sub-text, help text, a collapse/expand button, and a significant amount of JavaScript and CSS. An even more complex component such as a Driver's License scanning component may have multiple data entry fields, a camera button, descriptive images, and more. However, logically it is still a completely self-contained component, and occupies only a single line in the structure pane.In reality, a complex component has exactly the same structure as a simple component, just there is more "stuff". It is still made up of HTML, JavaScript and CSS, it's just that there is usually more of it. There is no fixed boundary between a simple and a complex component, although any component with more than one visible data entry area within it would usually be considered to be complex. Avoka staff, or someone with HTML, CS and JavaScript skills can create these components..

- Custom component

  Sometimes it is useful to create a re-usable variant of either a simple or complex component. The main reasons for this are:A component with a re-usable business rule, particularly a validation rule. An email field is an example of this.A component (usually a radio button or drop down list) with a specific set of values. An example of this is a drop down list of countries.A component with a particular XML binding. A custom component can be defined and re-used only within a single form, or can be published to a library for use among multiple forms. A Maestro Developer can create these components.

- Re-usable Block

  A re-usable block is a re-usable collection of simple components. An example of a re-usable block is an Address Block, which consists of two lines of text plus City, State and ZIP Code. Unlike a complex component, each of the sub-elements of the custom block will be visible in the Structure tab, and can be modified individually by the person using your block. Any Maestro user can create these components.

Re-use Components at the Form Level

You can reuse the following Journey Maestrocomponents at a form level:

- Template

  A template is an empty form that can be used as the starting point for new forms. Generally, a template contains all the so-called "chrome" that goes around the outside of the actual components that a Form Builder will add to the form. The chrome includes content such as

navigators, headers and footers, and standard dialogs. A template can be created based on an existing template or can be built from scratch. A Maestro Template Designer can build this component.

- Brand

  A template usually contains one or more brands. A brand allows a Form Builder to select a particular set of colors, fonts and other visual elements that can be applied to a form. A brand generally applies to a specific template, because the colors and fonts are applied to the "chrome" of the template, such as headers, footers, and navigators. The brand also applies to the components that will be added to the form.It is useful to separate the brand from the template in this way, because this allows an organization to come up with a single overall "shape" of all of their forms, but still allows them to define different color schemes, logos, and other branding elements for each of the sub-entities within their organization. This is particularly helpful for larger organizations who have multiple sub-organizations that have their own brand, or for organizations who white-label their products to other organizations. A Maestro Template Designer can build this component.

Reuse Components at the Style Level

You can reuse the following Journey Maestrocomponents at a style level:

- Simple Shared Style

  Sometimes you may want to style a component in a particular way. For example, you may want to create a Red Text Input. One way to do this is just to change the color using the Styles tab. However, this might result in different people choosing a different shade of red. Instead, you can create a shared style that defines the correct shade of red, has a name, and can be applied to any Text input.The shared style can be used simply within your own form, or can be published to a library for re-use among multiple forms. Any Maestro User can reuse this component.

- Complex Shared Style

  Maestro provides the capability to modify many of the simpler CSS style elements using an intuitive graphical editor. However, sometimes it may be desirable to create much more complex visual effects using the power of CSS. Maestro allows custom CSS to be used, but this requires the skills of someone who understands the intricacies of CSS. A CSS expert can reuse this component.

Styles are usually created by a Template Designer who shares them in Journey Maestro, so a Form Builder can use them in new forms.

You cannot make a Red Label Text Field as a Custom Component. This is because Custom Components only contain custom properties, which only affect functionality, but not look and feel. You will need to create a Red Label Custom Style, which can be applied to any Text Field.

In Maestro, you can control component functionality and styling by two different re-usable elements, which don't overlap:

- Custom components that are responsible for functionality.
- Custom styles that are responsible for look and feel.

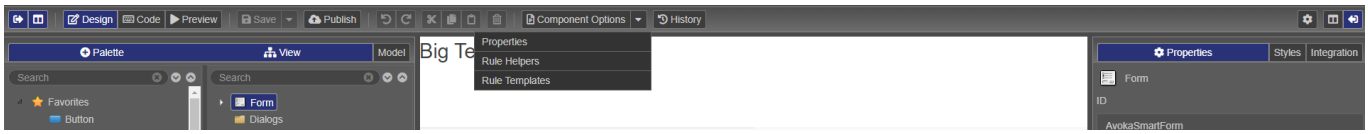
Component Options

Maestro allows you to define properties and business rules for custom native components using the Component Options menu. You usually do this for shared components, which are used in templates and forms, so these additional options can be invoked with a right click. This is handy for Form Builders as it speeds up form development process, which is essential while working on complex forms.

NOTE

You can't change the Component Options of core components.

The Component Options menu is only available when you open a component from the Components folder in the Maestro editor.



You can then add the following options to a selected component:

- Properties
- Rule Helpers
- Rule Templates

How to Use Rule Templates

When you've configured properties, rule helpers or rule templates in a component, you can start using them in a form. Let's look in an example illustrating how you can use a rule helpers and a rule template in a form.

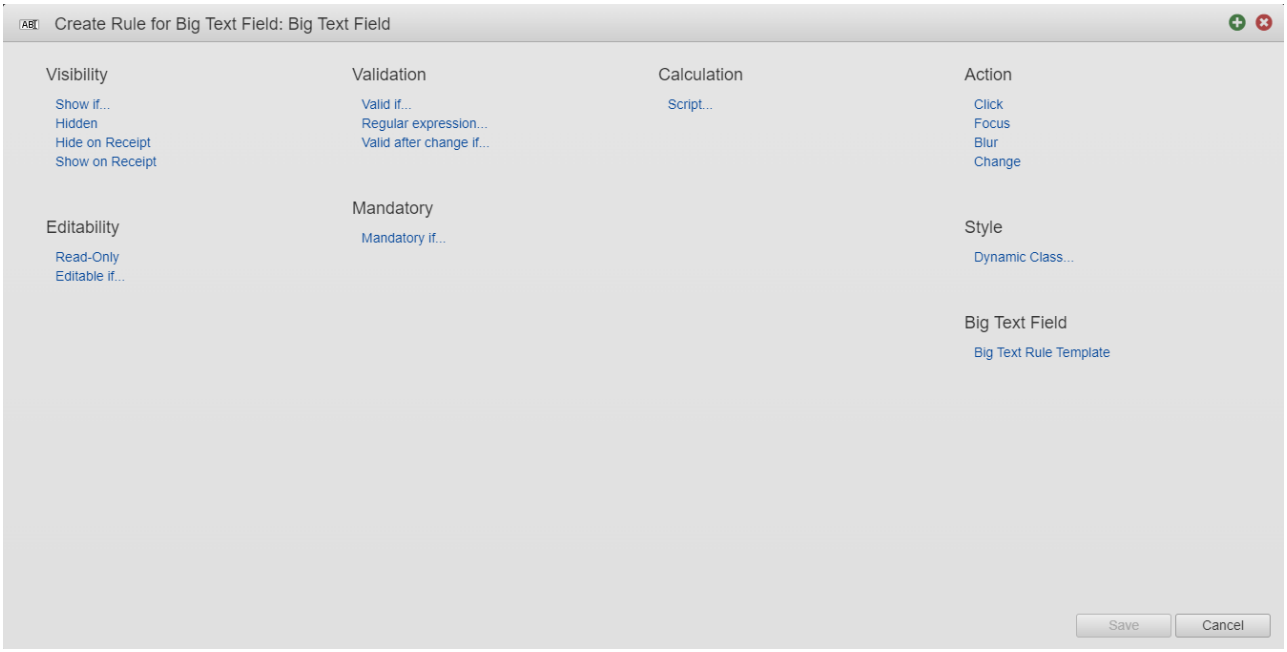
NOTE

You need to create both a rule helper and a rule template and configure them correctly, so you are able to see them in the Create Rule Dialog while working on a form.

To configured a component with a rule template and a rule helper component options:

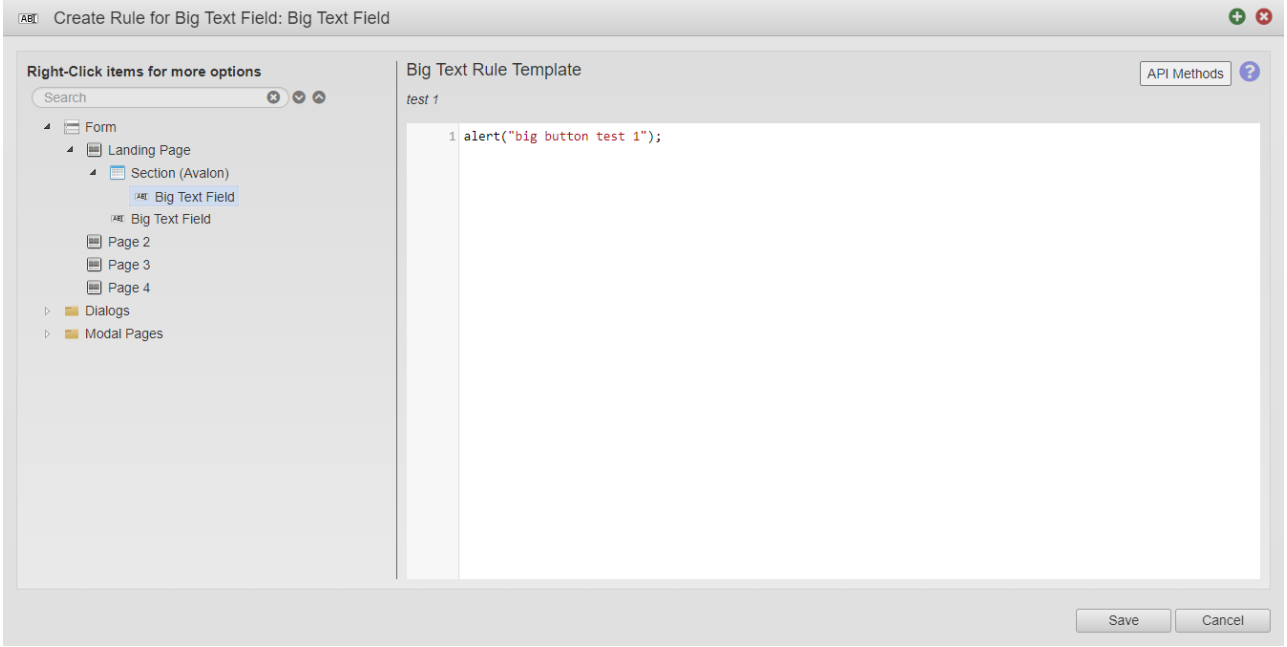
1. Open a project in your organization.
2. Select a form or a template that has a component with a rule helper and rule template configured and click Edit Form.

3. Add the component to the form and select it.
4. Click the Properties tab and click Create Rule to open the Create Rule dialog where you should see all pre-configured business rules as well as the component's rule, if the rule template was configured correctly.



In this example, Big Text Field is the name of the component and Big Text Rule Template is the name of a rule template.

5. Click Big Text Rule Template, the rule template, to open the Rule editor where you can edit a JavaScript, which is invoked when the rule is triggered from other component.



6. Click Save to save the changes.

Now, you can add another component to the form that executes the Big Text Rule Template rule. For example, you may add a button with a Click rule that calls a JavaScript when the button is clicked: `Form.fireRule("bigTextRuleTemplate", item, data)`

Next, learn how to add properties.

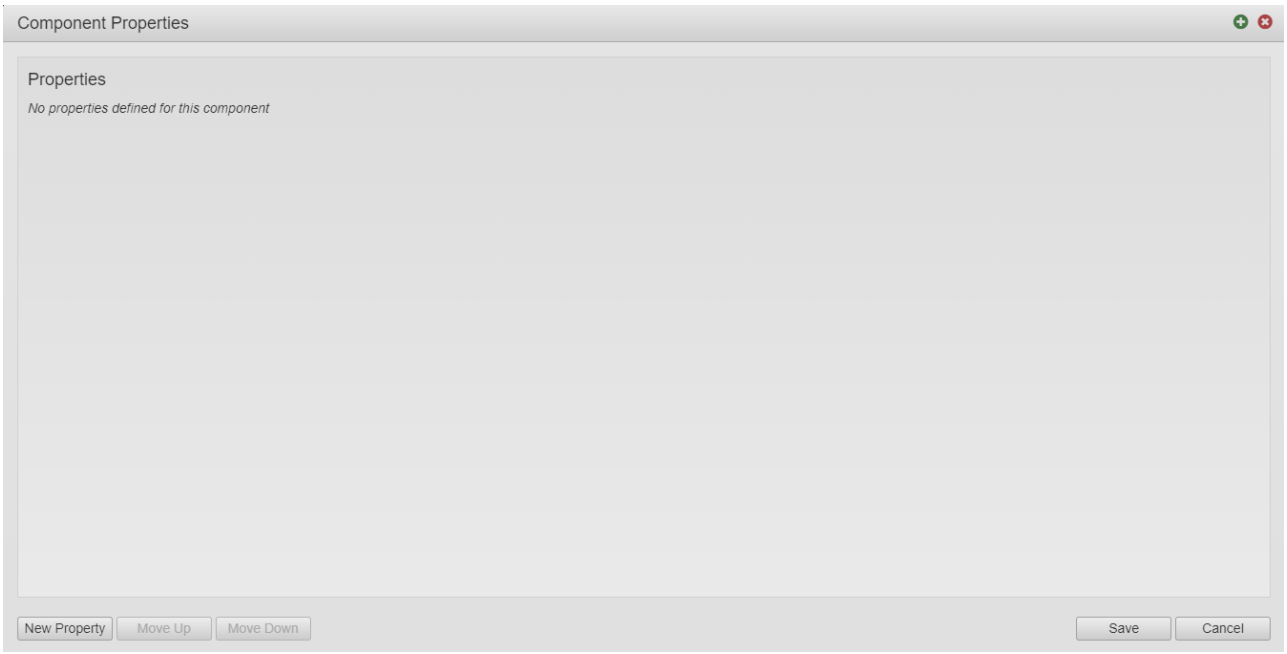
Component Options: Properties

Maestro allows you to create new and update existing properties for components using Component Options. This functionality is handy for configuring different brands, adding help texts, and so on. You can only add new properties to native components, which are usually shared and used in templates and forms. A Form Builder can then make use of the new properties in the Properties pane of the Maestro editor.

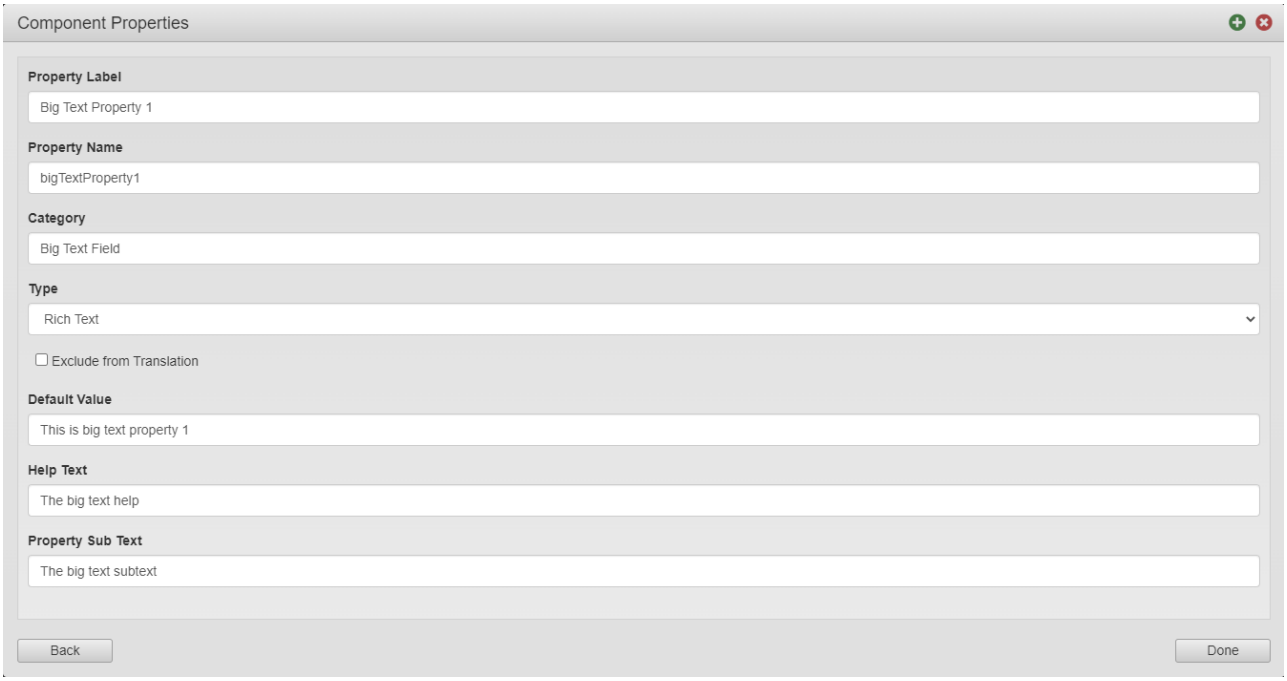
Create Properties

To create a new property using Component Options:

1. Open a project in your organization.
2. Select a component in the Component folder and click Edit Version.
3. Click Component Options and select Properties.



4. Click New Property and enter details of a new property.

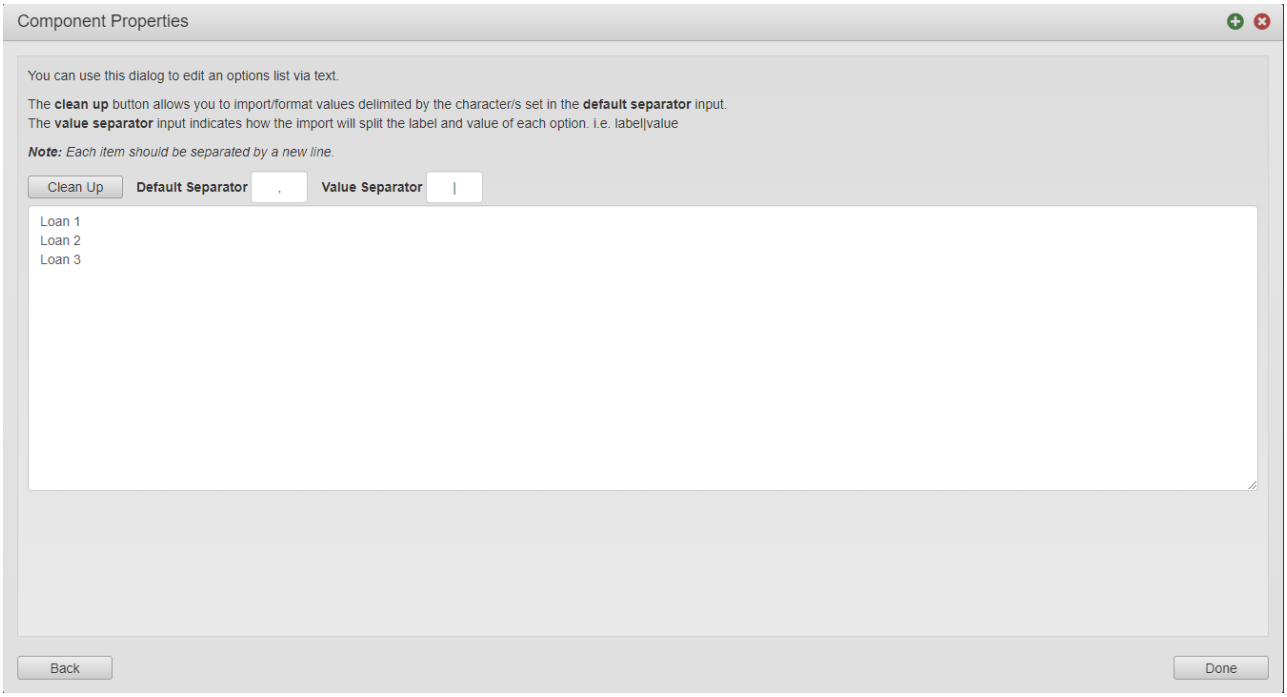


5. Provide a property label in the Property Label field, which is visible in the component. This is the mandatory field.
6. Edit a unique identifier of the property, which is automatically generated based on the label name, in the Property Name field.
7. Enter a category of the property in the Category field, which is used to help identify the new property. Category examples are Options, Input Fields, Background services, and so on.
8. Select a property type from the Type dropdown list, which can be one of the followings:
    - Text
    - Rich Text
    - Help Text
    - Integer
    - Boolean
    - Date
    - Icon
    - Image
    - Color
    - URL
    - Option
    - Option List
    - Field Ref
    - Field Ref Map

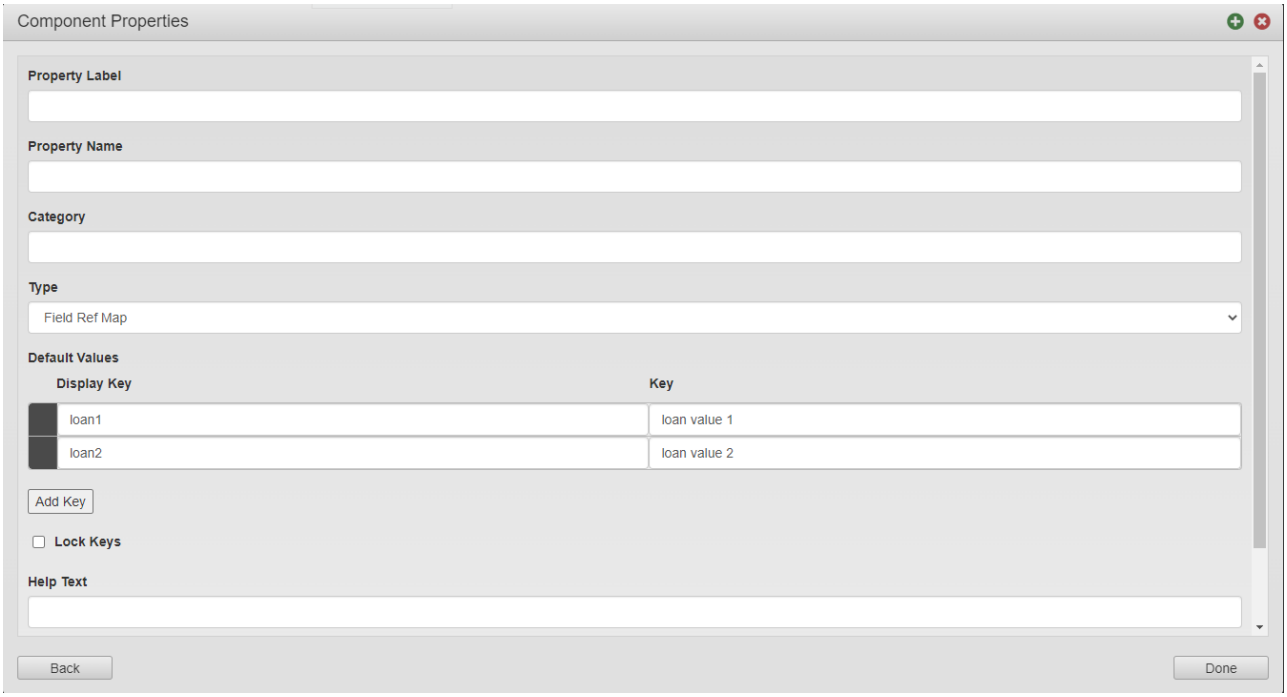
NOTE

Depending on the selected type, some additional property parameters are displayed.

9. Select the Exclude from Translation checkbox to exclude this property from been translated during form rendering.
10. Click Edit List Values to populate values of a property of the Option type.



11. Specify the Display Key and Key pairs for a property of the Field Ref Map type. Click Add Key to create more pairs. Select the Lock Keys checkbox to lock the key pairs.

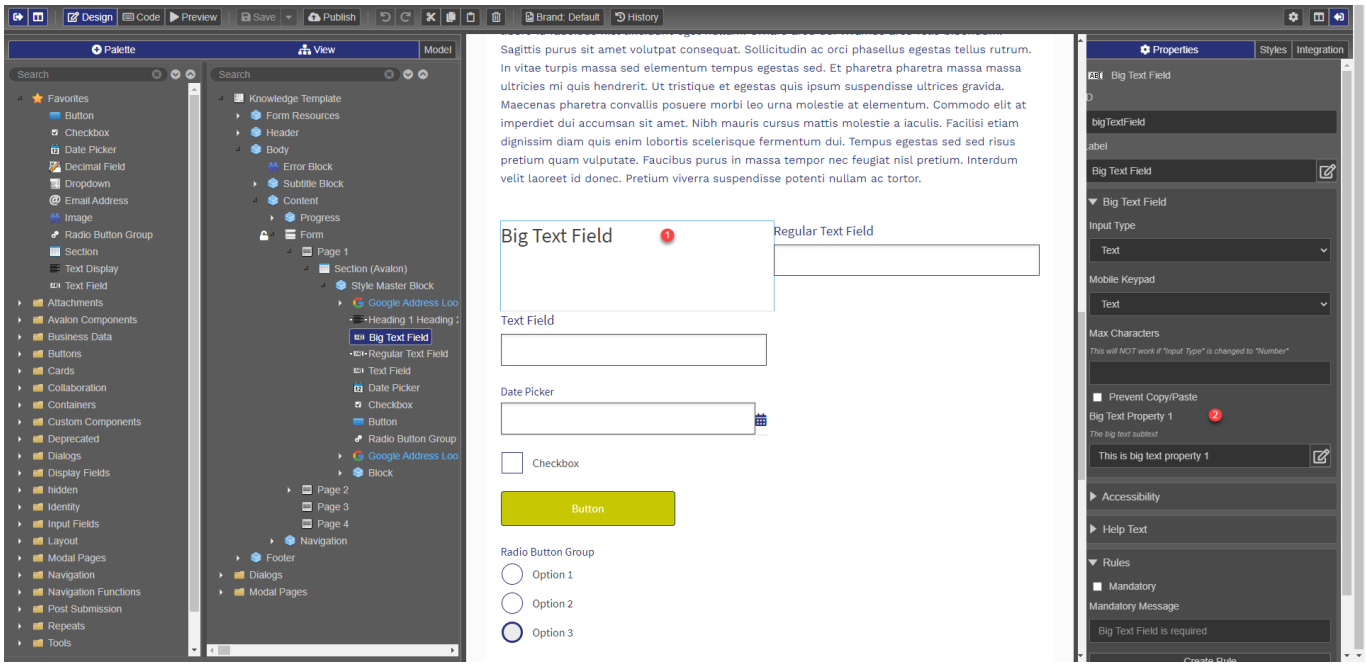


12. Provide a default value assigned to the property at he initialization in the Default Value field.
13. Provide a text, which is displayed when a cursor hovers over the component, in the Help Text field.
14. Provide a subtext text in the Property Sub Text field.
15. Click Done to create the property.
16. Check the property in the Component Properties window. You can also create another property if needed.



17. Click Save to create the property.
18. Click Publish to make the new property available to other forms or templates.

Now, you can publish the component to make the new property available to other forms or templates. Then, open a form or a template, which uses this shared component, and you can start using the new property. This is illustrated below:



Update Properties

You can update an existing property anytime you need it

To Update a property using Component Options:

1. Click Component Options and select Properties.
2. Double click a property to edit it.



3. Click Move Up to move the selected property up in the list.
4. Click Move Down to move the selected property down in the list.
5. Click Save.

Remove Properties

Maestro allows you to delete properties that you no longer need.

To remove the property using Component Options:

1. Select a property.
2. Click the red square to delete the property.



3. Click Save.

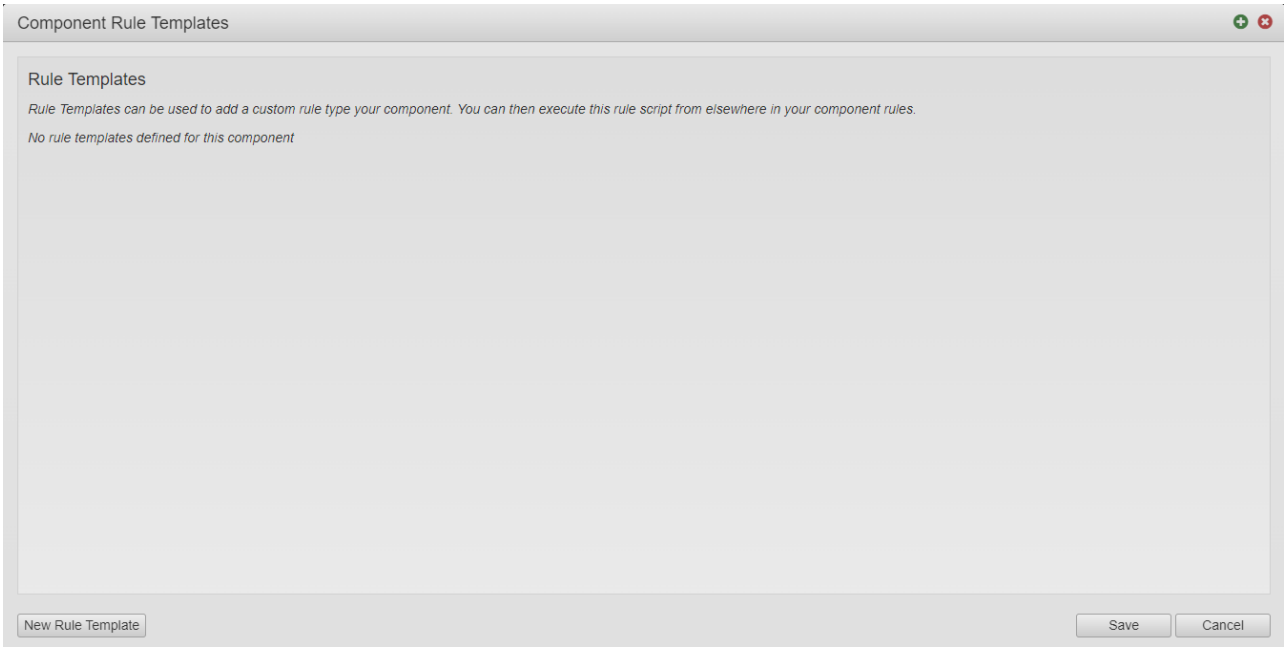
Next, learn how to add rule templates.

Component Options: Rule Templates

Maestro allows you to create new and update existing rule templates for components using Component Options. You can use it to add custom rule types to a component. Once a rule is configured, you can run its JavaScript from another location of your form.

To create a new rule template using Component Options:

1. Open a project in your organization.
2. Select a component in the Component folder and click Edit Version.
3. Click Component Options and select Rule Templates.



4. Click New Rule Template to create a new rule template.



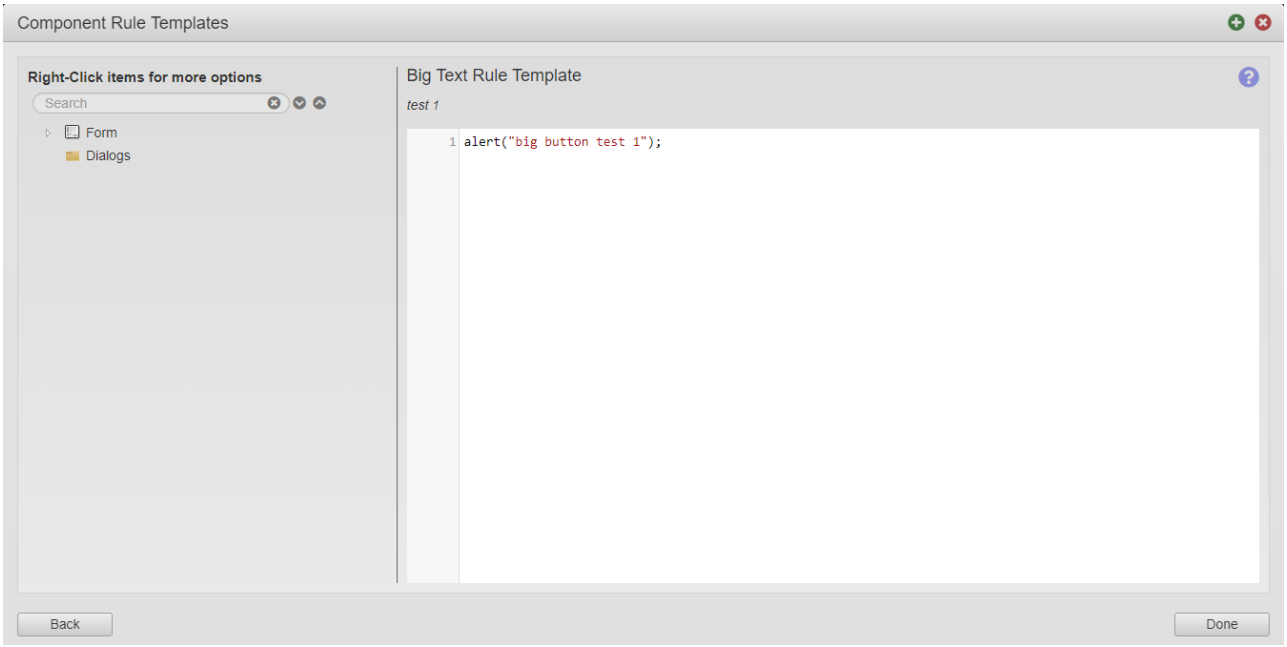
5. Enter the Name for the new rule template. It automatically prefills the type of the rule and a JavaScript code required to execute it, for example: `Form.fireRule("bigTextRuleTemplate", item, data)`.

   NOTE

   We recommended saving this code for your further reference as you will need it for an executable command later.

6. Update the type of the rule in the Type field if you are not happy with the auto-suggested type.

7. Click Create Default Script to edit a rule script.



8. Click Done.

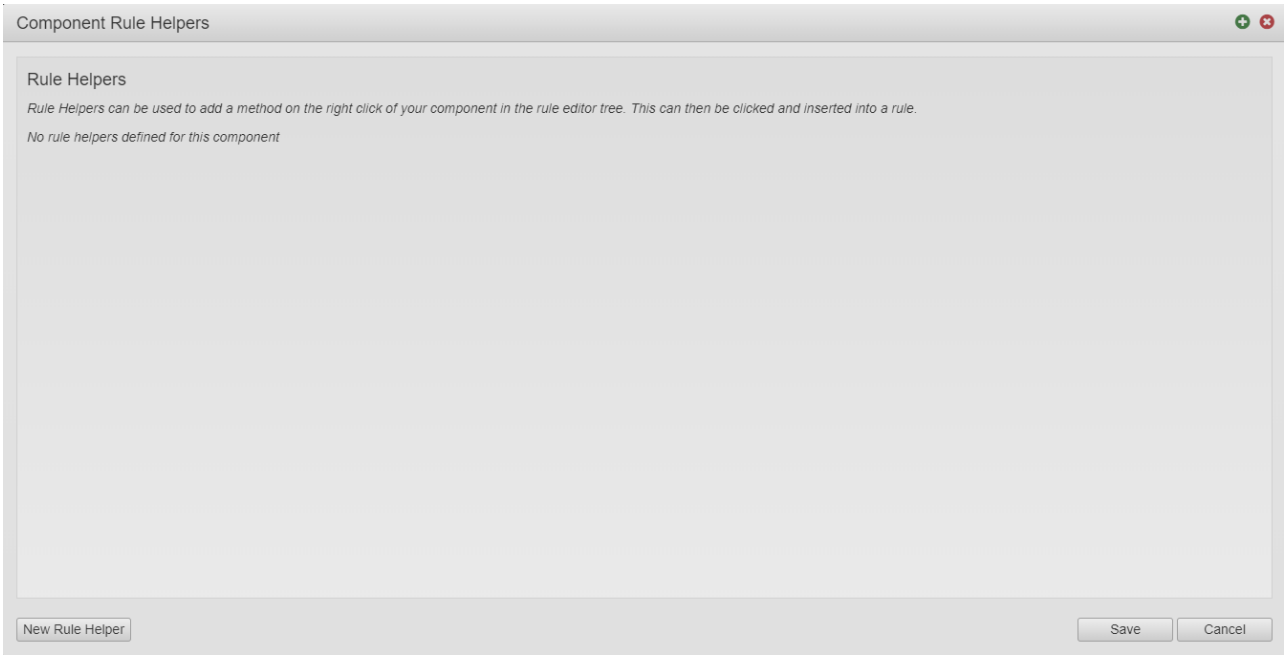
Next, learn how to add rule helpers.

Component Options: Rule Helpers

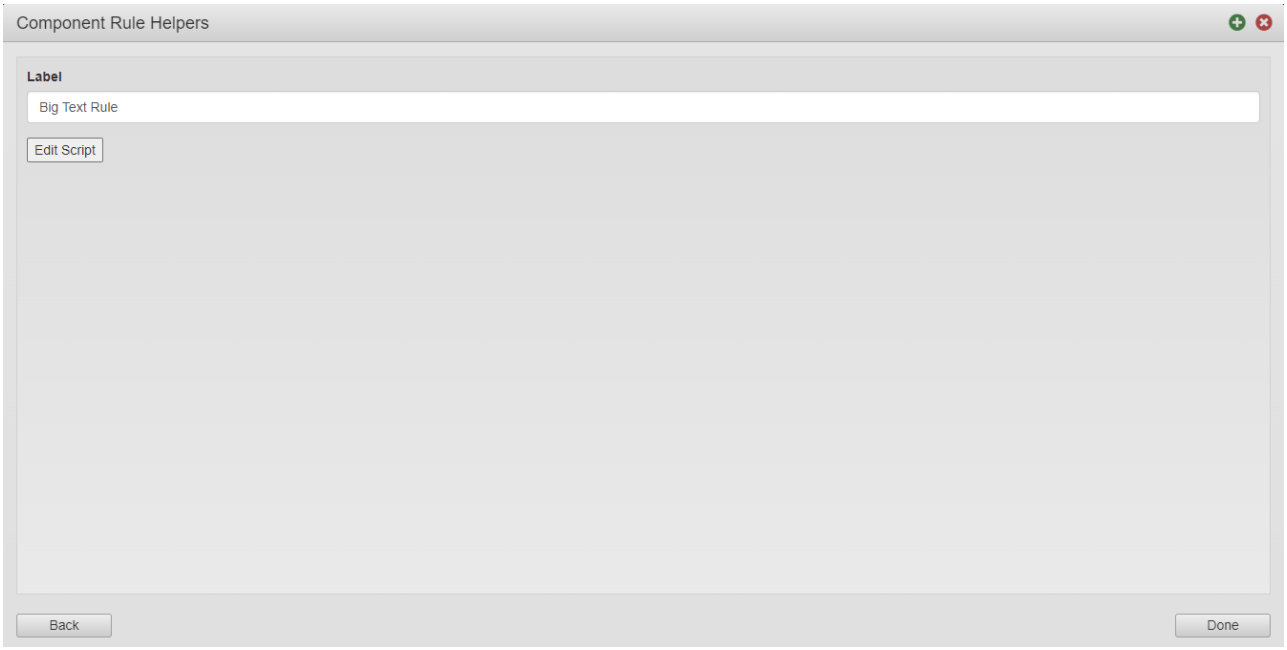
Maestro allows you to create new and update existing rule helpers for components using Component Options. You can use these rule helpers to add methods to a component right click event in the rule editor, so a rule helper will appear as a selectable option. Also, rule helpers are for when you right click on a component when writing a script, it gives you pre-defined actions relating to that object, for example, if you right click on a dialog, it has an option Open Dialog.

To create a new rule helper using Component Options:

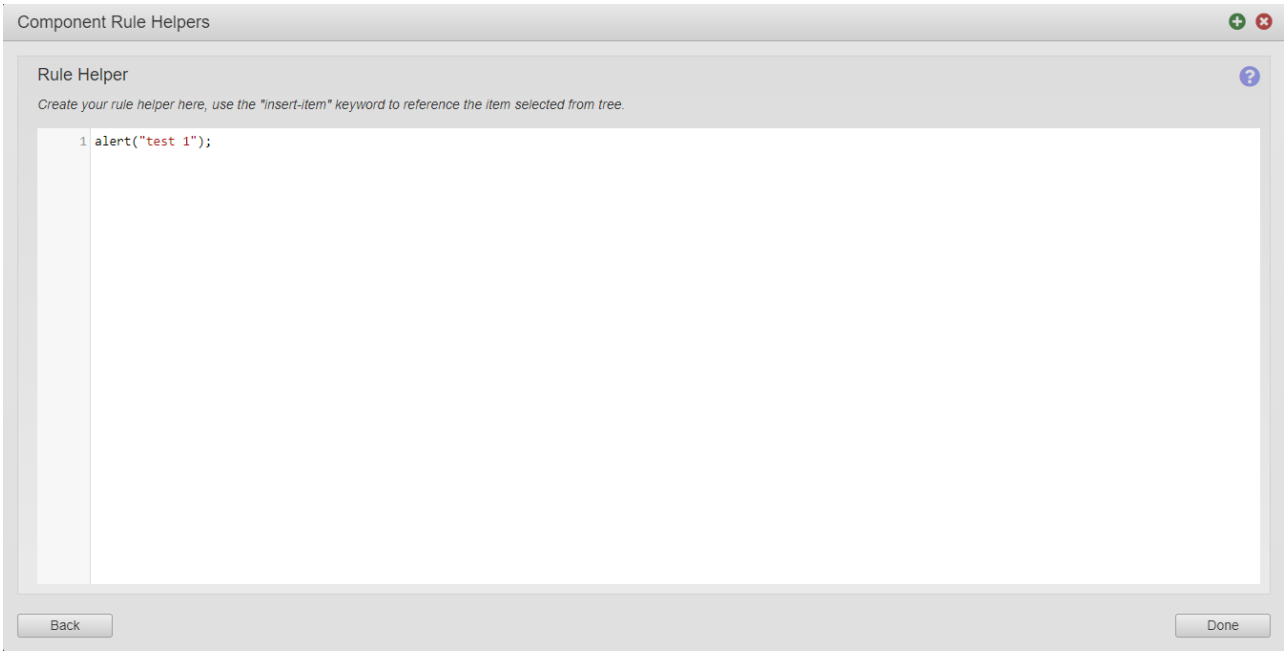
1. Open a project in your organization.
2. Select a component in the Component folder and click Edit Version.
3. Click Component Options and select Rule Helpers.



4. Click New Rule Helper to create a new rule helper.
5. Type a name for a Label to identify the rule helper when a user right-clicks the component in the editor tree and click Create Script.



6. Enter a JavaScript for the new rule helper.



A JavaScript can follow this pattern: `Form.fireRule ("name of the Component Template", Form.items.component_ID, data)`, for example, `Form.fireRule("testRule", Form.items.componentRuleTestID, data);`.

In this example, `testRule` is the name of the component rule template and `componentRuleTestID` is the component ID of the component that the rule helper is associated

with. When a user right-clicks the component with the component ID `componentRuleTestID`, this rule helper becomes available as a selectable option.

> NOTE
>
> You can use the `insert-item` keyword to reference the item selected from the tree, so it populates it with component's ID.

The example of the `insert-item` is shown below:

```
"ruleHelpers": [
    {
       "label": "Open Dialog",
       "name": "openDialog",
        "value": "Form.showDialog(\"insert-id\")"
    },
]
```

7. Click Done and then click Save.

Next, learn how to add rule templates.

Native Components Overview

Native components are the core components that come pre packaged with Journey Maestro. Native components can be customized and shared.

Native components are the basic widgets that are supplied with Maestro. These include components for entering a single data value, such as data entry fields, checkboxes, radio buttons, and dropdown lists. There are also a number of more sophisticated components such as numeric and number fields, and more. Many components have at least two sub-parts, the label and the data entry area. Some also include an icon (such as a currency indicator), and most will allow for an optional help icon to display help text. A date field is arguably a more complex component, because it includes a pop-up calendar control - but is still really just a simple component.Under the covers, a simple component consists of an HTML definition, a Maestro descriptor that tells Maestro what properties to display in the Properties tab, and optional JavaScript and CSS. However, as a Maestro user, you are shielded from the underlying complexity, and simply drag and drop the component into your form. These components are usually shipped in the product, although they can be built by anyone with HTML, CSS and JavaScript skills.

KEYBOARD SHORTCUT

Most of native component have a keyboard shortcut assigned to them.

Next, learn about the Attachment Field component.

Attachment Field

Maestro comes with the Attachment Field component (widget) that allows a form user to upload multiple attachments, such as files and images, which are a part of an onboarding process and are submitted along with a form.

NOTE

Since Maestro 19.05, all standard versions of the Attachment Field widget support a form space portal using CSRF[1] tokens.

NOTE

Starting in Maestro 20.11, the Attachment Field component is the part of the core library. Prior to this, it was part of the Maguire release library.

Usage

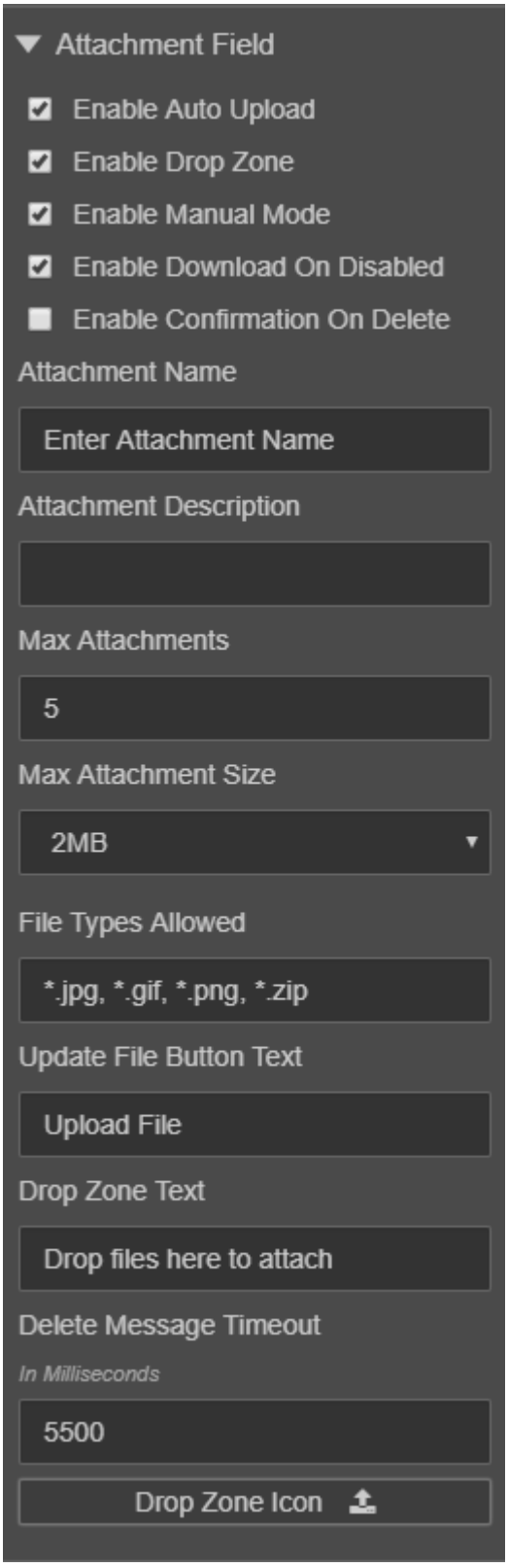
1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Attachment Field** component within the **Attachments** folder.



3. Drag the component into the **View** pane or the **Wireframe**.

[1]Cross-site request forgery (CSRF), also known as one-click attack or session riding, is a type of malicious exploit of a website where unauthorized commands are transmitted from a user that the web application trusts.

4. Configure the component's properties via the **Properties** pane.



Properties

The following properties are available to the Attachment Field component:

Enable Auto Upload
Boolean enableAutoUpload

Enable the ability to auto upload attachments. It automatically uploads the attachment once the user drags it into the drop zone or uses the upload button. This option may not work when previewing the form, it only works once the TM form version is built.

Enable Drop Zone
Boolean showDropZone

Enable the ability to show attachment drop zone area, so the user can use the drop zone to drag and drop attachment files there.

Enable Manual Mode
Boolean enableManual

Enable manual attachment feature, which displays the I will deliver manually text on the field. The user can select this option to indicate that they will be sending the attachments via a different method, such as by email or post.

Enable Download On Disabled
Boolean allowDownloadDisabled

Enable download on disable, so users can download attachments from a disabled attachment field.

Enable Confirmation On Delete
Boolean allowConfirmDelete

Enable confirmation on delete, so users will be prompted before an attachment is deleted.

Attachment Name
attachmentName

Enter the attachment name, which allows you to distinguish multiple attachment fields per form.

Attachment Description
attachmentDescription

Enter the attachment description, which allows you to distinguish multiple attachment fields per form.

Max Attachments
Integer queueLimit

Select the maximum number of attachments that a user can upload to a form which will be included in a form submission. Once the maximum number is met, the options to include additional attachments (drop zone and upload button) will disappear.

Max Attachment Size
Option maxSize

Select the maximum size of each attachment. If you want to set the maximum total size for all attachments that will need to be configured in Journey Manager.

The following options are available from the **Max Attachment Size** dropdown:

Label	Value
0.5MB	524288
1MB	1048576
2MB	2097152
3MB	3145728
4MB	4194304
5MB	5242880
6MB	6291456
7MB	7340032
8MB	8388608
9MB	9437184
10MB	10485760
15MB	15728640

Label	Value
20MB	20971520
25MB	26214400

File Types Allowed
fileTypes

Enter the file types allowed in the format provided. You can add more types by following the format displayed. For example, if you wanted to add PDF to the allowed types you would type *.pdf.

Update File Button Text
chooseFileButton

Enter text for the button used to upload files for attachment.

Drop Zone Text
dropZoneText

Enter the text for the drop zone used to upload files as attachments.

Delete Message Timeout
Integer deleteMessageTimeout

Delete Message Timeout

Drop Zone Icon
Icon dropZoneIcon

Select the button icon to display in the drop zone. Check with the Template Designer if you can change this icon, as icons are typically customized in the templates.

Error Messages

Invalid File
invalidFile

Error to display if the file is invalid

Invalid Size
invalidSize

Error to display if the file size is 0KB

Exceeds Maximum Size Limit
exceedsSizeLimit

Error to display if the file size exceeds the maximum limit

Exceeds Maximum Total Size Limit
exceedsTotalSizeLimit

Error to display if the total attachment size for this attachment name exceeds the maximum limit

Virus Warning
virusFoundOnUpload

Error to display if the attachment contains a virus when it is uploaded

Max Attachment Count Error
tooManyUploads

Error to display if there are too many attachments uploaded

Help Text

Popover Help Text
Help Text helpText

Success Messages

Successfully Uploaded
uploadSuccessful

Message to display if the file is successfully uploaded.

Successfully Removed
removeSuccessful

Message to display if the file is successfully removed

Thumbnail Options

Enable Image Preview
Boolean enableCanvas

Enable canvas image preview of any images uploaded in the attachment field in the form.

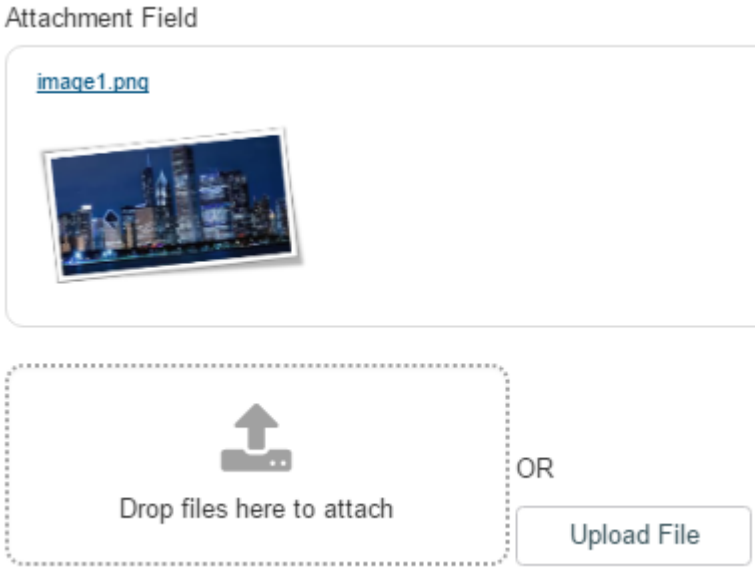


Image Preview Height (pixels)
Integer canvasHeight

Height for image to resize to in the preview mode.

Image Preview Width (pixels)
Integer canvasWidth

Width for image to resize to in the preview mode.

Transact Field | 20.11 This feature was removed in 20.11

Image Source
Option imageSource

Select the image source

The following options are available from the **Image Source** dropdown:

Label	Value
Camera	camera
Library	library

Maximum Dimension (pixels)
Integer maxDimension

Original attachment to be resized to this dimension.

Multi Select Attachments
Boolean multiSelect

Ability to multi select attachments

NOTE

You can also use the Attachment Field v2 widget that has additional functionality. | 22.10 This feature was introduced in 22.10..

Next, learn about the Countries component.

Card Content Template Component

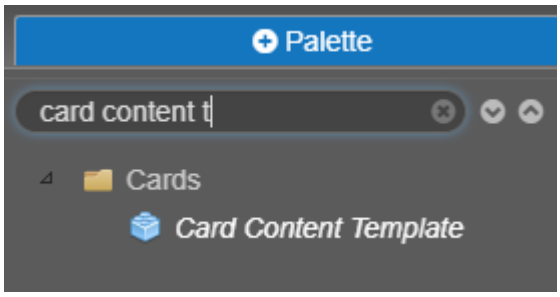
Maestro provides you with the Card Content Template component to simplify the process of collecting card details and representing these details on a card display. A card is a type of a layout that collects and displays details about an applicant or form user. You can use this component to:

- Add one or several card details to a form.
- Select and edit card details.
- Add advanced card details by adding multiple components to the template.

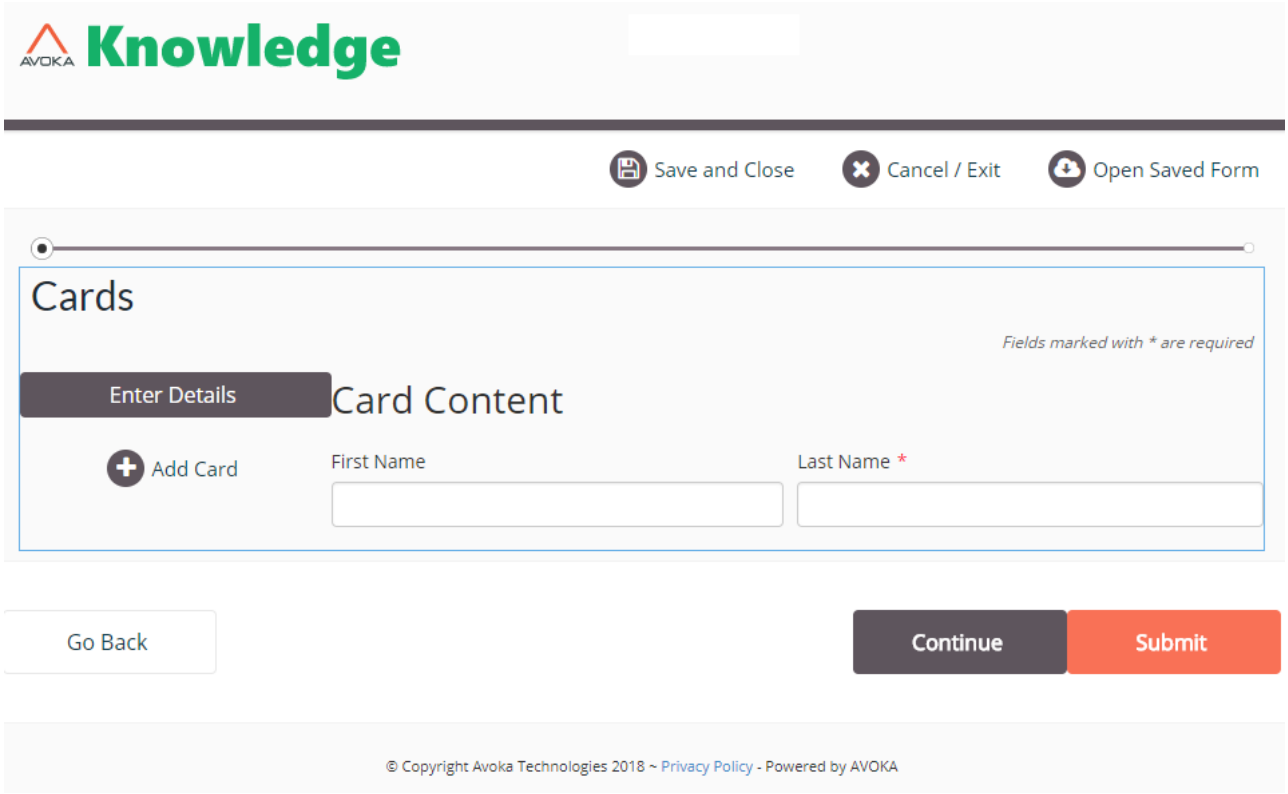
The Card Content Template is used to build the details that make up a card. For cards-based layout forms, the Card Content Template is the recommended starting point as it allows form users to enter details for one or many cards. Once entered, the Card Content Template provides form users with the ability to navigate between different card details for selecting and editing purposes. The Card Content Template is quite similar to the Repeating Block Template in that it allows multiple instances of the same set of components to be added to a Maestro form.

To configure the Card Content Template component:

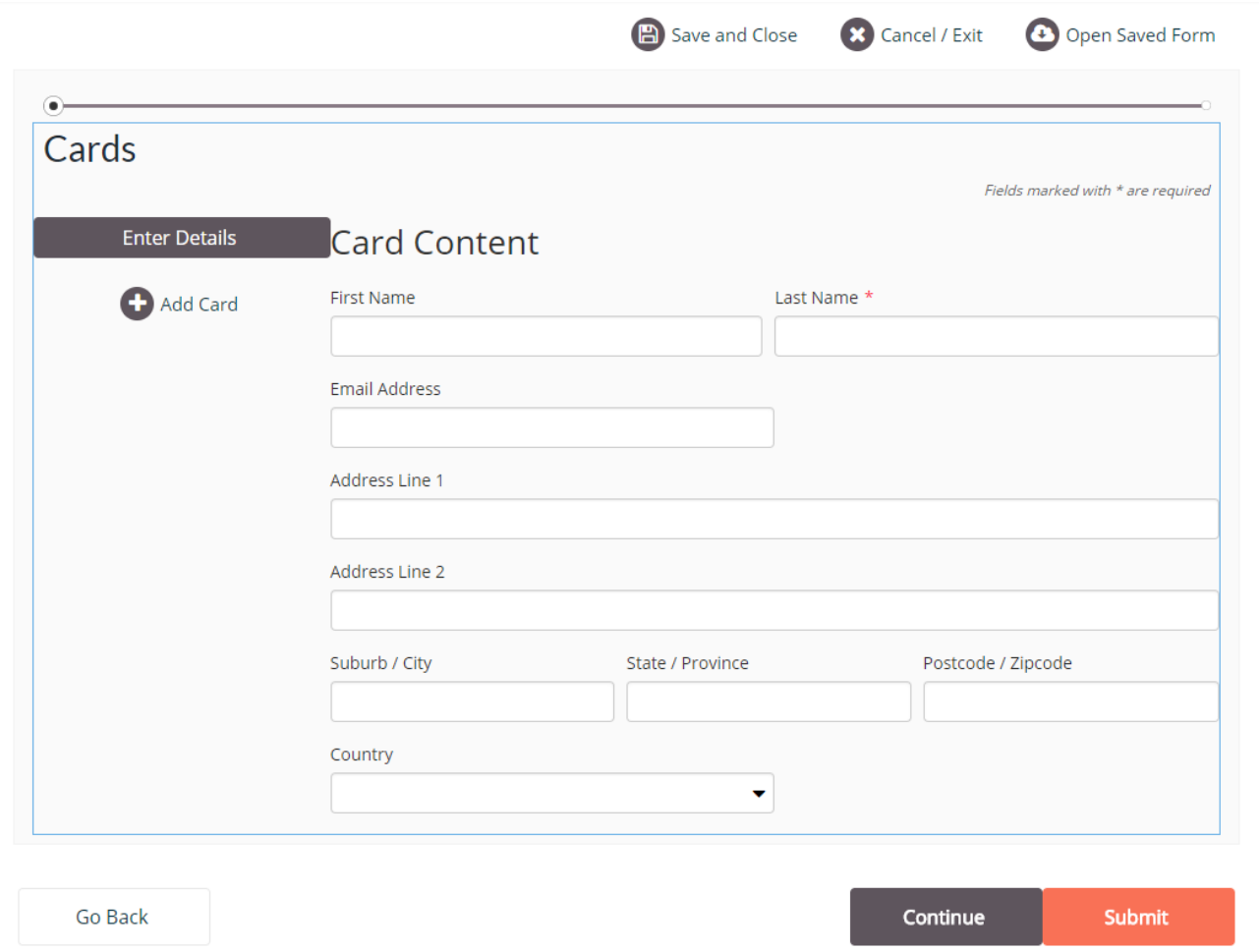
1. Open a Maestro form.
2. Click the Palette tab.
3. Expand Cards to see all available Cards library.



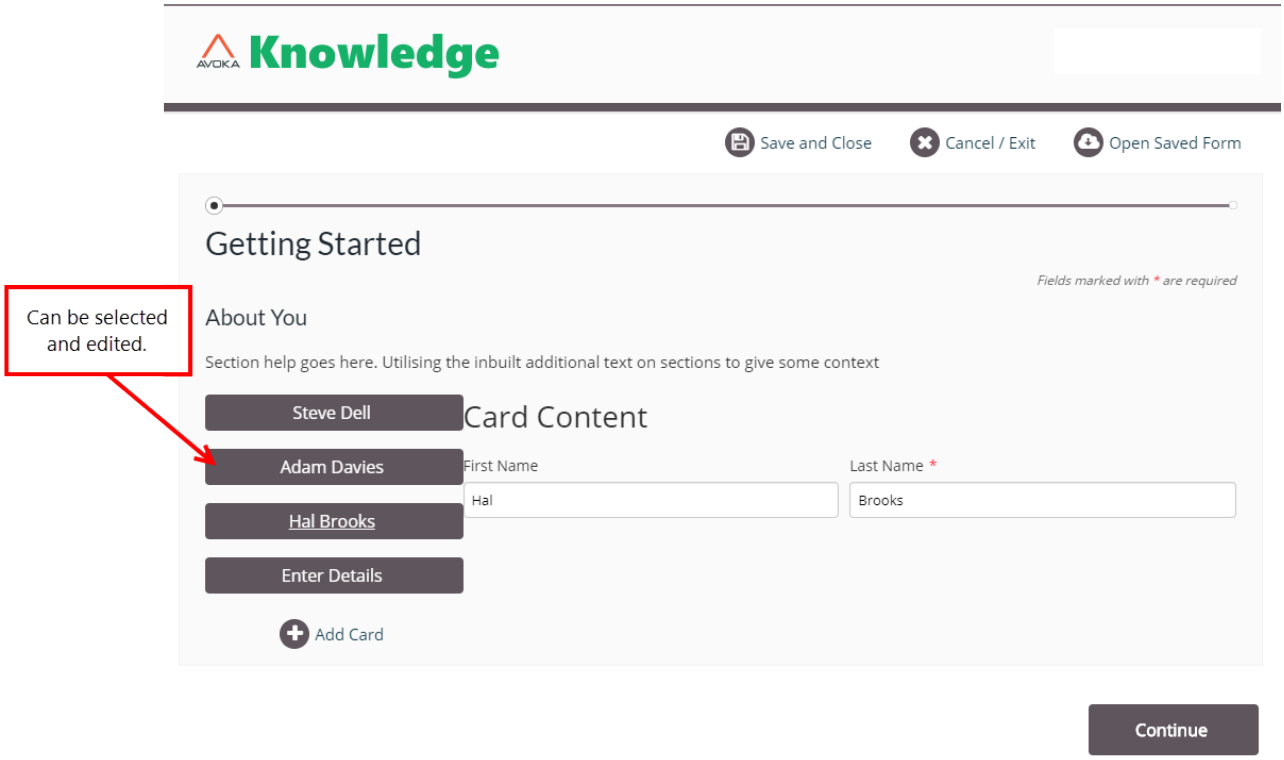
4. Click the Card Content Template. This component combines the functionality of both the Card Selector and Card Content components.
5. Drag and drop the component on your form. The example below shows the Card Content Template with two text fields.



6. Add several components if required. The example below shows the Card Content Template with multiple components.



7. Edit the component's details. The Enter Details tab displays the first and last name of each card entered. This is the default behavior, but this can be changed by updating the labels.
8. Click Add Card to enter details for another card. You can repeat this process as many times as required, but not exceeding the maximum number of repeats that is configured in the Properties panel.
9. Click Save.
10. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. In the example, details for three users (three cards) are collected. Each of these options can be selected and edited as needed. If a form user selects a component in the Card Content Template, and then saves and resumes, the component that was selected before the form was saved is still selected when the user returns to the form.


Knowledge
Save and Close
Cancel / Exit
Open Saved Form
Getting Started
Fields marked with * are required
Can be selected and edited.
About You
Section help goes here. Utilising the inbuilt additional text on sections to give some context
Steve Dell
Adam Davies
Hal Brooks
Enter Details
Card Content
First Name
Last Name *
Hal
Brooks
Add Card
Continue

Checkbox Component

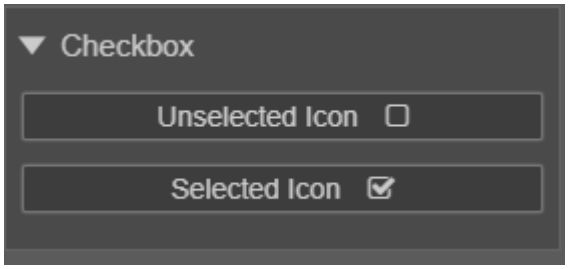
Maestro provides you with the Checkbox component to add a checkbox to the form.

To configure the Checkbox component:

1. Open a Maestro form.
2. Click the Palette tab and expand Input Fields.
3. Select Checkbox and drag and drop it on the form.



4. Click the Properties tab and find the Checkbox section.



5. Select Unselected Icon when the checkbox is not selected.
6. Select Selected Icon when the checkbox is selected by the user.
7. Click Save.
8. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Currency Field

Maestro comes with the Currency Field component (widget), which you can use in several scenarios.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Currency Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Currency Field component:

Currency Icon
Icon currencyIcon

Select the currency icon

Max Leading Digits
Integer maxLength

Decimal Places
Integer places

Number of decimal places to display

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

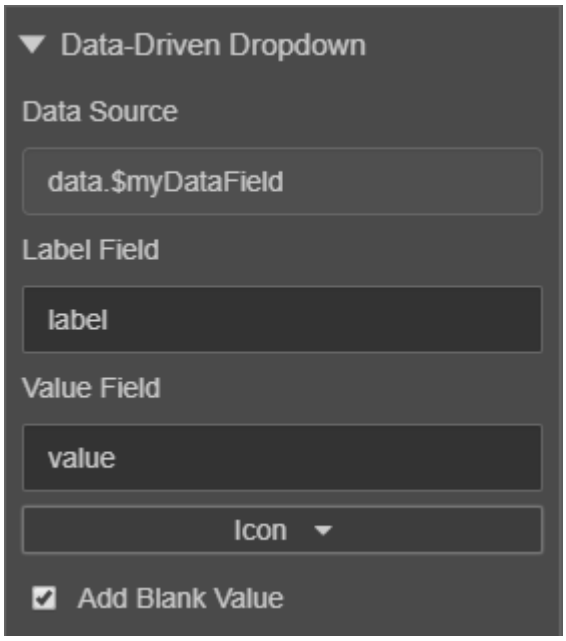
Next, learn about the Decimal Field component.

Data-Driven Dropdown Component

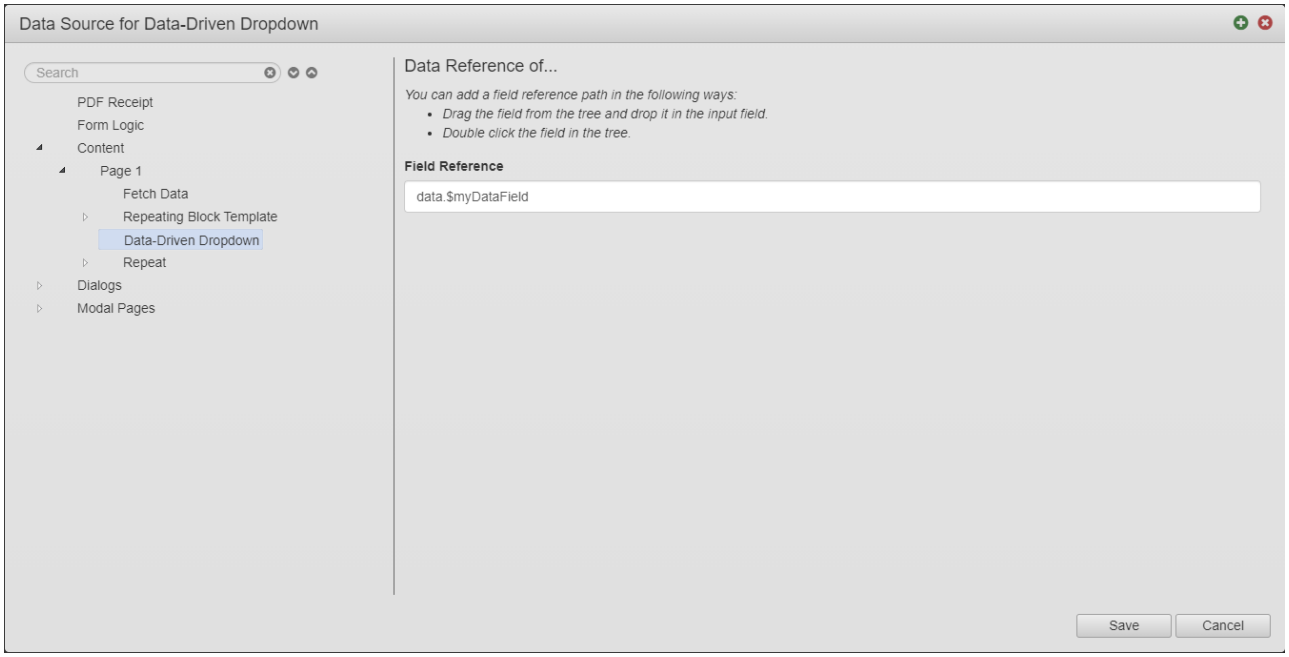
Maestro provides the Data-Driven Dropdown component that allows you to build dynamic selection lists to implement various customer requirements.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the Data-Driven Dropdown component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane under the Data-Driven Dropdown section.



5. Check the Data Source field that holds a path to source data, which is a key to the data to be shown in the dropdown lists. Click the field to edit the path.



For more information, see use cases below.

6. Update Label Field which is set to the field in each array object to use as a label. It should not be blank. The default is label.
7. Update Value Field which is set to the field in each array object that contains the value to include in submission XML for that option. It should not be blank. The default is value.
8. Icon allows you to select another icon to indicate a dropdown. Ask the Template Designer if you can change this icon, as icons are typically customized in the templates.
9. Select the Add Blank Value checkbox to add a blank value to the dropdown list.
10. Click Save.
11. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Use Cases

There are several ways to configure the Data-Driven Dropdown component, but the basic steps are as follows:

- Add a data field which stores your initial data. It is Product List In our example.
- Add your Data-Driven Dropdown and configure it to point to a relevant JavaScript object.
- Add the JavaScript script to your form to create this object using the string in your Data Field.

More generic steps are shown below:

- Add a script which creates a map.
- Add a component which uses the map.
- Add a data field to store initial data, for example:

```
[
   {
      "label":"Single investor",
      "value":"singleSuper",
      "brand":"Corporate Bank"
   },
   {
      "label":"Joint investor",
      "value":"joint",
      "brand":"Corporate Bank"
   },
   {
      "label":"Single investor (non-super)",
      "value":"singleNonSuper",
      "brand":"Corporate Bank"
   },
   {
      "label":"Company investor",
      "value":"company",
      "brand":"Corporate Bank"
   },
   {
      "label":"Product A",
      "value":"p3",
      "brand":"Retail Bank"
   },
   {
      "label":"Product B",
      "value":"p4",
      "brand":"Retail Bank"
   },
   {
      "label":"Product Z",
      "value":"p5",
      "brand":"Retail Bank"
   }
]
```

Where the `label` and `value` pairs correspond to the Data-Driven Dropdown properties. It also includes additional property, `brand`, which may be used later on., but for now, consider it optional.

Tip: The following online tool is great for converting an excel file to JSON format:

https://csvjson.com

When you copy and paste columns, just select a "tab" separator. Ensure that your columns have titles.

Adding a script which creates a map:

```
data.$MccCodes = [
  {
    "MCC": 742,
    "Description": "VETERINARY SERVICES",
    "label": "742 VETERINARY SERVICES"
  },
  {
    "MCC": 763,
    "Description": "AGRICULTURAL CO-OPS",
    "label": "763 AGRICULTURAL CO-OPS"
  },
  {
    "MCC": 780,
    "Description": "HORTICULTURAL AND LANDSCAPING SERVICES",
    "label": "780 HORTICULTURAL AND LANDSCAPING SERVICES"
  },
  {
    "MCC": 1520,
    "Description": "GENERAL CONTRACTORS",
    "label": "1520 GENERAL CONTRACTORS"
  }
];
```

Adding a Data-Driven Dropdown, and configuration

After dragging on a "Data-Driven Dropdown" component, configure the following:

Choose a name for the Data-Source. It needs to be unique, and you can ignore the $ symbol, it's a convention, not syntactical. We will use this name later, and in this example has been set as "data.$productData"

The Label Field and the Value Field need to map to keys in your JSON (not required to edit anything if you have used the template above)

Adding a script which creates an object out of your Data Field

At some point in form execution (normally on page transition or shoehorned into a validation script or calculation script on an unrelated field), you need to add some code to convert your field value into an object.

Do not add the code to a click script on the Data-Driven Dropdown, as the execution order of the script & other events will trip you up.

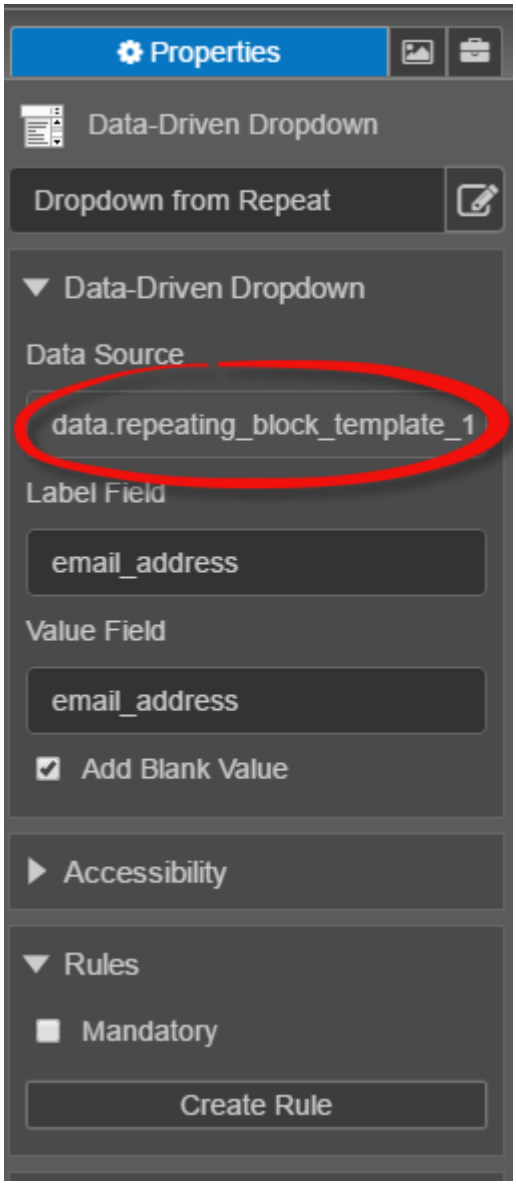
```
// data.productList is the field which contains the JSON string with keys and values
// data.$productData is the object which the Data-Driven Dropdown uses
// brand is an optional key in the JSON string
// data.tenant is a field which contains the name of current brand, and in this example
is prefilled into the form by services on form render.

var tempData = JSON.parse(data.productList );
data.$productData = tempData.filter(function(arrValue,arrIndex,arr) {
  if (arrValue && arrValue.brand && arrValue.brand.toLowerCase().indexOf(data.ten-
ant.toLowerCase())!=0) {
    return false;
  }
  return true;
});
return undefined;
```

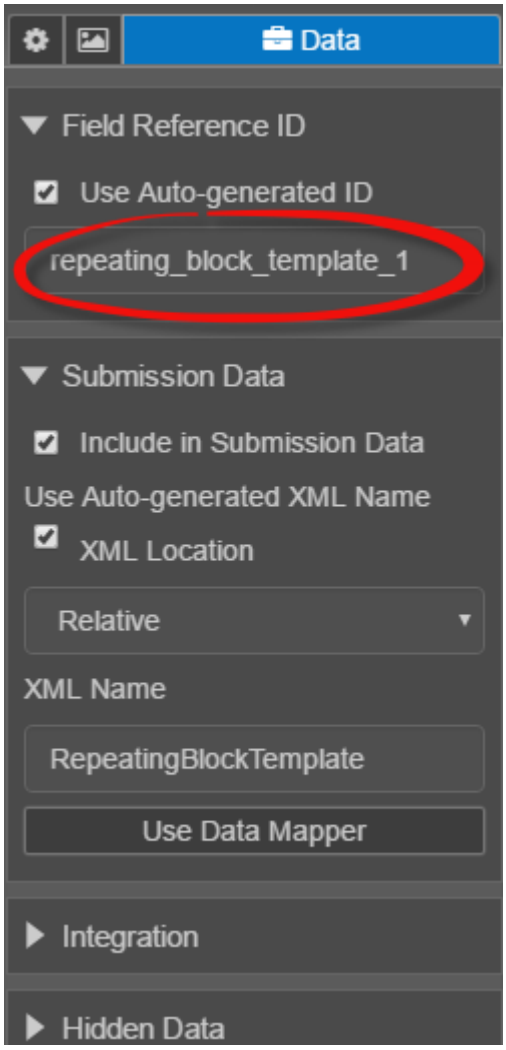
Data-Driven Dropdown Component Based on a Repeating Component

To configure a dropdown option for each item in a repeating component:

1. Configure the Data Source of the Data-Driven Dropdown to the data node for that repeat component.
2. Configure the Label and Value properties to the appropriate field IDs within the repeat.



3. The data source references the repeating block.
4. The Label to be shown in the dropdown will be found in the field email address.
5. The value that is included in the submission is also that of email address.
6. Configure the repeat component.
7. The data tab of the repeat displays the referenced id.
8. Within the repeat, the email_address field is referenced.



Data-Driven Dropdown Component Based on a Range Component

NOTE

You can also use this example for other generated sequence.

An array such as a range, for example years from 1900 to 2020, can be initialized as a transient data value in the Form load event, so it can be used as the Data Source for a data-driven dropdown. You can use this helper method to generate a range of values:

```
Calc.rangeSelection(10, 20)
```

Data-Driven Dropdown Component Based on Text Input

You could base the dropdown values on a text value such as an input field for testing, or the result of a dynamic data service call by converting the text to an appropriate array format. You can

use this method, depending on data format, which takes a string in Composer-style comma-and-pipe delimited format and produces an array suitable for data-driven dropdowns:

```
Calc.delimitedSelection(data)
```

NOTE

Each option is delimited by a comma, and within the option, the Label and Value are delimited by a pipe.

Cascading Dropdowns

You can create cascading dropdowns by setting the Data Source of one to be the top level of an array, for example from a JSON source, and using its Change rule script to set a transient data value to an array nested within the top-level object. This transient data value then forms the Data Source for the second data-driven dropdown.

Next, learn about the Date Picker component.

Decimal Field

Maestro comes with the Decimal Field component (widget), which you can use in several scenarios.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Decimal Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Decimal Field component:

Max Leading Digits
Integer maxLength

Decimal Places
Integer places

Number of decimal places to display

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

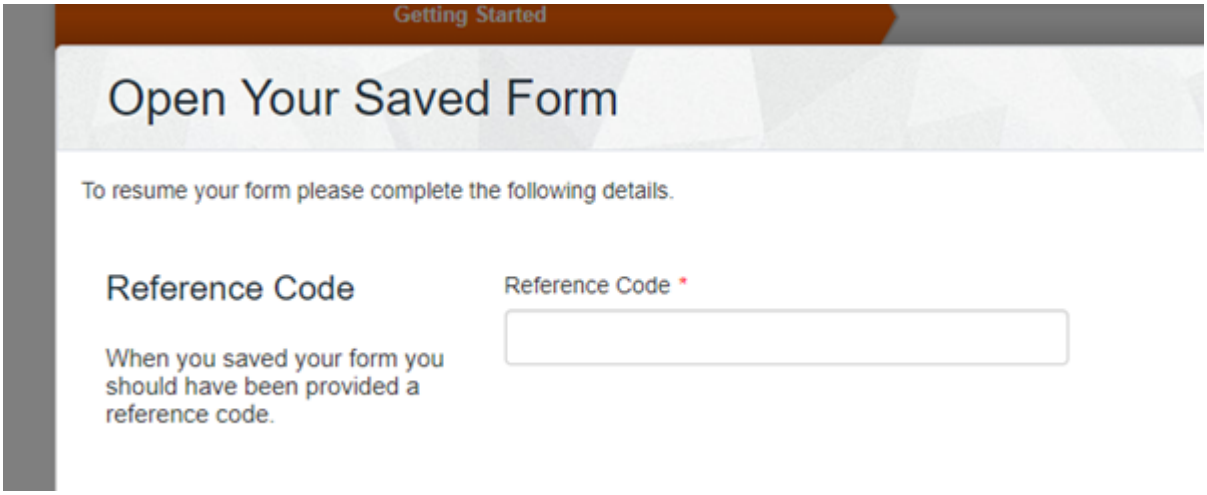
Enabling this property will prevent copy and paste

Next, learn about the Percentage Field component.

Dialogs Overview

Dialogs are pop-up windows that appear within the current page, in front of other content. Typically, they're used to capture information that might not need to be captured from every user.

For example, sometimes users save a form and return to it later, but many users complete a form in a single session. For this reason, saving a form is often handled within a dialog. If a user wants to save a form, they can do so, but if not, the user won't be presented with the option.



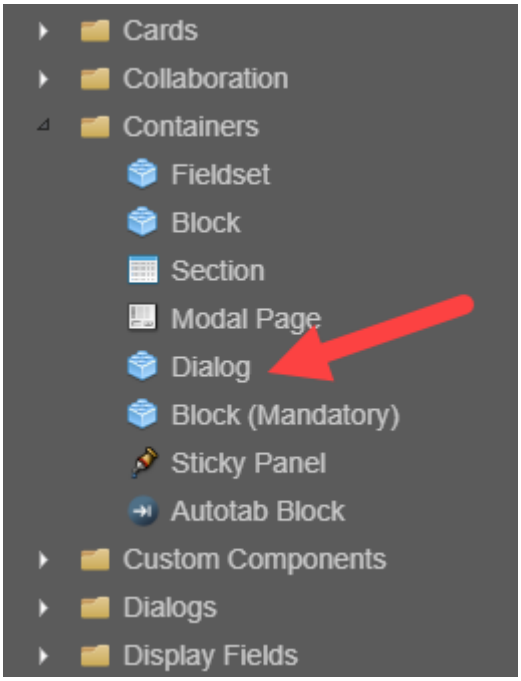
Dialogs can contain most of the components available to the form, but minimizing the amount of components in a dialog is recommend as they're a smaller, more condensed interface elements. If you place too many components inside a dialog, it can appear cramped and overwhelming.

> NOTE
>
> Some components cannot be inserted into a dialog, such as modal pages or other dialogs.

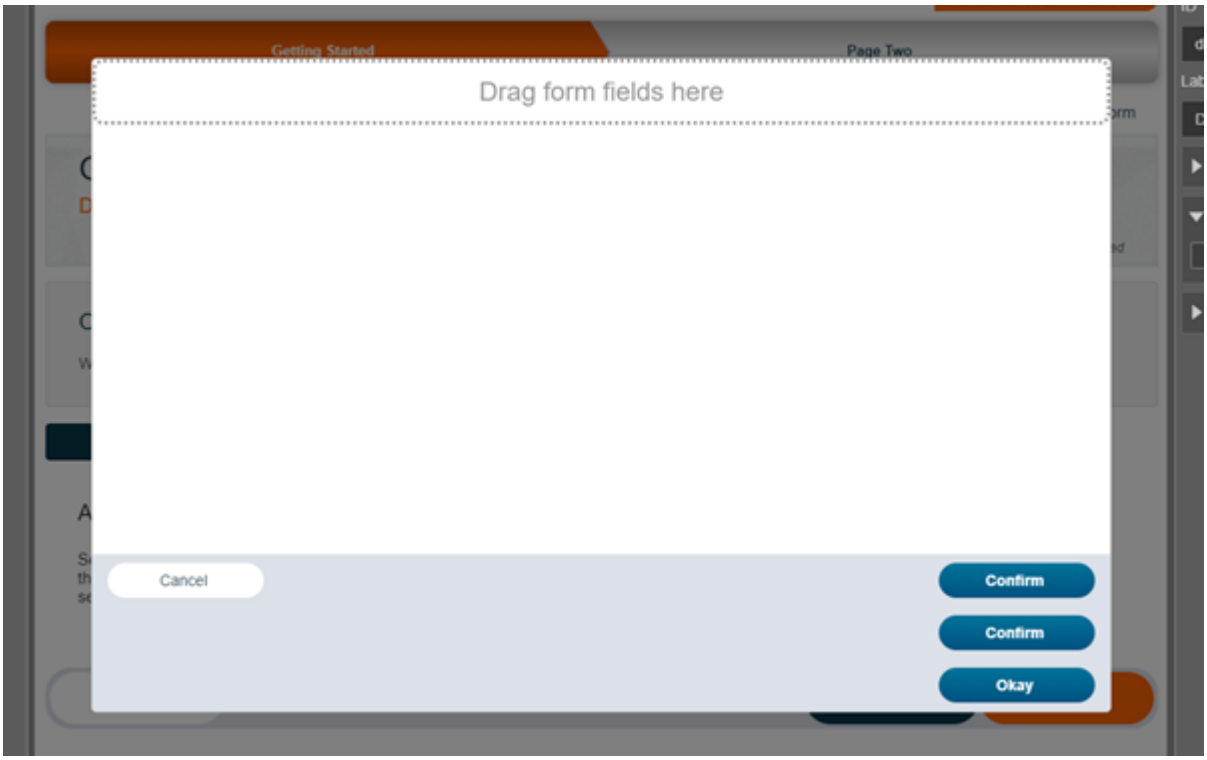
Dialog Types

Out of the box, Maestro provides a range of different dialog components.

The most flexible type of dialog is the Dialog component. It's available via the Palette pane, inside the Containers folder.



This dialog enforces the least amount of default functionality.



Additional dialogs are available via the Dialogs folder. The exact range of available dialogs, however, will depend on the template the form or template is based on.

Maguire	Blue Steel

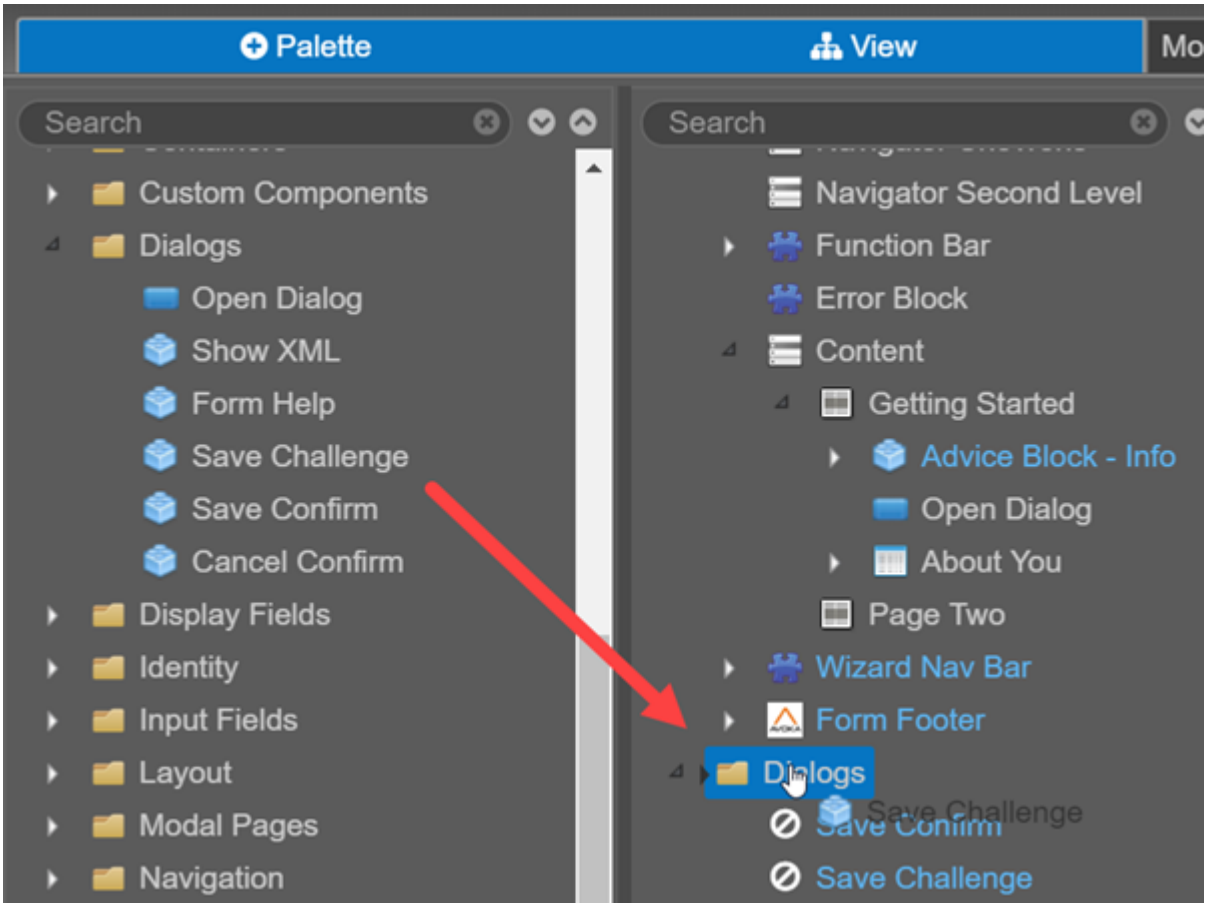
Save Confirm	Cancel Confirm
Save Challenge	Show XML
Cancel Confirm	Save Confirm
Form Help	Save Confirm Dialog
Show XML	Save Challenge Dialog
	Full Screen Menu
	Form Help

NOTE

Although different templates have dialogs with the same names, the dialogs themselves contain different content.

Creating Dialogs

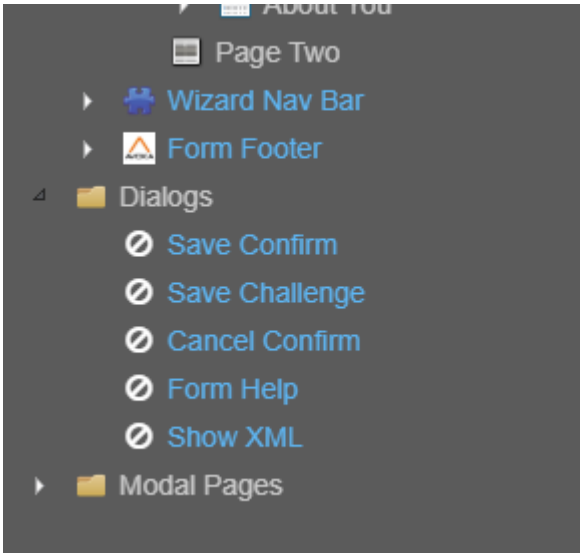
Unlike most other components, dialogs cannot be dragged directly into a form. Instead, they need to be dragged into the Dialogs folder, inside the Structure pane (also known as the **View** pane in earlier versions of Maestro).



Configuring Dialogs

To configure a dialog, simply select it. The dialog will appear within the form editor and its properties will appear in the Properties pane.

If a cross-out icon appears beside the name of a dialog, the dialog can only be edited via the template. If you want to configure this dialog but don't have access to the template, you will need to speak to the person who does.



Open a Dialog

To open a dialog within a form, use the `Form.showDialog` method inside a rule:

```
Form.showDialog("dialog_id_goes_here");
```

But replace `dialog_id_goes_here` with the ID of a dialog.

Typically, the opening of a dialog is triggered by a click rule.

To close a dialog, use the same method without any arguments:

```
Form.showDialog();
```

Next, learn how to use dialogs to implement a save and resume feature.

Fieldset

Maestro comes with the Fieldset component, which is a container component, allowing you to group several fields together. This is especially useful when fields are not stand-alone and only make sense in the context of a group. For example, you should use the Fieldset component to group a credit card details, such as a name of a card holder, credit card number and expiry date, or multiple checkbox components, such as contact preferences.

Some components, for example, the Address, Date of Birth Dropdown, and Time, already have their fields grouped according to required functionality, so there is no need to place them into a Fieldset. If you do so, you only create some confusion about the hierarchy of the components. This also may prevent some assistive technologies[1], such as screen-readers, to correctly interpret the content of the form.

The Field is not just for aesthetic purposes, but also helps users with assistive technologies to navigate through the form.

NOTE

We recommend using this component to increase the accessibility of a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Fieldset** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.



4. Configure the component's properties via the **Properties** pane.

[1]Assistive Technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities while also including the process used in selecting, locating, and using them.

Properties

The following properties are available to the Fieldset component:

Help Text

Label
Label label

Provide a meaningful description of this container identifying a group of fields. The label text (legend text) can be used by assistive technologies to inform the user of the context for fields within the Fieldset.

Popover Help Text
Help Text helpText

Provide a popover help text

Hide Label

Select Hide Label to suppress the label text, and use this component for grouping only.

Label Placement Left

Select Label Placement Left to align the label to the left. The label is aligned above the fields by default, which is best for accessibility as it keeps the caption closest to its field. In particular, this makes it easier for users of magnifier software to locate the field associated with a label without having to move the cursor too far and reduces the chances of finding the wrong field by mistake.

For more information, see Maestro form accessibility.

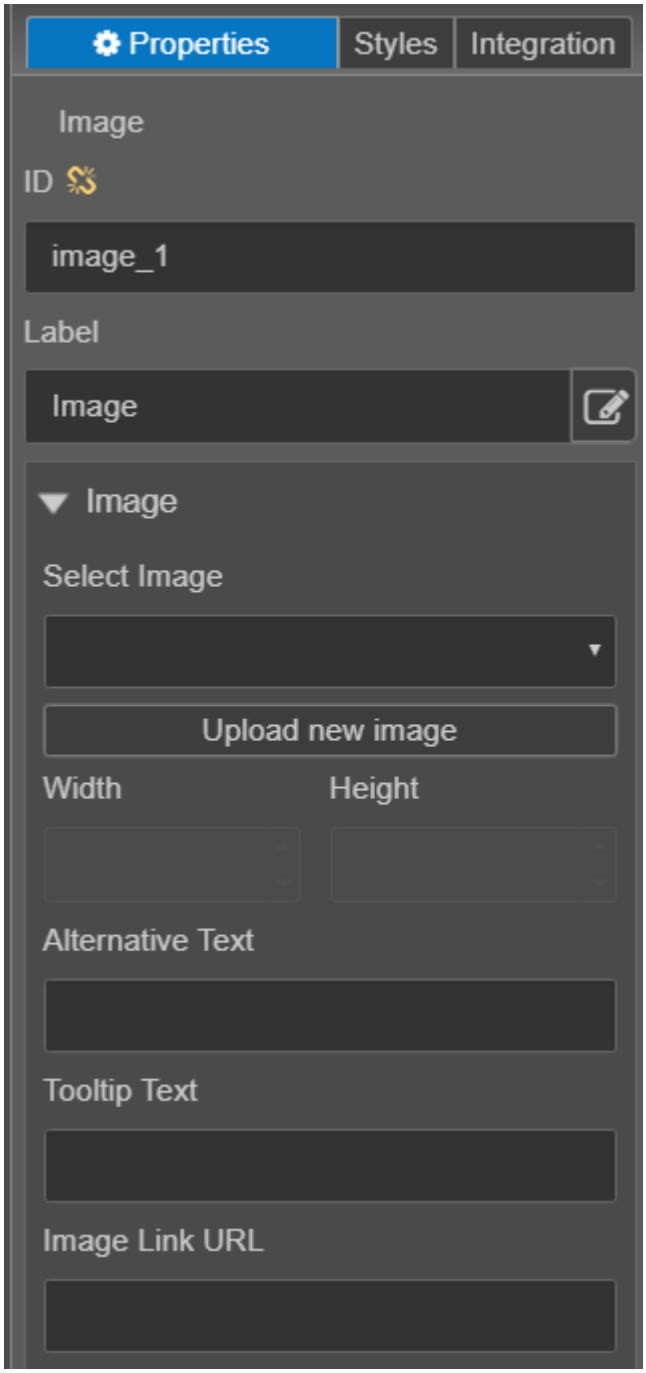
Next, learn about the Block component.

Image Component

Maestro provides the Image component that allows you to insert an image into a form.

To configure the Image component on a form:

1. Open a Maestro form.
2. Click the Palette tab and expand Display Fields.
3. Select Image and drag and drop it on the form.
4. Click the Properties tab and find the Image properties.



5. Use the Select Image dropdown list to select from images currently available in the library. You can see images from libraries available to this form, such as the project or organization library.
6. Click Upload new image to upload a new image that is not already in the library. You should always check the available images in the dropdown prior to uploading your own image.
7. Use Width and Height to resize the image you can enter the width and height that you want the image to be.

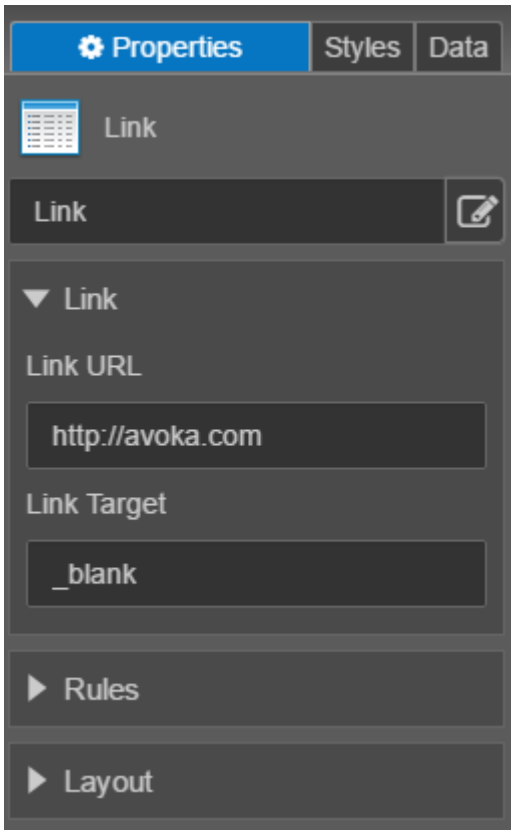
8. Alternative Text - The text entered is used for accessibility, particularly people with vision difficulties. There are two types of images, decorative and informative. Decorative images include separator lines or arrows for buttons. These types of images should not contain alternative text, therefore you can leave the option blank. Informative images include images such as logos or banners. These types of images should always contain alternative text that represents the image displayed.
9. Tooltip Text - The text entered will display on devices, with a mouse, when the mouse hovers over the image.
10. Image Link URL - If a URL is entered, a new browser tab opens linking to the Image Link URL when the user clicks the image.
11. Click Save.
12. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Link Component

Maestro provides the Link component that allows you to add a text link to a form. This can be used to redirect users to a URL away from the form, for example to direct users to websites that contain terms and conditions or privacy statements. However, when users navigate away from the form, there is always a chance that they won't return, so use this component with this information in mind.

To configure the Link component on a form:

1. Open a Maestro form.
2. Click the Palette tab and expand Display Fields.
3. Select Link and drag and drop it on the form.
4. Click the Properties tab.
5. Edit the following Link properties:



6. Label - the text that displays on the form, which users select to follow the link's URL.
7. Link URL - the URL for the link.
8. Link Target - defines where the link opens when users click on it. The options are:

- _blank- Opens the linked document in a new window or tab. This is the default.
- _self -Opens the linked document in the same frame as it was clicked.
- _parent - Opens the linked document in the parent frame.
- _top - Opens the linked document in the full body of the window.

9. Click Save.
10. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Modal Pages Overview

Modal pages are pages that can be made to appear at any point during the transaction experience. When opened, they appear immediately in front of the current page's content, similar to how dialogs behave. What makes them different from dialogs is that they fill the entire window, hiding all of the content behind them.

IMAGE

> NOTE
>
> Some components cannot be inserted into a modal pages, such as dialogs or other modal pages.

Modal Page Types

Out of the box, Maestro provides a range of different types of modal page components.

The most flexible type of modal page is the Modal Page component. It's available via the Palette pane, inside the Containers folder.

IMAGE

This modal page enforces the least amount of default functionality.

IMAGE

Additional modal pages are available via the Modal Pages folder. The exact range of available modal pages, however, will depend on the template the form or template is based on.

Maguire	Blue Steel
Cancel Success	Cancel Success
Submit Success	Submit Success
Save Success	Share Success
	Save Success

> NOTE
>
> Although different templates have modal pages with the same names, the modal pages themselves contain different content.

Create a Modal Page

Unlike most other components, modal pages cannot be dragged directly into a form. Instead, they need to be dragged into the Modal Pages folder that's, inside the Structure pane (also known as the **View** pane in earlier versions of Maestro).

IMAGE

Configure a Modal Page

To configure a modal page, simply select it. The modal page will appear within the form editor and its properties will appear in the Properties pane.

IMAGE

If a cross-out icon appears beside the name of a modal page, it can only be edited via the template. If you want to configure the modal page but don't have access to the template, you will need to speak to the person who does.

IMAGE

Open a Modal Page

To open a modal page within a form, use the `Form.showModal` method inside a rule:

```
Form.showModal("modal_id_goes_here");
```

But replace `modal_id_goes_here` with the ID of a modal.

Typically, the opening of modal pages is triggered by a click rule.

To close a modal page, use the same method without any arguments:

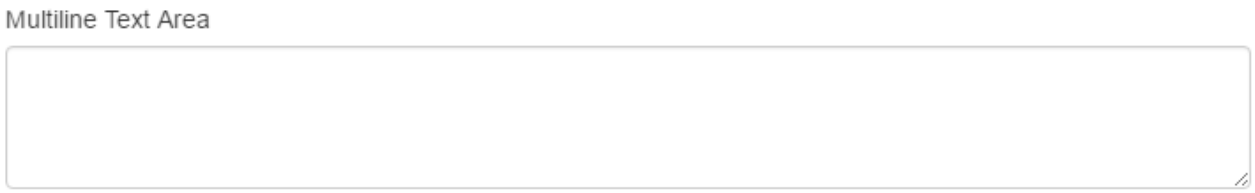
```
Form.showModal();
```

Multiline Text Area Component

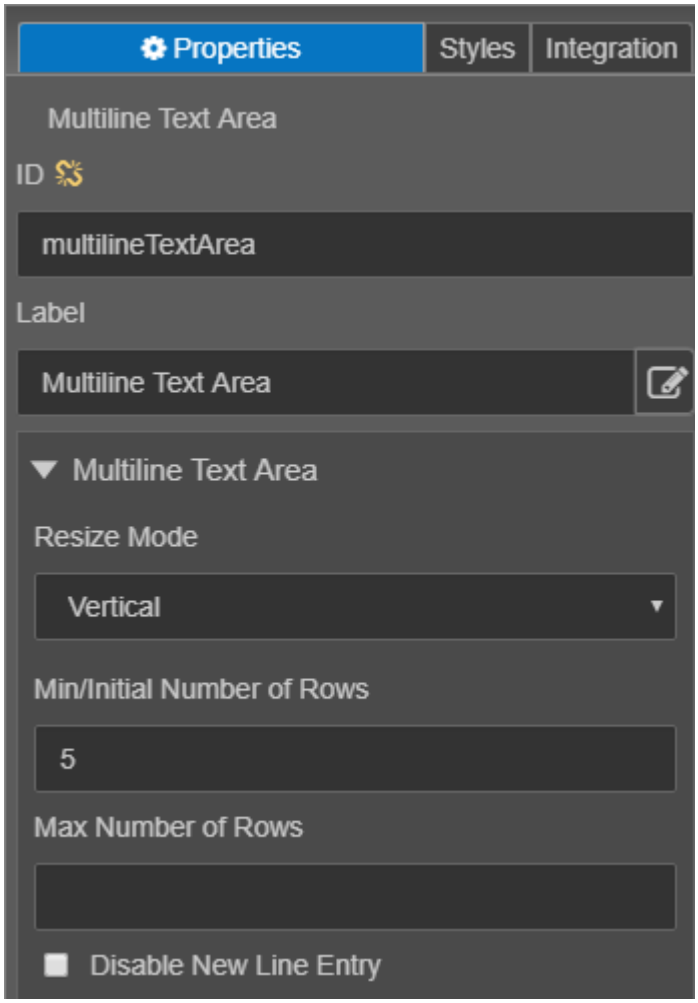
Maestro provides the Multiline Text Area component that accommodates large amounts of text entered by form users. You can configure it to either expand vertically or have fixed number of rows.

To configure the Multiline Text Area component on a form:

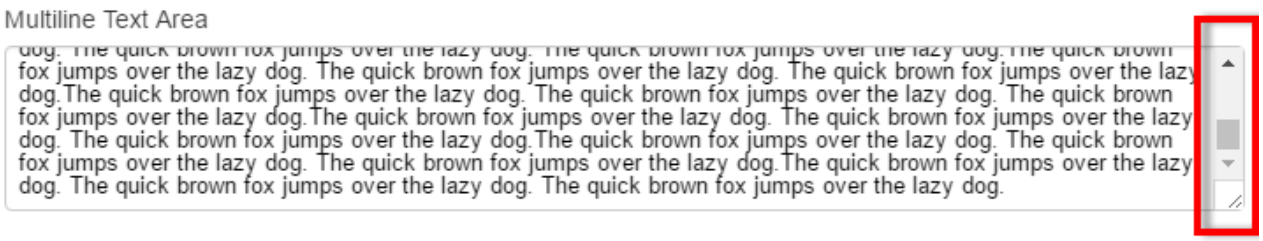
1. Open a Maestro form.
2. Click the Palette tab and expand Input Fields.
3. Select Multiline Text Area and drag and drop it on the form.



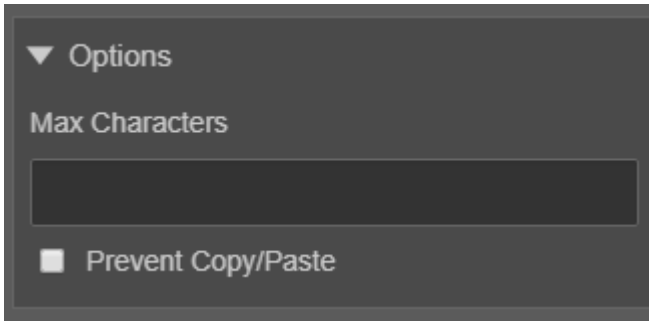
4. Click the Properties tab and find the Multiline Text Area section.



5. Resize Mode - Use the dropdown to select Vertical or Fixed. Vertical allows the component to expand vertically if the user enters text that fills more than the initial space. Fixed locks the multiline text area from expanding, no matter how much text the user enters.
6. Min/Initial Number of Rows - This is the starting side of the Multiline Text Area. You can determine the starting number of rows, which is the height of the entry box.
7. Max Number of Rows - You can limit the number of rows added based on the user's entry. If a max number of rows is determined, the multiline text area does not adjust the size, however the user is still able to enter additional text. A scroll bar and an option to expand the area will be displayed once the user passes the maximum number of rows.



8. Click the Properties tab and find the Options section.



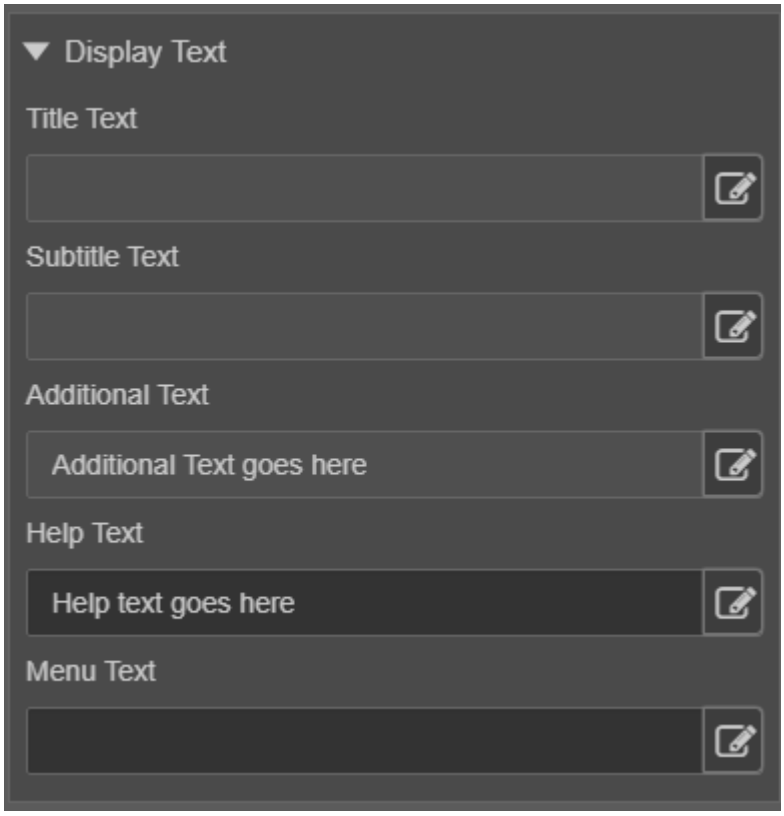
9. Max Characters - allows you to set the maximum number of characters allowed in the multiline text area. Letters, numbers, special characters and spaces are included in the total number of characters.
10. Prevent Copy/Paste - Select this checkbox to prevent the user from copying and pasting to this field.
11. Click Save.
12. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Page Component

Maestro provides the Page component that you can use to break up a longer form into multiple pages. When you add a page component to the form, the page name will also be added to the Navigator (if a Navigator is used in the form). You can remove the page from the Navigator if needed using the Properties panel. You can also navigate from one page to another by using the Continue and Go Back buttons at the bottom of the page (if used in the template). The Continue button is named as Submit on the final page, and the Go Back button is hidden on the first page.

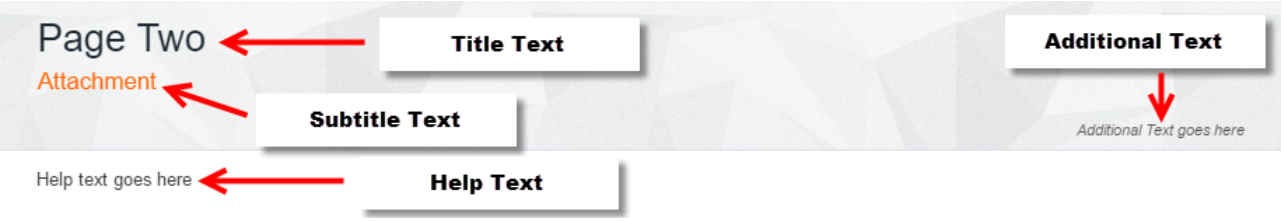
To configure the Page component on a form:

1. Open a Maestro form.
2. Click the Palette tab and expand Navigation.
3. Select Page and drag and drop it in the Content folder.
4. Click the Properties tab and find the Display Text section.

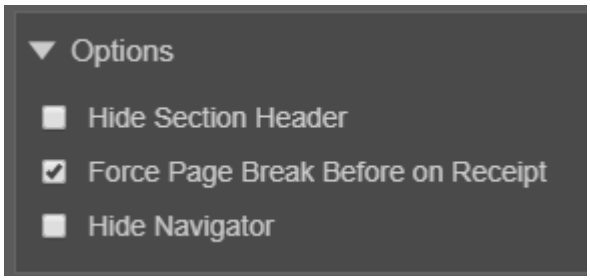


5. Title Text - displays the title of the page in the prominent way. It uses the page label, item.label, by default.
6. Subtitle Text - displays a sub-title for the page, which is set to the name of the form, Form.view.label, by default.

7. Additional Text - is displayed to the right of the page heading, if the value is provided.
8. Help Text - is displayed under the page heading, if the value is provided.
9. Menu Text - if a page has a long name, you can include a shortened version of the page name as the Menu Text.



10. Click the Properties tab and find the Options section.



11. Hide Section Header - hides the entire section header, including Title, Subtitle and Additional Text.
12. Force Page Break Before on Receipt – select it to force a new page on the printed or receipt version of the form.
13. Hide Navigator – select it to hide the navigator on this page. You can still navigate using the Go Back or Continue buttons. This can be useful for smaller forms that don't need a navigator, or for pre-condition pages that display prior to the Navigator being shown.
14. Click Save.
15. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Next, learn about Percentage Field.

Percentage Field

Maestro comes with the Percentage Field component (widget), which you can use in several scenarios.

> NOTE
>
> This component inherits properties and shared styles from the Decimal Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Percentage Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Percentage Field component:

Max Leading Digits Integer maxLength

Decimal Places Integer places
Number of decimal places to display

Accessibility

Placeholder Text Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Decimal Places
Integer places

Number of decimal places to display

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

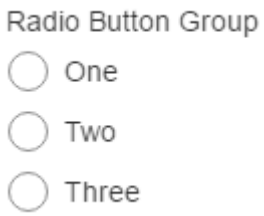
Next, learn about the Data-Driven Dropdown component.

Radio Button Group Component

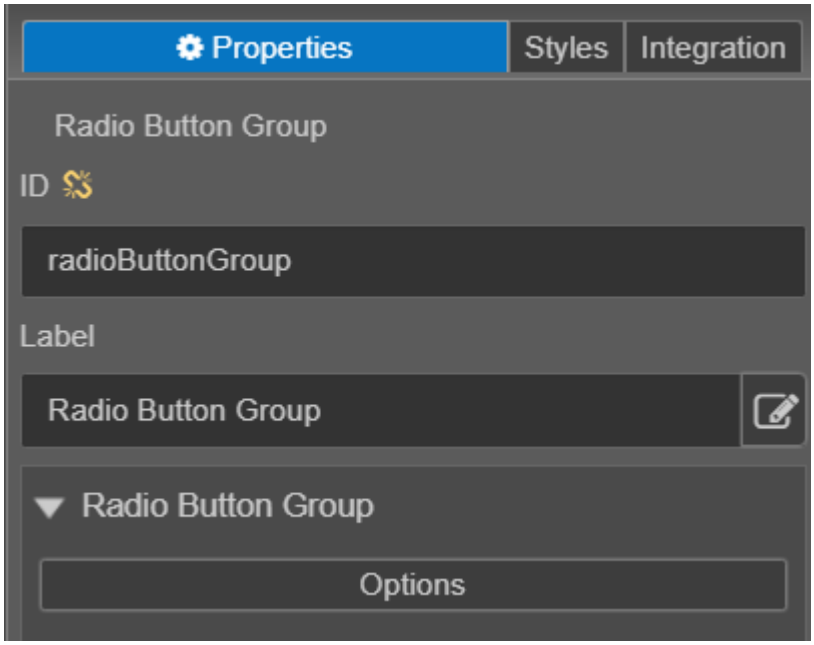
Maestro provides the Radio Button Group component that allows you to add a group of radio buttons to a form.

To configure the Radio Button Group component on a form:

1. Open a Maestro form.
2. Click the Palette tab and expand Input Fields.
3. Select Radio Button Group and drag and drop it on the form.



4. Click the Properties tab and find the Radio Button Group section.

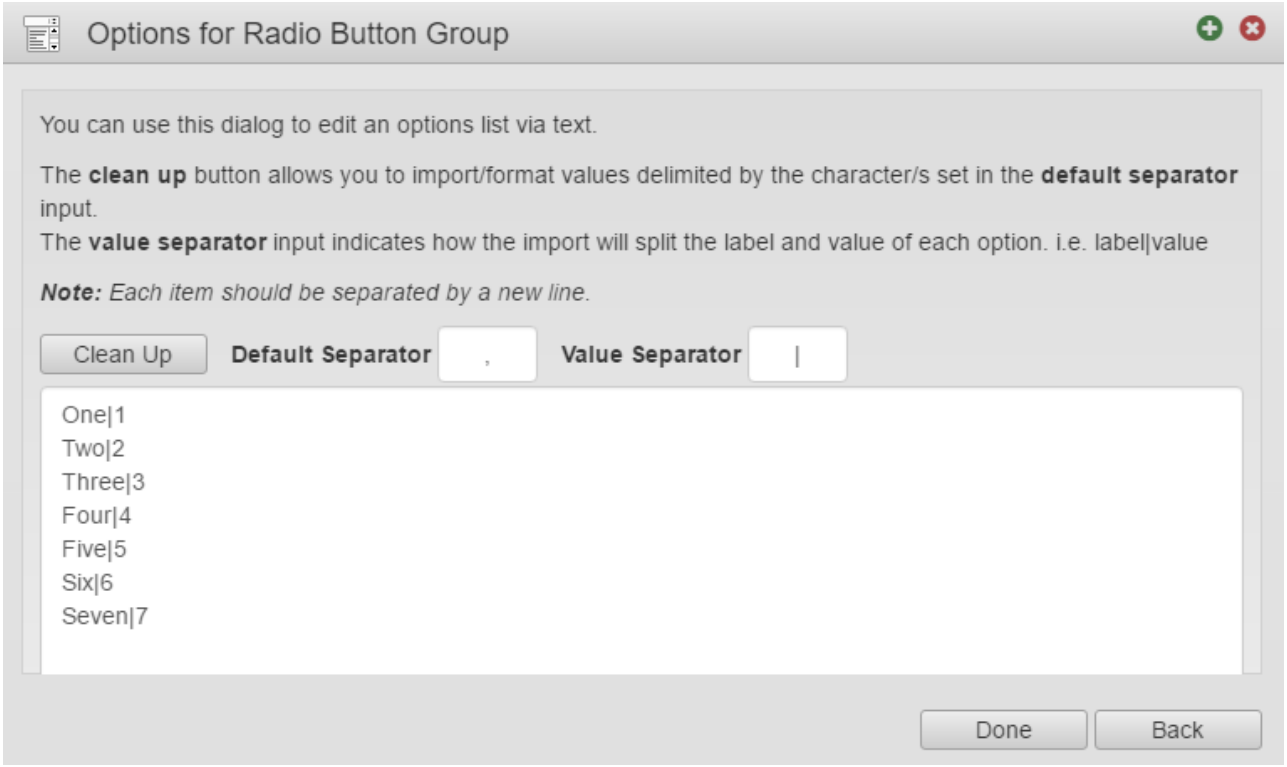


5. Options - allows you to enter each radio button option: radio button label, value and default. Each option added will be a radio button that the user can select. It displays the Options for Radio Button Group window. This is where you enter the options available to

the user.



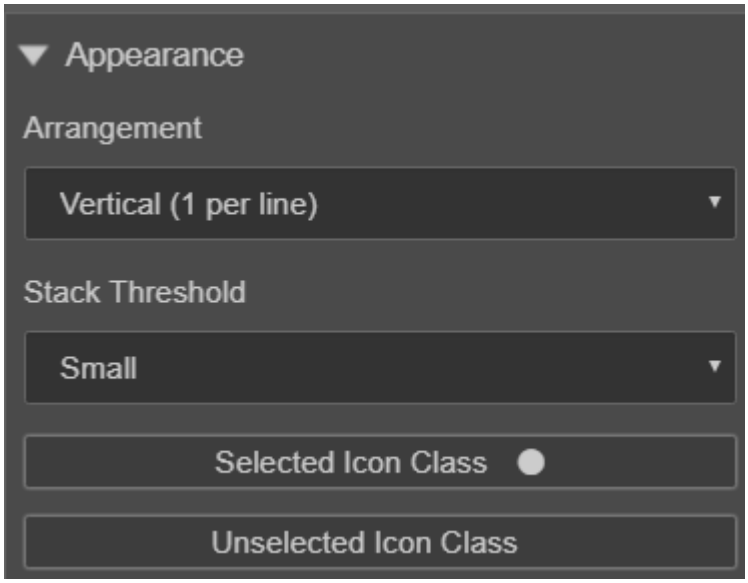
- Label - displays on the form next to the radio button.
- Value (if different) - Used for data collection and in scripts or rules based on the user's selection.
- Default - Select the check next to the option you want to be selected by default. If there is not a default selection, leave the checkboxes unchecked.
- Add - This button will add options to the radio button group. Once you add an option you will need to complete the Label, Value (optional) and Default (optional).
- Move Up / Move Down - to rearrange the radio button group options. Select the option you want to rearrange then click the Move Up or Move Down button.
- Edit As Text – allows to view and edit the radio button options in a text editor window as shown below. Using this view, allows you to copy text from an external source, such as an Excel spreadsheet, and paste it in here.



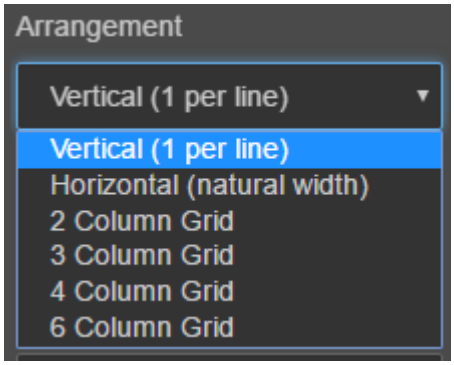
- You can select which Default Separator and Value Separator to use from the following options: One|1, Two|2, Three|3, etc. or each option can display on a separate line. This is summarized in the table below:

Item	Default Separator	Values on Separate Lines
With a Value (Value Separator)	One|1, Two|2, Three|3	One|1 Two|2 Three|3
Without a Value	One, Two, Three	One Two Three

6. Click the Properties tab and find the Appearance section.



7. Click Arrangement to select how the radio button options are displayed on the form.



8. Stack Threshold -
9. Selected Icon Class -
10. Unselected Icon Class –
11. Appearance of the Arrangement Options is summarized in the table below:

Item	Arrangement
Vertical (1 per line)	Radio Button Group One Two Three
Horizontal (natural width)	



12. Click Save.
13. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

KEYBOARD SHORTCUT

Use the Tab key to iterate through the component and press Space key to select a radio button you want. Use the Left, Right, Up, and Down arrow keys to change the selection.

Graphical Radio Button

Maestro comes with the Graphical Radio Button component (widget), which allows you to specify not only a text caption, but also an image from a predefined list of images or your own rich content. The Graphical Radio Button component replaces the usual radio button component. If you want to use a composite image, you can create a shared style for your Graphical Radio Button components and adding appropriate style rules to create and show this. You will need to factor in all the states so that the image is shown correctly when selected, not selected, hover, focus, active, disabled, error and so on. You can use different images for the selected and non-selected states, but we recommend using a single image.

NOTE

Graphical Radio Buttons are restricted to being used inside Graphical Radio Button Groups.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Graphical Radio Button** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Graphical Radio Button component:

Button Value Text value
Enter the value for this radio button

Appearance

Selected Icon Class Icon selectedIconClass
Selected icon class name

Unselected Icon Class
Icon unselectedIconClass

Unselected icon class name

Image

Button Image
Image src

Select from the available images resources, or upload a new one

Button Selected Image
Image srcSelected

Select from the available images resources, or upload a new one

Alternative Text
Text alternativeText

Type an alternative text for informative images, leave blank for decorative images.

Next, learn about the Graphical Radio Button Group component.

Graphical Radio Button Group

Maestro comes with the Graphical Radio Button Group component (widget) so you can group Graphical Radio Buttons to present several mutually exclusive options on a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Graphical Radio Button Group** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Graphical Radio Button Group component:

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Radio Button Group component.

Icon Button

Maestro comes with the Icon Button component (widget).

NOTE

This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Icon Button** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Icon Button component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this button

Next, learn about the Button Group component.

Image

Maestro comes with an Image component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Image** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Image component:

Select Image Image src
Select from the available images resources, or upload a new one

Alternative Text Text alternativeText
Type an alternative text for informative images, leave blank for decorative images.

Tooltip Text Text toolTip
This text will be added to the title attribute of the image.

Image Link URL Text imageLink
This url will be added as an anchor tag around the image. It will open a new tab.

Next, learn about Link component.

Link

Maestro comes with an Link component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Link** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Link component:

Link URL
Url linkUrl

Link Target
Text target

Next, learn about the Percentage Indicator component.

Repeating Block Template

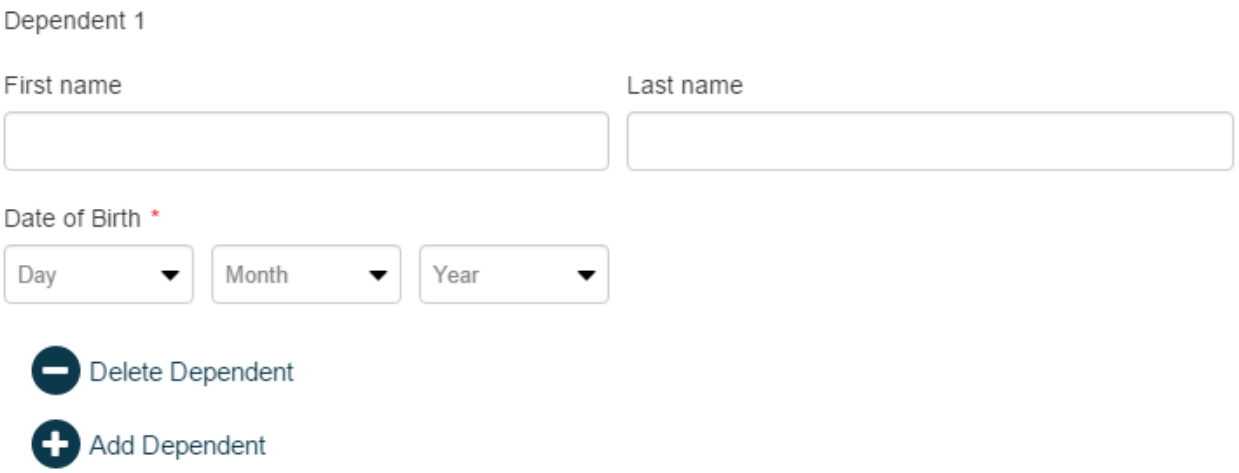
Maestro provides the Repeating Block Template component to allow users to add multiple instances of an item to a form. This is a useful when the number of instances varies for each form user, for example, when you need to add first and last names of all family members.

To configure the Repeating Block Template component on a Maestro form:

1. Open a Maestro form.
2. Select Repeats from the Palette.
3. Select Repeating Block Template and drag it onto the form.



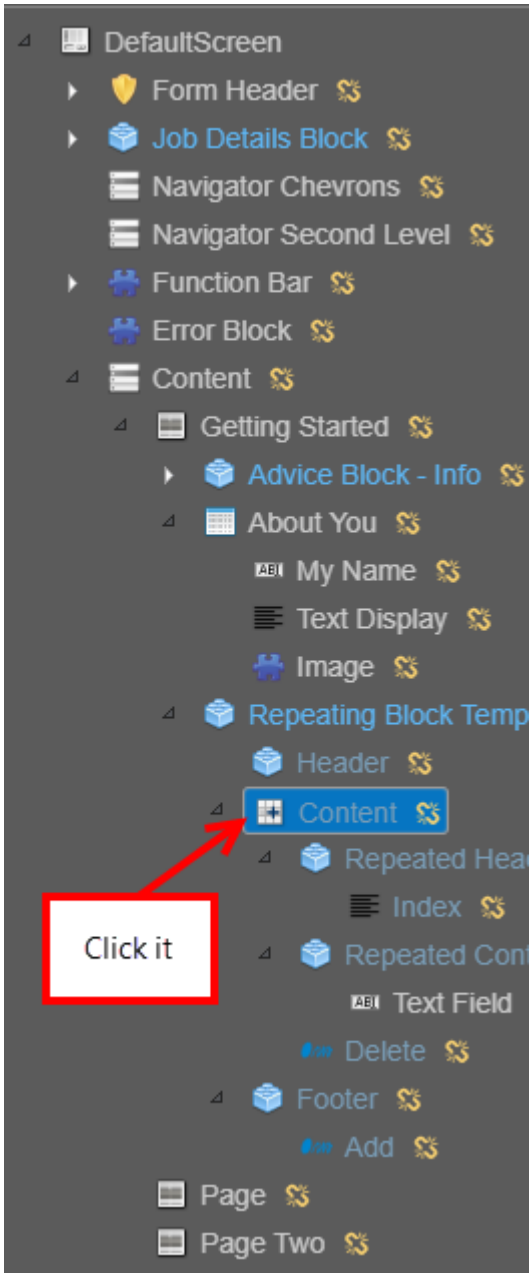
4. Add components to be repeated to the Repeating Block Template component, as shown below.



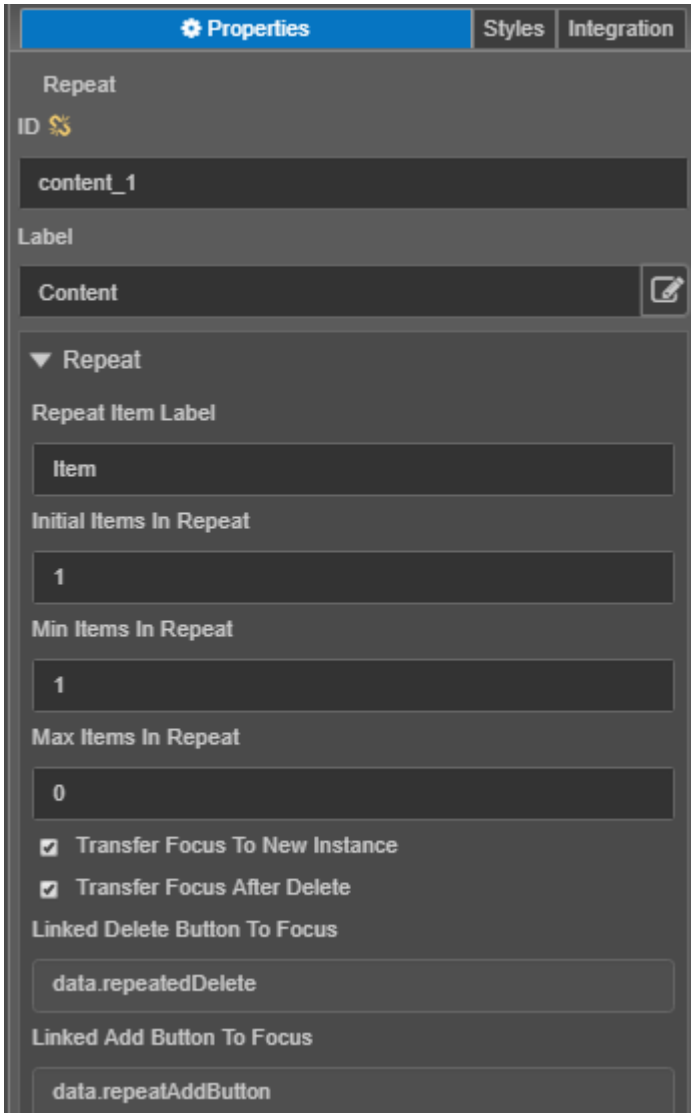
The Repeating Block Template is made up of several different components. It is important to customize the correct part of the repeating block template depending on what you are trying to achieve. For example, when items are added to the Repeating Block Template, they are added to the Repeated Content block. However, if you would like to change the

Repeat Item Label or the Min or Max items in the repeat, you will need to select the Content block.

5. Select the Content of the Repeating Block Template to edit it.



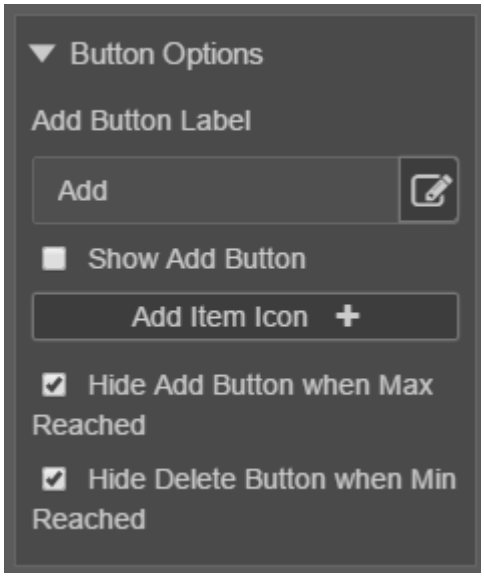
6. Click the Properties tab.
7. Edit the Repeat properties.



- Repeat Item Label - changes the heading within the repeating section and the button labels.
- Initial Items in Repeat - the starting number of repeating items, which defaults to 1. Change it if required, but there must have at least one item in the repeat block.
- Min Items in Repeat - The user can add or remove items. This is the minimum number of items that must be displayed on the form. You must have at least one item. Once the minimum is reached, the Delete button can disappear.
- Max Items in Repeat - You set a maximum number of repeating items for the form user. Once the maximum is reached the Add button can disappear. Enter zero to indicate that there is no maximum number of items.
- Transfer Focus To New Instance - When the user adds a new instance/item, the focus will be on the first component of the new instances/items.

- Transfer Focus After Delete - When the user deletes an instance/item, the focus will be on the first component of the previous instance/item.
- Linked Delete Button To Focus - When the user deletes an instance/item, the focus will be on the delete button of the previous instance/item in the repeat.
- Linked Add Button To Focus - When the user deletes all instances/items in the repeat, the focus will be on the remaining add button. This setting is only relevant where the Min Items in Repeat is set to 0.

8. Edit the Button Options properties.



- Add Button Label - allows you to change the wording on the Add button. The default is "Add" plus the Repeat Item Label that is “Add {{item.properties.itemLabel}}”. Click Edit to edit the button text in the editor, which allows you to use properties from other elements of the repeating block.
- Hide Add Button when Max Reached – select it to hide the Add button when the Max Items In Repeat is reached. This is selected by default.
- Hide Delete Button when Min Reached – select it to hide the Delete button when the Min Items In Repeat is reached. This is selected by default.

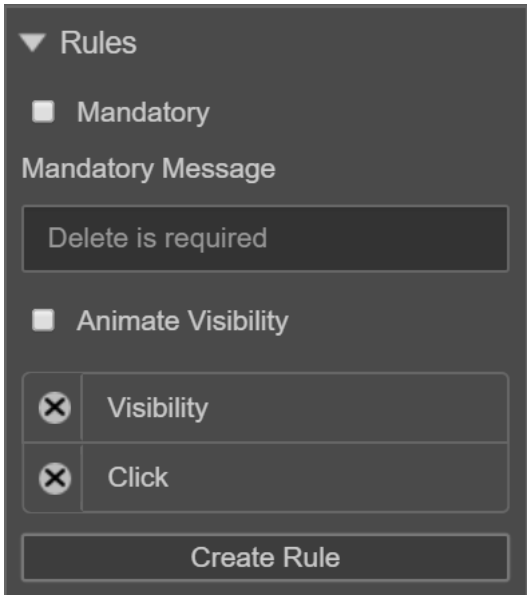
9. Edit Rules to implement specific customer requirements.
10. Click Save.
11. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Hide Delete Button for a Single Item in the Repeating Block Template

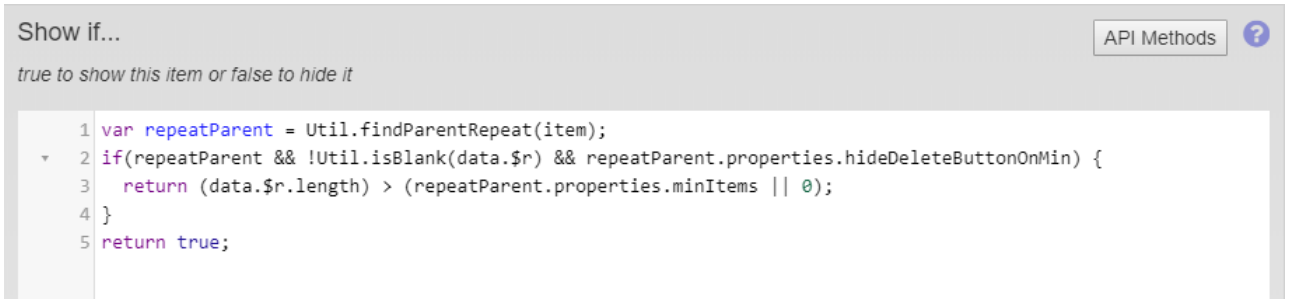
Each time a new item in a repeat block is created, Journey Maestro creates an Add Item button and a Delete Item button on the item. These buttons are used to allow the form user to continue to add items until they have entered all items that are required of them. However, there may be times where a Form Builder doesn't want to give the form user the option to delete an item until a certain validation rule has passed. The Form Builder may also only want the delete button to appear on certain repeat items.

To hide a delete button for a single item in a Repeating Block:

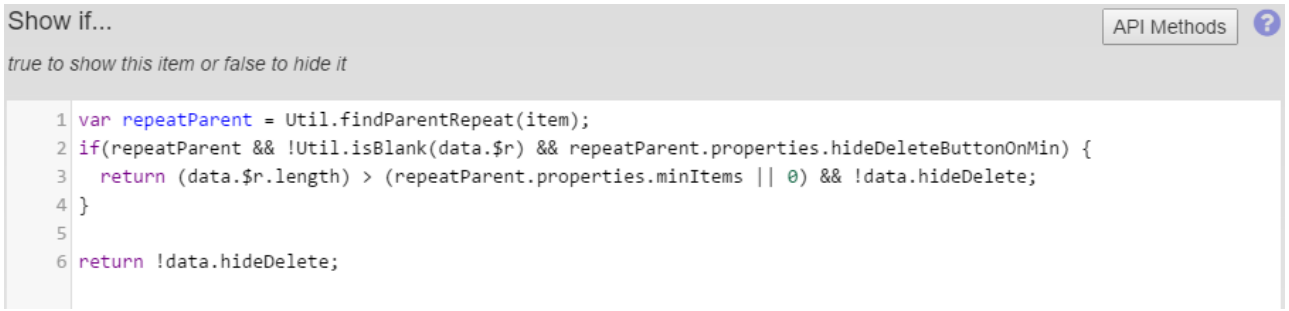
1. Configure the repeating block template component.
2. Select the Delete Item button from the Repeating Block. Delete Item buttons in the Repeating Block Component have their own visibility rules that can be modified to create expanded validation and sometimes extra functionality.
3. Click the Properties tab and expand Rules of a default Delete Item button.



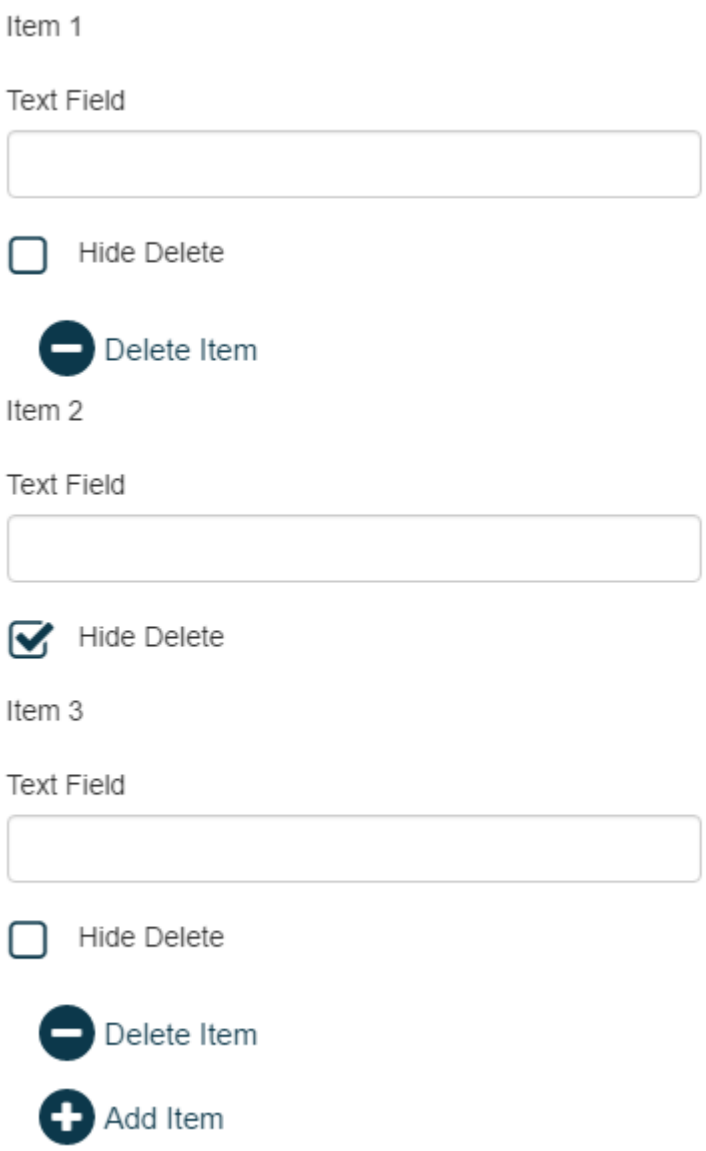
4. Click Visibility to edit the rule. This rule is created by default for all Delete Item buttons in a Repeating Block. To hide the delete button, you need to add additional logic to this rule.



5. Edit the JavaScript rule. In this example, we use a checkbox to decide which instances of the repeat block will display a delete icon button. When the Hide Delete checkbox is selected, the Delete Item button is not displayed for the following item, as shown below.



6. Click Save.
7. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. The example below displays this visibility rule applied to a Repeating Block when the Hide Delete checkbox has been selected after the first Text Field is displayed and the result of this selection is that the Delete Item button is removed from the second item.



Next, learn about the section component.

Save Challenge Dialog

You need to configure the Save Challenge Dialog with the same security question as the Save Confirm Dialog. The Save Challenge Dialog is displayed when the user returns to complete a saved form.

The Save Challenge includes a section to enter the generated reference code that displays when the user saves their form. It also includes the security question section. This is where the user needs to enter the same answer entered when the form was saved.

When configuring the components within the two dialogs, you will need to ensure that the XML Name is different. By default, if the label is the same, the XML Name will also be the same. This will cause a duplicate binding error when you publish your form. You can decide to only change one component XML Name or change both component XML Names.

Often, you may need to use a custom Save Challenge Dialog. For a form to use the new custom dialog instead of the default `savechallenge` dialog, you can add the following JavaScript rule on form load:

```
if( window.location.href.toLowerCase().indexOf('savechallenge=true') > 0 ){
  maestro.Form.showDialog('data.customDialog'.split('.').pop());
}
```

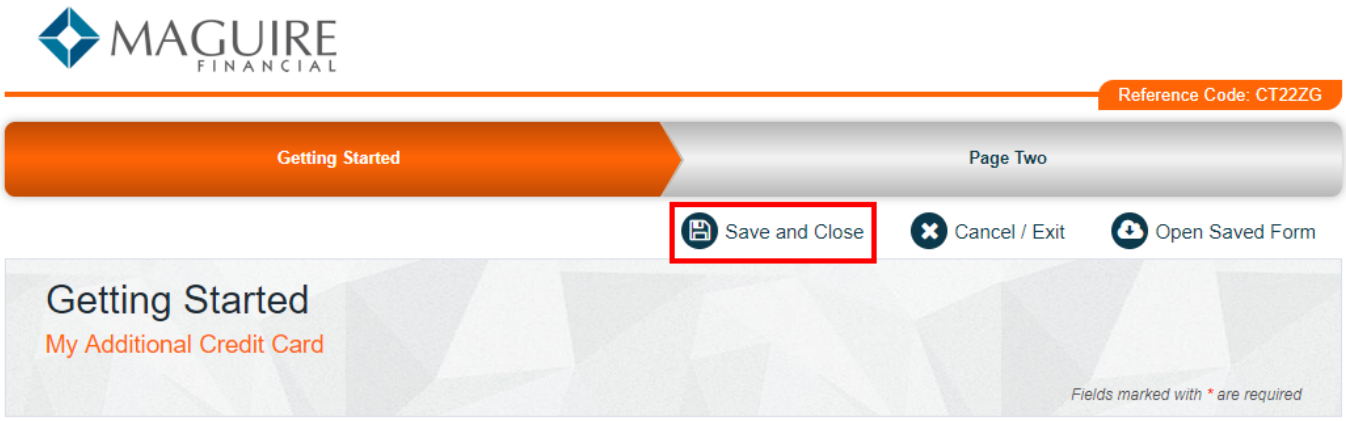
Where `customDialog` is your custom dialog ID.

You also need to configure Journey Manager to enable the Save Challenge feature.

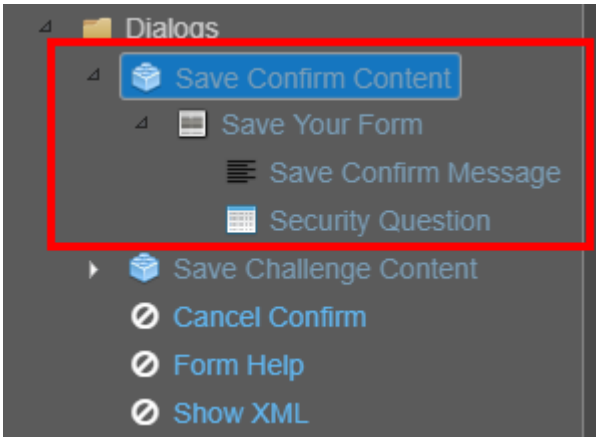
Next, configure security question for save challenge.

Save Confirm Dialog

The Save Confirm Dialog is displayed to form users when they click Save and Close to save the form and close it as shown below.



Maestro uses this page to collect the answers to the configured security challenge questions. Security questions, which are presented when the user saves a form, are configured from the Save Confirm Dialog itself as shown below.



Extension points must be configured in the form's template in order for the save confirm dialog to function in a meaningful way.

Next, learn about the Section component.

Select Language

Maestro provides the Select Language component (widget), which allows form users to select a language that they want to use on a form. You must add and configure a language or multiple languages for a form before a user can select them.



NOTE

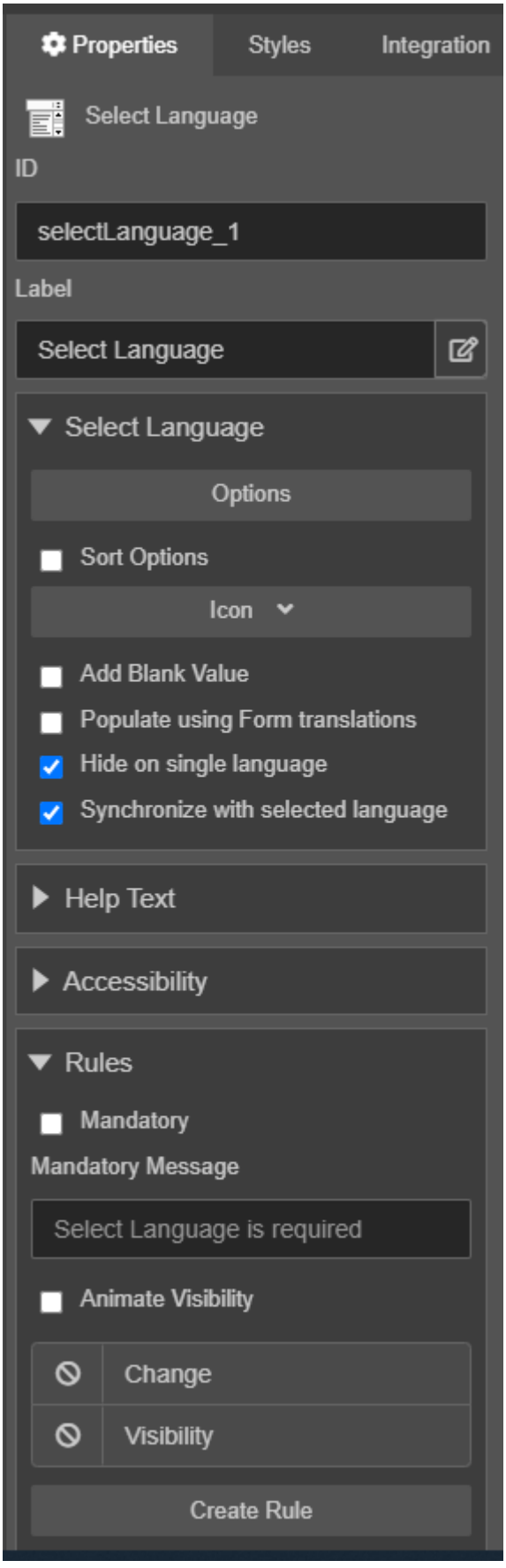
This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Select Language component within the User Information folder.

3. Drag the component into the View pane or the Wireframe.

4. Configure the component's properties via the Properties pane.


Properties
Styles
Integration
Select Language
ID
selectLanguage_1
Label
Select Language
Select Language
Options
Sort Options
Icon
Add Blank Value
Populate using Form translations
Hide on single language
Synchronize with selected language
Help Text
Accessibility
Rules
Mandatory
Mandatory Message
Select Language is required
Animate Visibility
Change
Visibility
Create Rule

5. Configure the component's styles via the Styles pane.

Properties

The following properties are available to the Select Language component:

Select Language

Populate using Form translations

`Boolean useFormLanguages`

Select the checkbox to populate the dropdown list with the translations configured in the form. This will overwrite the options specified at runtime. The Select Language component does not have to show all of the available languages in the list based on your business requirements.

Sort Options

`Boolean sortOptions`

Check to automatically sort options by label.

Hide on single language

`Boolean hideSingleLanguage`

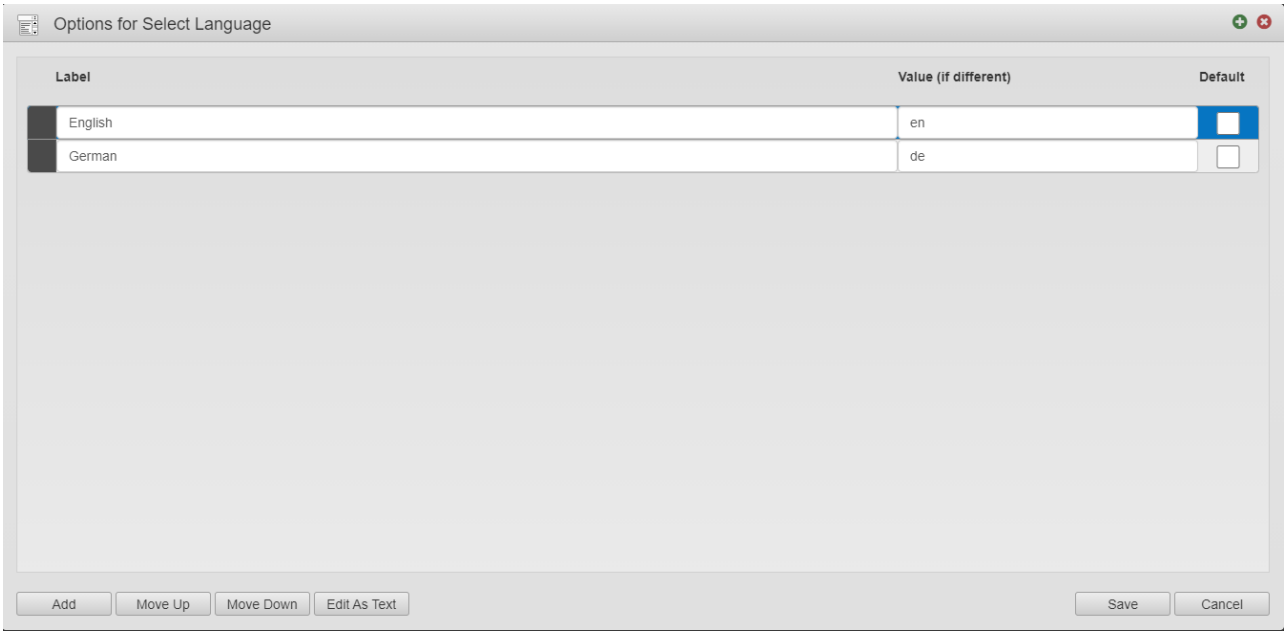
Hide this widget when the form has only one language defined.

Options

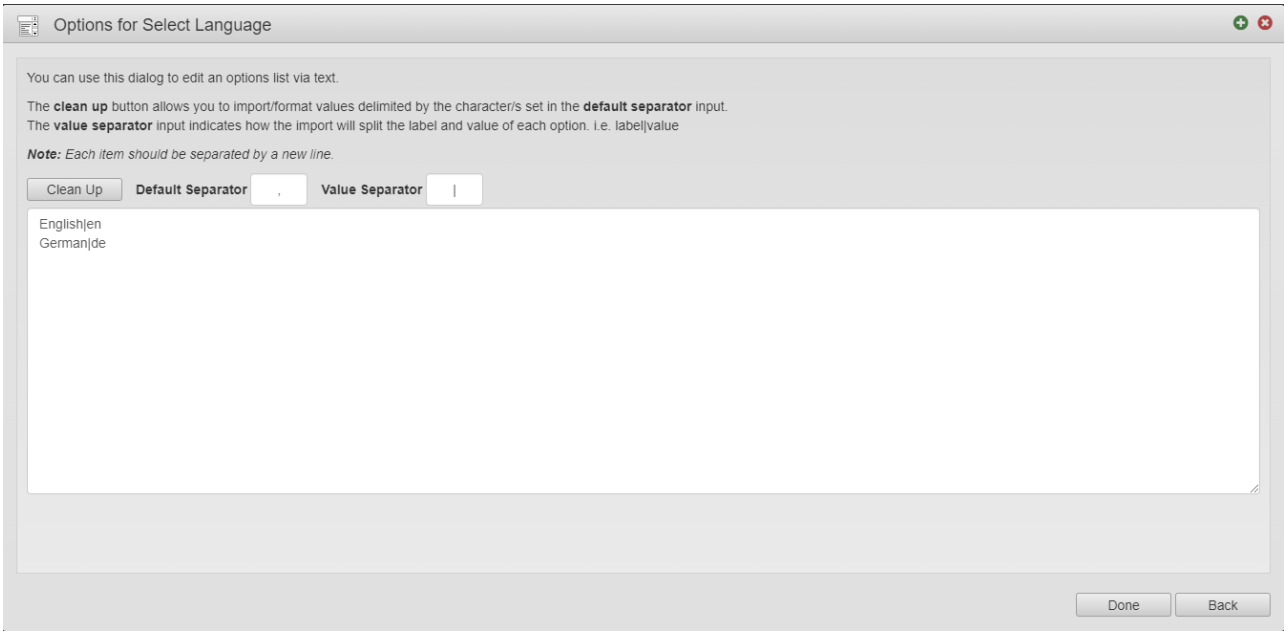
`List options`

Defines a list of languages in the dropdown. By default, the **Options** property contains the following values:

Label	Value
Language name 1	Locale code 1
Language name 2	Locale code 2



Update the language details or select the Default checkbox to make a selected language a default one and click Save.
Click Add to add a new line to the list where you need to add a language name and a locale code.
Select a language and click Move Up or Move Down to re-order its position in the list of languages.
Click Edit as Text to see the language configuration as a text file. You can change the separators used in the text.



Sort Options

`Boolean sortOptions`

Check to automatically sort options by label

Icon

`Icon icon`

Select the dropdown icon

Add Blank Value

`Boolean addBlankValue`

Check to add a blank value to the dropdown

Styles

The following styles are available to this component:

Avalon Language Selector

```
form[name='form'] {
  .avalon-language-selector {
    width: auto;
    margin-right: 20px;
    .wdg-label {
      display: none;
    }
    .av-select-overlay {
      display: inline-block;
      float: right;
      width: 150px;
      background-color: transparent;
      border: 0;
      border-radius: 0;
      padding: 0;
      min-height: 30px;
      outline: none;
      box-shadow: none;
      cursor: pointer;
    }
    .wdg-input {
      .av-select-value {
        right: 25px;
        padding: 0;
        font-family: @ux-default-font-family;
        font-size: @ux-default-font-size;
        color: @ux-default-font-color;
```

```
      }
      .wdg-select-icon {
        padding: 0;
      }
      &:hover, &:focus {
        .av-select-value {
          text-decoration: underline;
        }
      }
    }
  }
}
```

After you've configured the component, you can preview the form to switch between the available languages to verify it works as expected.

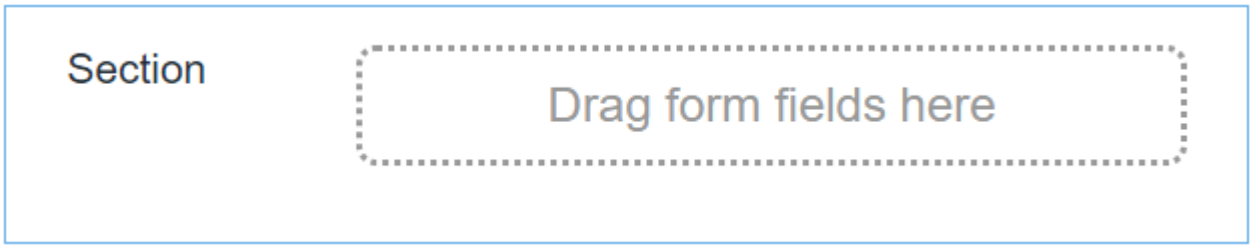
Next, learn about the Attachment Field component.

Section Component

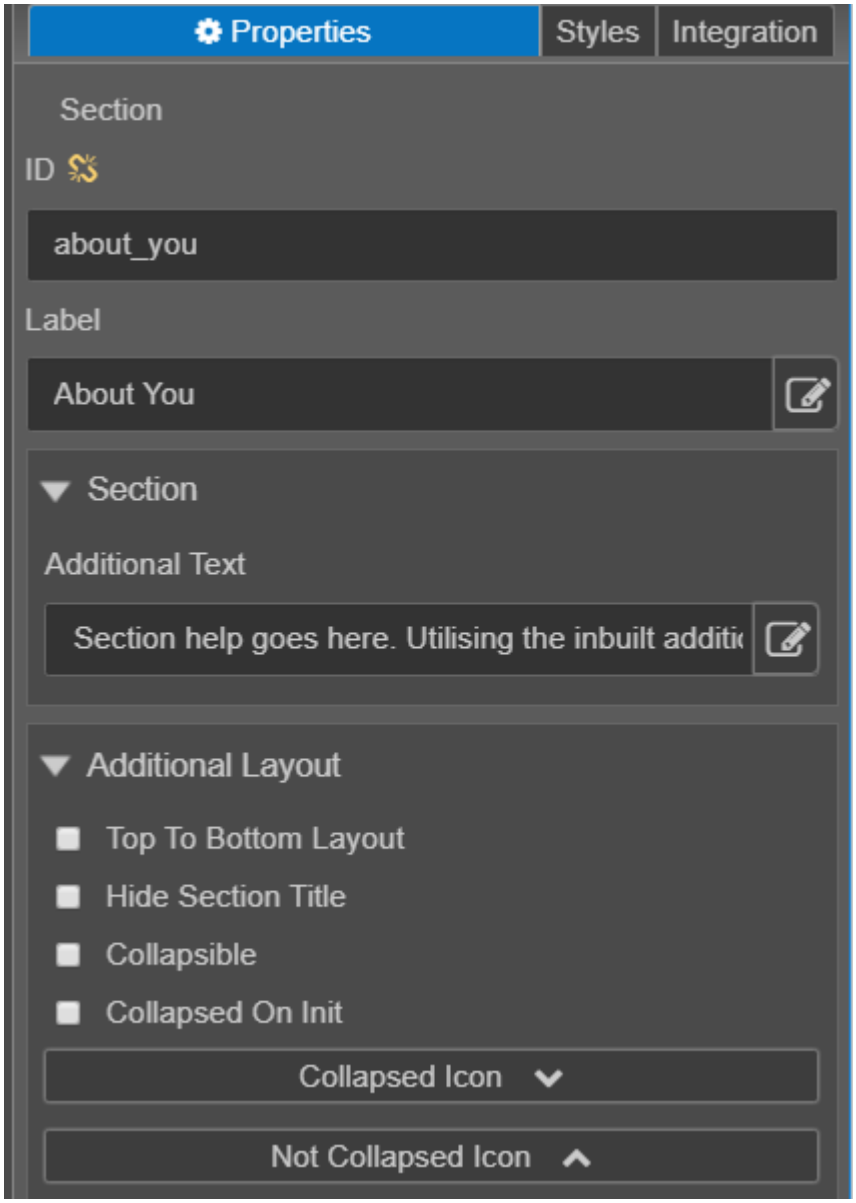
Maestro provides the Section component that allows you to break up a long page with many fields into logical sections. A Section has a section header and an optional explanatory text, plus it may have additional features, which allow uses to change the default layout, collapse, or and expand it.

To configure the Section component on a form:

1. Open a Maestro form.
2. Click the Palette tab and expand Containers.
3. Select Section and drag it onto the form.



4. Click the Properties tab and find the Section section.



5. Section Label displays at the top of the section on the form. The screenshot below shows section details:



6. Additional Text displays below the header within the section.

7. Select Top To Bottom Layout to change the layout of the section so that the header and additional text display above the components, rather than to the left.
8. Select Hide Section Title to hide the section title so that it isn't displayed on the form. The screenshot below shows a section with Hide Section Title enabled:



9. Select Collapsible to enable a user to collapse and expand the section on the form. The screenshot below shows a section with Collapsible enabled:



10. Select Collapsed On Init to make the section collapsed when first displayed. The user can expand and collapse the section as shown below:



11. Click Save.
12. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Next, learn about the Select Language component.

Slider

Maestro comes with the Slider component (widget) that allows users to view and select a value or range of values from the range along a bar.

This component supports both left-to-right (LTR) and right-to-left (RTL) languages. For LTR languages, the smallest value appears on the far left end of the track and the largest value is on the far right. For RTL languages this orientation is reversed.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Slider** component within the **Input Fields** folder.



3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Slider component:

Configuration

Min Value Integer minValue
The minimum value of the slider.

Max Value Integer maxValue

The maximum value of the slider.

Step Value
Integer step

The interval of the slider's value increment.

Show Ticks
Boolean showTicks

Shows tick marks at predetermined values, without their actual values, that the user can move the slider to. The predetermined values are calculated usingStep Value.

Show Ticks With Values
Boolean showTicksValues

Shows tick marks with their predetermined values that the user can move the slider to. The predetermined values are calculated using Step Value.

Value Prefix
Text valuePrefix

Adds this text to the value label as a prefix.

NOTE

This value can be translated to different languages including right-to-left languages. | 21.05 This feature was introduced in 21.05.

Value Suffix
Text valueSuffix

Adds this text to the value label as a suffix.

NOTE

This value can be translated to different languages including right-to-left languages. | 21.05 This feature was introduced in 21.05.

Add Space Between
Boolean addSpaceBetween

Adds a space between the prefix and the value label, and between the suffix and the value label.

Range Slider

Enable Range Slider
Boolean isRange

Shows the second thumb to allow the user to view and specify the range of values.

Min Range
Integer minRange

The minimum value of the range slider.

Max Range
Integer maxRange

The maximum value of the range slider.

Help Text

Popover Help Text
Help Text helpText

Shows a popover help text to provide some contextual help to the user. You can use the Maestro rich text editor to create the help text using various formatting and styles.

Next, learn about the Multiline Text Area component.

Text Field Component

Maestro provides the Text Field component which allows you to create a text field in a form.

NOTE

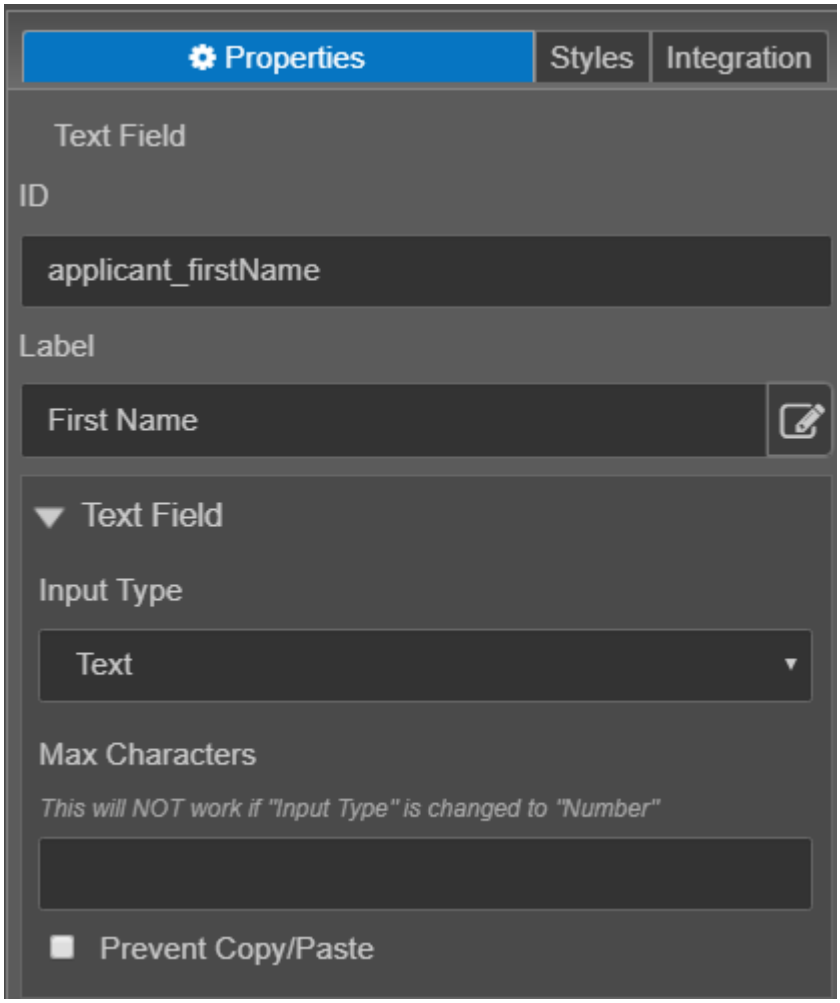
For large amounts of text, you should use the Multiline Text Area component.

To configure the Text Field component on a form:

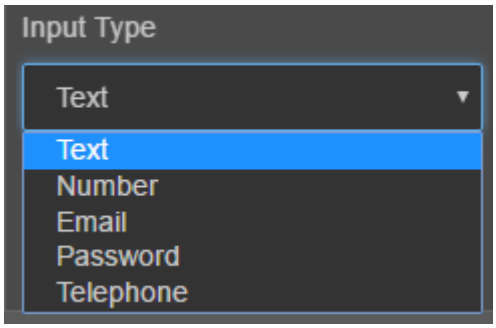
1. Open a Maestro form.
2. Click the Palette tab and expand Input Fields.
3. Select Text Field and drag and drop it on the form.



4. Click the Properties tab and find the Text Field section.



5. ID is the underlying Maestro name of the selected component.
6. Label displays the name to the user on the form. In the above example, the label is First Name.





- Input Type is specific to text related components. By default, when you drag a text field component on to a form, the input type defaults to Text. If you were to drag an email address component on to the form, the Email input type would be selected. Though you can change the input type, it is recommended that you change the component rather than the input type. For example, if you inserted a text field, but decide that you want an email address, you should delete the text field and add the email address component. The specific components have other pre-defined properties that are useful for Form Builders. For example, the email address component has a validation rule already created, whereas a text field, even if the input type is set to email, does not. The following input type are supported:
- Text - The Text input type should be used for text-based input. For more information on input fields, see https://www.w3schools.com/html/html_form_input_types.asp.
- Number is the input field used for numeric input (0-9). For example, if you want a user to enter their age, use a text field and set it as a number input type.
- Email is the input type used for text fields that should contain an e-mail address. If you select the email type for a component that is not created for email input, for example, a text field, the entered input will not be validated to ensure the user entered a valid email address. You can add a validation rule to the text field component, however, using the email address component (which already has the rule created) is much easier.
- Password is the input type used mask any characters entered into the component. The screenshot below displays the masked characters.
- Telephone - The Telephone input type is used for fields that should contain a telephone number. Similar to email addresses, you should use the specific phone number component, rather than changing the input type. The phone number component will contain the validation rule to ensure that the user is entering a valid phone number. You can add a validation rule to the text field component, however, using the phone number component (which already has the rule created) is much easier.

NOTE

Though these options are available for selection, it is recommended that when possible you use a component tailored to suit the needs of the data that will be collected by the field. For example, if want to collect an email address from a user, use the Email Address component from the Maestro Palette.

7. Max Characters - This property allows you to set the maximum number of characters that the user can enter into the field. Letters, numbers, special characters and spaces are each counted towards the maximum number of characters.
8. Prevent Copy/Paste - Select this option to prevent this text field from being copied to or pasted from the clipboard.
9. Click Save.
10. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Shared Components Overview

Maestro encourages you to reuse forms' components wherever possible by providing an easy way to share components across multiple forms and projects.

Shared components are custom built blocks that can be reused throughout forms and can be made available to multiple forms by publishing them to a project library or an organization library.

Shared components can be created by Form Builders or Template Designers for re-use and consistency among forms. They can consist of a single component or a collection of components wrapped in a block. Shared components can be published to a library, so they are available to other forms and templates within the project or organization.

You can create a shared component from within a form using existing components or blocks, or by using the component editor from the Components folder in the Maestro Management Dashboard.

A shared component is a custom-built component within the business. A shared component can be added to your form just like any other component. The difference with a shared component is that it can be updated outside of the form. In this case, all forms using that shared component are also updated. This is a great way to re-use common components, but also keep them consistent across multiple forms.

Once the shared component is added to the form, you can change the Component ID. If the ID includes an entity, you can apply the entity to the child components within the shared component.

Shared components can be developed within the Components folder in the Maestro Dashboard, or within a form or template.

Shared components can be published to any category within the Palette panel. The default location is the Custom Components folder, but you can change it anytime.

Organizations usually build shared components for the following reasons:

- **Consistency** - to ensure that a component looks and functions the same wherever it is used.
- **Encapsulation of complexity** - to allow complex components to just be dropped in and used, without having to understand the internal implementation. This is particularly useful when a component makes dynamic data calls to back-end services.

- **Productivity** - allow forms to be built faster.
- **Enable change** - if a component needs to be changed, all the forms that use it will automatically inherit the changes.

Next, learn how to create a shared component.

Create a Shared Component

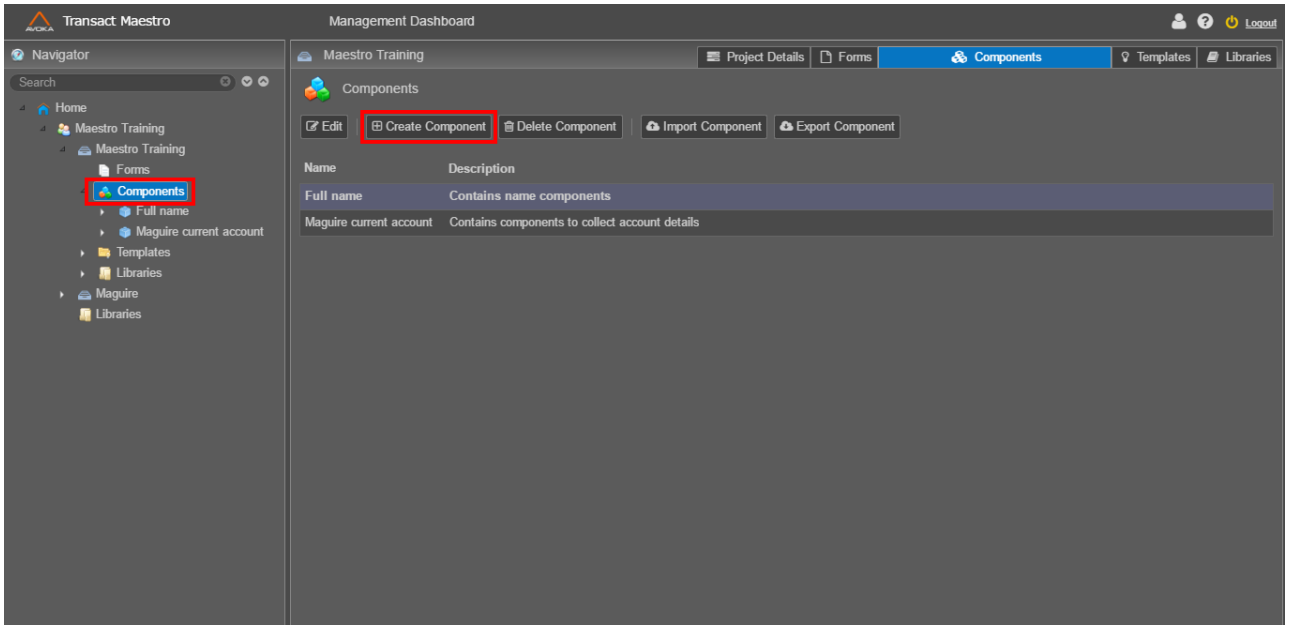
Maestro provides several ways to create a new shared component.

- Create from scratch in the Management Dashboard.
- Create from existing form items in the Maestro editor.

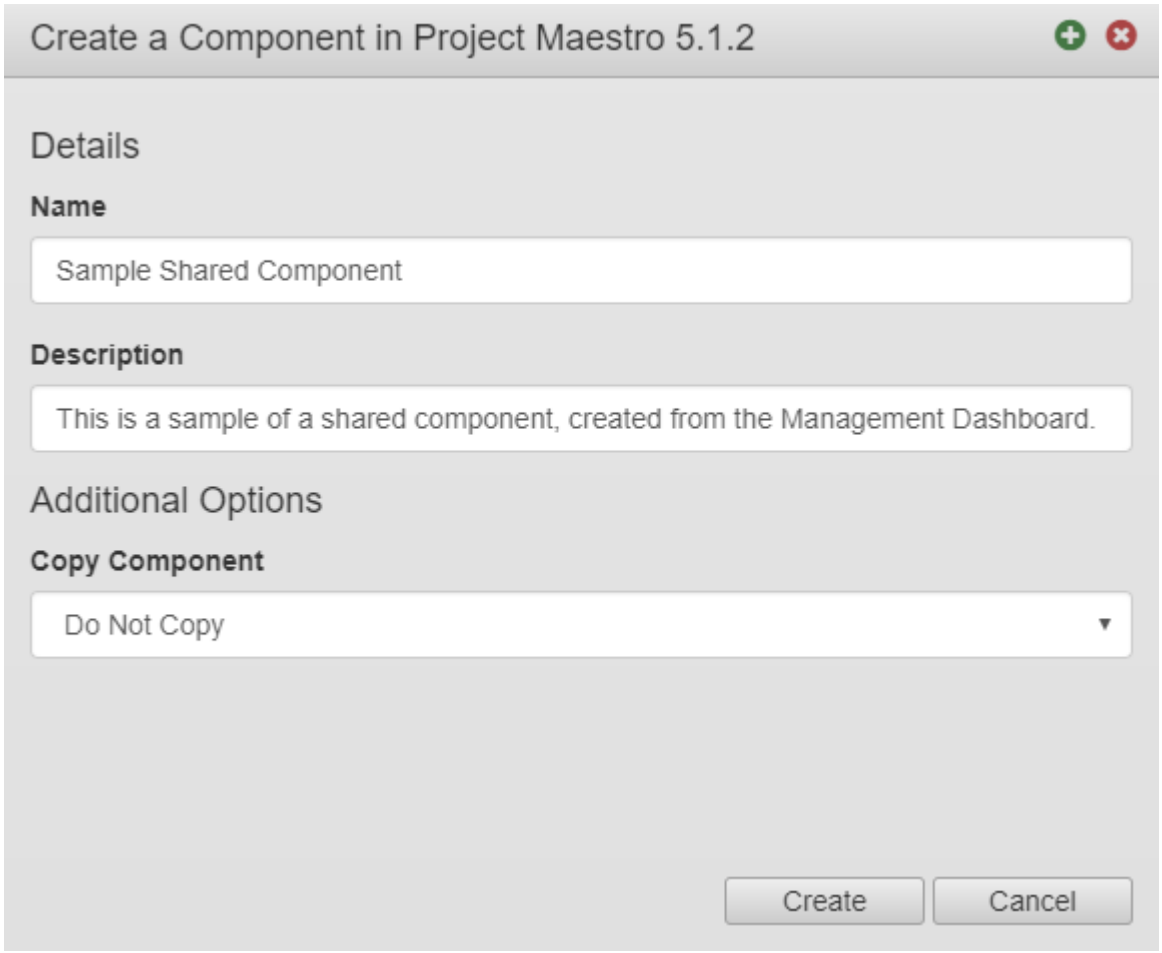
Create a Shared Component from the Management Dashboard

To create a shared component from Maestro's Management Dashboard, follow these steps:

1. Go to the Navigator pane.
2. Select Home > Organization > Project.
3. Select the Components folder in the project and click Create Component.



4. Edit the new component details.



5. Name - the component's name is used to identify the component in the Components folder.
6. Description – a description of the component, which is displayed when the Components folder is selected.
7. Copy Component – select from the following options:
    - Do Not Copy - This option allows you to create a brand new (blank) component. This option is recommended for shared components that you are building from scratch.
    - Copy and override an existing component - This option allows you to copy an existing component. The new component will replace the existing component in the library, which will update all forms using the existing component. The override will only replace the library resource, not the asset in the Components folder. Before selecting this option, it is important that you consider the usage of the component that you will be overriding.
    - Copy and create a new component - This option creates a new component based on an existing component. Selecting this option will create a copy without overriding the existing component.
8. Click Create.

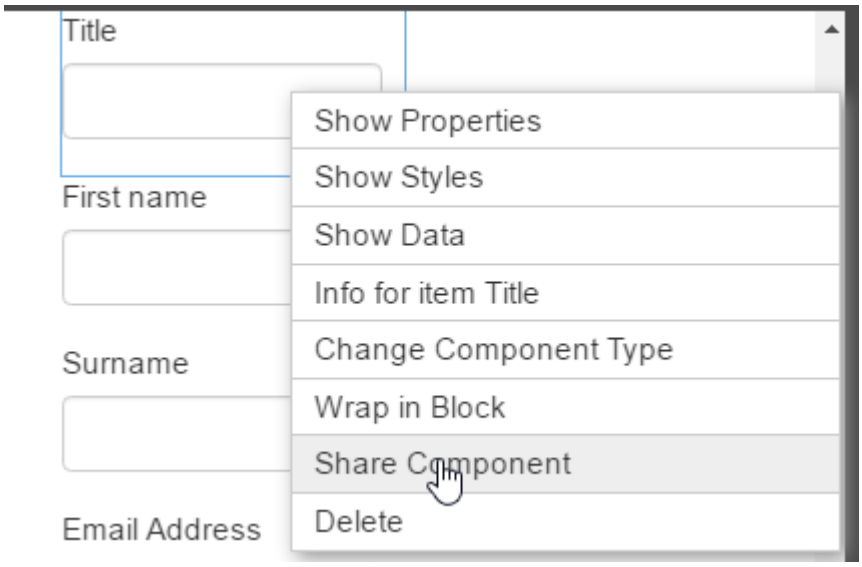
9. Edit the new component in the Maestro editor.
10. Publish the component.

Next, learn how to create a new shared component from existing items.

Create a Shared Component from Existing Form Items

To create a shared component from one or more existing form items in the Maestro editor:

1. Open a Maestro form.
2. Create a component.
3. Right click on the component in the Maestro editor and select Share Component.



4. If you are creating a shared component that contains more than one component, you need to wrap all components in a block first:
    - Select all components.
    - Right-click a selected component.
    - Click Wrap in Block from the dropdown list.
5. Edit the share component details.



6. Name is the default name of the new component is the label of the selected item.
7. Description is a short meaningful description of the shared component. This is optional parameter, but we recommend to provide a description.
8. Palette Folder defines where the shared component can be found in the Palette pane. The default is Custom Components.
9. Select Publish for immediate use to make the shared component immediately available to in other forms.
10. Select Replace item with shared component to use the component as the basis for the shared component will now be replaced by the shared component (i.e. it will now automatically reflect any changes made to the shared component).
11. Select a library from the Publish Library dropdown list to publish it to the project library, if you want to make this shared component only available to forms in this project, or to the Organization library, if you want any form in the organization to access this shared component.
12. Click Save. You can continue editing the shared component in the Component editor or view it in the Management Dashboard.
13. Publish the component.

Next, learn how to edit a shared component.

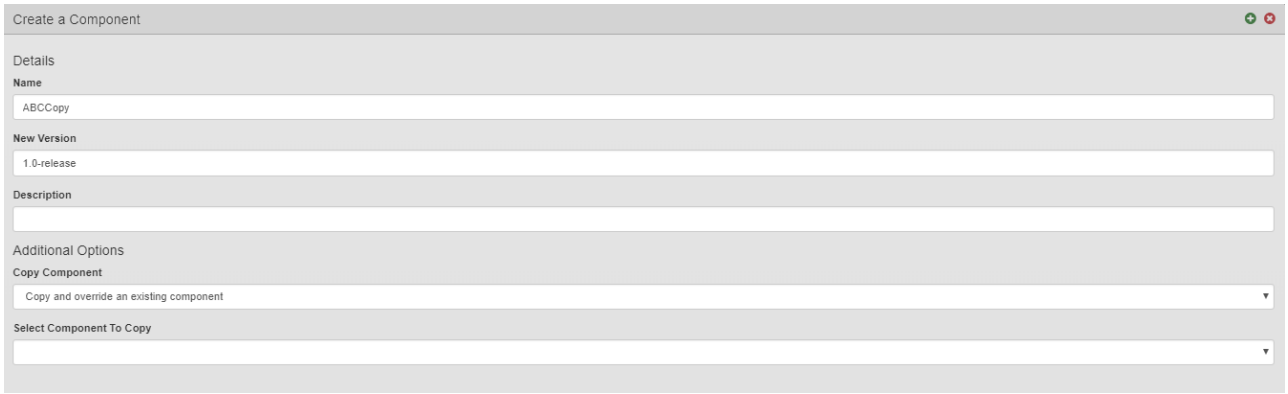
Override a Shared Component

Maestro allows you to override shared components. Though there are a variety of Maestro components available from the palette, there may be times where the available components do not fit the needs of your form and you may want to override a native component with a custom component that you can share across multiple locations in a form. Other reasons for overriding shared components are:

- Update a component to fill a specific one-time only purpose
- Create a component that provides functionality that is specific to your company

To copy and override a shared component:

1. Create a shared component.
2. Publish the shared component.
3. Add the published shared component to a form.
4. Create another new shared component from the Maestro Dashboard. To use the copy and override option, you must create the shared component from the Maestro Dashboard. It is important to select copy and override an existing component from the Copy Component dropdown list. Once the shared component is created, you can edit it in the Maestro editor. The components from the original shared component will display in the editor.



5. Select the component that you want to copy and override, for example the first shared component ABC, from the Select Component To Copy dropdown list. Selecting ABC means that all changes made in the ABCCopy shared component replace the original ABC shared component.
6. Edit the shared component.
7. Click Publish. When you publish the shared component make sure you publish to the same library as the original. If you publish to a different library, it will not fully override the

original and the shared component displayed in the form will be determined based on the precedence of the library used in the form.

8. Go back to the form and refresh the form. This updates the content of the original shared component with the contents that you added to the ABCCopy shared component.

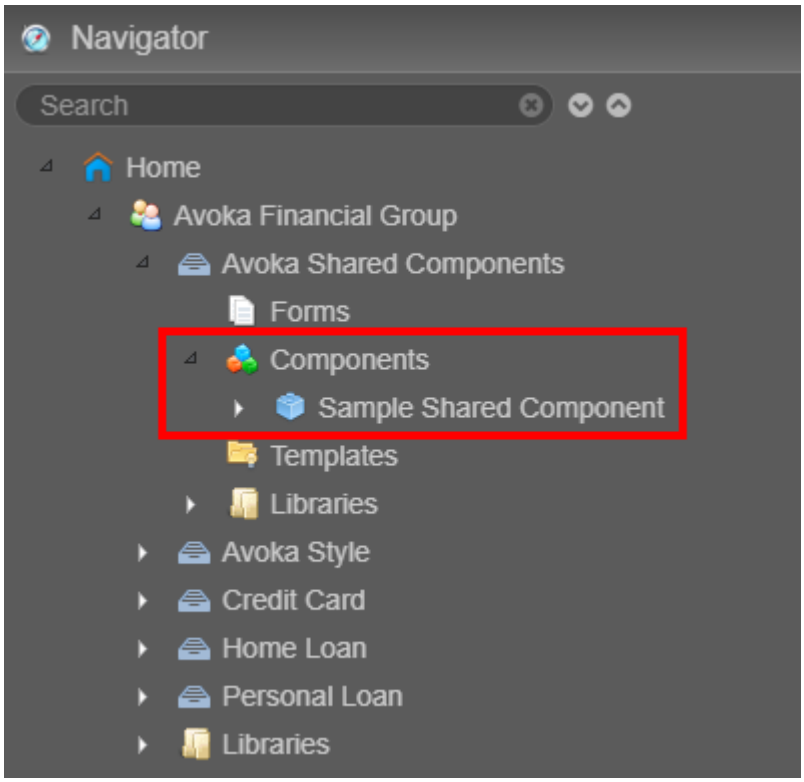
Next, learn how to edit a shared component.

Edit a Shared Component

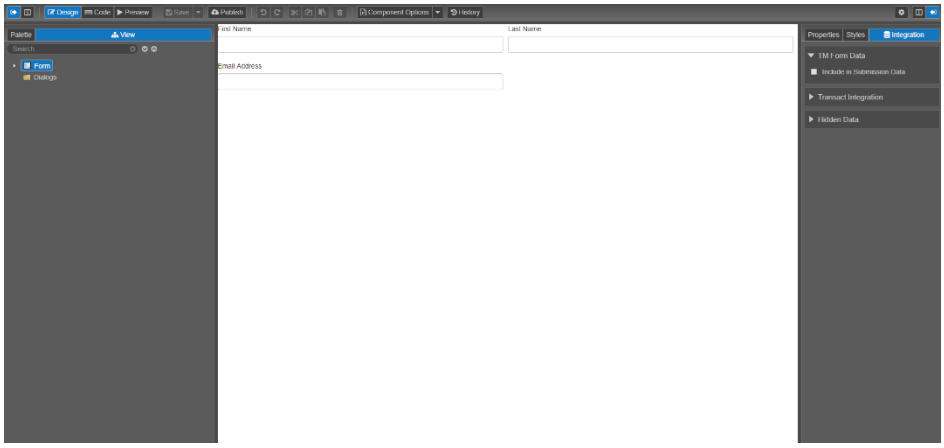
The Maestro editor allows you to edit existing shared components, for example a shared style, to implement customer requirements. Sometimes, your changes may override a shared component.

To edit a shared component:

1. Select the Navigator pane.
2. Select Home > Organization > Project.
3. Click theComponents folder.



4. Double-click a shared component to open it.



5. Edit the component as required and click Save when you are done.
6. Publish the component to make changes to the shared component available to this and other forms.

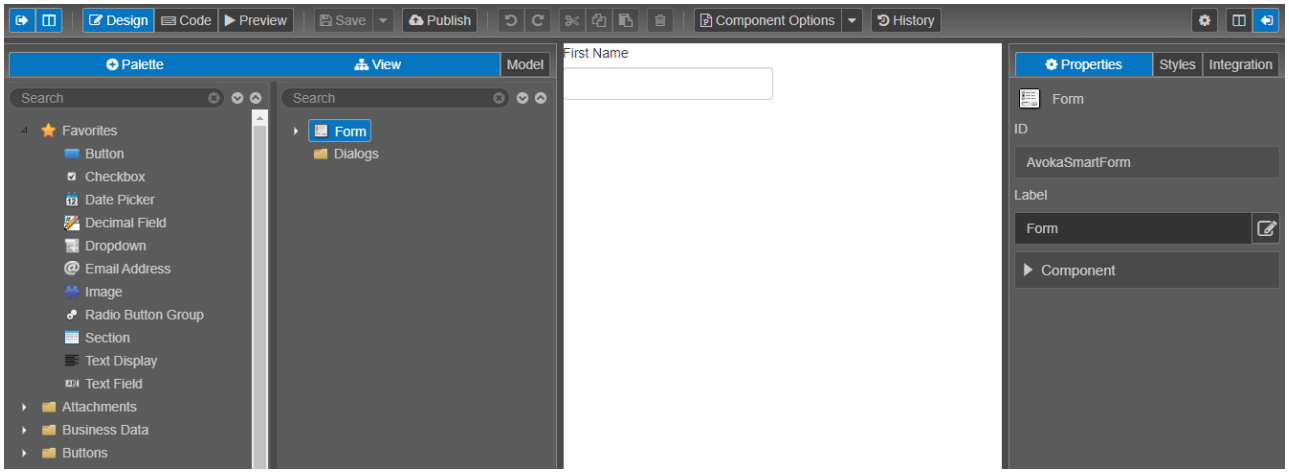
Next, learn how to override a shared component.

Publish a Shared Component

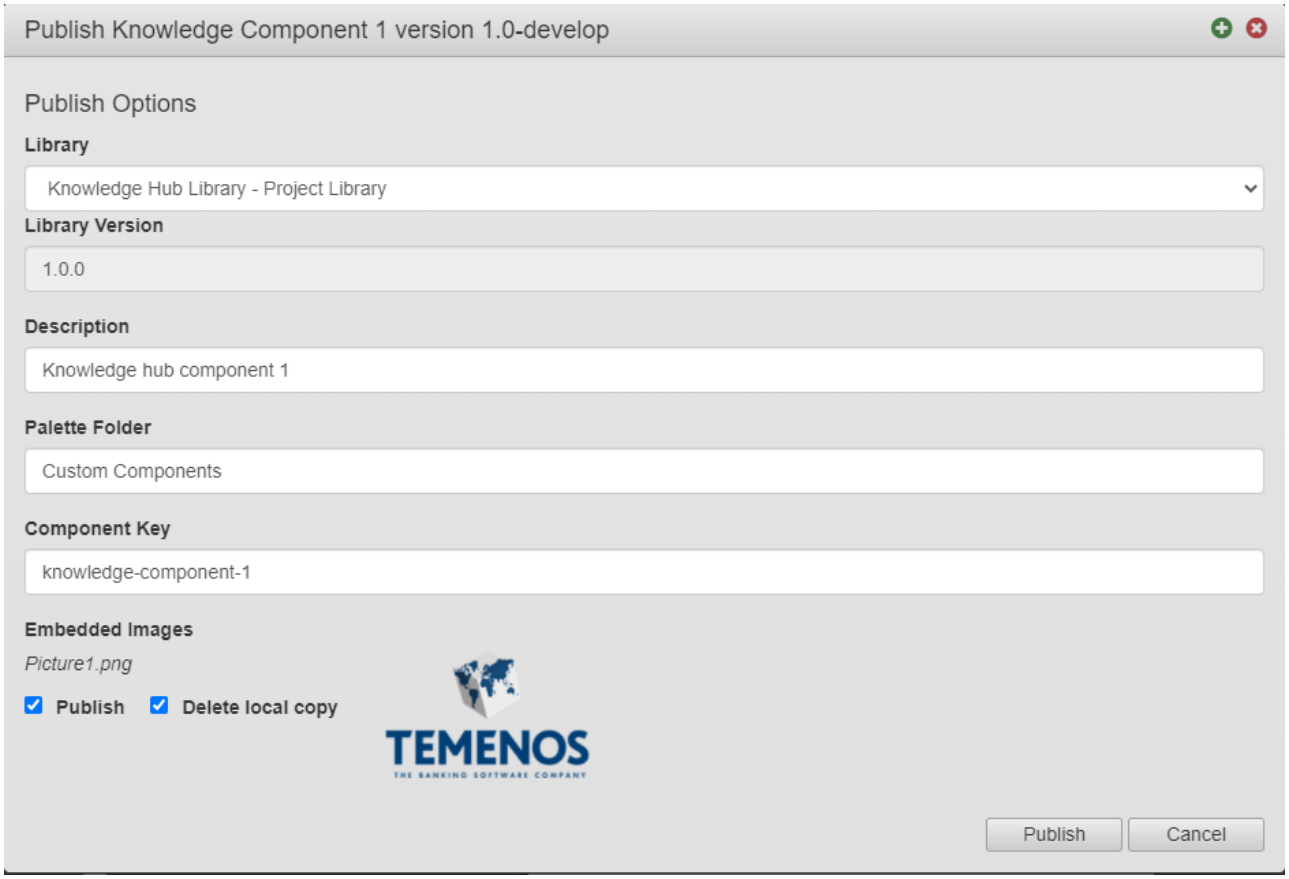
After you have created or updated a shared component, the Maestro editor allows you to publish it to a library so it can be used in forms or other components. Maestro provides the option to publish for immediate use, which means that the shared component will be immediately available to this form as well as other forms.

To publish a shared component:

1. Create a new shared component or find the existing one.



2. Click Publish.



3. Select a library, where the published shared component will be stored, from the Library dropdown list. It determines which forms have access to the shared component. It is recommended that you understand the organization, project and library structure, including where shared components should be published. When you select the library, the mapped library version will also be selected in the Library Version dropdown list below.
4. Select a specific version of the library from the Library Version dropdown list. | 18.05 This feature was introduced in 18.05.
5. Provide a description of the shared component in the Description field.
6. Update a name of the folder, where the shared component will be displayed in the Palette panel, in the Palette Folder field.
7. Review and update an uniquely identifier the shared component in the Component Key field.

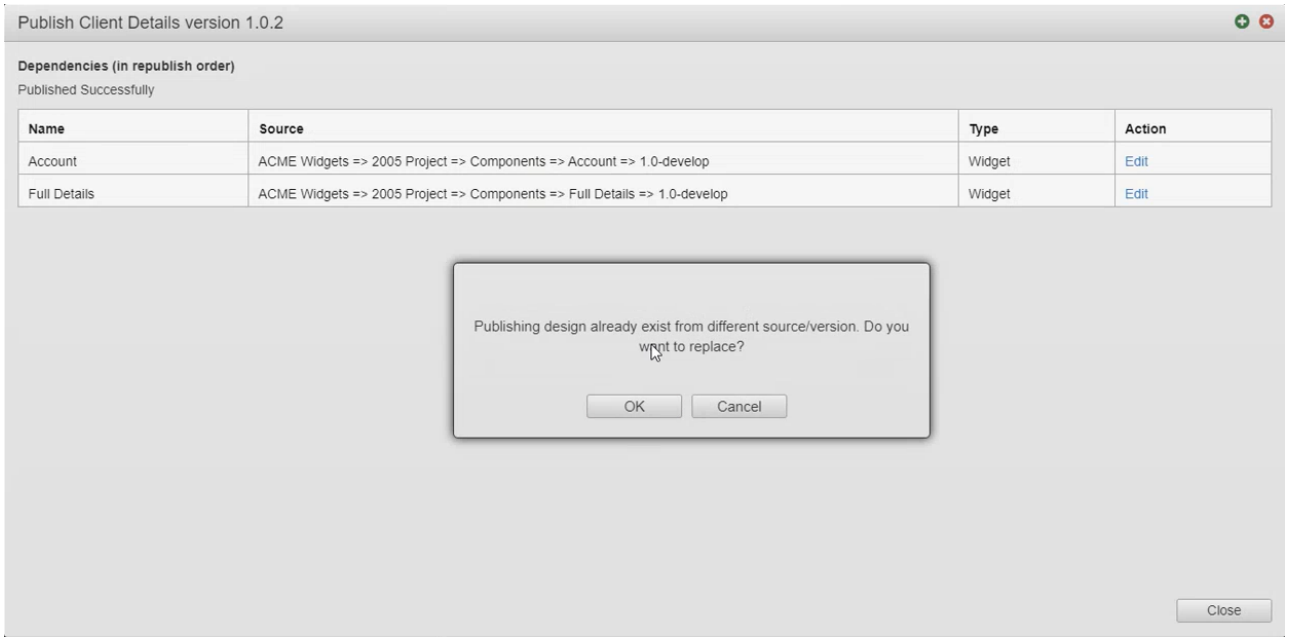
> NOTE
>
> The Component Key is automatically generated based on the name of the shared component, so we don't recommended changing it as it can lead to issues when the component is deployed in a Maestro form.

8. Select the Publish checkbox to publish listed shared styles or images that are only in the component design.
9. Select the Delete local copy checkbox to remove the local copy of the listed shared styles or images.
10. Click Publish to publish the component, if Maestro has not detected any impact changes, or click Next to review the impact analysis of component changes before publishing. | 20.05 This feature was introduced in 20.05.



For example, if you have a few components- a Client Details and Account components - where the Client Details component is the base component that is used in the Account component. They are already published as 1.0.1. After you create a new version of the client details component as 1.0.2 and try to publish it, Maestro will detect a clash and present you with a list of the dependencies that need to be republished.

11. Review the impact of the change and whether the impacted components should be re-published and click Publish to publish the shared component.
12. Click OK to confirm your decision.



13. Click Edit against each component to perform some action, for example, you can re-publish it.

Next, learn how to edit a shared component.

Custom Native Components Overview

A custom native component is a custom component that can be shared with other Maestro Form Builders and Platform Developers. A native component consists of a collection of files that are packaged together in a ZIP file using a specific folder structure, as shown below.

File Name	Description
`library-config.xml`	A file with this exact name must be in the ZIP file's root folder. This file identifies the ZIP file as a Maestro Library and provides meta-data such as dates and author.
`widgets`	A folder with this exact name must be in the ZIP file's root folder. This folder contains a sub-folder for each native component.
`component sub-folder`	Each component has a sub-folder under the top-level "widgets" folder. A component sub-folder contains the files that define the native component.
`widget.json`	A file with this exact name must be in the component sub-folder. This file includes JSON properties that defines various component attributes.
`widget.png`	A 24x24 pixel, 32-bit color image with a transparency layer. This is used as the component's icon in the Maestro Palette pane.
`widget.html`	HTML code defining the component's structure.
`widget.css`	CSS code defining the component's look and feel.
`widget.js`	JavaScript code defining the component's behavior.
`other.js`	Other JavaScript files that the component depends on, such as jQuery plugins.

Multiple native components can be packaged into a single ZIP file. The ZIP file is shared in Maestro by importing it into a project or organization library. Once imported, the components in the ZIP file are available on the Maestro Palette pane and can be used like any other component.

Next, learn how to develop a custom native component.

Custom Native Component Development

A component in Journey Maestro can be as simple or complex as the Form Builder wants or needs it to be. A Maestro component can be as basic as a one-line snippet of HTML[1] code to display a piece of text, or it can be as complex as displaying high fidelity graphics, or communicating with multiple servers.

Before developing any native component for your form, check if you can implement the required functionality using the available components in the Maestro Palette. It is important to consider and understand the use case of a new native component. For example, if it requires a server connection, it will be useless in a form that will be deployed for offline use.

You can develop custom native components using the web-standard resources such as JSON, HTML, CSS, and JavaScript by following the recommended process outlined here.

1. Created a new folder to hold all the files necessary for your native component. Name the folder the same as your native component.
2. Create a JSON file.
3. Create a HTML file.
4. Create a JavaScript file.
5. Use a jQuery.
6. Package and distribute the completed custom native component.

Create a Custom Native Component JSON File

Every custom native component that you develop in Maestro must have a JSON[2] file, so your first step is to create a valid JSON file, for example, `widget.json` and populate it with relevant information about the new native component

> NOTE
>
> JSON is a subset of the JavaScript object literal syntax, so you must surround your JSON property names with double quotation marks “”

A JSON file of this component is shown below:

---

[1]Bounce is when a user views a form but never starts it and simply closes the window immediately or navigates away.

[2]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

```
{
	"label": "Component A",
	"span": {"xs": 12, "sm": 12, "md": 4, "lg": 4},
	"propDefs": {
		"property1": {
			"label": "Property 1",
			"type": "text",
			"defaultValue": "Default",
			"helpText": "Specify a value for the custom property of this component"
		},
		"property2": {
			"label": "Property 2"
		}
	},
	"html": "component.html",
	"js": "component.js",
	"css": "component.css",
	"icon": "component.png"
}
```

A typical custom native component JSON file can contain the following elements:

Element	Required	Example	Description
label	Yes	"label": "Component A"	The text displayed in the Maestro palette for this native component. Note that this is the only required element in a native component's JSON file; for example, `{ "label": "Hello World" }`.
span	No	"span": {"xs": 12, "sm": 12, "md": 4, "lg": 4}	The span value of the native component, which is the number of columns that the native component will take up in the form. The default value is 3. Maximum value is 12.
propDefs	No	"propDefs": { "property1": {...}, ...}	The list of all properties defined for this component. Each property can have its own set of property-value pairs. For more information, see the property table below.
html	No	"html": "com-	The name of the native component's HTML

		ponent.html"	file. The default is component.html.
extraHTML	No		An additional HTML file or an array of HTML files that are generated in the completed form's head section. It's useful for adding HTML for popup dialogs and other similar functions.
js	No	"js": "component.js"	The name of the native component's JavaScript file. No JavaScript file is loaded by default.
css	No	"css": "component.css"	The name of the native component's CSS file. No CSS file is loaded by default.
icon	No	"icon": "dropdown.png"	The name of the native component's icon file, for example, a PNG, GIF or JPG image file. The default is a generic icon.
rows	No	"icon": "component.png"	Native components that need to contain other components should have a blank rows collection, which is an array within an array. By default, the component doesn't have rows collection, asit doesn't contain other components.
noData	No		Set to true for display native components that should not have entries in the form's output data.
validChildren	No		An array of component types that can be added to this component type. This prevents adding or moving components of other types into this component, and also creates options in the native component's right-click menu to add the specified component types as children. Set `validChildren` to an empty array to prevent any new content being added to the native component directly. If the native component contains a container, content

		can be added to the native component using this property. An object containing selection name-keyed selection arrays, typically one, that if not already there, are added to the form's selection collection. This allows the component to provide a default selection set to use in a drop-down, radio group, etc. The name of each selection array must not contain any non-alphanumerical characters other than underscores. Underscores are translated as spaces in the property editor window.
selections	No	

A JSON file can have a number of properties under `propDefs`, which are a keyed map of custom properties that appears in the Maestro property editor which can be referenced in your native component's code. The key of each property item within the properties object is the internal name of the custom property. For example, the name you use when referring to the item in your native component's code. This name must be camelCase, for example, StyleGuide.

A property element can contain the following elements:

Property Element	Required	Example	Description
label	Yes	"label": "Options",	The display name for the custom property that will be displayed in the Maestro property editor. If omitted or left blank, the default is, "text". In the above example, the label is, "My Property".
type	No	"type": "text"	This determines the input type in the Maestro property editor.
value	No	"value": "One"	The value of the property.
defaultValue	No	"defaultValue": "Default"	This is the default value that this property has when this component is first added to a form. The default is null.

helpText	No	"helpText": "My Help"	Any additional information that may be relevant to the Form Designer within the Maestro property editor. No help text link is displayed by default.
linked	No	"linked": "true"	If set to true, updates to the item's label is also set this property. This only occurs if this property is not currently overridden in the item, or if its value already matches that of the label.

The custom native component properties have different types.

If this component or widget extends another component and you are setting a property against a property defined on its parent, you can override their values. There are cases where there is a propDef to add properties that the user can set and properties that are setting the values on an inherited type.

```
{
	"category": "Input Fields",
	"label": "Dropdown",
	"html": "dropdown.html",
	"icon": "dropdown.png",
	"propDefs": {
		"options": {
			"label": "Options",
			"type": "list",
			"value": [
				{
					"label": "One",
					"value": "One"
				},
				{
					"label": "Two",
					"value": "Two"
				},
				{
					"label": "Three",
					"value": "Three"
				}
			],
			"helpText": "The options list for the dropdown"
		},
		"helpText": {
			"label": "Popover Help Text",
			"type": "helpText",
			"category": "Help Text",
			"value": ""
		},
		"icon": {
			"label": "Icon",
			"type": "icon",
			"value": "fa fa-caret-down",
			"helpText": "Select the dropdown icon"
		},
		"addBlankValue": {
			"label": "Add Blank Value",
			"type": "boolean",
			"value": true,
```

```
                        "helpText": "Check to add a blank value to the dropdown"
                },
                "placeholder": {
                        "label": "Placeholder Text",
                        "type": "text",
                        "category": "Accessibility",
                        "value": ""
                }
        },
        "styleTargets": ["wdg-select-icon"],
        "span": {"xs": 12, "sm": 12, "md": 6, "lg": 6},
        "ruleHelpers": [
                {
                        "label": "String value...",
                        "name": "stringValue",
                        "initDialog": true
                }
        ]
}
```

```
{
	"type": "dropdown",
	"label": "Title",
	"category": "Business Data",
	"properties": {
		"options": [
			{
				"label": "Mr",
				"value": "Mr"
			},
			{
				"label": "Mrs",
				"value": "Mrs"
			},
			{
				"label": "Miss",
				"value": "Miss"
			},
			{
				"label": "Ms",
				"value": "Ms"
			},
			{
				"label": "Other",
				"value": "Other"
			}
		]
	}
}
```

This is the common case, the first one is the `/dropdown/widget.json` and the second one is the `/dropdown-title/widget.json`. The directory name is the type and it contains a `widget.json`. In the dropdown you have a propDefs for options being declared, but in the dropdown-title you have properties being set for this widget

Create a Custom Native Component HTML File

After you have created the JSON file, `widget.json`, the next step is to build the native component's HTML file. Every native component created for use in Maestro needs a HTML file, for example, `component-widget.html`. This HTML file should define the content that the native component will place in the form's HTML document. The HTML file should have a single top-level element, usu-

ally a `div`. Within this top-level element, using standard (or custom) tag names and attributes, any valid HTML script can be placed.

A Maestro custom native component can be as simple as a component designed to display a simple piece of text, for example, `Hello World`. You can use the following process to create a simple Hello World custom native component:

1. Create the HTML file `component-widget.html`.

   ```
   <div>Hello, World!</div>
   ```

2. Place both the `widget.json` and `component-widget.html` files into a folder named `Hello World`.
3. Zip the `Hello World` folder as a `Hello_World.zip`.
4. Use Maestro to deploy the library of components `Hello_World.zip` to your form.

This Hello World native component doesn't do much so it is not very useful. Normally, components are used to capture user input data. To do that, Maestro uses the AngularJS[1] JavaScript library to extend basic HTML syntax with two-way data binding. You can use this functionality to make the Hello World native component more useful by adding the code below to the `component-widget.html` file.

```
<div>
   Enter your name: <input type="text" ng-model="data[item.id]"/>
   <p>Hello, {{data[item.id]}}!</p>
</div>
```

This updated version has a text input field whose value is bound to `data[item.id]` using the `ng-model` attribute. Whatever value is inputted into data[item.id] will form part of the form's submission data. In this case, this will be the text that is entered into the input field by the user, for example, a user's name.

Below the input field, the value of `data[item.id]` (the text entered into the text field) is displayed in a greeting paragraph, taking advantage of the two-way binding.

---

[1]A workflow is progression of steps (tasks, events, interactions) that comprise a work process, involve two or more persons, and create or add value to the organization's activities. In a sequential workflow, each step is dependent on occurrence of the previous step; in a parallel workflow, two or more steps can occur concurrently.

Create a Custom Native Component JavaScript File

By now, you have created the component's JSON and the HTML files that capture information, provides feedback and stores a value in the form's submission data.

So far, we have illustrated that no JavaScript is required to create a native component that can be used in Maestro. However, JavaScript can be used when creating native components for use in Maestro forms. A JavaScript file should be used when the native component needs to define custom behaviors or processes. The JavaScript file needs to conform to a special structure. This structure means that all JavaScript files used to create native components must begin with the basic structure as shown below.

```
define(["app"], function(app) { /* Your code here */ }
```

The recommended practice for providing a native component with some type of functionality is in the form of AngularJS objects. As described in the AngularJS developer guide and API reference guide (https://docs.angularjs.org/guide), if objects can be filters, directives, controllers or services, they are available to be used in JavaScript files.

The following list provides a brief explanation of filters, directives, controllers and services:

- Filters - Provide value transformation functions (For example text formatting)
- Directives - Enable inspection or manipulation of the DOM (Document Object Model). For example, adding an event handler.
- Controllers – Provide values and functions for binding. For example, managing a complex component data type.
- Services – Provide everything else. For example, integration with a remote server.

You can use the above-mentioned syntax in your native component to convert a text string into an UPPERCASE text string:

```
define(["app"], function(app) {
	app.ng.filter("upperCase", function() {
		return function(text) {
			return text.toUpperCase();
		};
	});
}
```

The code in the above image creates a filter called `upperCase`. The filter function takes a piece of text and returns the UPPERCASE version. This same function could be used in the Hello World native component's HTML file, `component-widget.html`, by pushing the data through the filter function. The image below demonstrates how this filter function can be applied to the HTML file of the Hello World native component.

```
<div component="item">
   Enter your name: <input type="text" ng-model="data[item.id]"/>
   <p>Hello, {{data[item.id] | upperCase}}!</p>
</div>
```

With the filter applied to the HTML file, the greeting provided to the user when the Hello World native component is loaded, will be shown in uppercase - HELLO, NAME!.

You can also make your own customizable attachments in your form to allow form users to attach various documents. Even though there are several native components, such as the Attachment Field and Attachment Field v2, which you can use out of the box, their functionality may not be enough for your needs. Maestro provides the `Transact.makeAddAttachmentFile()` method so you can set it on the AangularJS object of the particular widget instance. This is useful when the attachment widget is in a repeat and you can select the attachment name of the file you are uploading. This is especially important when you have security policies configured in Manager with restrictions per the attachment name, so you need to be able to set it dynamically based on user selection in the form

Create a Custom Native Component jQuery File

All Maestro forms include a full jQuery[1] library by default, and all element references passed into angular directive link methods are jQuery objects with the full jQuery API available. This makes it possible to use familiar jQuery methods and functions. However, it is recommended that you investigate whether you can use Angular data binding or built-in directives to meet your needs before doing any work on the DOM[2].

You can build custom Angular directives for use in your custom native component.

---

[1]A reference number is a unique identifier assigned to each transaction.
[2]The Document Object Model (DOM) is a cross-platform and language-independent application programming interface that treats an HTML, XHTML, or XML document as a tree structure wherein each node is an object representing a part of the document. The objects can be manipulated programmatically and any visible changes occurring as a result may then be reflected in the display of the document.

```
define(["app"], function(app) {
	app.ng.directive("mySpecialDirective", [function() {
		return function($scope, $el, $attr) {
			$el.text("Hello from my special directive");
		};
	}]);
}
```

If there is some part of your native component that needs to access properties of the Form View item, the JavaScript file should use Angular dependency injection to reference the form service object and call the `Form.getItem()` method.

```
define(["app"], function(app) {
	app.ng.directive("mySpecialDirective", ["Form", function() {
		return function($scope, $el, $attr) {
			Form.getItem().then(function(item) {
				$el.text(item.properties.messageSpecifiedByFormDesigner);
			});
		};
	}]);
}
```

The above example is quite contrived and could be handled in a much simpler way by binding the custom property value in the markup and using no JavaScript at all.

A native component can often specify a custom validation method, which is called before any validation rules are specified by a Form Builder. An example of this is the Date Picker component from the Maestro Palette. You can add a custom validation to the component's date range properties as shown below.

1. Obtain a reference to the View item, as explained above.
2. Add a `$validation` method to the View item.

```
item.$validation = function(data, value) {
	value = + value;    // Ensure value is a number
	if (value < 5) return "Too low";
	else if (value > 10) return "Too high";
	else return true;
}
```

This method takes two parameters - the item's parent data context and its own data value - and returns a validation result - true for valid, false for an error message.

3. Add the validation directive attribute `data-av-ok` to the top-level `div` of your native component's HTML file.

You can apply a similar approach to create a custom mandatory value checker, for example, `$hasValue`. This method is used to override the normal way of checking whether a value has been entered, if the field is marked as mandatory. Instead of checking if a value is provided, a mandatory field of this type will only pass if the field's length is greater than 5.

```
item.$hasValue = function(data, value) {
       return value.length > 5;
}
```

NOTE

The Attachment Field component uses this method.

Package a Custom Native Component

After you have created all files required by a custom native component, you can package and deploy it following this process:

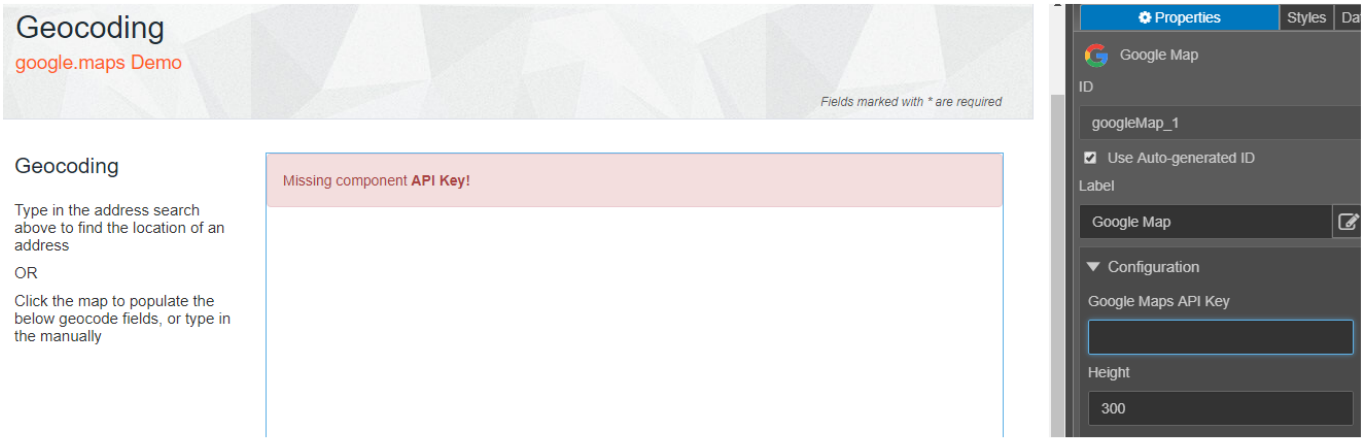
1. Add a library's XML manifest including a library's name and description to the component's directory.
2. Zip the content of the directory.
3. Use the gulp[1] tasks to automatically package and deploy libraries into a Journey Maestro server.
4. Import the library into Journey Maestro.

Enforcing Required Configuration Properties

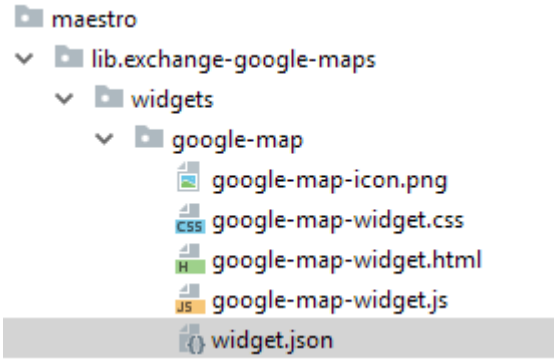
Sometimes, as a component designer, we want to define a component property that is required to be set. Since we don't have a built-in Maestro function to mark a property as "mandatory" field, we can still show a warning message like below directly in Maestro design view to remind the form designer to set this value. "Missing component API Key!" message will disappear as soon as "Google Maps API Key" property has been set.

---

[1]Business Process Modeling Notation (BPMN) is a method of illustrating business processes in the form of a diagram similar to a flowchart.



This technique can only be used when you develop a native component. Suppose you have native component called "Google Map" which structure looks like this.



In the widget,json, it defines a property "apiKey", then what you can do is to add a in google-map-widget.html like below

```
<div class="av-form-field google-map" data-ng-style="{height: item.properties.height+ 'px'}"
    <div ng-if="!item.properties.apiKey" class="alert alert-danger">
        Missing component <strong>API Key!</strong>
    </div>
    <div id="google-map-widget-container">
    </div>
</div>
```

The logic is actually pretty simple. If item.properties.apiKey value is blank, then show this "Missing component API Key" message with "alert alert-danger" class. The will be hidden when form designer set an api key to the property.

Next, learn about the Native Component Development Toolkit.

Create a Native Component Library Automatically

You can use the gulp watch task to automatically create a native component library while you are developing your components in a Visual Studio Code editor.

To create a library in Visual Studio Code:

1. Install the Native Component Development Toolkit.
2. Download Visual Studio Code and install it.
3. Start the Visual Studio Code IDE.
4. Select File/Open Folder, then open a folder where you installed the development toolkit
5. Select View/Integrated Terminal to open its Integrated Terminal.
6. Type `gulp watch` into the Integrated Terminal window
7. Edit your component files in the `src` folder.
8. Click File/Save save them, so the `gulp watch` builds your Maestro library in the `dist` directory.
9. Import this library into your Maestro instance.

NOTE

If you don't want to continuously have the `gulp watch` task running, you can use `gulp zip` command to generate your Maestro library manually.

For more information, see Creating native components for Maestro (Eclipse/ IntelliJ Developers).

Custom Native Component Property Types

The custom properties defined in a custom native component's JSON file can have different types (property types). A property's type determines the following:

- The editor that is displayed to the Form Designer for setting the property
- The data type that the property's `value` will have when accessed from within the native component's code. A property's `defaultValue` element must also match this data type.

Properties of certain types can have additional settings within the property object. For example, properties of type `option` must specify a setting for options. This is done to indicate the value choices available to the Form Designer.

The table below identifies several of the property types associated with a native component's JSON file.

Type	Editor	Value Datatype	Additional Settings
text	Text input	string	
integer	Number picker with text entry and up and down buttons.	number	min, max – (Optional) restrict the range of the value entered.
boolean	Checkbox	boolean	
option	Dropdown List. Maestro shows the list and the form designer selects a value from it. The selected value is stored in the item properties.	string (the chosen option)	options – (Required) an array of values to choose between. These can be strings. If the values are strings, then they can be used for both the text in the editor dropdown and the value assigned to the property. If separate labels and values are needed, the array can contain objects with label and value properties.
list	Selection property editor dialog. Maestro allows the list to be edited by adding and removing entries. The resulting	array of objects	value – the initial entries of the list as an object array. Each object requires value and label properties. The initial list may be an empty array.

	array is stored in the item properties.		
color	Text input	string	
url	Text input	string (must be valid URL)	
image	Image picker. Uploads and/or selects a resource image.	object with fileName, width, height properties	value – an object with fileName, width and height properties. Image can be referenced in HTML by `{{Resource.imagePath(item.properties.image.fileName)}}`.

Native Component Development Toolkit

The Temenos Journey Manager platform provides you with the Maestro Native Component Development Toolkit to simplify the creation of custom native components through the use of templates, and automated tasks. This toolkit is based on the gulp automation tool, which executes custom tasks defined in a `gulpfile.js` JavaScript file.

Installation

To install the toolkit:

1. Install NodeJs.
2. Download avoka-native-component-tools.zip.
3. Extract the zip file into an empty directory on your computer. You can do this by executing the following command:

   ```
   unzip avoka-native-component-tools.zip
   ```

4. Open a NodeJs command prompt window and change directory to the directory you just created.
5. Type `npm install` and wait for the npm installer to finish.

Using the Toolkit

You can define the following tasks:

- `new` – Generate a new component in the `src` folder, based on files in the template folders.
- `zip` – Create a Maestro Library in the dist folder by bundling all files in the `src` folder into a Zip file.
- `watch` – Helps automate the code generation and packaging process. It continuously monitors all files in the `src` folder structure and runs the zip task to generate a Maestro library, if it has been changed. It also continuously monitors `new-component.properties` and runs the new task to generate a new component if it has been changed.
- `redist` – Create a new toolkit distribution file by packaging all of the templates into a new toolkit. This is useful if you customize your templates and want to share them with others.

To run any of these tasks in the toolkit installation folder, type `gulp <task>`. A few examples are provided below:

```
gulp new
gulp zip
gulp watch
```

The `gulp new` task takes an optional parameter to identify which template to use as a model for your new component. Usage is `gulp new -templateName`, where `templateName` is the name of a sub-folder in the template folder. If you don't supply this optional parameter, a default (`-default`) is assumed, which uses the component template files in `template/default` directory.

NOTE

The `gulp new` task regenerates your component's source files from the files in the template folder that overwrites any changes in the '`src/<componentName>` directory. To avoid this, change the value of the '`component_filename` property in the '`new-component.properties` file immediately after you generate a new component, so the `gulp new` task uses the `component_filename` and it won't overwrite your original code.

To generate a new Maestro library with the default example component provided with the toolkit:

1. Type gulp new to create a new component, based on the values in the two .properties files, in a src folder.
2. Type gulp zip to package the new component as a Maestro library and named as the `dist/maestro-lib-<filename>.zip`.

To create a new component with customized `filenames` and `metadata`, follow the steps below:

1. Edit `library.properties` and `new-component.properties` to set your preferences.
2. Type gulp new to generate a new component in the src directory.
3. Edit the new component's files in the `src/widgets/<filename>` directory.
4. Type gulp zip to package all the components in the src directory as a Maestro library.

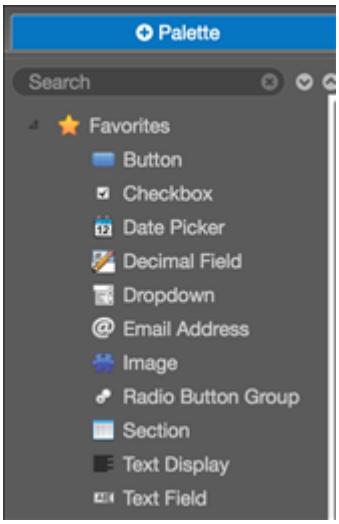
Next, learn how to create a native component library automatically.

Native Component Development Using Eclipse or IntelliJ

This guide is for Eclipse or IntelliJ developers who would like to create a native component library for Maestro. It is assumed that the audience already knows:

- How to use an IDE such as Eclipse or IntelliJ
- Is familiar with Maestro, related features and terminology
- Can navigate around HTML, CSS and Javascript

Maestro comes with a rich set of components that are contained in core libraries assigned at the organisation and project level. What this means is that when you create forms, your palette is complete with all of the usual features that you would expect to find in web development such as text fields, radios etc.



There may however be scenarios in which components do not perform the function you need and it is impossible to override the behaviour of an existing component in order to get the result you need.

In this case you may need a native component and this document deals with the creation

There are three primary documents found across Confluence and in the knowledge base (see Related Articles) which touch on the parts of the process, but none which I think attack this from a viewpoint of assembling a basic component and understanding the processes involved in a step by step fashion within an IDE. This guide will cover this and enable the developers to get up and running quickly.

This document will provide details on how to create components which:

- Are natively built outside of Maestro,
- Which enable best use of the Angular framework that's provided within Maestro AND,
- Which tap into the core benefits of Angular to provide rich two-way data binding.

This document does not deal with the rules and regulations around component creation.

Nor does it dive into details which are covered in other guides - it is intended to get development teams up and running.

Let's look at a few examples of native custom components.

Custom Button

we are going to create a button with some custom styling and add it to a library in Maestro.

1. Eclipse Setup - Create a new Web Project in Eclipse with the following directories.

   ```
   buildfiles >
   <Name>Library >
   <Name>Library > widgets >
   zip >
   ```

   Where <Name> is the name of the library

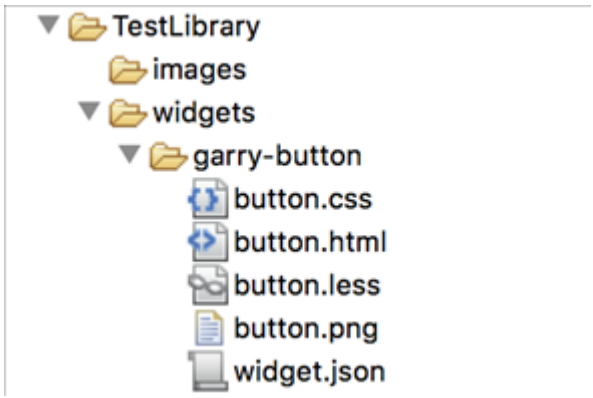
2. Create the ANT build file - Now create the ANT build file in buildfiles, and call it build<Name>.xml. Use this source and make sure that the project-name and folder-to-zip are the same names as your <Name>Library >

```
<project name="maestro-components" default="zip" basedir=".">
 <property name="project-name" value="TestLibrary" />
 <property name="folder-to-zip" value="TestLibrary" />
 <property name="dir" value="${basedir}\.."/>
 <property name="target-zip-folder" value="zip" />
 <target name="clean">
  <delete file="${project-name}.zip" />
  <delete dir="${target-zip-folder}" />
 </target>
 <target name="zip" depends="clean">

  <zip destfile="/${dir}/${target-zip-folder}/${project-name}.zip" basedir-
r="/${dir}/${folder-to-zip}" excludes="*.DS_Store,*.project" />
 </target>
</project>
```

This build file is responsible not just for zipping the correct structure, but ensuring that certain files which will cause the import to fail are excluded as well.

3. Create the custom component structure - In your <Name>Library > directory create this structure: `\ widgets \ <elementname>`
4. Baseline default files - And copy in the default files from the pack resources (css, html, less, png, json) to \ widgets \ <elementname>. Copy in the library config into the root of <Name>Library >. Add in a small image that will serve as the icon in Maestro palette. You should end up with a structure similar to this:



5. Create JSON Widget configuration - Modify widget.json to ensure that it references the resources in the pack, for example:

```
{
 "category": "Buttons",
    "label": "Garry Button",
    "html": "button.html",
    "icon": "button.png",
 "css": "button.css",
    "propDefs": {
        "icon": {
            "label": "Icon",
            "type": "icon",
            "imageStyleTarget": "Button icon",
            "value": "",
            "helpText": "Select the button icon"
        },
        "iconPos": {
            "label": "Icon Position",
            "type": "option",
            "value": "left",
            "options" : [{"label":"Left","value":"left"},{"label":"Right","-
value":"right"}],
            "helpText": "Select the button icon position"
        }
    },
    "defaultStyleTarget": "wdg-button",
    "span": {"xs": 12, "sm": 12, "md": 4, "lg": 4},
    "noData": true
}
```

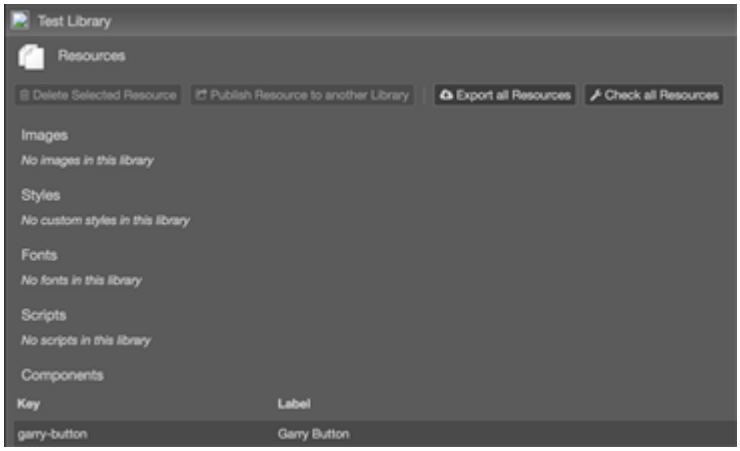
6. Create Widget HTML - Now modify the button.html to serve as your angular component.

```
<div>
 <button type="button" class="btn wdg-button">
  <i class="wdg-button-icon av-icon-button"
     data-ng-if="item.properties.icon && item.properties.iconPos == 'left'"
     data-ng-class="item.properties.icon"></i>
  <span data-av-compile class="wdg-button-label"
     data-ng-bind-html="item.htmlLabel || item.label"></span>
  <i class="wdg-button-icon av-icon-button"
     data-ng-if="item.properties.icon && item.properties.iconPos == 'right'"
     data-ng-class="item.properties.icon"></i>
 </button>
</div>
```

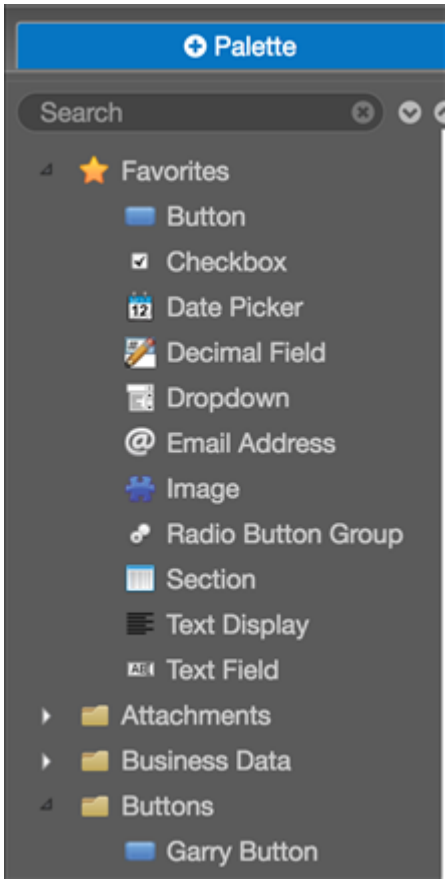
7. Create Widget Style (CSS) - Make sure button.css is as below:

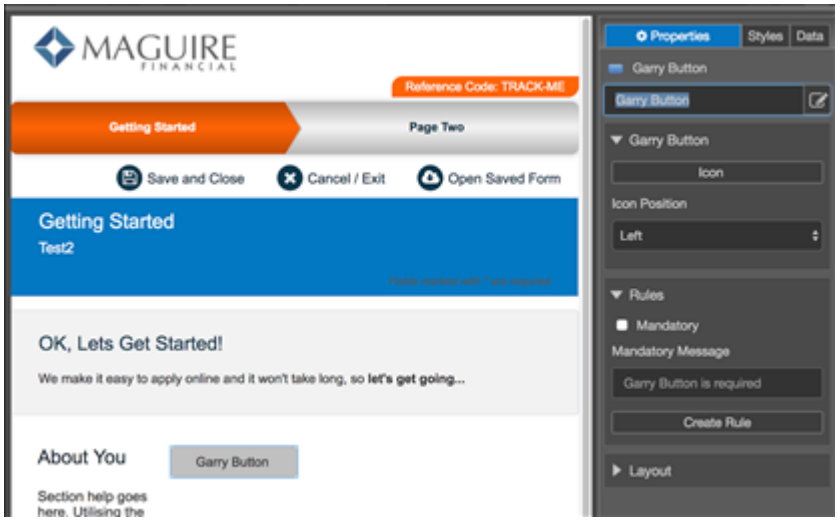
```
.wdg-button {
  width: 100%;
}
.wdg-button .wdg-button-label {
  padding-right: 4px;
}
.wdg-button .wdg-button-icon {
  display: inline-block;
  width: 28px;
  height: 28px;
  line-height: 28px;
  text-align: center;
  font-size: 18px;
}
.wdg-button .wdg-button-icon + .wdg-button-label {
  display: inline-block;
  padding: 4px 4px 0 5px;
  vertical-align: top;
}
```

8. Build the library - Run the ANT Build, and you should see a `TestLibrary.zip` file created within the `zip` directory
9. Import the library to Maestro - Access Maestro and go to Libraries. Now use the Import button and choose the ZIP file and once it's imported you should see your component listed.



10. Drag onto your form - Access Maestro and drag the component onto your form.





Angular Dynamic Button

In this next example, we will be providing a native component which uses angular to provide some additional functionality and data binding in the form of a count.

Follow the above exercise to step 4, but use the following button.html

```
<button ng-click="count = count + 1" ng-init="count=item.properties.count" class="btn
wdg-button">
  {{item.label}}
</button>
<span>
  count: {{count}}
</span>
```

Modify the original widget.json and use the one below. Note that you are changing the category, label and also adding in a count parameter which is referenced by the button.html binding to item.properties.count above. Use the other files associated with the previous example.

```
{
 "category": "Buttons",
    "label": "Angular Button",
    "html": "button.html",
    "icon": "button.png",
 "css": "button.css",
    "propDefs": {
        "icon": {
            "label": "Icon",
            "type": "icon",
            "imageStyleTarget": "Button icon",
            "value": "",
            "helpText": "Select the button icon"
        },
        "iconPos": {
            "label": "Icon Position",
            "type": "option",
            "value": "left",
            "options" : [{"label":"Left","value":"left"},{"label":"Right","-
value":"right"}],
            "helpText": "Select the button icon position"
        },

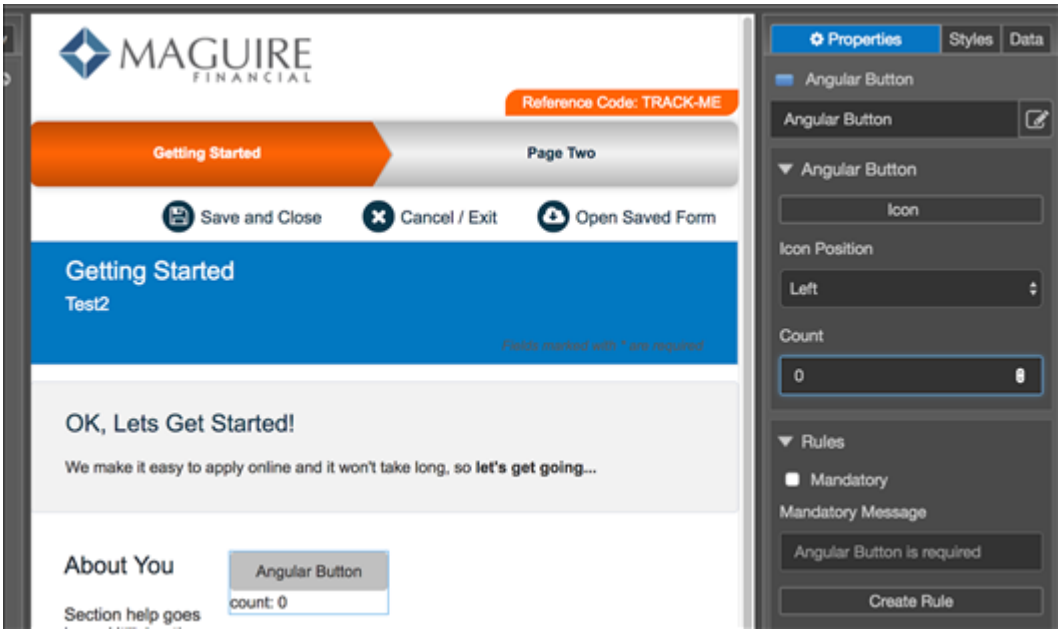


         "count":{
           "label": "Count",
             "type": "integer",
             "value": 0,
             "helpText":"Define the default value for the count"
         }

    },
    "defaultStyleTarget": "wdg-button",
    "span": {"xs": 12, "sm": 12, "md": 4, "lg": 4},
    "noData": true
}
```

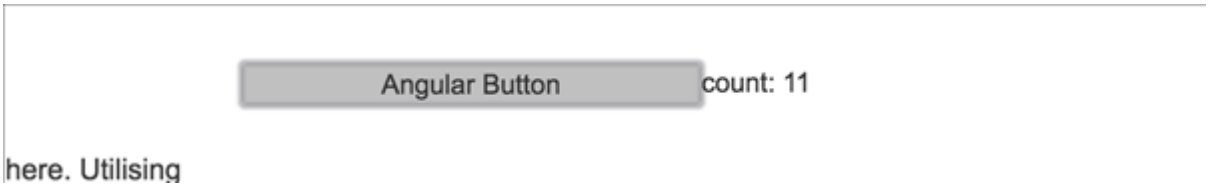
Now build the ZIP and import to Maestro.

From the buttons category drag across the Angular Button



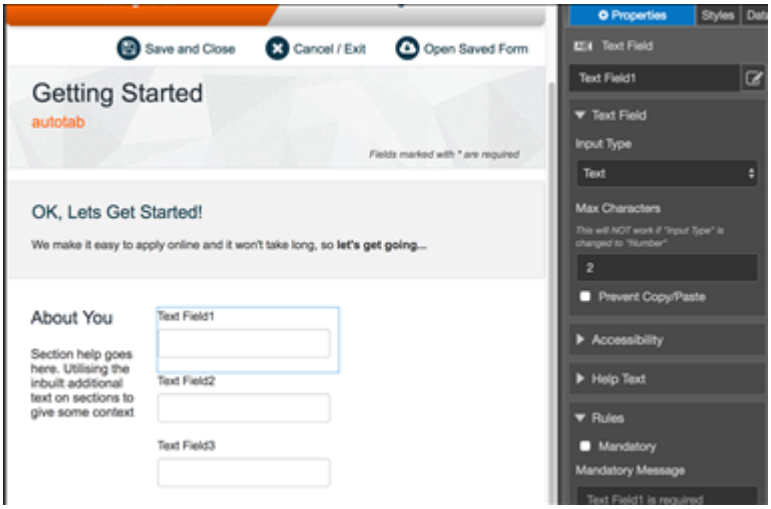
Now configure the count at 10 and preview the form:

Press the button and watch the dynamic count binding



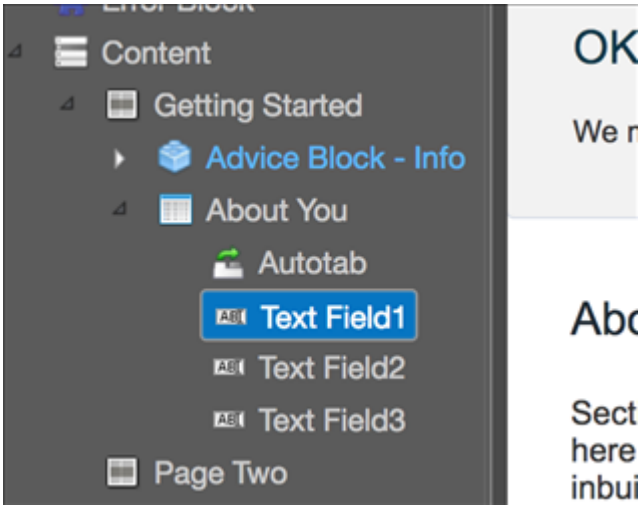
Auto-tabbing Component

The auto-tab component (autotab.zip) allows you to ensure that the cursor automatically moves between fields in Maestro once the maximum number of characters has been reached. In the example form below, this means that after 2 characters it will tab from text field 1 to 2, then 3 for you.

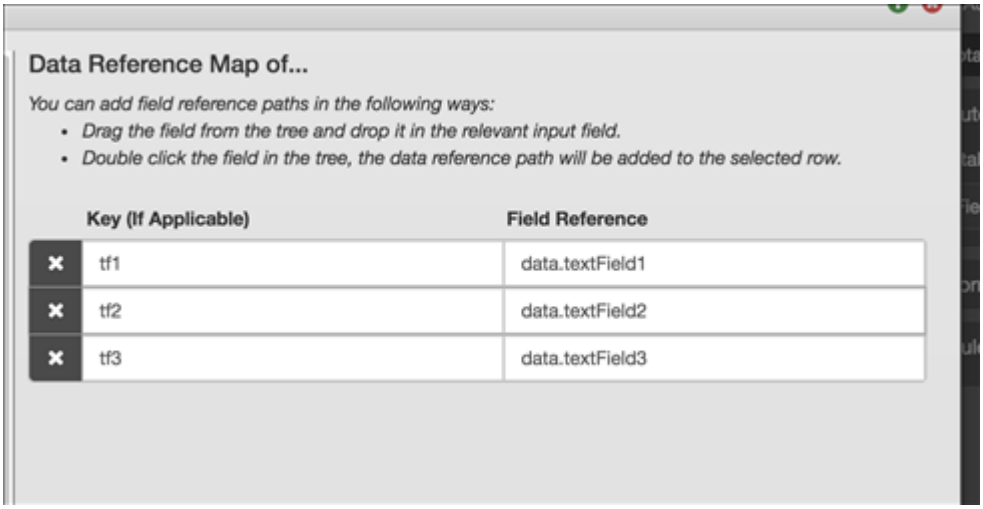


Once you have imported this component, set the max characters setting appropriately for each input field on the form.

Then drag in the autotab component



Now configure the auto tab component making sure that the autotab targets are set up with the fields in question, and that the data reference map has a field reference which correctly prefixes the data element (example below)



Pack Resources

Resource	Description
component.css	Default css file for component
component.html	Default html file for component
component.less	Additional header CSS
component.png	Default image for icon in Maestro for the component
widget.json	Configuration for the component
.library-config.xml	Default library configuration
MaestroComponents2.zip	Contains all files as above

You can download the MaestroComponents2.zip example here.

Next, learn how to create a native component library automatically.

List of Maestro Components

Maestro comes with the following components, which you can use in your application forms:

Icon	Name	Category	Library
	ABN (Australian Business Number)	Business Data	core
	ACN (Australian Company Number)	Business Data	core
	Address (Australia)	Business Data	core
	Address (Global)	Business Data	core
	Address (USA)	Business Data	core
	Address Lookup	Deprecated	core
	Advice Block - Info	User Information	maguire
	Advice Block - Promo	User Information	maguire
	Attachment Field	Attachments	maguire
	Autocomplete Field	Input Fields	core
	Autotab Block	Containers	core
	Autotab Controller	Tools	core
	Avalon Info Dialog	Avalon Components	avalon
	Block (Mandatory)	Containers	core
	Block	Containers	core
	Button Group	Buttons	core
	Button	Buttons	core
	Cancel / Exit	Navigation Functions	navigation
	Cancel Confirm	Dialogs	maguire
	Cancel Success	Modal Pages	maguire
	Card Content Template	Cards	cards
	Card Content	Cards	cards
	Card Selector	Cards	cards
	Checkbox	Input Fields	core
	Chevron Navigator (Embedded)	Deprecated	navigation
	Click To Call	Buttons	core

	Configurable Text Input	Input Fields	core
	Content	Deprecated	navigation
	Countdown Timer	Tools	core
	Countries	Business Data	core
	Currency Field	Input Fields	core
	Data Field	Tools	core
	Data-Driven Checkbox Group	Input Fields	core
	Data-Driven Dropdown	Input Fields	core
	Data-Driven Radio Group	Input Fields	core
	Date Picker	Input Fields	core
	Date Picker Drilldown	Input Fields	core
	Date of Birth Dropdown (Deprecated)	Deprecated	core
	Date of Birth Dropdown	Business Data	core
	Decimal Field	Input Fields	core
	Delete Item	Deprecated	core
	Dialog Content	hidden	core
	Dialog Navigation Bar	Dialogs	maguire
	Dialog	Containers	core
	Dialog (Avalon)	Dialogs	avalon
	Domain Object	Domain Model	domain
	Dropdown (Years)	Business Data	core
	Dropdown Bundle Navigation	Collaboration	core
	Dropdown Multi Select	Input Fields	core
	Dropdown	Input Fields	core
	Dynamic Data Button	Buttons	core
	Email Address	Business Data	core
	Email PDF Receipt Button	Post Submission	maguire
	Email Saved Form Button	Post Submission	maguire
	Error Block	Navigation	navigation
	Fieldset	Containers	core
	Follow On Options Block	Post Submission	maguire

	Footer	hidden	navigation
	Form Background Image	Display Fields	core
	Form Bundle Dialog	Collaboration	bundles
	Form Bundle Job Tasks	Collaboration	maguire
	Form Footer	Display Fields	core
	Form Footer (Avalon)	Display Fields	avalon
	Form Header	Display Fields	core
	Form Help	Dialogs	maguire
	Form Resume Button	Post Submission	maguire
	Form	Transaction	core
	Function Bar	Navigation	navigation
	Gender	Business Data	core
	Google Address Lookup	Business Data	core
	Graphical Radio Button Group	Input Fields	core
	Graphical Radio Button	Input Fields	core
	Header	hidden	navigation
	Horizontal Divide	Layout	core
	Icon Button	Buttons	core
	Image	Display Fields	core
	Initialize Event Hook	Tools	core
	JavaScript Library	Tools	core
	Job Details Block	Collaboration	core
	Job Number	Collaboration	core
	Jump to Issue	Buttons	core
	Landing Page Image	Avalon Components	avalon
	Launch Child Form	hidden	core
	Link	Display Fields	core
	LinkedIn Auto-Fill	Identity	identity
	Mastersoft Address Lookup	Business Data	core
	Missing Field	hidden	core
	Mitek License Auto-Fill	Deprecated	identity

	Mobile Number (AU)	Business Data	core
	Mobile Number (US)	Business Data	core
	Modal Mobile Header	Navigation	navigation
	Modal Page	Containers	core
	Modal Page Logo	Avalon Components	avalon
	Multiline Text Area	Input Fields	core
	Navigation Wizard Bar	Navigation	navigation
	Navigator Step Count	Navigation	navigation
	Navigator Wizard Bar	Navigation	navigation
	Navigator	Navigation	navigation
	Navigator (Avalon)	Navigation	avalon
	Open Bundle Dialog Button	Collaboration	bundles
	Open Dialog	Dialogs	core
	Open Saved Form	Navigation Func-tions	navigation
	PDF Display	Display Fields	pdf
	Page Controller	Navigation	navigation
	Page Controller (Avalon)	Navigation	avalon
	Page Group	Navigation	navigation
	Page	Navigation	navigation
	Page (Avalon)	Navigation	avalon
	Payment Type Selector	Transaction	core
	Percentage Field	Input Fields	core
	Percentage Indicator	Display Fields	core
	Phone Number (AU)	Business Data	core
	Phone Number (US)	Business Data	core
	Popover Text Display	User Information	maguire
	Popover Widget Container	User Information	maguire
	Preview Test Block	Collaboration	core
	Progress Bar	Avalon Components	avalon
	Radio Button Group	Input Fields	core
	Radio Button [Repeating]	Input Fields	core

	Receipt Download Button	Post Submission	maguire
	Repeat Add Button	Repeats	core
	Repeat Delete Button	Repeats	core
	Repeat Index Text	Repeats	core
	Repeat	Repeats	core
	Repeating Block Template (Deprecated)	Deprecated	maguire
	Repeating Block Template	Repeats	core
	Route Select	Collaboration	core
	Save Challenge	Dialogs	maguire
	Save Confirm	Dialogs	maguire
	Save Success	Modal Pages	maguire
	Save and Close	Navigation Functions	navigation
	Second Level Navigator	Navigation	navigation
	Section Level 1	hidden	core
	Section	Containers	core
	Section (Avalon)	Containers	avalon
	Select Language	User Information	core
	Session Timeout Controller	Avalon Components	avalon
	Share Form Button	Post Submission	maguire
	Show XML	Dialogs	maguire
	Signature Pad	Business Data	core
	Slider	Input Fields	core
	Small Dialog	Dialogs	avalon
	State (AU)	Business Data	core
	State (Codes) (US)	Business Data	core
	State (US)	Business Data	core
	Step Name	Collaboration	core
	Sticky Panel	Containers	core
	Submit Success	Modal Pages	maguire
	Submit	Transaction	core

	TFN (Tax File Number) (AU)	Business Data	core
	Text Display	Display Fields	core
	Text Field	Input Fields	core
	Tile List	Collections	collections
	Time	Input Fields	core
	Title	Business Data	core
	Toggle Icon Button	Buttons	core
	Tramline Navigator (Embedded)	Deprecated	navigation
	Tramline Navigator	Navigation	navigation
	Video Capture	Business Data	core
	Web Font	Tools	core
	Yes/No Radio Buttons	Business Data	core
	iFrame	User Information	core

NOTE

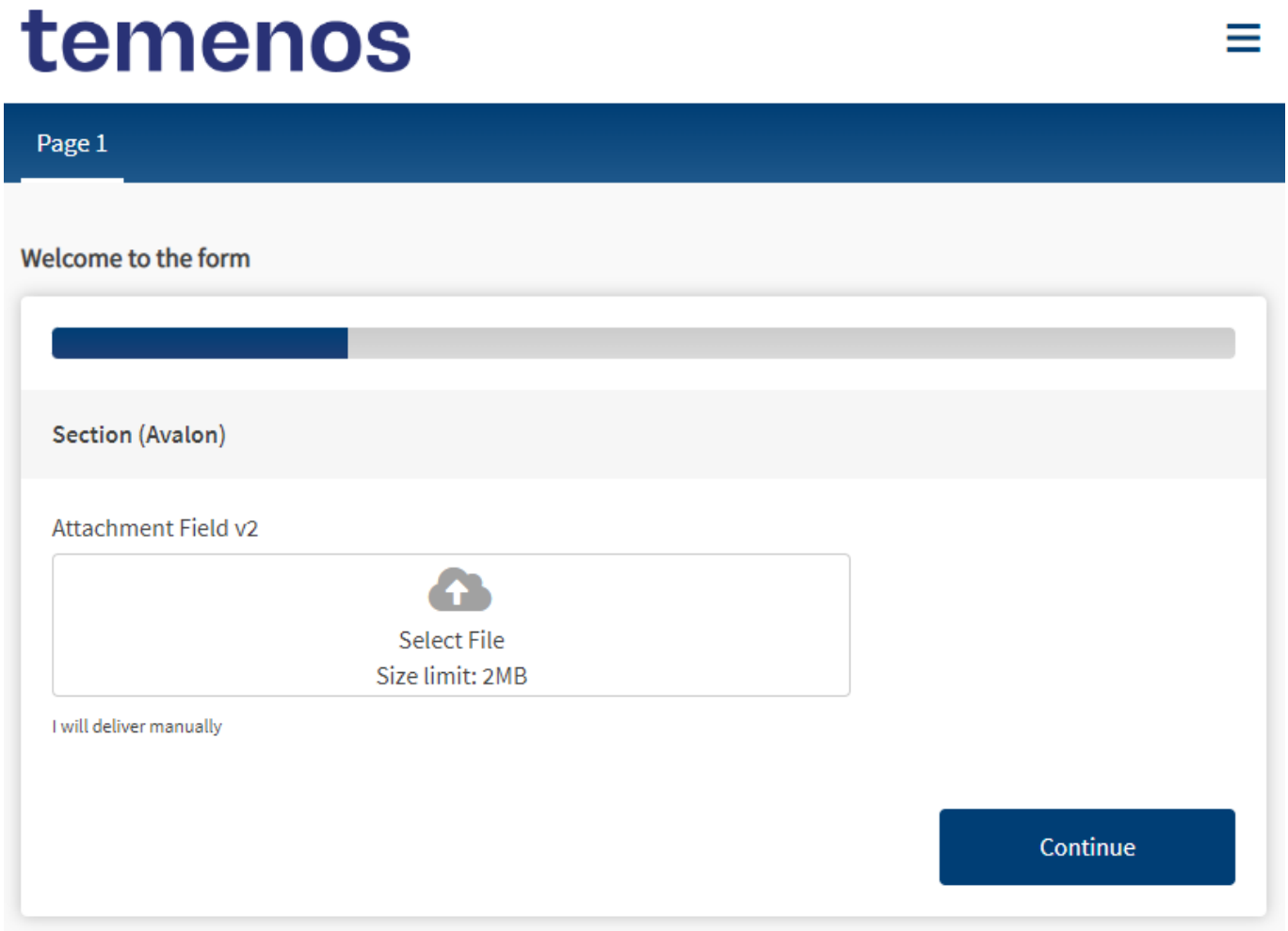
The `avalon` library contains the Avalon template including all related components and resources.

Next, learn about the Attachment Field component.

Attachment Field v2

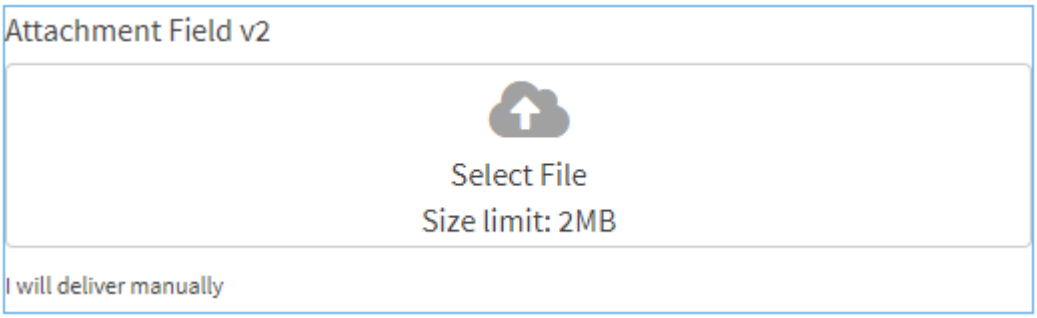
Maestro comes with the Attachment Field v2 component (widget) that allows a form user to upload multiple attachments, such as files and images, which are a part of an onboarding journey and are submitted along with a form. The Attachment Field v2 component extends functionality of the Attachment Field component.

A form with a rendered Attachment Field v2 widget is shown below:



Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Attachment Field v2** component within the **Attachments** folder.



3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane. For more information, see the Properties section below.
5. Configure the component's styles via the **Styles** pane. For more information, see the Styles section below.

Properties

The Attachment Field v2 component inherits all properties of the Attachment Field component, with the following additional properties:

Use Specified Attachment Filename
Leave blank for the original attached file name.

Drop Zone Drag Text
Button text for drag.

Drop Zone Icon Location
Select a location of the drop zone icon from the following options:

- Top
- Side

Fallback Error Message
fallbackErrorMessage

Fallback error message for translation

Additional Labels

Delete Attachment Confirmation Message
confirmDeleteAttachmentMessage

Confirm delete message for translation

Delete Attachment Button Tooltip
deleteAttachmentTooltip

Delete attachment button tooltip message for translation

Wait Message
waitMessage

Wait message for translation

Cancel Upload Button Label
cancelUploadButtonLabel

Label for cancel upload button for translation

Manual Attachment Button Label
manualAttachmentButtonLabel

Label for manual attachment button for translation

Upload Button Tooltip
uploadButtonTooltip

Tooltip for upload button for translation

Styles

The Attachment Field v2 component inherits all styles of the Attachment Field component, with the following additional styles:

~~Full Width Attachment Button~~
Adjust the width of the attachment button

```
form[name='form'] {
        .attachment-2-full-width-button {
                .wdg-drop-zone-container {
                        width: 100%
                }
        }
}
```

~~Attachment Dropzone Hover~~
Adjust dropzone hover

```
@import (reference) "../core-brand-vars/core-brand-vars";

form[name='form'] {
       .attachment-2-dropzone-hover {
          .wdg-drop-zone-container {
          &:hover > .wdg-choose-file-button {
            //background-color: @av-secondary-contrast;
            background-color: @ux-primary-color;
            color: white;
          }
              &:hover .wdg-drop-zone-icon {
              color: white;
          }
        }
       }
}
```

Next, learn about the Countries component.

Attachment Field

Maestro comes with the Attachment Field component (widget) that allows a form user to upload multiple attachments, such as files and images, which are a part of an onboarding process and are submitted along with a form.

NOTE

Since Maestro 19.05, all standard versions of the Attachment Field widget support a form space portal using CSRF[1] tokens.

NOTE

Starting in Maestro 20.11, the Attachment Field component is the part of the core library. Prior to this, it was part of the Maguire release library.

Usage

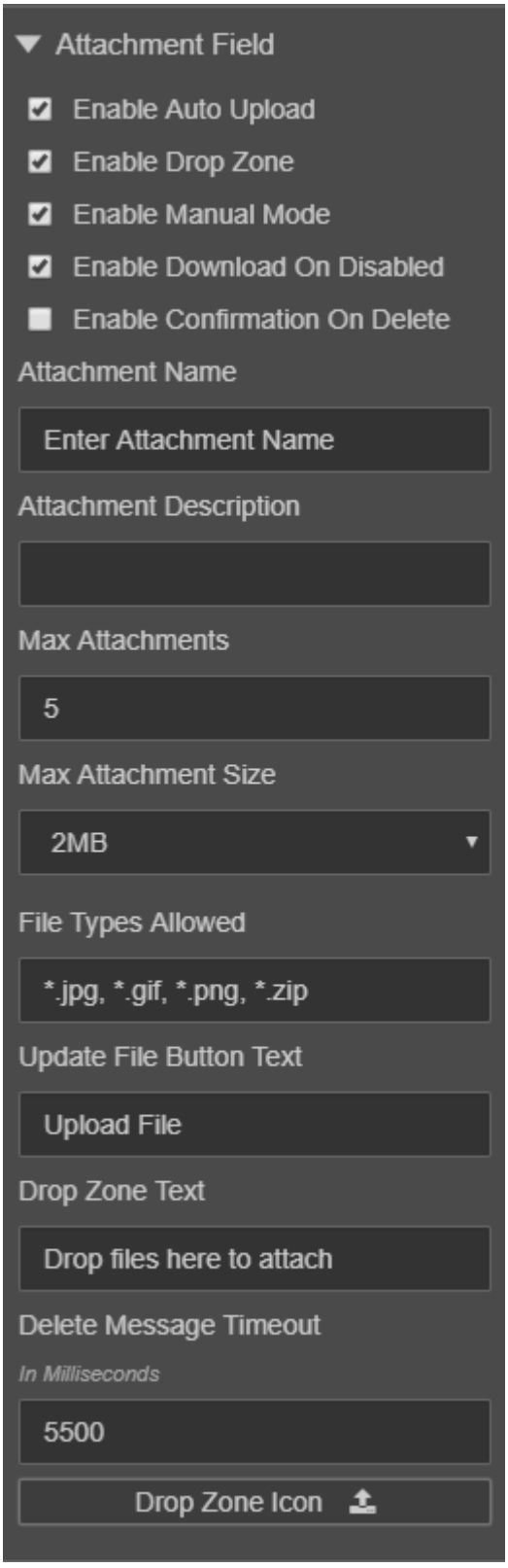
1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Attachment Field** component within the **Attachments** folder.



3. Drag the component into the **View** pane or the **Wireframe**.

[1]Cross-site request forgery (CSRF), also known as one-click attack or session riding, is a type of malicious exploit of a website where unauthorized commands are transmitted from a user that the web application trusts.

4. Configure the component's properties via the **Properties** pane.



Properties

The following properties are available to the Attachment Field component:

Enable Auto Upload
Boolean enableAutoUpload

Enable the ability to auto upload attachments. It automatically uploads the attachment once the user drags it into the drop zone or uses the upload button. This option may not work when previewing the form, it only works once the TM form version is built.

Enable Drop Zone
Boolean showDropZone

Enable the ability to show attachment drop zone area, so the user can use the drop zone to drag and drop attachment files there.

Enable Manual Mode
Boolean enableManual

Enable manual attachment feature, which displays the I will deliver manually text on the field. The user can select this option to indicate that they will be sending the attachments via a different method, such as by email or post.

Enable Download On Disabled
Boolean allowDownloadDisabled

Enable download on disable, so users can download attachments from a disabled attachment field.

Enable Confirmation On Delete
Boolean allowConfirmDelete

Enable confirmation on delete, so users will be prompted before an attachment is deleted.

Attachment Name
attachmentName

Enter the attachment name, which allows you to distinguish multiple attachment fields per form.

Attachment Description
attachmentDescription

Enter the attachment description, which allows you to distinguish multiple attachment fields per form.

Max Attachments
Integer queueLimit

Select the maximum number of attachments that a user can upload to a form which will be included in a form submission. Once the maximum number is met, the options to include additional attachments (drop zone and upload button) will disappear.

Max Attachment Size
Option maxSize

Select the maximum size of each attachment. If you want to set the maximum total size for all attachments that will need to be configured in Journey Manager.

The following options are available from the **Max Attachment Size** dropdown:

Label	Value
0.5MB	524288
1MB	1048576
2MB	2097152
3MB	3145728
4MB	4194304
5MB	5242880
6MB	6291456
7MB	7340032
8MB	8388608
9MB	9437184
10MB	10485760
15MB	15728640

Label	Value
20MB	20971520
25MB	26214400

File Types Allowed
fileTypes

Enter the file types allowed in the format provided. You can add more types by following the format displayed. For example, if you wanted to add PDF to the allowed types you would type *.pdf.

Update File Button Text
chooseFileButton

Enter text for the button used to upload files for attachment.

Drop Zone Text
dropZoneText

Enter the text for the drop zone used to upload files as attachments.

Delete Message Timeout
Integer deleteMessageTimeout

Delete Message Timeout

Drop Zone Icon
Icon dropZoneIcon

Select the button icon to display in the drop zone. Check with the Template Designer if you can change this icon, as icons are typically customized in the templates.

Error Messages

Invalid File
invalidFile

Error to display if the file is invalid

Invalid Size
invalidSize

Error to display if the file size is 0KB

Exceeds Maximum Size Limit
exceedsSizeLimit

Error to display if the file size exceeds the maximum limit

Exceeds Maximum Total Size Limit
exceedsTotalSizeLimit

Error to display if the total attachment size for this attachment name exceeds the maximum limit

Virus Warning
virusFoundOnUpload

Error to display if the attachment contains a virus when it is uploaded

Max Attachment Count Error
tooManyUploads

Error to display if there are too many attachments uploaded

Help Text

Popover Help Text
Help Text helpText

Success Messages

Successfully Uploaded
uploadSuccessful

Message to display if the file is successfully uploaded.

Successfully Removed
removeSuccessful

Message to display if the file is successfully removed

Thumbnail Options

Enable Image Preview
Boolean enableCanvas

Enable canvas image preview of any images uploaded in the attachment field in the form.

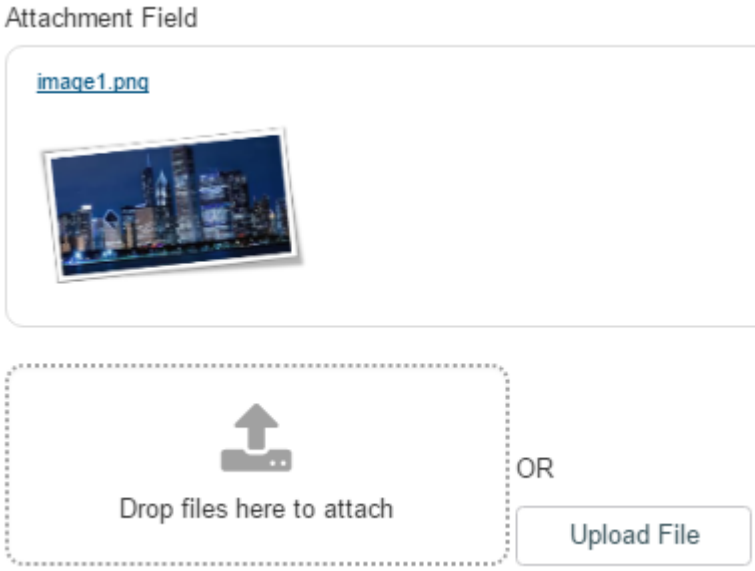


Image Preview Height (pixels)
Integer canvasHeight

Height for image to resize to in the preview mode.

Image Preview Width (pixels)
Integer canvasWidth

Width for image to resize to in the preview mode.

Transact Field | 20.11 This feature was removed in 20.11

Image Source
Option imageSource

Select the image source

The following options are available from the **Image Source** dropdown:

Label	Value
Camera	camera
Library	library

Maximum Dimension (pixels)
Integer maxDimension

Original attachment to be resized to this dimension.

Multi Select Attachments
Boolean multiSelect

Ability to multi select attachments

NOTE

You can also use the Attachment Field v2 widget that has additional functionality. | 22.10 This feature was introduced in 22.10..

Next, learn about the Countries component.

Landing Page Image

Maestro comes with the Landing Page Image component that allows you to ? according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template. The Landing Page Image component extends functionality of the ? component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Landing Page Image** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page



Next, learn about the Save and Close component.

Modal Page Logo

Maestro comes with the Landing Page Modal Page Logocomponent that allows you to ? according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template. The Modal Page Logo component extends functionality of the ? component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Modal Page Logo** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page



Next, learn about the Save and Close component.

Avalon Info Dialog

Maestro comes with the Avalon Info Dialog component that allows you to ? according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template. The Avalon Info Dialog component extends functionality of the ? component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Avalon Info Dialog** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page



Next, learn about the Save and Close component.

Progress Bar

Maestro comes with the Progress Bar component that allows you to ? according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template. The Progress Bar component extends functionality of the ? component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Progress Bar** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page



Next, learn about the Save and Close component.

Session Timeout Controller

Maestro comes with the Session Timeout Controller component that allows you to ? according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Session Timeout Controller** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page



Next, learn about the Save and Close component.

Countries

Maestro comes with the Countries component.

NOTE

This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Countries** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Countries component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Gender component.

Gender

Maestro comes with the Gender component.

NOTE

This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Gender** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Gender component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the State (Codes) (US) component.

State (Codes) (US)

Maestro comes with the State (Codes) (US) component.

NOTE

This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **State (Codes) (US)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the State (Codes) (US) component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the State (US) component.

State (US)

Maestro comes with the State (US) component.

NOTE

This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **State (US)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the State (US) component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the State (AU) component.

State (AU)

Maestro comes with the State (AU) component.

NOTE

This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **State (AU)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the State (AU) component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Title component.

Title

Maestro comes with the Title component.

> NOTE
>
> This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Title** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Title component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Yes/No Radio Buttons component.

Yes/No Radio Buttons

Maestro comes with the Yes/No Radio Buttons component.

NOTE

This component inherits properties and shared styles from the Radio Button Group component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Yes/No Radio Buttons** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Yes/No Radio Buttons component:

Options
List options

List of options

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Appearance

Arrangement
Option arrangement

Defines the layout arrangement of the radio options on the page.

The following options are available from the **Arrangement** dropdown:

Label	Value
Vertical (1 per line)	vertical
Horizontal (natural width)	horizontal
2 Column Grid	6
3 Column Grid	4
4 Column Grid	3
6 Column Grid	2

Min Width (px)
Integer minWidth

Radio Button Minimum Width in Pixels.

Stack Threshold
Option stackThreshold

Select which responsive threshold the radio options will stack on top of each other, or 'None' where stacking is not desired.

The following options are available from the **Stack Threshold** dropdown:

Label	Value
Small	sm
Medium	md
Large	lg
None	none

Selected Icon Class
Icon selectedIconClass

Selected icon class name

Unselected Icon Class Icon unselectedIconClass
Unselected icon class name

Help Text

Popover Help Text Help Text helpText

Next, learn about the Email Address component.

Email Address

Maestro comes with the Email Address component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Email Address** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Email Address component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Mobile Number (AU) component.

Mobile Number (AU)

Maestro comes with the Mobile Number (AU) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Mobile Number (AU)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Mobile Number (AU) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Mobile Number (US) component.

Mobile Number (US)

Maestro comes with the Mobile Number (US) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Mobile Number (US)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Mobile Number (US) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Phone Number (AU) component.

Phone Number (AU)

Maestro comes with the Phone Number (AU) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Phone Number (AU)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Phone Number (AU) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Phone Number (US) component.

Phone Number (US)

Maestro comes with the Phone Number (US) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Phone Number (US)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Phone Number (US) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Address (Global) component.

Address (Global)

Maestro comes with the Address (Global) component.

NOTE

This component inherits properties and shared styles from the Fieldset component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Address (Global)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Address (Global) component:

Help Text

Popover Help Text Help Text helpText

Next, learn about the Address (USA) component.

Address (USA)

Maestro comes with the Address (USA) component.

NOTE

This component inherits properties and shared styles from the Fieldset component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Address (USA)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Address (USA) component:

Help Text

Popover Help Text Help Text helpText

Next, learn about the Address (Australia) component.

Address (Australia)

Maestro comes with the Address (Australia) component.

NOTE

This component inherits properties and shared styles from the Fieldset component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Address (Australia)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Address (Australia) component:

Help Text

Popover Help Text Help Text helpText

Next, learn about the ABN (Australian Business Number) component.

Address Lookup

Maestro comes with the Address Lookup component.

Usage

1. Open the Palette pane in the Maestro Editor.
2. Locate the **Address Lookup** component within the Deprecated folder.

   NOTE

   This component belongs to the Deprecated category so it is not shown on the Palette to prevent users from adding it to new forms. However, the component is still part of the product for backwards compatibility so it will work in forms that contain it.

3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Address Lookup component:

Hide Map Boolean hideMap
Hide the canvas map
Country Code Filter Text country
Two letter country code to filter results
Enter Manually Text Text enterManualText

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Address Global component.

ABN (Australian Business Number)

Maestro comes with the ABN (Australian Business Number) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **ABN (Australian Business Number)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the ABN (Australian Business Number) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the ACN (Australian Company Number) component.

ACN (Australian Company Number)

Maestro comes with the ACN (Australian Company Number) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **ACN (Australian Company Number)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the ACN (Australian Company Number) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Google Address Lookup component.

Google Address Lookup

Maestro comes with the Google Address Lookup component.

NOTE

This component inherits properties and shared styles from the Fieldset component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Google Address Lookup** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Google Address Lookup component:

Always Mandatory
Boolean addressMandatory

Google Configuration

Country Code Filter
Text countryCodeFilter

Enter the country code to filter the search results

Language Code
Text language

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Mastersoft Address Lookup component.

Mastersoft Address Lookup

Maestro comes with the Mastersoft Address Lookup component.

NOTE

This component inherits properties and shared styles from the Fieldset component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Mastersoft Address Lookup** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Mastersoft Address Lookup component:

Always Mandatory
Boolean addressMandatory

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Dropdown (Years) component.

Dropdown (Years)

Maestro comes with the Dropdown (Years) component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dropdown (Years)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dropdown (Years) component:

Starting Year Integer minYear
Please enter the Starting Year

Use Descending Order Boolean useDescending
Select to use descending order

Icon Icon icon
Select the dropdown icon

Add Blank Value Boolean addBlankValue
Check to add a blank value to the dropdown

Accessibility

Placeholder Text Text placeholder

Next, learn about the Date of Birth Dropdown component.

Date of Birth Dropdown

Maestro comes with the Date of Birth Dropdown component (widget).

NOTE

This component inherits properties and shared styles from the Block (Mandatory) component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Date of Birth Dropdown** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Date of Birth Dropdown component:

Help Text

Popover Help Text
Help Text helpText

Options

Mandatory Setting
Option mandatoryOption

Select how many fields are mandatory.

The following options are available from the **Mandatory Setting** dropdown:

Label	Value
At Least One Mandatory	one
All Mandatory	all

Hide Mandatory On Labels
Boolean showChildrenIndicators

Enable mandatory asterisk on child element labels.

Validation

Min Age
Integer minAge

Enter the minimum age allowed.

Max Age
Integer maxAge

Enter the maximum age allowed.

Must be a past date
Boolean pastDate

Check to validate that date is in the past.

Next, learn about the Video Capture component.

Video Capture

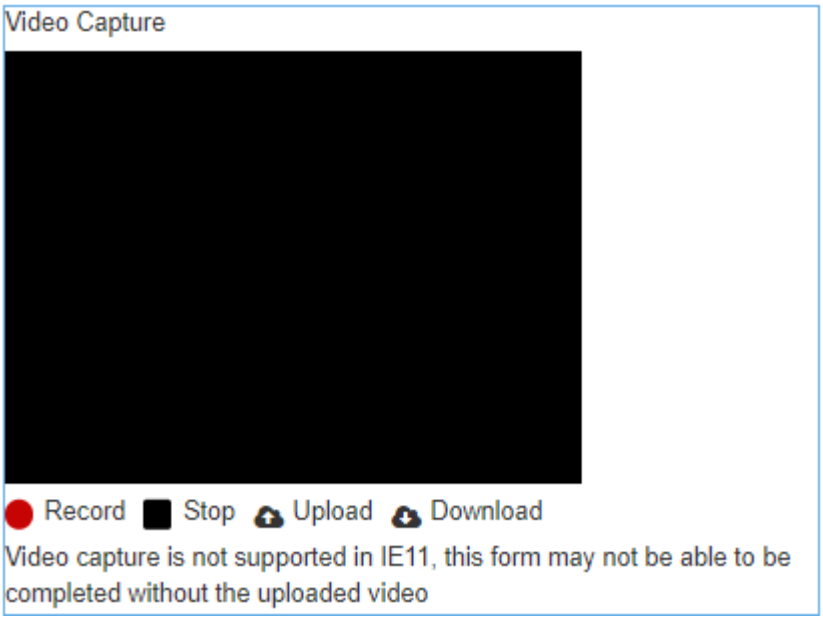
Maestro comes with the Video Capture component that can capture video and audio, which allows you to verify the user's identity via a gesture. You can also add the rules that fire when a video is uploaded to Manager or whether a webcam is not available after clicking record.

NOTE

The Video Capture component is not supported in E11 browser. For more information, see Temenos Journey Manager forms system requirements.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Video Capture** component within the **Business Data** folder.



3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Video Capture component:

Record Audio
Boolean audio

Select to record audio.

Record Video
Boolean video

Select to record video.

Video Width (px)
Integer videoWidth

Customize the video size.

Video Height (px)
Integer videoHeight

Customize the video size.

Record Delay (seconds)
Integer recordDelay

Specify delay recording in seconds.

Max Record Length (seconds)
Integer maxLength

Set a max length of recording in seconds.

Record Button Text
recordBtnText

Enter the record button text

Stop Button Text
stopBtnText

Enter the stop button text

Upload Button Text
uploadBtnText

Enter the upload button text

Download Button Text
downloadBtnText

Enter the download button text

Attachment Metadata

Attachment Name
attachmentName

Enter the attachment name

Attachment Description
attachmentDescription

Enter the attachment description

Configuration

Enable Progress Message
Boolean enableProgress

Check to enable loading message popup

Progress Message
Text progressMsg

Text to display in loading message

Next, learn about the TFN (Tax File Number) (AU) component.

TFN (Tax File Number) (AU)

Maestro comes with the TFN (Tax File Number) (AU) component.

NOTE

This component inherits properties and shared styles from the Text Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **TFN (Tax File Number) (AU)** component within the **Business Data** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the TFN (Tax File Number) (AU) component:

Input Type
Option inputType

Select the input type

The following options are available from the **Input Type** dropdown:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Signature Pad component.

Signature Pad

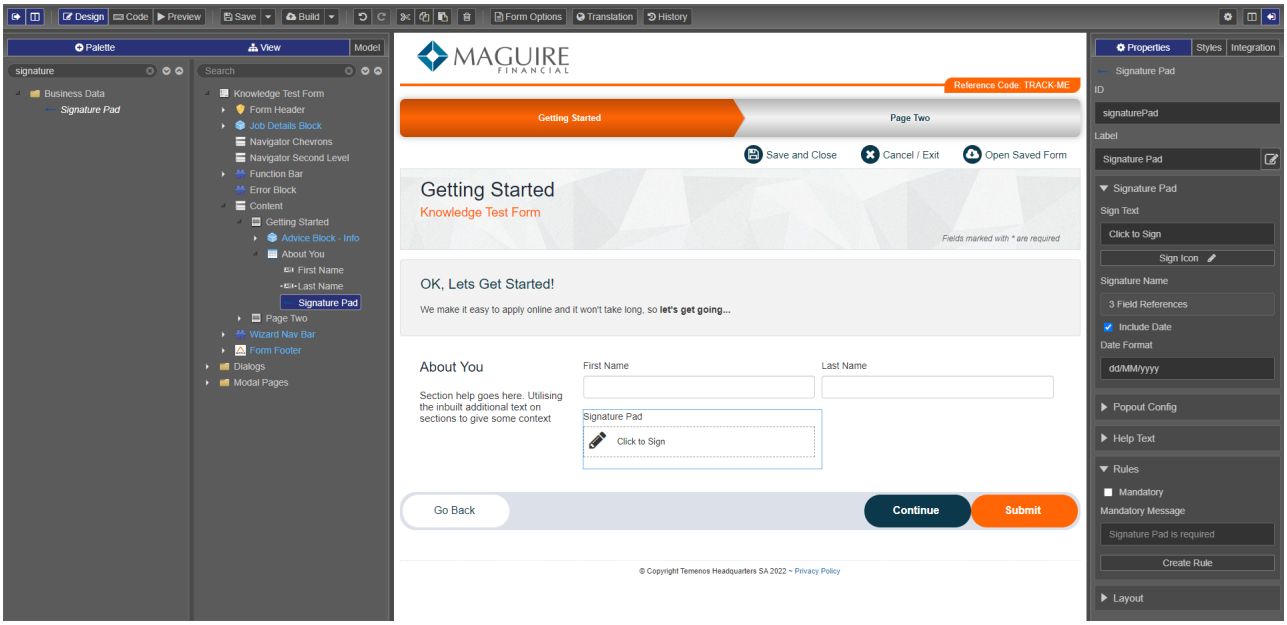
Maestro comes with the Signature Pad component enabling a form user to sign an application form digitally. This component allows the user to create a signature by drawing it on the pad, saving it, clearing the pad to redraw the signature, or canceling it. The image below shows how the Signature Pad component appears on a rendered form.



Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Signature Pad** component within the **Business Data** folder.

3. Drag the component into the **View** pane or the **Wireframe**.



4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Signature Pad component:

Sign Text
Text signText

The text used for empty signature box

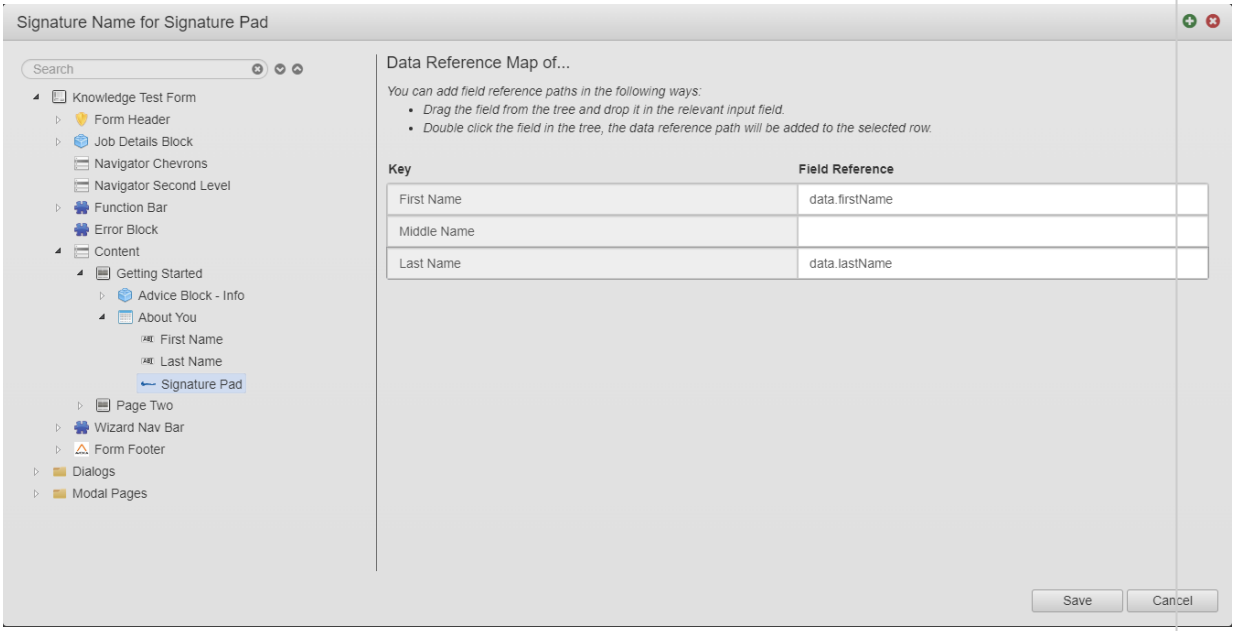
Sign Icon
Icon signIcon

The icon used for empty signature box

Signature Name
Field Ref Map signatureNameRef

Map form's field references for first, middle and last names that is displayed in the rendered Signature Pad component.

1. Click 3 Field References to map up-to 3 field references in the Signature Name for Signature Pad window.



2. Drag and drop a field from the Navigation bar to the Field Reference column against a Key you want to map. Repeat it for other references if needed.
3. Click Save to update the mapping.
4. Preview the form and Click to Sign to test the Signature Pad.



You can now see the first and last names appear at the bottom left corner of the component.

Include Date

Boolean includeDate

Select the Include Date checkbox to show the date when the user signs the form at the bottom left corner of the component, as shown above.

NOTE

Every time the user updates a signature, the signature timestamp (`data.signaturePad.signatureDate`) is updated. You can reference this value in other JavaScript code by right-clicking the Signature Pad component in Code View and selecting Signature Date.

Date Format
Date dateFormat

Enter the date format that is used to render the date and time when the form is signed, for example `dd/MM/yyyy HH:mm`. The default is `dd/MM/yyyy`.

Help Text

Popover Help Text
Help Text helpText

Popout Config

Dialog Title
Text dialogTitle

The title to display on the signature pad dialog

Cancel Button Label
Text cancelButtonLabel

The cancel button label

Cancel Button Icon
Icon cancelButtonIcon

The icon used for the cancel button.

Clear Button Label
Text clearButtonLabel

The clear button label

Clear Button Icon
Icon clearButtonIcon

The icon used for the clear button.

Save Button Label
Text saveButtonLabel

The save button label

Save Button Icon
Icon saveButtonIcon

The icon used for the save button.

Next, learn about the Button component.

Button

Maestro comes with the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Button** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Button component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label
Text ariaLabel

Enter the Aria Label for this button

Next, learn about Click To Call component.

Click To Call

Maestro comes with the Click To Call component.

NOTE

This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Click To Call** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Click To Call component:

Phone Number
Text phoneNumber

Enter the phone number

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left

Label	Value
Right	right

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this button

Next, learn about the Dynamic Data Button component.

Dynamic Data Button

Maestro comes with the Dynamic Data Button component, which is preconfigured to take the provided details and call the dynamic data service with the given inputs and populate the output into the specified outputs.

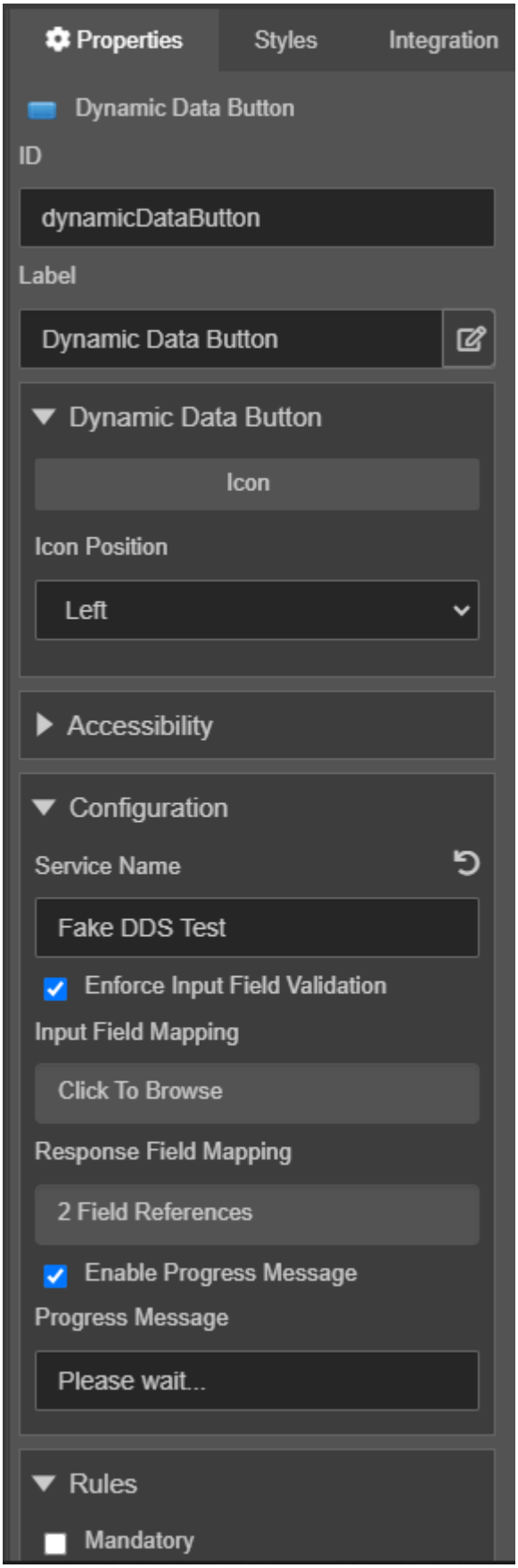
> NOTE
>
> This component inherits properties and shared styles from the Button component.

Usage

1. Open the Palette pane in the Maestro Editor.
2. Locate the Dynamic Data Button component within the Buttons folder.

3. Drag the component into the View pane or the Wireframe.

4. Configure the component's properties via the Properties pane.


Properties
Styles
Integration
Dynamic Data Button
ID
dynamicDataButton
Label
Dynamic Data Button
Dynamic Data Button
Icon
Icon Position
Left
Accessibility
Configuration
Service Name
Fake DDS Test
Enforce Input Field Validation
Input Field Mapping
Click To Browse
Response Field Mapping
2 Field References
Enable Progress Message
Progress Message
Please wait...
Rules
Mandatory

5. Expand the Rules section and click Create Rule to add a business rule to the button.

Properties

The following properties are available to the Dynamic Data Button component:

Dynamic Data Button

Icon

`Icon icon`

Select the button icon

Icon Position

`Option iconPos`

Select the button icon position from the Icon Position dropdown list, which can be one of the following:

Label	Value
Left	left
Right	right

Accessibility

Aria Label

`Text ariaLabel`

Enter the Aria Label for this button.

Configuration

Service Name

`Text serviceName`

The name of the dynamic data service to call.

Enforce Input Field Validation

`Boolean enforceFieldValidation`

Dynamic Data Button will check that input fields are valid before performing call.

Input Field Mapping

`Field Ref Map inputFieldRefs`

The fields to pass into the dynamic data call. Click the Click to Browse button to create or update the mappings in the Data Reference Mapping editor.

Response Field Mapping

`Field Ref Map responseFieldRefs`

The fields to populate with response data. Click the Click to Browse button to create or update the mappings in the Data Reference Mapping editor.

Enable Progress Message

`Boolean enableProgressMsg`

Check to enable a progress message pop-up advising a form user that data is loading.

Progress Message

`Text progressMsg`

Text to display as a progress message.

Next, learn about the Jump to Issue component.

Jump to Issue

Maestro comes with the Jump to Issue component.

NOTE

This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Jump to Issue** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Jump to Issue component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this button

Next, learn about the Icon Button component.

Icon Button

Maestro comes with the Icon Button component (widget).

NOTE

This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Icon Button** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Icon Button component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this button

Next, learn about the Button Group component.

Button Group

Maestro comes with the Button Group component.

> NOTE
>
> This component inherits properties and shared styles from the Radio Button Group component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Button Group** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Button Group component:

Options
List options

List of options

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Appearance

Arrangement
Option arrangement

Defines the layout arrangement of the radio options on the page.

The following options are available from the **Arrangement** dropdown:

Label	Value
Vertical (1 per line)	vertical
Horizontal (natural width)	horizontal
2 Column Grid	6
3 Column Grid	4
4 Column Grid	3
6 Column Grid	2

Min Width (px)
Integer minWidth

Radio Button Minimum Width in Pixels.

Stack Threshold
Option stackThreshold

Select which responsive threshold the radio options will stack on top of each other, or 'None' where stacking is not desired.

The following options are available from the **Stack Threshold** dropdown:

Label	Value
Small	sm
Medium	md
Large	lg
None	none

Selected Icon Class
Icon selectedIconClass

Selected icon class name

Unselected Icon Class Icon unselectedIconClass
Unselected icon class name

Help Text

Popover Help Text Help Text helpText

Next, learn about the Toggle Icon Button component.

Toggle Icon Button

Maestro comes with the Toggle Icon Button component.

NOTE

This component inherits properties and shared styles from the Icon Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Toggle Icon Button** component within the **Buttons** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Toggle Icon Button component:

Icon When On Icon icon
Select the button icon

Icon When Off Icon offIcon
Select the button icon

Next, learn about the Card Content component.

Card Content

Maestro comes with the Card Content component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Card Content** component within the **Cards** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Card Content component:

Selected Index Field Field Ref selectedIndexField
Assign a data field to store the index of the currently selected card

Minimum Cards Integer minItems
Minimum number of cards that should exist

Initial Cards Integer initialItems
Initial number of cards that should exist

Maximum Cards Integer maxItems
Maximum number of cards that should exist, or 0 for no maximum

Next, learn about the Card Content Template component.

Card Content Template

Maestro comes with the Card Content Template component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Card Content Template** component within the **Cards** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Card Selector component.

Card Selector

Maestro comes with the Card Selector component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Card Selector** component within the **Cards** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Card Selector component:

Card Content Field Ref contentRef
Reference to linked card content item
Label Field Text labelId
ID of field within card to use as selector label
Add Card Label Text addLabel
Used on Add button, which is hidden if blank
Delete Card Label Text deleteLabel
Used on Delete button, which is hidden if blank
Show Delete On Each Card Boolean showDeleteOnEach
Show a delete button on each card item

Next, learn about the Form Bundle Job Tasks component.

Form Bundle Job Tasks

Maestro comes with the Form Bundle Job Tasks component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Bundle Job Tasks** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Form Bundle Job Tasks component:

Show Job Description Boolean includeJobDescription
Enable the ability to show the job description if it is available.
Show Task Messages Boolean includeTaskMessages
Enable the ability to show the task messages.
Task Complete Image Image taskCompleteImage
Task Complete Image.
Task Not Done Image Image taskNotDoneImage
Task Not Done Image
Download Receipt Image Image taskDownloadReceiptImage
Download Receipt Image

Next, learn about the Dropdown Bundle Navigation component.

Dropdown Bundle Navigation

Maestro comes with the Dropdown Bundle Navigation component.

NOTE

This component inherits properties and shared styles from the Data-Driven Dropdown component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dropdown Bundle Navigation** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dropdown Bundle Navigation component:

Data Source Field Ref dataPath
Path to source data
Label Field Text labelField
Path from data to label
Value Field Text valueField
Path from data to value
Icon Icon icon
Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Job Details Block component.

Job Details Block

Maestro comes with the Job Details Block component.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Job Details Block** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Job Details Block component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Job Number component.

Job Number

Maestro comes with the Job Number component.

> NOTE
>
> This component inherits properties and shared styles from the Text Display component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Job Number** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Job Number component:

Accessibility

Enable Focus On Headings Boolean enableHeadingFocus
This will enable focus on heading elements (h1, h2) etc

Next, learn about the Step Name component.

Step Name

Maestro comes with the Step Name component.

> NOTE
>
> This component inherits properties and shared styles from the Text Display component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Step Name** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Step Name component:

Accessibility

Enable Focus On Headings Boolean enableHeadingFocus
This will enable focus on heading elements (h1, h2) etc

Next, learn about the Preview Test Block component.

Preview Test Block

Maestro comes with the Preview Test Block component.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Preview Test Block** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Preview Test Block component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Route Select component.

Route Select

Maestro comes with the Route Select component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Route Select** component within the **Collaboration** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Route Select component:

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Fieldset component.

Fieldset

Maestro comes with the Fieldset component, which is a container component, allowing you to group several fields together. This is especially useful when fields are not stand-alone and only make sense in the context of a group. For example, you should use the Fieldset component to group a credit card details, such as a name of a card holder, credit card number and expiry date, or multiple checkbox components, such as contact preferences.

Some components, for example, the Address, Date of Birth Dropdown, and Time, already have their fields grouped according to required functionality, so there is no need to place them into a Fieldset. If you do so, you only create some confusion about the hierarchy of the components. This also may prevent some assistive technologies[1], such as screen-readers, to correctly interpret the content of the form.

The Field is not just for aesthetic purposes, but also helps users with assistive technologies to navigate through the form.

NOTE

We recommend using this component to increase the accessibility of a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Fieldset** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.



4. Configure the component's properties via the **Properties** pane.

[1]Assistive Technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities while also including the process used in selecting, locating, and using them.

Properties

The following properties are available to the Fieldset component:

Help Text

Label
Label label

Provide a meaningful description of this container identifying a group of fields. The label text (legend text) can be used by assistive technologies to inform the user of the context for fields within the Fieldset.

Popover Help Text
Help Text helpText

Provide a popover help text

Hide Label

Select Hide Label to suppress the label text, and use this component for grouping only.

Label Placement Left

Select Label Placement Left to align the label to the left. The label is aligned above the fields by default, which is best for accessibility as it keeps the caption closest to its field. In particular, this makes it easier for users of magnifier software to locate the field associated with a label without having to move the cursor too far and reduces the chances of finding the wrong field by mistake.

For more information, see Maestro form accessibility.

Next, learn about the Block component.

Block

Maestro comes with the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Block** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Block component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Modal Page component.

Modal Page

Maestro comes with the Modal Page component, which represents a start or an end point where a form user must perform a task, an action, or make a decision, for example submit form data or cancel a form. A Modal Page can contain critical information or involve multiple tasks.

NOTE

This component inherits properties and shared styles from the Form component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Modal Page** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Modal Page component:

Page Icon Image favicon
The browser page / tab icon for this form
Popover Help Icon Icon popoverHelpIcon
The icon used for popover help
Auto-Send Confirmation Emails Boolean autoSendEmails
This property will auto-send an email on submit and save to the contact email address
Auto-Scroll Checkbox/Radio Button Selection Boolean checkboxRadioAutoScroll

This property will enable auto-scroll to checkboxes/radio buttons to the middle of screen on selection

Leave Page Warning
Boolean enableLeavePageWarning

This property will prompt a confirm dialog if the user tries to leave the page.

Leave Page Warning Message
Text leavePageWarningMessage

This property will replace the default message for the leave page warning.

Mandatory Message Suffix
Text mandatoryMsgSuffix

This text will be concatenated to the end of the label when a field is deemed mandatory.

Progress Message
Text progressMsg

This message will be used when Form.submit, Form.taskUrlNavigate and Form.postData methods are called.

Accessibility

Announcement Message
Text alertMsg

This message will be announced to screen readers when the modal has loaded. Otherwise the label will be used

Dynamic Page Title
Boolean dynamicPageTitle

If checked, the title will be updated with the current progress of the application.

New Window Link Warning Message
Text linkWarningMsg

This text will be concatenated to the end of link text and read out on focus to screen readers.

Enable Mobile Zooming
Boolean enableZoom

This will enable pinch-to-zoom on mobile devices. This is not normally needed with good responsive design, but some accessibility reviews require it.

Component

Component JavaScript
Js componentJs

This property will enable the upload of a JavaScript file, which will get added to the component on publish

Google Analytics

Google Tracking ID
Text gaTrackingId

Tracks page load and navigation views using Google Analytics. For more information, see how to add Google Tag Manager to a Maestro form.

Base URL
Text gaBaseUrl

(Optional) Identifies form within site context.

Transact Manager

Session Expiry Redirect Timeout (Seconds)
Integer sessionExpiryRedirectTimeout

Perform redirect after session expiry timeout

Auto Background Save Interval (Seconds)
Integer autoSaveInterval

Performs an auto background save using the interval (In Seconds) entered, if set to blank it will never auto-save

Next, learn about the Dialog component.

Dialog

Maestro comes with the Dialog component.

> NOTE
>
> This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dialog** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dialog component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Block (Mandatory) component.

Block (Mandatory)

Maestro comes with the Block (Mandatory) component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Block (Mandatory)** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Block (Mandatory) component:

Help Text

Popover Help Text
Help Text helpText

Options

Mandatory Setting
Option mandatoryOption

Select how many fields are mandatory.

The following options are available from the **Mandatory Setting** dropdown:

Label	Value
At Least One Mandatory	one
All Mandatory	all

Hide Mandatory On Labels
Boolean showChildrenIndicators

Enable mandatory asterisk on child element labels.

Next, learn about the Section component.

Section (Avalon)

Maestro comes with the Section (Avalon) component. This component is available when you use the Avalon Template. The Section (Avalon) component extends functionality of the Section component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Section (Avalon)** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Additional Text
Rich Text infoText

Additional Layout

Top To Bottom Layout
Boolean topToBottom

Hide Section Title
Boolean hideTitle

Collapsible
Boolean collapsibleSection

Collapsed On Init
Boolean collapsedOnInit

Collapsed Icon
Icon hideIcon

This icon is shown when the section is collapsed. You can choose an icon from the pre-defined collection of icons using the Icon Picker.

Not Collapsed Icon
Icon showIcon

Styles

The following styles are available to this component:

Next, learn about the Sticky Panel component.

Section

Maestro comes with the Section component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Section** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Section component:

Additional Text
Rich Text infoText

Additional Layout

Top To Bottom Layout
Boolean topToBottom

Hide Section Title
Boolean hideTitle

Collapsible
Boolean collapsibleSection

Collapsed On Init
Boolean collapsedOnInit

Collapsed Icon

Icon hideIcon

Not Collapsed Icon

Icon showIcon

Next, learn about the Sticky Panel component.

Sticky Panel

Maestro comes with the Sticky Panel component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Sticky Panel** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Sticky Panel component:

Offset (px) Integer offset
Offset in pixels.

Confine To Parent Height Boolean confine
Confine To Parent Height.

Float over Page Boolean floatOver
If Checked Panel will float over page.

Next, learn about the Autotab Block component.

Autotab Block

Maestro comes with the Autotab Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Autotab Block** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Autotab Block component:

Format

Format
Option format

Allowed characters

The following options are available from the **Format** dropdown:

Label	Value
All	all
Text	text
Alpha	alpha
Alphanumeric	alphanumeric
Number	number
Custom	custom

Pattern
Text pattern

Pattern regex - characters matching this regex will be disallowed. Refer to https://-github.com/Mathachew/jquery-autotab.

Next, learn about the Open Dialog component.

Dialog

Maestro comes with the Dialog component.

> NOTE
>
> This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dialog** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dialog component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Block (Mandatory) component.

Open Dialog

Maestro comes with the Open Dialog component.

NOTE

This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Open Dialog** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Open Dialog component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label
Text ariaLabel

Enter the Aria Label for this button

Configuration

Dialog To Open
Field Ref dialogRef

The name of the dialog or modal page

Next, learn about the Show XML component.

Dialog Navigation Bar

Maestro comes with the Dialog Navigation Bar component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dialog Navigation Bar** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dialog Navigation Bar component:

Dialog Nav Buttons
Option dialogNavButtons

Select the buttons to include in nav bar.

The following options are available from the **Dialog Nav Buttons** dropdown:

Label	Value
None	none
Okay	okay
Okay/Cancel	okay-cancel
Open Form	open
Save Form	save
Abandon Form	abandon

Block Or Field To Validate
Text validationRef

Block Or Field To Validate.

Next, learn about the component.

Show XML

Maestro comes with the Show XML component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Show XML** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Form Help component.

Small Dialog

Maestro comes with the Small Dialog component.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Small Dialog** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to this component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the Block (Mandatory) component.

Dialog (Avalon)

Maestro comes with the Dialog (Avalon) component. This component is available when you use the Avalon Template. The Dialog (Avalon) component extends functionality of the ? component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dialog (Avalon)** component within the **Containers** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to this component:

Additional Text
Rich Text infoText

Additional Layout

Top To Bottom Layout
Boolean topToBottom

Hide Section Title
Boolean hideTitle

Collapsible
Boolean collapsibleSection

Collapsed On Init
Boolean collapsedOnInit

Collapsed Icon
Icon hideIcon

Not Collapsed Icon
Icon showIcon

Styles

The following styles are available to this component:

Next, learn about the Sticky Panel component.

Form Help

Maestro comes with the Form Help component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Help** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Save Challenge component.

Save Challenge

Maestro comes with the Save Challenge component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Save Challenge** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Save Confirm component.

Save Confirm

Maestro comes with the Save Confirm component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Save Confirm** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Cancel Confirm component.

Cancel Confirm

Maestro comes with the Cancel Confirm component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Cancel Confirm** component within the **Dialogs** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Form Background Image component.

Form Background Image

Maestro comes with the Form Background Image component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Background Image** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Form Background Image component:

Select Image Image src
Select from the available images resources, or upload a new one

Next, learn about the Form Header component.

Form Header

Maestro comes with the Form Header component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Header** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Form Header component:

Show Help Boolean showHelp
Enable the ability to show form help area

Tracking Code

Show Tracking Code Boolean showTrackingCode
Enable the ability to show form tracking code

Tracking Code Prefix Text trackingCodePrefix
Tracking code prefix text

Next, learn about the Image component.

Image

Maestro comes with an Image component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Image** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Image component:

Select Image Image src
Select from the available images resources, or upload a new one

Alternative Text Text alternativeText
Type an alternative text for informative images, leave blank for decorative images.

Tooltip Text Text toolTip
This text will be added to the title attribute of the image.

Image Link URL Text imageLink
This url will be added as an anchor tag around the image. It will open a new tab.

Next, learn about Link component.

Link

Maestro comes with an Link component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Link** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Link component:

Link URL
Url linkUrl

Link Target
Text target

Next, learn about the Percentage Indicator component.

Percentage Indicator

Maestro comes with the Percentage Indicator component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Percentage Indicator** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Text Display component.

Text Display

Maestro comes with the Text Display component (widget), which allows you to display rich textual context, such as icons, HTML code, and JavaScript, to users. The component invokes the Rich Text editor where you can edit this textual content.

As opposed to the iFrame component, which accepts a static URL only, the Text Display allows you to configure a dynamic URL, which is assembled at runtime. This functionality let you to embed various documents, such as legal statements, disclosures and term and conditions (T&Cs), into a form and present them to form users as per a journey flow.

To embed a PDF file into a form:

1. Upload a resource on a Manager server in a resource of a form space the form is hosted and rendered from.
2. Generate a relative URL to the resource path to load iFrame at runtime in Maestro form.
3. Insert the following HTML code into the Label property of the Text Display component.

```
<iframe id="iframePdf" scrolling="auto" src="{{Form.data.SFMData.Sys-
temProfile.FormDataServiceURL.replace('servlet/FormDynamicDataServlet', 'resources/-
dummy-pdf-file.pdf')}}" style="width: 100%; height: 100%;"> </iframe>
```

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Text Display** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Text Display component:

Label Text label
This will display the component name as text.

In some cases, you can use this property to enhance or even change the component behavior by inserting an HTML code instead of a static text. For example, you may want to specify a dynamic relative URL pointing to a PDF file hosted on a Manager form space.

To insert an HTML code:

1. Click the label to edit its content in the Rich Text editor and select Source tab.
2. Insert the HTML tag and click Save.

You can also provide a JavaScript in the label that will be evaluated dynamically to populate the label's content. For example, `${{((+data.amount) / (+data.term * + data.frequency)).toFixed(2)}}`, which is calculated in the Preview mode and on the rendered form. However, in the Design mode, the Text Display displays any embedded data in its raw form, and doesn't attempt to evaluate any embedded calculations.

Accessibility

Enable Focus On Headings
Boolean enableHeadingFocus

This will enable focus on heading elements (h1, h2) etc

Next, learn about the Form Footer component.

Form Footer

Maestro comes with the Form Footer component.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Footer** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Form Footer component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Next, learn about the LinkedIn Auto-Fill component.

Form Footer (Avalon)

Maestro comes with the Form Footer (Avalon) component. This component is available when you use the Avalon Template. The Form Footer (Avalon) component extends functionality of the ? component.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Form Footer (Avalon)** component within the **Display Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to this component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

Styles

The following styles are available to this component:

Next, learn about the LinkedIn Auto-Fill component.

LinkedIn Auto-Fill

Maestro comes with the LinkedIn Auto-Fill component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **LinkedIn Auto-Fill** component within the **Identity** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the LinkedIn Auto-Fill component:

Api Config

Client ID
Text apiKey

Auto Authorize
Boolean authorize

Help Text

Popover Help Text
Help Text helpText

Options

Description
Rich Text description

Completed Message
Rich Text completedMessage

Opt Out on Init
Boolean optOutInitFlag

Opt Out Button Caption
Rich Text optOutButton

Opt Out Button Caption
Rich Text prefillButton

Opt In Button Caption
Rich Text optInButton

Opt In Image
Image optInImage

Select from the available images resources, or upload a new one

Prefill Mappings

Prefill Mappings
Field Ref Map prefillMappings

Next, learn about the Checkbox component.

Checkbox

Maestro comes with the Checkbox component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Checkbox** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Checkbox component:

Unselected Icon Icon unselectedIconClass
Icon for unselected checkbox

Selected Icon Icon selectedIconClass
Icon for selected checkbox

Help Text

Popover Help Text Help Text helpText

Next, learn about the Currency Field component.

Configurable Text Input

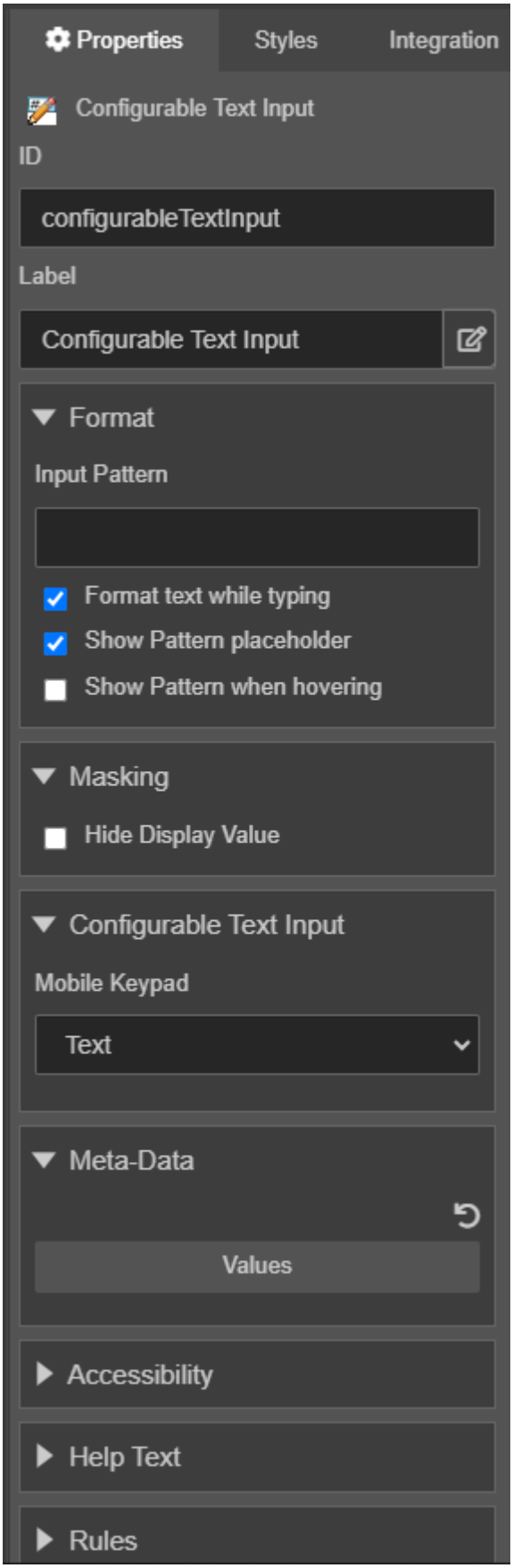
Maestro comes with the Configurable Text Input component, which you can use to mask text for passwords and credit card numbers and so on. This component is a replacement for Text Field with text filtering enabled, thus preventing the input of invalid characters.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Configurable Text Input component within the Input Fields folder.

3. Drag the component into the View pane or the Wireframe.

4. Configure the component's properties via the Properties pane.


Properties
Styles
Integration
Configurable Text Input
ID
configurableTextInput
Label
Configurable Text Input
Format
Input Pattern
Format text while typing
Show Pattern placeholder
Show Pattern when hovering
Masking
Hide Display Value
Configurable Text Input
Mobile Keypad
Text
Meta-Data
Values
Accessibility
Help Text
Rules

Properties

The following properties are available to the Configurable Text Input component:

Format

Input Pattern
: `Option inputPattern`
: Specify the input pattern in the Input Pattern field.

Format text while typing
: Select to enable text formatting while typing.

Show Pattern placeholder
: Select to show a pattern placeholder

Show Pattern when hovering
: Select to show a pattern while hovering a mouse over the field.

Masking

Hide Display Value
: Select to hide text of the component.

Configurable Text Input

Mobile Keypad
: `Option mobileKeypad`
: Select a mobile keypad type from the Mobile Keypad dropdown list, which can be one of the following:

Label	Value
Text	text
Numeric	number
Email	email
Telephone	tel

Meta Data

Value
: Click Value to add key / value pairs in the Key-Value editor.

Next, learn about the Currency Field component.

Currency Field

Maestro comes with the Currency Field component (widget), which you can use in several scenarios.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Currency Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Currency Field component:

Currency Icon
Icon currencyIcon

Select the currency icon

Max Leading Digits
Integer maxLength

Decimal Places
Integer places

Number of decimal places to display

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Next, learn about the Decimal Field component.

Data-Driven Dropdown

Maestro provides the Data-Driven Dropdown component that allows you to build dynamic selection lists to implement various customer requirements.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Data-Driven Dropdown** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Data-Driven Dropdown component:

Data Source Field Ref dataPath
Path to source data, which is a key to the data to be shown in the dropdown lists.

Label Field Text labelField
Path from data to label

Value Field Text valueField
Path from data to value

Icon Icon icon
Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

You can also update a Data-Driven Dropdown triggered by an input Text Field. In this cae, you have to use the input from a text field to both trigger and to make a dynamic data services call. This DDS call will retrieve the data to populate a data-driven dropdown. We will use the example of a zip code text field where the user types the zip code and a zip code lookup service returns the list of cities in a zip code and populates them in a DDD.

To do so, you need to:

1. Add a Text Field to your form. This will be the zip code field. Here we presume that the field reference ID for the zip-code field is "zipcode".
2. Add a Data Field to your form. This will store the data returned by the DDS call. We presume that the field reference ID for the Data field is cityDataField.
3. Add a Data-Driven Dropdown to your form. Make the data source for the DDD point to "data.cityDataField".
4. Add an "On Change" script to the Text Field in order to map the request and response parameters for your DDS call and to make the call. It should look something like the JavaScript below.

Example Javascript to map request and response fields, to make DDS request and to update the Data Field is shown below:

```
// The key "ZIPCODE" is presumed to be the input parameter for the "Zipcode Lookup Ser-
vice"
var inputFieldRefs = [{
    key: "ZIPCODE",
    ref: "data.zipcode"
}];

// The key "cities" is presumed to be the output parameter returned from the "Zipcode
Lookup Service"
var outputFieldRefs = [{
    key: "cities",
    ref: "data.cityDataField"
}];

var serviceName = "Zipcode Lookup Service";
var dataParams = Form.convertToFieldDataMap(inputFieldRefs, data);

// Character input must be length of valid zipcode before making request
if(data.zipcode && data.zipcode.length === 5) {
  proceed();
}

// Lookup promise
function proceed() {
    // Make asynchronous call to DDS and when the response is received set the field data
or log an error
    DynamicData.call(serviceName, dataParams).then(function(response) {
        // Update the form field data.cityDataField with the response data formatted for
a Data-Drive Dropdown.
        Form.setFieldDataFromResponse(outputFieldRefs, response, data);
    }).catch(function(err) {
        console.log("Error: ", err);
    });
}
```

Make sure you have a service written to return the data back as JSON in the correct format. The service in our example, "Zipcode Lookup Service", is presumed to return a JSON response format that looks like:

```
{"cities":[{"label":"city1","value":"city1"},{"label":"city2","value":"city2"}]}
```

Next, learn about the Dropdown component.

Decimal Field

Maestro comes with the Decimal Field component (widget), which you can use in several scenarios.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Decimal Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Decimal Field component:

Max Leading Digits
Integer maxLength

Decimal Places
Integer places

Number of decimal places to display

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Next, learn about the Percentage Field component.

Dropdown

Maestro provides the Dropdown component (widget), which allows form users to make a selection from a list of available options.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dropdown** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dropdown component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Icon
Icon icon

Select the dropdown icon

Add Blank Value
Boolean addBlankValue

Check to add a blank value to the dropdown

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Graphical Radio Button Group component.

Graphical Radio Button

Maestro comes with the Graphical Radio Button component (widget), which allows you to specify not only a text caption, but also an image from a predefined list of images or your own rich content. The Graphical Radio Button component replaces the usual radio button component. If you want to use a composite image, you can create a shared style for your Graphical Radio Button components and adding appropriate style rules to create and show this. You will need to factor in all the states so that the image is shown correctly when selected, not selected, hover, focus, active, disabled, error and so on. You can use different images for the selected and non-selected states, but we recommend using a single image.

NOTE

Graphical Radio Buttons are restricted to being used inside Graphical Radio Button Groups.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Graphical Radio Button** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Graphical Radio Button component:

Button Value Text value
Enter the value for this radio button

Appearance

Selected Icon Class Icon selectedIconClass
Selected icon class name

Unselected Icon Class
Icon unselectedIconClass

Unselected icon class name

Image

Button Image
Image src

Select from the available images resources, or upload a new one

Button Selected Image
Image srcSelected

Select from the available images resources, or upload a new one

Alternative Text
Text alternativeText

Type an alternative text for informative images, leave blank for decorative images.

Next, learn about the Graphical Radio Button Group component.

Radio Button Group

Maestro comes with the Radio Button Group component (widget) so you can group Radio Buttons to present several mutually exclusive options on a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Radio Button Group** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Radio Button Group component:

Options
List options

List of options

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Appearance

Arrangement
Option arrangement

Defines the layout arrangement of the radio options on the page.

The following options are available from the **Arrangement** dropdown:

Label	Value
Vertical (1 per line)	vertical
Horizontal (natural width)	horizontal
2 Column Grid	6
3 Column Grid	4
4 Column Grid	3
6 Column Grid	2

Min Width (px)
Integer minWidth

Radio Button Minimum Width in Pixels.

Stack Threshold
Option stackThreshold

Select which responsive threshold the radio options will stack on top of each other, or 'None' where stacking is not desired.

The following options are available from the **Stack Threshold** dropdown:

Label	Value
Small	sm
Medium	md
Large	lg
None	none

Selected Icon Class
Icon selectedIconClass

Selected icon class name

Unselected Icon Class Icon unselectedIconClass
Unselected icon class name

Help Text

Popover Help Text Help Text helpText

Next, learn about the Radio Button [Repeating] component.

Radio Button [Repeating]

Maestro comes with the Radio Button [Repeating] component (widget).

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Radio Button [Repeating]** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Radio Button [Repeating] component:

Selected Icon Class Icon selectedIconClass
Selected icon class name

Unselected Icon Class Icon unselectedIconClass
Unselected icon class name

Next, learn about the Text Field component.

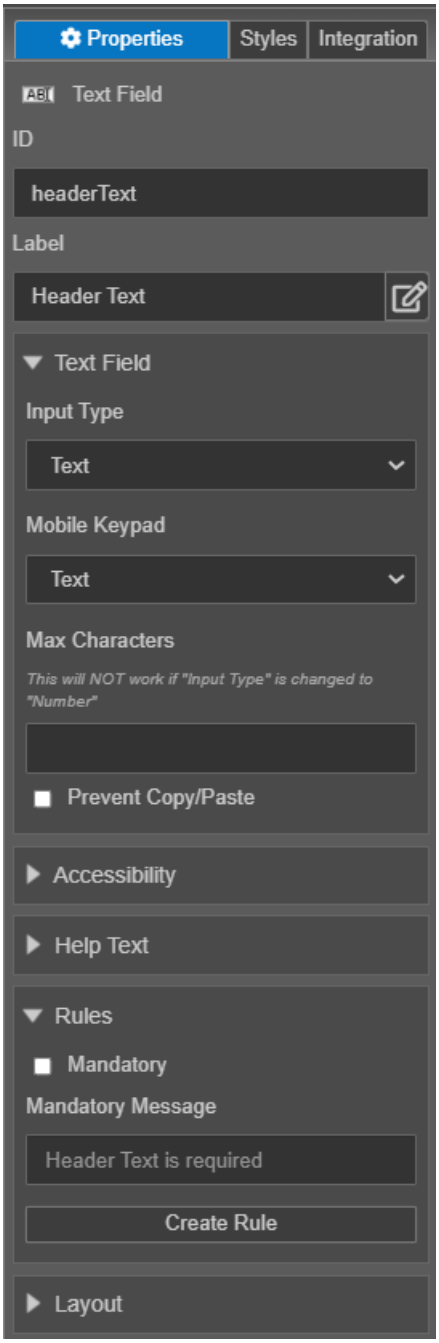
Text Field

Maestro comes with the Text Field component, which you can use to capture user input in various parts of a form.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Text Field component within the Input Fields folder.
3. Drag the component into the View pane or the Wireframe.

4. Configure the component's properties via the Properties pane.



Properties

The following properties are available to the Text Field component:

Text Field

Input Type

`Option inputType`

Select the input type from the Input Type dropdown list, which can be one of the following:

Label	Value
Text	text
Number	number
Email	email
Password	password
Telephone	tel

Mobile Keypad

`Option mobileKeypad`

Select a mobile keypad type from the Mobile Keypad dropdown list, which can be one of the following:

Label	Value
Text	text
Numeric	number
Email	email
Telephone	tel

Max Characters

`Integer maxLength`

Provide the maximum number of characters the component can hold.

> NOTE
>
> This doesn't apply if the Input Type is set to Number.

Prevent Copy/Paste

`Boolean preventCopyPaste`

Select this property to prevent form users from copying and pasting text content.

Next, learn about the Time component.

Percentage Field

Maestro comes with the Percentage Field component (widget), which you can use in several scenarios.

> NOTE
>
> This component inherits properties and shared styles from the Decimal Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Percentage Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Percentage Field component:

Max Leading Digits Integer maxLength

Decimal Places Integer places
Number of decimal places to display

Accessibility

Placeholder Text Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Decimal Places
Integer places

Number of decimal places to display

Prevent Negative
Boolean preventNegative

Decimal Point
Text decimalPointChar

Thousands Separator
Text thousandsSeparator

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Next, learn about the Data-Driven Dropdown component.

Time

Maestro comes with the Time component.

> NOTE
>
> This component inherits properties and shared styles from the Block (Mandatory) component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Time** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Time component:

Help Text

Popover Help Text
Help Text helpText

Options

Mandatory Setting
Option mandatoryOption

Select how many fields are mandatory.

The following options are available from the **Mandatory Setting** dropdown:

Label	Value
At Least One Mandatory	one
All Mandatory	all

Hide Mandatory On Labels Boolean showChildrenIndicators
Enable mandatory asterisk on child element labels.

Next, learn about the Data-Driven Checkbox Group component.

Data-Driven Checkbox Group

Maestro provides the Data-Driven Checkbox Group component so you can group Checkbox components to present several options on a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Data-Driven Checkbox Group** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Data-Driven Checkbox Group component:

Data Source Field Ref dataPath
Path to source data

Label Field Text labelField
Path from data to label

Appearance

Vertical Checkbox Group Boolean verticalGroup
Select to make a vertical checkbox group.

Checkbox Min Width (px) Integer minWidth
Checkbox Button Minimum Width in Pixels.

Unselected Icon
Icon unselectedIconClass

Icon for unselected checkbox

Selected Icon
Icon selectedIconClass

Icon for selected checkbox

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Data-Driven Radio Group component.

Data-Driven Radio Group

Maestro comes with the Data-Driven Radio Group component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Data-Driven Radio Group** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Data-Driven Radio Group component:

Data Source Field Ref dataPath
Path to source data

Label Field Text labelField
Path from data to label

Value Field Text valueField
Path from data to value

Selected Icon Class Icon selectedIconClass
Selected icon class name.

Unselected Icon Class Icon unselectedIconClass
Unselected icon class name.

Appearance

Arrangement
Option arrangement

Defines the layout arrangement of the radio options on the page.

The following options are available from the **Arrangement** dropdown:

Label	Value
Vertical (1 per line)	vertical
Horizontal (natural width)	horizontal
2 Column Grid	6
3 Column Grid	4
4 Column Grid	3
6 Column Grid	2

Min Width (px)
Integer minWidth

Radio Button Minimum Width in Pixels.

Stack Threshold
Option stackThreshold

Select which responsive threshold the radio options will stack on top of each other, or 'None' where stacking is not desired.

The following options are available from the **Stack Threshold** dropdown:

Label	Value
Small	sm
Medium	md
Large	lg
None	none

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Date Picker component.

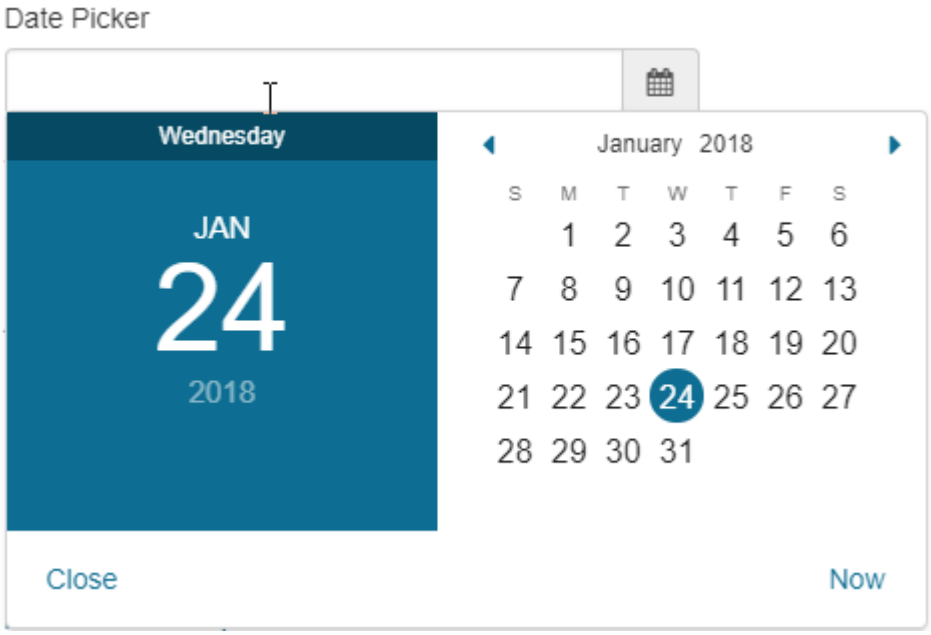
Date Picker

Maestro comes with the Date Picker component (widget) that allows form users to select a date and time on a form.

This component supports both left-to-right (LTR) and right-to-left (RTL) languages.



The rendered date picker component is shown below.



Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Date Picker** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Date Picker component:

Date/Time Data Format
Text dateFormat

Enter the date and time format that is stored in the underlying XML

Date/Time Display Format
Text dateDisplayFormat

Enter the date display format

Display Mode
Option displayMode

Select the display mode

The following options are available from the **Display Mode** dropdown:

Label	Value
Date Only	date
Full Mode (Date and Time)	full

Prefill with Today's Date
Boolean prefillTodaysDate

Check to prefill with today's date

Prefer Non-US Input
Boolean auDateInput

Check to prefer using non-US date format.

NOTE

The US date format is m/d/yy or m/d/yyyy.

Open Calendar Icon
Icon inputIcon

The icon used for the open calendar button. You should check with the Template Designer if you can change this icon, as icons are typically customized in the template.

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Terminology

Close Button Label
Text closeBtnLabel

Now Button Label
Text nowBtnLabel

Month Labels
Text monthLabels

A comma separated list of month labels from January to December

Month Abbreviations
Text monthShortLabels

A comma separated list of month abbreviations from January to December

Day Labels
Text dayLabels

A comma separated list of day labels from Sunday to Saturday

Validation

Min Date (dd/mm/yyyy)
Date minDate

Minimum Date allowed. For example, a valid date may be between 01/01/2017 (min) to 31/12/2017 (max).

Max Date (dd/mm/yyyy)
Date maxDate

Maximum Date allowed.

Must Be A Past Date
Boolean pastDate

Check if the date must be in the past.

Must Be A Future Date
Boolean futureDate

Check if the date must be in the future.

Include Today
Boolean includeToday

Check to include today in validation.

Validation Messages

Past Date
Text pastDateValidationMsg

Enter the past date validation message, which is displayed if the Must Be A Past Date option is selected. The user will receive the message if they do not follow the validation rules. The Form Builder can customize the messages displayed when validation is not met.

Past Date (Inc Today)
Text pastDateIncTodayValidationMsg

Enter the past date (Inc Today) validation message, which is displayed if the Must Be A Past Date and Include Today options are selected. The user will receive the message if they do not follow the validation rules.

Future Date
Text futureDateValidationMsg

Enter the future date validation message, which is displayed if the Must Be A Future Date option is selected. The user will receive the message if they do not follow the validation rules.

Future Date (Inc Today)
Text futureDateIncTodayValidationMsg

Enter the future date (Inc Today) validation message, which is displayed if the Must Be A Future Date and Include Today options are selected. The user will receive the message if they do not follow the validation rules.

Next, learn about the Autocomplete Field component.

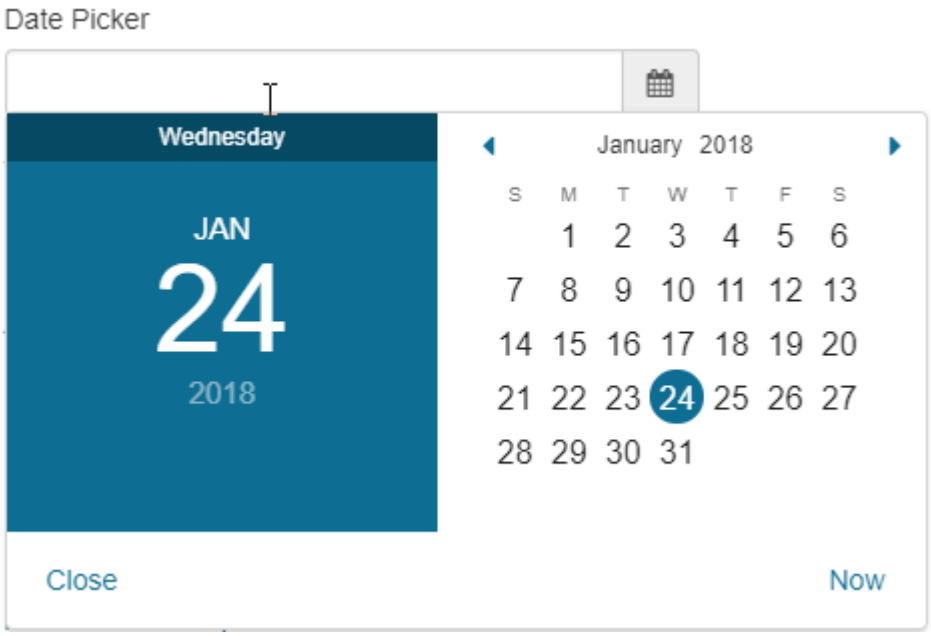
Date Picker Drilldown

Maestro comes with the Date Picker Drilldown component (widget) that allows form users to select a date and time on a form.

This component extends the Date Picker component and it supports both left-to-right (LTR) and right-to-left (RTL) languages.



The rendered date picker component is shown below.



Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Date Picker** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Date Picker component:

Date/Time Data Format
Text dateFormat

Enter the date and time format that is stored in the underlying XML

Date/Time Display Format
Text dateDisplayFormat

Enter the date display format

Display Mode
Option displayMode

Select the display mode

The following options are available from the **Display Mode** dropdown:

Label	Value
Date Only	date
Full Mode (Date and Time)	full

Prefill with Today's Date
Boolean prefillTodaysDate

Check to prefill with today's date

Prefer Non-US Input
Boolean auDateInput

Check to prefer using non-US date format.

NOTE

The US date format is m/d/yy or m/d/yyyy.

Open Calendar Icon
Icon inputIcon

The icon used for the open calendar button. You should check with the Template Designer if you can change this icon, as icons are typically customized in the template.

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Terminology

Close Button Label
Text closeBtnLabel

Now Button Label
Text nowBtnLabel

Month Labels
Text monthLabels

A comma separated list of month labels from January to December

Month Abbreviations
Text monthShortLabels

A comma separated list of month abbreviations from January to December

Day Labels
Text dayLabels

A comma separated list of day labels from Sunday to Saturday

Validation

Min Date (dd/mm/yyyy)
Date minDate

Minimum Date allowed. For example, a valid date may be between 01/01/2017 (min) to 31/12/2017 (max).

Max Date (dd/mm/yyyy)
Date maxDate

Maximum Date allowed.

Must Be A Past Date
Boolean pastDate

Check if the date must be in the past.

Must Be A Future Date
Boolean futureDate

Check if the date must be in the future.

Include Today
Boolean includeToday

Check to include today in validation.

Validation Messages

Past Date
Text pastDateValidationMsg

Enter the past date validation message, which is displayed if the Must Be A Past Date option is selected. The user will receive the message if they do not follow the validation rules. The Form Builder can customize the messages displayed when validation is not met.

Past Date (Inc Today)
Text pastDateIncTodayValidationMsg

Enter the past date (Inc Today) validation message, which is displayed if the Must Be A Past Date and Include Today options are selected. The user will receive the message if they do not follow the validation rules.

Future Date
Text futureDateValidationMsg

Enter the future date validation message, which is displayed if the Must Be A Future Date option is selected. The user will receive the message if they do not follow the validation rules.

Future Date (Inc Today)
Text futureDateIncTodayValidationMsg

Enter the future date (Inc Today) validation message, which is displayed if the Must Be A Future Date and Include Today options are selected. The user will receive the message if they do not follow the validation rules.

Next, learn about the Autocomplete Field component.

Autocomplete Field

Maestro comes with the Autocomplete Field component, which allows you to create fields that auto-complete user's input text as they are entering it, for example, a client's address.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Autocomplete Field** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Autocomplete Field component:

Accessibility

Placeholder Text
Text placeholder

Include Button Next To Label
Boolean includeButton

Descriptive Text
Rich Text descriptiveText

This text will be used in an aria described by on the input

No Results Message
Text noResultsFoundMsg

This text will be alerted to the user if 0 results are found

No Results Message Part 2
Text noResultsFoundMsgIfExtra

This text will be concatenated to the No Results Message if Extra Item Message is NOT blank

One Result Found Message
Text oneResultFoundMsg

This text will be alerted to the user if 1 result is found

More Than One Result Found Message
Text resultsFoundMsg

This text will be alerted to the user if more than 1 result is found

Prefix Text
Rich Text prefixText

This text will be placed on the left of the button

Button Label
Rich Text buttonLabel

Configuration

Clear Field When Not Matched
Boolean clearWhenNotMatched

Min Characters To Show Suggestion
Integer minCharTrigger

Max Items In Suggestion List
Integer itemLimit

Continue Typing Message
Text continueMessage

Extra Item Message
Text extraItemMessage

Data Source

Data Source
Option dataSource

Select the data source

The following options are available from the **Data Source** dropdown:

Label	Value
TM Dynamic Data Service	service
Reference Data (Prepop)	refData

Use Transact Functions
Boolean useTransactFunctions

Uses the Transact function call instead of legacy dynamic data calls

Reference Data Name
Field Ref dataPath

Path to source data

Trigger Property Name
Text triggerName

Trigger Field name in JSON Result

Suggestion List Names
Text suggestionListNames

Names that will show on each suggestion list item

Dds Configuration

First Service Name
Text DynamicDataServiceName

First Service Version
Text serviceVersion

Response Data Key
Text responseKey

Delay Of Triggering First DDS Call
Integer delayDDSCall

First Input Field Map
Field Ref Map inputFieldRefs

The fields to pass into the dynamic data call

First Response Field Map
Field Ref Map dataResultMappings

Paths to set result data to

Second Service Version
Text secondServiceVersion

Second Response Data Key
Text secondResponseKey

Help Text

Popover Help Text
Help Text helpText

Second Dds Configuration

Second Service Name
Text secondDynamicDataServiceName

Second Input Field Mapping
Field Ref Map secondInputFieldRefs

The fields to pass into the dynamic data call

Second Response Field Mappings
Field Ref Map secondDataResultMappings

Paths to set result data to

Enable Progress Message
Boolean enableProgressMsg

Check to enable loading message popup

Progress Message
Text progressMsg

Text to display in loading message

Next, learn about the Slider component.

Graphical Radio Button Group

Maestro comes with the Graphical Radio Button Group component (widget) so you can group Graphical Radio Buttons to present several mutually exclusive options on a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Graphical Radio Button Group** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Graphical Radio Button Group component:

Help Text

Popover Help Text Help Text helpText

Next, learn about the Radio Button Group component.

Slider

Maestro comes with the Slider component (widget) that allows users to view and select a value or range of values from the range along a bar.

This component supports both left-to-right (LTR) and right-to-left (RTL) languages. For LTR languages, the smallest value appears on the far left end of the track and the largest value is on the far right. For RTL languages this orientation is reversed.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Slider** component within the **Input Fields** folder.



3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Slider component:

Configuration

Min Value
Integer minValue

The minimum value of the slider.

Max Value
Integer maxValue

The maximum value of the slider.

Step Value
Integer step

The interval of the slider's value increment.

Show Ticks
Boolean showTicks

Shows tick marks at predetermined values, without their actual values, that the user can move the slider to. The predetermined values are calculated usingStep Value.

Show Ticks With Values
Boolean showTicksValues

Shows tick marks with their predetermined values that the user can move the slider to. The predetermined values are calculated using Step Value.

Value Prefix
Text valuePrefix

Adds this text to the value label as a prefix.

NOTE

This value can be translated to different languages including right-to-left languages. | 21.05 This feature was introduced in 21.05.

Value Suffix
Text valueSuffix

Adds this text to the value label as a suffix.

NOTE

This value can be translated to different languages including right-to-left languages. | 21.05 This feature was introduced in 21.05.

Add Space Between
Boolean addSpaceBetween

Adds a space between the prefix and the value label, and between the suffix and the value label.

Range Slider

Enable Range Slider
Boolean isRange

Shows the second thumb to allow the user to view and specify the range of values.

Min Range
Integer minRange

The minimum value of the range slider.

Max Range
Integer maxRange

The maximum value of the range slider.

Help Text

Popover Help Text
Help Text helpText

Shows a popover help text to provide some contextual help to the user. You can use the Maestro rich text editor to create the help text using various formatting and styles.

Next, learn about the Multiline Text Area component.

Multiline Text Area

Maestro comes with the Multiline Text Area component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Multiline Text Area** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Multiline Text Area component:

Resize Mode
Option resizeMode

Select the resize mode

The following options are available from the **Resize Mode** dropdown:

Label	Value
Vertical	vertical
Fixed	none

Min/Initial Number of Rows
Integer minRows

Number of Rows

Max Number of Rows
Integer maxRows

Number of Rows

Disable New Line Entry
Boolean disableNewLine

Disable New Line Entry

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Options

Max Characters
Integer maxLength

Prevent Copy/Paste
Boolean preventCopyPaste

Enabling this property will prevent copy and paste

Next, learn about the Dropdown Multi Select component.

Dropdown Multi Select

Maestro comes with the Dropdown Multi Select component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Dropdown Multi Select** component within the **Input Fields** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Dropdown Multi Select component:

Options
List options

The options list for the dropdown

By default, the **Options** property contains the following values:

Label	Value
One	One
Two	Two
Three	Three

Sort Options
Boolean sortOptions

Check to automatically sort options by label

Accessibility

Placeholder Text
Text placeholder

Help Text

Popover Help Text
Help Text helpText

Next, learn about the Horizontal Divide component.

Horizontal Divide

Maestro comes with the Horizontal Divide component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Horizontal Divide** component within the **Layout** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Cancel Success component.

Cancel Success

Maestro comes with the Cancel Success component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Cancel Success** component within the **Modal Pages** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Submit Success component.

Submit Success

Maestro comes with the Submit Success modal page component, which you can use to display a successful response from a form submission to Manager.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Submit Success** component within the **Modal Pages** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

> NOTE
>
> Check the Submit component.

Next, learn about the Save Success component.

Save Success

Maestro comes with the Save Success component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Save Success** component within the **Modal Pages** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Modal Mobile Header component.

Modal Mobile Header

Maestro comes with the Modal Mobile Header component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Modal Mobile Header** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Navigator Step Count component.

Navigator Step Count

Maestro comes with an Navigator Step Count component, which displays a current step (page) out of the total number of steps (pages) that a form consists of. You can use this components along with the Navigator component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Navigator Step Count** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Navigator Wizard Bar component.

Navigation Wizard Bar

Maestro comes with the Navigation Wizard Bar component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Navigation Wizard Bar** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Navigation Wizard Bar component:

Options

Next Button Label Text nextButtonLabel
Enter the next Button label.

Submit Button Label Text submitButtonLabel
Enter the submit button label.

Back Button Label Text backButtonLabel
Enter the back button label.

Next, learn about the Navigator component.

Navigator

Maestro comes with an Navigator component that allows a form user to move between pages of a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Navigator** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Navigator component:

Show Left Hand Navigation
Boolean leftMenu

Select this option to move navigation from the top to the left of the page

Show Mobile Menu Button
Boolean includeMenuButton

Select this option to show the mobile menu

Accessibility

Aria Label
Text navAriaLabel

Enter the Aria Label for this navigation element

Tab Focus
Option tabFocus

If set to reachable, the tab index is set to 0, else it will be set to -1

The following options are available from the **Tab Focus** dropdown:

Label	Value
Reachable	0
Not reachable	-1

Disable All Non-Active Navigator Items
Boolean disableOnNonActive

If checked, all non-active navigator items will have aria-disabled set to true

Navigator type (role)
Text navItemGroupRole

The value entered will appear within the role attribute for navigation item group/container

Navigator item type (role)
Text navItemRole

The value entered will appear within the role attribute for each navigation item

Left Hand Navigation

Show Second Level
Boolean includeSecondLevel

Select this option to move navigation from the top to the left of the page

Next, learn about the Second Level Navigator component.

Second Level Navigator

Maestro comes with the Second Level Navigator component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Second Level Navigator** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Second Level Navigator component:

Display on Side Boolean leftMenu
Select this option to move navigation to top to bottom

Equal Width Boolean equalWidth
Select this option ensure equal item widths

Accessibility

Aria Label Text navAriaLabel
Enter the Aria Label for this navigation element

Menu Item Group Role Text navItemGroupRole
The value entered will appear within the role attribute for navigation item group/container

Menu Item Role Text navItemRole
The value entered will appear within the role attribute for each navigation item

Next, learn about the Tramline Navigator component.

Tramline Navigator

Maestro comes with the Tramline Navigator component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Tramline Navigator** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Tramline Navigator component:

Tramline Images

Active Image
Image activeImage

Select an image for the active page.

Inactive Image
Image inactiveImage

Select an image for the inactive page.

Visited Image
Image visitedImage

Select an image for the visited pages.

Next, learn about the Page Group component.

Navigator (Avalon)

Maestro comes with an Navigator (Avalon) component that allows a form user to move between pages of a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Navigator (Avalon)** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to this component:

Show Left Hand Navigation
Boolean leftMenu

Select this option to move navigation from the top to the left of the page

Show Mobile Menu Button
Boolean includeMenuButton

Select this option to show the mobile menu

Accessibility

Aria Label
Text navAriaLabel

Enter the Aria Label for this navigation element

Tab Focus
Option tabFocus

If set to reachable, the tab index is set to 0, else it will be set to -1

The following options are available from the **Tab Focus** dropdown:

Label	Value
Reachable	0
Not reachable	-1

Disable All Non-Active Navigator Items
Boolean disableOnNonActive

If checked, all non-active navigator items will have aria-disabled set to true

Navigator type (role)
Text navItemGroupRole

The value entered will appear within the role attribute for navigation item group/container

Navigator item type (role)
Text navItemRole

The value entered will appear within the role attribute for each navigation item

Left Hand Navigation

Show Second Level
Boolean includeSecondLevel

Select this option to move navigation from the top to the left of the page

Styles

The following styles are available to this component:

Next, learn about the Second Level Navigator component.

Page Group

Maestro comes with the Page Group component to enable a second level navigator, which reduces the number of items displayed on the navigator.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page Group** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Page Group component:

Display Text

Menu Text Rich Text menuText
This Text will be used in the Navigator Menu instead of Page label

Next, learn about the Page Controller component.

Page Group (Avalon)

Maestro comes with the Page Group (Avalon) component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page Group (Avalon)** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to this component:

Display Text

Menu Text Rich Text menuText
This Text will be used in the Navigator Menu instead of Page label

Styles

The following styles are available to this component:

Next, learn about the Page Controller component.

Navigator Wizard Bar

Maestro comes with an Navigator Wizard Bar component that allows a form user to move between pages of a form. This is an alternative to the Navigator component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Navigator Wizard Bar** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Navigator Wizard Bar component:

Options

Next Button Label Text nextButtonLabel
Enter the Next Button Label for this navigation element

Submit Button Label Text submitButtonLabel
Enter the Submit Button Label for this navigation element

Back Button Label Text backButtonLabel
Enter the Back Button Label for this navigation element

Next, learn about the Navigator component.

Page Controller

Maestro comes with the Page Controller component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page Controller** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Page Controller component:

Background Save On Page Change
Boolean saveOnPageChange

Select to enable saving a form on page change event. However, the following conditions apply:

- Transact Function enabled forms, which are forms built with the Use server side Transact Functions (requires TM 17.10 +) option selected, will always Background Save on page change
- Non-Transact Function forms will only do the Background Save if the form data has changed since the last page change

Validation Mode
Option validationMode

Select the page validation mode

The following options are available from the **Validation Mode** dropdown:

Label	Value
Unconstrained, validate on submit	unconstrained
Sequential, validate on page change	sequential

Page Transition Delay
Integer transitionDelay

Provide how long the duration of the page transition will be

Restart At Last Saved Page
Boolean restartAtLastSavedPage

If checked, the form will return to the page it was on after save and resume.

Accessibility

Focus After Page Change Mode
Option focusMode

Smart focus sets focus to navigator if present. If not, find first heading.

The following options are available from the **Focus After Page Change Mode** dropdown:

Label	Value
Smart Focus	smart
Do Nothing	none

Next, learn about the Page component.

Page Controller (Avalon)

Maestro comes with the Page Controller (Avalon) component, which only allows you to use Page Groups (Avalon) and Pages (Avalon) as they have additional properties. If you don't use the Avalon Template, you can use the Page Controller component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page Controller (Avalon)** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

This component has the same properties as the Page Controller.

Styles

The following styles are available to this component:

Next, learn about the Page component.

Page

Maestro comes with the Page component that allows you to group components according to a form logic so they make up a user journey flow.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Page component:

Display Text

Menu Text Rich Text menuText
This Text is used in the Navigator Menu instead of Page label

Options

Hide Navigator Boolean offMenu
A page that is in the flow of the form but not displayed in the menu

Next, learn about the Save and Close component.

Page (Avalon)

Maestro comes with the Page (Avalon) component that allows you to group components according to a form's navigation logic to build a user journey flow. This component is available when you use the Avalon Template. The Page (Avalon) component extends functionality of the Page component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Page (Avalon)** component within the **Navigation** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.
5. Configure the component's styles via the **Styles** pane.

Properties

The following properties are available to this component:

Display Text

Title Text
Rich Text titleText

This text is used as a title. If the text is not provided, the default `{{T[item.id].label}}` value is used.

Subtitle Text
Rich Text subtitleText

This text is used as a subtitle. If the text is not provided, the default `<h1 ng-bind-html="T[Form.$Pages.currentPage.id].properties.formName">Form Name</h1>` value is used.

> NOTE
>
> You can use HTML tags in the Subtitle Text component, for example, `<samp>Welcome</samp> to <em>my</em> page!`. For more information, see rich text editor.

Additional Text
Rich Text additionalText

This text is used as an additional text

Help Text
Rich Text helpText

This text is used as a help text

Options

Hide Navigator
Boolean offMenu

A page that is in the flow of the form but not displayed in the menu

Page View

Hide From Navigator
Boolean hideFromNavigator

A page that is in the flow of the form but not displayed in the Navigator

Hide From Header
Boolean hideFromHeader

Hide or show the form header (if applicable for the template)

Hide From Footer
Boolean hideFromFooter

Hide or show the form footer (if applicable for the template)

Hide Navigation Buttons
Boolean hideNavigationButtons

Hide or show the navigational buttons

Hide Menu Button
Boolean hideFromHeader

Hide or show the form menu button

Page of No Return
Boolean pageNoReturn

The user will not be able to navigate back past this page

Navigator

Navigator Text
Rich Text

This text will be shown in the Navigator in place of the page label

Styles

The following styles are available to this component:

Avalon Page

```
form[name='form'] {
  .avalon-page {
    width: ~"calc(100% + 10px)";
    margin: 0;
    padding: 0;
    border: 0;
    border-radius: 0;
    box-shadow: none;
    .wdg-section-1-container {
      margin: 0;
      padding: 0;
      border: 0;
      border-radius: 0;
      box-shadow: none;
    }
    .wdg-section-1-outer-wrapper {}
    .wdg-section-1-wrapper {
      padding: 0;
    }
    .wdg-section-1-header {}
    .wdg-section-1-icon {
      display: none;
    }
    .wdg-section-1-title {
      margin: 0;
      padding: 0 0 20px 0;
      outline: none;
    }
    .wdg-section-1-form-name {
      display: none;
    }
    .wdg-section-1-additional-text {
      display: none;
    }
    .wdg-section-1-body {
      padding: 0;
    }
  }

  &.av-receipt {
    .avalon-page {
```

```
      width: 100%;
    }
  }
  // Fullscreen page overrides
  .av-fullscreen {
    .wdg-section-1-wrapper {
      max-width: @ux-max-form-width;
      margin-left: auto;
      margin-right: auto;
    }
    .wdg-section-1-header {
      display: none;
    }
    .wdg-section-1-body {
      padding: 0;
    }
  }
}
```

Next, learn about the Save and Close component.

Save and Close

Maestro comes with the Save and Close component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Save and Close** component within the **Navigation Functions** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Repeat Index Text component.

Repeat Index Text

Maestro provides the Repeat Index Text component (widget).

> NOTE
>
> This component inherits properties and shared styles from the Text Display component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Repeat Index Text** component within the **Repeats** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Repeat Index Text component:

Accessibility

Enable Focus On Headings Boolean enableHeadingFocus
This will enable focus on heading elements (h1, h2) etc

Next, learn about the Repeat Add Button component.

Repeat Add Button

Maestro provides the Repeat Add Button component (widget), which allows a form user to add the whole Repeat component multiple times to a form. This is especially handy when adding another name or address field to a form.

> NOTE
>
> This component inherits properties and shared styles from the Icon Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Repeat Add Button** component within the **Repeats** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Repeat Add Button component:

Repeat Link Field Ref repeatLink
Link to the repeat

Next, learn about the Repeat Delete Button component

Repeat Delete Button

Maestro provides the Repeat Delete Button component (widget), which allows a form user to remove the whole repeat component from a form. This is especially handy when deleting another name or address field from a form. If you need to add a repeat component, use the Repeat Add Button.

NOTE

This component inherits properties and shared styles from the Icon Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Repeat Delete Button** component within the **Repeats** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

See properties of the Icon Button component.

Next, learn about the Repeat component.

Repeat

Maestro provides the Repeat component (widget), which is a container for other components, such as text fields and labels, that allows a form user to add the whole repeat component multiple times to a form, by clicking a Repeat Add Button. This is especially handy when adding another customer's name or address field to a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Repeat** component within the **Repeats** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Repeat component:

Repeat Item Label Text itemLabel
Can be used on multiple references, such as add and delete buttons
Initial Items In Repeat Integer initialItems
Enter the initial number of items in repeat
Min Items In Repeat Integer minItems
Enter the minimum number of items allowed in repeat
Max Items In Repeat Integer maxItems
Enter the maximum number of items allowed in repeat. Set to 0 for unrestricted

Transfer Focus To New Instance
Boolean transferFocus

Transfers the focus to the first field in new instance

Transfer Focus After Delete
Boolean transferFocusAfterDelete

Transfers the focus to the previous instance

Linked Delete Button To Focus
Field Ref linkedDeleteButton

Link the delete button which will get focused to when deleted

Linked Add Button To Focus
Field Ref linkedAddButton

Link the add button which will get focused to when deleted if no instances remain

Button Options

Add Button Label
Rich Text addItemLabel

Used on Add button

Show Add Button
Boolean showAddButton

Check to show the add button.

Add Item Icon
Icon addButtonIcon

Used on Add button

Hide Add Button when Max Reached
Boolean hideAddButtonOnMax

Check to hide the add item button when item max is reached

Hide Delete Button when Min Reached
Boolean hideDeleteButtonOnMin

Check to hide the delete item button when item min is reached

Next, learn about the Repeating Block Template component.

Repeating Block Template

Maestro provides the Repeat Block Template component (widget), which allows you to build a small part of form that can be repeated multiple times on a form by a use clicking a Repeat Add Button. This is especially handy when adding another name or address field to a form.

NOTE

This component inherits properties and shared styles from the Block component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Repeating Block Template** component within the **Repeats** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Repeating Block Template component:

Accessibility

Aria Label Text ariaLabel
Enter the Aria Label for this block

Hide from assistive technology Boolean ariaHidden
Hide component from assistive technology (aria-hidden)

To learn more about the best practices for using this component, read here.

Next, learn about the Repeating Block Template (Deprecated) component.

Repeating Block Template (Deprecated)

Maestro provides the Repeat Block Template (Deprecated) component (widget).

This component is deprecated so you should use the Repeating Block Template component instead.

Usage

1. Open the Palette pane in the Maestro Editor.
2. Locate the Repeating Block Template (Deprecated) component within the Deprecated folder.

   NOTE

   This component belongs to the Deprecated category so it is not shown on the Palette to prevent users from adding it to new forms. However, the component is still part of the product for backwards compatibility so it will work in forms that contain it.

3. Drag the component into the View pane or the Wireframe.
4. Configure the component's properties via the Properties pane.

Next, learn about the Data Field component.

Data Field

Maestro comes with the Data Field component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Data Field** component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Web Font component.

Bundle Resource Library

Maestro comes with the Bundle Resource Library component, which allows you to add library's resources, such as images, JavaScripts[1], and CSS[2], to a form's FAR[3] file so they can be used at runtime without needing to first include them in the form as a direct resource. You can use this widget for runtime branding.

Usage

1. Open the **Palette** pane in the Maestro editor.
2. Locate the Bundle Resource Library component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.

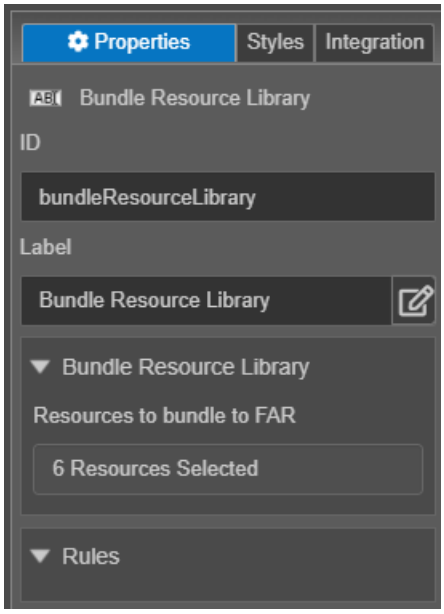
---

[1]Personally Identifiable Information (PII) is information about an individual that can be used to distinguish or trace an individual‘s identity, such as name, social security number, date and place of birth, mother‘s maiden name, or biometric records; and any other information that is linked to an individual. In Europe, PII is known as personal data.

[2]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form’s display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form’s assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

[3]FAR is a Form Archive that contains a form and all related resources that can be deployed as a package in various Journey Manager environments.

4. Configure the component's properties via the **Properties** pane.



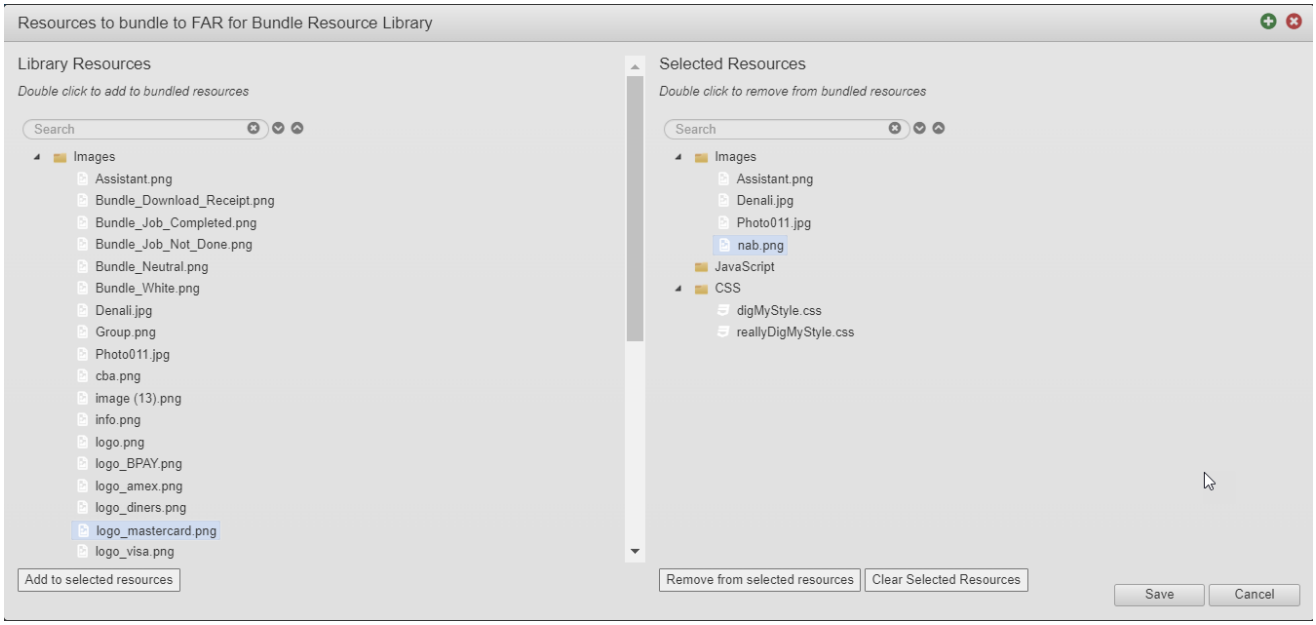
Properties

The following properties are available to the Bundle Resource Library component:

Bundle Resource Library

Resource to bundle to FAR

Click to add resources to a form's FAR file or view resources already added to the FAR file.



Select a resource or several resources from the Library Resources pane and click Add to selected resources to add them to the component.

Select a resource or several resources from the Selected Resources pane and click Remove from selected resources to delete them from the component.

Click Clear Selected Resources to delete all resources from the component.

NOTE

You can't add a rule to this component. For more information, see Maestro Business Rules.

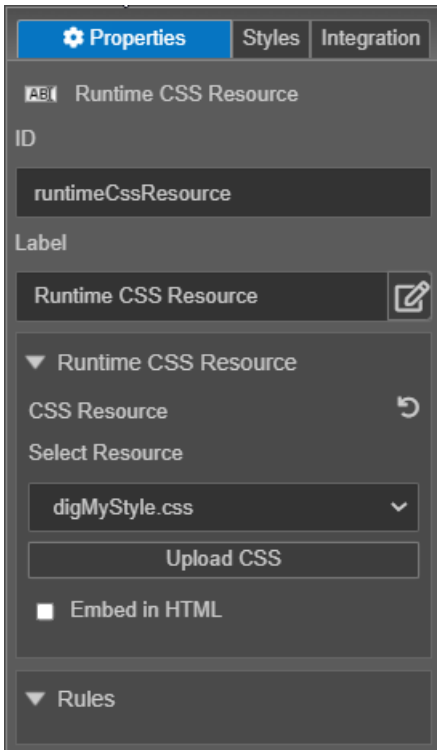
Next, learn about the Runtime CSS Resource component.

Runtime CSS Resource

Maestro comes with the Runtime CSS Resource component, which allows you to add CSS[1] files to a form's FAR[2] file so they can be used at runtime without needing to first include them in the form as a direct resource. You can use this widget for runtime branding.

Usage

1. Open the **Palette** pane in the Maestro editor.
2. Locate the Runtime CSS Resource component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.



---

[1]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form's display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form's assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

[2]FAR is a Form Archive that contains a form and all related resources that can be deployed as a package in various Journey Manager environments.

Properties

The following properties are available to the Runtime CSS Resource component:

Runtime CSS Resource

CSS Resource
Click to refresh

Select Resource
Select a CSS resource from the dropdown list of uploaded CSS files.

Upload CSS
Click to select a CSS file to upload to the form's FAR file.

Embed in HTML
Select to embed the CSS into the form.

Next, learn about the Web Font component.

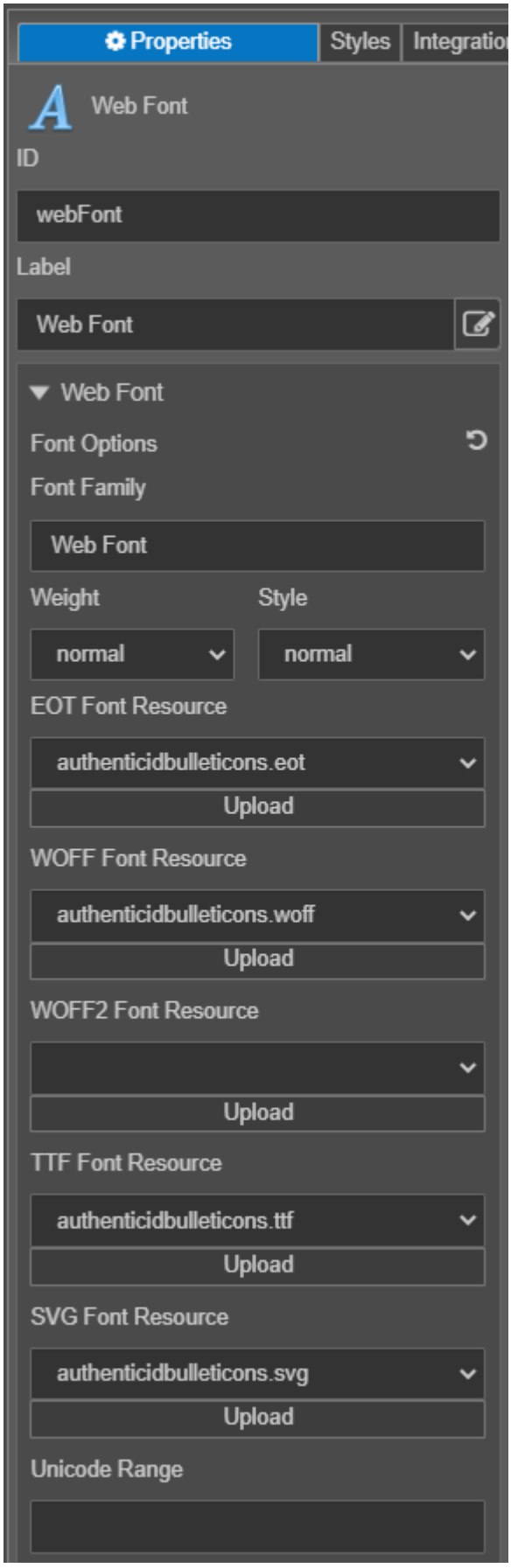
Web Font

Maestro comes with the Web Font component, so you can upload fonts as a resource and configure one to be used in a form.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Web Font** component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.

4. Configure the component's properties via the **Properties** pane.


Properties
Styles
Integratio
Web Font
ID
webFont
Label
Web Font
Web Font
Font Options
Font Family
Web Font
Weight
Style
normal
normal
EOT Font Resource
authenticidbulleticons.eot
Upload
WOFF Font Resource
authenticidbulleticons.woff
Upload
WOFF2 Font Resource
Upload
TTF Font Resource
authenticidbulleticons.ttf
Upload
SVG Font Resource
authenticidbulleticons.svg
Upload
Unicode Range

Properties

The following properties are available to the Web Font component:

Web Font

Font Options
Font font

Upload the font resources and configure the font or click Remove Local Override to clear the uploaded font

Font Family

Type a family of a font

Weight

Select a weight of a font from the dropdown list

Style

Select a style of a font from the dropdown list

EOT Font Resource

Select an Embedded OpenType (EOT)[1] font resource from the dropdown list or click Upload to use another EOT font file

[1]Embedded OpenType (EOT) fonts are a compact form of OpenType fonts designed by Microsoft for use as embedded fonts on web pages. These files use the extension . eot

WOFF Font Resource

Select a Web Open Font Format (WOFF)[1] font resource from the dropdown list or click Upload to use another WOFF font file

WOFF2 Font Resource

Select a Web Open Font Format 2 (WOFF2)[2] font resource from the dropdown list or click Upload to use another WOFF2 font file

TTF Font Resource

Select a TrueType[3] font resource from the dropdown list or click Upload to use another TTF font file

SVG Font Resource

Select an SVG[4] font resource from the dropdown list or click Upload to use another SVG font

---

[1]The Web Open Font Format (WOFF) is a font format for use in web pages. WOFF files are OpenType or TrueType fonts, with format-specific compression applied and additional XML metadata added.

[2]WOFF2 font is a web font file created in the WOFF (Web Open Font Format) 2.0 format, an open format used to deliver webpage fonts on the fly. It is saved as a compressed container that supports TrueType (. TTF) and OpenType (. OTF) fonts. WOFF2 files also support font licensing metadata.

[3]TrueType (TTF) is an outline font standard developed by Apple in the late 1980s as a competitor to Adobe's Type 1 fonts used in PostScript. It has become the most common format for fonts on the classic Mac OS, macOS, and Microsoft Windows operating systems.

[4]An SVG font is a new version of the OpenType format, with SVG standing for Scalable Vector Graphics. The SVG glyph format allows the characters to be displayed in multiple colors and different transparencies, and some may even be animated.

file

NOTE

To use SVG as a font in Maestro, first, you need to add a Web Font component to a template and configure it with an SVG font file. Then, you use @font-face CSS in the shared styles to apply the SVG as a font.

Unicode Range
Type an unicode range CSS descriptor to set the specific range of characters to be used from a font defined by `@font-face` and made available for use on the current page.

NOTE

You can't add a rule to this component. For more information, see Maestro Business Rules.

Next, learn about the JavaScript Library component.

JavaScript Library

Maestro comes with the JavaScript Library component allowing you to include pre-existing JavaScript libraries in your Maestro form, either from an external URL, or a text file.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **JavaScript Library** component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the JavaScript Library component:

Code Js jsLibrary
Upload the JS resource

Source
Select a source of JavaScript library, which can be one of the following: • Resource • External URL If you've selected Resource as the source, you have the following options: • Click Upload File to choose a JavaScript library to upload. • Click Create New Resource to create a new resource. You will see a warning message if a resource with the same name already exists. • Select the Wrap in Namespace checkbox to wrap it in namespace. For example, if the JavaScript library contains a method named `doSomething()` and you enter a namespace of `MyNamespace`, then the method will be available to other code within the form, such as business rules, as `MyNamespace.doSomething()`. • Select the Load JS Asynchronously checkbox to load a JavaScript in asynchronously.

If you've selected External URL as the source, you have the following option:

- Type a URL to a JavaScript resource in the URL field.

NOTE

You can't add a rule to this component. For more information, see Maestro Business Rules.

Next, learn about the Countdown Timer component.

Countdown Timer

Maestro comes with the Countdown Timer component, which you can use in several scenarios, such as showing a time left before the form expires or managing a user session timeout.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Countdown Timer** component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Countdown Timer component:

Seconds To Expire
Integer secondsToExpire

Number of seconds after which to fire OnExpiry event.

Options

Countdown Time Format
Text countdownFormat

Format pattern for countdown timer, as defined by AngularJS date filter. This only applies when the Show Countdown Value is selected.

Show Countdown Value
Boolean showCountdown

Show the value of the countdown timer.

Operating Mode
Option operatingMode

Act either as an idle timer, or require full manual control.

The following options are available from the **Operating Mode** dropdown:

Label	Value
Idle Timer	idle
Manual Operation	manual

The Idle Timer is reset on any user keystrokes or clicks on the page, regardless of whether it is on any component you can interact with or not.

Restart After Expiry
Boolean restartAfterExpiry

Act as an interval timer, by restarting each time it fires the `onExpiry` event

Countdown from Timestamp
Boolean countdownFromTimestamp

If this option is selected, when a timer is started the timestamp is recorded and the timer update triggers once per second for an active tab. For the inactive tab, that can be reduced to once per minute under certain circumstances. This means that the timer will expire once the timer is run after the start time plus the timer duration passes.

If this option is not selected, the timer will update once per second and decrement the number of seconds remaining, which will work as intended when the window is active for the duration of the timer. Due to this limitation, it is recommended to have this option enabled for all timers.

Rules

You can add a rule to the Countdown Timer component that will invoke specific actions on the timer using Maestro JavaScript API. The event type `onExpiry` is triggered when the timer finishes.

Mandatory
Boolean

A rule is required

Mandatory Message
Text

A mandatory message text

Rule Helpers

Rule helpers are context menu options that help you create a snippet of code for a specific task on relating to this component.

Reset Timer

The Countdown Timer component can be reset in two ways depending on its Operating Mode:

- Idle Timer / Auto - the timer is reset on user interaction with the form. Usually, it is used for session timeouts.
- Manual Operation - you control and reset the timer using the `Form.getItemFromPath('data.countdownTimer_1').resetTimer()` Maestro JavaScript API. Additionally, Manual Operation relies on user defined action through On Expiry rule in that widget.

Cancel Timer

The Countdown Timer component can be cancelled using the `Form.getItemFromPath('data.sessionTimeoutCountdownTimer').cancelTimer()` Maestro JavaScript API

Start Timer

The Countdown Timer component can be started using the `Form.getItemFromPath('data.sessionTimeoutCountdownTimer').startTimer()` Maestro JavaScript API

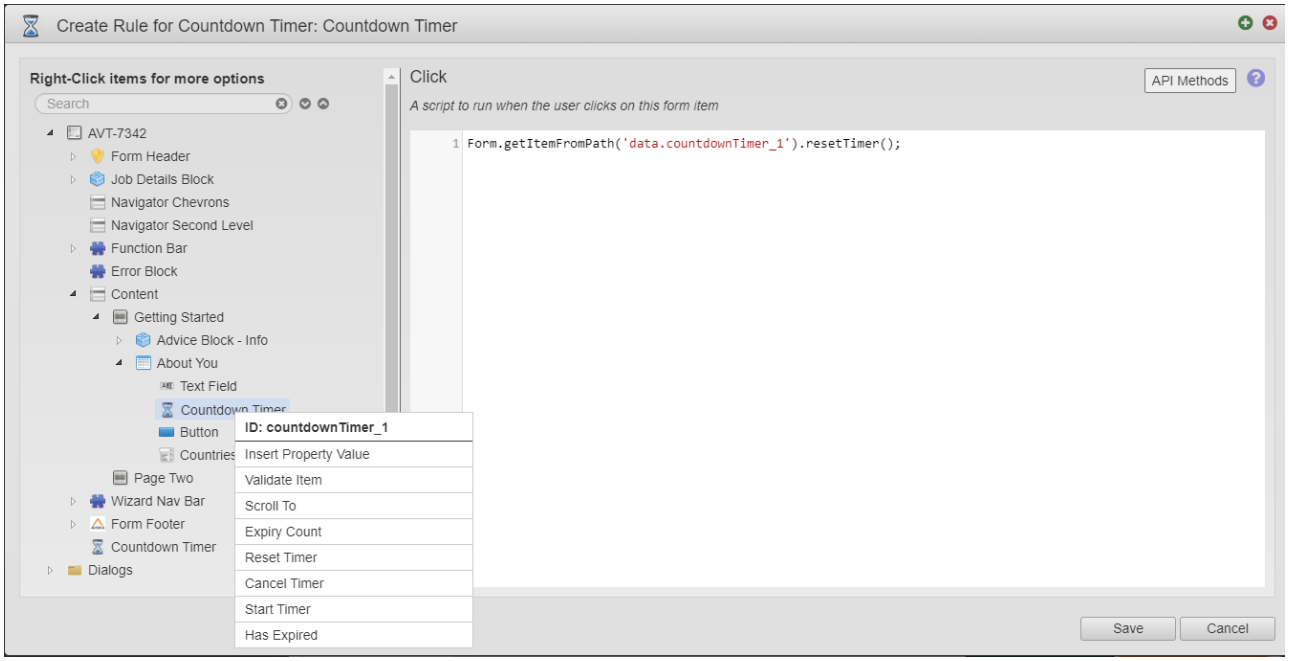
Format Remaining Time

`Form.getItemFromPath('data.countdownTimer').formatTimeRemaining()` that uses the Countdown

Time Format property to format it.

Use a rule helper to add an interaction with this widget to the JavaScript of a rule:

1. From the object that needs to interact with the timer, click Create Rule and select a rule you want to add to the timer, for example, Click event on a Button.
2. Select the Countdown Timer component and right-click on it



3. Select an action from the context menu. The action is added to the JavaScript script.
4. Click Save.

In the example above, we have added a click rule to the timer, which resets the timer by calling the `Form.getItemFromPath('data.countdownTimer_1').resetTimer()` Maestro JavaScript API.

Next, learn about the Autotab Controller component.

Initialize Event Hook

Maestro provides the Initialize Event Hook component (widget), which allows you to add a one-off create event that runs the On Create rule when the object is created. Depending on where you drop this component on the form, the rule may run more than once. For example, if you place this component:

- Outside the page controller, then the rule will run once when the form starts and will only run again once a modal page that is shown is closed.
- On a navigation page, then the rule will run each time the page is shown.
- Inside a block that has a visibility rule on it, then it will run each time the block is made visible after it has been hidden.

This component is an appropriate place to put any override scripts that use jQuery to implement various custom behaviors on an HTML element.

The component is of the `data-initialize-event-hook` type.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Initialize Event Hook component within the Tools folder.
3. Drag the component into the View pane or the Wireframe.
4. Configure the component's rule via the Properties pane.

Properties

The following properties are available to the Initialize Event Hook component:

Rules

On Create

`onCreate`

Provide an action script to run once this object is created, for example:

```
alert("On create rule on " + item.id)
```

Next, learn about the Autotab Controller component.

Autotab Controller

Maestro comes with the Autotab Controller component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Autotab Controller** component within the **Tools** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Autotab Controller component:

Autotab Targets
Field Ref Map targets

Select Text Fields you want to apply auto-tabbing. Tabbing order is determined by DOM order, not by order of Field References. Use only Field Reference column - Key column is not applicable, leave blank.

Format

Format
Option format

Allowed characters

The following options are available from the **Format** dropdown:

Label	Value
All	all
Text	text
Alpha	alpha
Alphanumeric	alphanumeric
Number	number
Custom	custom

Pattern Text pattern
Pattern regex - characters matching this regex will be disallowed. Refer to https://-github.com/Mathachew/jquery-autotab.

NOTE

You can't add a rule to this component. For more information, see Maestro Business Rules.

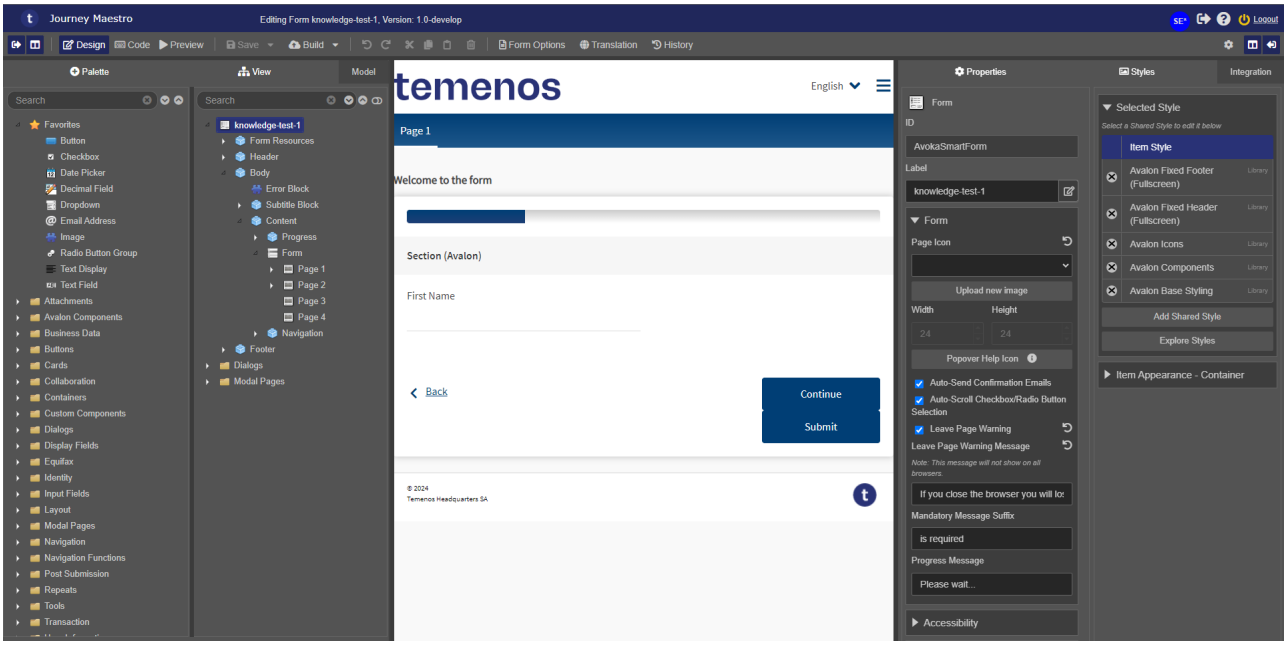
Next, learn about the Form component.

Form

Maestro comes with the Form component, which is a foundation of any user form, and it's where you start building your form from.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Form component within the Transaction folder.
3. Drag the component into the View pane or the Wireframe.



4. Configure the component's properties via the Properties pane.
5. Configure the Load rule to be executed when this form loads.

Properties

The following properties are available to the Form component:

Page Icon Image favicon
The browser page / tab icon for this form

Popover Help Icon Icon popoverHelpIcon

The icon used for popover help

Auto-Send Confirmation Emails
Boolean autoSendEmails

This property will auto-send an email on submit and save to the contact email address

Auto-Scroll Checkbox/Radio Button Selection
Boolean checkboxRadioAutoScroll

This property will enable auto-scroll to checkboxes/radio buttons to the middle of screen on selection

Leave Page Warning
Boolean enableLeavePageWarning

This property will prompt a confirm dialog if the user tries to leave the page.

Leave Page Warning Message
Text leavePageWarningMessage

This property will replace the default message for the leave page warning.

Mandatory Message Suffix
Text mandatoryMsgSuffix

This text will be concatenated to the end of the label when a field is deemed mandatory.

Progress Message
Text progressMsg

This message will be used when `Form.submit`, Form.taskUrlNavigate and `Form.postData` methods are called.

Accessibility

Dynamic Page Title
Boolean dynamicPageTitle

If checked, the title will be updated with the current progress of the application.

New Window Link Warning Message
Text linkWarningMsg

This text will be concatenated to the end of link text and read out on focus to screen readers.

Enable Mobile Zooming
Boolean enableZoom

This will enable pinch-to-zoom on mobile devices. This is not normally needed with good responsive design, but some accessibility reviews require it.

Component

Component JavaScript
Js componentJs

This field is only used when editing a component. If a JavaScript resource is selected it will be included as part of the component when it is published to the selected library.

Google Analytics

Google Tracking ID
Text gaTrackingId

Tracks page load and navigation views. To use Google Analytics, configure the Page Tracking feature in Manager for this form. The built in Google Analytics events that the Maestro runtime framework fires checks this value and will trigger on a non-blank value and will use the Google Analytics configuration as defined in the Page Tracking feature.

Base URL
Text gaBaseUrl

Identifies form within site context. (Optional)

Transact Manager

Session Expiry Redirect Timeout (Seconds)
Integer sessionExpiryRedirectTimeout

This is the timeout between a form being successfully submitted and the form redirecting to the Session Expired page of the Manager Portal. If this value is blank the form will default to a value of 300 seconds. The Session Expired page can be modified within the Manager portal using `Form.view.properties.sessionExpiryRedirectTimeout`.

Auto Background Save Interval (Seconds)
Integer autoSaveInterval

Performs an auto background save using the interval (In Seconds) entered, if set to blank it will never auto-save

Receipts | 19.05 This feature was introduced in 19.05.

Enabled Improved Receipt Pagination
Boolean enableImprovedPageBreaks

Performs improved receipt pagination. The most important thing to know about page breaks in printed HTML is that once a print related directive fails, for example, setting a block to stay as a whole on a page goes over a page, all child fields will ignore page related directives. For example, setting page-break-inside to avoid on a section that goes over a page can cause fields to split over the page break with part of the text on one page and the rest on the next.

Add Page Break Debug CSS
Boolean addPageBreakDebugCss

Adds page break in the debug CSS to a Maestro form that will show you the unbreakable parts of your form as well highlight areas that may be problematic. This greatly helps with debugging pagination issues, for example, when a generated receipt generation is split across the page break. The colors explanations are summarized in the table below.

Border Color	Border Style	Explanation
Gray	Dashed	Hard coded CSS applied by Maestro to low level widgets. The only way to change this is by overriding the CSS.
Blue	Solid	Indicates that the row containing the field has been explicitly marked unbreakable by the user adding the pbu-avoid class.
Purple	Solid	Indicates that a page break will be forced at this point in the form.
Green	Dashed	Shows rows that are automatically marked as unbreakable by the default row level pagination JavaScript that makes lowest level rows automatically unbreakable.
Magenta	Solid	Highlights side by side content. This is potentially problematic content that will behave differently on Chrome or Puppeteer and PhantomJS.

Receipt Pre-Render Callback Timeout

Integer prePhantomCallbackTimeout

This timeout is used during rendering receipts in PhantomJS[1] to allow extra time after the form has loaded to allow all the form to fully initialize. There are various cases where this is needed and there is no single answer as to whether this is needed or what to use. If a receipt does not seem to be working as intended, try setting this value. Examples of cases where additional time may be required:

- External resources such as images are used
- Receipts with large numbers of repeats
- Large receipts may need additional time to fully initialize

[1]PhantomJS is a scripted, headless browser used for automating web page interaction. PhantomJS provides a JavaScript API enabling automated navigation, screenshots, user behavior and assertions making it a common tool used to run browser-based unit tests in a headless system like a continuous integration environment. PhantomJS is based on WebKit making it a similar browsing environment to Safari and Google Chrome (before Chrome's fork of WebKit evolved into Blink). It is open-source software released under the BSD License.

Rules

Create Rules
Specifies rules for the form's events.

Layout

Specifies layout of the form.

Next, learn about the Submit component.

Submit

Maestro comes with the Submit component so you can configure how a form is submitted.

NOTE

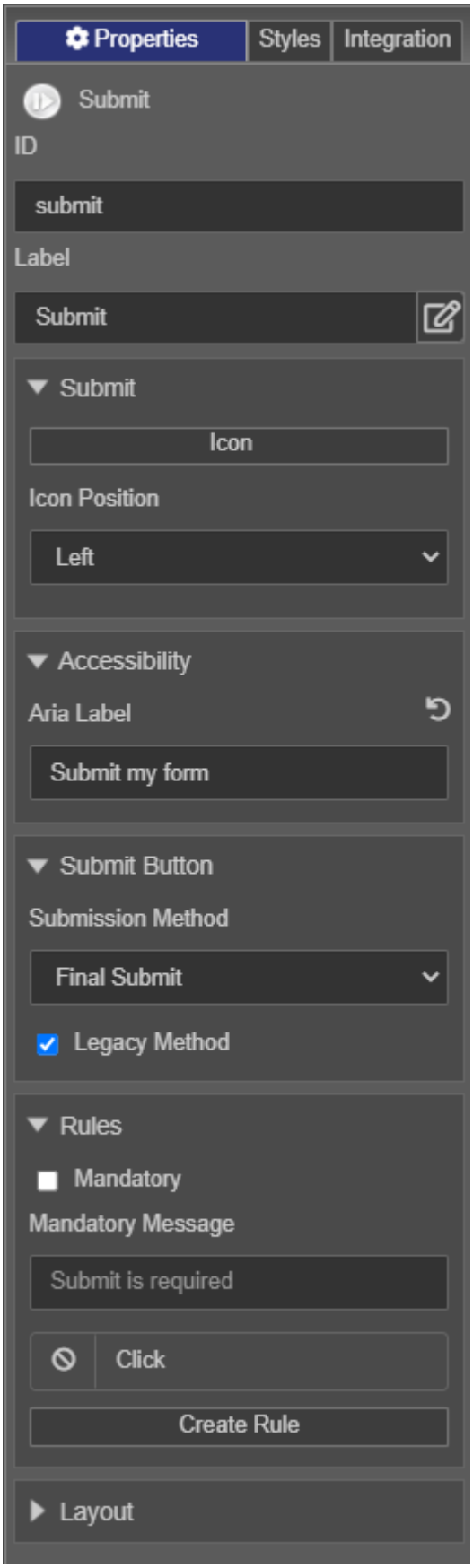
This component inherits properties and shared styles from the Button component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Submit** component within the **Transaction** folder.

3. Drag the component into the **View** pane or the **Wireframe**.

4. Configure the component's properties via the **Properties** pane.


Properties
Styles
Integration
Submit
ID
submit
Label
Submit
Submit
Icon
Icon Position
Left
Accessibility
Aria Label
Submit my form
Submit Button
Submission Method
Final Submit
Legacy Method
Rules
Mandatory
Mandatory Message
Submit is required
Click
Create Rule
Layout

Properties

The following properties are available to the Submit component:

Icon
Icon icon

Select the button icon

Icon Position
Option iconPos

Select the button icon position

The following options are available from the **Icon Position** dropdown:

Label	Value
Left	left
Right	right

Accessibility

Aria Label
Text ariaLabel

Enter the Aria Label for this button, for example, Submit my form. For more information, see ARIA documentation

Submit Button

Submission Method
Option submissionMethod

Select the submission method from the **Submission Method** dropdown, which has the following options:

Label	Value
Final Submit	Submitted
Save Draft	Saved
Abandon Form	Abandoned

Legacy Method

Boolean legacyMethod

Use old-style HTML form post and redirect

Next, learn about the Payment Type Selector component.

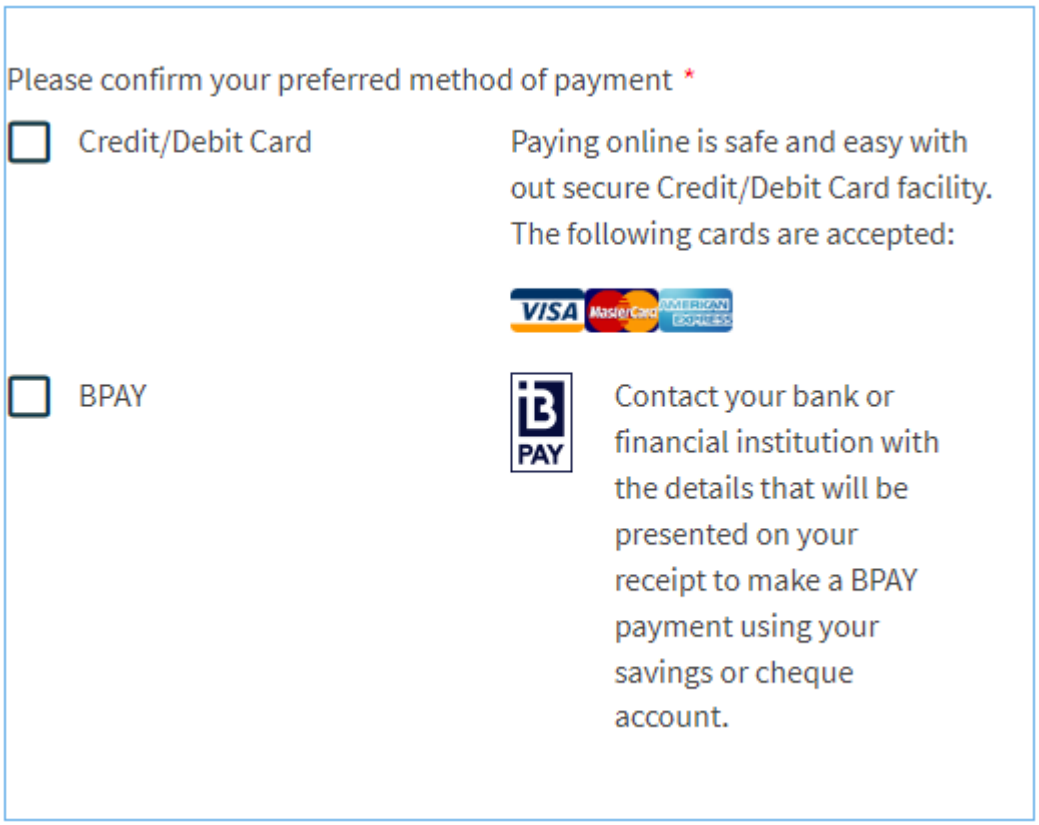
Payment Type Selector

Maestro comes with the Payment Type Selector component, which allows you to set the payment amount, what types of payment are accepted and so on. This is a common requirement to implement payment interface functionality within a form.

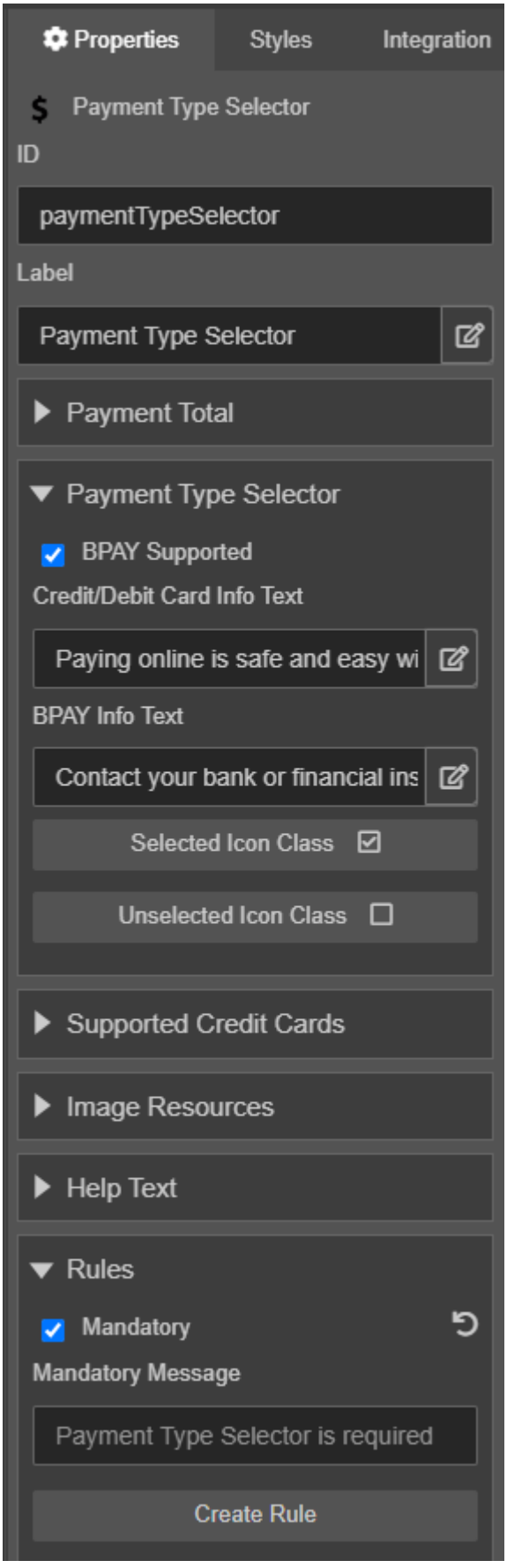
It's important to note that Manager does not store, process or transmit payment card data; any payment card data interaction is directly between the end user's browser and the payment gateway or tokenization provider. We recommend that, when enabling our payment interface features, you ensure appropriate security, access and change control measures are in place to prevent accidental or malicious change of configurations.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Payment Type Selector** component within the **Transaction** folder.
3. Drag the component into the **View** pane or the **Wireframe**.



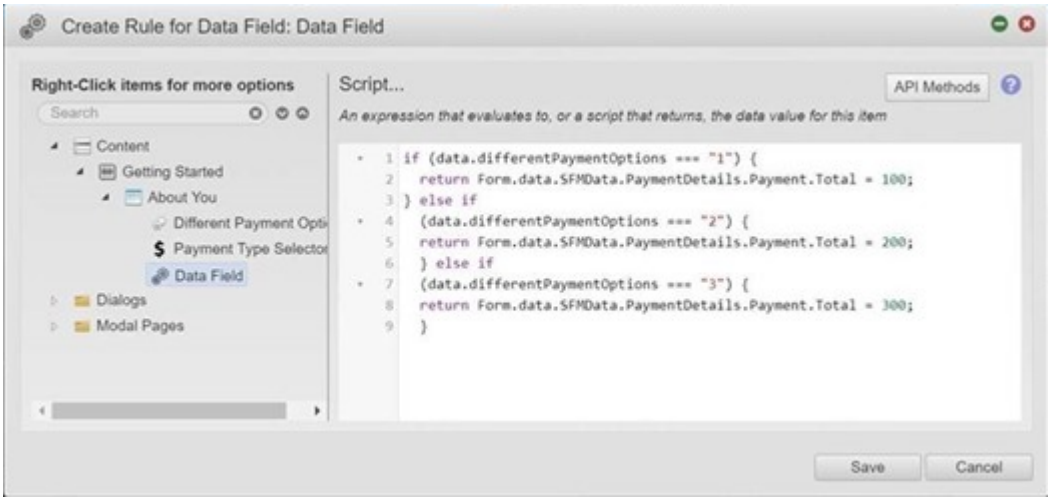
4. Configure the component's properties via the **Properties** pane.


Properties
Styles
Integration
Payment Type Selector
ID
paymentTypeSelector
Label
Payment Type Selector
Payment Total
Payment Type Selector
BPAY Supported
Credit/Debit Card Info Text
Paying online is safe and easy wi
BPAY Info Text
Contact your bank or financial ins
Selected Icon Class
Unselected Icon Class
Supported Credit Cards
Image Resources
Help Text
Rules
Mandatory
Mandatory Message
Payment Type Selector is required
Create Rule

5. Add a Rule to perform any additional actions. For example, you can add a data field to this form with a calculation rule that sets the payment amount into the `Field.data.SFMData.PaymentDetails.Payment.Total` data property of the Payment Type Selector, as shown below:

```
data.SFMData.PaymentDetails.Payment.Total = data.textField
```

Or it could be a more complex rule:



The Payment Type Selector component automatically populates the submission XML data with the correct data that Manager uses to process the form. Manager reads the payment information from a `PaymentDetails` XML document node, which comes from the form, by looking for this node using the XPath `//PaymentDetails`, though the search path can be customized. Manager uses the following values from the XML data to display the payment pages after a user submits the form:

```
<AvokaSmartForm>
	<SFMData>
		<PaymentDetails>
			<Payment>
				<SubTotal/>
				<GST/>
				<ServiceFee/>
				<Total/>
			</Payment>
			<PaymentType/>
			<AccountNumber/>
			<ItemList>
			<Item>
				<Description/>
				<Quantity/>
				<UnitValue/>
				<GST/>
				<Total/>
				<FeeCode/>
				<ReceiptCode/>
			</Item>
			</ItemList>
		</PaymentDetails>
		...
	</SFMData>
</AvokaSmartForm>
```

The form is responsible for telling Manager that a payment is required and what amount and types of payment will be accepted. Then when the form is submitted, Manager receives this information and presents the payment pages depending on which payment gateway has been configured.

Properties

The following properties are available to the Payment Type Selector component:

BPAY Supported Boolean optionBPAY
Check to include BPAY

Credit/Debit Card Info Text
Rich Text ccDbInfoText

Credit card/Debit card info text.

BPAY Info Text
Rich Text bpayInfoText

Credit card/Debit card info text.

Selected Icon Class
Icon selectedIconClass

Selected icon class name.

Unselected Icon Class
Icon unselectedIconClass

Unselected icon class name.

Help Text

Popover Help Text
Help Text helpText

Image Resources

Select VISA Image
Image srcVISA

Select from the available images resources, or upload a new one

Select MasterCard Image
Image srcMASTER

Select from the available images resources, or upload a new one

Select AMEX Image
Image srcAMEX

Select from the available images resources, or upload a new one

Select Diners Image
Image srcDiners

Select from the available images resources, or upload a new one

Select BPAY Image
Image srcBPAY

Select from the available images resources, or upload a new one

Payment Total

Payment Total ($)
Integer paymentTotal

Enter the payment total. It has to be non-zero for the Payment page to appear after submission. If you require a Fixed payment amount, update the Payment Total ($) property of the Payment Type Selector.

Supported Credit Cards

Visa
Boolean optionVISA

Check to include VISA

Master Card
Boolean optionMASTER

Check to include Master Card

AMEX
Boolean optionAMEX

Check to include AMEX

Diners
Boolean optionDINERS

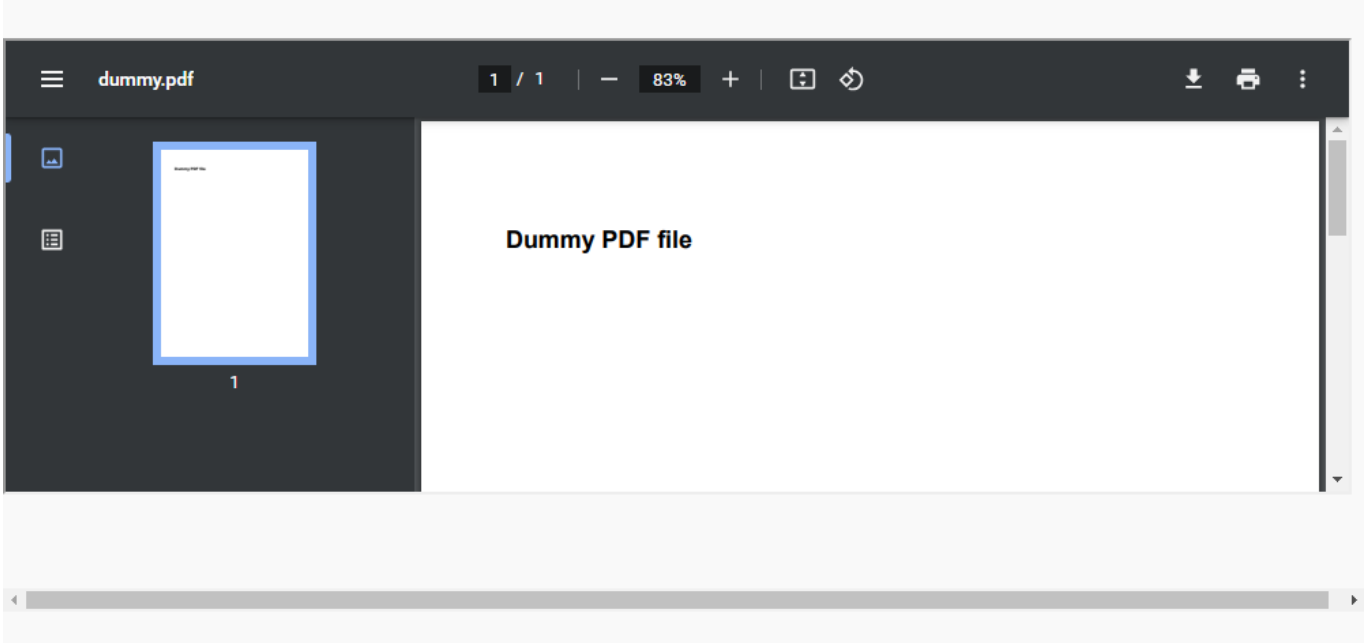
Check to include Diners

Next, learn about the iFrame component.

iFrame

Maestro comes with the iFrame component, which allows you to load any resource specified with a static URL. A URL can point to a PDF file, hosted internally on a Manager form space or externally on a client web site.

You can use this functionality to embed various documents, such as legal statements, disclosures and term and conditions (T&Cs), into a form and present them to form users as per a journey flow. The example of an embedded PDF file in an iFrame is shown below:



NOTE

You can't use dynamic URLs with the iFrame component. Use the Text Display component instead.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **iFrame** component within the **User Information** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the iFrame component:

URL
Url url

A static URL pointing to a web page or a resource, for example, a PDF file, hosted on a Manager form space or externally on a client web site

Height
Integer height

The height of the frame in CSS pixels. Default is 300

Next, learn about the Advice Block - Info component.

Advice Block - Info

Maestro comes with the Advice Block - Info component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Advice Block - Info** component within the **User Information** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Advice Block - Promo component.

Advice Block - Promo

Maestro comes with the Advice Block - Promo component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Advice Block - Promo** component within the **User Information** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Popover Text Display component.

Popover Text Display

Maestro comes with the Popover Text Display component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Popover Text Display** component within the **User Information** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Properties

The following properties are available to the Popover Text Display component:

Help Text

Popover Help Text Rich Text popoverContent
Enter the text to display in popover.

Popover Options

Popover Button Label Rich Text PopoverButtonText
Enter the text to display. This will be read out on focus for screen readers.

Next, learn about the Popover Widget Container component.

Popover Widget Container

Maestro comes with the Popover Widget Container component.

Usage

1. Open the **Palette** pane in the Maestro Editor.
2. Locate the **Popover Widget Container** component within the **User Information** folder.
3. Drag the component into the **View** pane or the **Wireframe**.
4. Configure the component's properties via the **Properties** pane.

Next, learn about the Select Language component.

Select Language

Maestro provides the Select Language component (widget), which allows form users to select a language that they want to use on a form. You must add and configure a language or multiple languages for a form before a user can select them.



NOTE

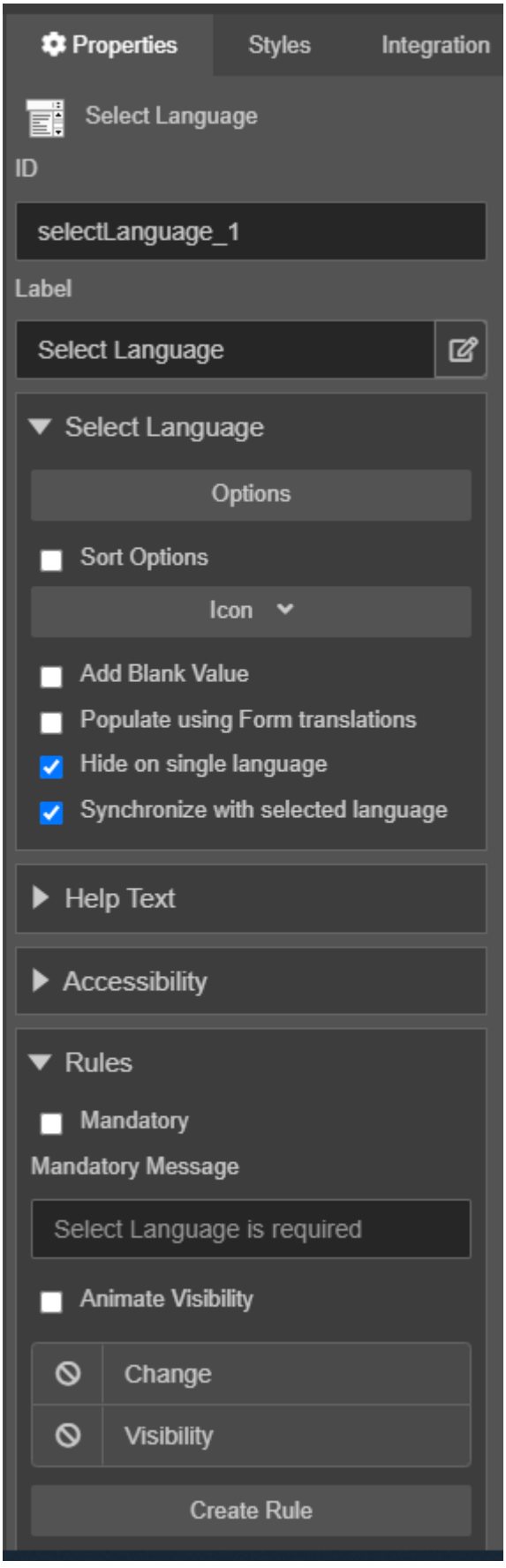
This component inherits properties and shared styles from the Dropdown component.

Usage

1. Open the Palette pane in the Maestro editor.
2. Locate the Select Language component within the User Information folder.

3. Drag the component into the View pane or the Wireframe.

4. Configure the component's properties via the Properties pane.


Properties
Styles
Integration
Select Language
ID
selectLanguage_1
Label
Select Language
Select Language
Options
Sort Options
Icon
Add Blank Value
Populate using Form translations
Hide on single language
Synchronize with selected language
Help Text
Accessibility
Rules
Mandatory
Mandatory Message
Select Language is required
Animate Visibility
Change
Visibility
Create Rule

5. Configure the component's styles via the Styles pane.

Properties

The following properties are available to the Select Language component:

Select Language

Populate using Form translations

`Boolean useFormLanguages`

Select the checkbox to populate the dropdown list with the translations configured in the form. This will overwrite the options specified at runtime. The Select Language component does not have to show all of the available languages in the list based on your business requirements.

Sort Options

`Boolean sortOptions`

Check to automatically sort options by label.

Hide on single language

`Boolean hideSingleLanguage`

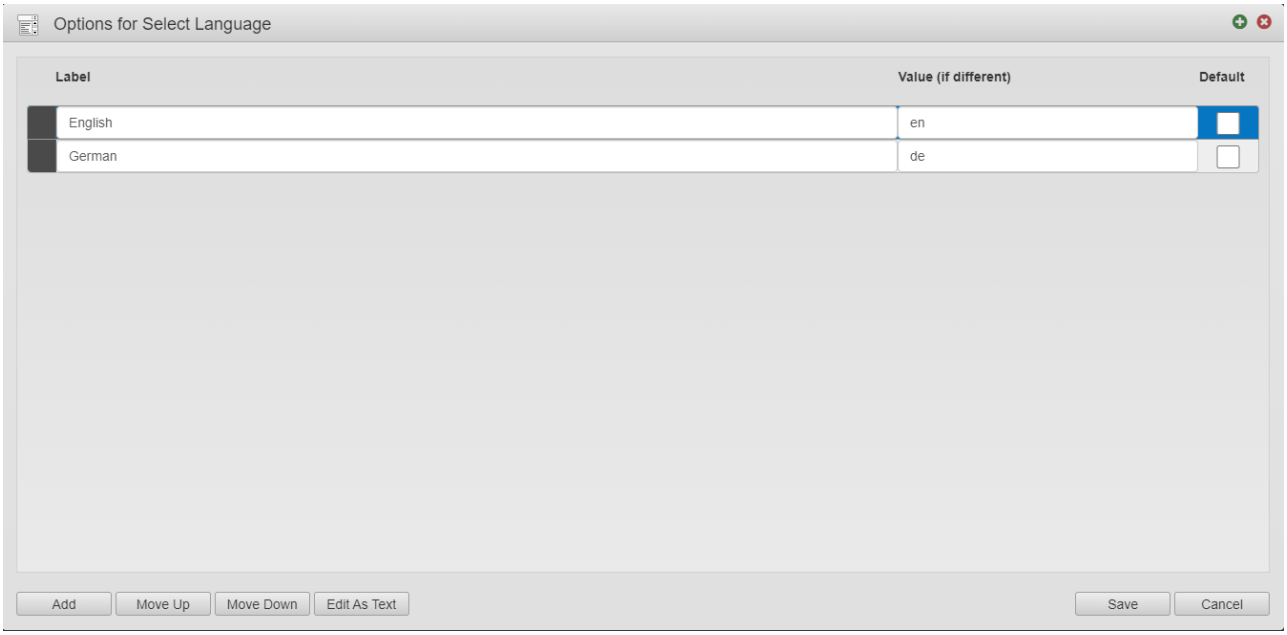
Hide this widget when the form has only one language defined.

Options

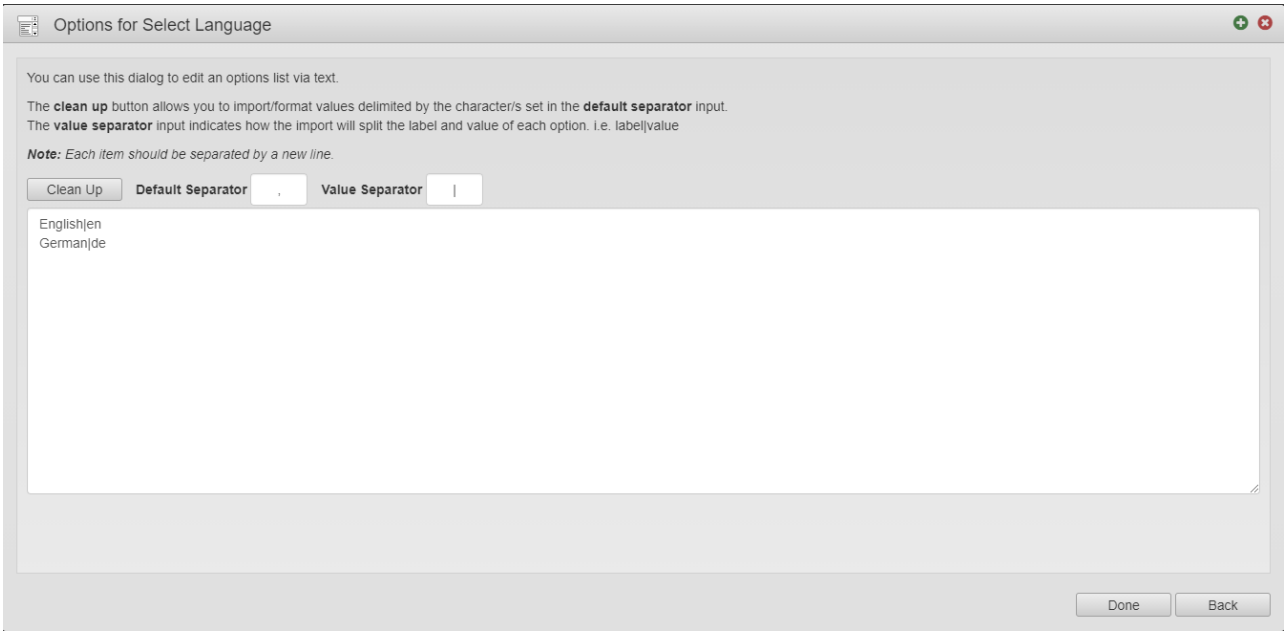
`List options`

Defines a list of languages in the dropdown. By default, the **Options** property contains the following values:

Label	Value
Language name 1	Locale code 1
Language name 2	Locale code 2



Update the language details or select the Default checkbox to make a selected language a default one and click Save.
Click Add to add a new line to the list where you need to add a language name and a locale code.
Select a language and click Move Up or Move Down to re-order its position in the list of languages.
Click Edit as Text to see the language configuration as a text file. You can change the separators used in the text.



Sort Options

`Boolean sortOptions`

Check to automatically sort options by label

Icon

`Icon icon`

Select the dropdown icon

Add Blank Value

`Boolean addBlankValue`

Check to add a blank value to the dropdown

Styles

The following styles are available to this component:

Avalon Language Selector

```
form[name='form'] {
  .avalon-language-selector {
    width: auto;
    margin-right: 20px;
    .wdg-label {
      display: none;
    }
    .av-select-overlay {
      display: inline-block;
      float: right;
      width: 150px;
      background-color: transparent;
      border: 0;
      border-radius: 0;
      padding: 0;
      min-height: 30px;
      outline: none;
      box-shadow: none;
      cursor: pointer;
    }
    .wdg-input {
      .av-select-value {
        right: 25px;
        padding: 0;
        font-family: @ux-default-font-family;
        font-size: @ux-default-font-size;
        color: @ux-default-font-color;
```

```
      }
      .wdg-select-icon {
        padding: 0;
      }
      &:hover, &:focus {
        .av-select-value {
          text-decoration: underline;
        }
      }
    }
  }
}
```

After you've configured the component, you can preview the form to switch between the available languages to verify it works as expected.

Next, learn about the Attachment Field component.

Maestro Receipts Overview

Maestro allows you to build receipts that are read-only statements for various stages of form application processes, for example, a successful form submission, or all pages of a form concatenated together. It uses a printable CSS so it's rendered similarly to a printed version. By default, Maestro auto-generates a receipt based on the design and structure of the form. A receipt can be an HTML or a PDF file. You can always preview a receipt in the Maestro editor.

Sometimes, you may want to create custom a receipt having a very different structure to a web form or optimized for printing. The later is often a case as a dynamic and interactive form can be a lot less space efficient, as well as presenting data on a page along with the interactive form used for data collection which may not be efficient for creating a printable record of the transaction. The Maestro editor allows you to create these receipts using the Receipt Designer tool.

If a form has a receipt design, then when you build a form with the Use Separate Receipt Design option selected, Maestro generates a FAR file containing two complete Maestro designs - a form and a receipt, and an XML configuration file specifying which receipt design to use when the FAR file is published in Manager. If there is no receipt in the FAR file, the interactive form is used for the receipt.

When creating a receipt, a Form Builder will:

- Use the Receipt Designer to create a custom receipt
- Remove tooltips, help text, and other changes to make the most of receipt improvements

The Maestro editor provides the Add Page Break Debug CSS option in the Form component to outline the page breaks with the dotted outlines in the Preview mode to help you debug receipts.

NOTE

Manager delivers receipts to applicants and also allows you to perform some minor receipt configuration.

Next, learn how to use Receipt Designer.

Receipt Designer

Maestro allows you to design a receipt using the Receipt Designer feature, which is available in the Maestro editor since version 19.05.

Creating a receipt is very similar to creating a form, so only a basic understanding of form development is required. We will illustrate it with a concrete example where we will:

1. Create a form
2. Create a receipt
3. Download the Form Version Archive file
4. Deploy the form to Manager
5. Test the receipt

Create a form

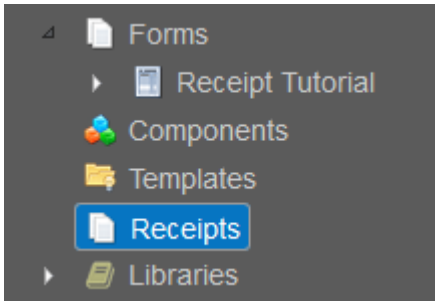
1. Create a form with First Name and Last Name text fields in your project.



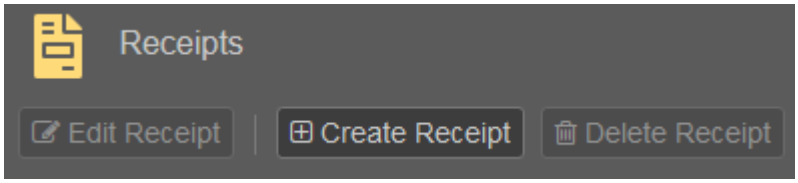
2. Select the **Maguire - Default Form** template when creating the form to make the form submittable without any further configuration. This isn't strictly necessary though, as we can use a Receipt Test Harness to test the receipt without navigating and submitting the form.

Create a receipt

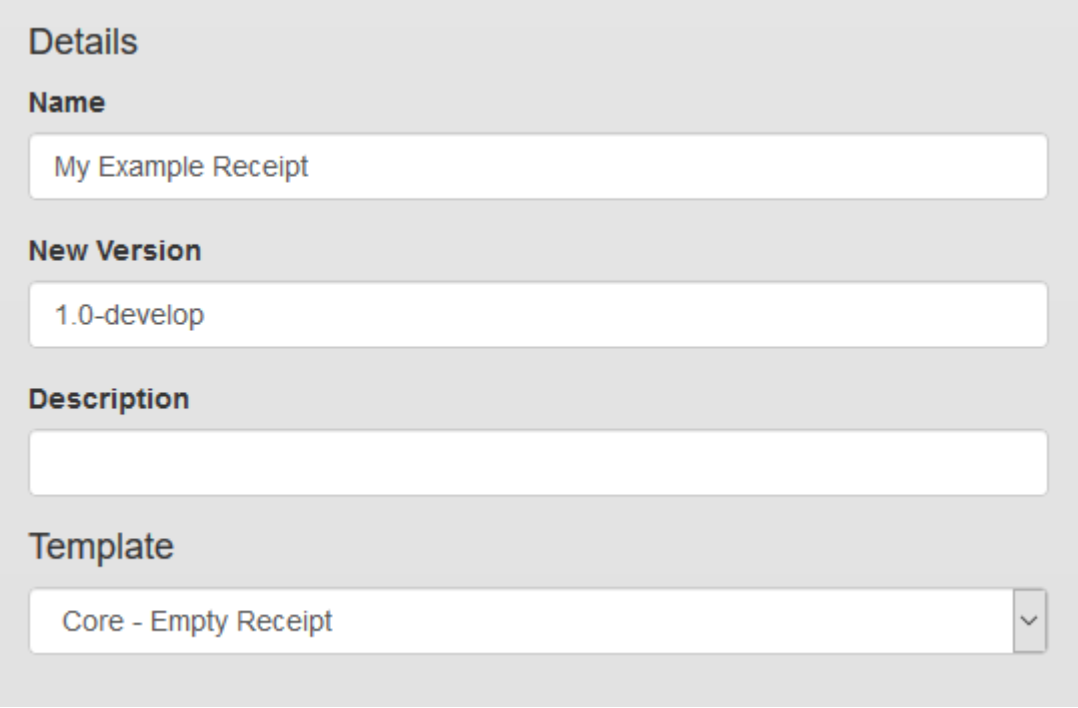
1. Click **Receipts** in the same project as the form.



2. Click **Create Receipt**.



3. Enter a name for the receipt in the **Name** field.
4. Select the **Core - Empty Receipt** template from the **Template** dropdown list. This is the simplest receipt template you can use.



5. Click **Create**.

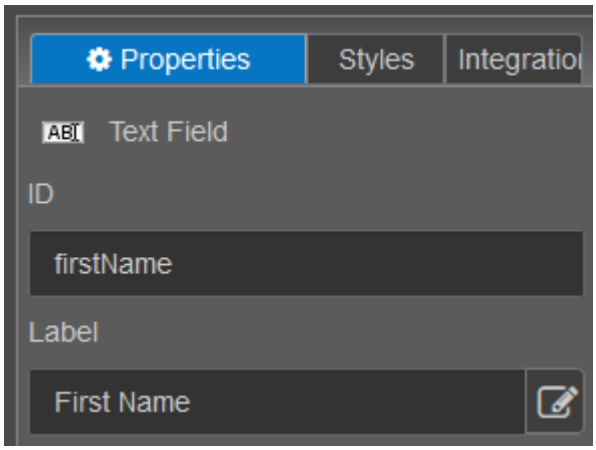
> NOTE
>
> In a real-world project, we recommend creating and publishing a custom receipt template based on an existing receipt template. Functionally, receipt templates are identical to form templates, so all standard template practices apply.

6. After the receipt opens in a new window, drag two text fields into the receipt.



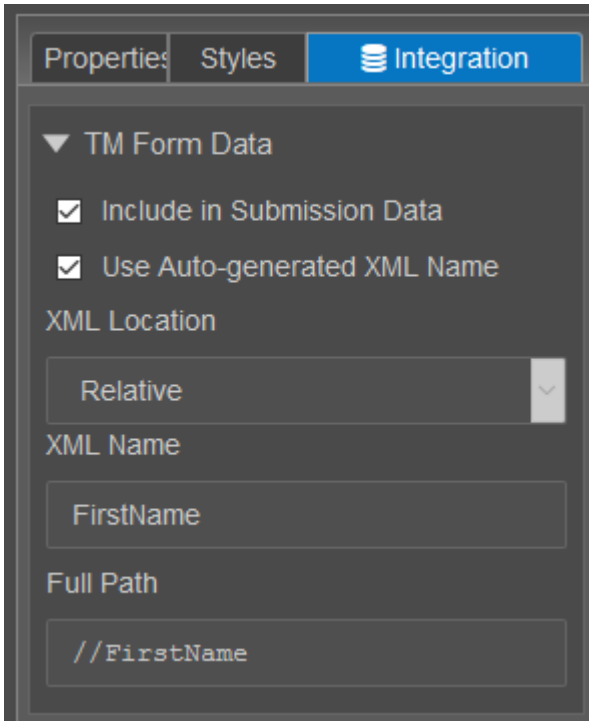
For the data from a form to appear in the receipt, the fields need to have the same XML path. To accomplish this, we suggest creating a domain model and sharing it between the receipt and form. In this topic however, we'll just manually ensure the component IDs are the same.

7. Change the ID of the first text field to firstName and the ID of the second text field to lastName. Their labels should automatically regenerate.



NOTE

By default, XML names are auto-generated based on component IDs. If this option is disabled via the **Integration** properties, you'll need to manually set the XML names rather than the component IDs.



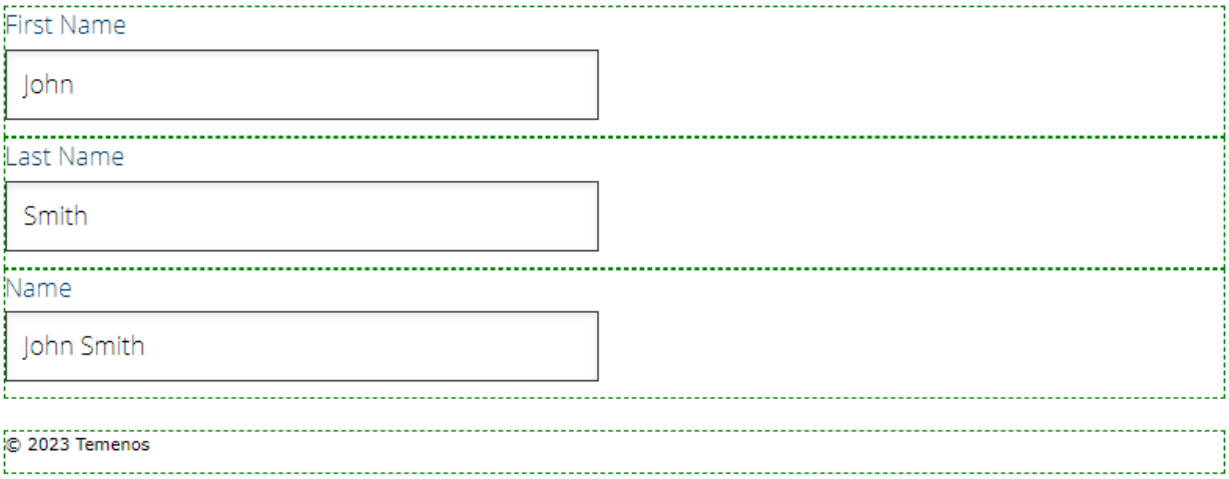
So far we've recreated the form in the receipt, but typically, receipts will look different from their forms.

Here is one example of how to approach this:

1. Drag a Text Field component into the receipt.
2. Change the ID of the component to fullName.
3. Click **Create Rule**.
4. Under the **Calculation** heading, click **Script**.
5. Copy and paste the following code into the code editor: `return data.firstName + " " + data.lastName;`
6. Click **Save**.

   This code concatenates the first name and last name into a single line of text.

7. To see this, switch to the **Preview** tab and fill out the First Name and Last Name fields. The Name field will update with the combined result of these values.



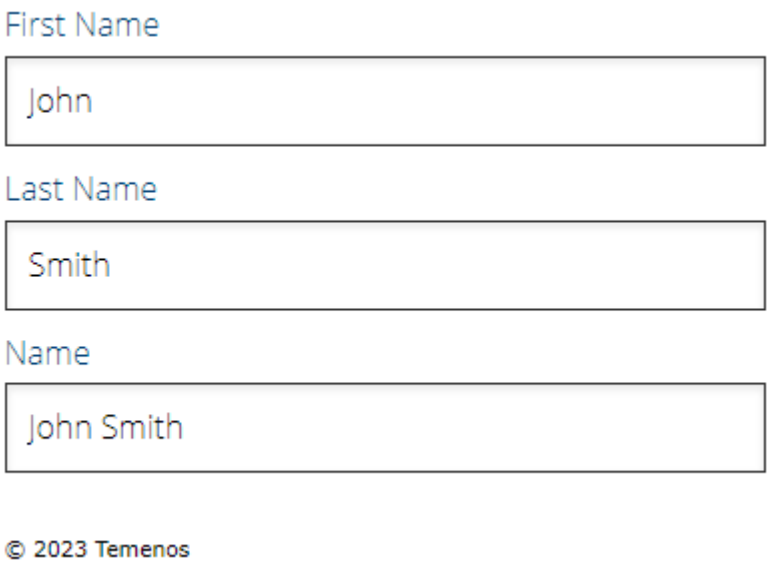
NOTE

The dotted outlines in the preview show the page breaks to help you debug receipts.

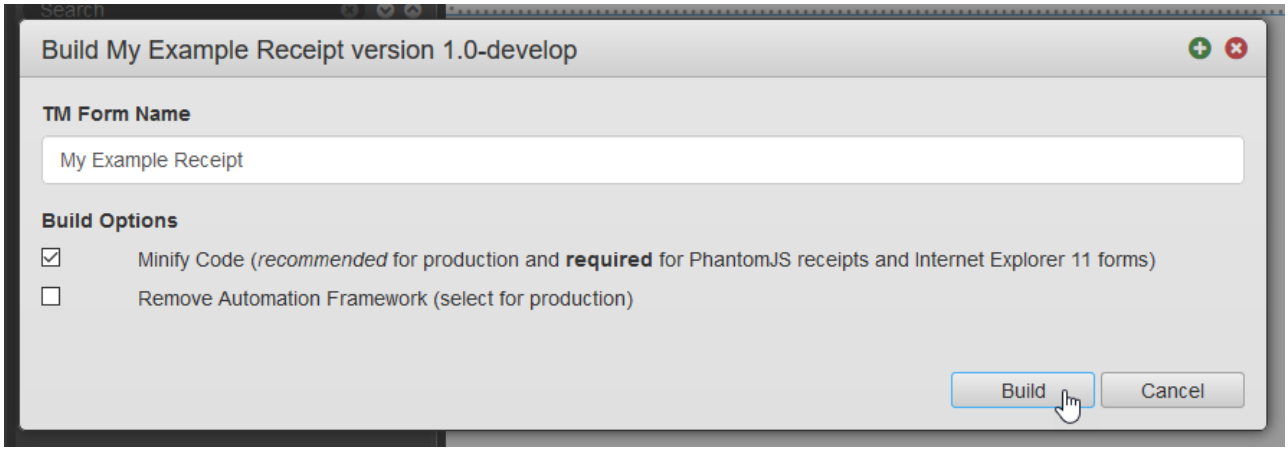
To switch off the page break debugging:

- Select the form root and click the Properties tab.
- Expand the Receipt and clear the Add Page Break Debug CSS checkbox.

The receipt preview without the page break is shown below:

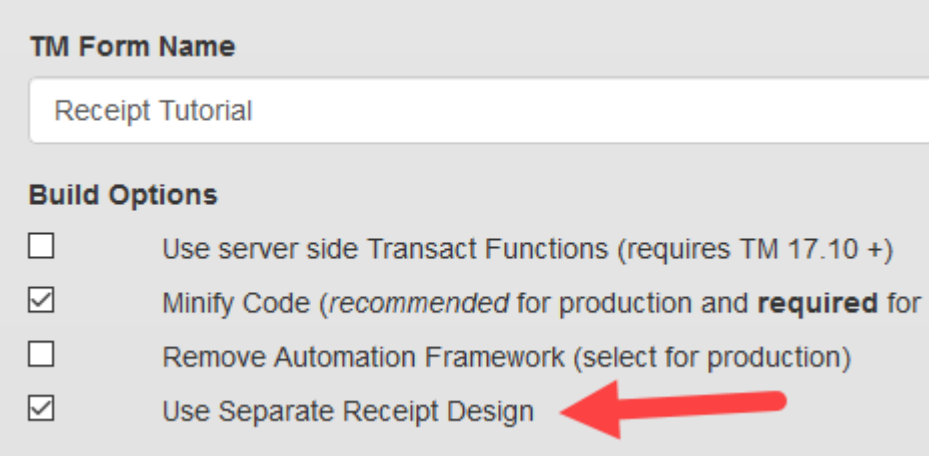


8. Finally, click **Build** to make the receipt available to the form.



Download the Form Version Archive file

1. Return to the form and refresh the UI.
2. Click **Build > Build and Download TM Form Version** to build the form.
3. Enable **Use Separate Receipt Design**.



4. Select a receipt from the **Receipt Version** dropdown. If the receipt isn't available, verify that you clicked the **Build** button in the previous step.



5. Select a version number from the **Receipt Version** dropdown.

6. Click **Build**.
7. Click **Download TM Form Version** to download the Form Version Archive file.

NOTE

Multiple forms can use the same receipt.

Deploy the form to Manager

NOTE

Whether or not a custom receipt has been designed in Maestro, the process of deploying a form to Manager is the same.

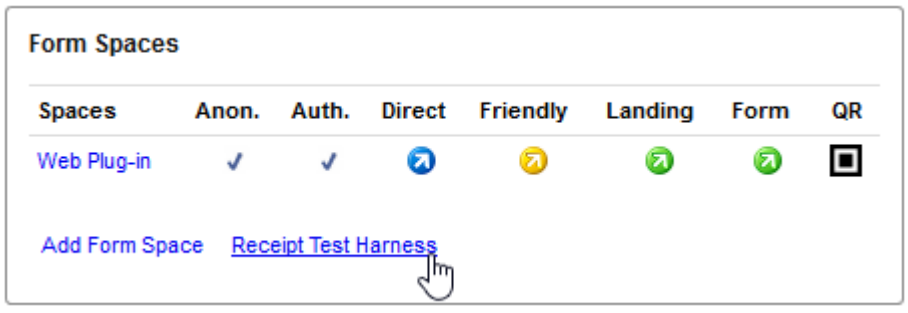
1. Log in to Manager.
2. Navigate to **Forms > Forms**.
3. Click **Import Form**.
4. Click **Browse**.
5. Select the Form Version Archive file downloaded in the previous step.
6. Click **Upload**.
7. Select **Create a Form**.
8. Click **Proceed to Import**.
9. Click **Import**.

For more information, see import forms.

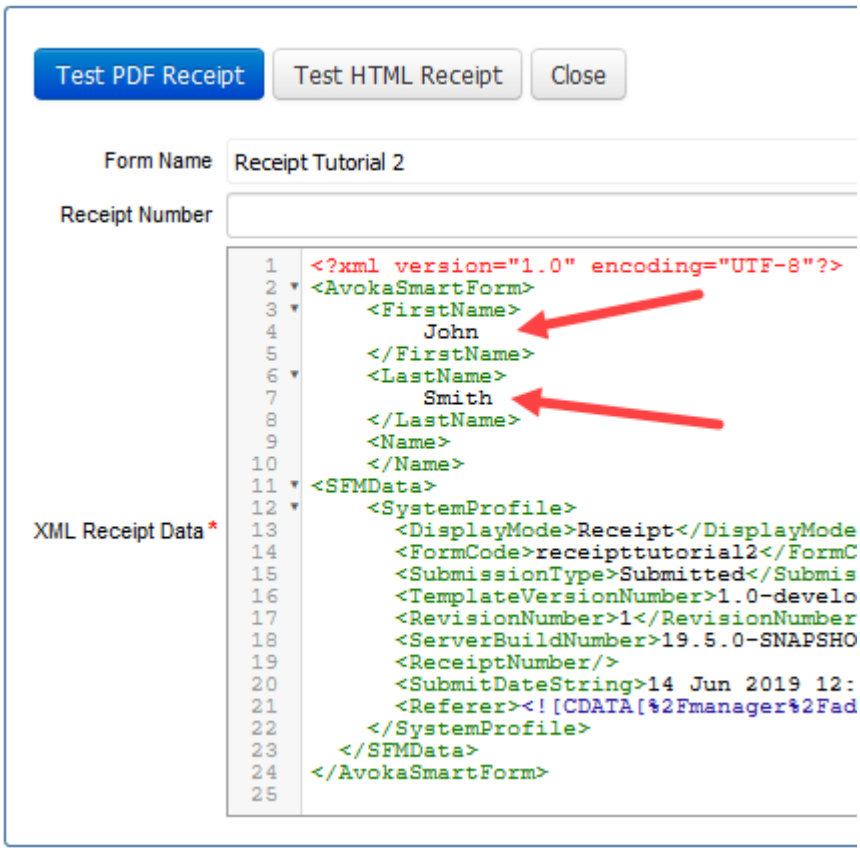
Test the receipt

Rather than testing the receipt by repeatedly submitting the form, use Manager's Receipt Test Harness feature:

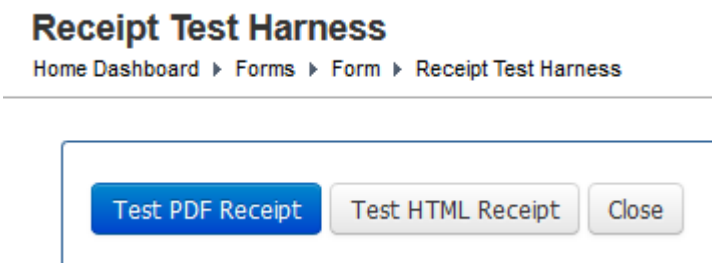
1. Navigate to the **Form Dashboard** for the imported form.
2. Click **Receipt Test Harness**.



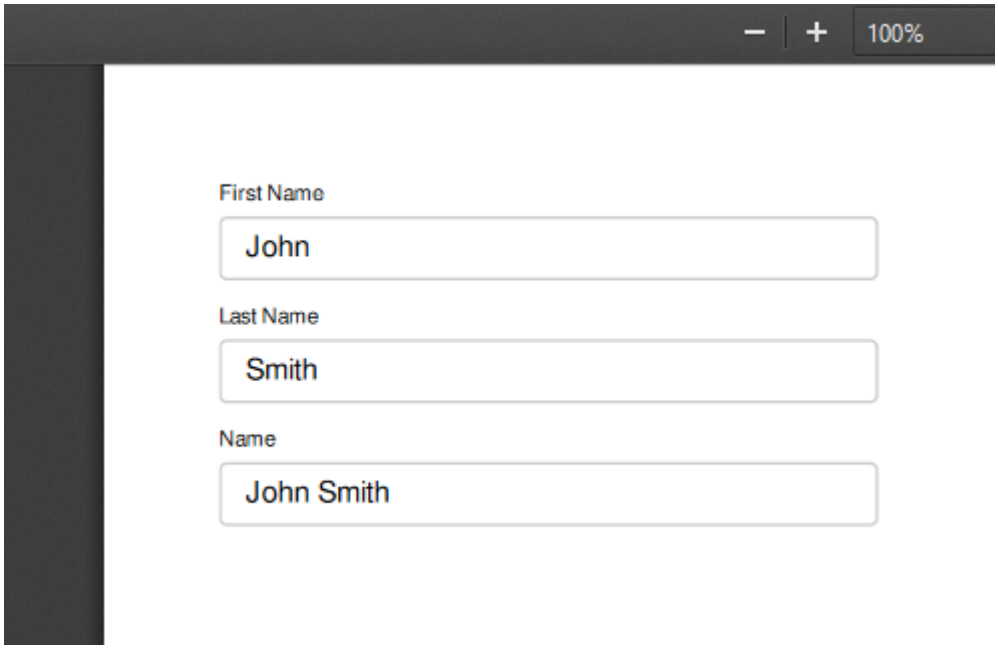
3. Inside the **XML Receipt Data** field, change the values of the FirstName and LastName fields.



4. Click **Test PDF Receipt** or **Test HTML Receipt**.



The receipt contains the data from the form, as shown below:



This is a simple receipt, but it does demonstrate:

- How a receipt can be designed in Maestro
- How data flows from a form and into a receipt
- How form rules can affect the display of data

Now, with these fundamentals, you can easily create more complex receipts.

Next, learn how to edit a form in Design Mode.

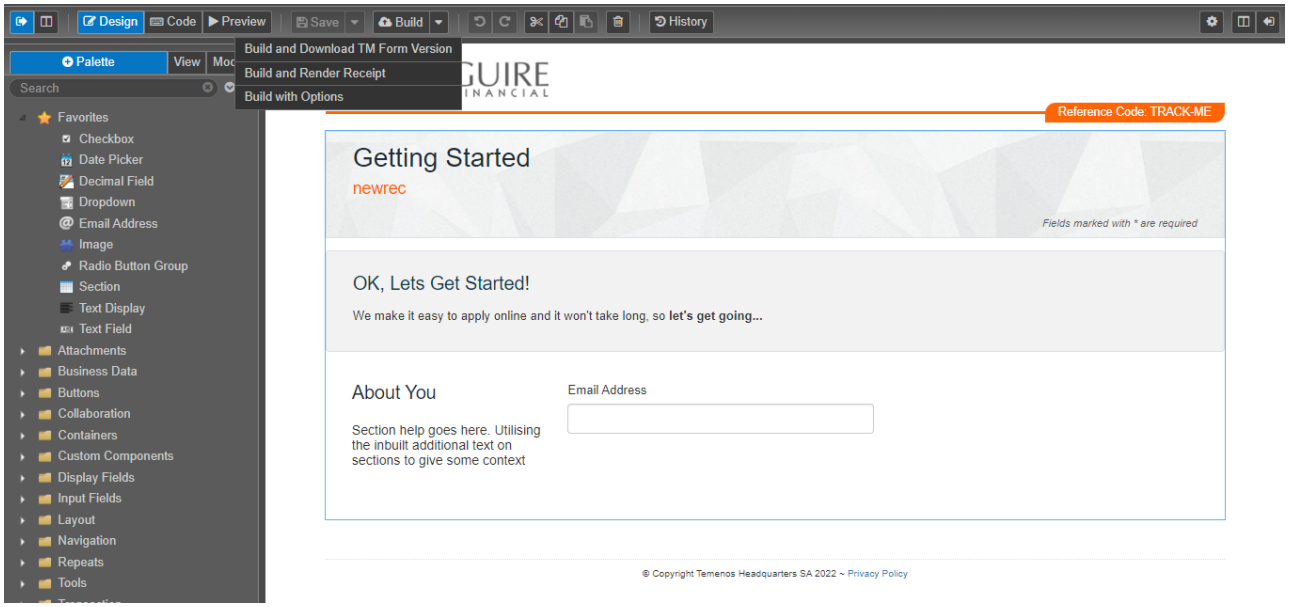
Build a Receipt

Maestro allows you to build a receipt in a similar fashion as you build a form. You should always build a receipt after you've created it or after you've done some changes to it. While you are editing the receipt, you can just build it or build it with various publishing options. However, receipts have less building options as that of the forms.

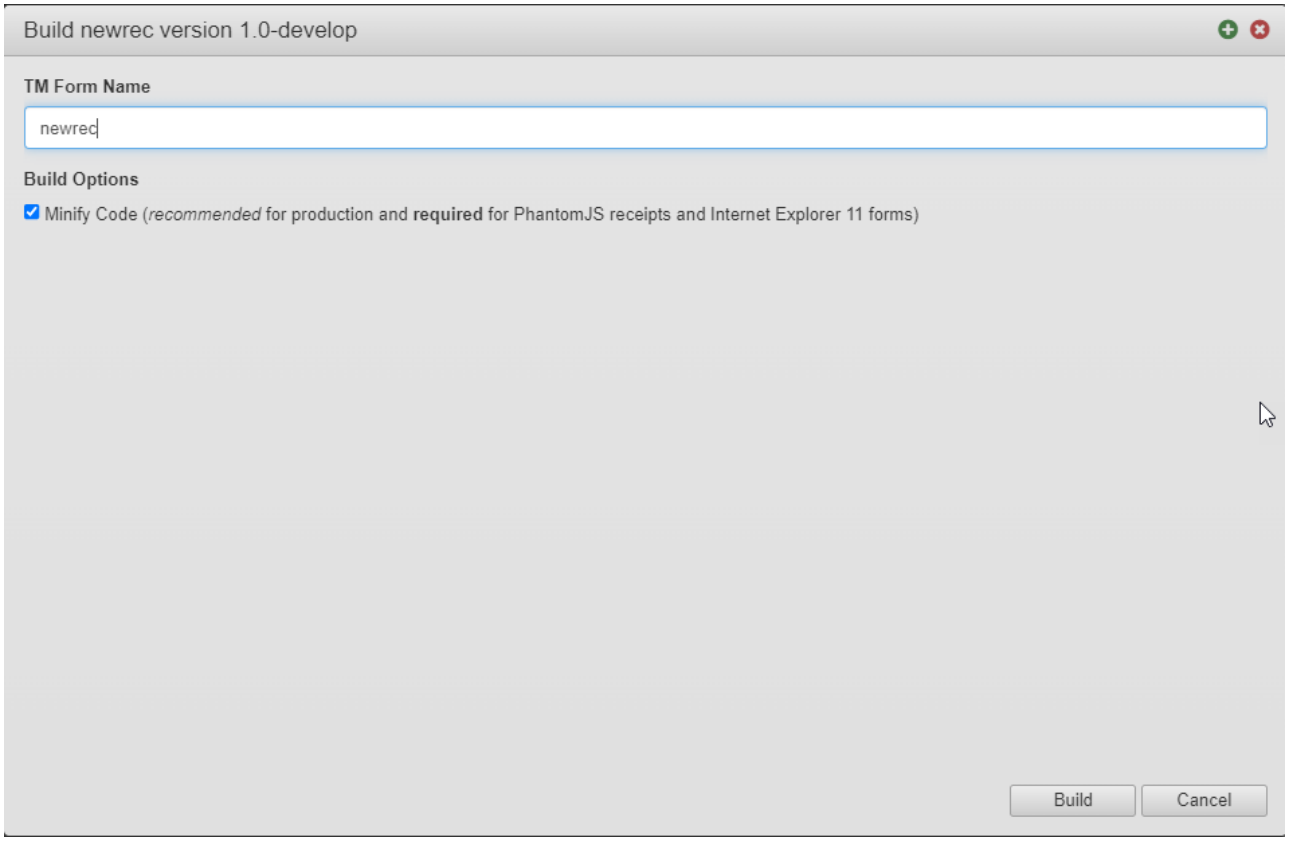
The receipt is fetched each time the form is built so that Maestro can pick up the latest version. If the receipt has been changed since its last built, Maestro will prompt you to re-built it. The Maestro editor makes this publishing easier for you. While you are editing a form, you can open the receipt and make a change to it, build the receipt and then go back to the form tab and click Build. The new changes from the receipt will be included in the form build.

To build the receipt of a Maestro form:

1. Open a form in the Maestro editor and select one of the following options from the Build dropdown menu:



2. Click Build to build the receipt.
3. Click Build and Download TM Form Version to build a TM Form Version and then immediately download the ZIP file needed to import the Form Version into Manager.
4. Click Build and Render Receipt to build a TM Form Version and render the receipt in a new tab.
5. Click Build with Options to apply the following options to the receipt before building the TM Form Version.



- Enter a new TM Form Version name in the TM Form Name field, in case you want to change it from the default name, which is the existing name of the receipt.
- Select the Minify Code checkbox to reduce the size of the receipt and related JavaScript[1] resources without changing its functionality so they can be sent out to a client browser more efficiently.

Next, learn how to edit a receipt.

[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

Shared Styles

Maestro allows you to create shared styles that can then be used to attach visual attributes to one or more components. Out of the box, Maestro's templates provide their own range of shared styles, but you are allowed to create custom shared styles. You can think of a shared style as a place for grouping various CSS logically.

Styling should be done by a Template Designer within a template. Using a template ensures that all forms follow a corporate style guide. The Template Designer can help to determine whether you should make style changes in the form or if the template needs to be updated. If a change is needed and it applies to other forms, it is best to be applied in the template so that all forms can access this change. This type of management allows all forms to continue to follow the corporate style guide keeping all forms consistent.

Templates allow for corporate brand control and for all forms to have a consistent look and feel. Templates are created by a Template Designer based on a corporate style guide. The responsibility of the Template Designer includes styling areas, such as the navigator, footer, and styling of specific components.

Ideally, individual forms and components should never deviate from a corporate style guide. A Form Builder should not change any styling without first talking to the Template Designer.

Usually, the Template Designer creates a shared style and make it available to other components so Form Builders can use it. The style can be added a component and then moved up and down to adjust its precedence as required. When the shared style is not needed or should not be used by Form Builders, the Template Designer can remove it from a component.

You can change the style of components in brands.

Next, learn how to create a shared style.

Create a Shared Style

Maestro allows you to create shared styles that can then be used to attach visual attributes to one or more components. Out of the box, Maestro's templates provide their own range of shared styles. You can, however, create custom shared styles. You can think of a shared style as a place for grouping of CSS logically.

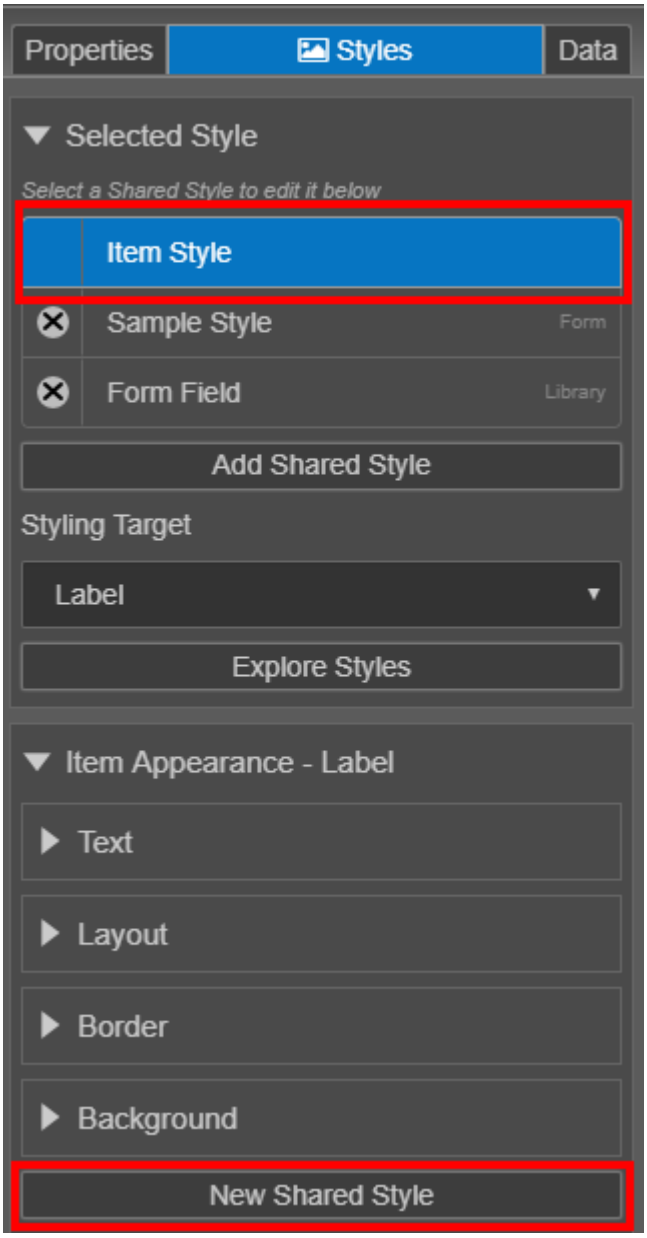
There are two ways to create a shared style:

- Create a new shared style and then apply it to a component
- Update the Item Style of a component and then save as a new shared style

To create a shared style:

1. Open a design in the Maestro editor.
2. Select a component and click the Styles tab to view available shared styles. For more information, see the Styles pane.

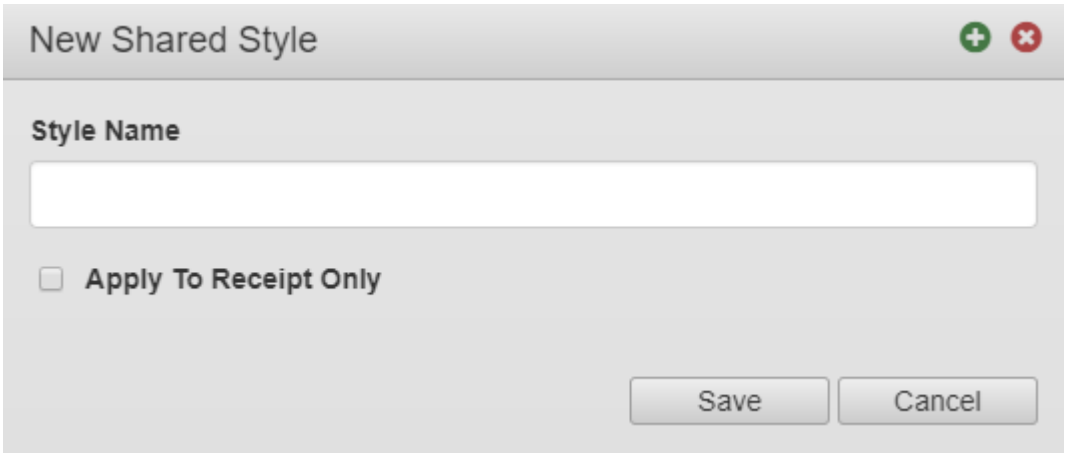
3. Expand the **Item Appearance - Container** pane.



4. Click **New Shared Style**.

> NOTE
>
> This button is only visible when the **Item Style** is selected and the **Item Style** has not been edited via the GUI.

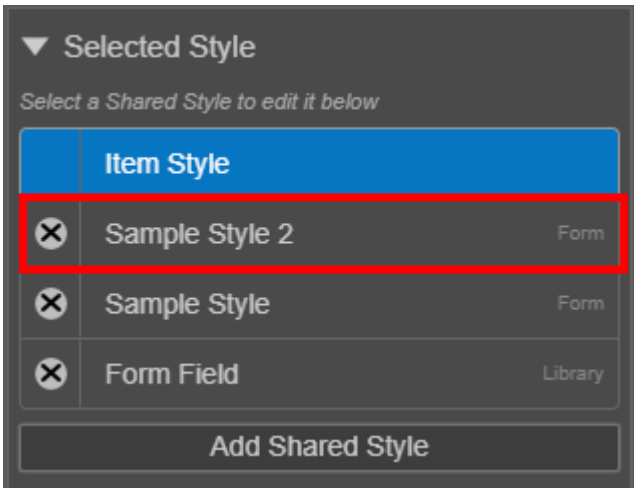
5. Enter a name for the style in the **Style Name** field.



6. Select the **Apply To Receipt Only** checkbox to apply the style only when the component is rendered as a receipt. This is optional.

> NOTE
>
> You can change this option after the style has been created.

7. Click **Save**. The new style will appear under the **Selected Style** heading.



> NOTE
>
> The new style is not selected by default. Make sure you always check the selected style before applying any style changes.

Next, learn how to make a shared style available.

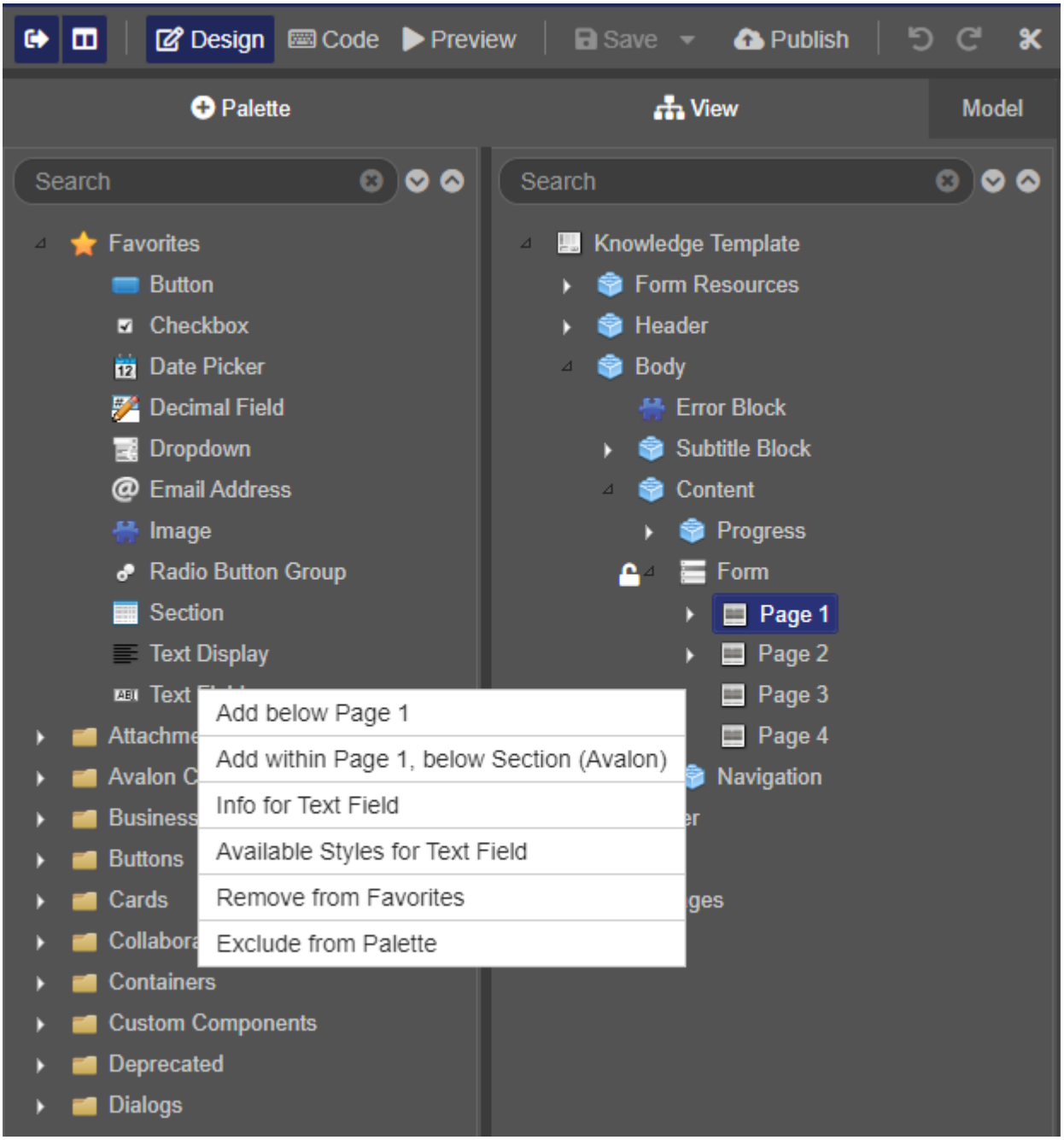
Make a Shared Style Available

Maestro allows you to make a shared style available to other component, so a Form Builder can choose the most appropriate style depending on the requirements.. When a shared style is created, it's applied to the instance of the component upon which it was created and made available to all components of the same type.

For example, a shared style created on a Section component will be applied to that Section component and made available to other Section components and components that extend the Section component. However, you can make shared styles available to other components.

To make a shared style available to a component:

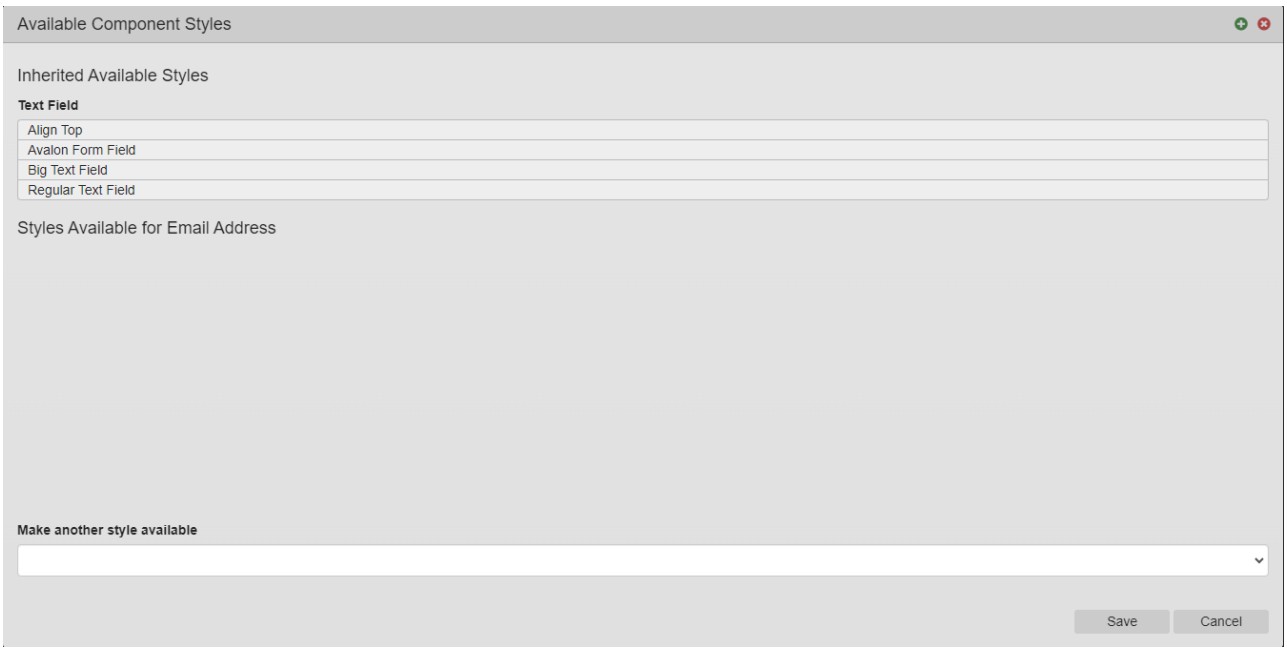
1. Open a design in the Maestro editor.
2. Right-click on a component in the Palette tab and select Available Styles for [Component]. For more information, see the Palette pane.



3. Check the list of styles available for the selected components in the Available Component Styles dialog.



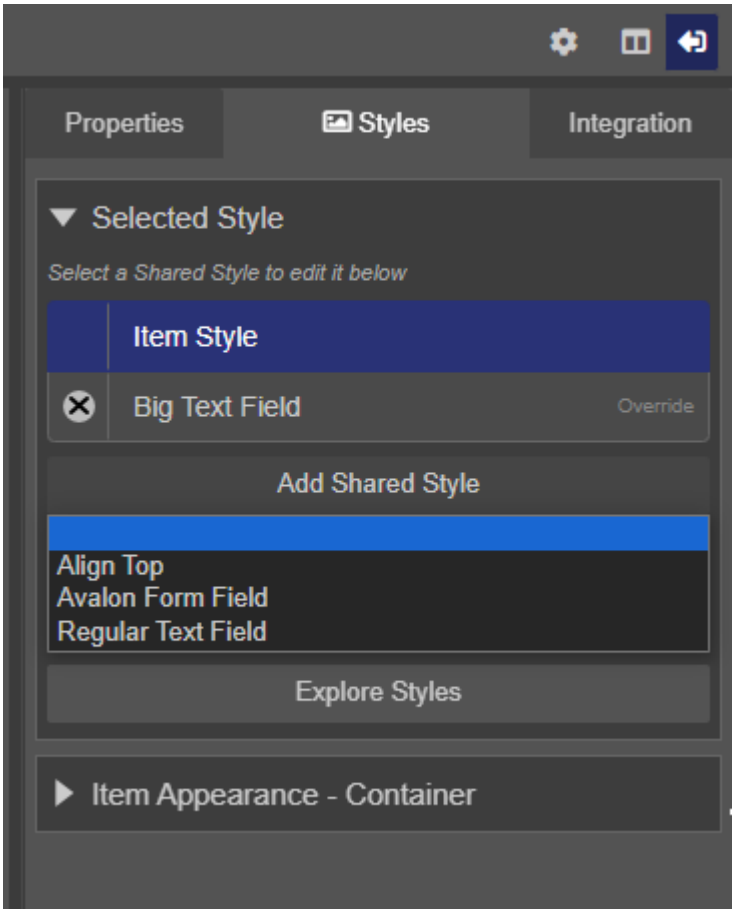
4. Select a style from the Make another style available dropdown.
5. Click the left-most icon of a selected style if you want to make it unavailable to the component.
6. Check which shared styles are inherited from another component as some components list them under Inherited Available Styles, as shown below:



You can't directly edit the list of inherited styles, but you can exclude them from the parent component. For instance, if you don't want the Email Address component to inherit a style from the Text Field component, you need to modify the available styles for the Text Field

component. However, this will affect the available styles for the Text Field component and all components that inherit from the Text Field component.

7. Click Save. All components of that type will now have access to that style.



NOTE

If you adjust some aspect of the styling, the changes will immediately be applied to all fields of that type in your entire form.

Next, learn how to apply a shared style.

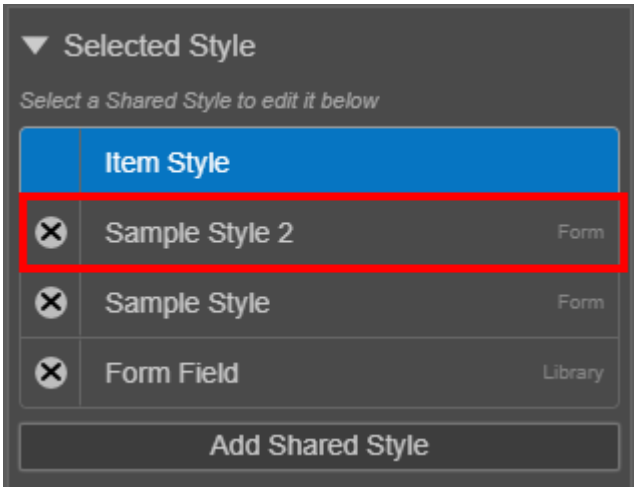
Apply a Shared Style

Maestro allows you to apply a shared style to a component to change it look and feel. You usually want to do this after you have created a new shared style.

> NOTE
>
> We recommend defining and applying shared styles at the template level, so it's easy to maintain and update styles.

To apply a new shared style to a component:

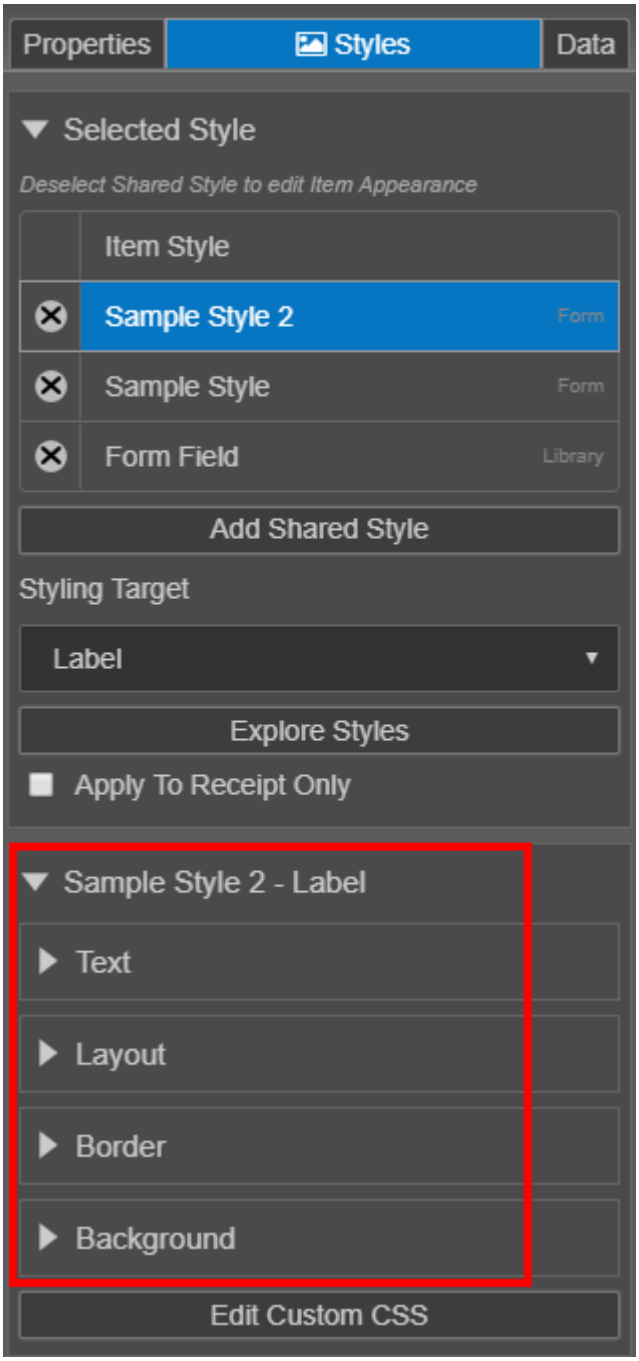
1. Open a design in the Maestro editor.
2. Select a component and click the Styles tab



3. Select the new style and then select the correct Styling Target.

> NOTE
>
> The new style is not selected by default. Make sure you always check the selected style before applying any style changes.

4. Expand the Item Appearance section to display the selected style name.

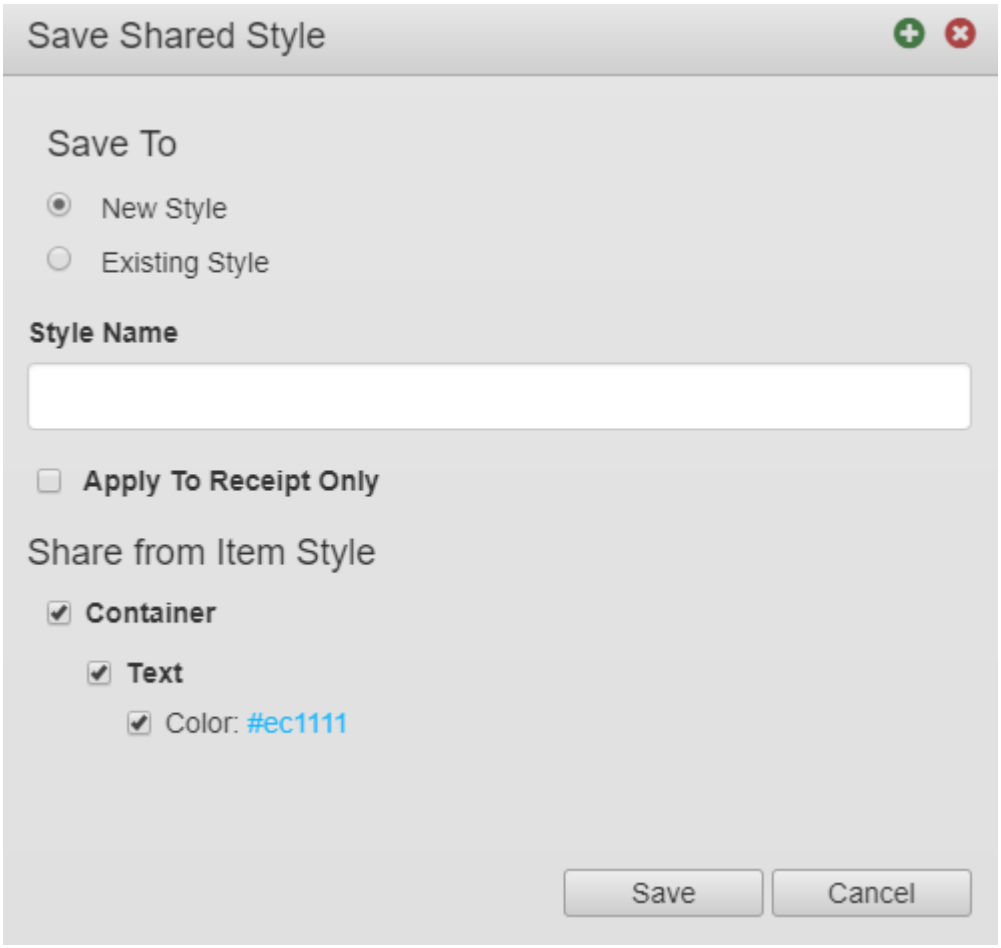


NOTE

You can also click the Edit Custom CSS button to make you styling changes using CSS.

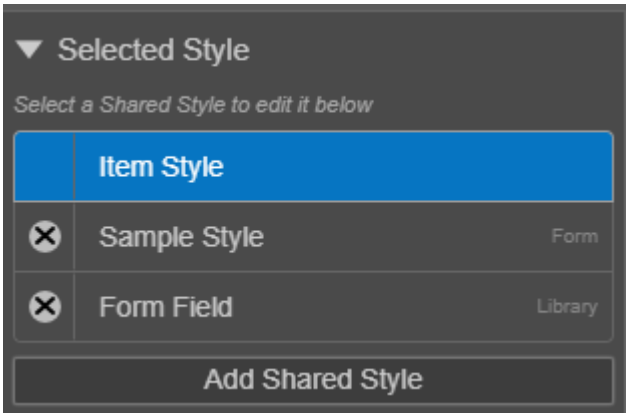
5. Click Save to Shared Style to keep your changes.

6. Select some of the following options shown below:



- Select New Style to create a new shared style. Or, select Existing Style o save the changes to an existing shared style.
- Enter a name of the new style you are creating in the Style Name field, which is displayed when the New Style options is selected. Or, select an existing style from the Select Style dropdown list, which is displayed when the Existing Style option is selected.
- Select the Apply To Receipt Only checkbox to create styles that are only displayed in the receipt, and not used in the form.
- Under Share from Item Style, select what changes, made to the Item Style, you want to be saved in the new or existing style.

- Click Save. The new style will be displayed in the Selected Style list:



> NOTE
>
> The word Form displayed next to the new shared style indicates that the style has not been published, and is only available in the template or from where it was created.

> NOTE
>
> The word Library displayed next to the new shared style indicates that the style is being pulled from a library. Many standard components include a default style that is inherited from the library that they are defined in. This may vary depending on how Maestro has been configured for your organization. You may remove or modify this standard style, but generally, this should be avoided. You can always add it back if you remove it accidentally.

> NOTE
>
> If you want to use a shared style that you have created in other forms, then you will need to publish this shared component to a library.

7. Click Clear Items Styles to undo any styling changes made since the last time the style was saved.

Next, learn how to add a shared style.

Add a Shared Style

Maestro allows you to add an existing shared style to a component, which you normally do after you created a new shared style.
To add a shared style to a component:

1. Open a design in the Maestro editor.
2. Select a component and click the Styles tab to view available shared styles. For more information, see the Styles pane.
3. Click Add Shared Style.
4. Select a style from the dropdown list.

   > NOTE
   >
   > If a style isn't available from the dropdown, it was probably created for a different type of component. To resolve this issue, see style availability.

5. Click Save.

Add a Shared Style to Multiple Components

If you want to add the same set of styles to multiple components of the same type, you don't have to do it one-by-one. You can instead do it using a style created in a template.

To add a shared style to multiple components:

1. Open a template in the Maestro editor.
2. Add a style to one of the components, for example, change the background color of a Button component to red.
3. Click Save to update the template
4. Right click the component in the View pane and select **Add Shared Styles to Every [Component]**. In this example, Maestro will apply the red background color to all button element of the Button component type.

Next, learn how to move a shared style.

Move a Shared Style

Maestro allows you to move shared styles. The order in which the styles appear in the **Styles** tab can affect how the styles are rendered in a form. This is referred to as style precedence. You can, however, control the order of the styles by moving them up and down the list.

To move a shared style:

1. Open a design in the Maestro editor.
2. Select a component and click the Styles tab to view available shared styles. For more information, see the Styles pane.
3. Right click a style.
4. Click Move style up or Move style down.
5. Click Save.

It's difficult to predict how style precedence will affect the appearance of a component. If the styles don't appear to be applied in the correct order, some trial-and-error will be required.

> NOTE
>
> If a style can't be moved up or down, such as when there's only one style in the list, these options will not be available.

Next, learn how to remove a shared style.

Remove a Shared Style

Maestro allows you to remove a shared style that was applied to a component in a template, so it is not available for anyone to use anymore. This is often the case when the shared style is no longer relevant or meaningful, for example, the new look and feel of an organization.

To remove a shared style from a component:

1. Open a template in the Maestro editor.
2. Select a component and click the Styles tab.
3. Expand Selected Styles to view available shared styles. For more information, see the Styles pane.
4. Click the X icon next to the name of a style you want to remove.
5. Click Save. The style will disappear from Selected Style.
6. Add a new style to the component, save it and re-publish for the changes to take effect.

warning
If a shared style was manually added as an override on the form level, this method of removing of the style may not work. This is why we always recommend applying styles in a template.

Alternatively, you can remove only a specific element of the style within a shared style you will continue to use.

To remove a specific element of a shared style:

1. Open a template in the Maestro editor.
2. Select a component and click the Styles tab.
3. Update the style as needed.
4. Save and publish the template so that the updated shared style to take on that change throughout your forms.

Next, learn how to create a shared style.

Template Overview

Maestro allows you to create templates that accelerates application form development process and unifies look and feel of forms, which are based on the templates. Templates are mostly created by Template Designers.

If your organization creates forms using Maestro, they probably intend to create multiple forms with similar layouts and styles. To streamline this process, Maestro allows you to use templates. You can think of a template as a form that is published in a library so it can be used as a starting point in a new form development.

The primary purpose of a template is to define a structure that can be used across multiple forms. A template usually includes a header, footer, and navigation or progress bar. You might, for instance, want to use the same header, footer, and navigation for more than one form. To accomplish this, you can create these components once and place them in a template. Then, when creating a form, you select a template so the form is populated with these components.

From that point onward, any changes made to the template — and any changes made to the components in that template — will be reflected in any forms using the template.

Templates are also responsible for brands, which are used to control the appearance of templates, including their colors, heights, widths, and padding.

All templates have a default brand that cannot be deleted. Most organizations will only need this default brand. You can, however, create multiple brands to create variations of a template. This is called white-labelling[1]. Maestro editor gives you all mechanisms to create your own while-label brands.

Using a template provides you with the following benefits:

- Avoid implementing the same styles and behavior in multiple places

  If you have multiple forms with similar styles, the only way to implement those styles across the forms without templates is to duplicate the work. Even if you're just working on a couple of forms, this is an unproductive use of time.

- Update the look and functionality of multiple forms at once

[1]White-label software is software that is purchased by a company from a service provider and rebranded as its own.

When the design of forms are based on a template, updating the design of those forms is simply a matter of publishing a new version of the template. The changes will be automatically reflected in any form using the template.

- Prevent Form Builders from introducing inconsistencies into the design of a form

  When designing a template, you can use Extension Points to control what parts of the template the Form Builders can edit and add content to. This prevents them from making changes that should be made within the template, ensuring consistency across dozens (or even hundreds) of forms.

- Design templates and forms simultaneously

  Templates and forms can be developed independently and simultaneously. This improves the overall workflow, as Template Configurators and Form Builders won't cause any conflicts as they will work on different resources - a template and a form..

- Work faster with a fully-fledged starting point

  In Maestro, all templates must be based on a template that we've bundled with the software. These templates are feature-rich starting points that allow you to quickly implement styles and functionality specific to your organization, rather than having to repeatedly reinvent the wheel.

- Save time (and money) with less testing

  You can't avoid testing your templates and forms entirely, but because your templates will be based on one of our templates, you'll benefit from the testing we do in-house.

In Maestro, all forms must be based on a template. Templates are responsible for the look and feel of forms. By using templates, you can define a source of truth of how an organization's forms should look. Then, if the organization wants to update the look and feel of its forms, the changes only need to be made in the template, rather than in each form

Most Maestro templates have the following common elements:

- Form Header
- Navigator
- Function Bar
- Wizard Navigation Bar
- Form Footer

These elements can be present or positioned differently in various template. For more information, see common template elements.

Templates are created in the same Maestro editor that's used for creating forms. The same components are available via the **Palette** pane, but you'll mostly use different components in a template than you would in a form. Typically, templates contain components that you want to appear consistently across forms. They don't contain content that will most likely be different across forms, such as form fields or Page components.

The table below provides examples of components that typically appear in templates, forms, or both templates and forms. Maestro allows you to put any component in both templates and forms though, so these examples are just guidelines, rather than strict enforcements.

Templates Only	Forms Only	Templates & Forms
Template Controller	Page Controller	Section
Narrator Controller	Page Group	Button
Progress Bar	Page	Image
JavaScript Library	Text Field	Text Display
Web Font	Dropdown	Block

Within a template, it's also possible to define Theme Options and Item Properties, which can then be used to configure a template without diving into the underlying code. These features are intertwined with brands.

When creating a template, a Template Designer:

1. Defines the structure that surrounds a form, such as, header, footer, navigation, and so on
2. Defines what Theme Options and Item Properties can be configured at the brand-level
3. Adds and remove shared styles
4. Sets extension points
5. Creates brands. This is an optional step.
6. Publishes the template to a library

A Template Designer uses the Maestro editor to:

- Create templates
- Explore component's styles, for example, to understand an effective style of a component
- Change components' styles in Styles panel so they are available to all components
- Override shared components that are used in templates
- Exclude or include components from and in the Palette pane to customize it for Form Builders

However, more often than not, a Template Designer uses CSS directly to create a template and change its styles as needed.

As with any software development, creating complex, elegant and well designed form applications that provide smooth and intuitive customer onboarding journey is a task that needs to be carefully planned and executed. Maestro allows you to implement such forms, assuming the form designers and form builders follow some well-established guidelines. As always, Maestro is just a tool that helps you do complex tedious tasks faster and with fewer mistakes, but real success lies within clear and concise styles that are used consistently across the whole application, or even several applications belonging to one organization or a company.

Typically, work on a new form application starts with a Form Designer getting a form prototype outlining the styles of each page and its elements. The prototype, or a wireframe, can be a set of PDF or HTML pages, made up in a web design tool.

To get on with the task, a Template Designed creates a set of projects that will keep all relevant resources and configurations. This is a crucial point of getting things rights, which ensures easy changeability and maintenance of the form. This is especially true for complex forms, forms with brands, or white-label forms that will be used or extended by other parties.

The Template Designer creates a template for the new form design in a style project. This template will accommodate most, if not all, styles pertinent to the form look and feel.

The new template is usually based on one of the predefined templates shipped with Maestro. We recommend using the latest template, which is the Avalon template.

The Template Designer adjusts the structure of the template to reflect a user journey through the form. During this activity, the designer sets extension points to lock out the parts of the templates that only the Template designer can modify. This significantly improves manageability of forms based on the template, reduces clutter of different styles used in various forms to style similar or even same components. The list goes on.

When the preliminary version of the template is ready and, possible, shared with a Form Developer who can start working on a concrete form implementation, the Template Designer begins meticulous work creating styles that exactly copy the form wireframe design.

Before delving into changing existing component's styles used in the template, it's important to understand style's inheritance and how they are overridden either directly or via libraries that a form makes use of. For more information, see shared libraries.

The Maestro editor gives you several options working with styles - via the UI or more direct access to CSS and LESS syntax. We recommend using the later as it provides the better visibility of what styles are in use and how they are inherited.

As you are working on a particular style in the editor, you open the template in the Preview mode to check how each styled element looks on a rendered form. This gives you an option to view the HTML code using a developer plug-in, for example, Chrome browser's Developer Tools. Here you can check if the correct style is used and adjust a corresponding value, or try a different value or even a different style until the element is styled exactly as per the wireframe design.

Maestro comes with several ready-to-use templates:

- Avalon Template
- Maguire Template

Next, learn how to change default properties.

Common Template Elements

A Maestro template has several distinct areas or elements, which mostly managed (created, edited, or updated) by a Template Designer, who also decides which areas of the form has access to and which areas can be edited using the Form Options. functionality in Maestro.

Forms always has access to the content area, which is the form main editable area and it is where all components are added. Forms can also have access to specific dialogs and modal pages. In rare cases, the form can have access to other elements of the form, but this is unlikely.

Most templates have the following common elements:

Form Header is at the top of the form. The header displays the logo and the reference code that is used when a user returns later to complete the form. It is common for the form header to be configured in the template NOT the form.

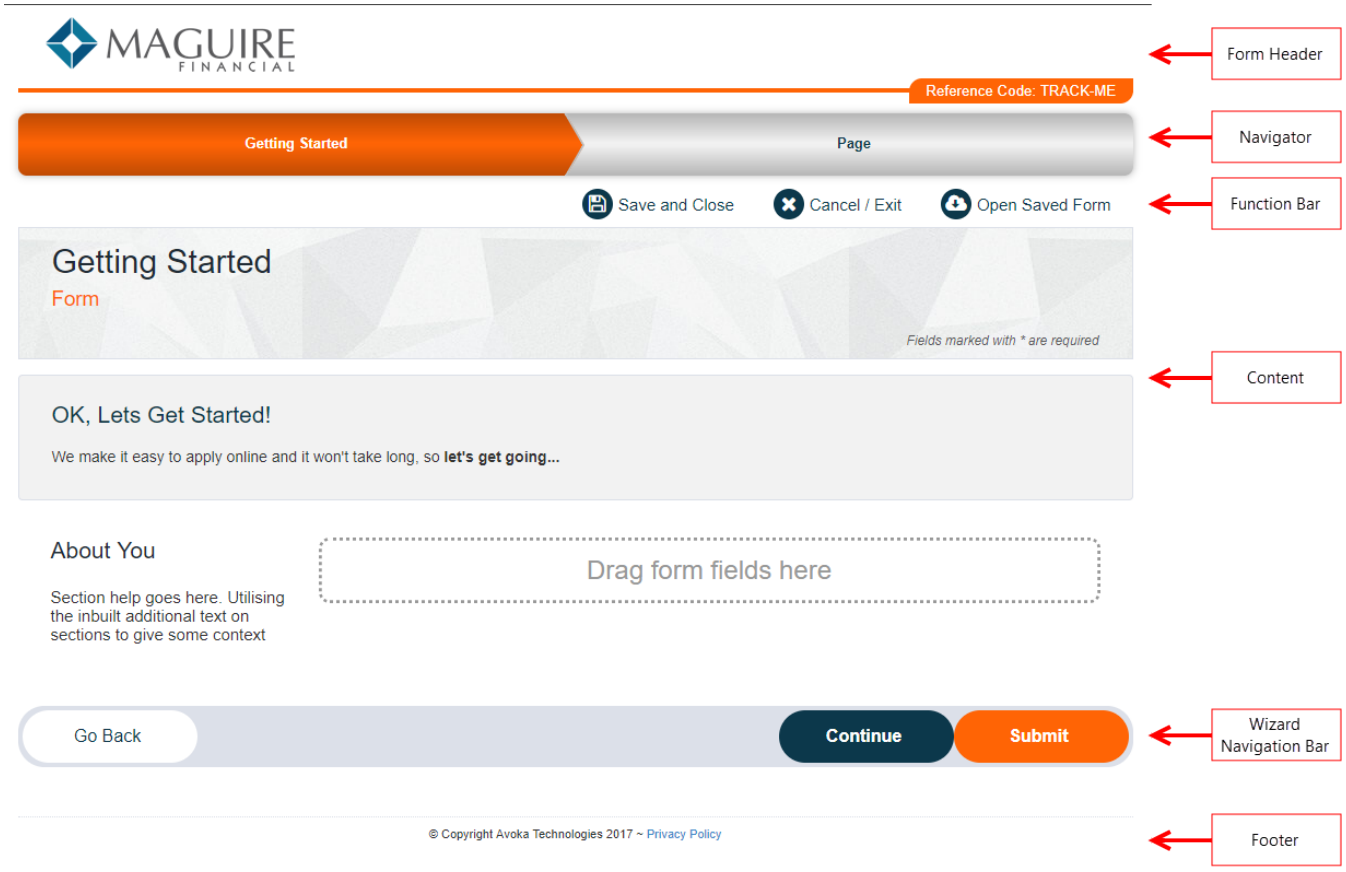
Navigator displays all the pages in the form and allows easy navigation between pages. The Form Builder can have access to make basic changes to the navigator such as edit page names and create page groups. However, the look and feel of the navigator is solely the responsibility of the Template Designer.

Function Bar contains buttons to save and close, cancel or exit and open a saved form. The Function Bar is exclusively managed and configured by the Template Designer, however, the Form Builder usually can enable or disable buttons that are present in the function bar.

Wizard Navigation Bar is at the bottom of the form and contains the navigation buttons to allow users to move from page to page, as well as submit the form when finished. The wizard navigation bar is exclusively configured and managed by the Template Designer.

Form Footer is at the bottom of a form and holds some specific details such as copyright. The Form Builder doesn’t usually have access to this area.

The image below shows typical locations of the above mentioned elements.



Next, learn how to create a template.

Avalon Template Overview

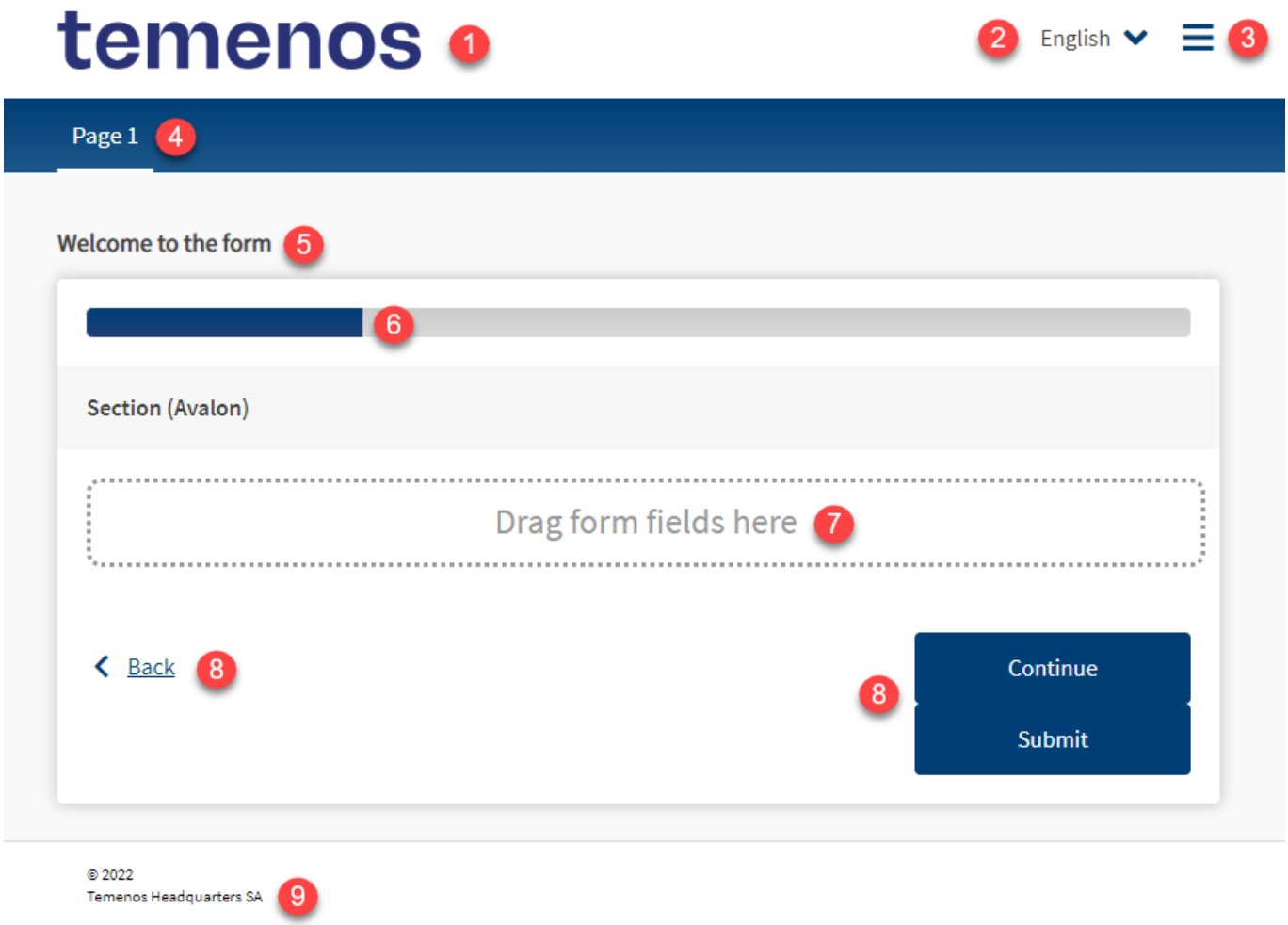
Maestro comes now with a new template, the Avalon template, which brings a more modern look and feel and encapsulates common design patterns, as well as helps speed development time frames. The template addresses growing demands in more contemporary UI look and feel and new UX elements, as well as to allow developers to design and build new forms using Temenos approved look and feel elements and styles.

NOTE

The Maguire Template has been removed from the Journey Manager installer, so you should use the Avalon template instead.

Maestro uses templates to standardize appearance for your forms. A template you select, when creating a form, makes a significant difference to how your form looks, so you must always use a template. Templates are created and maintained by a Template Designer. When updates are made to a template, the changes will be applied automatically to all forms using that template, once it has been published.

The standard Avalon template is show below.



The template has a well-defined structure with components and their sub-components laid in a particular order. It's important to understand the recommended structure of the template before you endeavor to change this structure to one that suits your requirements.

Template Elements

The Avalon template includes the following elements:

1. Header
2. Language selector
3. Menu
4. Current Page Title , for example, "Page 1"
5. Current Page Subtitle , for example, "Welcome to the form"
6. Progress Bar
7. Page Content - this is a placeholder where a Form Builder is allowed to add new form elements, such as components

8. Navigation Block
9. Footer

Template-Specific Components

When you build forms based on the Avalon template, the forms have access to the Avalon-specific components under the following categories:

Avalon Components

- Landing Page Image
- Modal Page Logo
- Avalon Info Dialog
- Progress bar
- Session Timeout Controller

Containers

- Section (Avalon)

Dialogs

- Dialog (Avalon)

Display Fields

- Form Footer (Avalon)

Navigation

- Navigator (Avalon)
- Page Group (Avalon)
- Page Controller (Avalon)
- Page (Avalon)

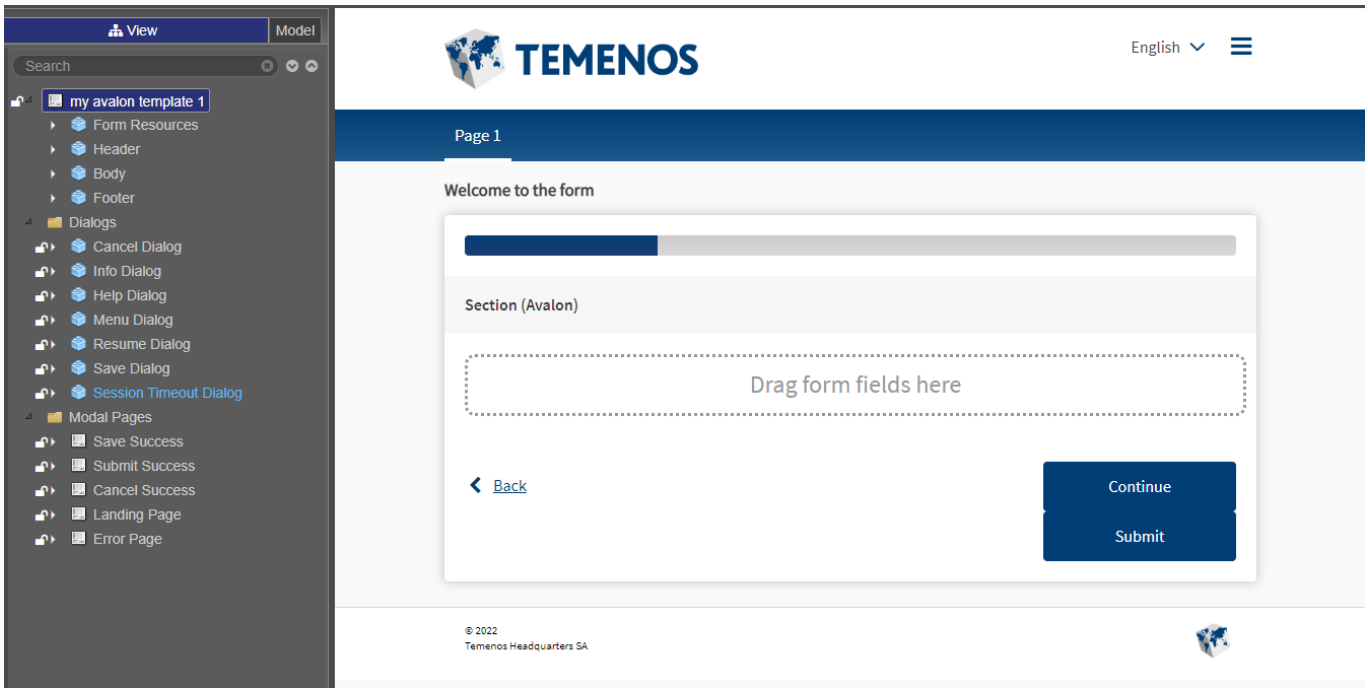
> NOTE
>
> You can find these components by expanding each category in the Palette pane of the Maestro editor.

Next, learn how to create a form using a template.

Avalon Template Structure

A new template that you create based on the default Avalon Template has a well-defined structure. Let's examine its structure to understand how it works and how you can extend it.

When you open the new template in the Maestro editor, you should see something like this.



The standard Avalon template has pre-configured components arranged in a particular order. Components come with some elements so you can use them out of the box, or you can add, remove, modify and change the order of them as needed.

The new template can be split into the following groups:

- Template's content
- Dialogs
- Modal Pages

Let's look at each groups in detail.

Template's Components

The main Avalon template's components and their children components are listed below:

- Form Resources
  - Fonts
    - Source Sans Pro Light
    - Source Sans Pro Regular
    - Source Sans Pro Semi Bold
    - Source Sans Pro Bold
  - Scripts
    -
  - Template Configuration
    - Session Timeout Controller
  - Form Configuration
    - Language Selection
      - Locale
  - Style Master Content
- Header
  - Top Header
  - Sub Header
- Body
  - Error Block
  - Subtitle Block
    - Content
  - Content
    - Progress
      - Progress Bar
    - Form
      - Page 1
        - Section (Avalon)
      - Page 2
      - Page 3
      - Page 4
    - Navigation
      - Left
        - Back
      - Right
        - Continue
        - Submit

- Footer
  - Content
    - Footer Text
    - Footer Icons

NOTE

The template has an extension point set at the root, so you may need to move it to limit the scope where content can be modified.

The Body > Content is where you may be doing most of your changes. If this is the case, it is a good idea to set the extension point there

Dialogs

The Avalon template comes with the following Dialogs:

- Cancel Dialog
  - Dialog Body
    - Dialog Content
      - Cancel Application
    - Dialog Footer
      - Cancel
      - Confirm
    - Dialog Header
    - Close
- Info Dialog
- Help Dialog
- Menu Dialog
- Resume Dialog
- Save Dialog
- Session Timeout Dialog

NOTE

Each Dialog has an extension point set at the root, so you may need to move it to limit the scope where content can be modified.

Modal Pages

The Avalon template comes with the following Modal Pages:

- Save Success
  - Header
    - Top Header
      - Logo
    - Sub Header
  - Body
    - Save Page Content
      - Application Saved
      - Share Form
  - Footer
    - Content
      - Footer Text
      - Footer Icons
- Submit Success
  - Header
  - Body
  - Footer
- Cancel Success
- Landing Page
- Error Page

NOTE

Each Modal Page has an extension point set at the root, so you may need to move it to limit the scope where content can be modified.

Next, learn about template JSON definition.

Avalon Template JSON Definition

The Avalon Template has a well-defined structure, which is stored in a JSON[1] file. Every time you modify the template, Maestro persists these changes by updating the JSON file. You can download this file and view it in a text editor.

Let's look at the JSON file in detail.

blockInfo

brandOptions

brands

breakpoints

childExtensions

Next, learn how to create a template.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

Maguire Template Overview

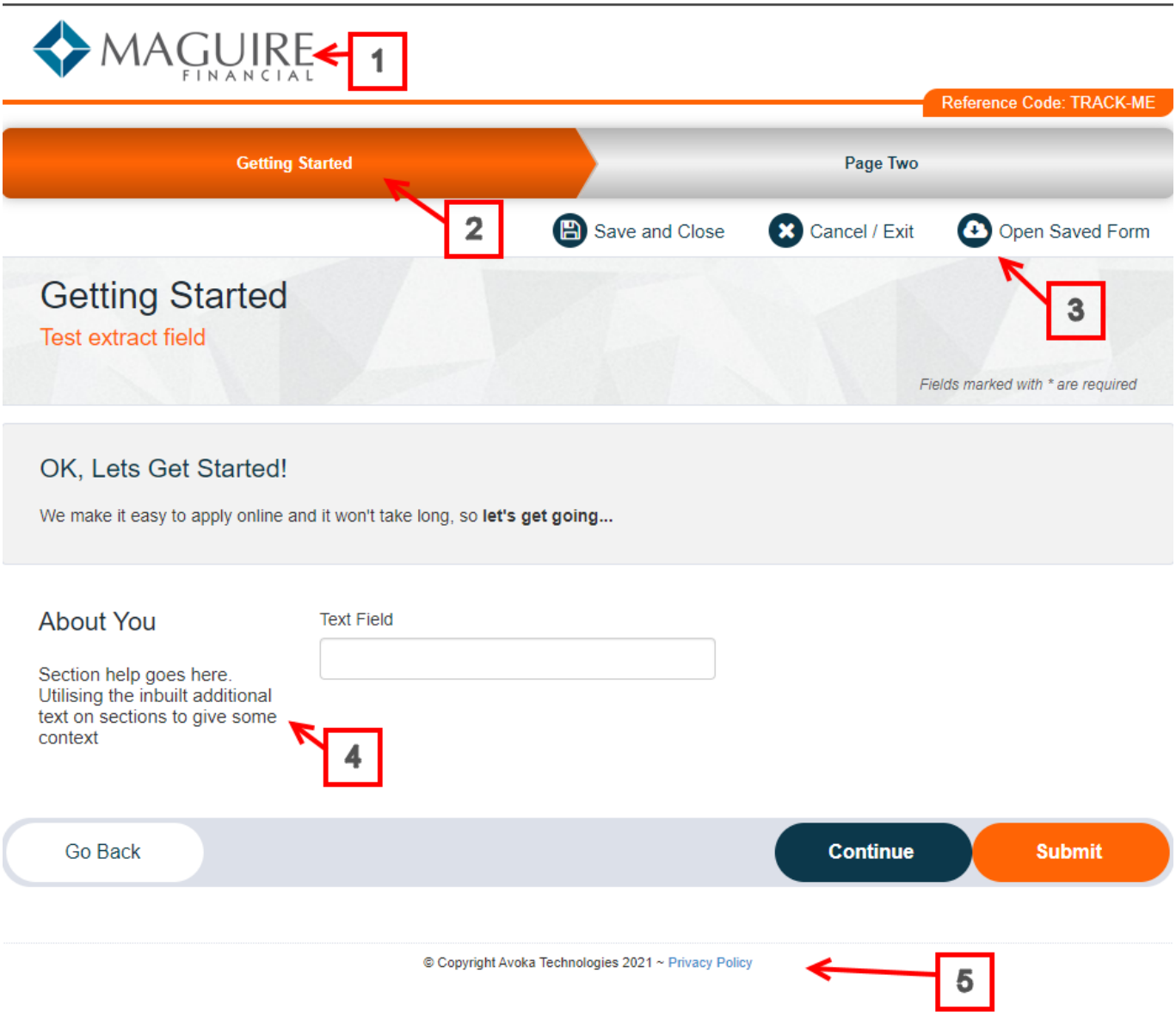
Maestro provides several templates, including the Maguire Template, which allow you to standardize an appearance of application forms and receipts you develop. Templates are created and maintained by a Template Designer. When updates are made to a template, the changes will be applied automatically to all forms using that template, once it has been published. The Maguire template can't be edited and should only be used to create new templates, not new forms.

The template you choose when creating a form will make a significant difference to how your form looks and behaves., so you always must use a template as a starting point.

The template usually includes the following elements, as visualized below:

- Header (1)
- Navigation bar (2)
- Button bar (3)
- Footer (5)

The only element not managed by the template is the form content itself (4).



NOTE

There is no relationship between the Maquire form space and Maquire template. The Maguire template is used for building forms, whilst the Maguire form space is a staff and customer portal for managing submissions, assisted workflows and so on. The Maguire form space was removed from the installer, | 18.11 This feature was removed in 18.11

Next, learn how to create a form using a template.

Create a Template

Maestro allows you to create templates that accelerates form development process and unifies look and feel of forms, which are based on the templates. Templates are mostly created by Template Designers.

In Maestro, a template is the starting point for all forms. Templates contain the style, brand, colors, and other configurations used by Maestro forms. Each Maestro project contains one or several default templates, which include some default assets and resources. A Template Designer decides what assets and resources belong to each template. However, templates should be used by form developers as a guideline when working on new assets and resources.

New templates are always created based on existing or default templates. Creating a new template from scratch is extremely difficult and time-consuming so it should only be undertaken by an experienced Template Designer. We recommend starting with creating a placeholder template first, which is a simple custom template that contains the correct extension points, but no other styling elements. This allows a Form Builder to start using it right away for form development. Then, the placeholder template is further configured and customized by a Template Designer to follow the branding requirements. This approach allows the Form Builder and Template Designer to work simultaneously and the Form Builder can begin work immediately on the form.

To get a new template and start using it, you should:

1. Create a new template
2. Set an extension point
3. Publish the template to a library
4. Customize the template

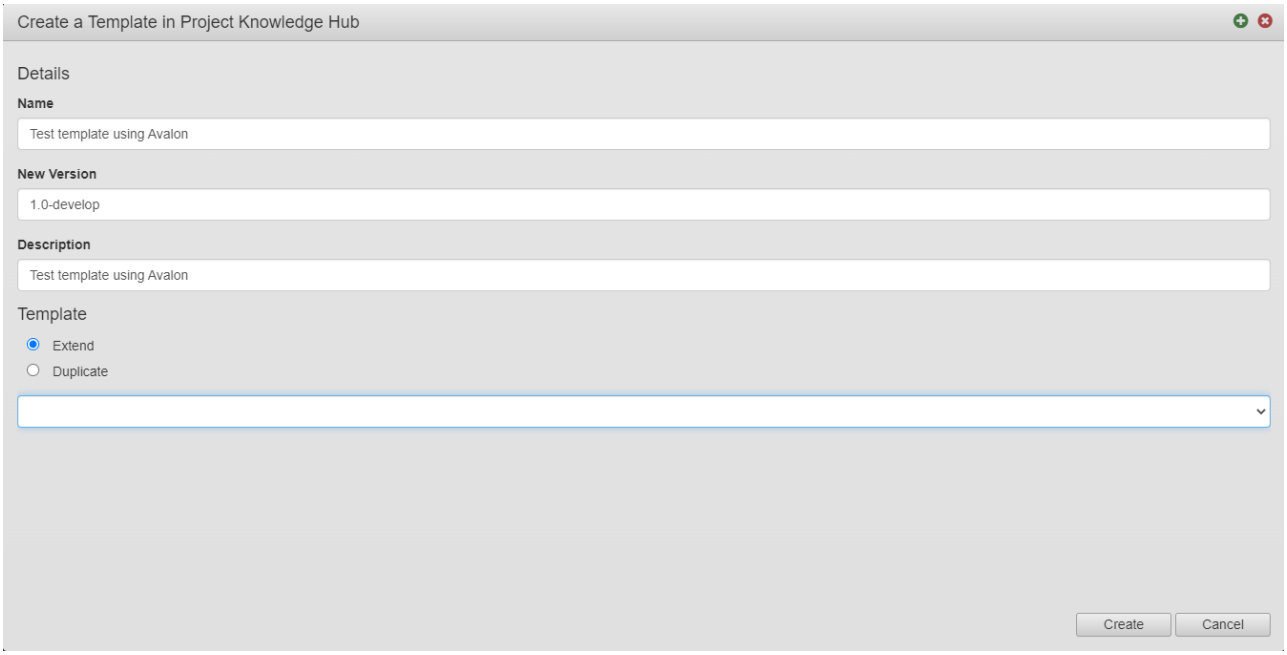
Let's look at each of these steps in more detail.

Create a Template

To create a template:

1. Open a project from the Management Dashboard, for example, your Styles project or your organization’s project directory. If you do not have a Styles project, see project configuration.

2. Select Templates and click Create Template.



3. Enter a new template name in the Name field.
4. Change a system generated version in the New Version field to adjust it to your requirements. Maestro uses semantic versioning.
5. Provide a meaningful description in the Description field so it's clear for others what this template is for and what it does.
6. Select a base template from the dropdown list.
7. Select Extend to link the new template to the base template, so if it is changed, these changes will appear in the new template. Since most templates are based on an Temenos approved template, it is a good idea to use the this option.
8. Select Duplicate to copy the base template, so there is no link between the two templates. It means any changes to the base template won't appear in the new template.
9. Click Create.

> NOTE
>
> The template should open in a new tab. If the template doesn't open, verify that it hasn't been blocked by your browser's pop-up blocker.

Set Extension Points

Once you have created your new template, you will need to set an extension point to restrict form's content for a Form Builder to modify.

Publish the Template

After the extension points are added, you need to publish the template so that the Form Builder can create a form based on it. We will call this template the placeholder template. The placeholder template needs to be published to an organization's library so new forms can be created with this template.

When creating new forms, there are several default templates available for selection. Additionally, you will have access to several custom-built templates specific to your business. When selecting a template for a new form, always select one of the custom-built templates, as the default templates can't be edited and should only be used for creating new templates.

Customize the Template

Now that the placeholder template has been published, the Form Builder can create a form and begin development. While the Form Builder is working on the form the Template Designer can further configure and customize the template. At various stages of template development the template can be published when required. Any changes to the template will be seen by the Form Builder as they develop the form.

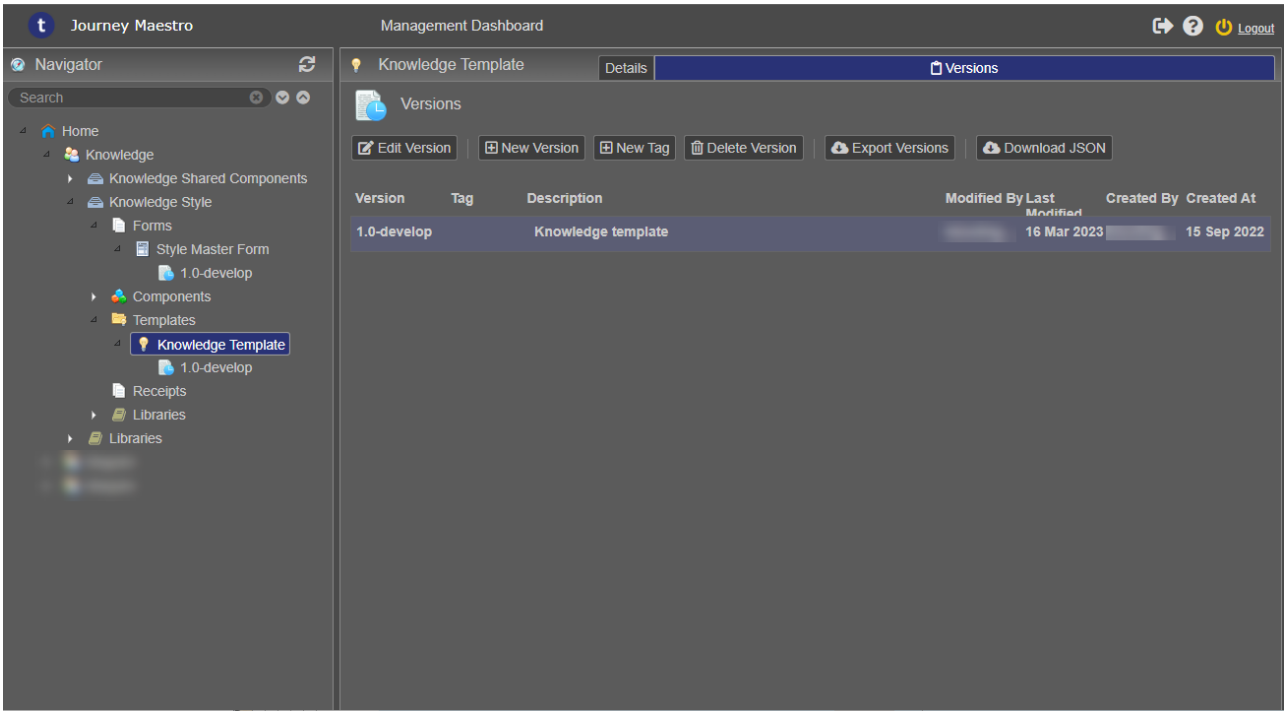
Next, learn how to publish a template.

Tag a Template

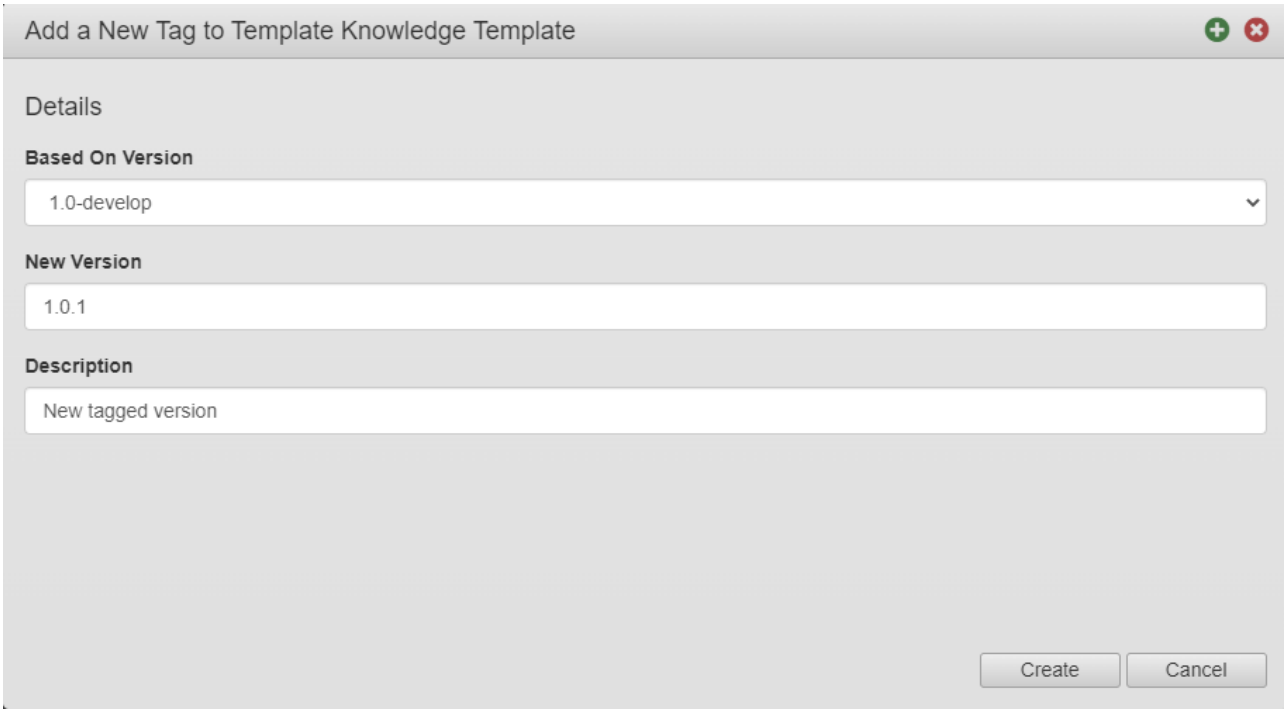
Maestro allows you to create a read-only version of a template by tagging its specific version. After that, the tagged version of the template will remain unchanged forever, so it doesn't permit you to add new components and, if you change any configuration, there is no option to save these changes. You can use this functionality to capture a template snapshot, which is handy when you wish to come back to, or use for application releases and so on.

To tag a template:

1. Open a project from the Management Dashboard.
2. Select a Template you wish to tag.

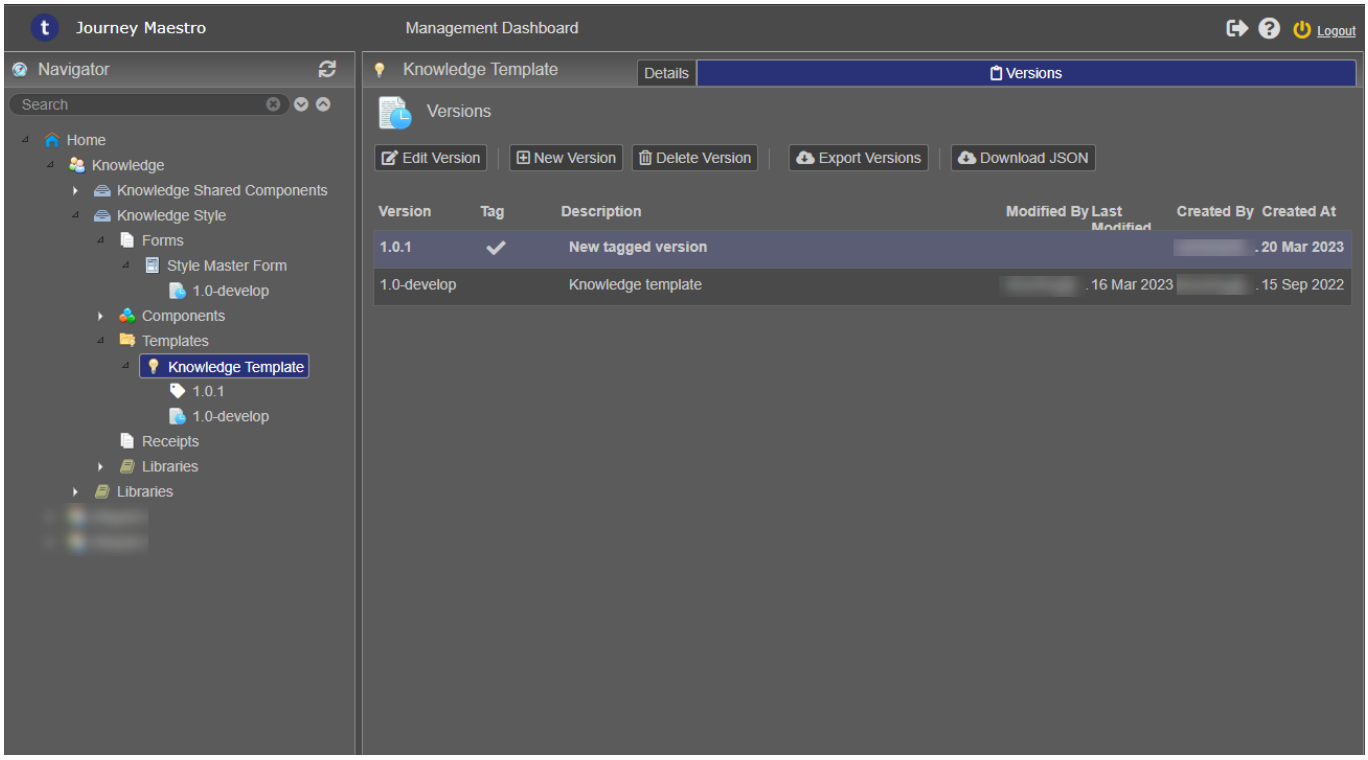


3. Click New Tag to populate the tagged version details.



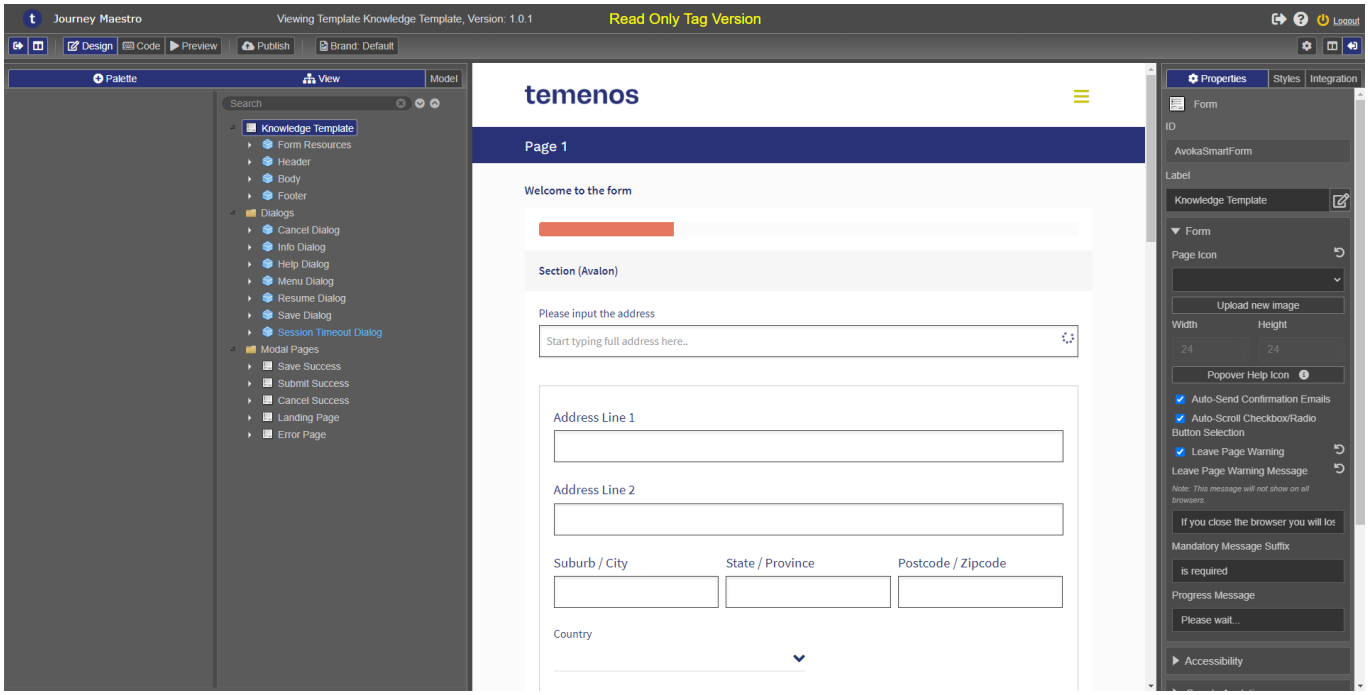
4. Select a version of the template to tag from the Based On Version dropdown list.
5. Enter a template version in the New Version field or leave it as Maestro prefills it for you, which is a recommended option.
6. Provide a meaningful description in the Description field .
7. Click Create.

You can now check the tagged template version in the Navigator pane.



In this example, the tagged version is 1.0.1 and it is marked with the tag sign () in the Navigator pane and with the check sign () in the Tag column.

If you open the tagged version in the Maestro editor, you can see that this template is a read-only.



Next, learn how to publish a template.

Publish a Template

Maestro allows you to publish a template to a library so it can be used by different forms. You do this after creating and testing a new template.

To publish a template to a library:

1. Open a template in the Maestro editor.
2. Click Publish.



3. Select a library from the Library dropdown list. The Library Version shows you the available library version.
4. Select the Publish checkbox to include embedded styles, which are defined in the form, so they will be published to the selected library as well.

   NOTE

   This option is not shown if styles are not defined in the form.

5. Select the Delete local copy checkbox to delete the local copy of embedded styles.

   NOTE

   This option is not shown if styles are not defined in the form.

6. Click Publish.

You can check which template version is present in the library, as shown below:



NOTE

If you make any changes to the template after publishing it, you must re-publish it again for the changes to take effect in forms that use it.

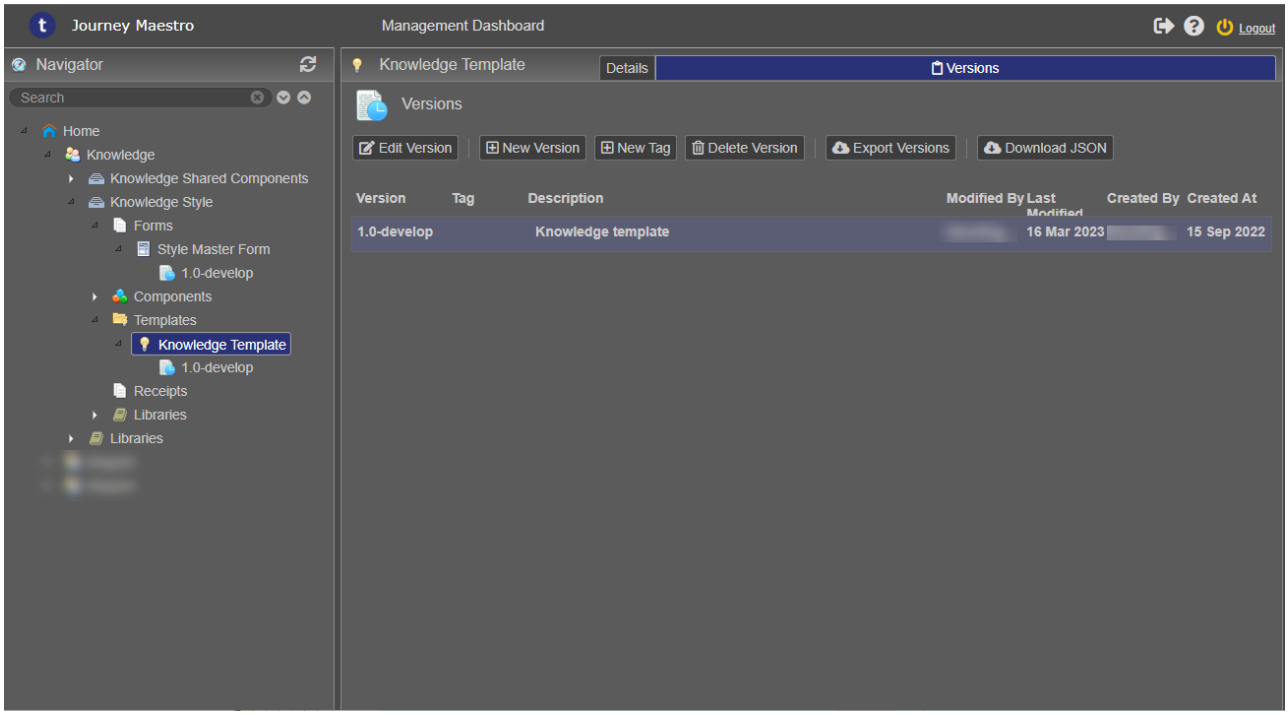
Next, learn how to export a template.

View Templates

Maestro allows you to view and manage templates.

To view the list of templates:

1. Open your project in the Navigator pane and click Templates to view the list of templates created in your project.
2. Select a template in the Templates folder to view available versions of this template.



   The templates are listed in ascending order by template versions. The list includes the following information, which helps you use templates correctly:

   - Version: a semantic version of a template
   - Tag: whether a template version is tagged or not
   - Description: a meaningful description of a template
   - Modified by: who modified a template
   - Last Modified: when a template was modified
   - Created By: who created a template
   - Created At: when a template was created
3. Click Edit Version to open a selected template in the Maestro editor for editing.
4. Click New Version to create a new version of a selected template.
5. Click New Tag to tag a selected template.

6. Click Delete Version to delete the selected template.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple templates. | 21.05 This feature was introduced in 21.05.

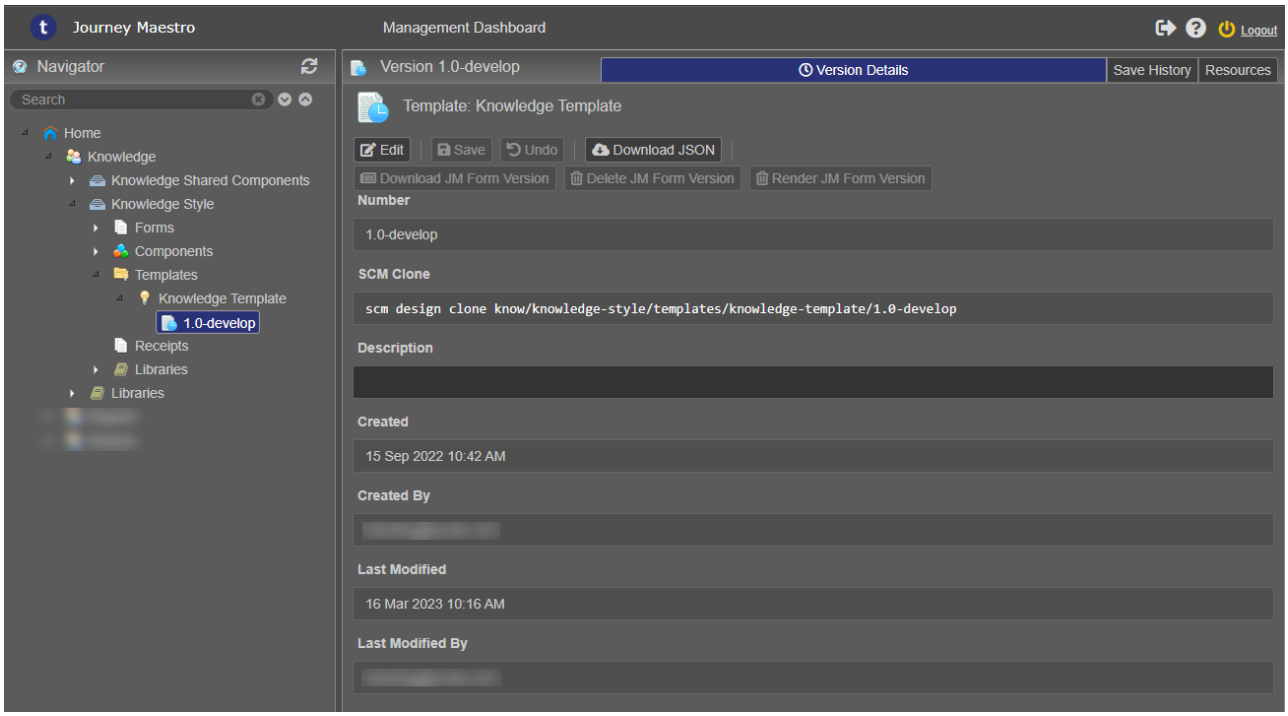
7. Click Export Versions to export the selected templates.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple templates. | 21.05 This feature was introduced in 21.05.

8. Click Download JSON to download JSON files of the selected templates.

> NOTE
>
> Use `Shift` or `Ctrl` key to select multiple templates. | 21.05 This feature was introduced in 21.05.

9. Double-click a selected template to view its details.

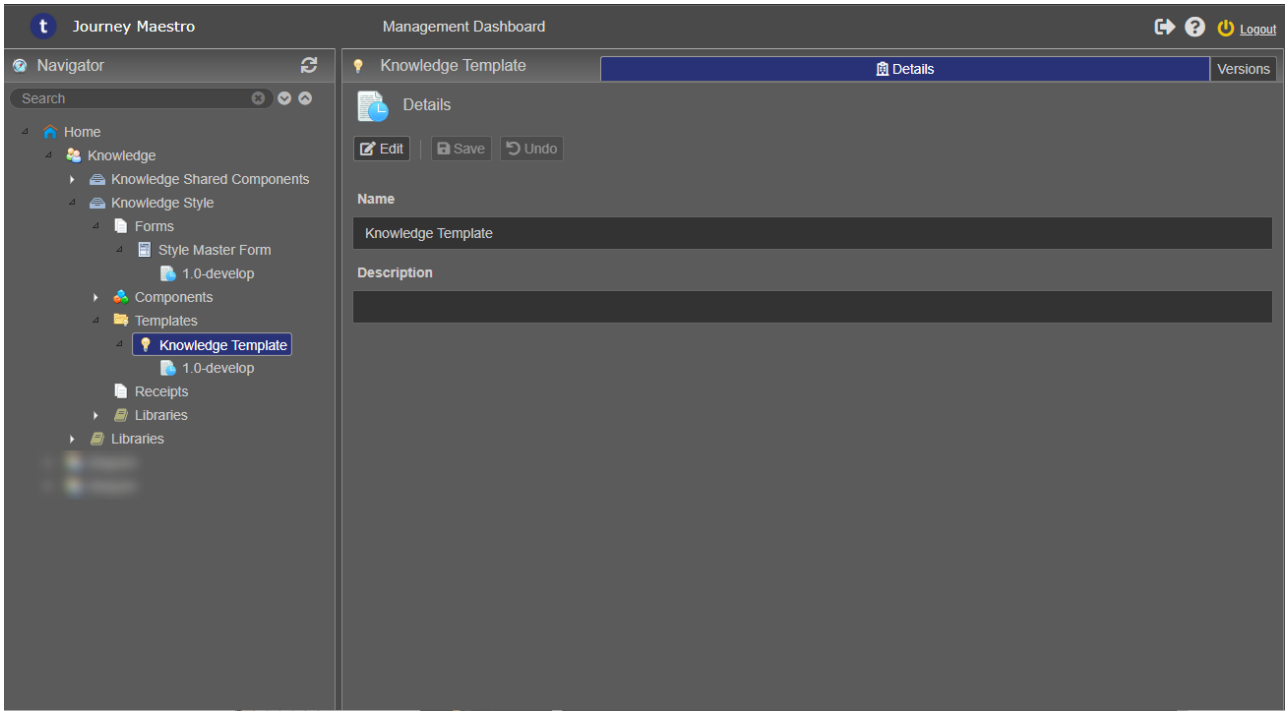


Edit a template description in the Description field and click Save to update the changes

NOTE

You can't update the name and version number of the template.

10. Select the template and click the Details tab to see the template's details.



Edit the template's name and description in the corresponding Name and Description fields and click Save to persist the changes.

Next, learn how to export a template.

Export a Template

Maestro allows you to import and export templates, so you can reuse them across different projects, organizations or environments. This saves you time and effort, as you don't need to create a new template from scratch. This process is also commonly used to migrate templates from one environment to another. You can use this functionality to:

- Rollback one or several templates
- Re-create one or several templates in another Maestro
- Promote one or several template

To export a template:

1. Open a project in the Navigator pane where you want to export a template from and click Templates to view the list of templates created in your project.
2. Select the template you wish to export from the list and click Export Template. Maestro exports the template into a form archive ZIP file, which will be downloaded to your machine.

NOTE

You can also export a template by exporting a library, which contains the template.

Next, learn how to import a template.

Import a Template

Maestro allows you to export and import templates, so you can reuse them across different projects, organizations or environments. This saves you time and effort, as you don't need to create a new template from scratch. This process is also commonly used to migrate templates from one environment to another. You can use this functionality to:

- Rollback one or several templates
- Re-create one or several templates in another Maestro
- Promote one or several template

NOTE

When you import a template to a different project, it is not available to forms within the project until the template is published to a project's library. However, if you import the entire project or the library, the published version of the template is already available to forms.

To import a template:

1. Open a project in the Navigator pane where you want to import a template to and click Templates to view the list of templates created in your project.
2. Click Import Template and choose a template archive ZIP file.

NOTE

You can also import a template by importing a library, which contains the template.

Next, learn how to update default properties of a template.

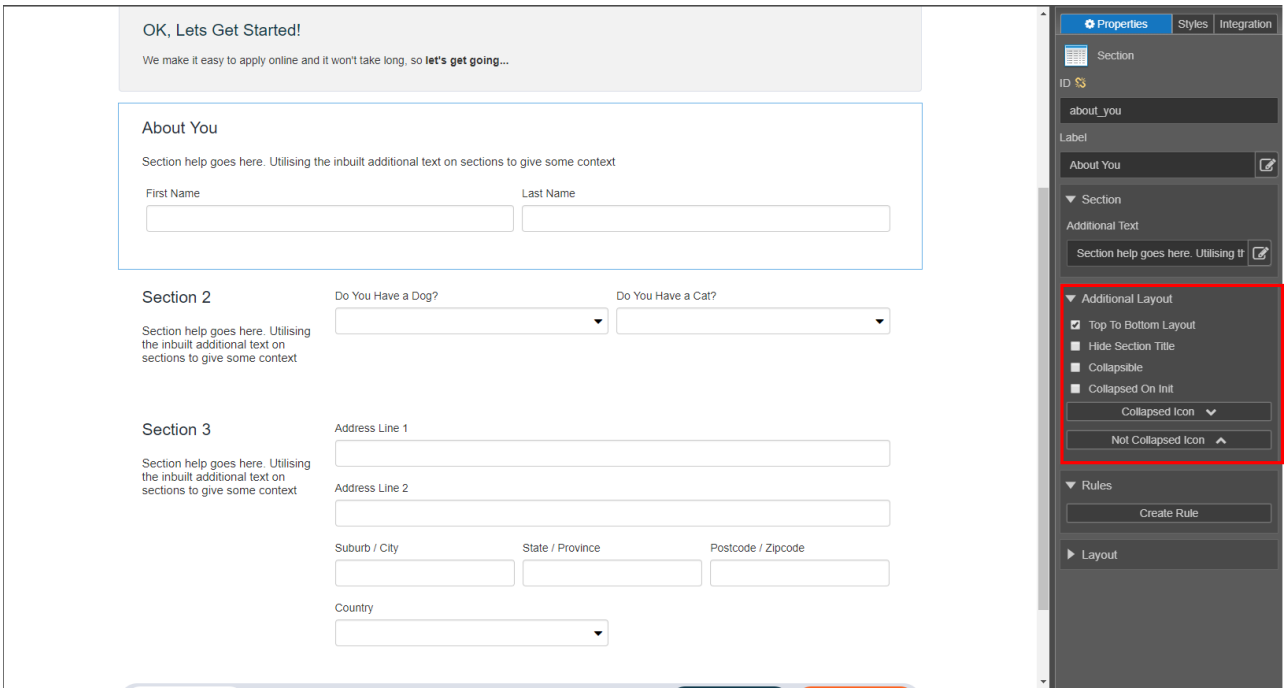
Update Template Default Properties

Maestro allows you to change default properties of a template after you have created it, so you can customize certain properties for a component type and it will be reflected in a form that uses that component. For example, you decide that the heading of a section need to appear above the content, rather than to the left, which is the default option.

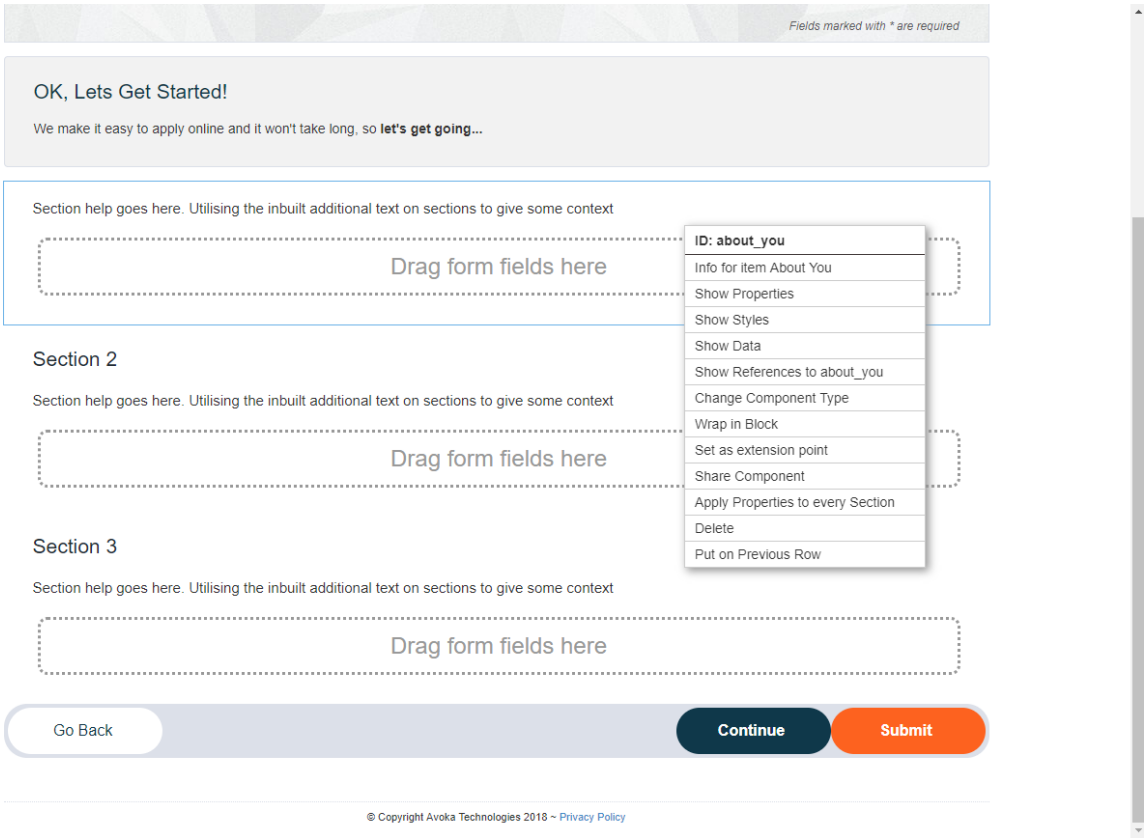
Changing the default properties of a component type should only be done in the template by a Template Designer, because it will be applied to all components of the same type that may affect many forms using this component.

To change the default properties on a component in a template:

1. Open a template in the Maestro editor.
2. Select a component you want to modify, for example, the About You section component.
3. Select the Properties pane to update the default properties of the component. For example, you may change the layout of the section to be Top to Bottom Layout.



4. Right-click the section component with the updated properties and select Apply Properties to every Section.



5. Click Save to update the template.
6. Click Publish to apply the updated component changes to a library so in all forms, based on this template, all sections will be displayed with the Top To Bottom layout.

NOTE

Changes to the component properties will only be applied to new components added to a form. Forms with existing components will not be updated. You will need to manually change the properties for existing components or delete the component and re-add it to the form.

Next, learn how to change a template in a form.

Change a Template of a Form

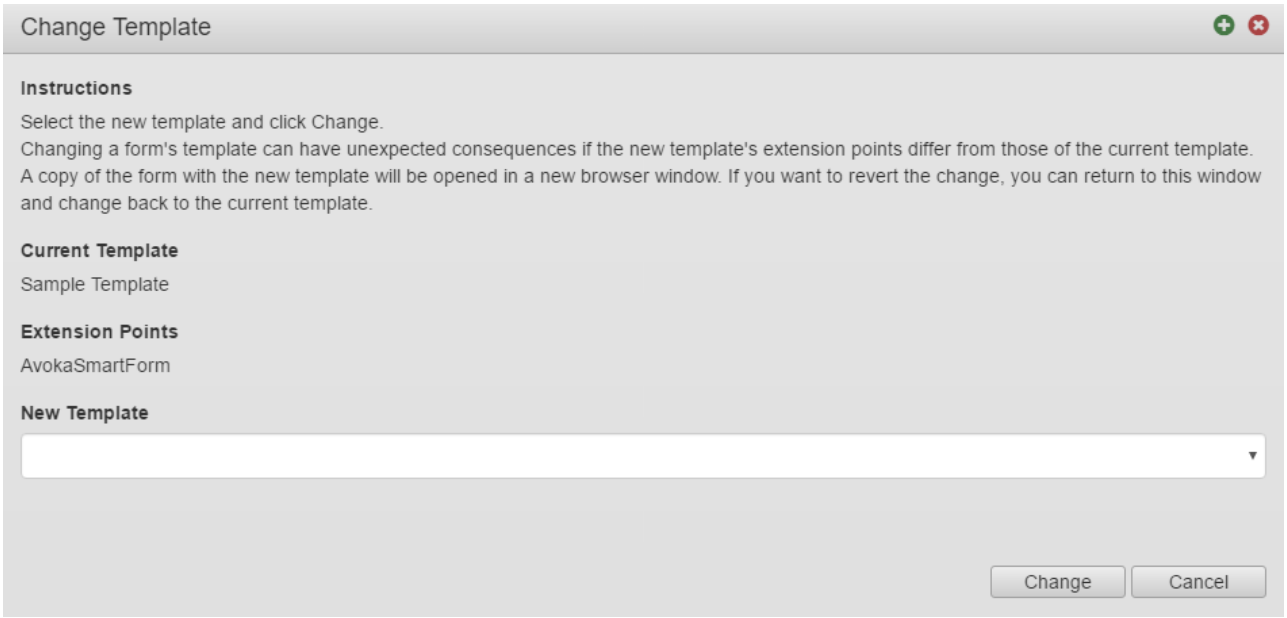
Maestro allows you to change a template that a form uses. When you create a new form, you have an option to select a template to be used by the form. It is important to choose a correct template at the first place, but, you can always change the template later, if necessary.

> NOTE
>
> We recommended speaking to a Template Designer before changing the template because it can and will affect the form in many ways.

When designing a template, a Template Designer may limit the Form Builder's access to certain areas within the form by using extension points. When the template of the form is changed, the extension points in the new template may be different to those in the original template. If the extension points are different, the Form Builder may lose content within the form.

To change a template of a form:

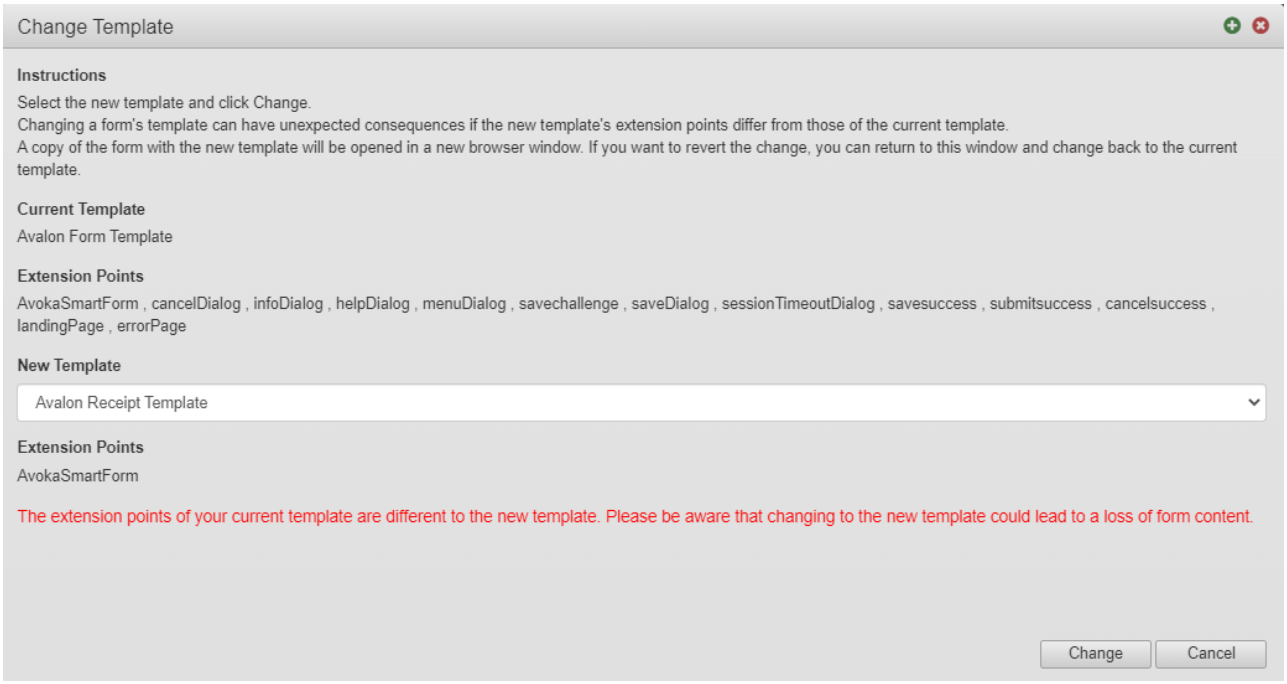
1. Open a form in the Maestro editor.
2. Click Settings Menu in the Toolbar and select Change Template from the dropdown list.



NOTE

The Extension Points section displays the extension points in the current template. `AvokaSmartForm` means that no specific extension points have been set. When no extension points are set, the Form Builder has access to all areas of the form. Most of the time, the template will have extension points set to limit the Form Builder's access and prevent changes to company branding or style guides.

3. Select a new template from the New Template dropdown list. If you select a new template, which has different extension points to the current template, the following warning message is shown. It also lists the extension points in the new template. In this example, the template has an extension point set on the content, which is the main area of the form, and two dialogs, which are the save confirm and save challenge.



4. Click Change. The form using the new template will open in a new browser tab, so you can view it and check if you are happy with the change. This gives you the following options:
   - If you decide to keep the form with the new template, you can close the form in the original browser tab and continue working with the form in the new browser tab.
   - If you don't want to keep the form with the new template, close the new browser tab and return to the form in the original browser tab where you can revert the form to the original template.

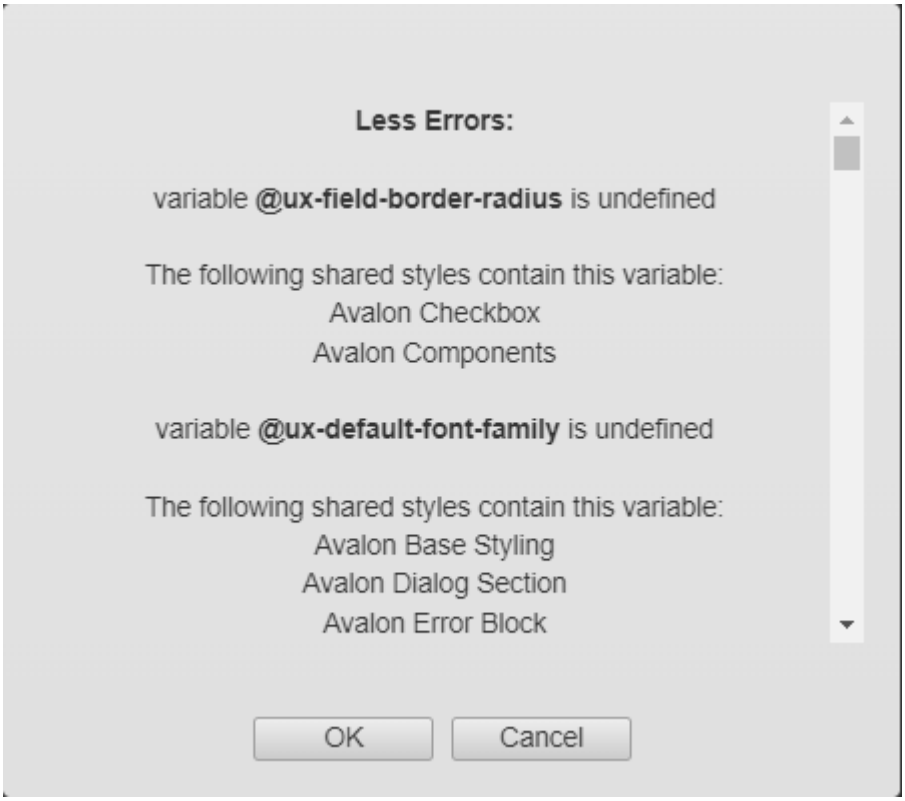
NOTE

The Change Template dialog in the original browser tab now displays a message explaining what has happened and what to do next.



Click Back to return to the original template. The form will again open in a new window with the selected template applied. You can close the form in the original browser tab and continue working with the form in the new browser tab.

5. If there are any major issues, the following windows is displayed with the detailed description of errors.



6. Click OK to continue with changing the template or click Cancel to dismiss the template change. Alternatively, you can close the new browser tab and return to the form in the original browser tab.

Next, learn how to .

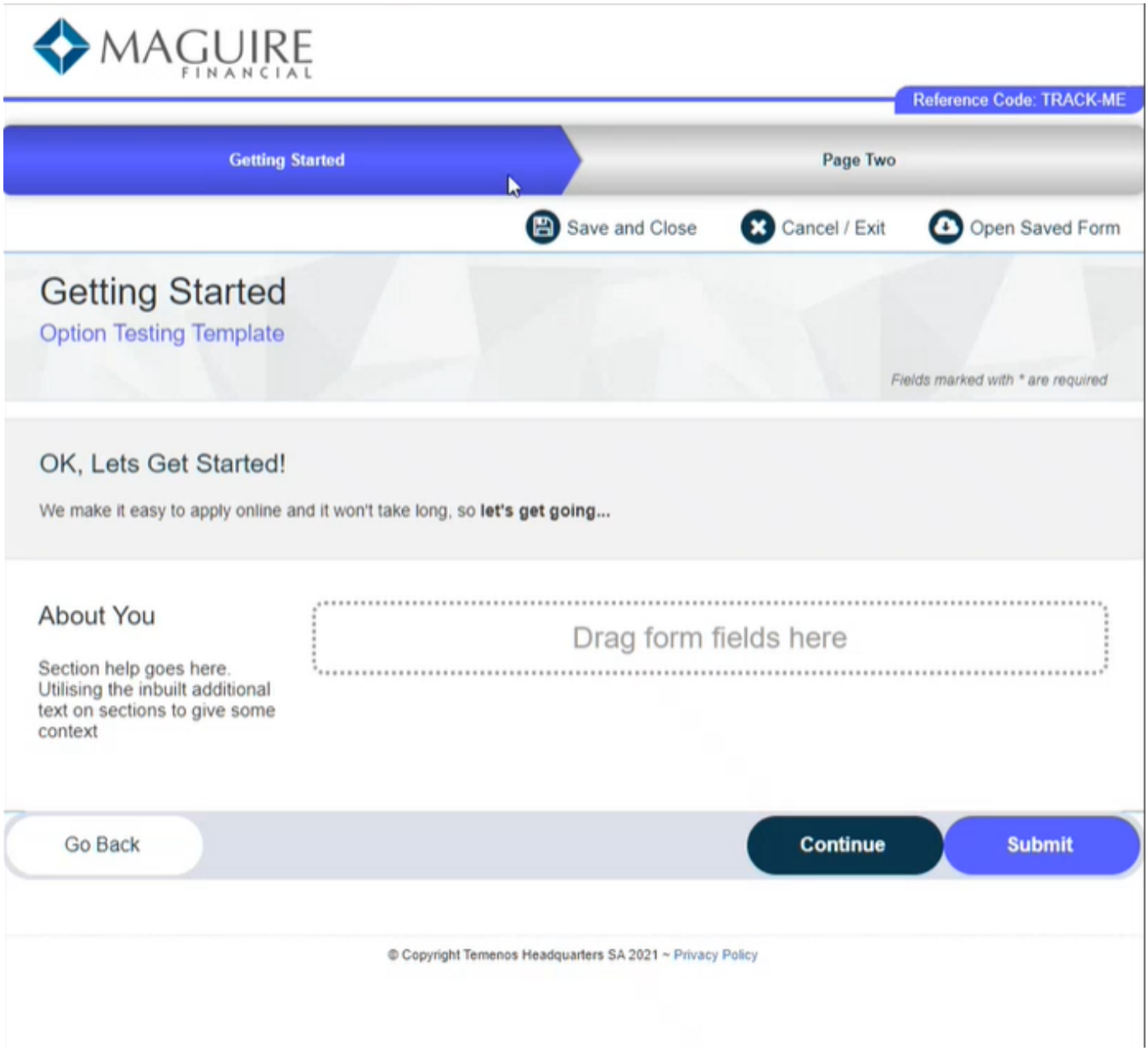
Brands Overview

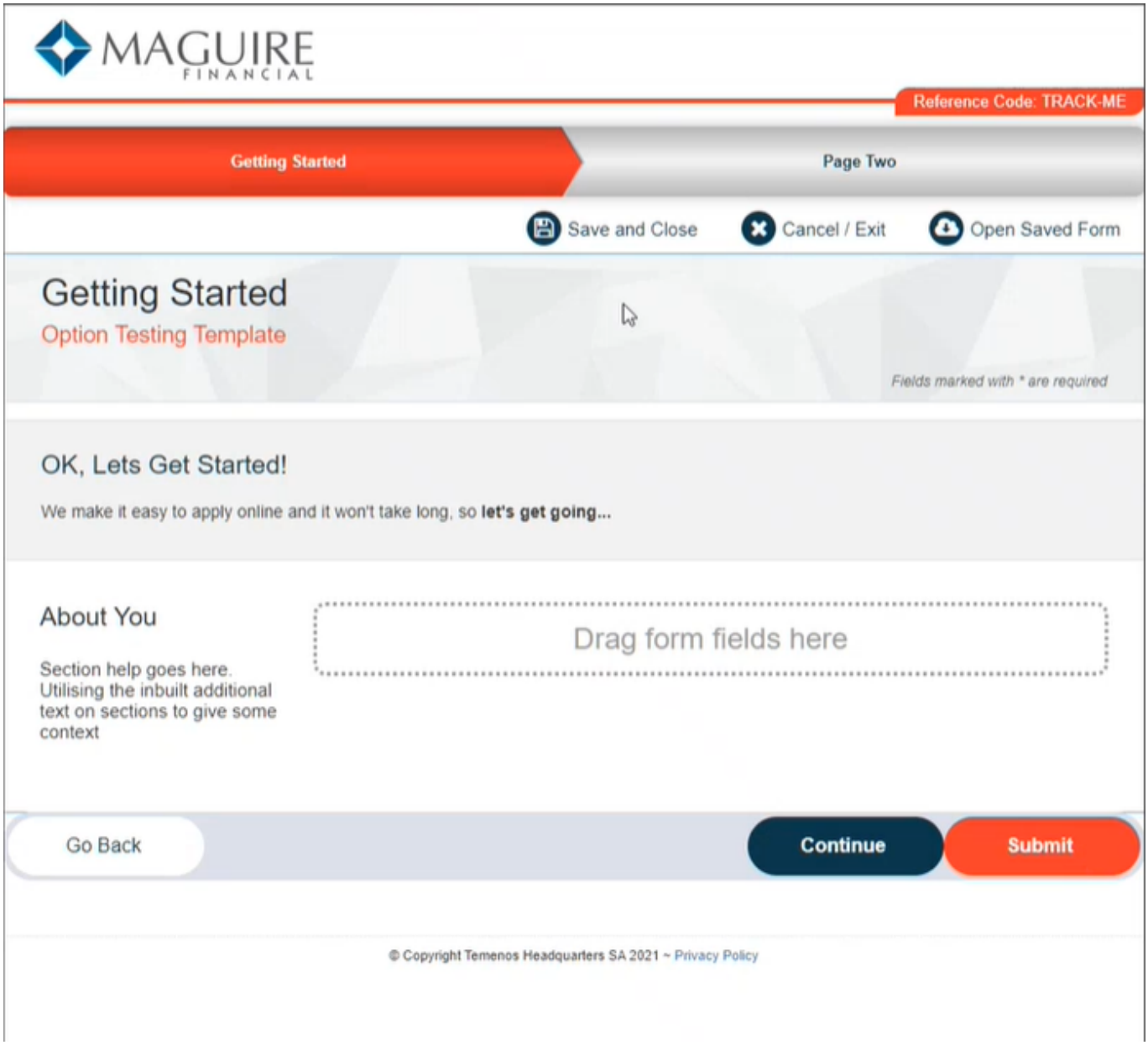
When an organization creates a template, they often want to reuse the structure of the template while still being able to adjust many of its attributes, such as background colors and button styles. This is commonly done for the sake of white-labelling, so an organization can create configurable copies of its templates to eliminate the need of creating a new template every time they enter into a white-labeling deal. This means that the same template can be used for different companies.

To streamline this process, Maestro allows you to use a brand, which is a variation of a template.

A brand defines the physical appearance of a Maestro form and is stored within a template. Brands control colors, fonts, images, translation, and other aspects of a form. Brands are created in the template by a Template Designer, which ensures that all forms, using a particular brand, have consistent colors, fonts, and other design elements. If a change to a brand is required, for instance a new color, all that is needed is a modification to the brand and a re-publish of the form – each form does not need to be modified individually.

For example, you may want to have a template defining the same form structure, but with different colors, heights, and widths configured in several brands. This is illustrated in the example below.


MAGUIRE
FINANCIAL
Reference Code: TRACK-ME
Getting Started
Page Two
Save and Close
Cancel / Exit
Open Saved Form
Getting Started
Option Testing Template
Fields marked with * are required
OK, Lets Get Started!
We make it easy to apply online and it won't take long, so let's get going...
About You
Section help goes here. Utilising the inbuilt additional text on sections to give some context
Drag form fields here
Go Back
Continue
Submit
© Copyright Temenos Headquarters SA 2021 ~ Privacy Policy



Every Maestro template has at least one brand, named Default. Even if you don't plan to have multiple brands, you still need to use the Default brand to configure the Theme Options and Item Properties within the template. You can't rename or delete the Default brand.

You can create as many brands as required and then apply a brand to a form as you work on. When a brand is not needed any longer, you can remove it. It's recommended that only a Template Designer manages templates.

A brand shares the same underlying structure as the original template, meaning all of the components in the View pane are the same, but the properties and styles can be adjusted on a per-brand basis.

When you edit a form with multiple brands in the Maestro editor, you can see extra options, such as the Brand button where you can switch a brand and the Build with Options where you can choose which brand to use while generating a TM Form Version file.

When creating a brand, a Template Designer will:

1. Configure Theme Options
2. Configure Item Properties

Maestro allows you to use design-time and runtime branding in your forms. Let's look at them in more detail.

Design-time branding

Design-time branding is when you create a form based on a certain brand available in your template, then build the form using that brand, and, finally, deploy the form to Manager where it is rendered as per the brand's definition.

Since Maestro 21.11, you can generate multiple form versions of a form using several brands as ZIP files. However, these files need to be imported separately as they will either be going to the same Manager instance in different organizations and form spaces or different Manager instances.

Runtime branding

Runtime branding is a new powerful concept in branding, which is available starting with Maestro 21.11. Runtime branding is based on JSON configuration file that specifies the details of a brand, such as images, CSS[1], translation setting, and brand properties, that can be referenced by business rules.

The runtime branding is made up of the following methods, which you call individually based on requirements:

[1]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form's display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form's assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

- `Form.updateImageByName()`
- `Form.updateCssByName()`
- `Translation.fetch()`

You can also use only one method - `Form.updateBranding()` - that handles all the above functionality. In this case, you have to pass in the `RuntimeBrandUpdate` object, which is the JSON file specifying a brand. For more information, see the Maestro API.

When you create a form, you define a brand in a JSON file, which is stored in Manager. Every time the form is rendered, Manager passes this file into the form using various methods, such as a form prefill, a service call, or an HTTP GET / POST. This way, if you need to change something in a brand, you don't need to do any changes in the form using the Maestro editor. Instead, you simply update the JSON file in Manager and the form will pick up the changes from there.

Runtime branding utilizes the enhanced form build process and the new framework as well as the Runtime CSS Resource and Bundle Resource Library components. The Bundle Resource Library adds resources, which the form has access to, into the FAR file, so you can add JavaScript, CSS and images that will be available at runtime without needing to first include them in the form as a direct resource. There is also the ability to specify images to use a URL so they can be picked up from a portal resource.

Next, learn how to create a brand.

White-label Overview

Maestro allows you to create white-label[1] brands so they can be used by various clients, partners and customers. The concept of white-labeling is tightly coupled with brands and templates.

You can create a form template and define several brands within it. Then you can refine each brand by specifying brand themes and options. the Maestro editor allows you to switch between brands quick and easily so you can try them out in a form and see which suits best. After that, you can build the form using the chosen brand, which will become your white-label brand.

Next, learn how to create a brand.

[1]White-label software is software that is purchased by a company from a service provider and re-branded as its own.

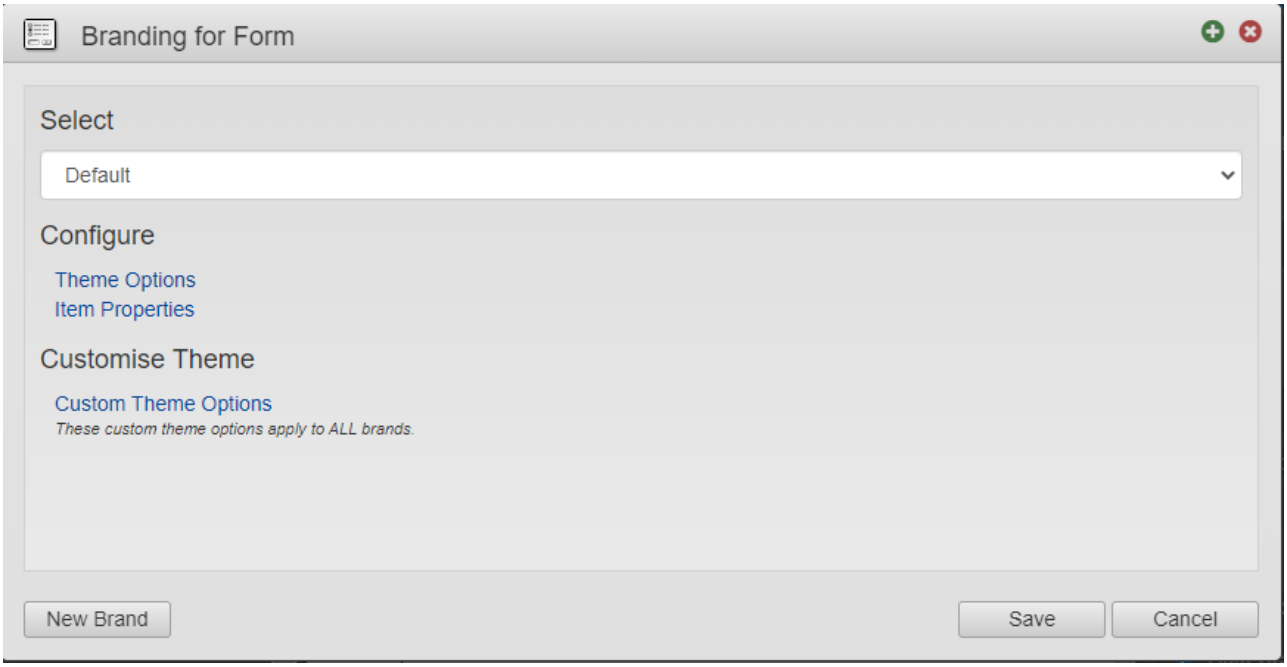
Create a Brand

Maestro allows you to create a new brand in a template, so you can leverage on common structure, styles and other form configuration while building a form. You can't create new brands in a form. Usually, a Template Designer creates brands in a template used by your forms.

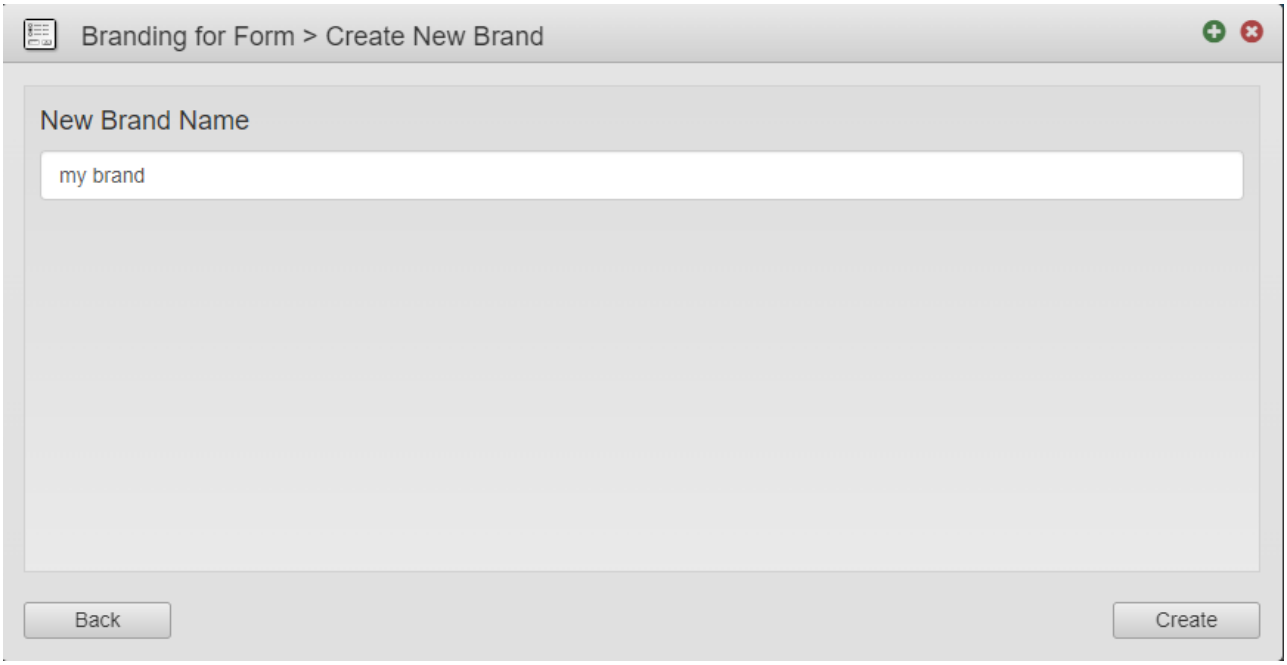
If a template has more than one brand, the Brand button displays in the Maestro Editor when editing a form. The Brand button allows switching between the available brands that were created and configured in the selected template. The Brand button also displays the name of the brand that is currently being used by the form.

To create a brand in a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.



3. Click New Brand.



4. Enter a name for the brand in the **New Brand Name** text field.
5. Click **Create**.
6. Click Theme Options to configure brand's theme options.
7. Click Item Properties to configure brand's properties.
8. Click Custom Theme Options to add or modify theme options applicable to all brands.
9. Click Save.

Next, learn how to delete a brand.

Delete a Brand

Maestro allows you to delete a brand from a template, so you can maintain integrity of templates by removing brands you don't need any more. Forms, which use a deleted brand, still work - there just won't be an option to build them with that brand any more. If you use the offline build, it only builds the brands that actually exist, even if other ones are requested.

Usually, a Template Designer deletes brands in a template used by your forms.

To delete a brand from a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.
3. Select a brand you want to delete from the **Select** dropdown.
4. Click **Delete Brand** and confirm it.

Next, learn how to apply a brand to a form.

Apply a Brand to a Form

Maestro allows you to switch between brands as you work on a form in the Maestro editorMaestro editor. This way you apply all brand's specific styles, themes and item properties to the form so you can see how it looks. This is different to the runtime branding.

To switch between available brands:

1. Open a form in the Maestro editor,
2. Click Brand on the Maestro toolbar.



> NOTE
>
> You can only see the Brand button if a form uses a template containing more than one brand.

3. Select a brand you want to apply to the form the Brand dropdown list and click Save. The new brand name appears in the Maestro toolbar.
4. Click Save to safe the form.
5. Click Build with Options to build the form using the selected brand.

> NOTE
>
> If you want to use different brands on the same form, you will need to apply the brand and then build a TM Form Version of each form that contains a different brand.

You can use the `maestro.Form.view.selectedBrand` method to change brands when the form is open in the Maestro editor. However, this value is not passed through to the form when it is built, so you can't use this method for runtime branding.

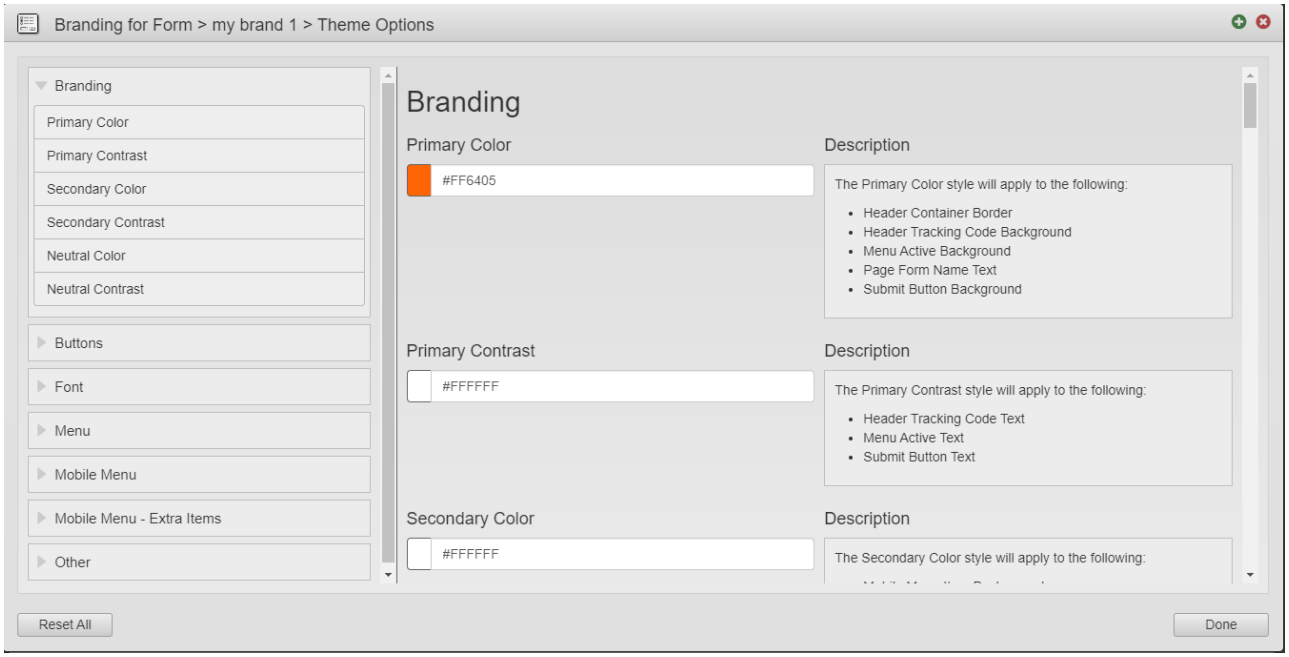
Next, learn how to configure theme options.

Brand Theme Options

Maestro allows you to configure brand's specific styles, such as color scheme, font sizes, buttons and menus, using the Theme Options functionality. This way you can have different styles for various brands in one template, and you can make a common change once and have it applied within multiple styles. The Theme Options ensures that common styling elements are consistent throughout the brand. It also saves development time. You can think of Theme Options as a built-in CSS[1] file.

To configure brand's Theme Options in a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.
3. Select a brand and click Theme Options.



4. Find an option you want to update. Options are grouped by the following categories:

---

[1]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form's display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form's assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

- Branding allows you to define the fundamental color scheme of your brand. You should try to create your brand using only the colors in the Branding category, as these will be used consistently through various elements in the form. Only override the values in the more detailed areas of the brand in special circumstances.
- Buttons
- Font
- Menu allows you to define the specific colors used in the Navigators. It inherits from the colors defined in the Branding category. The Description with each of these colors will indicate which elements it affects.
- Mobile Menu - Extra Items allows you to define the specific colors used in the Navigators.
- Other contains colors and other settings related to other aspects of the forms, such as buttons and sections.

5. Update the option. You can update multiple options as required.
6. Click Done when you have finished updating the options to go back to your brand configuration.

   NOTE

   You can select another brand to edit its Theme Options without exiting the window.

7. Click Save to save the changes.

Next, learn how to create new theme options.

Custom Theme Option

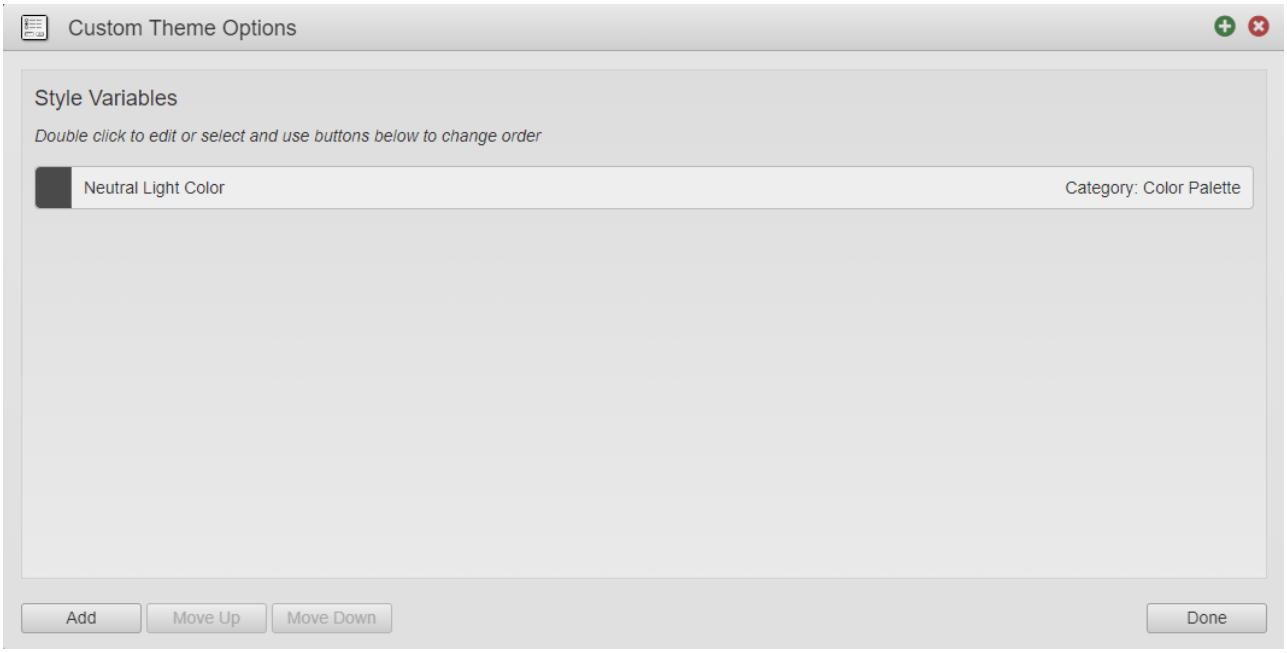
Maestro allows you to create a new custom theme options in a template, so you can add new variables and use them across various styles to improve usability and maintainability of your templates and forms. Usually, a Template Designer creates new theme options in a template as there may need to be some UI design and considerations done prior to that.

Before you create a new variable, we recommend checking the list of existing variables to see if there is one that suits your needs.

View Custom Theme Options

To view custom theme options in a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.
3. Click Custom Theme Options to see the list of all custom theme options created in the template. .



4. Double-click a style variable from the list to open it in the editor. For more information, see how to create a custom theme option.
5. Click Move Up to change the order of the precedence of the selected theme option by moving it up.
6. Click Move Down to change the order of the precedence of the selected theme option by

moving it down.

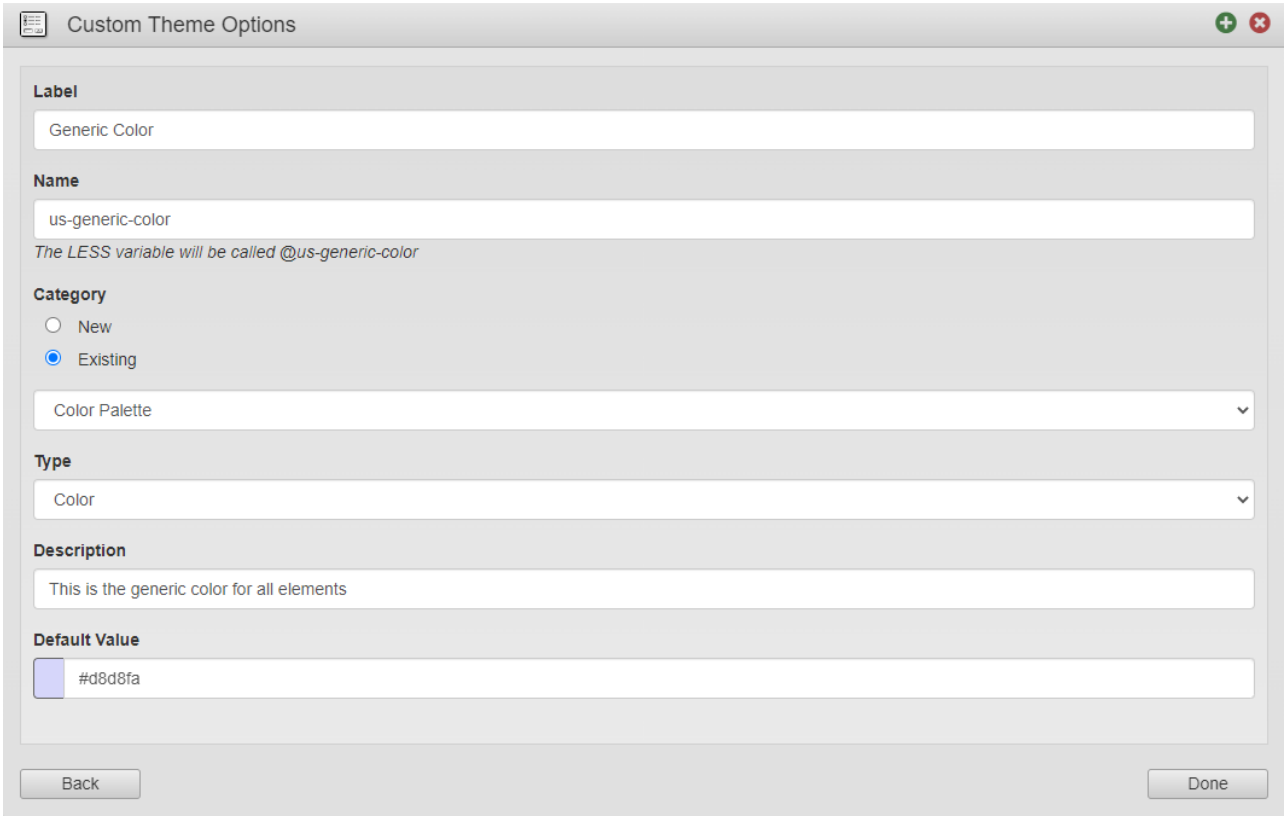
7. Click Done to save the changes.

If you don't see variables you need, you can create a new theme option.

Create Custom Theme Options

To create a custom theme option in a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.
3. Click Custom Theme Options and then click Add to create a new theme option.



4. Enter a meaningful name for the theme option in the **Label** text field.

> NOTE
>
> Try to create more generic theme options so they can be used in various styles or parts of a style, for example, Neutral Light Color.

5. Correct a variable name in the **Name** text field. The Maestro editor auto-generates this name based on the label you have entered above, but you can change it as necessary.

6. Select a category under the Category section that can be:
    - New - to create a new category
    - Existing - to select from the list of existing categories, which can be one of the following:
        - Navigator
        - Layout
        - Fonts
        - Color Palette
        - Fields
        - Buttons
7. Select a variable type from the Type dropdown list, which can be one of the following:
    - Text
    - Color
    - Pixels
8. Enter a meaningful description in the Description text field.
9. Provide a default value in the Default Value text field.
10. Click Done to save the changes.

The new theme option should appear in Theme Options under the category you have selected. Now, you can use it in styles of your components. It's important to understand that you don't really publish new variables so they will become available in styles. Instead, you publish the template, which defines the variables, and you publish shared styles, which use these variables, to the organization-level stye library. For more information, see organization structure.

Next, learn how to configure item properties.

Brand Item Properties

Maestro allows you to configure component's properties, such as logo or background layer, differently for each brand in your template using the Item Properties functionality. This way every form using template gets the same settings, so it is like a global option.

> NOTE
>
> Compare this to Form Options where you can set component's properties same for all brands, but every form that uses a template can be set differently. These are change on a form level.

The primary purpose of Item Properties is to allow you to control the look and behavior of multiple components by modifying a single property. This allows you to avoid making identical changes to multiple components, saving time and decreasing the likelihood of inconsistent behavior appearing in the template.

Another benefit of Item Properties is that they provide a central source of truth for adjusting the most essential properties. This means you don't have to dig around the structure of the form to find the components that you'll almost certainly want to configure.

To explain how it works, let's look at the Logo's Item Property that appears in the top left-hand corner of the template is an Image component. This component has a property which defines which image to use. Because the Image component is part of the template's header - which is not available for editing - there is no way of modifying it. To make the image logo configurable in the brand, the Template Designer has added this particular property to the Item Properties in the brand.

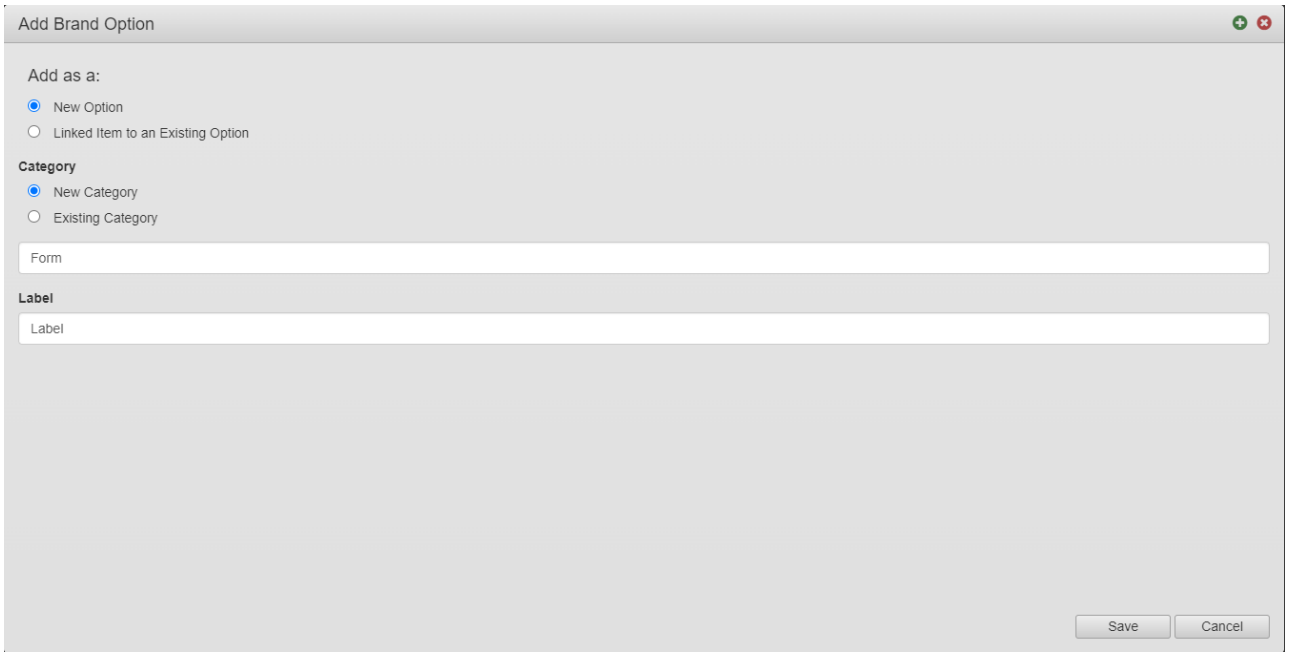
Brand's Item Properties work like this - first, you need to add a component's property to brands in a template you are building. Then you edit a value of the property for each brand using Item Properties. After you save and publish the template, you build a form using one of the brands. You can always remove the property from the brand when it's needed any more.

To add a component's property to a brand:

1. Open a template in the Maestro editor.
2. Select a component in the Design mode and click the Properties tab.
3. Right click on a property you want to add, for example, Label or Hide Section Header, and select Add to Brand Options.

NOTE

You also have a choice of adding a component's property to Form Options. However, if you've already added the property to brands, you can't add it to form options. You must remove it from brands first.



4. Select how you want to add a property from the Add as a radio button group:
   - New Option to add as a new property.
   - Linked Item to Existing Option to add as linked to an existing property and then select an existing property from the Select Existing Option dropdown list.
5. Select a category to use for the property from the Category radio button group:
   - New Category to create a new category for the new property and type a category name in the field.
   - Existing Category to add a new property to the already existing category and then select an existing category from the dropdown list.

   NOTE

   Adding categories help you group and navigate properties, especially, when there are many of them.

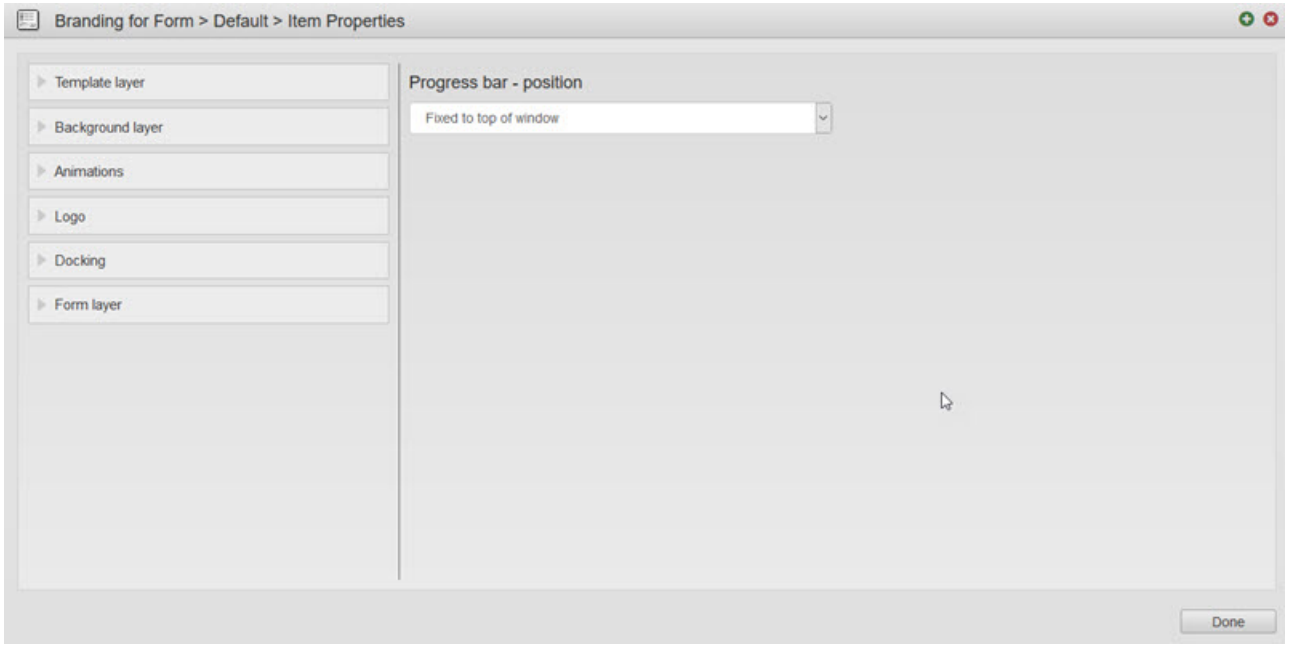
6. Type a name for the property in the Label field
7. Click Save. The property is added to Item Properties, where you can edit it.

Now, you can access this property using the Item Properties option.

To configure a component's property in a template:

1. Open a template in the Maestro editor.
2. Click Brand in the Maestro toolbar.
3. Select a brand and click Item Properties.

> NOTE
>
> You can configure the Default brand as well.



4. Find an item property you need and update it. Item Properties are grouped by categories.
5. Click Done to go back to your brand configuration and click Save.
6. Click Save in the Maestro toolbar to save the template.
7. Click Publish to make the template changes to be available to forms that use it.

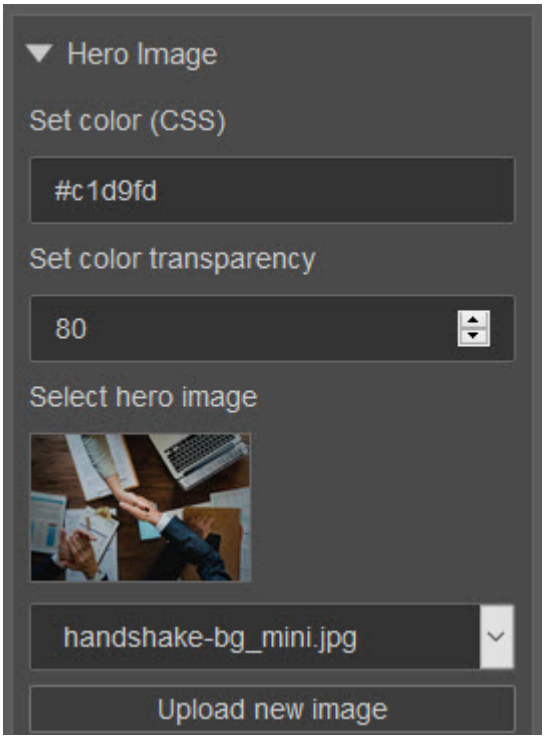
> NOTE
>
> The template changes may not be available to a forms depending on where the extension points are in the template - anything that's inside the extension point (that can be changed in the form) can't be updated by the template

To remove an Item Property from a brand:

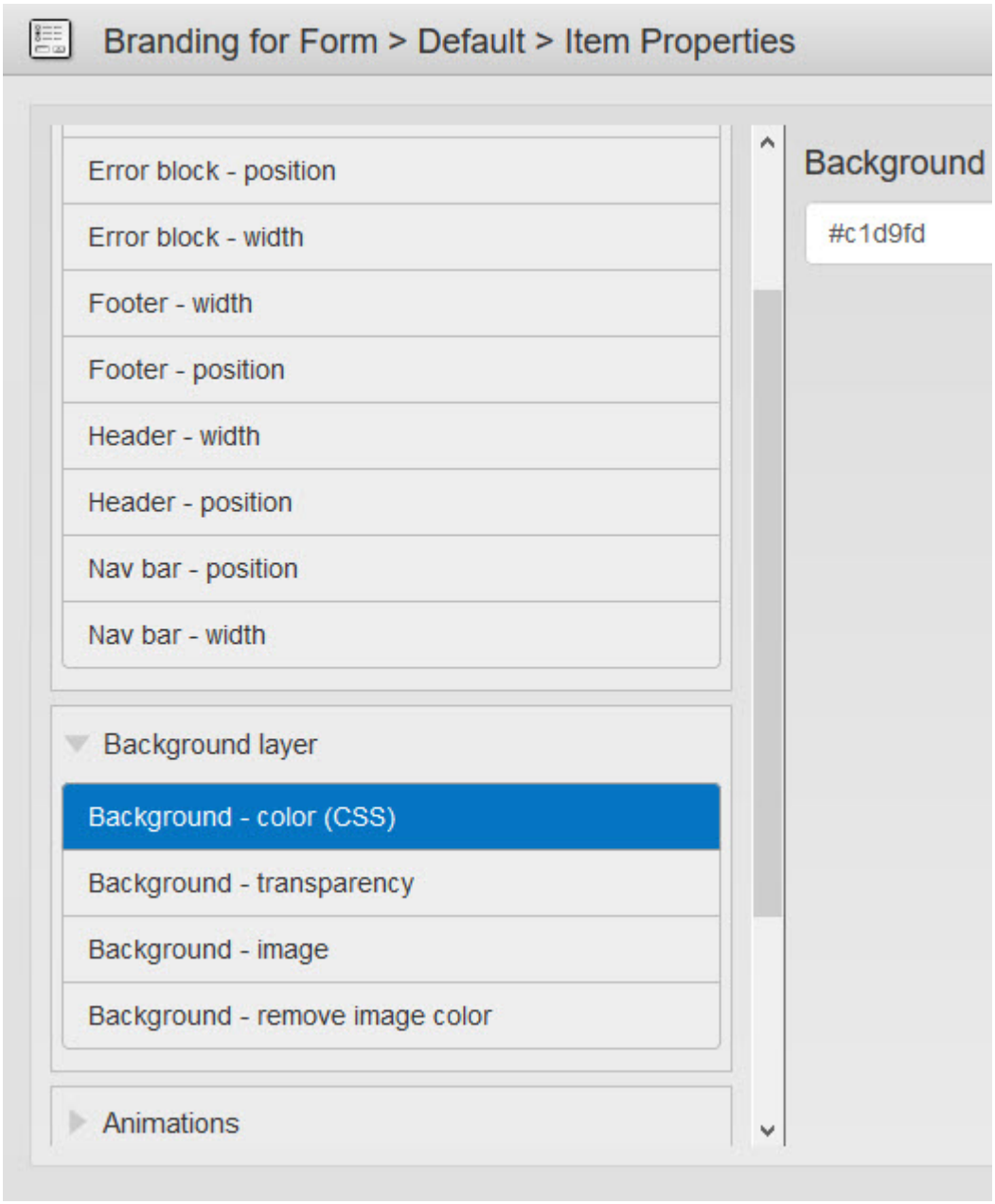
1. Open a template in the Maestro editor.
2. Select a component in the Design mode and click the Properties tab.

3. Right click on Label and select Remove from Brand Options. The Item Property is removed from all brands defined in the template.

It's important to note that, if a property is available via the Item Properties window, you should not edit that property on the component itself. For example, if you select the Background Layer component, you may be tempted to configure the component via its Properties pane, as shown below:

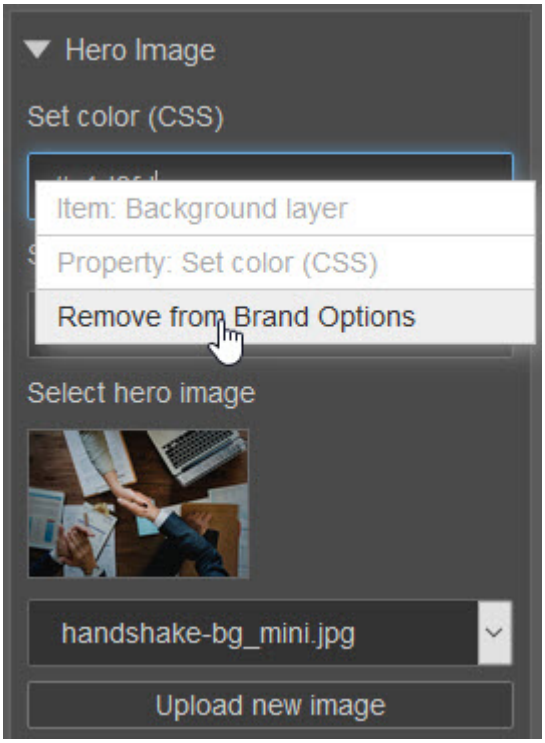


However, if you change the properties of this component, they won't be saved. This is because the properties have been made available using the Item Properties functionality, as shown below:



As a result, they must be configured via the Brands' Item Properties window.

At the moment, the only way to identify how a component's property should be modified is to right-click on the property in the **Properties** pane. If the **Remove from Brand Options** option is available, the property must be configured via the Item Properties window.



Next, learn how to change the style of components in a brand.

Change the Style of Components in Brands

Brands allows you to configure the look and feel of the contents of a template, so you can control the styling of any components of a particular type that are added to a Maestro form by a Form Builder.

To change the style of components in a brand:

1. Open a template in the Maestro editor and select the Style tab.
2. Drag an instance of the component into the template (you will delete the component before publishing).
3. Adjust the styling as required.
4. Click Save to Shared Style to save your changes. Use a meaningful name when saving the style.
5. Right-click the component in the Palette pane, and then select Available Styles for <Component Type>.
6. Select your newly created shared style from the dropdown menu of available styles.
7. Click Save.

NOTE

You can remove this style from the same dialog by clicking the x next to the style.

To apply the shared style to the component type:

1. Right click on any instance of the component in the form.
2. Select Apply Shared Styles to every <component type>.

For more information, see the Style pane.

Next, learn more about shared styles.

Runtime Branding

Maestro allows you to update a brand dynamically using the runtime branding feature. This functionality is based on JSON[1] configuration file that specifies the details of the brand, such as images, CSS[2] content, translation setting, as well as components and widgets' properties, which can be referenced by rules or by Form functions.

Maestro provides you with two specialized components for creating runtime brands - Runtime CSS Resource and Bundle Resource Library components.

Let's start with understanding the JSON structure and how it relays to a brand.

JSON Structure

The JSON file contains the following objects and their corresponding properties that help you define a brand, with some objects configured as single entities or as arrays:

css

This object has several properties specifying a CSS[3] file to use. You can also define an array of CSS objects, if you want to use different CSS files to control color, look and feel, and so on.

- id - an ID of CSS to update as defined in the ID property on a Runtime CSS Resource widget in the form.

---

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

[2]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form’s display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form’s assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

[3]CSS stands for Cascading Styles Sheets and is used to define styles for a Maestro Form, including the design, layout, and variations in the form’s display on different devices and screen sizes. The CSS on a Maestro form is primarily taken care of by the Template Designer. The Template Designer will implement the branding and/or styling of the form’s assets.CSS can be applied to the template of the form, individual components, and any other asset associated with a Maestro form.

- cssUrl - a new URL for the CSS to use, for example, using a relative URL like `./css/myCustomCss.css` will get the image from the FAR file. Setting the URL takes priority over setting CSS Content.
- cssContent - a new CSS content to inject into a style tag for the CSS name.

You can use the `Form.updateCssByName()` function to update named CSS with either a new URL or CSS content, switching between a URL and a CSS string which will remove the previous link or style tag as appropriate and replace it with the one based on the update required.

images

This object allows you to control an image using the following properties.

- imageName - the image name as defined in an image widget in the form.
- imgUrl - a new URL for the image to use, which can be a relative or absolute URL. For example, a relative URL `./images/myImage.png` will specify the image in the FAR file.
- imgHeight - a new height for the image.
- imgWidth - a new width for the image.
- alternativeText - an alternative text for the image, this is populated into the alt attribute on the image.
- toolTip - a tooltip text for the image, this is populated into the title attribute on the image.
- imageLink - a URL for the image to go to, leaving this blank or null will not take the user anywhere on click.

You can use the `Form.updateImageByName()` function to update images in the form by its name specified in the image widget.

translation

You can define only one translation per brand by using either this object or the `translation_template` property described below.

- code - a language code, which is used by the `Translation.fetch()` function.
- url - a URL to a translation CSV file if it is not included in the FAR file. This is an optional parameter.

You can use the `Translation.fetch()` function to load the translation for the specified language code. For more information, see how to configure a new language.

If the translation loads, the interface will refresh with the localized terminology. If the translation doesn't load, an error will appear in the JavaScript Console. A simple way to implement it in a form is to add a button that calls `Translation.fetch("myLanguageCode", false, "/web-`

`plugin/resources/mynewCSC.csv")`.This translates the form based on a translation file that's at an external URL. In this example, it's in a portal resource on the Manager server, but it could be anywhere.

translation_template

This property specify a template to use for your translation using the locale, for example `en_AU`.

dataValues

This object contains key / value pairs allowing you to update the form's data model. Values can be both plain text and rich text, such as HTML, defining component's fields. For example, the JSON's property `dataValues: { footerUrl: "https://myUrl.com" }` will be populated into the `data.footerUrl` data model element.

The following JSON example shows a simple brand configuration:

```
css: [{
    id: "runtimeCssResource",
    cssUrl: "",
    cssContent: ""
}],
images: [{
    imageName:"myLogo",
    imgUrl: "./images/anotherLogo.jpg",
    imgHeight: "",
    imgWidth: "",
    alternativeText: "",
    toolTip: "",
    imageLink: ""
}],
translation_template: "en_AU",
translation: {
    code: "en_AU",
    url: ""
},
dataValues: {
    footerText: "",
    headerText: ""
}
```

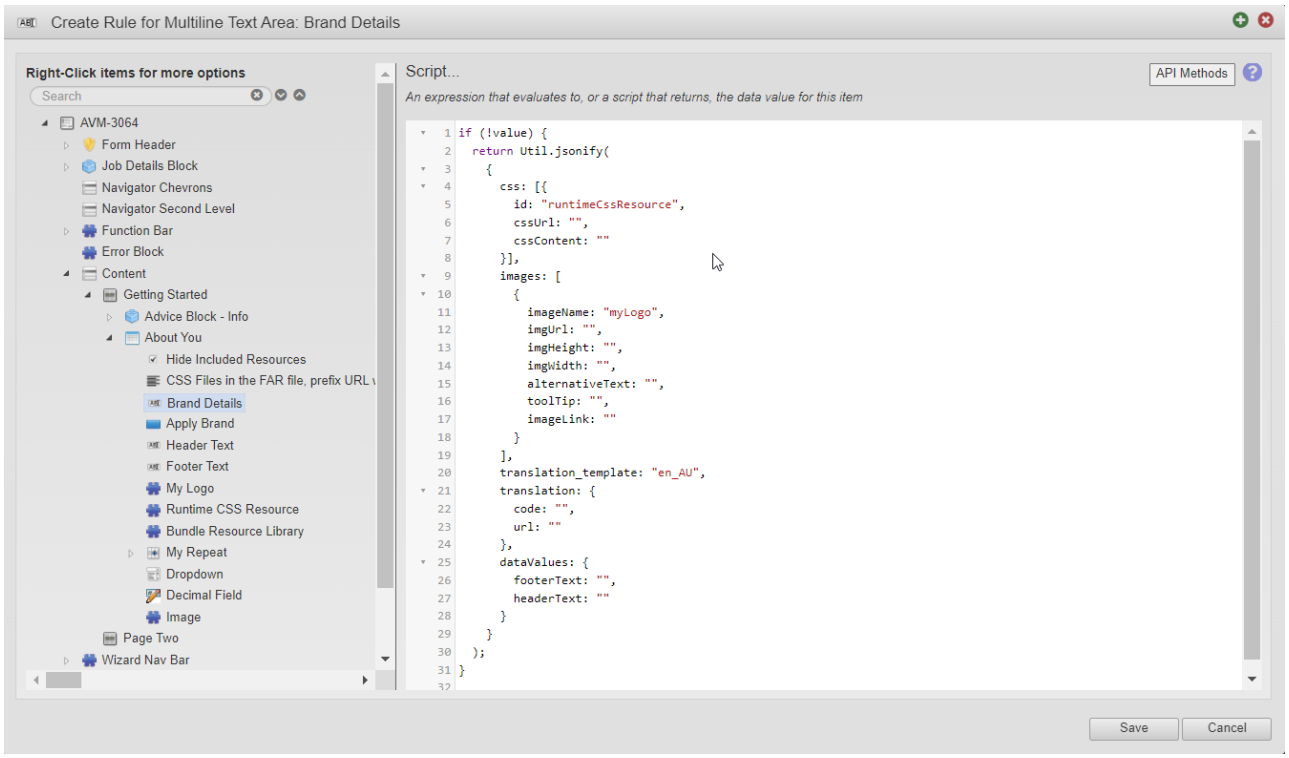
To illustrate how runtime branding works, imagine that you want to update the form's copyright footer text, which is configured in a brand as `Copyright {{data.footerText}}`. With runtime branding, all you need to do is to pass the updated `footerText: "My new copyright text"` parameter into the form, so the next time it is rendered in the browser, the updated copyright text is shown to the user. As a comparison, using the design-time branding approach, you would need to edit the brand, re-build the form and then deploy it in your Manager.

Rules

You can use Maestro rules to add and configure brand's properties using the JSON file.

To configure a brand:

1. Open a brand in the Maestro editor.
2. Select a component in the form.
3. Select the Properties tab and click Calculation under the Rules section.



4. Edit the content of the script using JSON syntax in the Script window.
5. Click Save.
6. Rebuild the form and render it to check the updated brand.

API

Maestro introduces the new JavaScript API in the Form namespace that you can use to dynamically update your brand.

- `Form.updateImageByName()`
- `Form.updateCssByName()`
- `Form.updateBranding()`
- `Translation.fetch()`

For more information, see the Maestro API.

Next, learn how to create a brand.

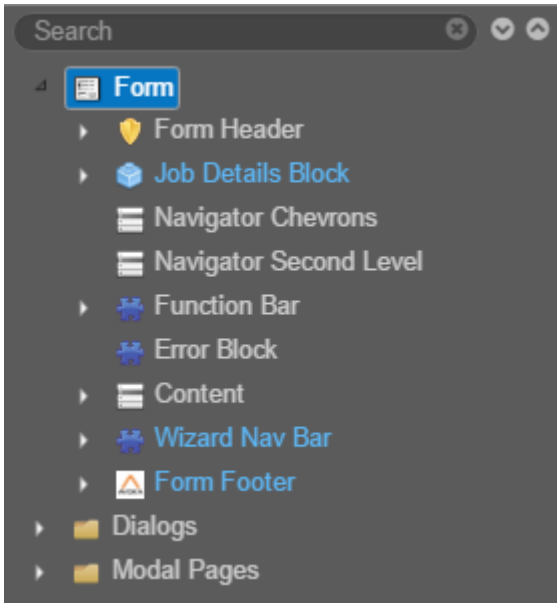
Extension Points Overview

Maestro comes with the concept of Extension Points that define areas within a template where Template Designers allow Form Builders to add their content. Extension points are normally used to control common areas, such as headers, footers, and navigation bars, that should only be styled by a Template Designer. If no extension points are set in a template, the Form Builder has access to the entire form.

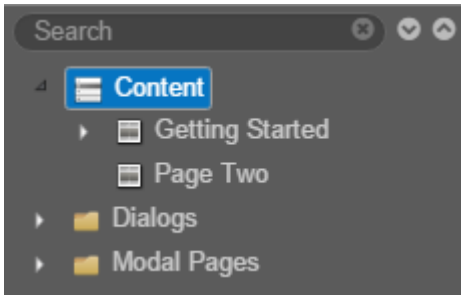
NOTE

An extension point should always be set on Content because this area is used for all elements of the form, which gives a Form Builder complete access to all the content of the extended container. However, it can be also set on the Dialogs and Modal Pages, if required.

To illustrate how an extension point works, let's look at the following template and a form structures:



Template Structure



Form Structure

In this example, the extension point is set on Content, so the Form Builder, who works with the form structure, won't be able to select the Form container or the Navigator components. However, the Template Designer has access to all elements in a form.

Extension points can't be set within other extension points. If there is an extension point already created for an outside container, a warning message is displayed, which tells you that the new extension point will cause an existing extension point to be removed. As a Template Designer, you have the option to restrict an extension point, or remove the extension point completely.

For example, if you have Getting Started set as an extension point (see the image above), you will receive a warning when you set Content or About You section as an extension point. If you accept the warning message, the extension points will be automatically removed from the conflicting container.

Changes to extension points are updated in forms once the template is published, so be aware that this may affect content within existing forms that use this template.

It is important to create templates with the correct extension points and then publish them as soon as possible. These templates are known as placeholder templates. They allow Form Builders to start working on the form, while you are still styling and modifying the template. This provides you with the ability to work in parallel, which significantly speeds up form development.

Next, learn how to set an extension point.

Set an Extension Point

A new template that you create in Maestro doesn't come with extension points by default. You must add them manually to the areas where you want to restrict access to certain parts of a form. Once an extension point is set, Form Builders have the ability to add, remove or modify the elements within a container that is set as an extension point. The container's content now belongs to a form, so any changes made to this content in the template won't be automatically propagated to the form. This is an expected behavior and you should be aware of this when setting up extension points.

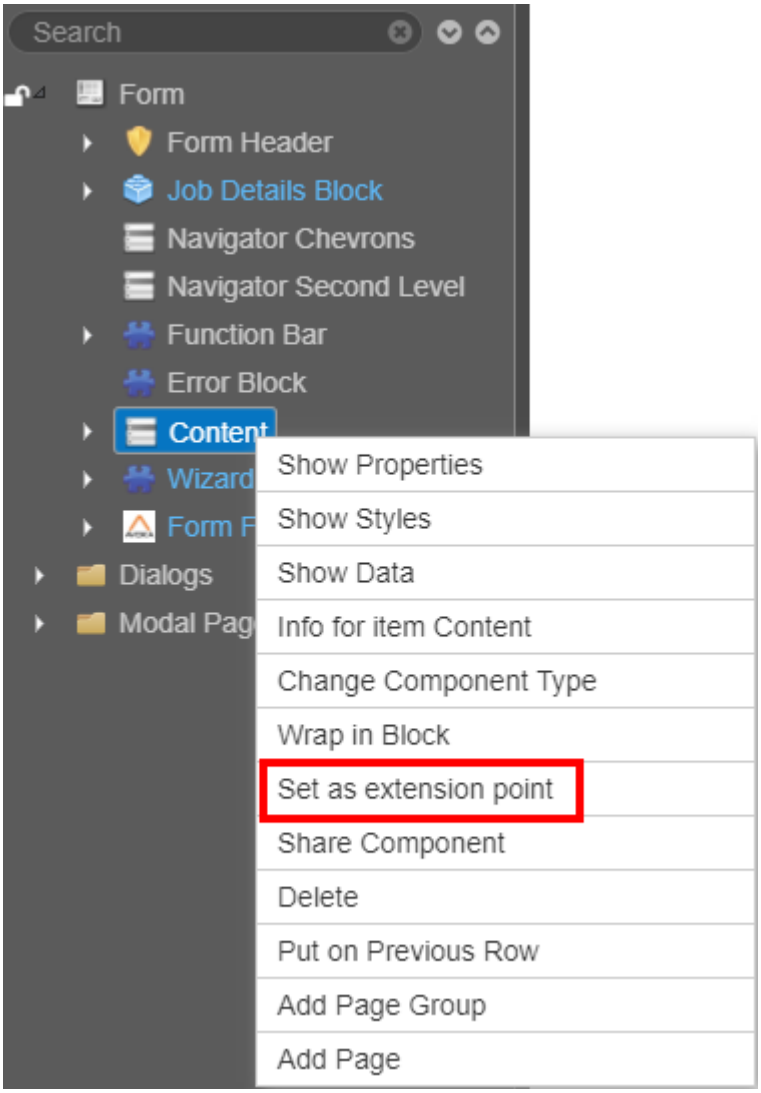
To set an extension point in a template:

1. Open a template in the Maestro editor.
2. Click the View tab and expand Form.
3. Select a container, for example Content, and right-click on it.

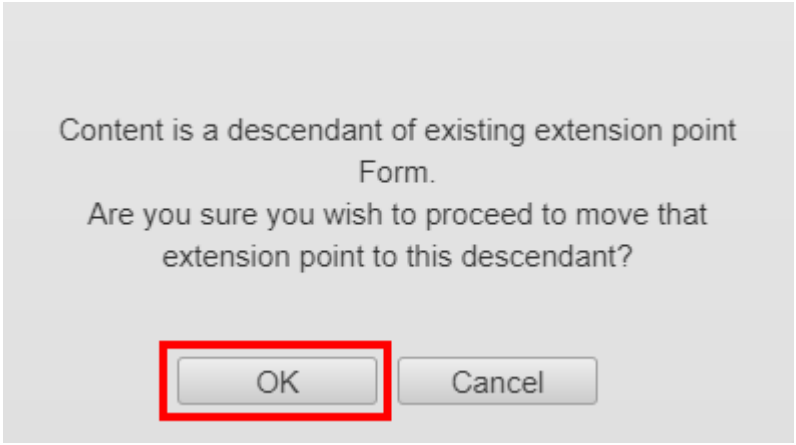
   > NOTE
   >
   > We recommend applying an extension point to Content or Dialogs and Modal Pages content areas only.

4. Select Set as extension point from the dropdown list to apply the extension point.

   > NOTE
   >
   > Currently, Form has the extension point configured, which is represented with the unlocked padlock icon.



5. Click OK to confirm or click Cancel if you don't want to proceed.

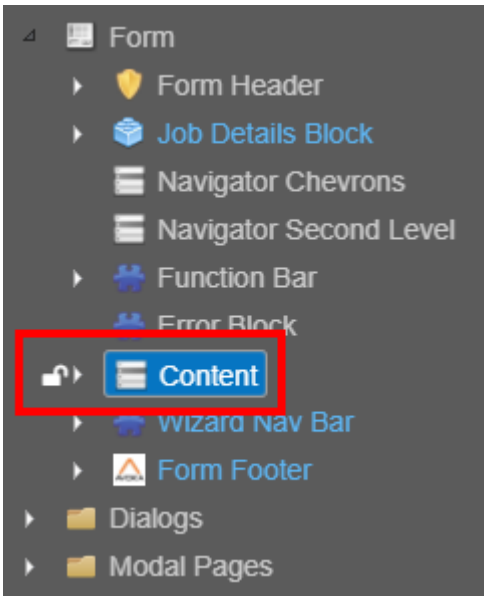


The warning message tells you that the extension point is being removed from Form, which means that other areas within the form structure will no longer be available in the form.

NOTE

Be aware that changes to extension points may affect content within existing forms that are using that template.

The Content now has the extension point, which is represented with the unlocked padlock icon.



6. Click Save to update the template.

Repeat the process above, if you need to add more extension point, for example, for Metadata and Narrator Controller under the Nuts & bolts container. You should notice the unlocked padlock icon next to each of the items that are set as an extension point.

NOTE

You must publish the template or re-publish it again for the change to the extension point to take effect in forms that use it.

Maestro allows you to restrict an Extension Point. That is, if there are multiple containers underneath a current extension point, you can set the extension point further down in the tree. However, you can only have one extension point within each level of the hierarchy. To reset back to a higher level in the hierarchy, set the extension point at a higher level - all lower levels will be automatically removed.

Next, learn how to remove an extension point.

Remove an Extension Point

Maestro allows you to remove an extension point from a template. You may need to do this if you created the extension point by mistake, want to move it or don't need it any more.

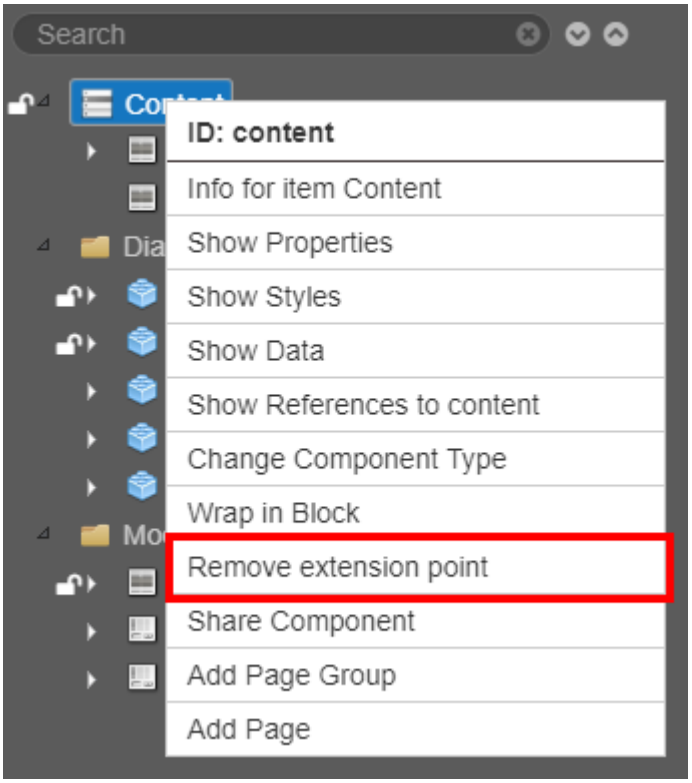
> NOTE
>
> Removing of extension points can affect forms in many different ways, so we recommend it to be done by a Template Designer.

To remove an extension point:

1. Open a template in the Maestro editor.
2. Click the View tab and expand Form.
3. Select a container that has an extension point configured, for example Content, and right-click on it.

   > NOTE
   >
   > The extension point is represented with the unlocked padlock icon. If you can't find this icon, it means there are no extension points set in the template.

4. Select Remove extension point from the dropdown list to delete the extension point.



5. Click Save to update the template.

NOTE

You must publish the template or re-publish it again for the change to the extension point to take effect in forms that use it.

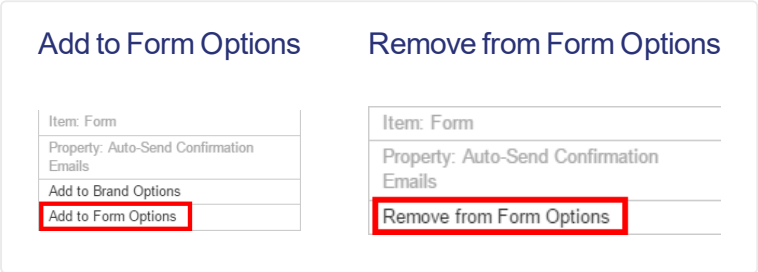
If you have removed all extension points in the template, the Form Builder will have access to all elements of the form. This scenario is not ideal as all consistency controlled by the template will no longer be available.

Next, learn about save and resume.

Setting Form Options for Extension Points

TO BE REMOVED?

The Template Designer can control which options display within the Form Options window.



1. From the hierarchy, View or Structure pane, select the element that contains the property you want to add to the Form Options window.
2. With the element selected, right-click the option from the Properties pane. If the property is not currently in the Form Options window you will see Add to Form Options. If the property is already in the Form Options window you will see Remove from Form Options.
3. When you select Add to Form Options, the Add Form Options window will display.

   Add as a:

   New Option - Thiswill create a new option within the Form Options window.

   Linked Item to an Existing Option - This will allow you to link the selected item to an existing item in the Form Options window.

   Category: This is the area within the Form Options window the property will display.

   New Category - You can create a new category within the Form Options window. Once selected you can enter a name.

   Existing category - This will add the property to an existing category within the Form Options window. When you select the option, you will then have a dropdown of the existing categories.

   Label: This is the name used for the property in the Form Options window.

3. Inverted Data: This is used to turn a negative property into a positive option. For example, if you add the Exclude property (which is a negative) to Form Options, you could select Inverted Data which would turn it into an Include option from within the Form Options window.



4. Once the selections are complete, click Save. The property will now be added to the Form Options window.

Save Challenge Overview

Maestro comes with the Save Challenge feature, also called Save and Resume, which allows a form user to save a form, with all filled data, at any point and then open it later to resume filling the form from the point where the user left off. There are many business cases where it's very handy for a form applicant. For example, when they don't have all required information or documents on hands and therefore the form application has to be postponed until the form applicant will get it available.

When the user saves a form, they are given an automatically generated reference code. This reference code is defined in Manager ad is required to open the form. Along with the reference code, the form builder can also include a security question. Using the reference code, along with a security question, creates two factor authentications[1].

If implemented, when saving a form, a form user will be prompted to answer the security question. If the form user provides the correct details, the form user will be able to save the form with their data still in place when they return to the form. When returning to the form, the form user will be prompted to answer the security question again and provide the reference code that they were given when they initially saved the form.

Any component type can be used for the security question, such as a text field.

When the user saves their form, they are presented with the Save Confirm dialog. When the user returns to resume their form, they are presented with the Save Challenge dialog.

Save Challenge can be configured to popular answers to the configured questions with data previously entered by the user, and a save challenge can be configured with multiple questions using multiple components.

Next, learn about best practices on creating a save challenge with multiple components.

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[1]Two-factor authentication (2FA), sometimes referred to as two-step verification or dual factor authentication, is a security process in which the user provides two different authentication factors to verify themselves to better protect both the user's credentials and the resources the user can access. Two-factor authentication provides a higher level of assurance than authentication methods that depend on single-factor authentication (SFA), in which the user provides only one factor -- typically a password or passcode. Two-factor authentication methods rely on users providing a password as well as a second factor, usually either a security token or a biometric factor like a fingerprint or facial scan.

Create a Save Challenge

In this topic, we're going to create a save challenge from scratch. This will provide insight into how to create your own save challenges and how to customize save challenges in existing templates.

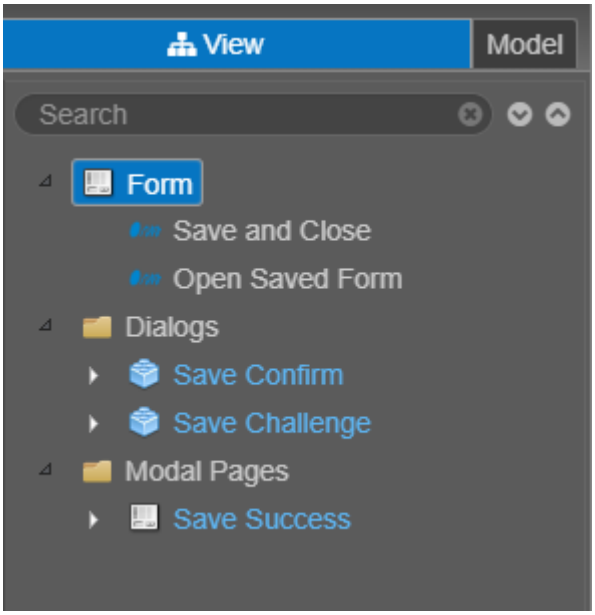
To setup this feature:

1. Create a Maestro form with the Core - Empty Form template.
2. Drag a Save Confirm component into the Dialogs folder. This dialog allows a user to save the form.
3. Drag a Save Success component into the Modal Pages folder. This modal loads after the user saves a form and displays the reference code they can use to re-open the form.
4. Drag a Save Challenge component into the Dialogs folder. This dialog allows the user to submit a reference code. If the reference code is valid, it will open the form associated with that code

   > NOTE
   >
   > In earlier versions of Maestro, the Save Challenge component was named TRN Save Challenge.

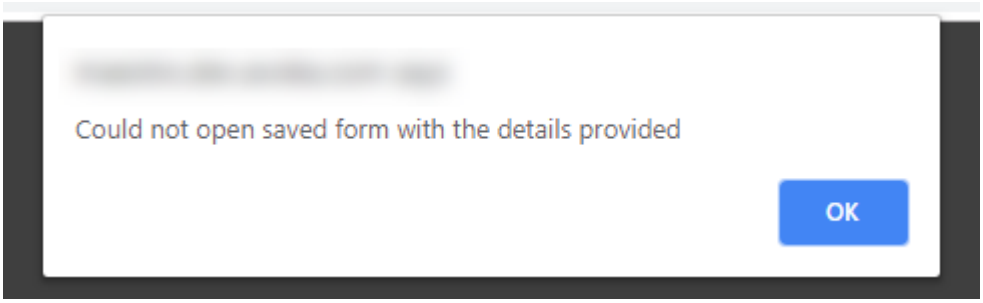
5. Drag a Save and Close component into the form. This button will open the Save Confirm dialog.
6. Drag an Open Saved Form component into the form. This button will open the Save Challenge dialog.

You should end up with a View pane that looks like this:



Based on these changes, the save challenge feature is now functional. If you render the form and click the Save and Close button, you'll see the reference code assigned to the transaction. Then, if you click the Open Saved Form button and enter the reference code, the saved form will open.

If you enter an incorrect reference code, an error will be returned:



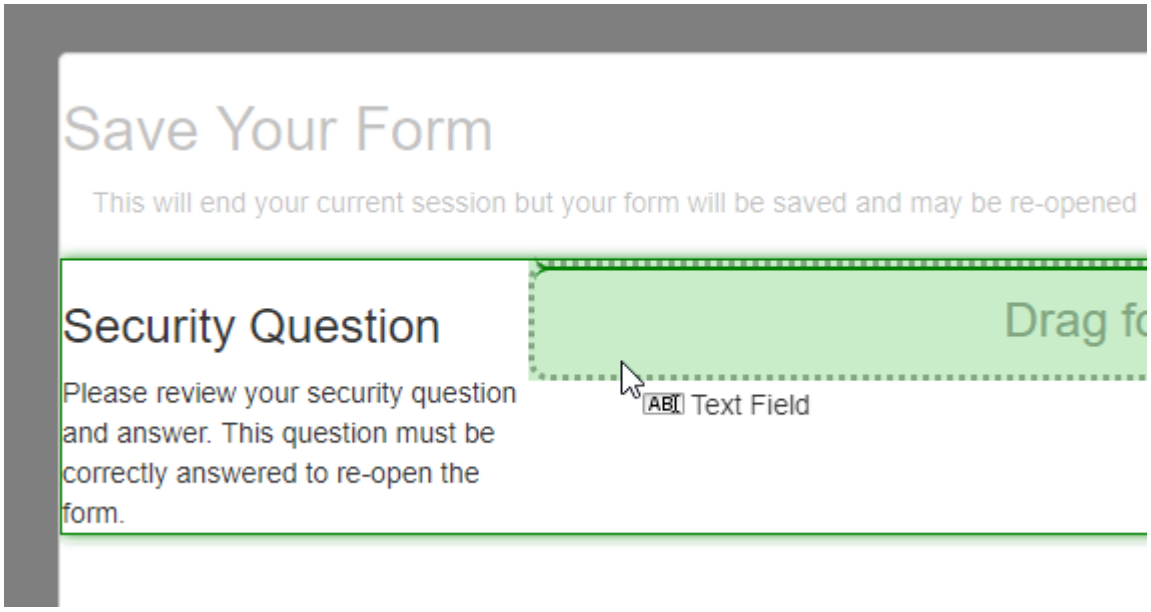
If you receive this error after entering a *correct* reference code, it's probably because you're using an earlier version of Maestro. In this case, you'll need to add a security question for the save challenge feature to work. Fortunately, adding a security question is considered a best practice.

Adding a Security Question

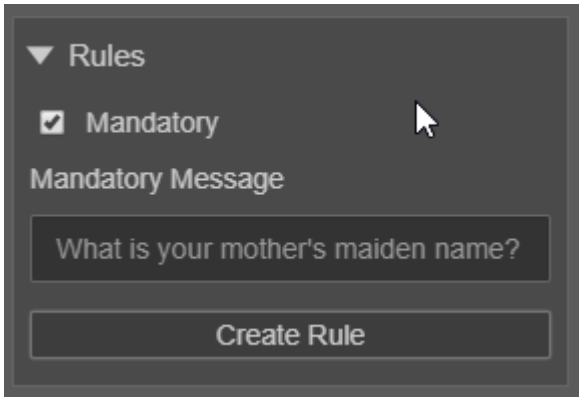
Security questions ensure an extra layer of protection for users who save their forms. Rather than simply entering a reference code, they're required to enter an additional piece of information to verify their identity.

To add a security question to the Save Confirm dialog:

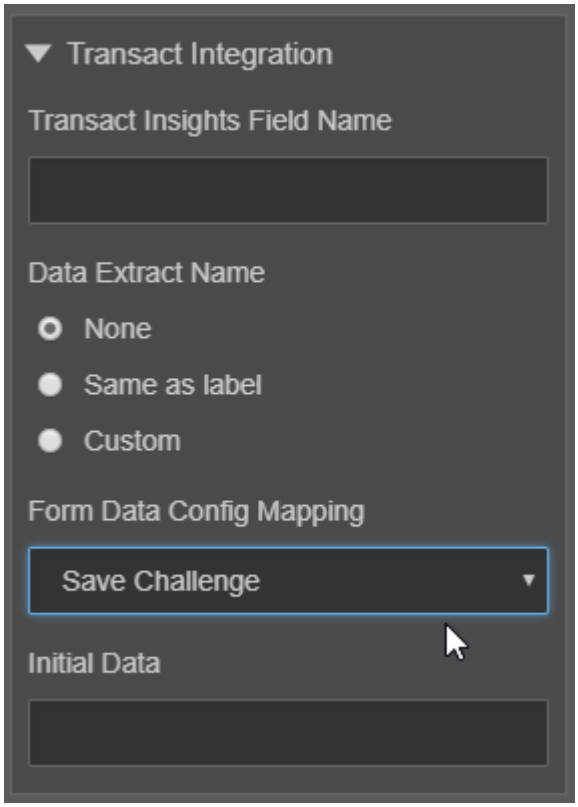
1. Drag a Text Field component into the Save Confirm component's Security Question block.



2. Change the label of the text field to a question, such as "What is your mother's maiden name?"
3. Enable the Mandatory rule to prevent users from saving a form without a security answer.

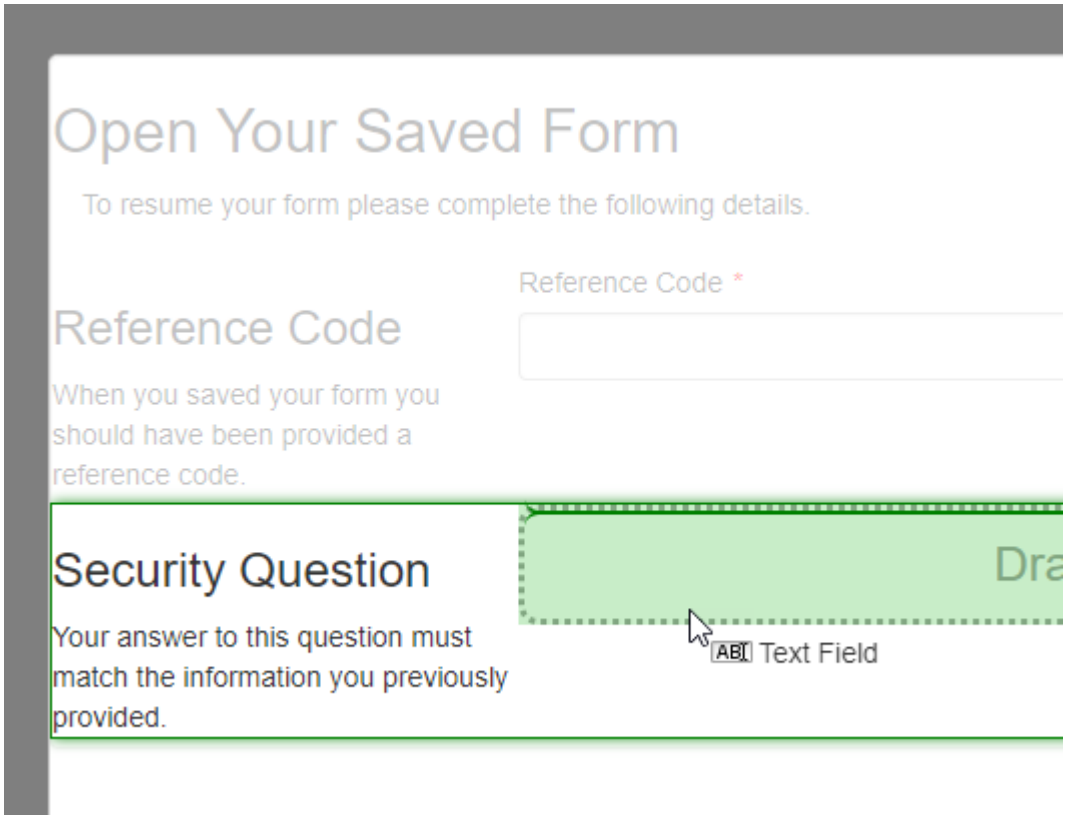


4. Switch to the Integration tab, expand the Integration panel, and select Save Challenge from the Form Data Config Mapping dropdown.



Then, to allow users to provide their security answer via the Save Challenge dialog:

1. Drag a Text Field component into the Save Challenge component's Security Question block.



2. Change the label of the text field to the same label as the previous text field.
3. Enable the Mandatory rule to prevent users from trying to open a form without a security answer.

It's important to note that only the first text field — the text field in the Save Confirm component — should be mapped using the Form Data Config Mapping dropdown. If you map the second text field, the original mapping will be lost, as only one field can be mapped to the Save Challenge option at any one time.

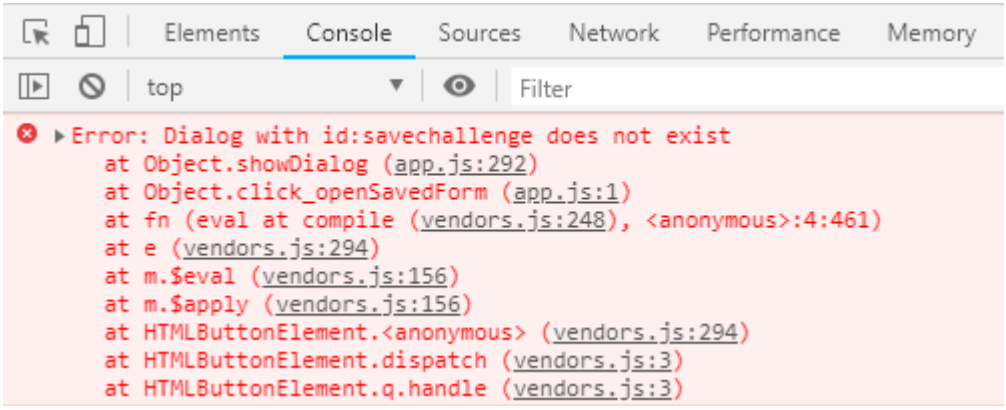
Based on these changes, users will now be required to answer a security question when saving and opening a form.

Troubleshooting Dialogs

The reason the Save and Close and Open Saved Form buttons automatically open the relevant dialogs is because of the IDs associated with the components. The Save Challenge component, for instance, has an ID of "savechallenge", and the Open Saved Form button has a rule that opens a dialog with the ID of "savechallenge":

```
Form.showDialog("savechallenge");
```

If a dialog isn't opening for whatever reason, it's worth verifying that the IDs are setup correctly. The easiest way to do this is to open the Google Chrome DevTools before attempting to open the dialog. If there's an error with the ID, it will appear via the Console:



Configure Security Questions for Save Confirm Dialog

To configure a save challenge security question in the save confirm dialog of a Maestro form.

1. Open a Maestro form.
2. Expand Dialogs.
3. Click Save Confirm.
4. Add a component to the security question section within the dialog.
5. Map the component as the save challenge.
6. Click the Integration tab.
7. Expand Integration.
8. Select Save Challenge from the Form Data Config Mapping dropdown menu.
9. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

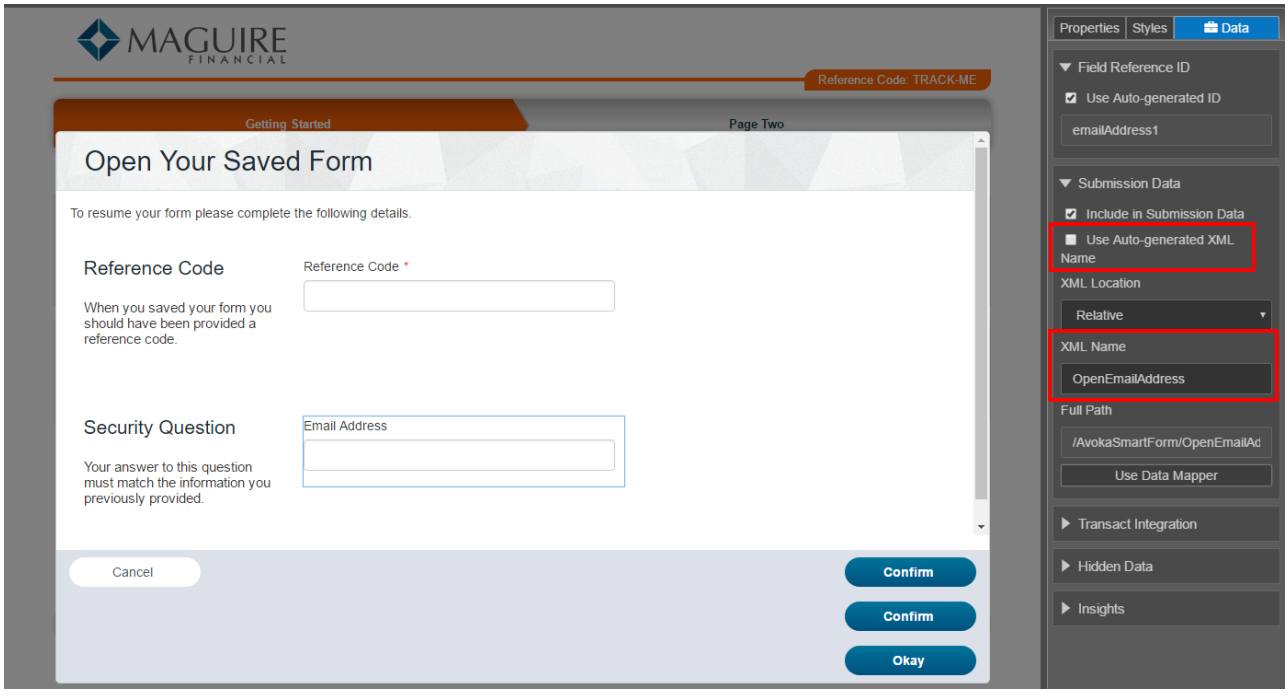
You can only add one security question to the Save Confirm dialog. However, you can use a calculated data field to configure and use multiple components for the security question. When using multiple components and questions to create the security question and answer, ensure that the calculated field that combines the multiple questions, is the first field on the Challenge Dialog. Alternatively, you can update or override the JavaScript that performs security check.

Next, configure the save challenge dialog security question.

Configure Security Questions in Save Challenge Dialog

To configure a save challenge security question in the save challenge dialog, follow these steps:

1. Open a Maestro form.
2. Expand Dialogs.
3. Select Save Challenge.
4. Click Copy to copy the component.
5. Paste the component within the Save Challenge security question section. The Save Challenge security question doesn't need to be mapped to the Save Challenge System Mapping. You only need to map the component displayed on the Save Confirm dialog, this is done when the save confirm dialog is configured with a security question.
6. Expand Save Challenge > Save Challenge Content.
7. Select Security Question.
8. Select the Integration tab.
9. Clear Use Auto-generated XML.
10. Change the XML Name.



12. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

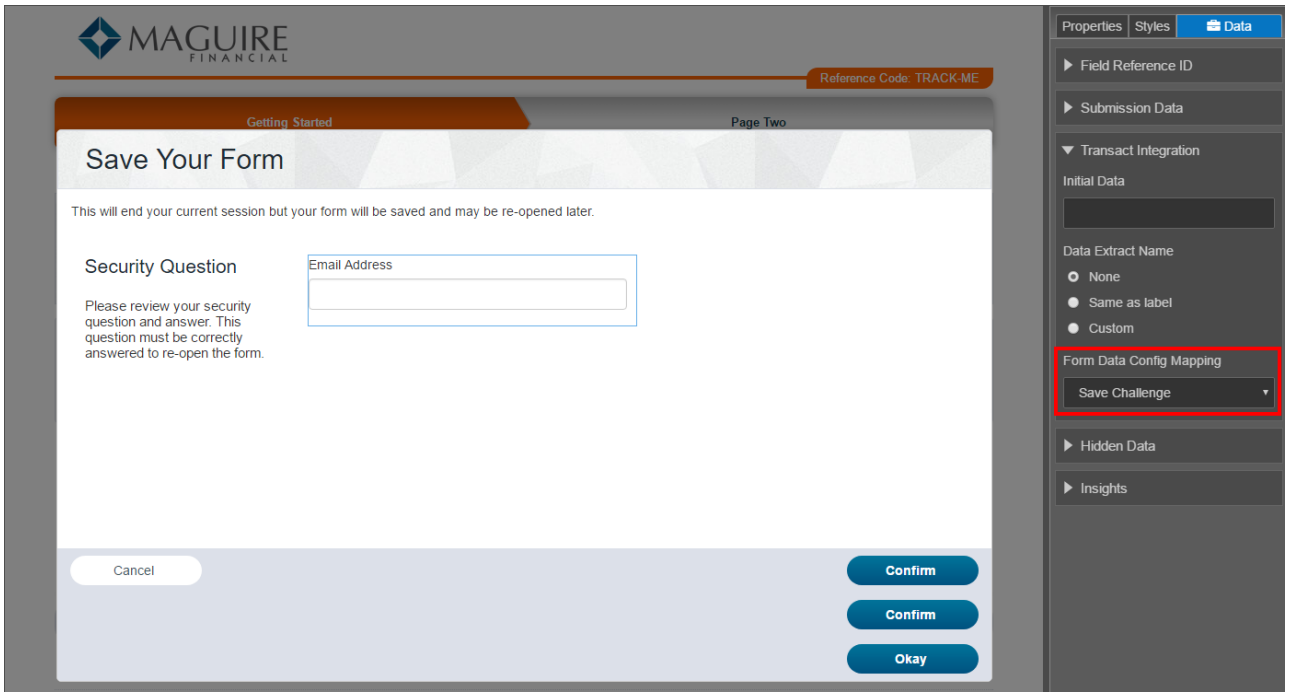
Populate Security Questions from User Entered Data

Another option for the save challenge security question is to populate the answer from a component the user has already completed within the form.

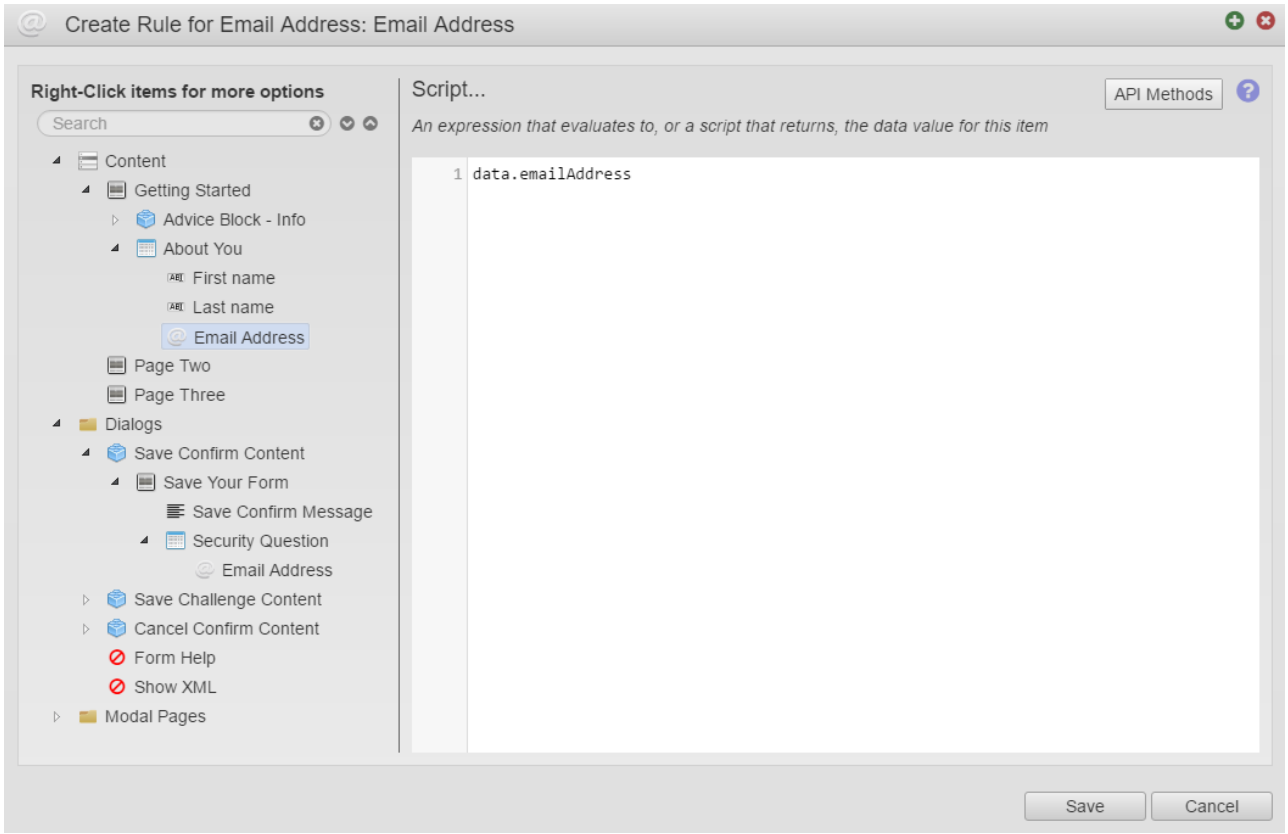
For example, if the answer to the security question is the user's last name, you have probably already asked the user for their last name within the form. You can calculate the field in this dialog to be equal to the same data they have already typed in the form. This makes the save process easier for the user.

To populate security questions from user entered data, follow these steps:

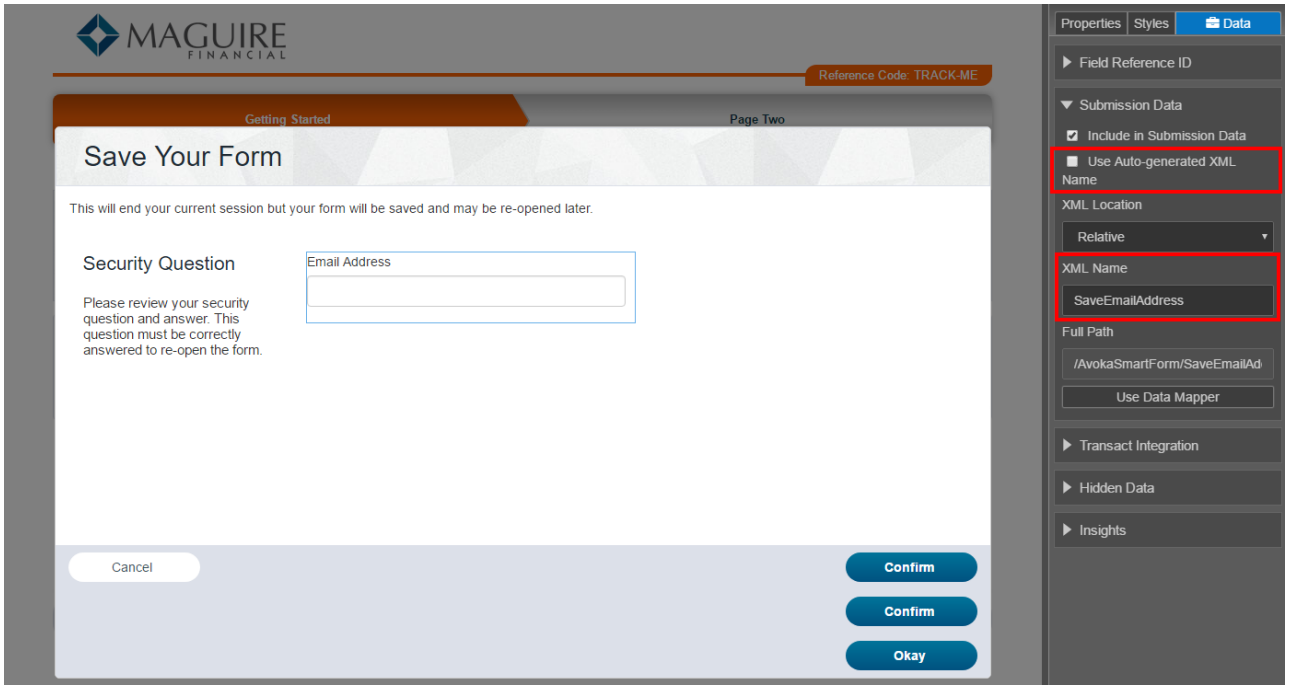
1. Open a Maestro form.
2. Expand Dialogs.
3. Select Save Confirm.
4. Add a component to the security question section within the dialog
   You can copy the component on the form and paste it to the Save Confirm dialog if preferred or you can drag a component from the Palette pane to the Security Question section of the dialog.
5. Map the component as the save challenge.
6. From the Data pane expand Integration.
7. Select Save Challenge from the Form Data Config Mapping dropdown.



8. With the component selected, click Create Rule on the Properties pane.
9. Select Script
10. Navigate to the existing component within the form and double-click to add it to the calculation.



11. Click Save.
12. Select the Integration tab.
13. Clear Use Auto-generated XML.
14. Change the XML Name.



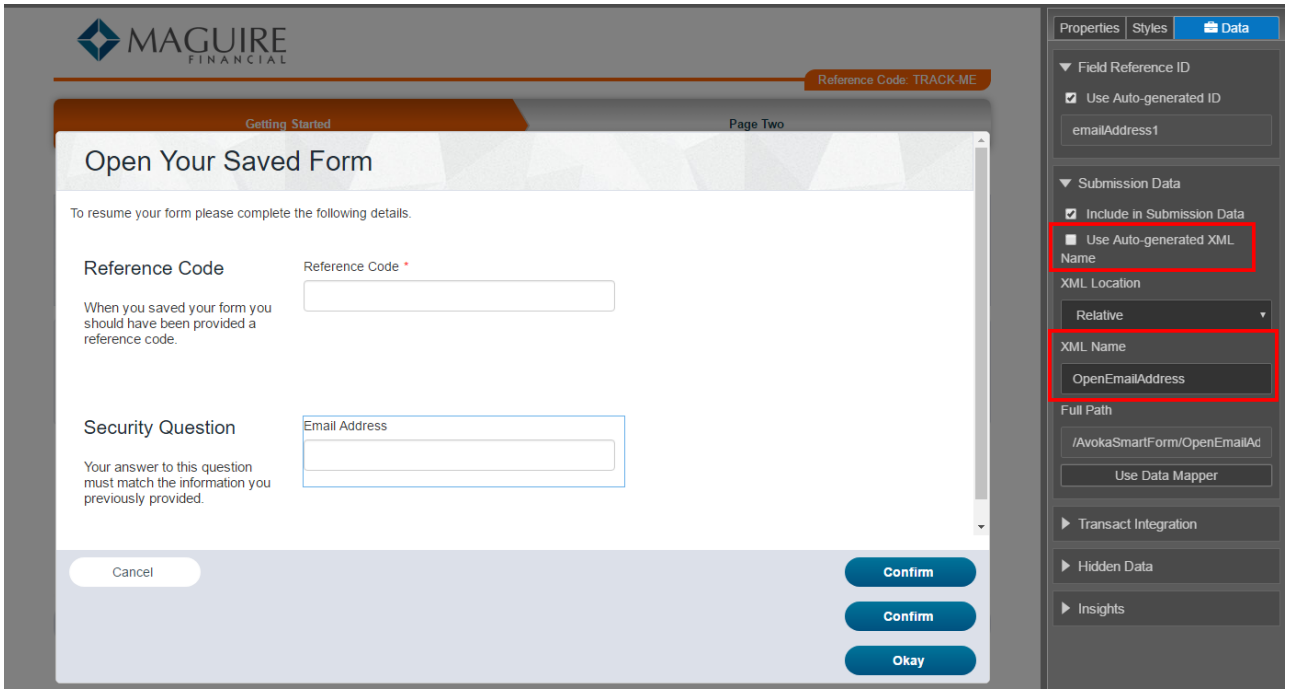
15. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Remember that you cannot have multiple components with the same XML Name. In this scenario you will end up with three components that could have the same XML Name - the component on the form, the component on the Save Confirm dialog and the component on the Save Challenge dialog. You need to ensure that all three components have different XML Names. In most cases you will likely change the components within the dialogs and leave the component on the form as an auto-generated XML name.

Remember you need to add the security question component to the Save Challenge dialog. Rather than recreating the component along with the calculation rule, you may find it easier to copy and paste the component from the Save Confirm dialog to the Save Challenge dialog.

1. Select the Save Confirm security question.
2. Copy the component using the Copy button on the toolbar or type CTRL + C on your keyboard.
3. Paste the component within the Save Challenge security question section.
4. Expand Save Challenge > Dialog Content and then select Security Question.
5. Click the Paste button on the toolbar or type CTRL + V on your keyboard.
6. Select the Data tab.
7. Clear Use Auto-generated XML.

8. Change the XML Name.



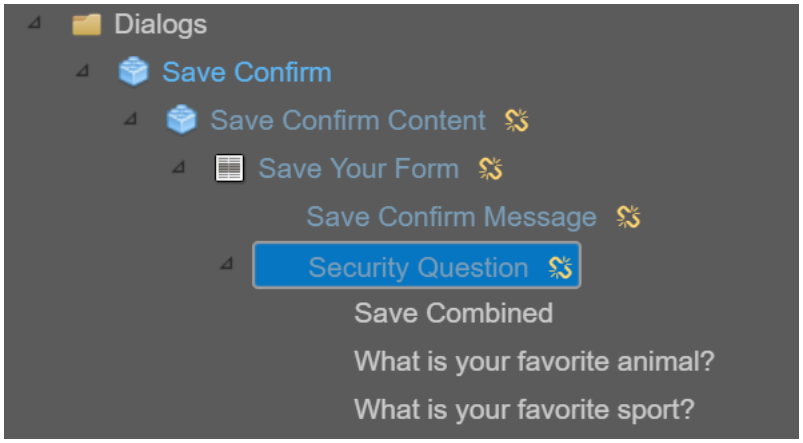
Once the save challenge has been configured, you can import it into Journey Manager.

Setting up Security Questions with Multiple Components in the Save Confirm Dialog

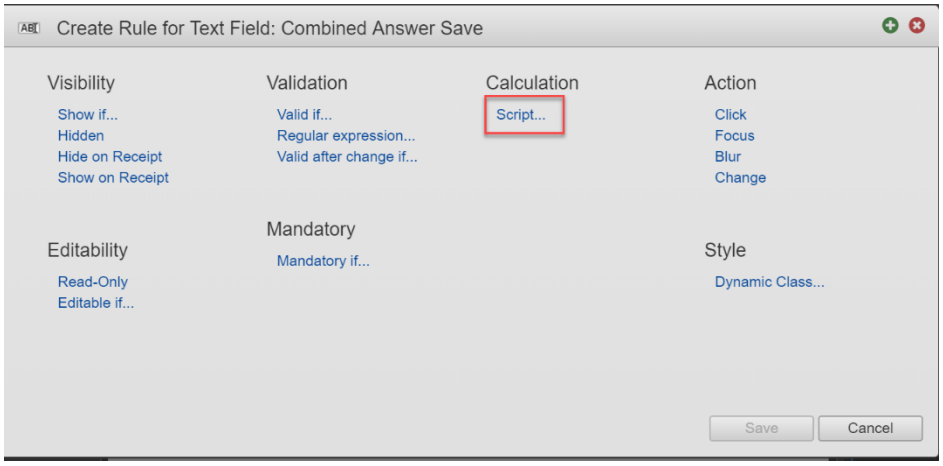
Setting up multiple save challenge security questions in the Save Confirm Dialog is almost identical to setting up a single security question Save Challenge.

To set up multiple security questions in the Save Confirm Dialog, follow the steps below:

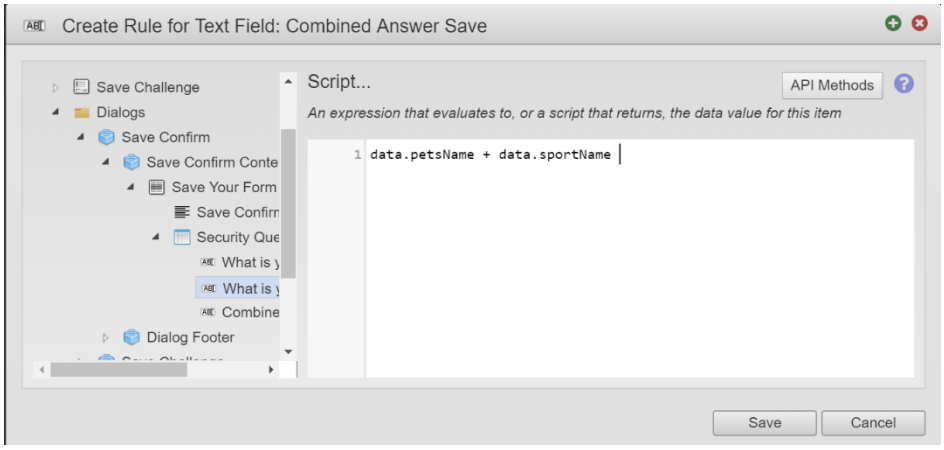
1. Expand Dialogs.
2. Select Save Confirm >Save Confirm Content > Save Your Form > Security Question.
3. Add multiple components to the security question section within the Dialogs section (for example, you could add multiple text fields and use the labels as questions).
4. Add a separate data field to the security question section (name the text field something similar to Save Combined). This data field will be the hidden field that will collect the answers to all the security questions. The screenshot below displays the tree once the data field and text fields have been added.



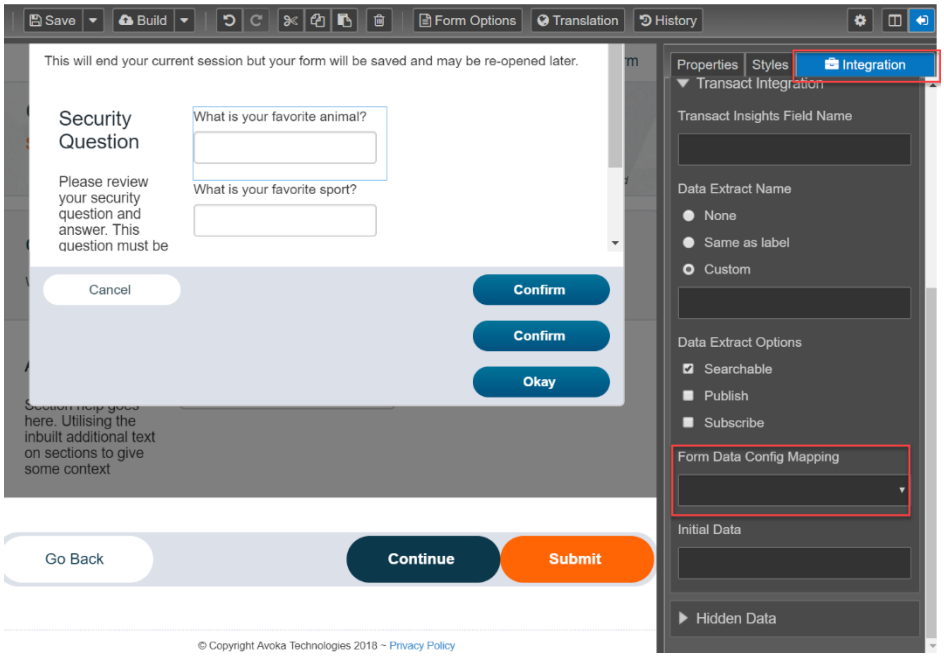
5. Create a calculation rule on this data field to concatenate the answers to the questions.
6. Select the data field Component.
7. Navigate to the Properties tab and scroll down to Rules.
8. Select Rules.
9. Click Create Rule.
10. Select Script... from the Calculation rules List.



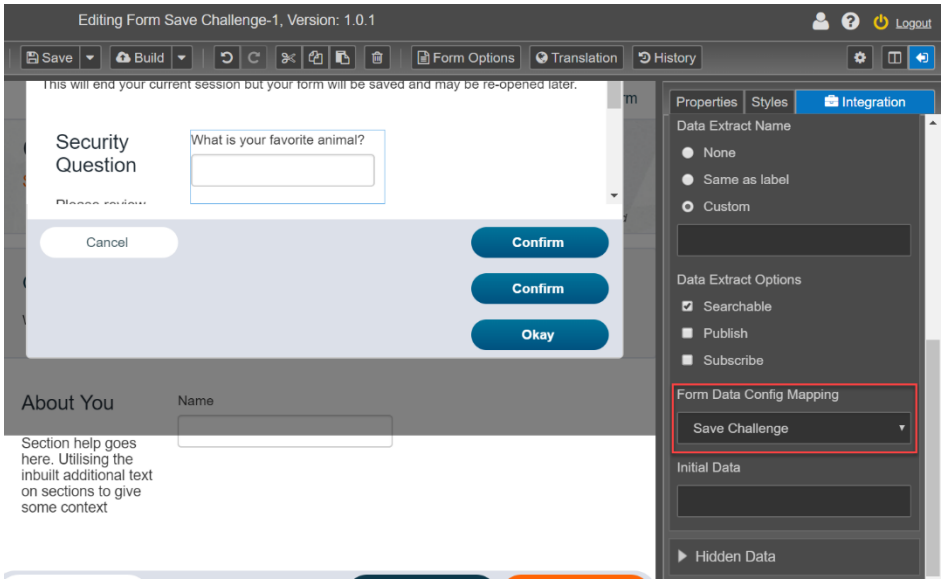
11. Create a concatenation calculation script by double-clicking the first security question and adding an additional (plus) sign and then double-clicking the second security question (this process will vary depending on the number of security questions that you implement). The example below displays the concatenation rule.



12. Click Save.
13. Map the data field as the Save Challenge (by following the steps below). Mapping the data field ensures that Manager knows what to search and compare when a form user answers each question.
14. From the Data pane, expand Transact Integration.



15. Select Save Challenge from the Form Data Config Mapping dropdown menu.

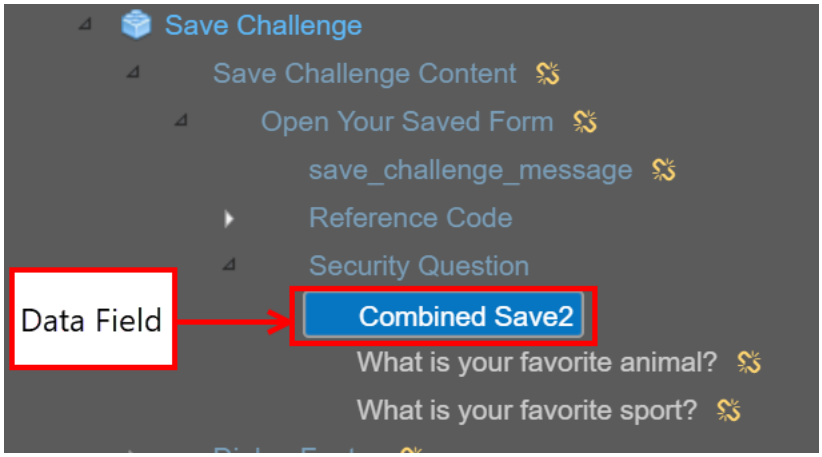


16. Once you have mapped the data field to be the Save Challenge, ensure that the Include in Submission Data checkbox has been checked. This checkbox is found on the Integration tab.
17. Once you have mapped the data field as the Save Challenge, you can move on to configuring the Save Challenge Dialog.

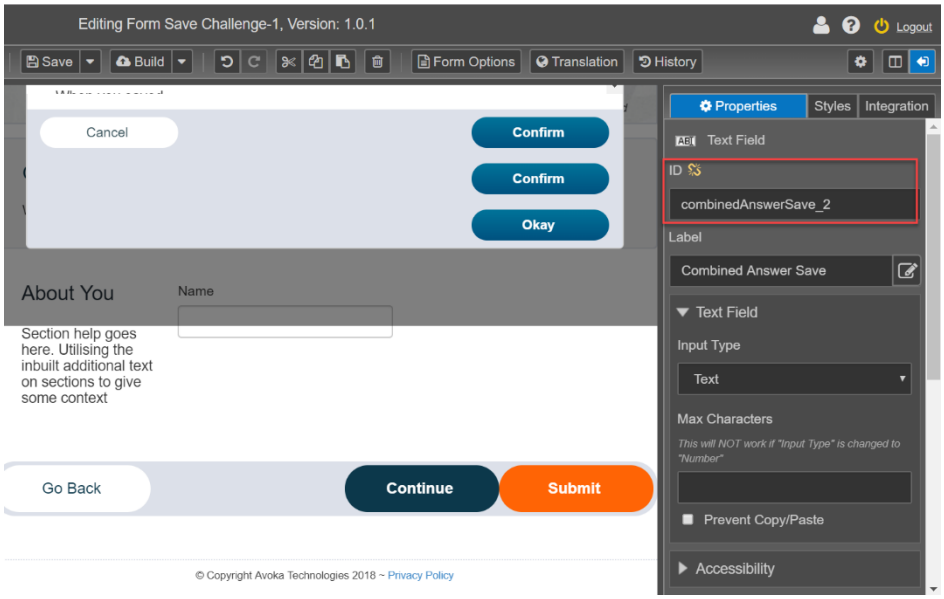
Configure Security Questions for Multiple Components in Save Challenge Dialog

Follow the steps below to set up a save challenge with multiple security questions in the Save Confirm Dialog.

1. Open a Maestro form.
2. Expand Dialogs.
3. Select Save Challenge >Save Challenge Content > Open Your Saved Form > Security Question.
4. Copy the components you configured in the Save Confirm Dialog using the Copy button on the toolbar or CTRL + C (copy the question text fields, along with the hidden combined answers data field).
5. Paste the components into the Save Challenge security question section (the Save Challenge security question does not need to be mapped to the Save Challenge System Mapping). When copying these components, it is essential that the data field is the first field in the tree. The data field should be the first field as this will ensure that the data field is the field that Manager will collect and compare with the originally entered answers. The screenshot below displays and highlights the data field as the first field in the tree.



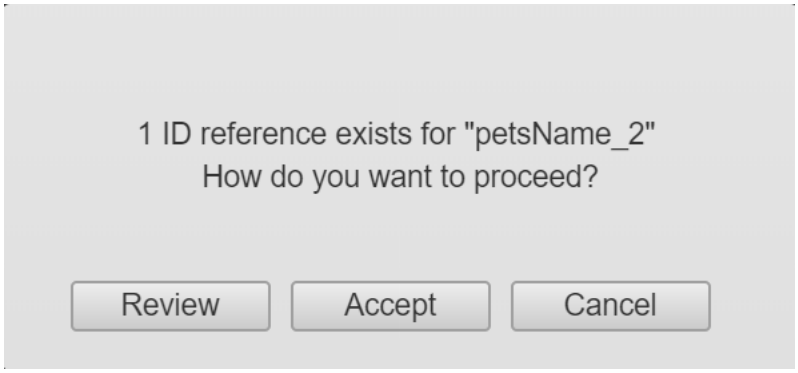
6. Change the IDs of the pasted text fields and data field. Select the component, then navigate to the Properties tab and change the ID in the ID field.



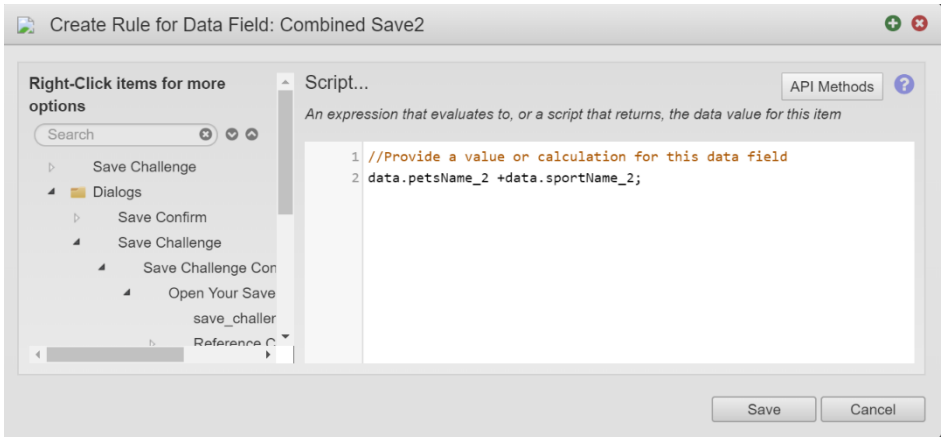
NOTE

It is recommended that you change the ID of all security question fields AND the ID of the data field. Changing the IDs will update the XML Name which will prevent any duplicate binding errors.

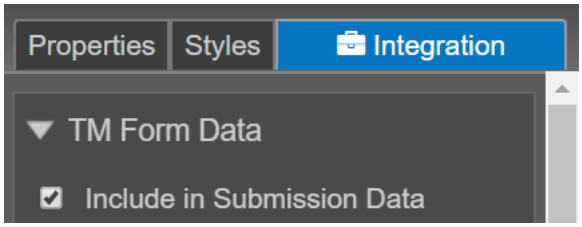
When you change an ID of a text field that is included in a calculation rule, Maestro will warn you that the ID you are attempting to change is currently referenced somewhere within the form. In this case, the one ID reference is coming from the calculation rule that was configured in the Save Confirm Dialog. The screenshot below displays this warning.



7. Ensure that the calculation rule that was copied from the Save Confirm dialog was updated to represent the new IDs. Do this by double-clicking the calculation rule. The screenshot below displays a simple calculation rule that concatenates the answers to two security questions.



8. Ensure that the Include in Submission Data has been checked. This checkbox is found on the Integration tab. The screenshot below displays the Include in Submission Data check-box.



Populate Multiple Security Questions from User Entered Data

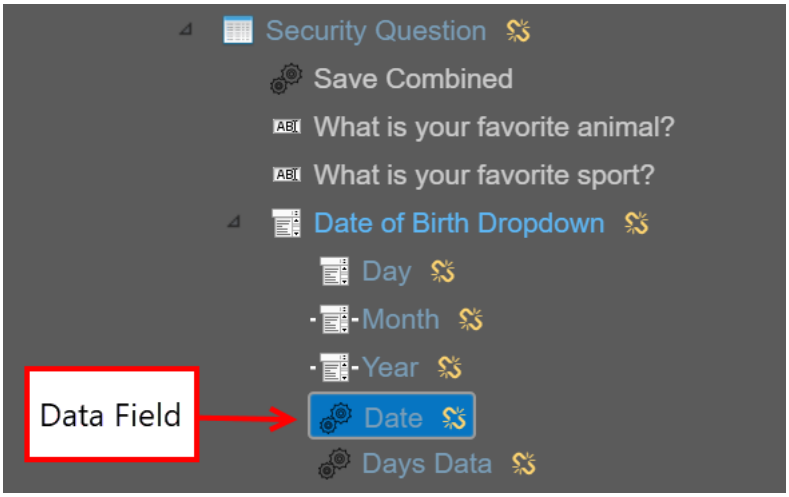
Though it is quite useful to configure a save challenge that ask users questions that are completely removed from the application experience, it can also be useful and – more convenient, to ask users security questions based on information that they previously entered in the form. For example, to return to a saved form, a user must provide the email address they entered when they were originally completing the form.

To populate multiple security questions, follow these instructions, except you will need to create change rules on each of the components that will work as the answers to the security questions. These change rules should be applied when configuring the Save Confirm Dialog.

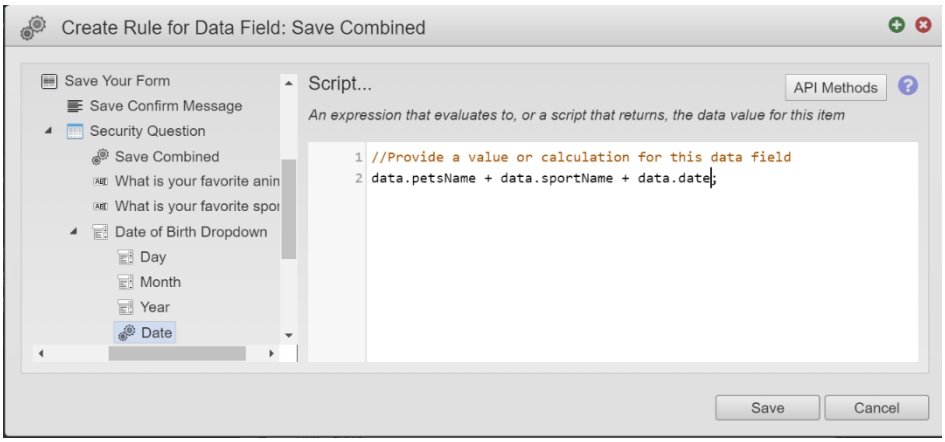
```
if(!Util.isBlank(data.lastName)) {
	data.lastName1 =data.lastName;
	if(!Util.isBlank(data.day)&&!Util.isBlank(data.month)&&!Util.isBlank(data.year)) {
		data.day1 = data.day;
		data.month1 = data.month;
		data.year1 = data.year;
		data.date1 = data.date;
		data.daysData1 = data.daysData;
	}
}
```

Save Challenge for Multiple Components Best Practices

When working with a Date of Birth component (or any compounded component) in a save challenge, it is important that you use the pre-configured data field to create the concatenation calculation rule. The screenshots below highlight that date data field that comes pre-configured for all Date of Birth components and show how this data field can be referenced in a concatenation calculation rule.



Enter the following JavaScript.



Maestro Rules Overview

Maestro allows you to add business rules to components used in a form.

A business rule is a JavaScript[1] function that is invoked in response to different events related to a component. Developers working in Maestro do not normally see the function scaffold that is provided by the platform, but it is important that developers understand how this works.

Rules are invoked by the Maestro framework in response to:

- a change in the data object bound to a component,
- an event propagated from the web browser,
- an asynchronous event like a Dynamic Data Service, or
- because a script directly invokes a rule function via an API call.

For example, a Valid If rule is triggered when the data value changes, a Click rule when the user clicks on an element, a Page Load rule every time a Maestro page is shown, and so on.

Rule developers need to understand what is provided by Maestro in the scope of a rule function:

data
: is an object passed as the first argument (`argument[0]`) to the JavaScript rule function.
For non-repeated items, this is the form data object holding values for user defined all form fields plus additional system-related data.
For repeated items, this is a repeating object instance holding all sibling repeating values, including any nested repeats, plus other properties, such as the current index, the repeated data object array and the parent item.
For more information on the structure of the data argument and how repeated data is represented in Maestro's data model, see Maestro's Data Object.

item
: is an object passed as the second argument (`argument[1]`) to the JavaScript rule function.
An item object contains the structure and definition of the form field including style and properties, as well as repeat-aware `getData()` and `setData()` methods.
For more information on the structure of the item argument, see Maestro's Item Object.

info

---

[1] Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

is an optional object passed as the third argument (`argument[2]`) to the JavaScript rule function.

The info object contains details of the event that triggered the rule, or the object returned from a success or failure call in a dynamic data service result handler.

For more information on the structure of the info argument, see Maestro's Info Object.

value

is a function scoped variable that is initialized to the value of the data value bound to the item on which the rule was invoked. For example, given an item with the id `applicant_firstName`, the value variable would be created by the framework as follows:

```
var value = data.applicant_firstName;
```

Adding a breakpoint to a rule shows how Maestro generates the function:



As you can see, this scaffolded references the data argument and so is repeat aware meaning that it represents either the sole data value, or the indexed data value in a repeat.

Calc, DynamicData, EncUtil, Form, HTTP, Insights, Resource, Scroll, Transact, Translation, Util and Validation

are all namespaces that expose Maestro API methods to the form developer. For example, in a rule a developer might use the API method:

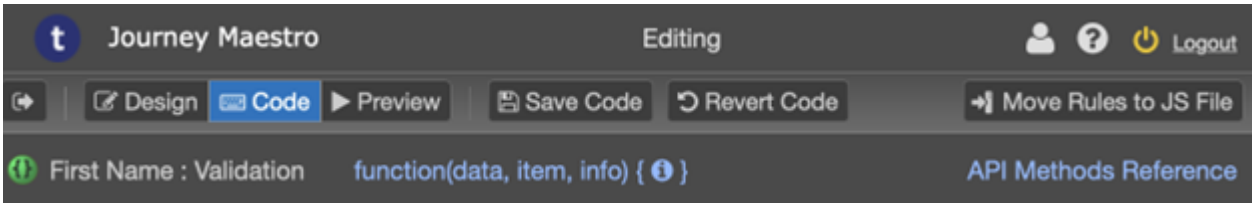
```
Calc.total( data.expenses, "expense" )
```

Which sums the values of `expense` properties stored in the `expenses` array. In addition to this, the API exposes some methods on the global scope.

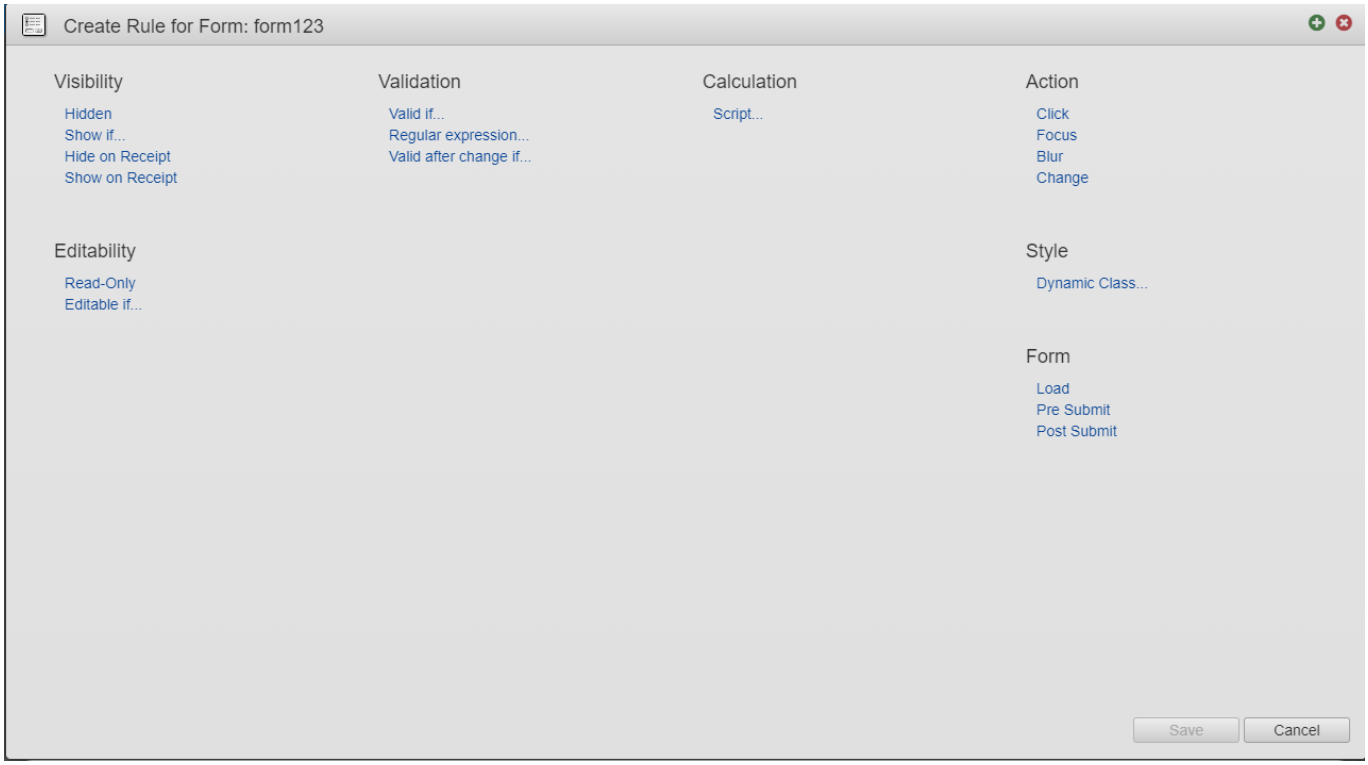
JSDoc for these APIs is accessed via Maestro by clicking on the API Methods button in a Rule editor:



Or, in the Code editor, by clicking on the API Methods Reference link:



Maestro's Rule Dialog lists the available rules for the selected item:



For more information, see List of Maestro Rules.

You can also create your own business rule types and add them to the Create Rule dialog, and so expose them via the Properties pane. However, these rule types must be for native components only as described in Component Options.

Some components can't have rules added to them, so you won't see the Rules category or any rules displayed in the Properties pane. These components include:

- Bundle Resource Library
- JavaScript Library

- Web Font

Working with the Rule Editor

The Rule editor is designed to be as simple as possible to use, but sometimes, this leads to unexpected side effects.

Consider a developer who is writing a Calculation rule on a Data Field and needs to inspect the current value and type of the object:

```
console.info("Value: " + value);
console.info("Value type: " + typeof value);
```

The console output is:

```
value: 12
```

What happened to the second console statement? Why wasn't it output?

Maestro does not see a return statement and so 'helpfully' adds it to the first line of the script. If you were to code this yourself, you would write the following – with the warning because the second line is unreachable:

```
return console.info("Value: " + value);
console.info("Value type: " + typeof value);
```

The lesson is that if you write a muti-line rule that expects a return value, you must provide a return statement:

```
console.info("Value: " + value);
console.info("Value type: " + typeof value);
return value;
```

When you are developing rules, test your work often in the debugger. Several types of errors, for example compilation problems, can result in your form not displaying correctly in Preview mode.

The earlier you test, the more likely you are to find the bit of code that is causing the problem.

Hints for Rule Developers

Maestro rules are JavaScript and, whereas Maestro hides much of the complexity, rule developers should have a foundation in the language. We recommend the Mozilla Developer Network first steps course.

Maestro Stores Data Values in String Types

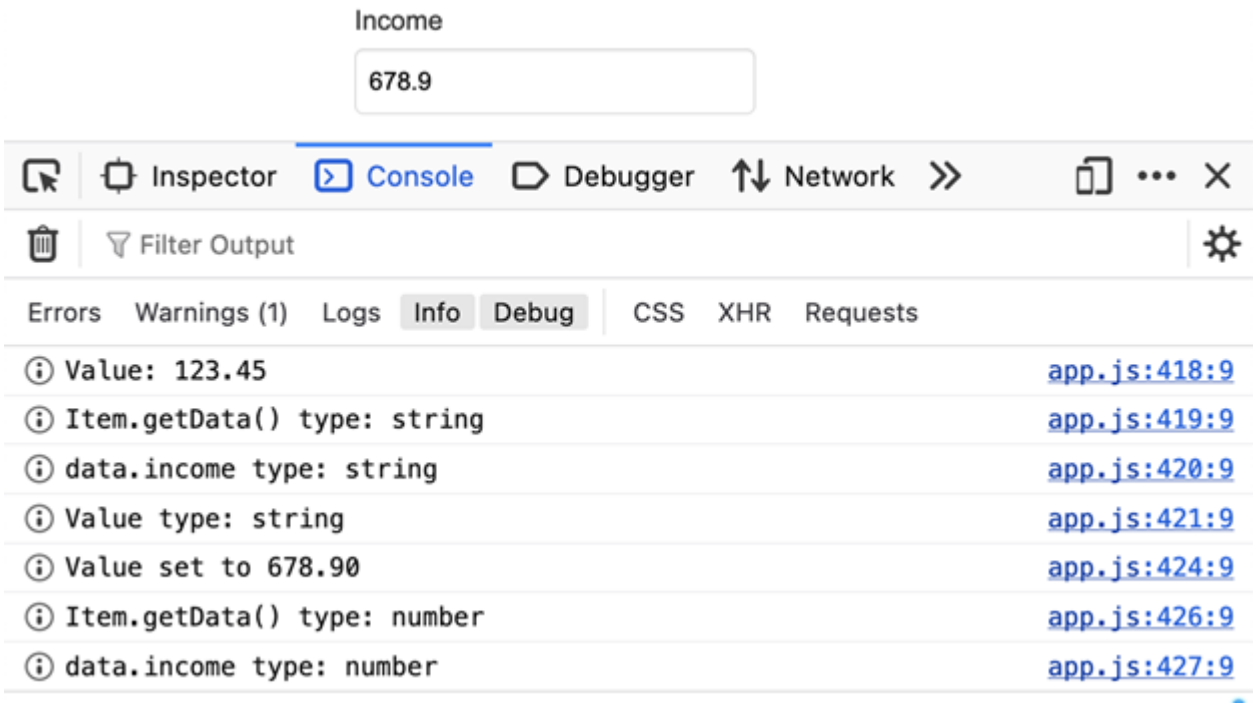
All data is stored in Strings which can lead to unexpected results. Consider this rule snippet:

```
console.info("Value: " + value);
console.info("Item.getData() type: " + typeof item.getData());
console.info("data.income type: " + typeof data.income);
console.info("Value type: " + typeof value);

data.income = 678.90;
console.info("Value set to 678.90");

console.info("Item.getData() type: " + typeof item.getData());
console.info("data.income type: " + typeof data.income);
```

Running this rule results in the following output in the browser, with the income in the form field displayed above the developer tools console:



Let's break down what's going on here:

1. The value variable shows as `123.45`, which was the data entered by the user that led to the rule being triggered.
2. Internally, the `item.getData()` returns the `data.income` property and this is also assigned to the value property – all have a type of `string`.
3. This demonstrates that data input into a form is stored as `string` type by the Maestro framework in the data model.
4. The rule handler then sets the value via the statement `data.income = 678.90`. The type of the right hand side of this expression is a JavaScript number. (This could also have been achieved by using a function call: `item.setData(678.90)`.)
5. Subsequent calls to `item.getData()` and `data.income` show that the updated value in the data model has a type of `number`.
6. This demonstrates that data input into the data model in a script is stored in the type given.

It should be clear from the above, that rule developers should take care with assumptions about the types they are working with.

Working with Numbers in Rules

If a user inputs a numeric value in an income field and Maestro stores this as a `string`, how do developers do math?

If we used the `data.income` property in an expression, you would see an unexpected result. Consider an expression that assumed two numeric values:

```
console.info("data.income value: " + data.income);
console.info("data.income type: " + typeof data.income);
console.info("data.frequency value: " + data.frequency);
console.info("data.frequency type: " + typeof data.frequency);

let yearlyIncome = data.income * data.frequency;

console.info("Income: " + yearlyIncome);
```

The console shows the result:

```
data.income value: 1234
data.income type: string
data.frequency value: "1"
data.frequency type: string
Income: NaN
```

Two strings can't be multiplied, hence the result NaN (Not a Number).

There is no magic here – rule developers must learn about JavaScript type coercion, which is the automatic or implicit conversion of values from one data type to another, such as strings to numbers.

To coerce a `string` to a `number`, simply prefix the data value with a `+`, as shown below:

```
console.info("data.income value: " + (+data.income));
console.info("data.income type: " + typeof (+data.income));
console.info("data.frequency value: " + (+data.frequency));
console.info("data.frequency type: " + typeof (+data.frequency));

let yearlyIncome = +data.income * +data.frequency;

console.info("Income: " + yearlyIncome);
```

This gives you the result you expect:

```
data.income value: 1234
data.income type: number
data.frequency value: 12
data.frequency type: number
Income: 14808
```

NOTE

Because rule developers can add any type into the data model, to ensure expected behavior, we recommend that developers performing calculations should always use type coercion.

Converting Data Values to Boolean Values

To force the conversion of any value to a `boolean`, developers can use a double negation (or double not), namely, `!!`.

This is a standard JavaScript technique that relies on "truthyness" or "falsyness" of the value. The first `!` converts a 'truthy' value to false and a 'falsy' value to true. The second `!` flips these.

This technique is commonly used to check whether an element exists.

Enhancing Form Usability Using Visibility Rules

Consider the case where an application allows single and joint applicants for a product. A form design may wish to only show a text display field when both applicant's details are known.

To handle this, we would create a Visibility Rule using the technique we just learned:

```
!!data.applicant1_name && !!data.applicant2_name
```

JavaScript Techniques that act on Data

If you have, for example, some values in a dropdown list, and want to turn these into more human readable values, you could use an if statement or a switch statement. However, if you want to embed the logic inside some text, you can use the following object key lookup syntax:

```
{{ {'52': 'per week', '24': 'bi-monthly', '12': 'per month'} [data.frequency] }}
```

This defines an object with keys `52`, `24`, and `12` and then looks up the key matching the data field `[data.frequency]` which, in turn, returns a human readable `string` describing the value. For more information, see Introduction to Maestro Business Rules.

Having Problems?

If you are experiencing some issues with business rules, learn how to debug them.

Next, learn how to create a rule.

List of Maestro Rules

Maestro comes with several pre-configured business rules types, which can be divided in the following groups:

- Action
- Calculation
- Editability
- Mandatory
- Style
- Validation
- Visibility
- Form
- Event

Every rule, which you configure in components that a Maestro form makes use of, has a corresponding JavaScript function defined in the `app.js` file. The app.js[1] file is the root bootstrapping file for an AngularJS project. The name of a function is generated based on a standard naming convention that consists of a rule type code and the field ID with an underscore separator, such as `<rule-type-code>_<field-id>`. This allows you to quickly identify a business rule in the `app.js` file, which is especially handy in debugging a form or a rule.

Let's look at each group of the rules and their corresponding codes. Click a rule name to learn how to use it.

Action

Action rules are triggered at various points in the live cycle of a form.

Rule Type Code	Name	Description
`blur`	Blur	Run a script when a component loses focus.
	Change	Run a script when the value of a component changes.

[1]App. js is the root bootstrapping file for an AngularJS project. It's built to serve makers of static single-page apps, so it keeps all page navigation within the session of the webpage. It defines "pages" as DOM nodes that can be instantiated. Pages are HTML elements that have certain generic components like a topbar and content area.

Rule Type Code	Name	Description
`change`		
`chok`	Change	Short for "change OK". This is the code for a validate after change rule that augments the standard validation rule to provide support for dynamic data validations. The result of this rule can contain the error message (like the standard validation rule) or a promise.
`click`	Click	Run a script when a component is clicked. A component must be a clickable UI item.
`focus`	Focus	Run a script when a component gains focus in the browser window.

Calculation

Rule Type Code	Name	Description
`eq`	Script	Return the result of a calculation. `eq` stands for equals. NOTE Calculation rules are not triggered, if the field they are added to is not visible.

Editability

Rule Type Code	Name	Description
`us`	Editable If	Allow the user to edit a component's value if a condition is `true`. `us` stands for usable.
`us`	Read-Only	Prevent the user from editing a component's value if a condition is `true`.

Mandatory

Rule Type Code	Name	Description
`md`	Mandatory If	Require a component to contain a value if a condition is `true`, otherwise, it's optional. `md` stands for mandatory.

Style

Rule Type Code	Name	Description
`dc`	Dynamic Class	Apply one or more CSS classes to a component, dynamically based on some logic, if a condition is `true`. dc stands for dynamic class.

Validation

Rule Type Code	Name	Description
`ok`	Regular Expression	Validate a component's value against a regular expression.
`ok`	Valid After Change If	Interpreted as OK, this is the code for a validation rule that controls the error state of the field. The result of this rule should be a string that is either blank (for valid values) or contains the error message (for invalid values).
`ok`	Valid If	Validate a component's value against an arbitrary condition.

Visibility

Rule Type Code	Name	Description
`sh`	Hidden	Hide a component if a condition is `true`. `sh` stands for show, this is the code for a visibility rule that controls whether the field is presented on screen. The result of this rule should be a boolean value where true = visible, false = read-only.

Rule Type Code	Name	Description
`sh`	Hide on Receipt	Hide a component on a receipt if a condition is `true`.
`sh`	Show If	Show a component if a condition is `true`.
`sh`	Show on Receipt	Show a component on a receipt if a condition is `true`.

Form

The following rules only exist on the form component:

Rule Type Code	Name	Description
`load`		Execute a rule when a form is loaded.
`presuit`		Execute a rule before a form is submitted.
`postsubmit`		Execute a rule after a form is submitted.
`onSuccess`		Execute a rule upon successful completion of the dynamic data function. This rule type is specific to the Dynamic Data Button.
`onFailure`		Execute a rule upon failure from a dynamic data call. This rule type is specific to the Dynamic Data Button

Event

Rule Type Code	Name	Description
`onCreate`	On Create	One off create event that is run a rule when a component is created. For more information, see Initialize Event Hook.

Here are a few examples of functions names with explanation what rules they use:

Function Name	Rule Description
`sh_previousAddress`	A visibility rule on the `previousAddress` block

`eq_totalIncome`	A calculation rule on the `totalIncome` currency field
`ok_emailAddress`	A validation rule on the `emailAddress` field
`click_verifyIdentity`	A click rule on the `verifyIdentity` button
`load_AvokaSmartForm`	A load rule on the form

These function names are guaranteed to be unique, so they're a handy way to find specific rules in the `app.js` file.

> NOTE
>
> Component developers can create additional rule types for their widgets as needed.

Next, learn how to create a rule.

Introduction to Maestro Business Rules

Maestro allows you to create various business rules in the Code View or in the Rule Editor accessed from the Rules section of the Properties pane. Before you start creating your own business rules, you need to get some basic understanding about this concept and specifics pertaining to the Maestro product.

Values in Scope within a Maestro Rule Function

All rule functions can access the current data value of the field to which they are attached using the variable `value` (see Shortcuts). In addition to that, they receive several other parameters, injected references and shortcut variables as described below.

Statements vs Expression

All Maestro business rules get packaged within a function body, providing various parameters and variables described further below. The returned value from this function is the result of the rule. So, for example the following validation rule would result in a Boolean true (meaning validation passed) or an error message string depending on the value of the field.

```
if (value > 17) {
    return true;
} else {
    return "Not old enough";
}
```

However, for a rule that only returns one calculation, you can enter a simple expression and omit the `return` keyword. It will be added into the generated function automatically. So the same rule could be expressed simply as follows:

```
value > 17 ? true : "Not old enough";
```

Due to the semantics of the JavaScript OR (`||`) operator, this can be simplified further:

```
value > 17 || "Not old enough";
```

The general rule of thumb is that if the result can be expressed as a simple calculation then it doesn't need the `return` keyword. If it requires control flow, nested functions or any other kind of statements then you should use `return` where appropriate.

Parameters

Maestro business rule functions receive three parameters:

- **data** – The data context that the rule operates in. For items that are not in a repeat, this will be the main form data context. Each instance of a repeat creates a new data context. Instances of nested repeats have a separate data context within the data context of their parent repeat, and so on. This can be used to look up other items of data, in the same context, or in parent, sibling or child contexts.
- **item** – The view item that this rule is attached to. This can be used for looking up properties of the item.
- **info** – An extra parameter that some component-specific rules use to supply additional information. For example, the Page Controller component Change rule has an info parameter with `from` and `to` properties that identify the pages being navigated from and to. To inspect the value of the info parameter for a specific rule in the JavaScript console add the following line:

  ```
  console.log(info);
  ```

Navigating the Data Model

As explained above, a new data context is created for each instance of a repeat. To navigate to the parent context use `data.$p`. To navigate to the repeat item's own data entry in the parent context (which will be an array of all the data contexts in that repeat) use `data.$r`. To find out a data context's index within a repeat, use `data.$i`.

So, to get to a sibling context - say the previous instance in a repeat - you would first navigate to the repeat's data entry and then use square-brackets to address the relevant child context in the array

```
data.$r[data.$i - 1];
```

Navigating the View Model

If the item for which the rule is defined is in a container, you can access that container item using `item.$parent`.

Within any given container item, the child items are held in an array of rows, each of which is an array of child items within that row. So the first child of a containers first row would be `item.rows[0][0]`.

In this way you can navigate up, down and across the view hierarchy. However, to get to a specific item it's easier to look it up in the flattened map held in `Form.items`, such as

```
Form.items.myRadioButton;
```

The properties of each item are available on the key `properties`. So to get the placeholder text of a Text Field with ID `firstName` you would use

```
Form.items.firstName.properties.placeholder;
```

Global API Objects

In the previous section we saw the a reference to an object called `Form` - in that case to access its `items` property, containing an ID-keyed map of all the view items. There are several of these global objects. (They are not global in the sense of being available on the `window` object, but they are injected into the scope of each business rule function using Angular.) These objects (or *"Services"* in the Angular terminology) are described below. A full reference of API methods available on each of them can be found using the API Methods Reference link in the Code View.

`$rootScope`

The Angular `$rootScope` object - can be useful if you are an Angular expert. See the Angular documentation.

`$q`

The Angular `$q` object. This can be used for creating and aggregating Promises. See the Angular documentation, as well as general documentation about JavaScript Promises.

`$timeout`

The Angular timeout function. This is similar to JavaScript's standard setTimeout function, but ensures that any data updates are rendered again in the form. Also, it can be used with a

callback, as follows:

```
$timeout(function() {
    data.status = "Success";
}, 5000);
```

or it can be used to return a prommise, as follows:

```
$timeout(5000).then(function() {
    data.status = "Success";
});
```

Form

The Form service contains a number of properties and methods for general form interactions such as validation and submission.

Calc

The Calc service provides some useful methods for running calculations on data.

Resource

The Resource service provides methods for working with external resources, such as formatting image URLs.

Util

The Util service provides general utilities to assist with tasks such as searching and sorting arrays, walking the row/child view hierarchy and so on.

DynamicData

The DynamicData service provides methods for interacting with Dynamic Data Services published in Transact Manager.

Scroll

The Scroll service provides a way to scroll to and focus on particular form fields.

Insights

The Insights services enables rules to register events with Transact Insights analytics.

Translation

The Translation service has some helper methods for working with multi-lingual forms, although for basic access to localized terminology use the `T` shortcut described further below.

Other Shortcut Variables

value

This is a shortcut to the current data value for the field to which the rule is attached. So for a rule on a Text Input with ID lastName it is the equivalent of using `data.lastName`.

Rules

In the final published form, all the business rules are contained within a single Rules service. This shortcut lets you navigate to and even run business rules from within other business rules.

Business rule functions have names formatted as follows:

```
<rule-type>_<item-id></item-id></rule-type>
```

Basic standard rule types are `ok` (validation), `us` (editability), `sh` (visibility) and `eq` (calculation). Other action rule types have their full action name, such as `click`, `blur` and `change`. Components can also provide their own custom rule types.

So, the click rule on a button with ID `verify` could be accessed with

```
Rules.click_verify;
```

and the validation rule for a Decimal Field with ID `age` would be

```
Rules.ok_age;
```

Whilst you could call the age validation rule from another rule in the same data context with the code

```
Rules.ok_age(data, Form.items.age);
```

It would only return the validation state of that field. To properly validate the field, including display of approriate errors and setting form validation state, you should use the validation methods available in the `Form` service object.

T

This is the hierarchical map of all terminology items for the currently selected language in a multi-lingual form. So, to get the translated placeholder text for an item with ID firstName you could use

```
T.firstName.properties.placeholder;
```

SystemProfile

This is a shortcut to the SystemProfile node of the form's data, which contains metadata about the submission provided by Transact Manager.

Job

This is a shortcut to the Job section of the forms SystemProfile data. Useful for some collaboration job scenarios.

When the rule is triggered, the value of the field is passed in as a `value` variable. For instance, the Select Language component defines a Change rule as `Translation.fetch(value).catch(function(error) { alert("Cannot find language code '"+value+"' in form")}).` So, when you select a language from the dropdown list, the `value` variable will be the value of the entry you have selected.

The rule execution context also exposes the following objects, which you can call via API methods:

- Form
- Util
- Calc
- DynamicData

The Rule editor provides a quick access to the API documentation, so click API Methods to open Maestro API Reference documentation in a new tab.

While you are writing your business rules, you should keep in mind the following suggestions:

The Rule editor

Sometimes, the Rule editor can become confused about exactly what you are trying to achieve, and can interpret what you are typing in the wrong way. If you are getting unexpected results, you may want to switch to Source mode, and review the underlying HTML. You may have accidentally injected HTML tags you didn't expect.

Test often

When you are developing rule's formulae, test your work often. Several types of errors can result in your form not displaying correctly in Preview mode. The more often you test, the more likely you are to find the bit of code that is causing the problem.

Use a field within a calculation

A calculation is assumed to be code, and therefore everything is interpreted as JavaScript. When you insert a field into a calculation, simply reference the field id as `data.firstname`.

If you need to include text, include it in single or double quotes.

For example:

```
"Welcome " + data.firstname
```

Insert a field into text

A caption or display field is interpreted as text, and so you need special syntax in order to have everything interpreted as code. Maestro uses double curly braces to inject code into the string.

For example, to insert a field value into a piece of text, such as a caption or a display field, use the following notation:

```
{{ data.firstname }}
```

You can perform calculations within the braces, like this:

```
{{ data.firstname + " " + data.lastname }}
```

The braces mean: "Treat whatever is inside the braces as a calculation rather than as text.

Hide text display until all dependent values are valid

Sometimes a text display can look strange if only some of the values that are used within it have been completed. To avoid this, simply create a Visibility rule that looks something like this:

```
data.firstname != "" && data.lastname != ""
```

or

```
+data.term != 0 && +data.frequency != 0
```

Treating field values as numbers

All data is inherently treated as text. If you want to force a field's value to be treated as a number, prefix it with a "+". (If you don't do this, when you try to add two numbers, they will be concatenated as strings rather than added together. You can also use JavaScript functions to format the result. For example:

```
(+data.term * +data.frequency).toFixed(2)
```

or

```
(+data.term) + (+data.frequency).toFixed(2)
```

Treating field values as boolean (true/false)

All data is inherently treated as text. If you want to force a field's value to be treated as a boolean or logical value, prefix it with `!!`. For example:

```
if (!!data.is_married) ...
```

Conditional values

If you have, for example, some values in a dropdown list, and want to turn these into more human readable values, you could use an if statement or a switch statement. However, if you want to embed the logic inside some text, you can use the following object key lookup syntax:

```
{{ {'52': 'per week', '24': 'bi-monthly', '12': 'per month'} [data.frequency] }}
```

This is a shortcut for:

Depending on the values of [data.frequency], use the following lookup values:

- '52' = 'per week'
- '24' = 'bi-monthly'
- '12' = 'per month'

This defines an in-line JavaScript object, and then uses the field's data value to index into that object. More information is available at this website.

Note that if there is no match, then the first pair will be used, and so this can be used as a default.

Next, learn how to create a rule.

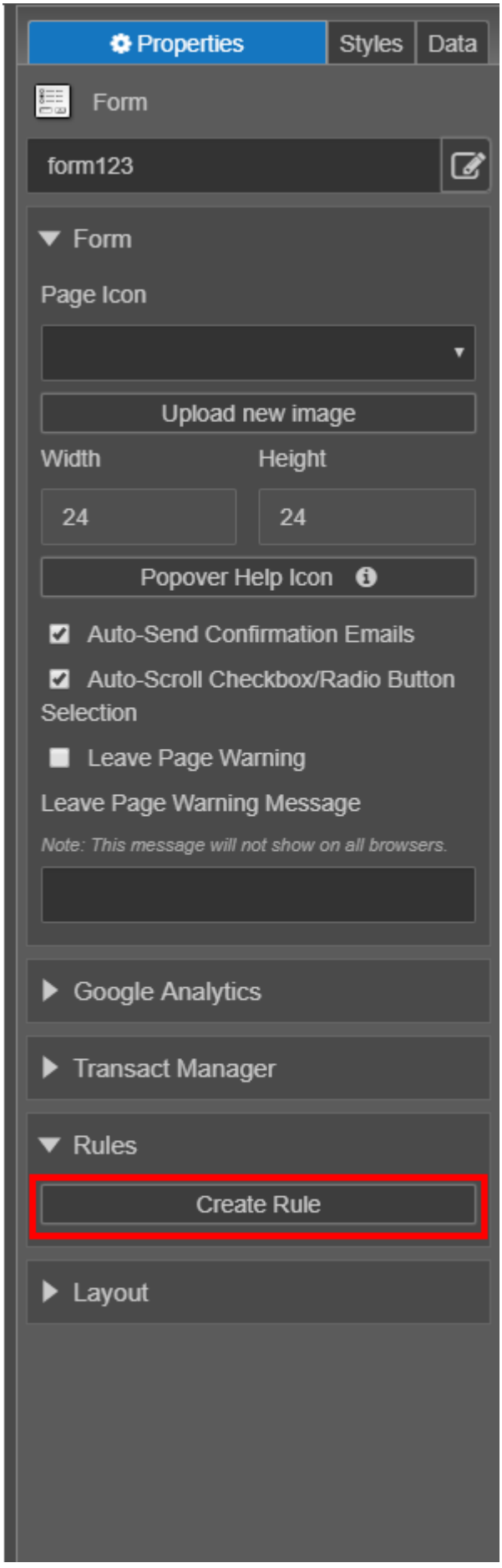
Create a Business Rule

Maestro allows you to add business rules to components used in a form so you can implement a desired functionality of the onboarding form.

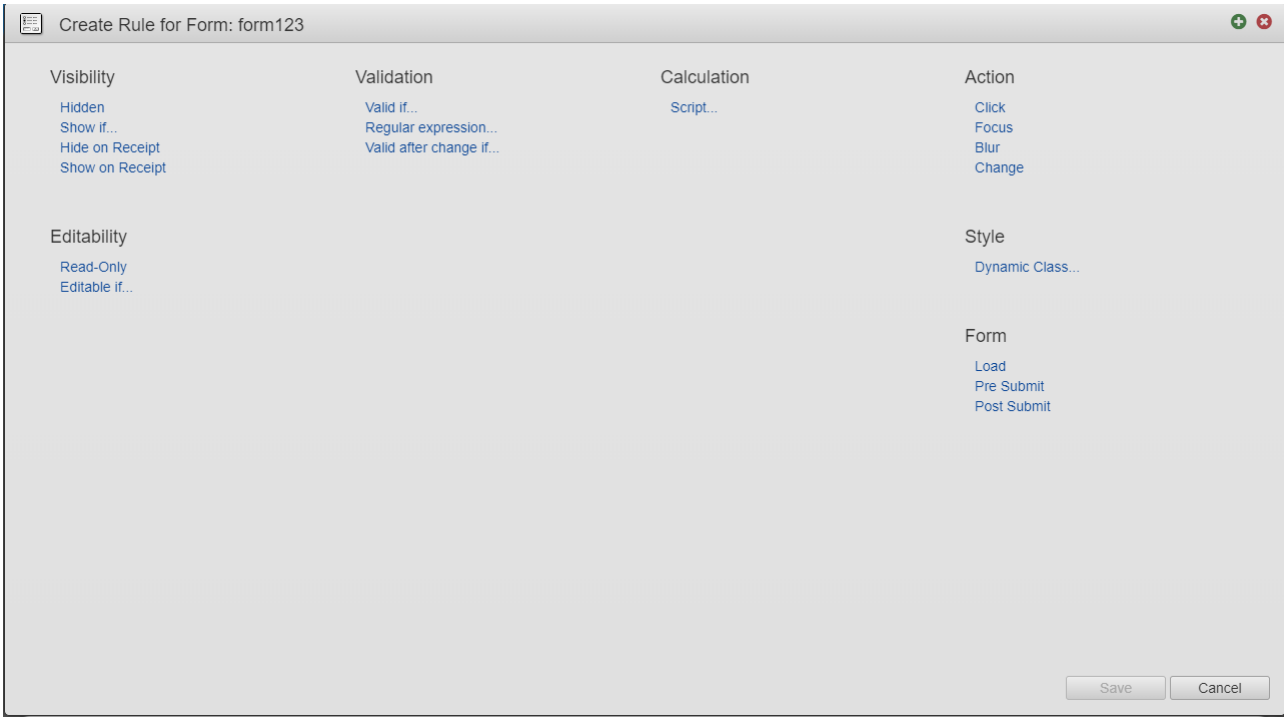
To create a business rule in a Maestro form:

1. Open a Maestro form in the Maestro editor.

2. Select the Properties tab and click Create Rule as shown below.


Properties
Styles
Data
Form
form123
Form
Page Icon
Upload new image
Width
Height
24
24
Popover Help Icon
Auto-Send Confirmation Emails
Auto-Scroll Checkbox/Radio Button Selection
Leave Page Warning
Leave Page Warning Message
Note: This message will not show on all browsers.
Google Analytics
Transact Manager
Rules
Create Rule
Layout

3. Select the type of rule you want to create from the Create Rule dialog.



4. Configure the rule.
5. Click Save.

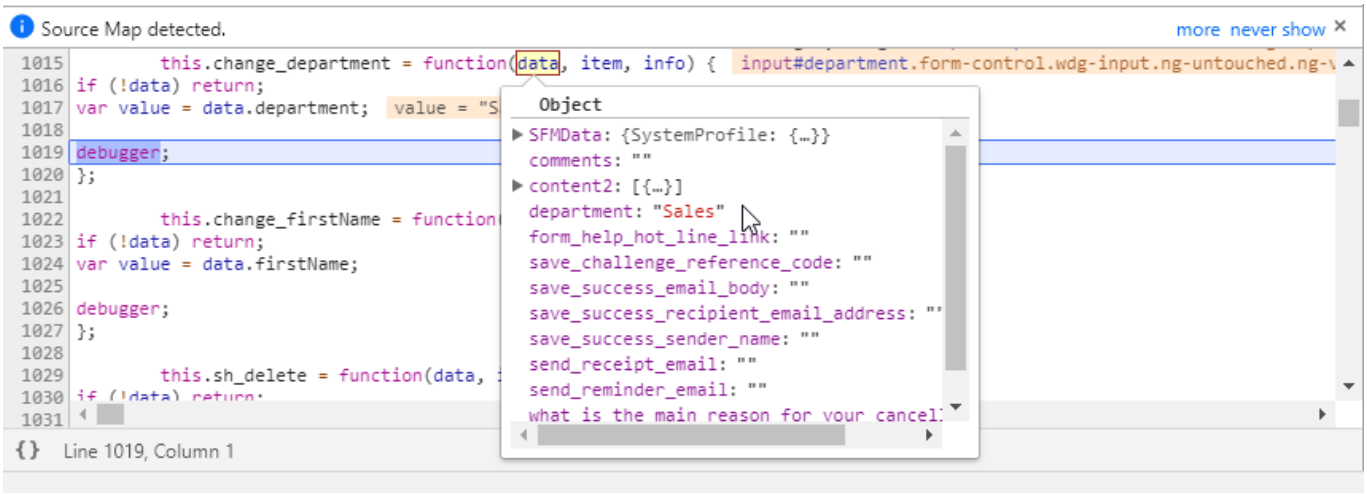
> NOTE
>
> You can only create one rule of each type for each component.

Next, learn how to configure a business rule.

Maestro's Data Object

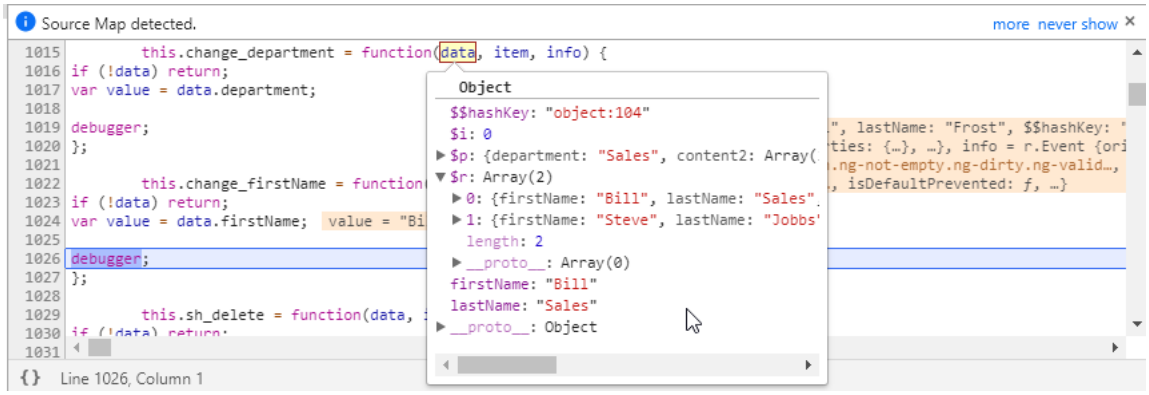
A JavaScript, implementing a Maestro business rule, requires a data object, passed to it on its invocation, to perform a desired action.

In the example below, a change rule has been set on a field named `department`. This change rule triggers the debugger. The debugger is inspecting the `data` parameter that has been passed to the change rule and `data` is the form data object which will eventually become the form XML when passed to Journey Manager. Also, the `value` variable has been overridden with `Sales`.

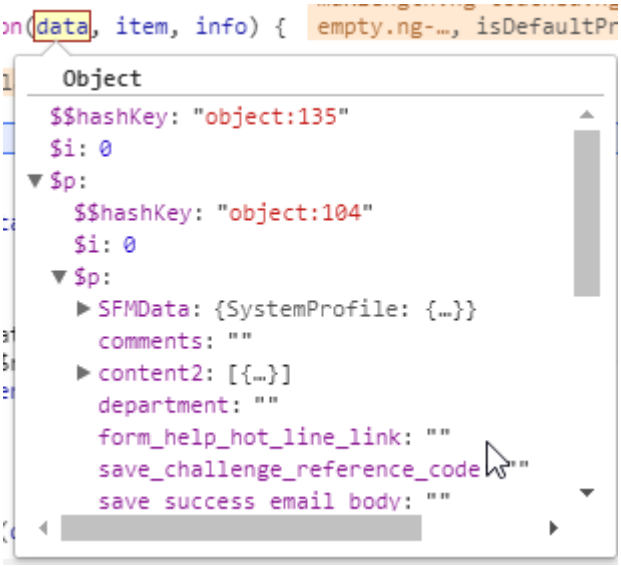


Let's check the data parameter being passed to a change rule for a repeating field called firstName. Notice the rule's 'data' parameter in the inspector is the same object as `data.$r[data.$i]`. This shows that the object `data.$r` holds all the repeated data fields for a repeat, and the object `data.$i` is the index of the repeated field occurrence whose rule is executing. If you are stopped in the rule code of a repeated item in a debugger, enter '`data.$r[data.$i] === data`' without the quotes in the console tab, and the result will be true.

In the example below, `data.$p` is the parent of the repeating object, `data.$r` is the array of repeating rows, and `data.$i` is the index of the affected row. `data.$p` above is the same as the data object in the preceding non-repeat example, since the item whose rule has fired is a member of a top-level repeating item, rather than a nested repeating item. If this item was nested one more level deep, its `data.$p` would point to its parent repeat instance, and that item's `0` would point to the root form data object (Form.data). In this way, you can get access to the full ancestry chain of repeated items.



A 2-level repeat would look like the screenshot below:



Next, learn about an item object.

Maestro's Info Object

A Maestro business rule JavaScript requires an info object parameter, passed to it on its invocation, to perform a desired action.

The `info` parameter is an object describing the event which triggered the rule, or it can be the object returned from a success or failure call in a remote data handler. The value of the info object strongly depends on the rule's implementation. For most rules, the returned info object is undefined.

The info object can be described with the following structure:

```
info = {
       widgetTypes: {},
       images: [],
       fonts: [],
       scripts: [],
       styleImages: [],
       ruleScripts: {},
       extraHtml: {},
       formView: formView
}
```

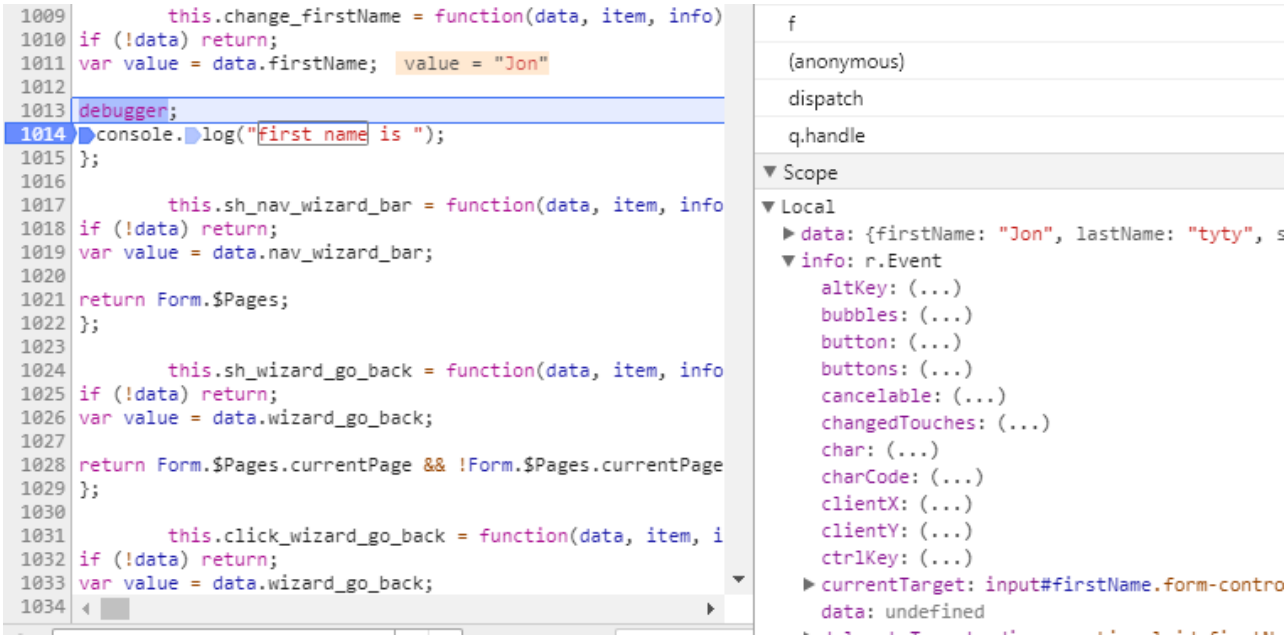
A Form Builder can always check the values of the info object in JavaScript by:

1. Adding debugger; line in the JavaScript code

   ```
   info object
   debugger;
   console.log("first name is ");
   ```

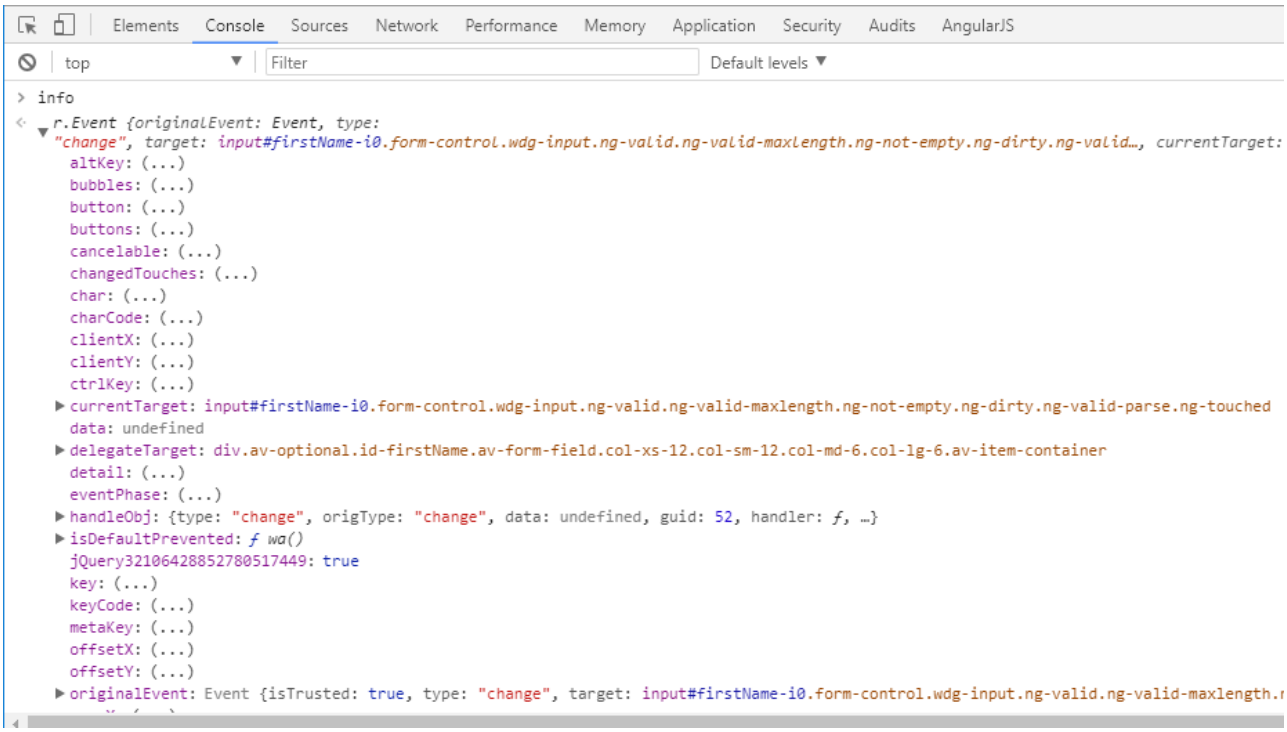
2. Building with Options.
3. Navigating the form's property in the Browser with debugging on.

4. Viewing values in the debugger:

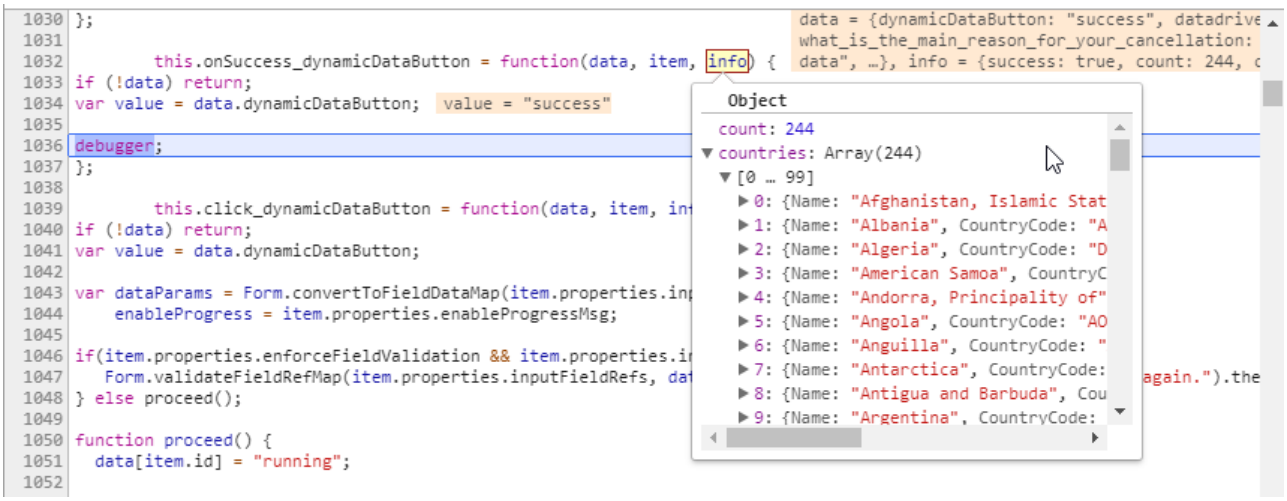


For more information, see Debug Maestro Forms.

5. Expanding the `info` parameter in the developer tools console to see that this event has been triggered by Angular code, which is the framework Maestro forms run within.



6. Opening the debugger to see the info object returned from a dynamic data call. The returned data in this particular case is an array of country names and codes, but it could be anything, depending on the dynamic data service it invoked.



Next, learn about a data object.

Maestro's Item Object

An item encapsulates static data captured in Maestro about a form element, as well as providing methods for getting and setting data and checking the visible state of the HTML object that is created by Maestro from the item.

There is a one-to-one relationship between Maestro form elements and item objects at form runtime.

An item can be obtained in one of four ways:

1. An item is always passed as an argument to the rule function to which it is bound.
2. Within a rule scope, the `Form.items` object has properties keyed on the Maestro ID. For instance, `Form.items.firstName` is the item definition for the `firstName` element.
3. Outside of a rule scope, the item list can be accessed from any context via the `maestro.Form.items`, for example, `maestro.Form.items.firstName`.
4. Items can be looked up dynamically, using the `Form.getItemFromPath(id)` API method. For example, if the item ID is only available as a variable:

```
let itemId = "firstName";
Form.getItemFromPath( itemId );
```

The `Form` property is always available in the scope of any Maestro rule and outside of that the `maestro.Form` property provides access to the same object from any scope.

Stylistically, `Form.items.firstName`, which is the dot notation property accessor, is preferred to the API call `Form.getItemFromPath("firstName")`. The dot property accessor approach is clearer, less brittle (Maestro can do a better job of refactoring elements when the ID is changed) as well as being more performant at runtime.

Items as Arguments Passed to Maestro Rules

Rule developers don't need to look up the item on which the rule was invoked - it is passed as the second argument to the function body of every rule:

```
function(data, item, info) { // Your rule body... }
```

Developers working in Maestro don't code the function scaffold but simply reference these elements directly in the rule body. Therefore, the argument order is only important for developers who work with exported JavaScript code within an IDE.

The value returned by `item.getData()` is the same as `data.firstName`. Maestro even scaffolds the return statement, limiting the coding overhead even further. Consider the following two code snippets of a validation rule for an item:

```
item.getData().length > 25
```

The alternative approach is to use the data dot notation lookup as follows:

```
data.firstName.length > 25
```

The use of the item argument is more resilient to ID changes during refactoring, but arguably, the code is slightly less comprehensible. For more information, see data object.

The Item Object as a Function Argument in the Form API

As we have seen, using the item argument passed to a rule provides a consistent way to get and set data that is guaranteed to be robust if the ID of the element changes. Maestro Form API functions typically accept either a String identifier or an item object as arguments. In most cases, using item objects as function arguments is more robust.

For example, assuming the code is in a rule for the `firstName` element, then instead of

```
Form.addRepeatInstance("firstName", repeatData);
```

the item can be substituted:

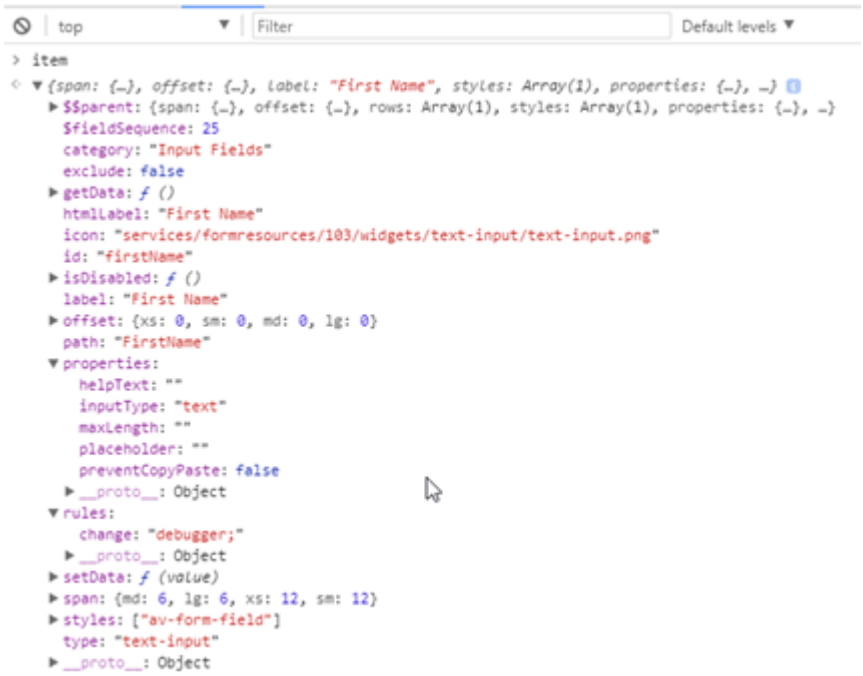
```
Form.addRepeatInstance(item, repeatData);
```

or:

```
Form.cacheData(item, dataToCache)
Form.clearValidationErrors(item)
Form.getBlockData(Form.items.lastName)
// and so on…
```

The Item Object in Detail

An Item object contains static data describing a single Maestro element as well as providing functions to get and set the data value bound to the element, and to query whether the item is enabled. The snippet below shows a browser inspecting an item that was passed as an argument to a rule:

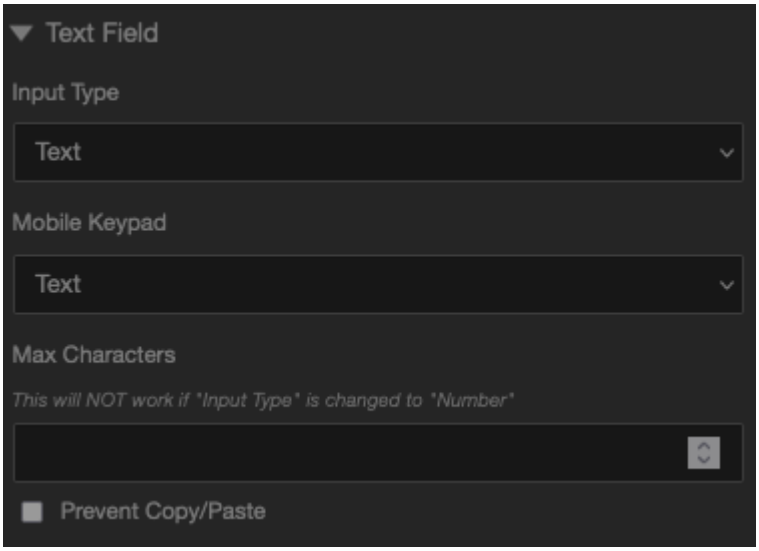


Key properties of the item object include:

id
: is the unique element ID defined in Maestro, in the example `firstName`. As noted above, this ID is also used as a key in the `Form.items` object meaning that this item could be found using `Form.items.firstName`.

type
: is the Maestro element type (shown above an element in the properties tab of the editor), for example, text-input.

properties
: is an object containing all the type specific configuration for the item. This is the information set in the Properties pane. Although these values can be set by the developer, they don't affect the runtime HTML elements. For example, you can't dynamically change the `maxLength` input constraint by changing this property.



getData( )

a function returning the value of the data element for this item.

setData(value)

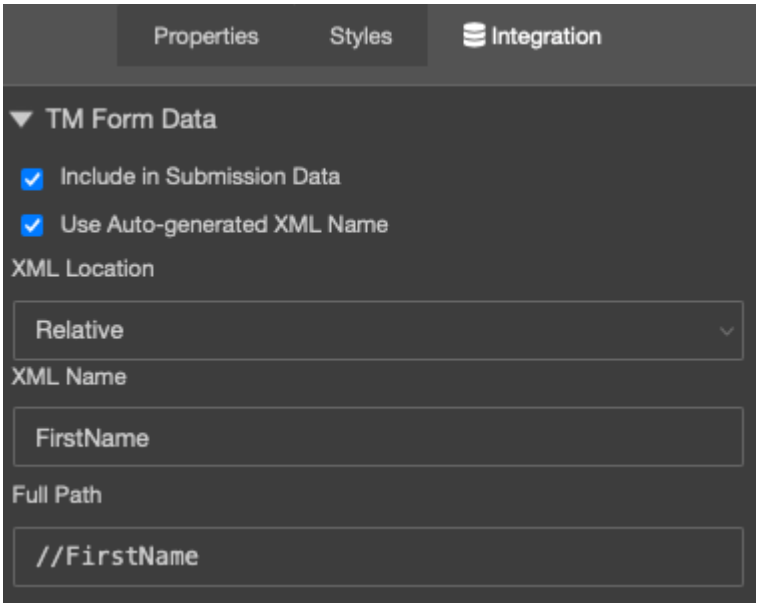
a function seting the data element for this item.

isDisabled( )

a function returning a Boolean indicating the state of the element.

path, pathContext and entityPath

are used to map the element's data into the XML form's data model. The path will always be the same as the id unless the default path has been overridden in the Integration pane:



clearHidden

is a Boolean property on a container element that describes whether children of the element should have their data cleared if the container is hidden.

label and htmlLabel
: refer to the labels bound to the element via the Maestro's property Label.

rules
: is an Object with properties that key to the JavaScript rule values – in the example above, the rule has a single “debugger;” statement.

$fieldSequence
: is the sequence number of the element in the form structure.

$$parent
: is the item’s direct parent object, which is usually a Maestro container, such as a block element. Developers can traverse parent hierarchies using these properties.

offset and span
: are objects whose keys are named after bootstrap grid responsive design breakpoint names, whose valued give layout offsets, and column widths for the form element in layout grid.

styles
: is a list of styles applied to the item. Changing this doesn't affect the form HTML elements created by the item at runtime.

Next, learn about an info object.

Create a Form Load Rule

Maestro allows you to create form load rules, which are business rules that are invoked on a form load event. This event is triggered immediately after a page has been loaded. Form load rules can only be applied to a whole Maestro form, so you can't fire this rule on a single field. Load rules are created slightly differently to the way traditional business rules are created in Maestro.

You can use this rule to mock services and test data so you can test a form without needing to configure Manager. For example, add `Form.addPreviewDDSData("Fake DDS Test", { 'field1': 'Field 1 value', 'field2': 'Field 2 Value' } );` to mock a Fake DDS Test service.

> NOTE
>
> `Form.addPreviewDDSData()` only works for `DynamicData.call()` functions and doesn't work with Transact Functions.

To create a form load rule:

1. Open a form in the Maestro editor.
2. Click Form Options.
3. Select Form Rules and click Create Rule.
4. Click Load the type of rule from the Create Rule dialog.
5. Configure the rule by writing a JavaScript that implements desired logic.
6. Click Save to create the rule.
7. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Next, learn how to how to debug Maestro business rules.

How to Debug Maestro Business Rules

While you are developing business rules for a forms in Maestro, you may need to test or troubleshoot them. You can use Chrome developer tools with many useful plugins and extensions. One of them is a debugger allowing you to set breakpoints in your business rule's JavaScript, or any JavaScript.

To open the Developer tools, click `Ctrl +Shift+l` and click the Console tab.

A quick way to trigger the debugger from inside your own rule code is to include the `'debugger;'` statement in your code as you are developing it. When the statement is executed in a rule, the debugger is activated, so you can inspect the values of variables in the debugger or in the Console tab. Make sure to remove any debugger statements when you have finished debugging the rule.

For more information, see how to debug a Maestro form with Chrome DevTools.

Next, learn about Calculation Rules.

Calculation Rules

Maestro allows you to create various Calculations rules, which you can add to components and fields of a Maestro form. The calculation rules are part of the business rules and currently consist of the Script rule.

Calculation rules must return a value. If you have any looping or branching logic, then you must include a return statement at the end of the script, for example, `return value;`. If you just want to return a simple expression, for example, `'data.postCode + " additional text"'`, then you can leave out the return and Maestro will add it automatically.

Calculation rules aren't explicitly initiated by Maestro, they're initiated through AngularJS whenever the data model changes.

Maestro executes Calculation rules to a form in the following order when:

1. As soon as AngularJS is given some form XML data to create the data model, Calculation rules are executed, which means they run before the Form Load rule.

   NOTE

   This is only applicable to Calculation rules that belong to items that are visible when the form loads, that is, only either the first page, or a landing page. if there is one.

2. An item, such as a field, has become visible.
3. An item's value, that a rule depends on, changes.

It is important to understand the order of rules execution so empty values are not passed to calculation rules, which will break the rule's logic or cause an exception.

You can use the Script rule in several distinct ways:

Mathematical Calculation

Mathematical Calculations allow you to create simple and complex mathematical calculations (+, -, *, etc.). Calculations can be created using data entered in components on the form, or by using defined numerical values. Mathematical calculation rules can be created in repeating blocks.

Duplicate Data

Duplicate Data from Another Component allows you to populate components in the form using data entered in another components.

Preset Data

You can preset some field's values as defaults on form load using a calculation rule. For example, you can select a default checkbox option when the form loads by setting its value to `true`, if the value is blank, using the following JavaScript:

```
if (Util.isBlank(data.checkBox)) {
    data.checkBox = true
}
```

It's important to note that we check whether the value is blank or not before setting its value, because if you open the form again after saving it when you have unselected the checkbox, the rule will set the default value again, as well as that of on a receipt.

NOTE

You can also set the value to `true` by using the Form Load rule, the Integration pane, or in the initial XML file, which Manager uses to prefill a form. The later is the easiest and most reliable option.

Concatenate Multiple Components

Concatenate Multiple Components allows you to take data entered into multiple components and combined the entered data into one component. An example of this is asking for a First Name and Last Name and combining them into a single Full Name component.

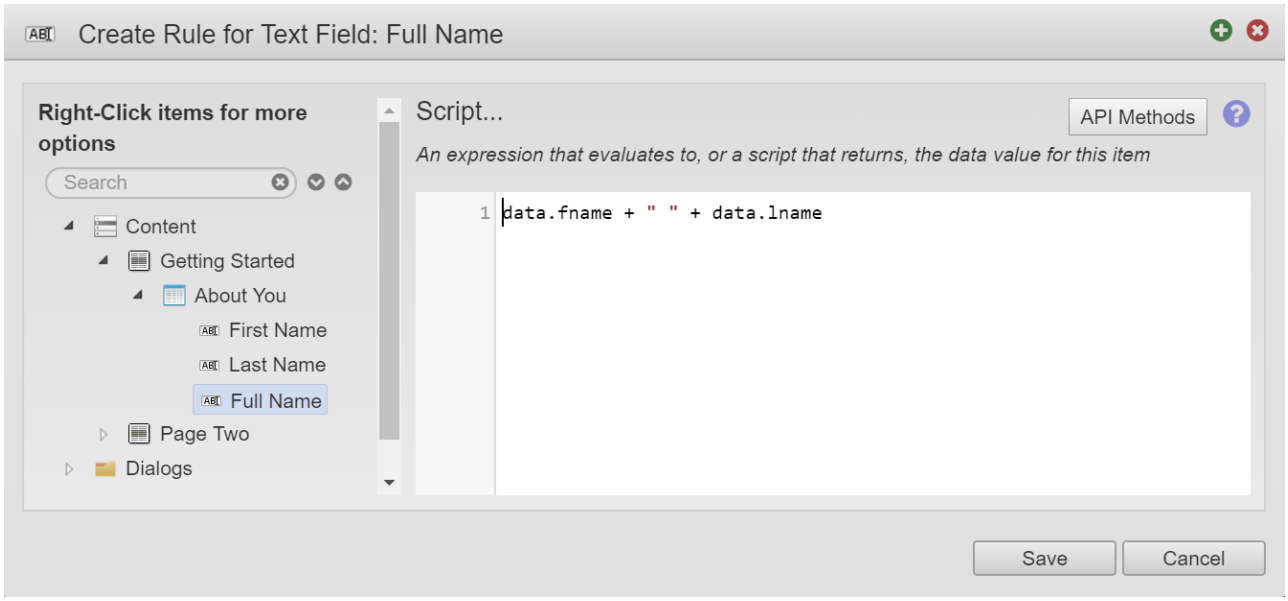
Next, learn how to create a mathematical calculation rule.

Concatenate Multiple Components Rule

Use the Concatenate Multiple Components calculation rule option when you want to combine multiple components and display them in a single component. The Concatenate Multiple Components option allows you to combine the value from more than one component into a different component. For example, you may have text fields for First Name and Last Name and you want the entered values from both to display in the Full Name field.

To create a concatenate multiple components business rule for a Maestro form, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component where you want the result to be displayed.
4. Click Create Rule.
5. Select Script under Calculation.
6. Expand the form structure as needed and double-click the component with the entered value you want to display in the select component.
7. Add + " " + sequence, which actually concatenates multiple components. After the plus sign we will enter a space surrounded by quotation marks along with another plus sign. You may use either single or double quotes as long as you are consistent. The plus sign concatenates when applied to text input and adds when applied to numbers. The " " adds a space between the combined components. The quotations need to be around any characters, including any spaces that you want to display in the resulting component.
8. Double-click another component you want to add to the selected component.
9. Repeat steps 7 and 8 until all components are added.



10. Click Save.
11. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

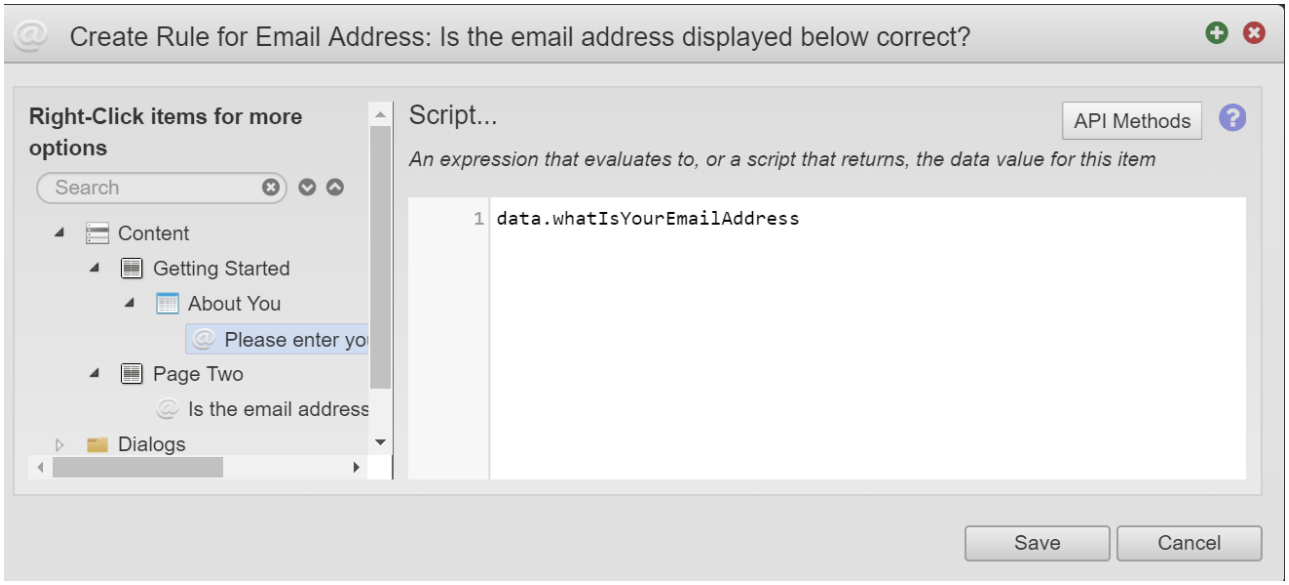
Next, learn how to duplicate data calculation rule.

Duplicate Data Calculation Rule

Use the Duplicate Data calculation rule to display some sort of data that was previously collected and display it in a different place within the Maestro form. This option is commonly used to display a form user's name after they have entered their personal details into the form. The Duplicate Data option allows you to use data from different components in other parts of the form. For example, you could use an entered value such as first name in a text display. This allows you to dynamically customize areas of the form. You could also re-use entered data so that the form user doesn't have to re-enter data multiple times.

To create a duplicate data calculation rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component where you want the entered value from another component to be displayed.
4. Click Create Rule.
5. Select Script under Calculation.
6. Expand the form structure and double-click to add the component with the entered value you want to display. For example, the form user has been asked to enter their email address into the form. Once the user has entered their email address, and clicked continue, the form displays the email address and asks the user to confirm that the entered email address is correct.



7. Click Save. The script will be added to the window by coping the entered data from one component to another.

8. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

A calculation rule has been added to a second email address component, this component will be used to confirm that the entered email address is correct without the user having to enter their email address more than one time.

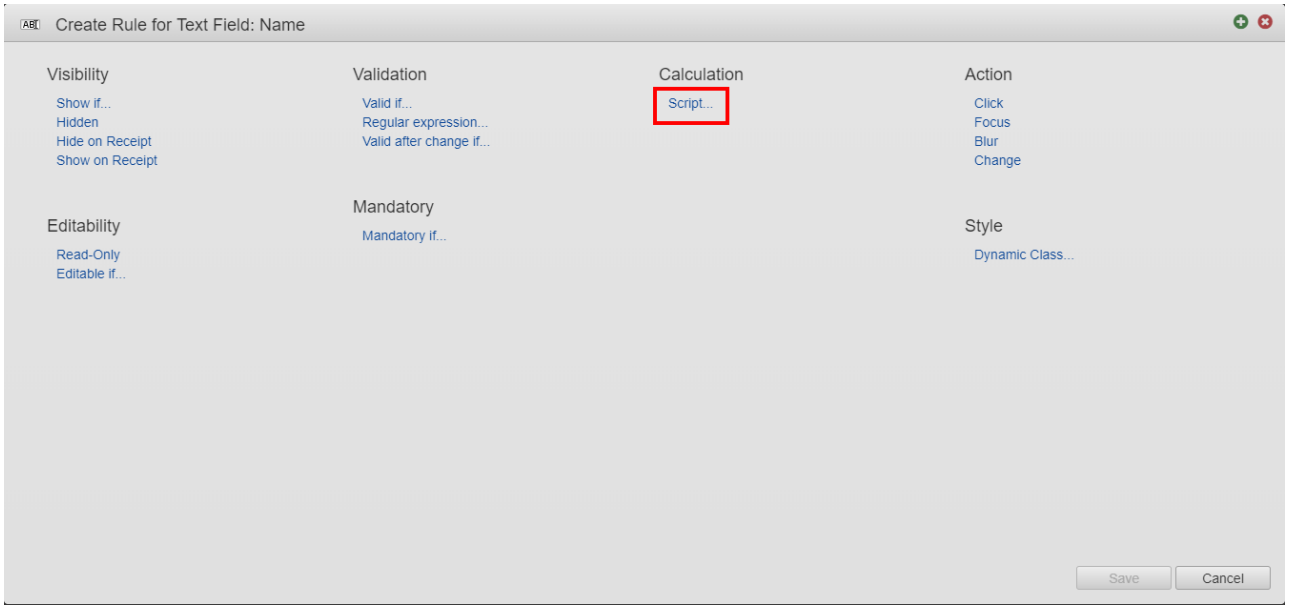
Next, learn how to use mathematical calculation rule.

Mathematical Calculation Rule

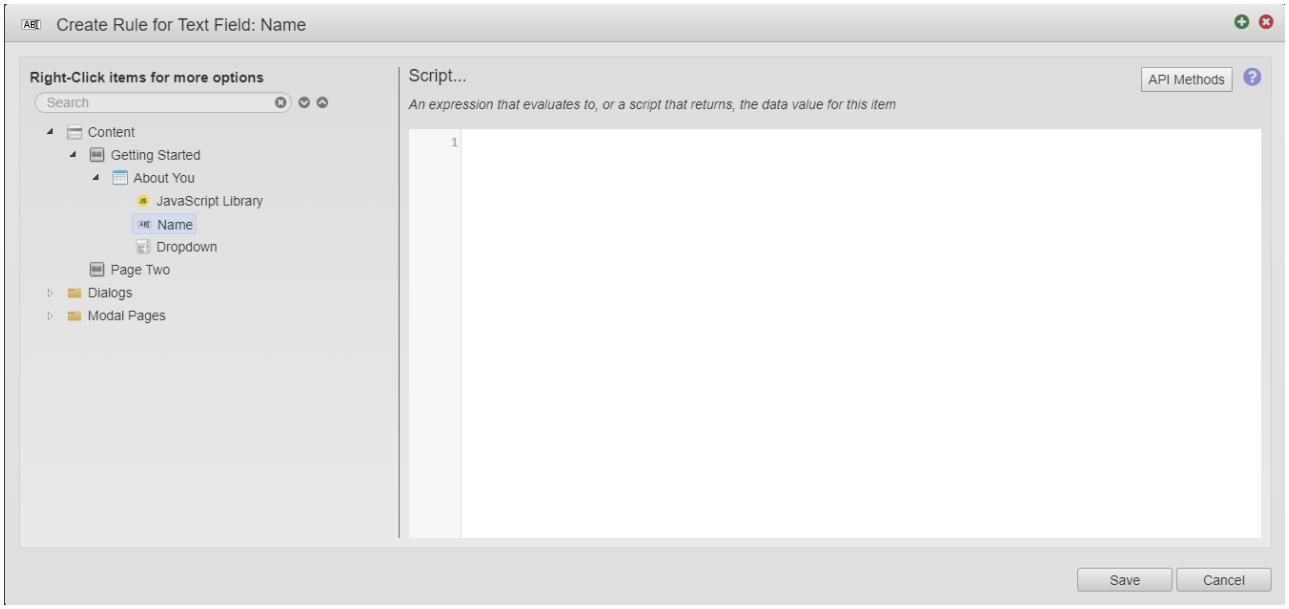
The Mathematical Calculation business rule option allows you to create simple and complex mathematical calculations (+, -, *, etc.) for a Maestro form. Calculations can be created using data entered in components on the form, or by using defined numerical values.

To create a Mathematical Calculation rule for a Maestro form, follow these steps:

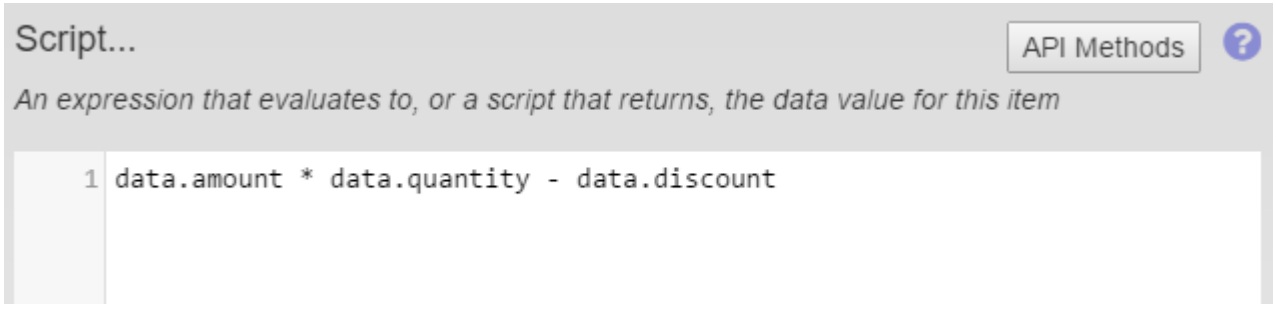
1. Open a Maestro form.
2. Click the Properties tab.
3. Select a component that displays a calculation result.
4. Click Create Rule.



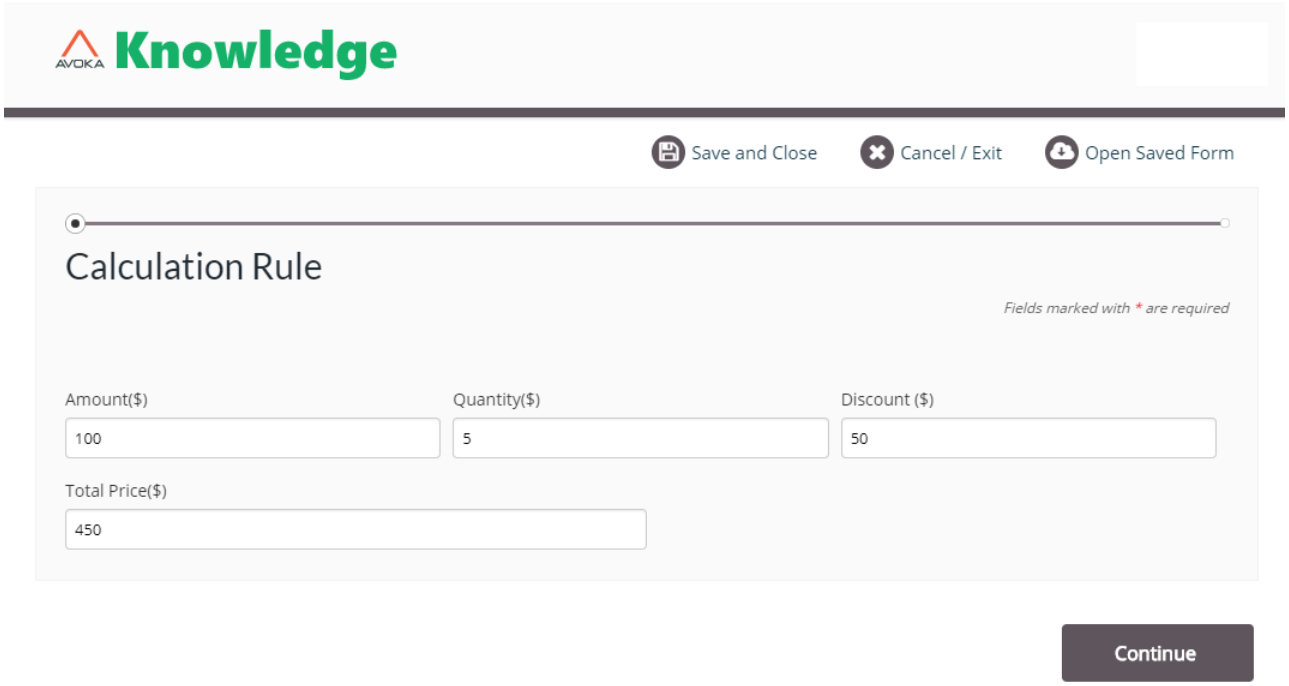
5. Click Script under Calculation as shown below.



6. Expand the form structure as needed and double-click the component you want to include in the calculation
7. Insert a mathematical symbol, for example `+,( ), - , *, /`
8. Double-click the next component you want to include in the calculation.
9. Repeat the steps 7 and 8 until you have completed the calculation, for example, the amount value is multiplied by the value entered into the quantity value and then the discount is subtracted from the value.



10. Click Save.
11. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

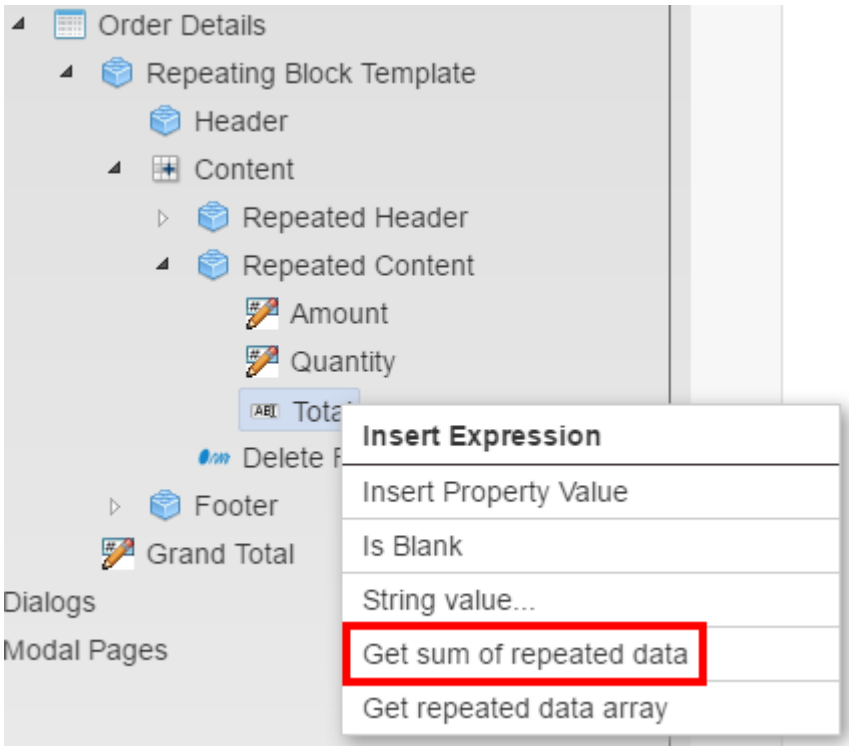

Knowledge
Save and Close
Cancel / Exit
Open Saved Form
Calculation Rule
Fields marked with * are required
Amount($)
100
Quantity($)
5
Discount ($)
50
Total Price($)
450
Continue

Repeating Blocks Calculation Rule

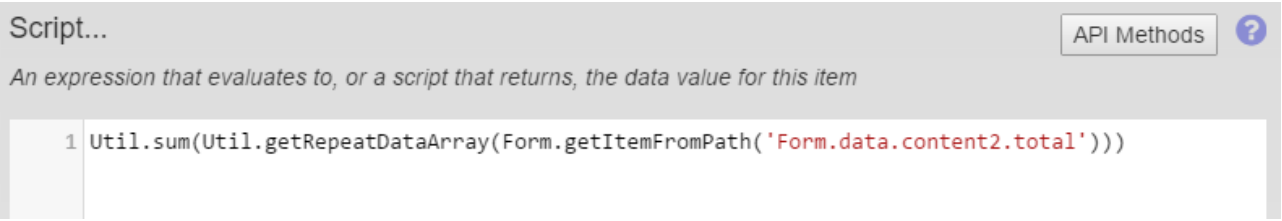
Use a calculation rule for repeating components to perform some summing up actions. For example, you may ask a form user to enter prices of all items they purchased at a supermarket and then display the total sum of the purchase.

To create a repeating calculation rule for a Maestro form, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component outside of the repeating block.
4. Click Create Rule.
5. Select Script under Calculation.
6. Expand the repeating block template as Repeating Block Template > Content > Repeated Content.
7. Right-click the component you want to sum.
8. Select Get sum of repeated data as shown below.



The following script is added to the window, which sums the component within each repeating instance.



9. Click Save.
10. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Editability Rule Overview

Editability Rules limit a form user's ability to edit component content in a Maestro form. There are two editability rules available in the Maestro Create Rule window:

- Read-Only
- Editable if

Create a Read-Only Rule

The Read-Only editability rule makes any component the rule is applied to, read only. When a read-only business rule is applied to a component, form users will not be able to enter any values into the component. The Read-Only rule can be applied to any component on a Maestro form. The Read-Only Rule is useful when you only want to display content in a field, which doesn't need to be modified.

To create a Read-Only rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component you want to make read-only.
4. Click Create Rule.
5. Select Read-Only. The editability rule status is shown for a selected component in the Rules section.



Editable If Rule Overview

The Editable If rule makes a field editable only when certain conditions are met. By default, a component with an Editable If rule is not editable until the configured condition is met.

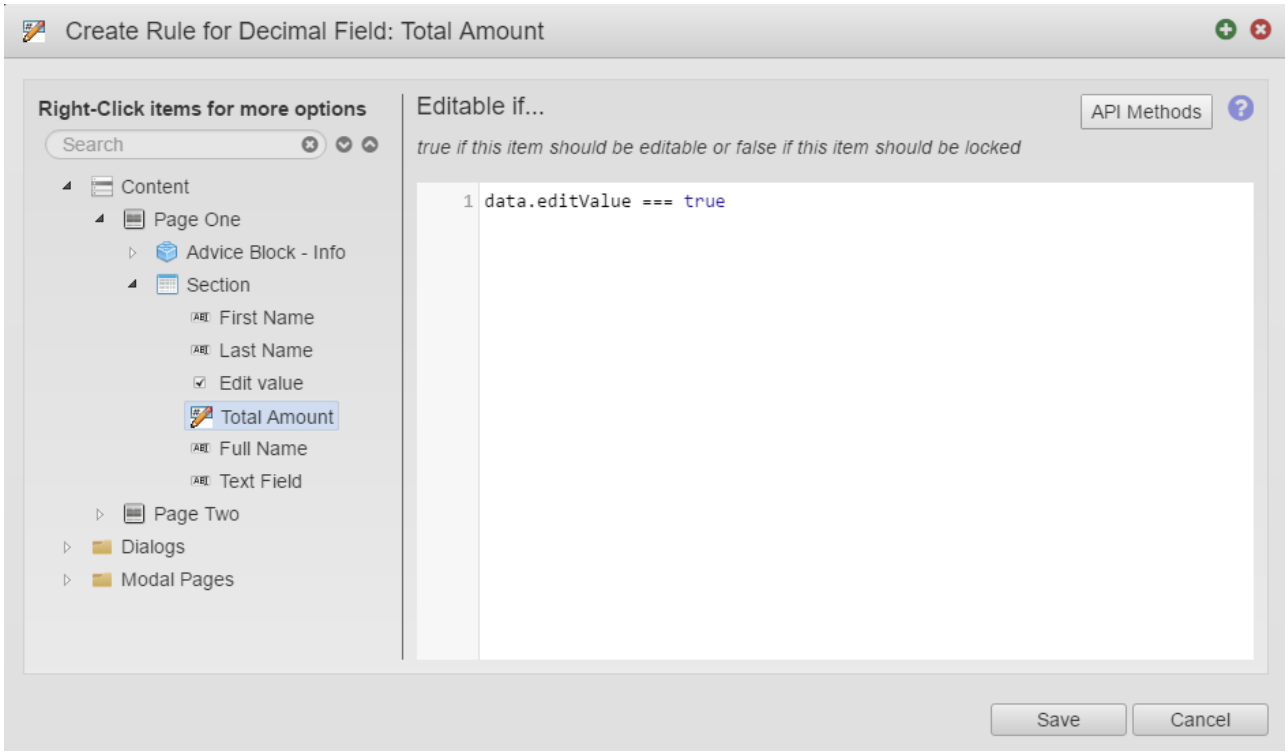
For more information, see.

Create an Editable If Rule

The Editable If editability rule makes a field editable only when certain conditions are met. By default, a component with an Editable If rule is not editable until the configured condition is met.

To create an Editable If rule for a Maestro form, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component to apply the rule to.
4. Click Create Rule.
5. Select Editable if.



6. Type a JavaScript that implements the rule or right-click on existing components. In this example, an Editable If rule checks if the Edit checkbox is selected then the Total Amount decimal field is editable.
7. Click Save.

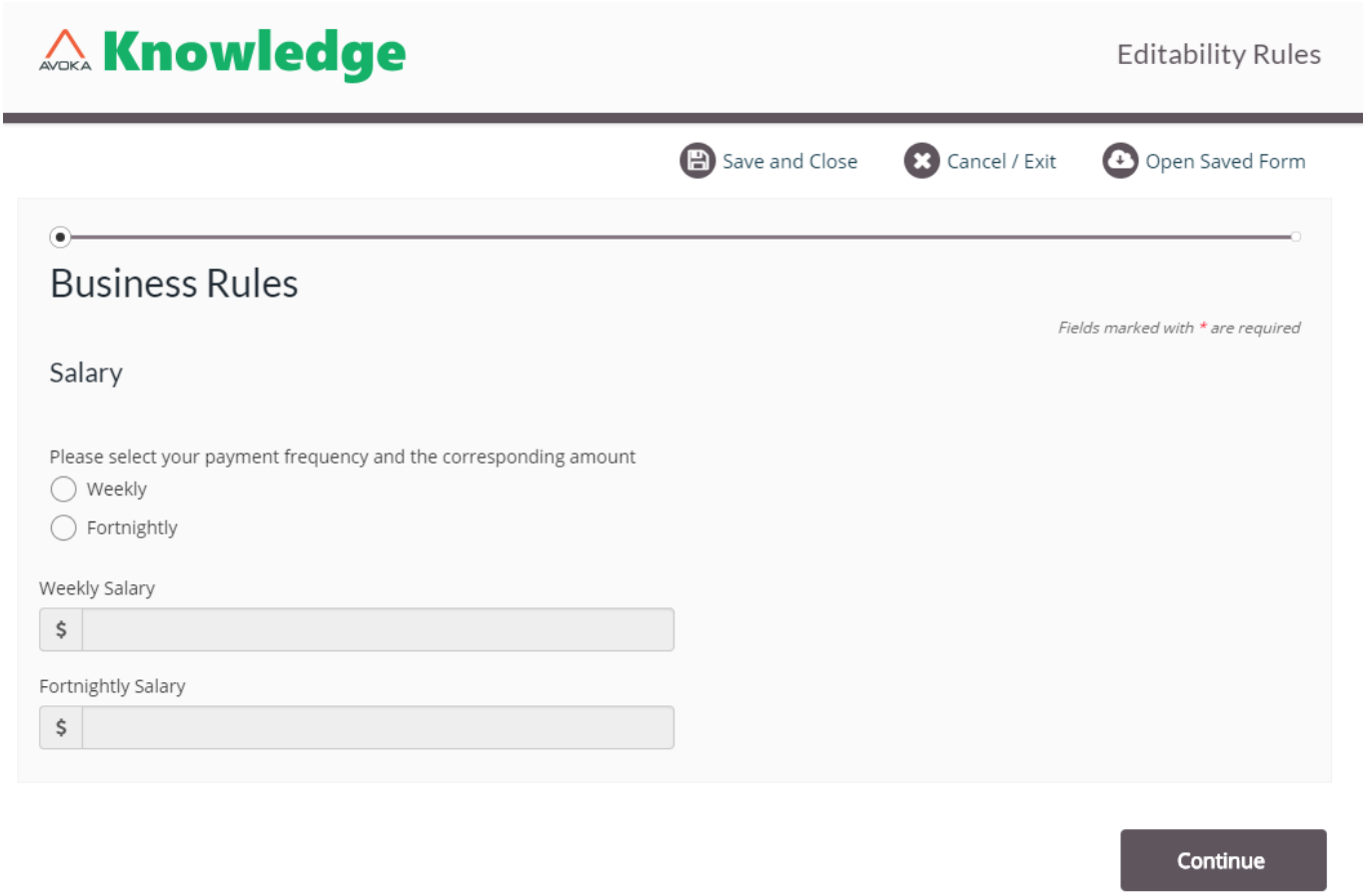
NOTE

Check out the Editable If rule example.

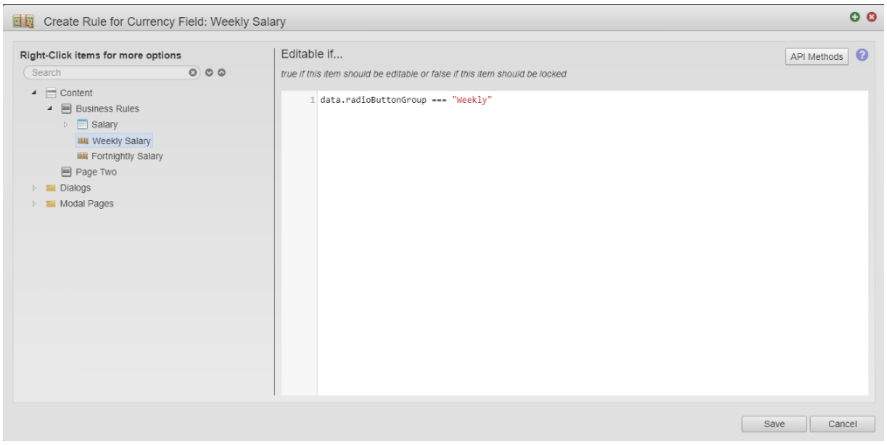
Salary Editable If Rule Example

This example uses the Editable If editability rule to allow a user to enter data only into specific components of a Maestro form. If the user selects the Weekly radio button option, then the Fortnightly Salary currency text field becomes not editable and vice versa.

A form below has a radio button group and two currency fields. A user can specify a payment frequency and the amount to be paid.



The Editable If rule is applied to the currency field named Weekly. The JavaScript checks if the Weekly radio button is selected from the radio button group and enables editing of the Weekly currency field. A user is able to enter the amount that to be paid in weekly installments.



The editable if rule that has been applied to the Fortnightly currency field. The script in this example says that if Fortnightly is selected from the radio button group, then the Fortnightly currency field will be editable (i.e the user will be able to enter the amount they will pay in fortnightly payments).

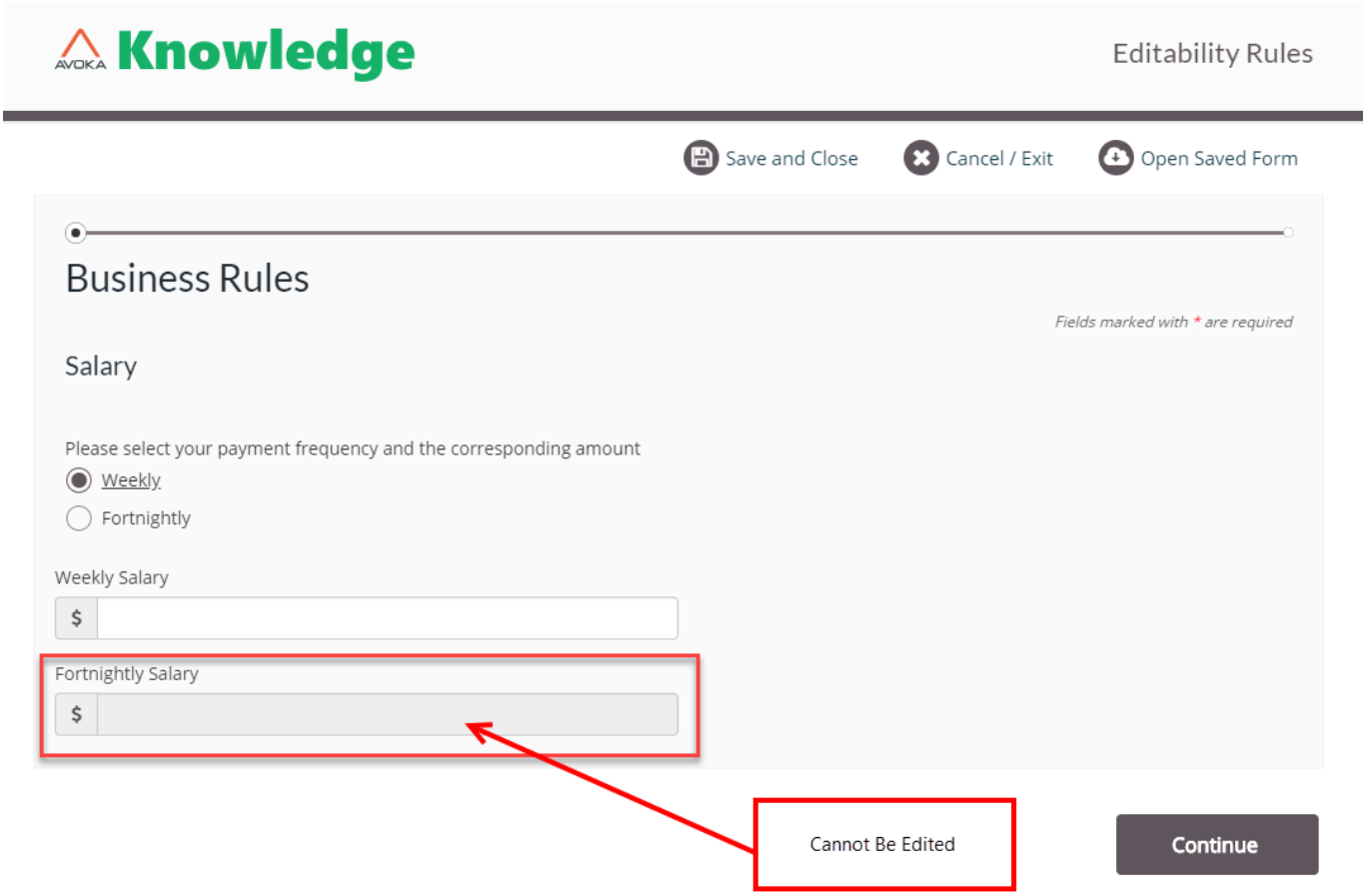




It displays calculation rules that have added to extend the functionality of this example.



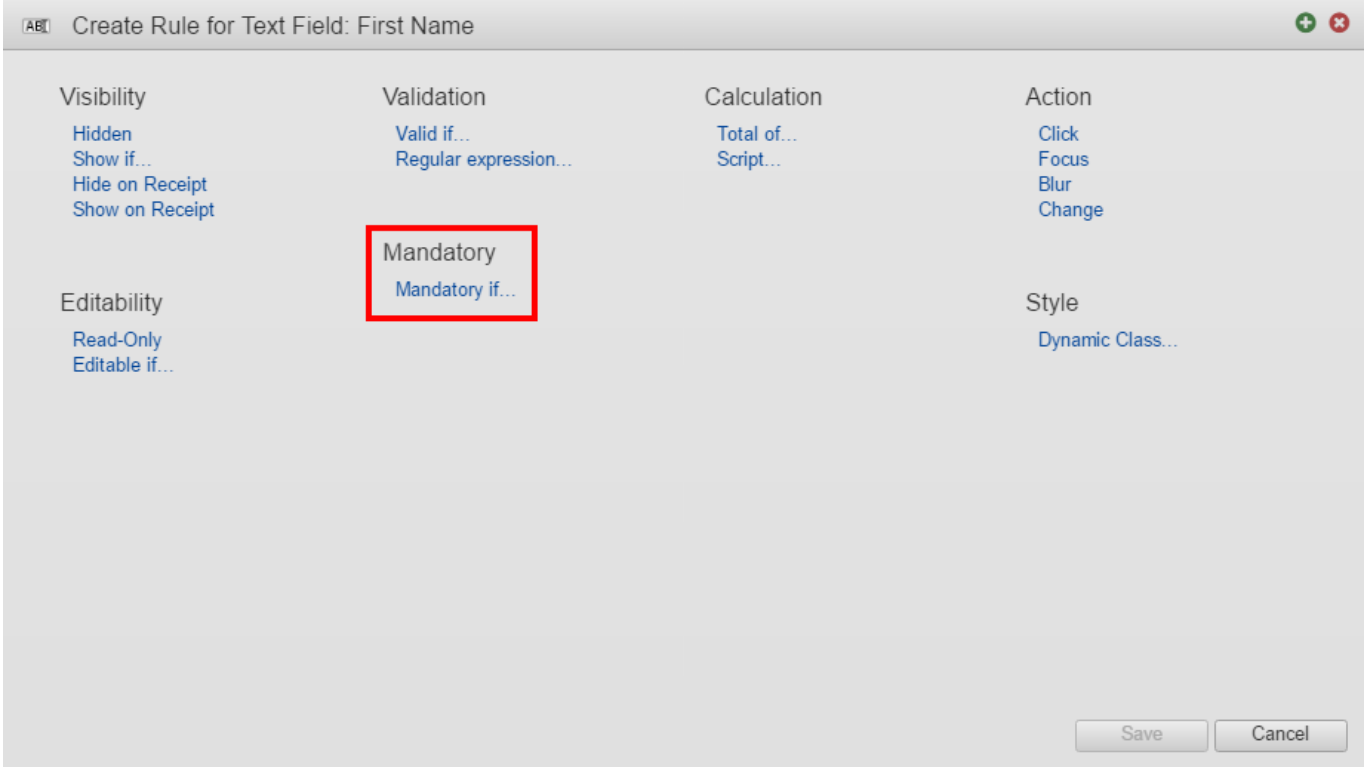
It displays the form once the editability rules have been added to the form. When Weekly is selected from the radio button group, the user will not be able to enter input into the Fortnightly Salary currency field.


Knowledge
Editability Rules
Save and Close
Cancel / Exit
Open Saved Form
Business Rules
Fields marked with * are required
Salary
Please select your payment frequency and the corresponding amount
Weekly
Fortnightly
Weekly Salary
$
Fortnightly Salary
$
Cannot Be Edited
Continue

Mandatory Rule Overview

A mandatory rule is a rule that requires valid input from a user before the user is allowed to continue with a form journey. Mandatory Rules should be created and used to identify components that are essential to a form journey. This means that no matter what happens, the user should not be able to continue with the form until they have provided valid input for these components. Maestro currently provides Mandatory If rules.

The Mandatory If rule allows you to create a script that marks the component as mandatory based on certain conditions.



Mandatory If Rule Overview

The Mandatory If rule allows you to create a script that marks the component as mandatory based on certain conditions.

To create a mandatory if rule, see.

Create a Mandatory If Rule

The Mandatory If rule allows you to create a script that marks the component as mandatory based on certain conditions.

To create a Mandatory If rule, follow these steps:

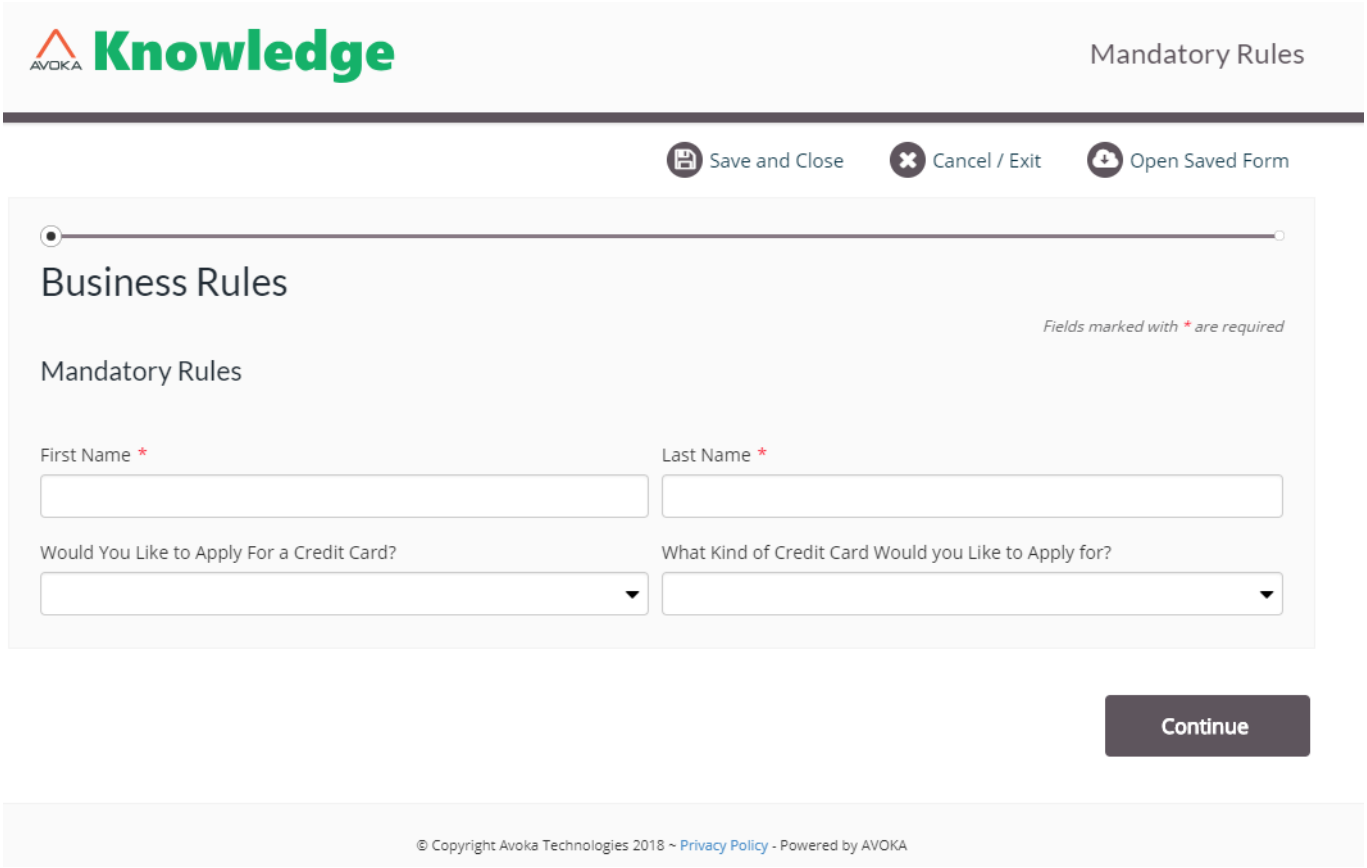
1. Open a Maestro form.
2. Click the Properties tab.
3. Select a mandatory component.
4. Click Create Rule.
5. Select Mandatory If.
6. Enter some JavaScript to implement the rule.
7. Click Save.
8. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

Use the Mandatory Message from the Properties panel to customize the message displayed when the user does not complete the mandatory component.

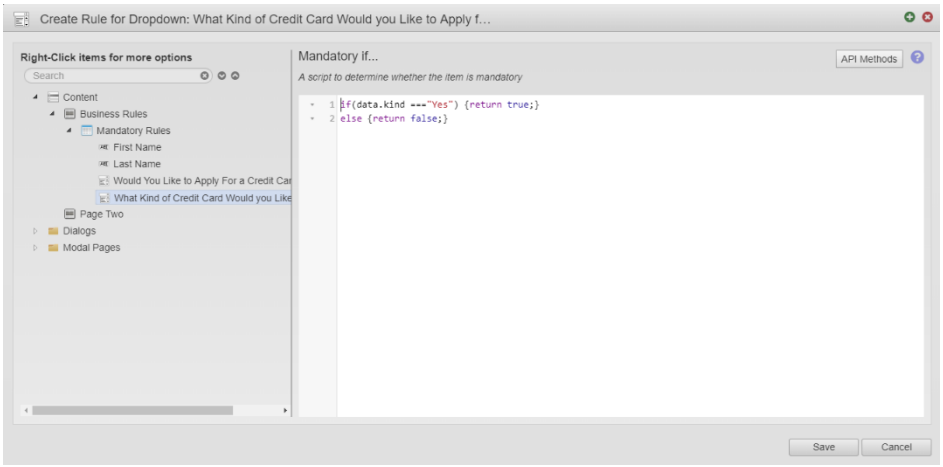
> NOTE
>
> Check the Mandatory If rule example.

Mandatory If Rule Credit Card Application Example

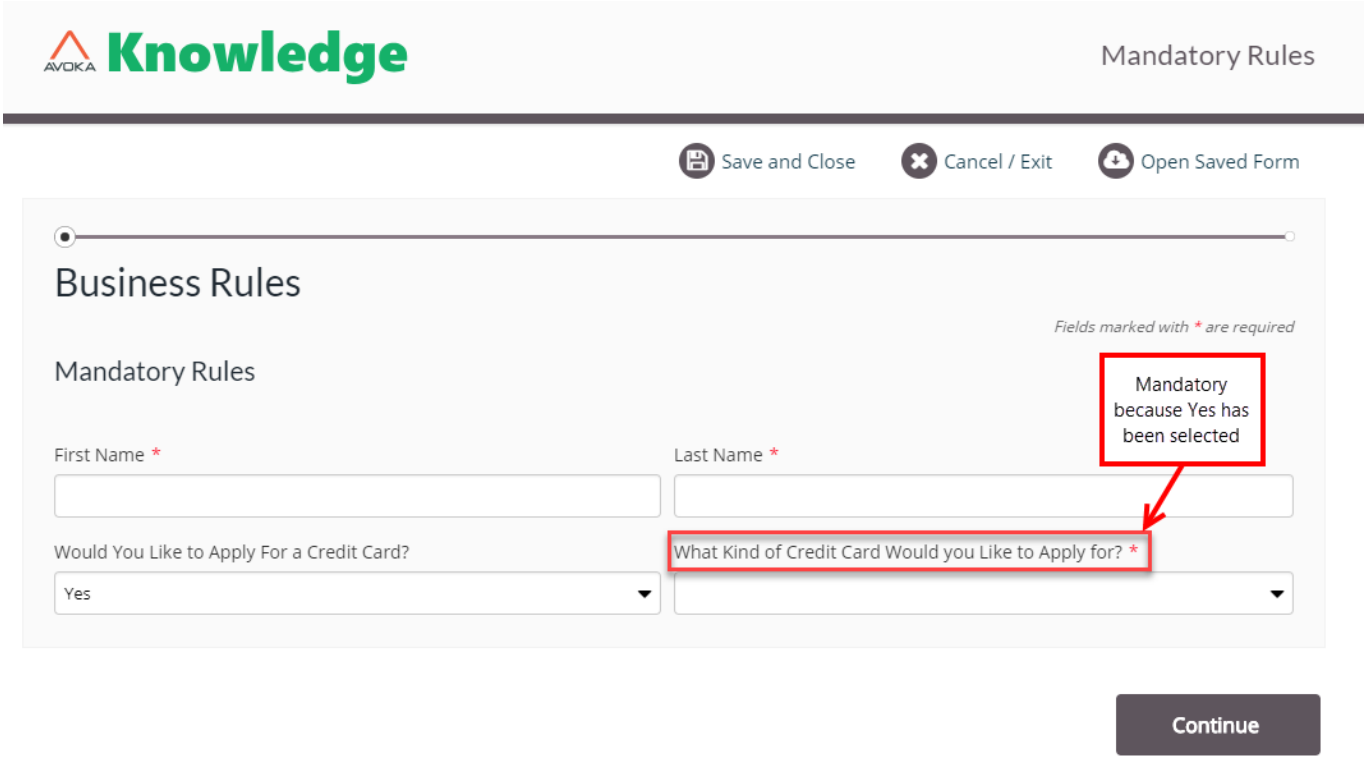
This example uses a credit card application form that asks customers if they would like to apply for a credit card. If the answer is yes, then the type of credit card question becomes mandatory as shown below.



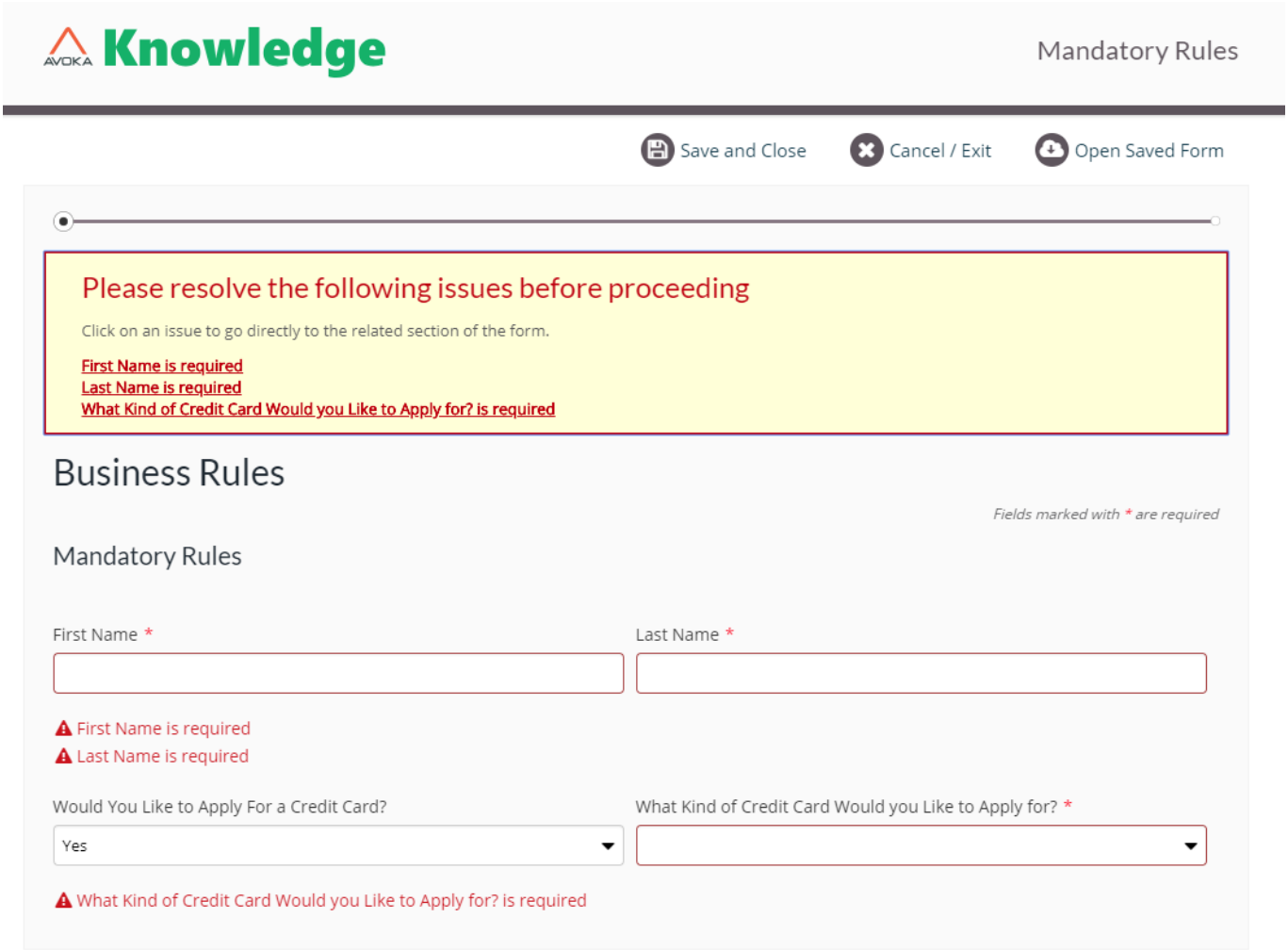
The above screenshot displays how the form appears in the browser initially.



The above screenshot shows the Mandatory If script that is applied to the component. In this example, the script checks if the component named kind is equal to "Yes" (that is, if the customer has selected the "Yes" option for the question "Would you like to Apply for a Credit Card?"). If this condition is met then the script returns true and this field becomes mandatory.



The above screenshot shows that the "What Kind of Credit Card Would you Like to Apply for?" dropdown has become mandatory as a result of the "Yes" option being selected from the first dropdown ("Would you like to Apply For a Credit Card?").



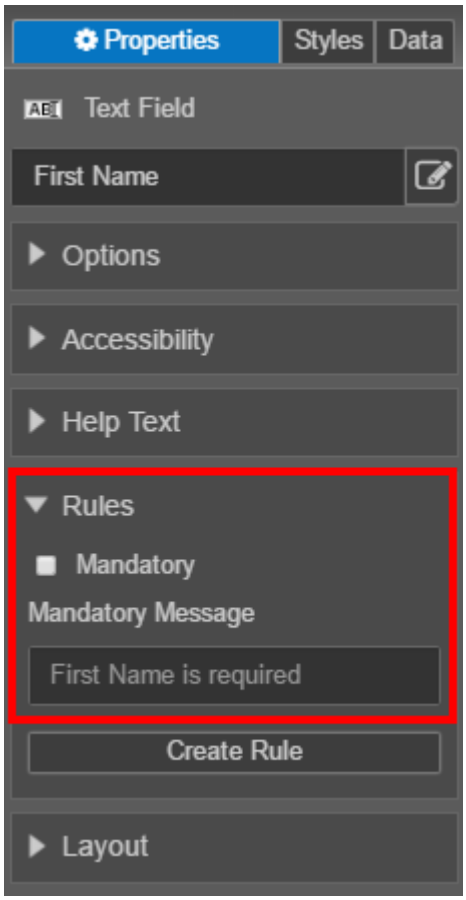
If a mandatory field is left blank and a user attempts to continue their form journey, the associated error message is displayed.

Make a Component Mandatory

This is quickest and easiest way to make a component mandatory. Alternatively, you can apply the Mandatory If Rule to component.

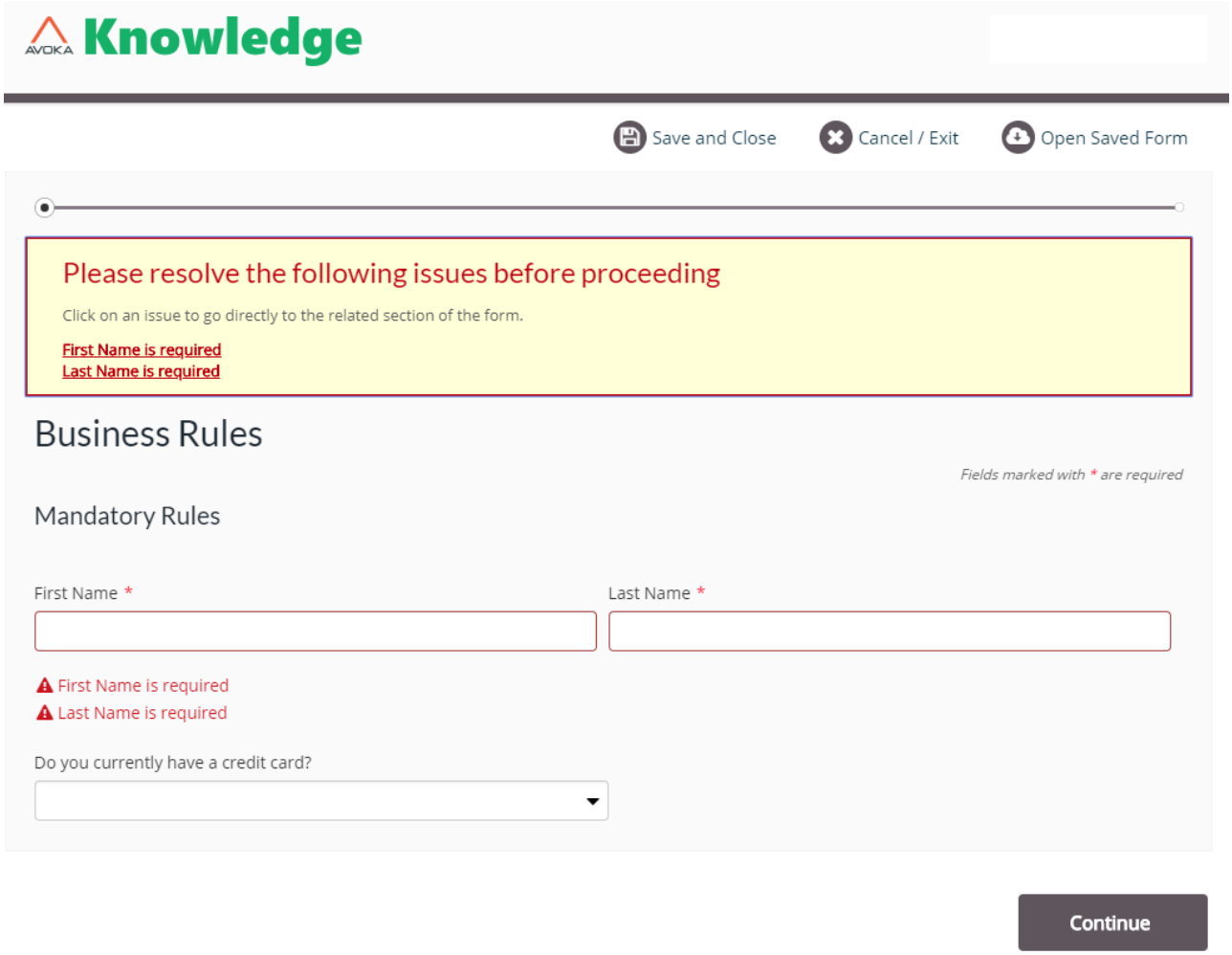
To make a component mandatory, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select a component that you want to make mandatory.
4. Select the Mandatory checkbox.



5. Update the Mandatory Message, which is displayed if a user attempts to move forward in their form journey without completing this mandatory component.
6. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. For example, the Mandatory property has been applied to both the First Name

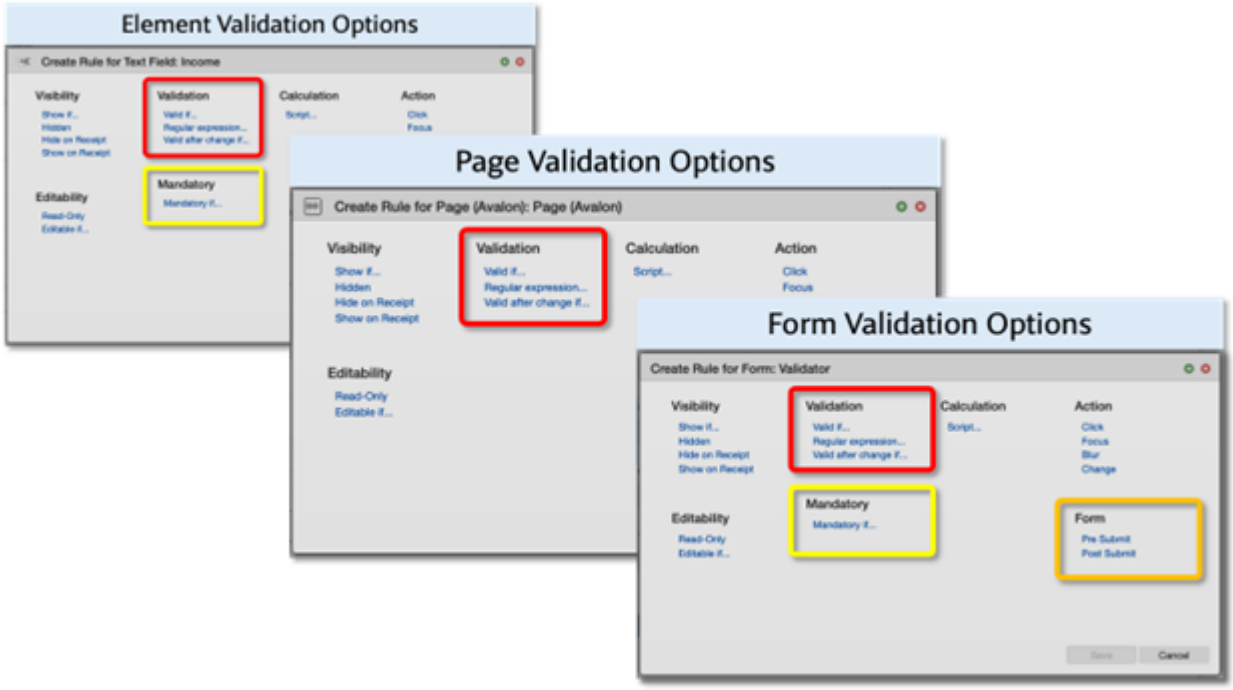
and Last Name fields.



Validation Rule Overview

Maestro validation rules provide the ability to validate either an individual element's value or complex, interdependent data relationships in a form. More often than not, you use client-side validation rules in a Maestro single page application. Let's look at it in more detail.

A simple validation rule for an item may check that its value contains only the letters `A-Z` or `a-z`. A complex rule may check that, for a joint application, all the second applicant's details are complete.



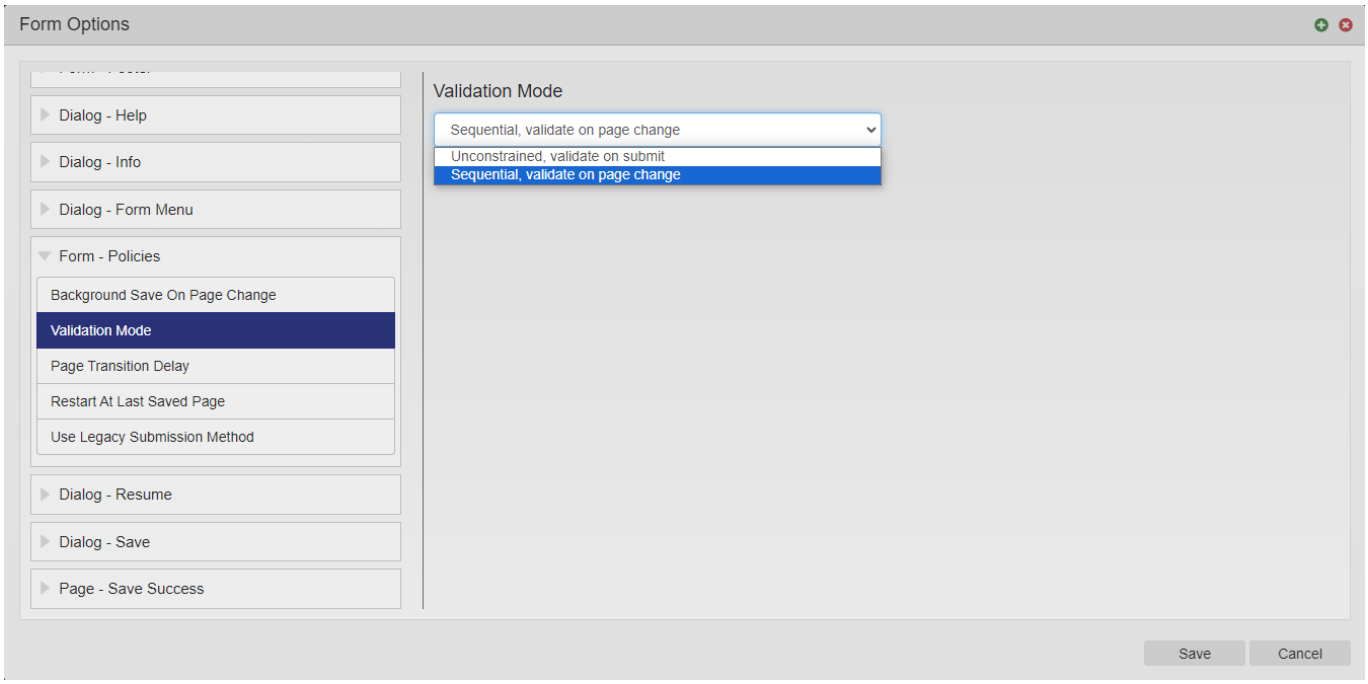
Validation rules can be applied to individual Elements (see the image above - the top left, red highlight), Pages (middle, red highlight), or at the Form level (bottom right, red highlight).

Data Fields are calculated and have no validation rule support. The onus is on developers to ensure these calculations are accurate. If validation is required, this can be done in a related UI element validation rule or in a Page Validation rule.

Validation rules work alongside Elements marked Mandatory at design time, or at runtime if a Mandatory If rule condition is met (see the image above - yellow highlight) and Pre-Submit rules (orange highlight).

A well-designed client-side validation model will use a mix of techniques to ensure a Form is complete and correct at the time of submission.

When Validation and Mandatory rules are run depends on the validation policy setting for a form. This can be either Validate on Page Change – which means validation must be complete on a page to move forwards, or Unconstrained, validate on submit - which enforces rules only at the point of submission providing more flexibility in data entry.



NOTE

Validation is not performed if the user navigates backwards to a previous page.

Mandatory data requirements, if implemented, are enforced before any validation rule is invoked and this only happens once a user has entered data into a field or changed an existing data value.

Types of Validation Rules

A validation rule states the conditions in which the data in a component is considered valid.

There are three types of validation rules available in Maestro:

- A Regular Expression validates an element if the test pattern matches, the field is considered valid. This rule generates a normal 'Valid If' rule using the parameters provided.
- A Valid If rule validates an element using a JavaScript function which must return either true (valid) or a String (error) as described, below. Because these rules can reference any other element, they can be used to create complex business rules in a compound validation scenario.

- A Valid after change if rule validates an element using a JavaScript function. The only difference between this and a Valid If rule is when the rule is called.

Validation Function Return Values

Validation function return values are not interpreted by Maestro as truthy values as you can see from the following snippet of a generated Regular Expression rule:

```
var ex = new RegExp('$.*^', 'img');
return ex.test(value) || 'Fail'
```

The return value is truthy for both a successful match (where the boolean true is returned) and an unsuccessful match (where the string `Fail` is returned).

Maestro interprets return values as follows:

true
: The validation succeeded.

false
: The validation failed. Maestro displays the default error message, usually, `Not Valid`.

string
: The validation failed. Maestro displays the returned string in an error message.

All other return types are ignored. This means that Object, Number, Array, etc., are treated as a successful validation (one would assume the truthiness rule would apply). However, the same applies to `null`, `undefined`, “”, and other falsy values – all are ignored and the validation succeeds.

This last point is sometimes a cause for confusion.

Best practice is to return a either String in the case of a validation error, or true / undefined. For example, the rule below checks the field value is less than one million or, if it is not, returns `Invalid amount`.

```
value < 1000000 | "Invalid amount"
```

Ordering of Validation Rule Execution

Rules will be called at different stages:

- If a value is entered into a field, which has a Valid If rule, that rule will be called when the field loses focus.
- If a value is changed in a field with a Valid on Change rule, that rule will be called when the field loses focus.
- If Sequential, validate on page change is enabled, rules for every element in the page are validated before the page change can occur, namely, after the user clicks the Next button.
- If an Unconstrained, validate on submit is enabled, rules for every element are validated before submission can occur, namely, after the user clicks the Submit button.

Maestro's Handling of Validation Errors

How Maestro handles failed validation errors depends on the template configuration. Let's look at typical configurations in more detail.

Validation on Focus Change / Value Change

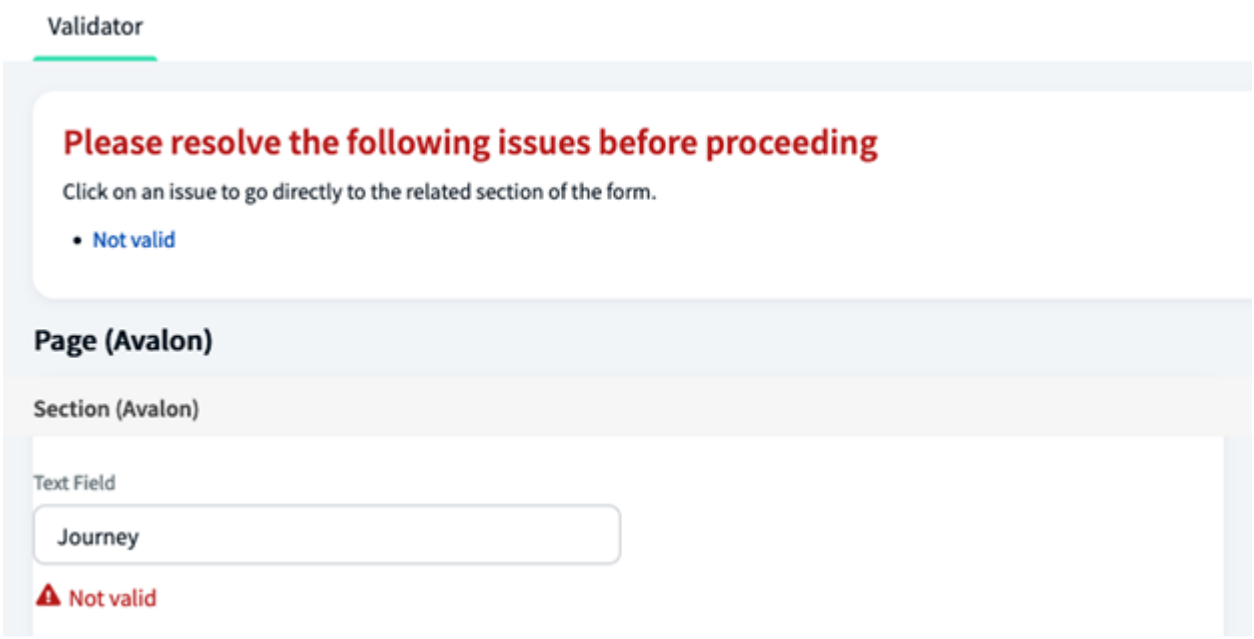
The screenshot shows a failed validation from the Regular Expression:



The error block bound to the text input is shown with the error message from the validation rule. Maestro uses the HTML 5 validation framework so assistive technologies can link the message to the input element.

Validation on Page Change

Validation on page change will cause all the validation rules on the page to fire. Because of this, Maestro shows a block element summarizing all failures, with links to each field:



Next, learn how to use Regular Expressions in your rules.

Create a Regular Expression Rule

Maestro allows you to use Regular Expressions[1] in validation rules, so you can created a pattern that will match character combinations in strings. A pattern makes use of special text strings, which are like wildcard notations in your OS. For example, as you can use a wildcard of `*.txt` to find all text files in a File Manager, the regex equivalent is `^.*\.txt$`.

You can do much more with regular expressions. You could create the regular expression `\b[A-Z0-9._%+-]+@[A-Z0-9.-]+\.[A-Z]{2,}\b` to search for any email address. A very similar regular expression (replace the first `\b` with `^` and the last one with `$`) can be used to check whether the user entered a properly formatted email address. Regular expressions are very compact, so it can be written in just one line of code.

In JavaScript[2], regular expressions are also objects. These patterns are used with the exec and test methods of `RegExp`, and with the match, replace, search, and split methods of String.

Below are several patters that can be handy to use:

- an email address validation - ^[a-zA-Z0-9_-\.]+@[a-zA-Z0-9_-\.]+\.[a-zA-Z]{2,4}$
- an URL validation - ^http\://[a-zA-Z0-9-\.]+\.[a-zA-Z]{2,3}(/\S*)?$

It takes a bit of time to get familiar with RegExp and start using them correctly, so we recommend checking the following resources first :

- Regular Expression Library - http://regexlib.com/
- Regular Expressions 101 - https://regex101.com/
- Online regular expression editor and evaluator - http://regexr.com/
- https://www.debuggex.com

To create a rule with a RegExp:

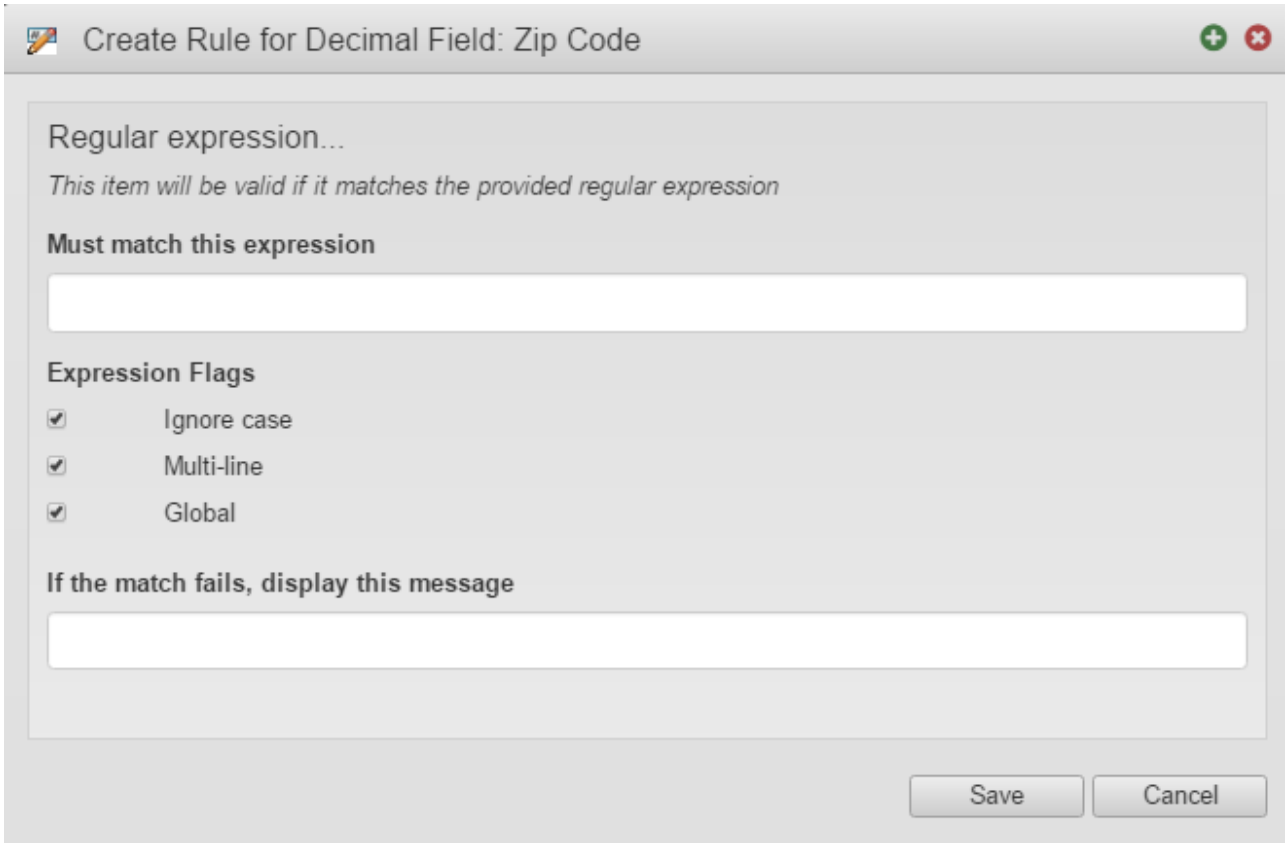
1. Open a Maestro form and select a component from the **View** pane.
2. Select the Properties tab and click Create Rule.

---

[1]A regular expression (regex) is a sequence of characters that define a search pattern. Usually such patterns are used by string-searching algorithms for "find" or "find and replace" operations on strings, or for input validation.

[2]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

3. Select Regular Expression, located under the **Validation** heading.



4. Enter a RegExp in the Must match this expression field. Define the JavaScript-based logic of the rule within the code editor. As a Validation rule, the Regular Expression rule should return `true` to indicate that the component is valid or `false` to indicate that the component is invalid.
5. Enter a message in the If the match fails, display this message field.
6. Select the Ignore Case checkbox to use case insensitive matching. For more information, see Mozilla documentation.
7. Select the Multi-line checkbox to apply the RegExp over multiple lines.
8. Select the Global checkbox to find all matches rather than stopping after the first match..
9. Click Save. The rule will appear in the **Properties** pane, under the **Rules** heading.

NOTE

You can only attach one rule of each type to a component.

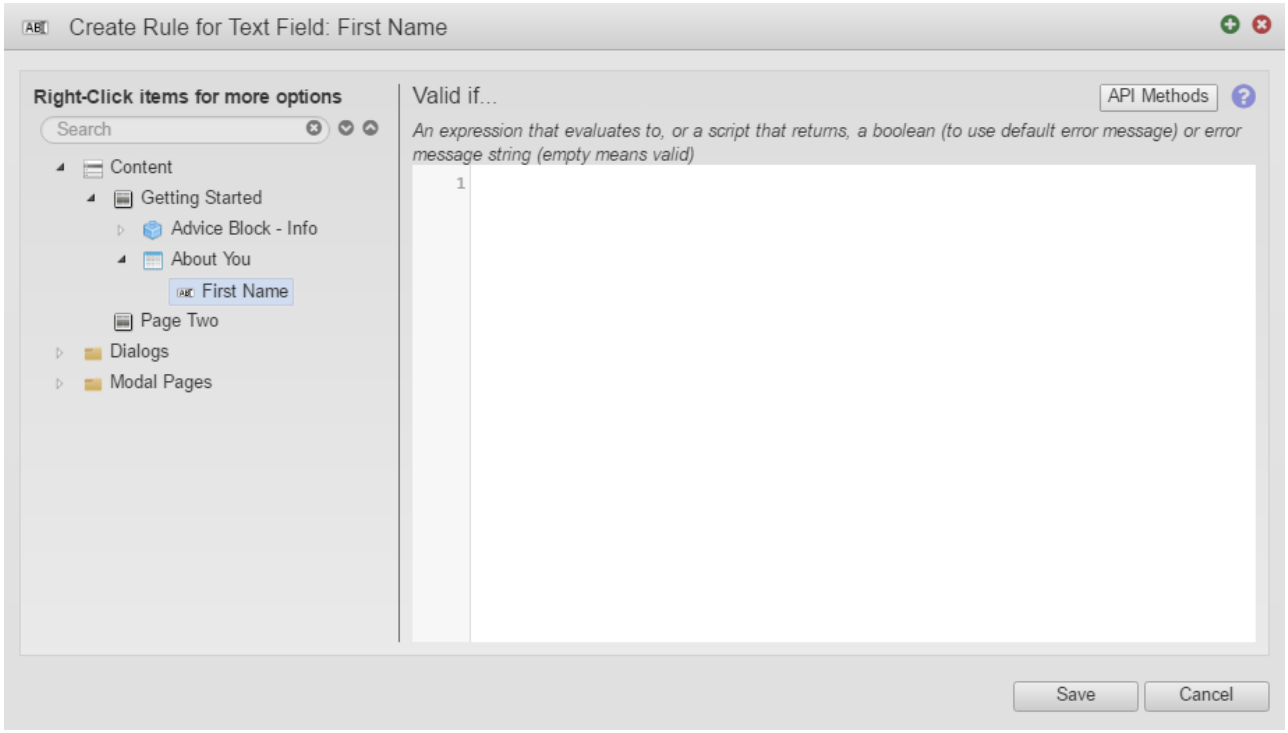
Next, learn how to create a Valid If Rule.

Create a Valid If Rule

The Valid If validation rule can be created to evaluate a component value using JavaScript, which returns true if the value is valid or false otherwise. If the valid if rule returns false, the validation fails, and an error message can be displayed. You can write a JavaScript script or use existing JavaScript functions of any complexity to evaluate the component's value.

To create a Valid If rule:

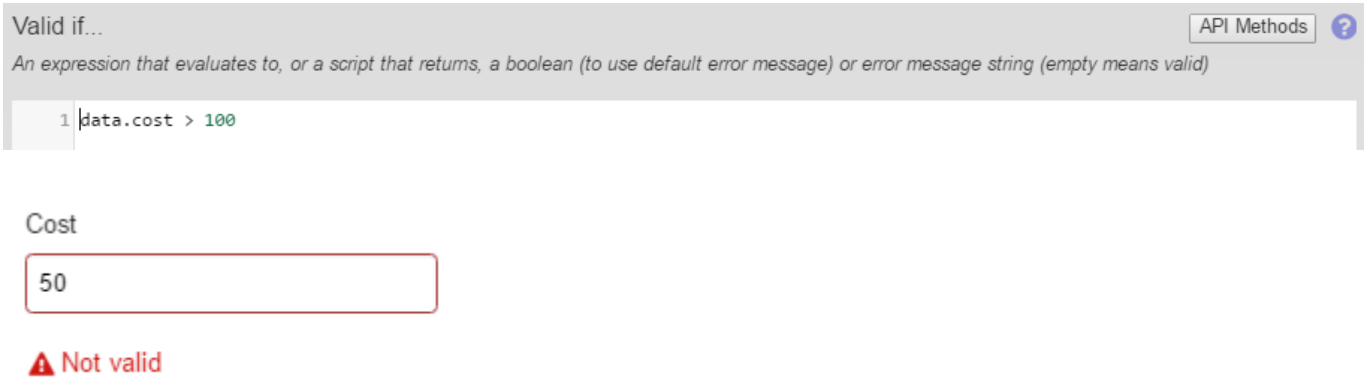
1. Open a Maestro form.
2. Click the Properties tab.
3. Select a component.
4. Click Create Rule.
5. Select Valid If.



6. Type a JavaScript that validates the selected component.
7. Click Save.

To help you understand more how the Valid If rule works, we listed several examples below.

Basic Valid If Rule with Default Error Message



Basic Valid If Rule with Custom Error Message



Valid If Rule with multiple conditions



Next, learn how to Create a Valid After Change If Rule.

Valid After Change If Rule Overview

The valid after change if rule is a validation rule that is used when you want to perform API based validation on a component, once the value in the component has changed. This rule validates locally, and only validates remotely when the value being validated has changed in some way. The valid after change if rule only runs after the value in the validated component has changed and the standard validation rule has passed.

The valid after change if rule should be used when there is an API call required to validate the value in a component.

For example, when you use a regular email address component, you can do format validation using the browser (e.g. ensuring that the entered email address contains an @ symbol). However, this type of validation will not validate whether the entered email address actually exists. To validate if the email address actually exists, you can use the valid after change if rule to interrogate the mail server and create an API request to confirm that the entered email address actually exists and is valid. Interrogating the mail server using a standard validation rule is not appropriate as a standard validation rule gets called even if the value has not changed, whereas the valid after change if rule will only execute once the value in the component has changed.

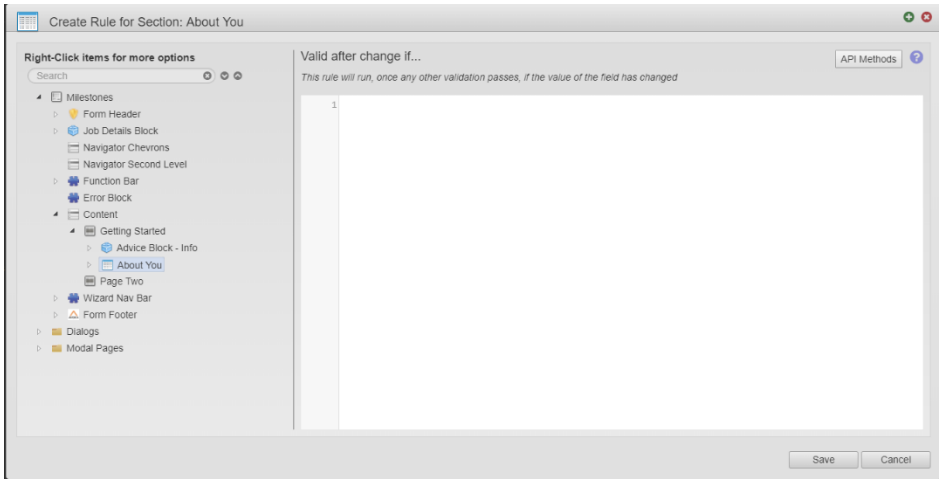
You should use both the standard validation rule and the Valid after change if rule together and the validate after change rule will only be called if the standard validation rule passes.

Next, learn how to create a valid after change if rule.

Create a Valid After Change If Rule

To create a Valid after change if rule, follow these steps:

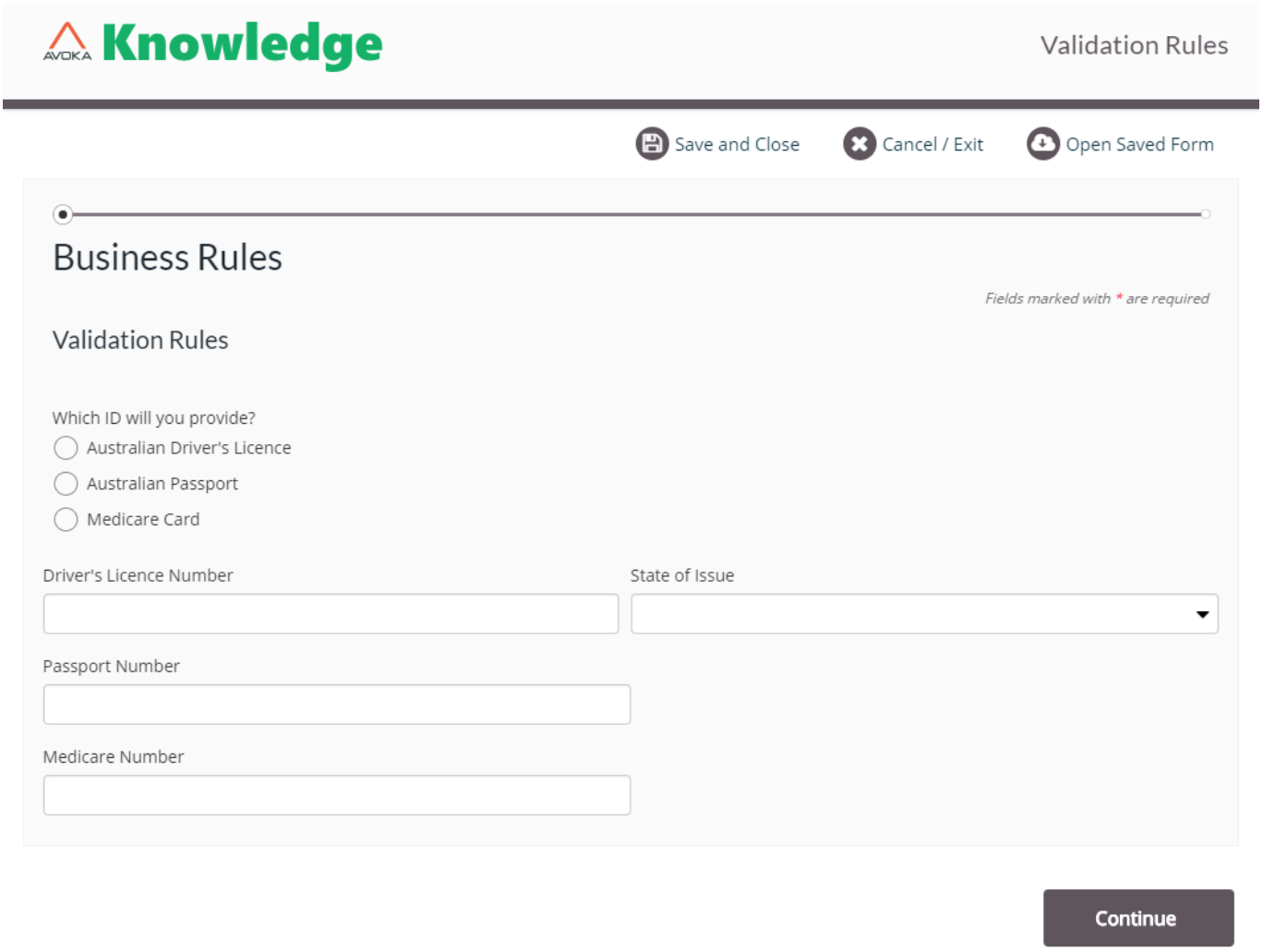
1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component.
4. Click Create Rule.
5. Select Valid after change if.



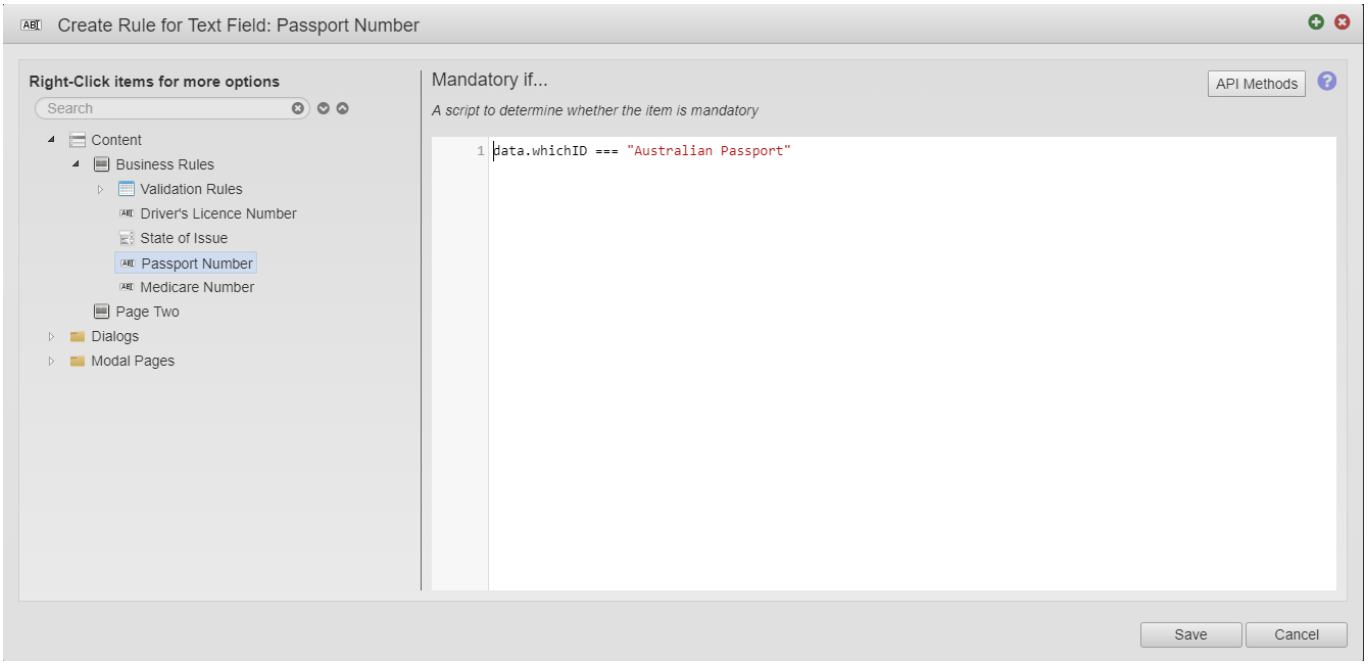
6. Type a JavaScript that implements the validation rule.
7. Click Save.

Australian ID Validation Rule Example

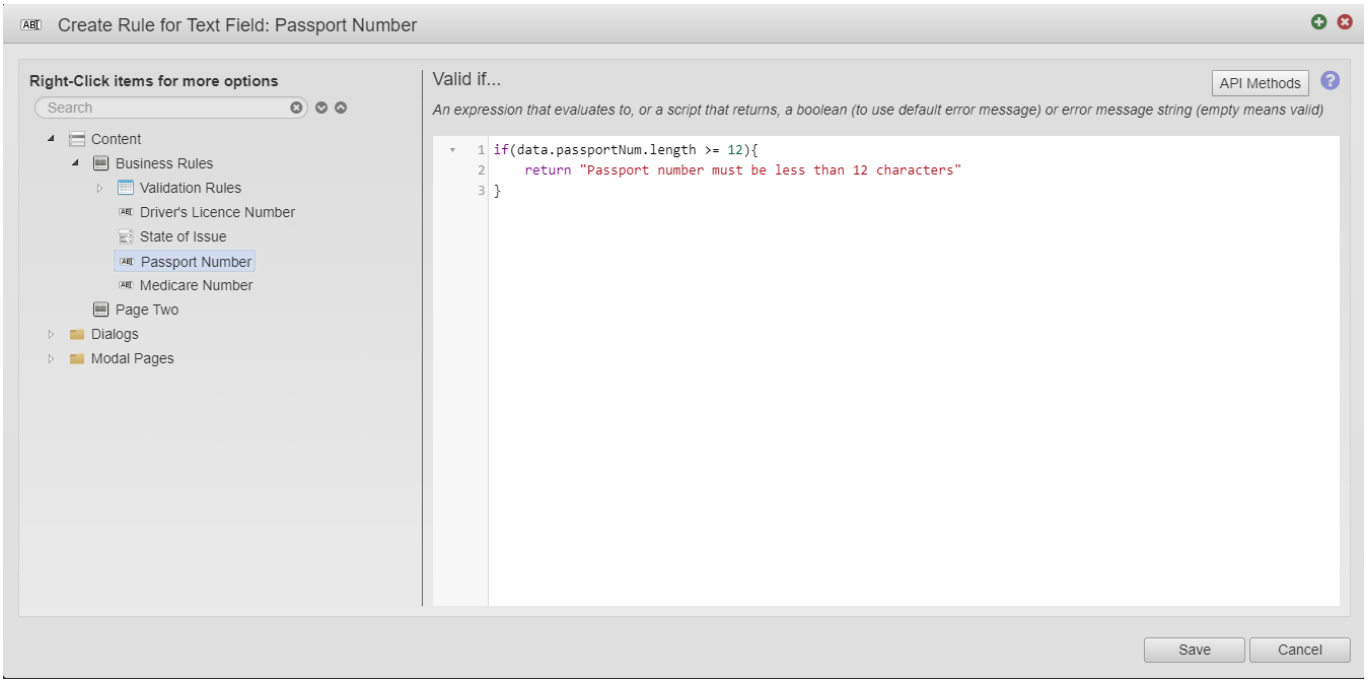
This example uses three validation rules to check the input from a user who is attempting to identify themselves. The form below provides several ID options, which the user can chose from and then provide the appropriate ID information in to components.



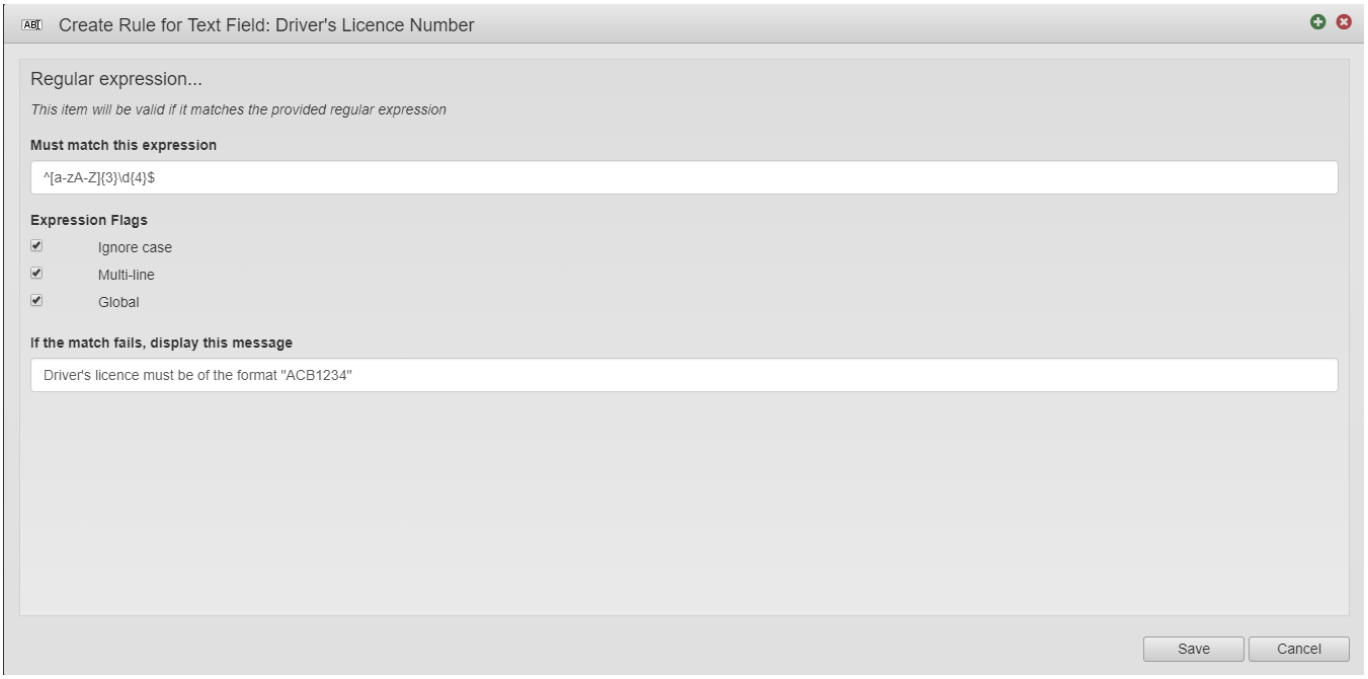
This Mandatory if rule applies a script to the Passport Number text field.



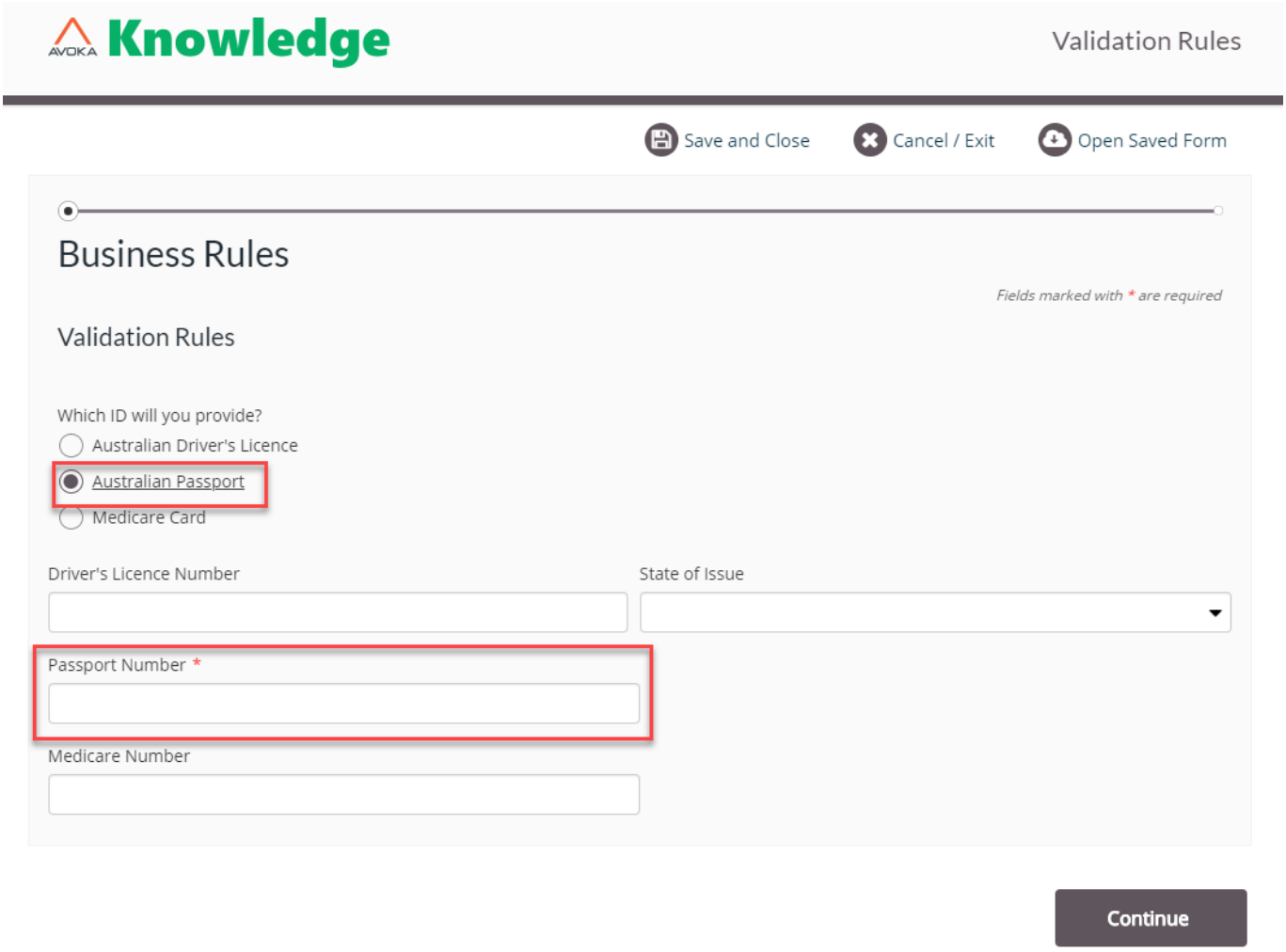
This Valid If rule applies a script to the Passport Number text field, which checks if its input data exceeds or is equal to 12 characters long and deems it invalid and show the error "Passport number must be less than 12 characters" message to the user.



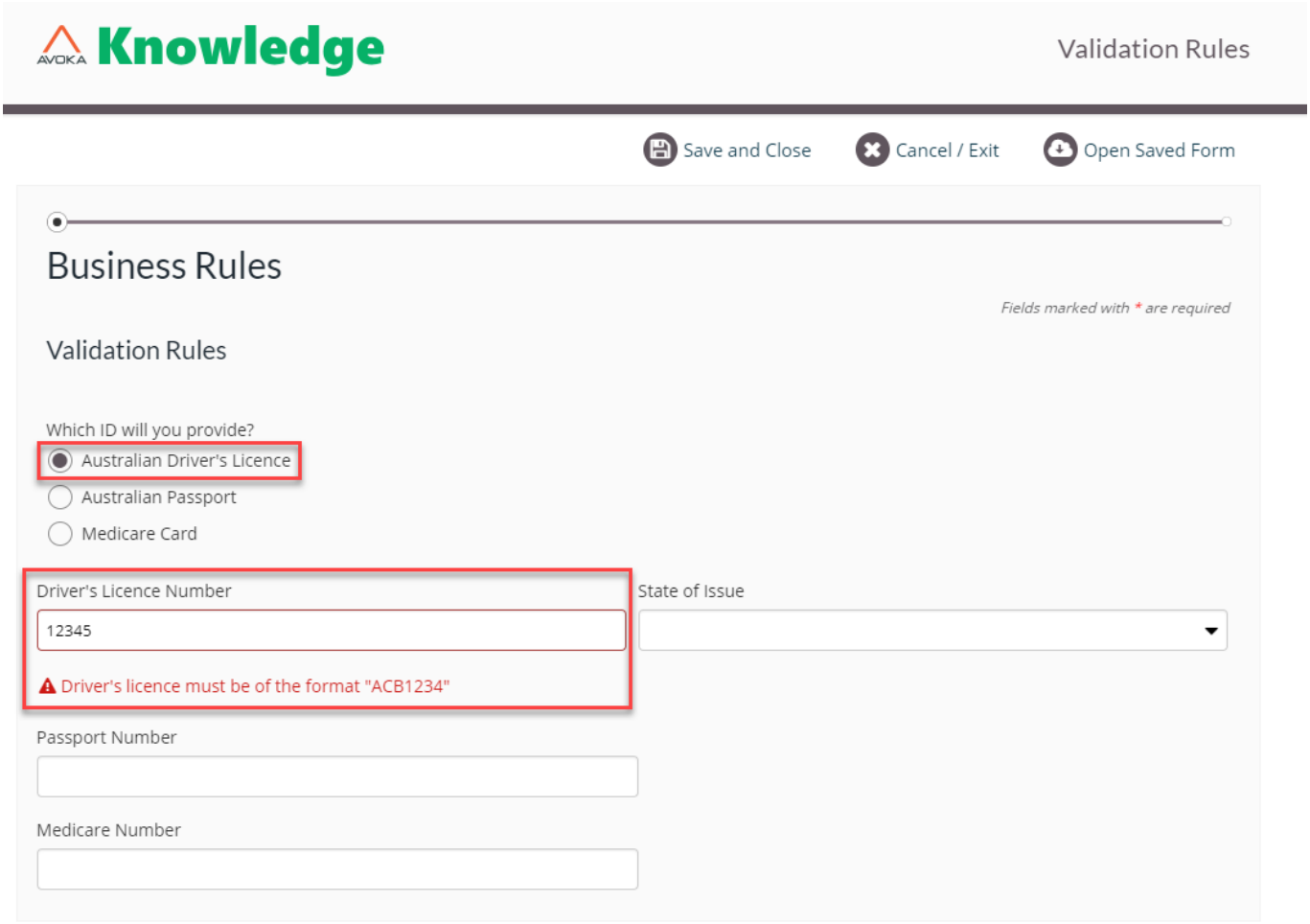
Next rule is a Regular expression that has been applied to the Driver's License text field. In this script, all input of the text field must match the expression ^[a-zA-Z]{3}\d{4}$ and if the input does NOT match this expression, then the message, "Driver's license must be of the format "ACB1234" is displayed to the user.



This displays the form that has been built and then the user has selected. "Australian Passport" from the radio button group. This selection has triggered the mandatory rule and the Passport Number text field has now been made mandatory.



This displays the error message when the input of the Driver's License is not successfully validated.



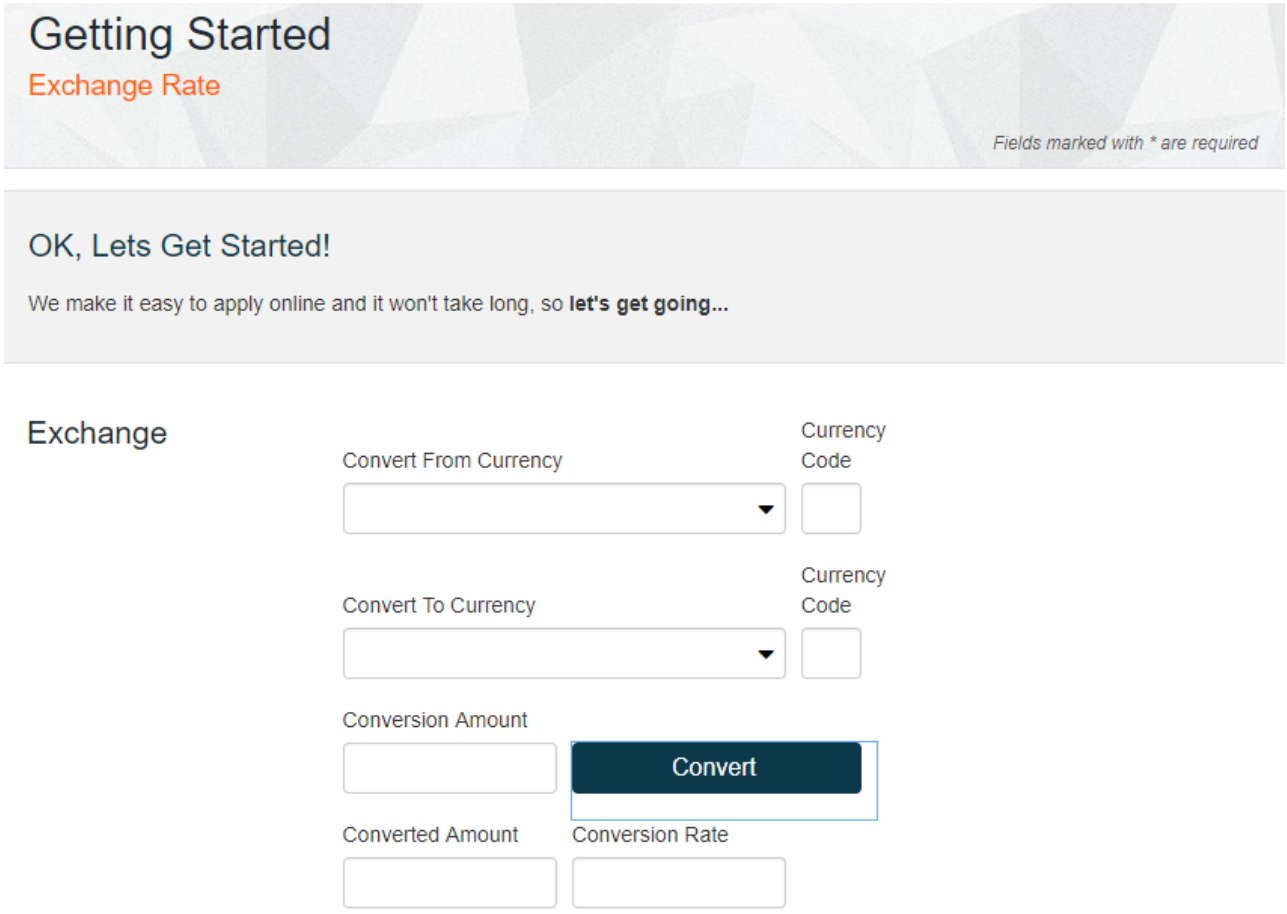
Australian ID Validation Rule Example

Exchange Rate Valid After Change If Rule Example

The example demonstrates the Valid after change if rule, which retrieves an exchange rate value from a Journey Manager.

To create the exchange rate rule, follow these steps:

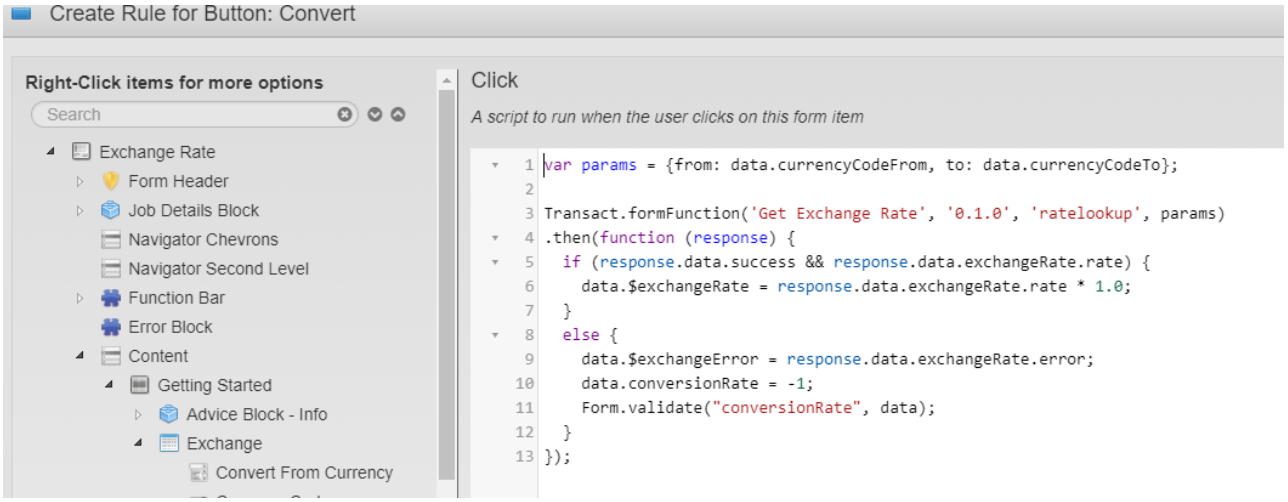
1. Select an Exchange Rate form.



2. Select the Convert button to add a rule to.
3. Click Create Rule and select Valid after change if.



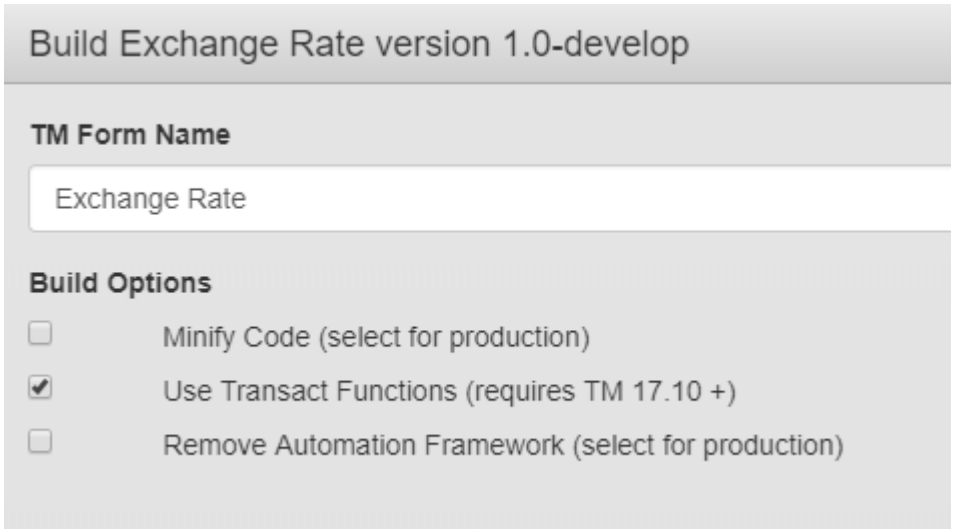
4. Name the rule according to the functionality, in this example it is Click.
   - Enter the following JavaScript code.




```
var params = {from: data.currencyCodeFrom, to: data.currencyCodeTo};
Transact.formFunction('Get Exchange Rate', '0.1.0', 'ratelookup', params).then(func-
tion (response) {
	if (response.data.success && response.data.exchangeRate.rate) {
		data.$exchangeRate = response.data.exchangeRate.rate * 1.0;
		data.$exchangeError = response.data.exchangeRate.error;
		data.conversionRate = -1;
		Form.validate("conversionRate", data);
	}
});
```

5. Click Save.
6. Click Build with Options to see how this rule is displayed when the form is built and rendered. When you initially build the Journey Manager form version in Maestro, it is important that you check the Build Option Use Transact Functions as for this rule to function cor-

rectly, you will be developing with Transact Functions. See Journey SDK - Developer Guide for more details.



7. Check in Journey Manager that the following configuration exists.
    - The Exchange Rate Form is created.
    - It is configured so it can be called from Maestro by service name

- Groovy code is provided.



Visibility Rule Overview

A Visibility rule controls visibility scope of components and assets used in a form. Maestro has the following rules defined under the Maestro Visibility Rule group.

- Hidden - hides a component on a form.
- Show if – shows a component on a form if pre-defined conditions are met, otherwise the component is hidden.
- Hide on Receipt - hides a component on a generated receipt but shows it on the form.
- Show on Receipt – shows a component on a generated receipt but hides it on the form.

Create a Hidden Visibility Rule

The Hidden visibility rule hides the selected component on the form.

A Hidden rule is created automatically when a Show if rule is applied to a component.

To create a hidden rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component you want to hide.
4. Click Create Rule.
5. Select Hidden.
6. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. Check that the selected component is hidden now.

When a Hidden rule is configured, a Visibility rule item is displayed in the Rules section of the Properties pane for the selected Maestro form. If you want to make any changes to the existing rule, you can do so by selecting this item from the panel. You can also click the X icon to remove the rule from the component.



Create a Hide on Receipt Rule

When a transaction is completed by a form user, a receipt is rendered and emailed to the user. This receipt is used as a record for form users. By default, most components are display on both the form, and on the generated receipt. Use the Hide or Show on Receipt rules to hide components on the form and only show them on a receipt, or hide the components on the receipt and only show them on the form.

The Hide on Receipt visibility rule hides the component on a generated receipt.

To create a Hide on Receipt rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component to hide on the receipt
4. Click Create Rule.
5. Select Hide on Receipt.
6. Type a JavaScript that implements the rule.
7. Click Save.
8. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. Check that the selected component is hidden on a generated receipt.

When a Hide on Receipt rule is configured, a Visibility rule item is displayed in the Rules section of the Properties panel for the selected Maestro form. If you want to make any changes to the existing rule, you can do so by selecting this item from the panel. You can also click the X icon to remove the rule from the component.



Hide or Show on Receipt Overview

Use the Hide on Receipt or Show on Receipt to control which components form users see on a generated receipt.

Create a Show on Receipt Rule

The show on receipt visibility rule shows the component on a generated receipt. The component is still displayed in the Editor window, however, when you preview or build the Journey Manager form version, the component is not displayed.

When a transaction is completed by a form user, a receipt is rendered and emailed to the user. This receipt is used as a record for form users. By default, most components are display on both the form, and on the generated receipt. Use the Hide or Show on Receipt rules to hide components on the form and only show them on a receipt, or hide the components on the receipt and only show them on the form.

The show on receipt rule should be used when you have components that require no user input but provide further information to the user. For example, you may want to display a list of items that the user is required be collect in addition to submitting the form and printing a receipt.

To create a Show on Receipt rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component to hide on the receipt
4. Click Create Rule.
5. Select Show on Receipt.
6. Enter JavaScript that implements the rule.
7. Click Save.
8. Click Build and Render Form to see how this rule is displayed when the form is built and rendered. Check that the selected component is shown on a generated receipt.

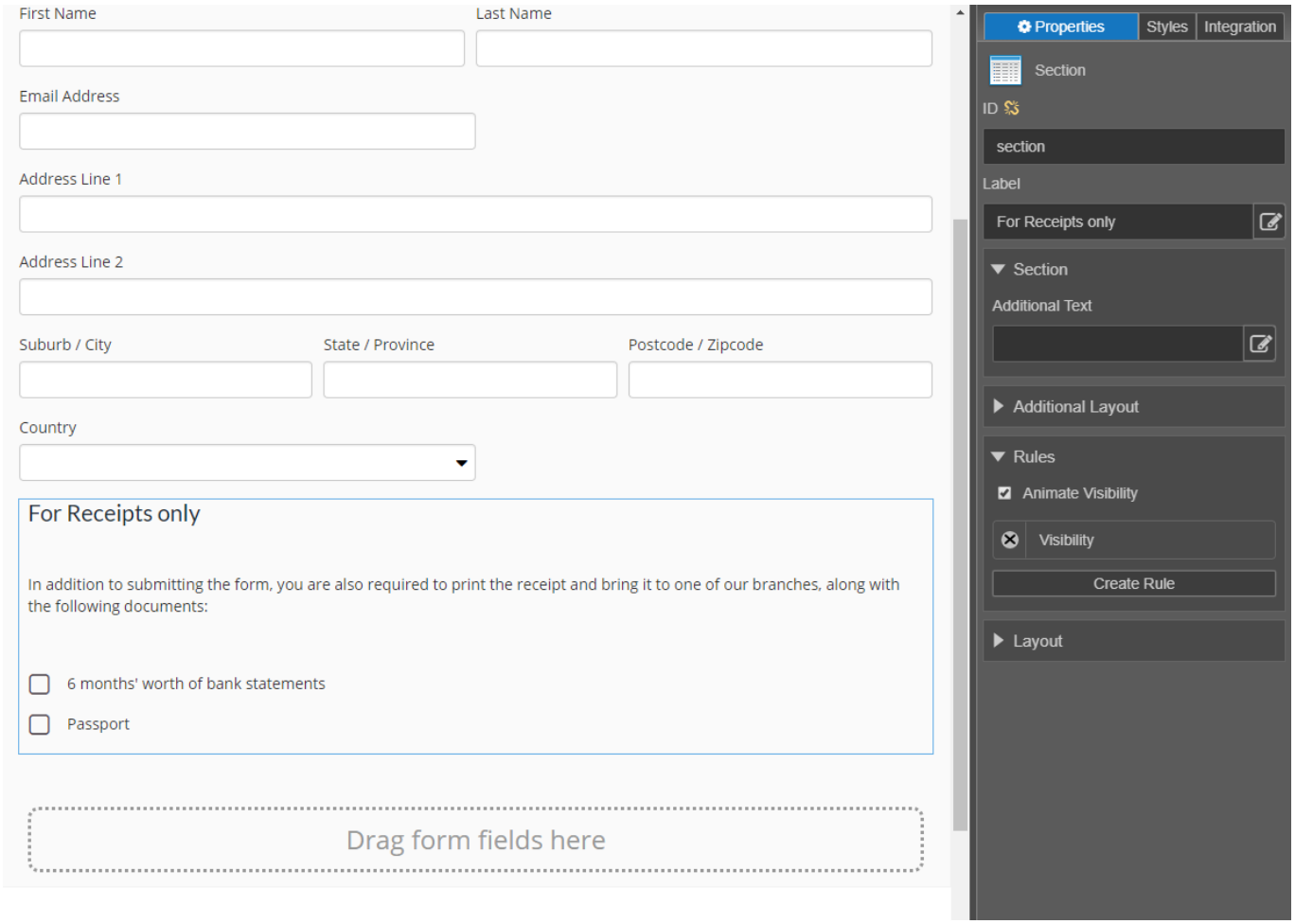
When a Show on Receipt rule is configured, a Visibility rule item will be displayed in the Rules section of the Properties pane for the selected Maestro form. If you want to make any changes to the existing rule, you can do so by selecting this item from the panel. You can also click the X icon to remove the rule from the component.

NOTE

Check out the Show on Receipt example.

Show on Receipt Example

This example uses the Section component For Receipts only, which is configured to show only on a generated receipt and is hidden on the rendered form.

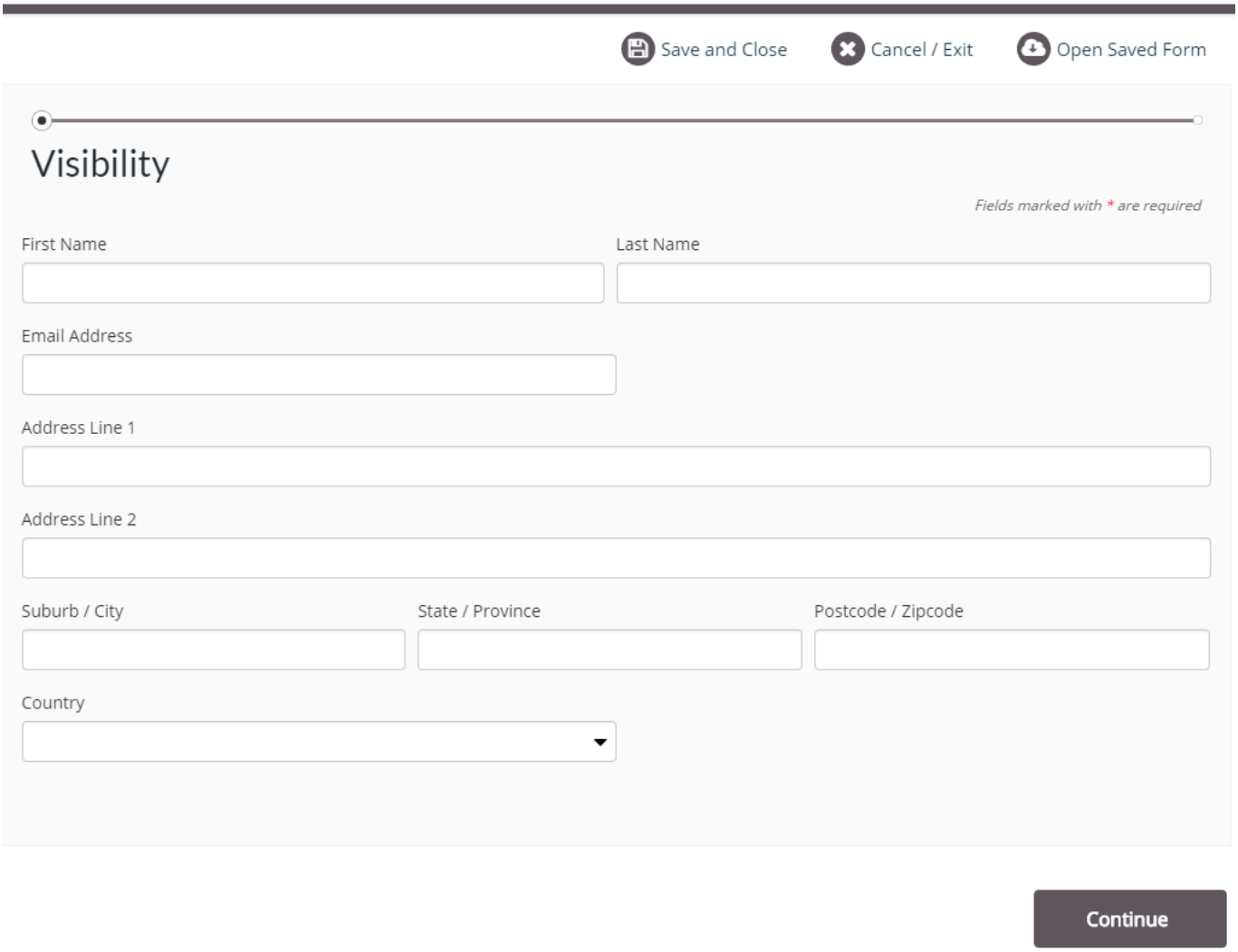


The Section component in the above screenshot has been configured with a Show on Receipt Visibility rule.

The screenshot below displays the script that is applied to the section component.



When the form is saved, built and rendered. The form will NOT show the Section component named For receipts only. The screenshot below displays the built and rendered form.


Save and Close
Cancel / Exit
Open Saved Form
Visibility
Fields marked with * are required
First Name
Last Name
Email Address
Address Line 1
Address Line 2
Suburb / City
State / Province
Postcode / Zipcode
Country
Continue

Create a Show If Rule

Use the Show if rule to show a component only when certain conditions have been met, for example provided answers or selections based on previous components. The Show if rule allows you to show components based on the value of other components.

To create a Show if rule, follow these steps:

1. Open a Maestro form.
2. Click the Properties tab.
3. Select the component to show or hide.
4. Click Create Rule.
5. Select Show if.
6. Type a JavaScript that implements the rule or right-click the component that defines whether the selected component is visible or hidden.
7. Select the correct expression.
8. Click Save.
9. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

NOTE

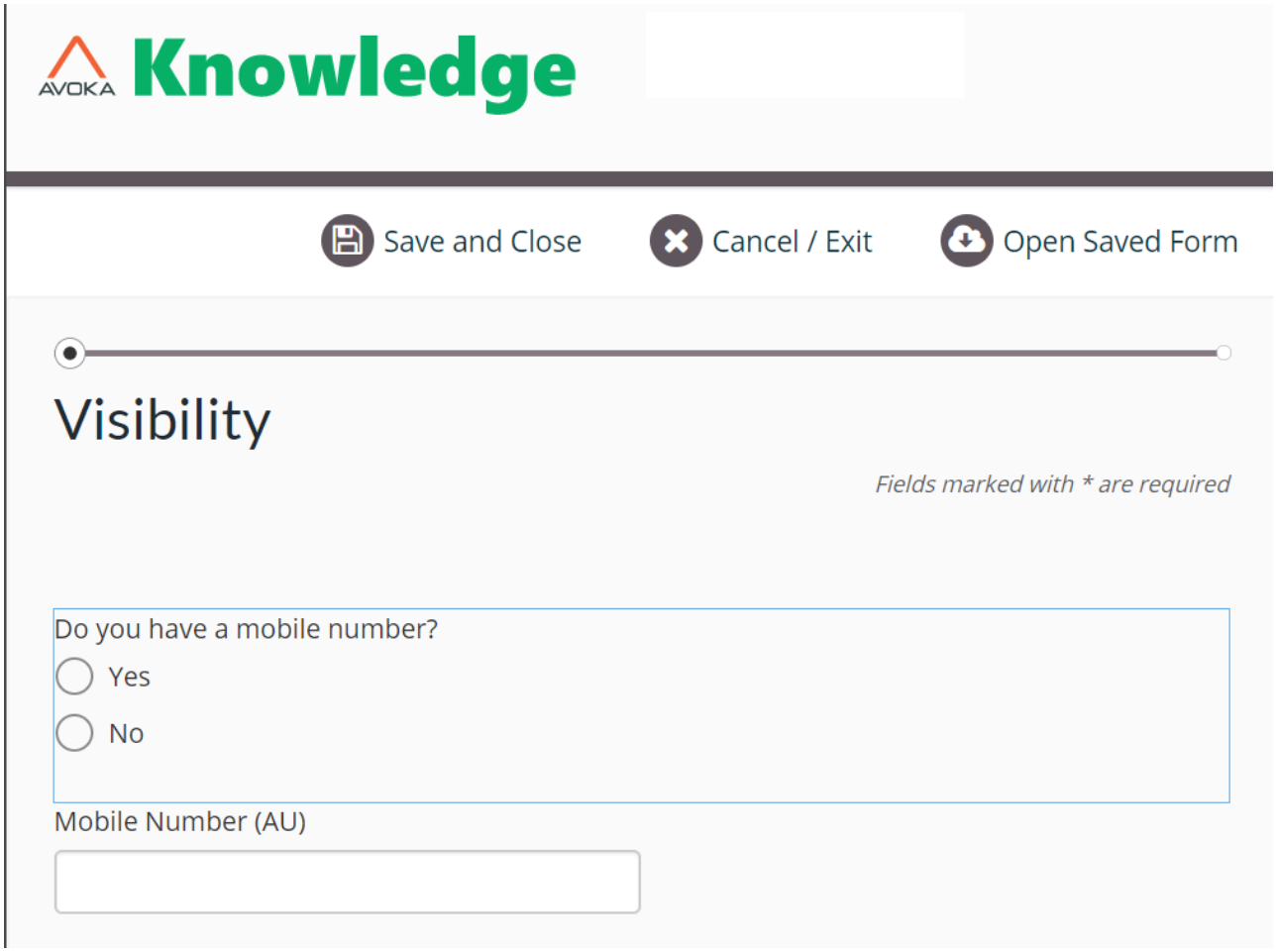
Check out the Show If rule examples.

Show If Rule Examples

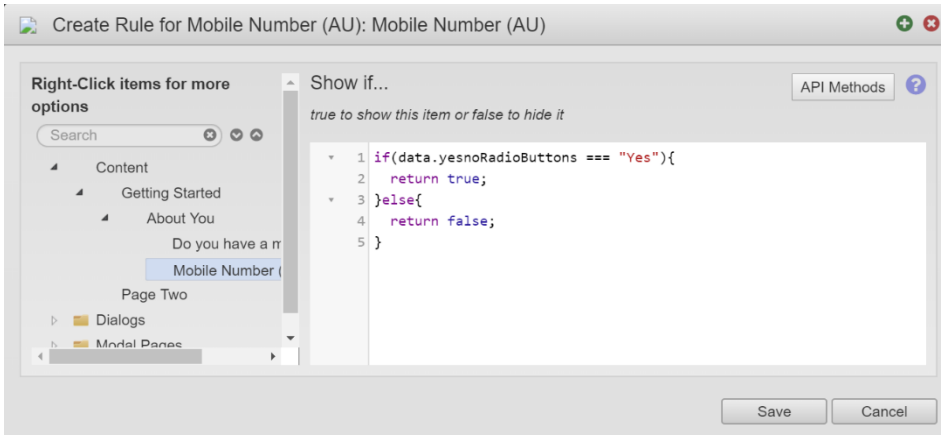
This example demonstrates a Show if to show a Mobile Number (AUS) component only when the answer to the radio button question is Yes. If a form user selects Yes, indicating that they have a mobile number, then a mandatory text field is displayed so the user can enter a mobile phone number.

To create the Show If rule, follow these steps:

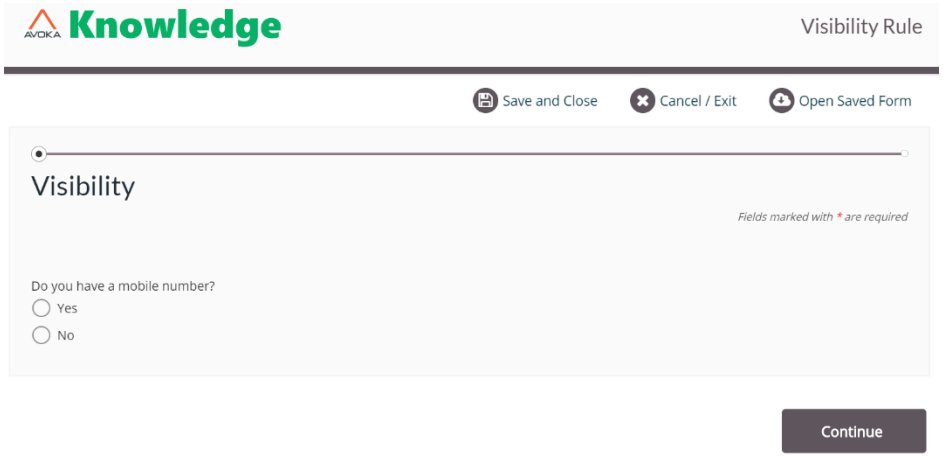
1. Open a Maestro form.
2. Drag a radio button group component to a form.
3. Drag a Mobile Number component to a form.



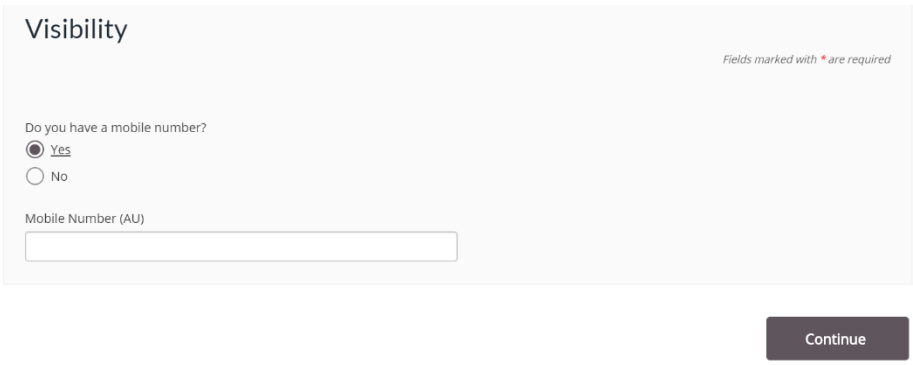
4. Select the component to show only when the Yes option is selected.
5. Click Create Rule.
6. Select Show if.



7. Type a JavaScript that implements the rule similar to the code shown above. If "Yes" is selected in the radio button group, the script will return true and the mobile number component will show in the form, otherwise the script returns false and the mobile number component is not shown on the form.
8. Click Save.
9. Click Build and Render Form to see how this rule is displayed when the form is built and rendered.

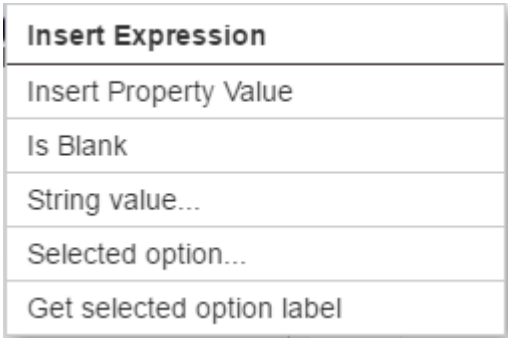


10. If Yes is selected, the Mobile Number component is shown.



Insert Expression in a Visibility Rule

You can insert a pre-defined expression into a rule. The options available from the right-click menu are based on the selected component type and may not be relevant to the specific rule you are creating.



The available expressions are:

- Insert Property Value - inserts the value of the selected property, which can be: options, arrangement, popover help text, etc. It's not applicable to the Show if rule.
- Is Blank - creates a Show if rule that displays the hidden component if the selected component is blank.
- Selected option - creates a Show if rule based on one of the options created for the selected component. Use it for radio button groups or dropdown lists.
- Get selected option label - pulls the label from the selected component. It's not applicable to the Show if rule.

Multi-Lingual Forms

Journey Maestro allows you to configure Maestro forms to support multiple languages, including right-to-left languages, so applicants view and fill in forms in their local language or they can choose a language they require. A form uses a default language unless the form has been set to remember the last language or locale used. The form also saves the latest language used in the form data, which is stored in a database.

Translation is also an important part of a form branding, as different brands can be created for various countries and regions.

When you create a design, such as a template or a form, it comes with the default language - English, and the default locale - `en`. This means that all components and fields you drag and drop on the design have all labels and messages, which are intended for form users, are in English. These labels and messages make up a form dictionary. The default form dictionary is the English dictionary.

As you may want to have your forms available to users using other languages than English, you need to create a new dictionary for each language you require, for example, the German dictionary. There is no limit on a number of languages a design can have configured.

There are 2 ways of enabling and managing translations of Maestro forms:

- Configure and store translations within a form itself.
- Configure a form with languages but store translations outside the form, for example, in Manager.

Let's look at each of these approaches in more detail.

Translations Within Forms

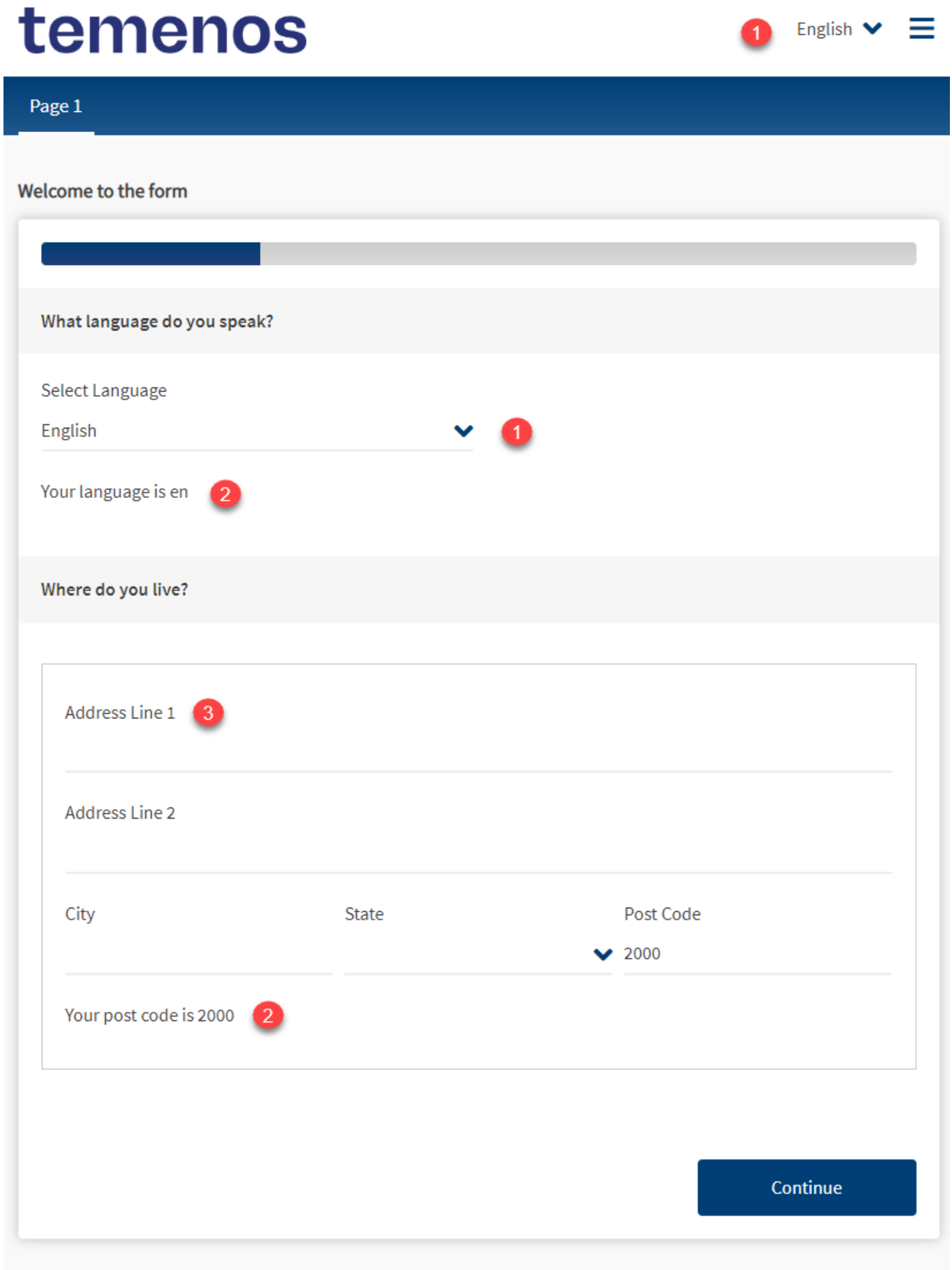
Regardless of how many languages a form may use, you develop and build it as you would normally do. Then you add required languages and edit their dictionaries. To speed up this process, the Maestro editor allows you to export and import their dictionaries as a CSV file. This way you can give this file to a translator who professionally converts its content from one language to another. Then you import this CSV file into the form and build and publish it, so the new language is available to form users.

Maestro comes with the Select Language component, which allows form users to select a language that they want to use on a form. For this to work, you need to set up a new language first and then drag and drop the Select Language component on the form and configure it.

Some textual content is embedded into business rules, so you may need to translate it as you create or update JavaScripts. The Maestro editor allows you to select strings of text used in these scripts, such as messages shown to form users, and mark them for translation. They will appear in translation files and can be translated in all languages a form uses.

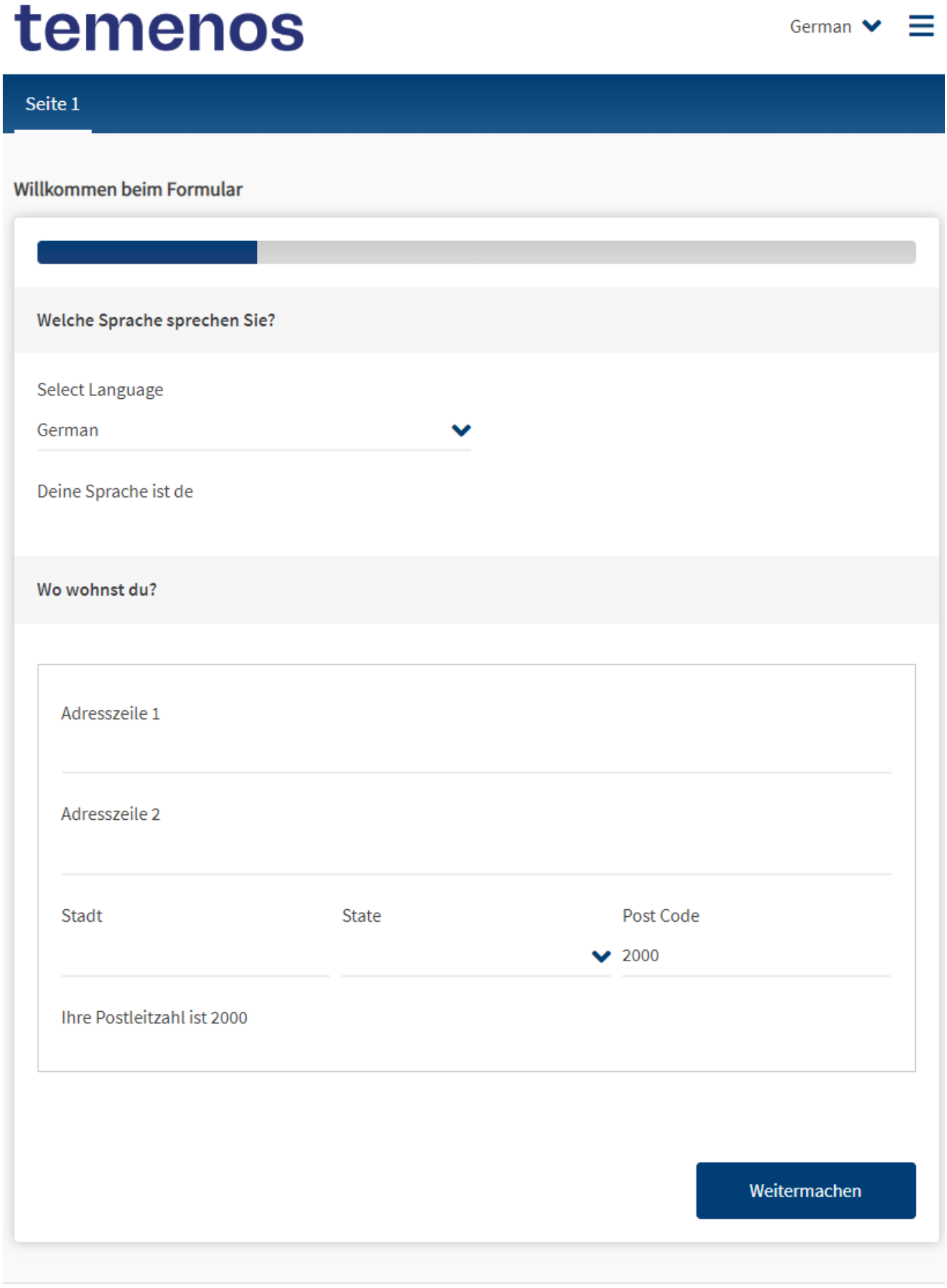
When you build a form as a JM Form Version ZIP file, all language dictionaries are packaged inside a FAR archive under the `locales` directory. After you deploy the JM Form Version into a Manager instance, everything inside that FAR file will be stored in the form deployment in the database. This means that if you update a form translation, even slightly, you need to redeploy the FAR file.

A typical example of a form that has multiple languages configured is shown below:


temenos
1
English
Page 1
Welcome to the form
What language do you speak?
Select Language
English
1
Your language is en
2
Where do you live?
Address Line 1
3
Address Line 2
City
State
Post Code
2000
Your post code is 2000
2
Continue
© 2024
Temenos Headquarters SA

The form rendered using the English translation.

1. A Select Language component.
2. A text label dynamically updated depending on selections, for example, a selected language.
3. A component translated into a selected language.


temenos
German
Seite 1
Willkommen beim Formular
Welche Sprache sprechen Sie?
Select Language
German
Deine Sprache ist de
Wo wohnst du?
Adresszeile 1
Adresszeile 2
Stadt
State
Post Code
2000
Ihre Postleitzahl ist 2000
Weitermachen
© 2024
Temenos Headquarters SA

Translations Outside Forms

So far, languages, which you've configured in a form, are stored with that form. This has some certain advantages, such as it automatically handles things like refactoring - when you add or remove a component or its text, the Maestro editor updates all languages' dictionaries accordingly. However, you need to re-build and publish the form each time a translation is updated. This could be a significant drawback when the form is deployed in many form spaces and across multiple environments.

To make such updates easier to perform, starting from version 21.11, Maestro gives you the ability to retrieve translation CSV files from external locations and automatically refresh the form so all translated items are rendered in a desired language or as defined by a current locale. This way you can maintain and edit multiple translations outside the form meaning you don't need to republish it to propagate any changes. It goes even further -- you can update translations or even add new languages in real-time. For this you must use runtime branding functionality.

Manager allows storing and managing translation CSV files securely as well as providing seamless retrieval of these files from within Maestro forms via the `Translation.fetch()` and `Form.updateBranding()` methods. For more information, see Maestro API. If the translation loads successfully, the interface will refresh with the translation defined by the current locale. If the translation fails to load, an error will appear in the JavaScript console. For example, you can add a button that calls `Translation.fetch("myLanguageCode", false, "/web-plugin/resources/mynewCSC.csv")`, which pulls a translation file form the Web Plug-in's `resources` directory hosted on a Manager server.

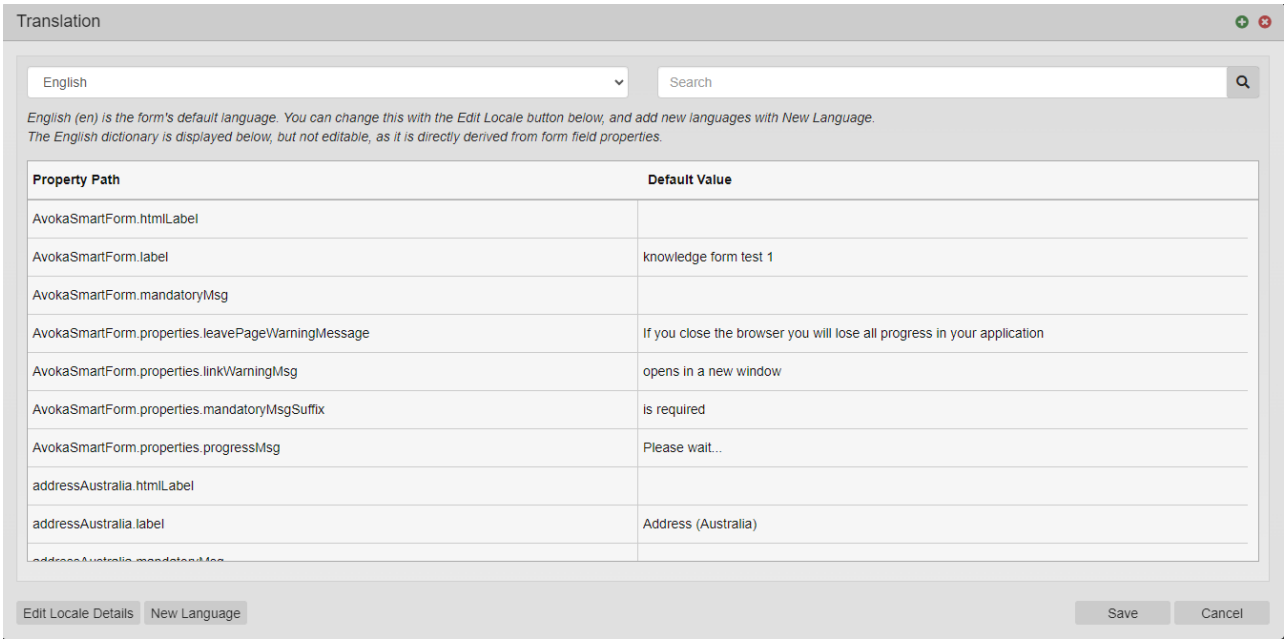
Next, learn how to add a new language.

Add Languages

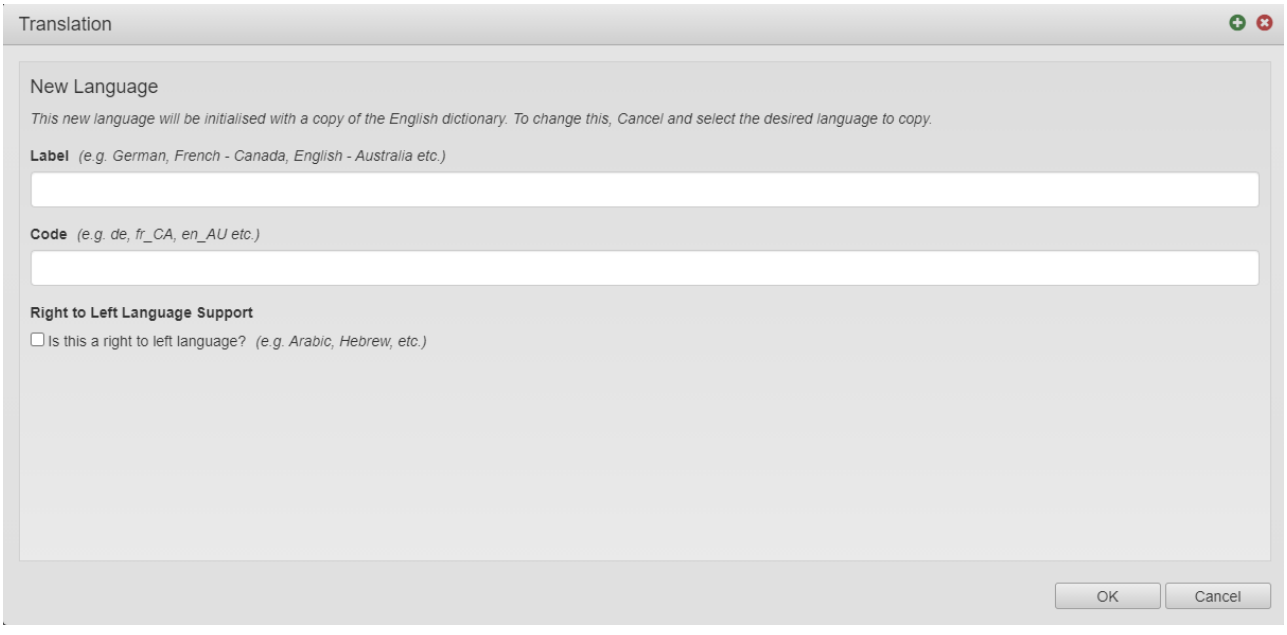
Maestro allows you to add a language or multiple languages, including right to left languages, to a design, such as a form or template. This creates a dictionary for a new language and you will need to populate it with translated context for each form's label and message.

To add a new language:

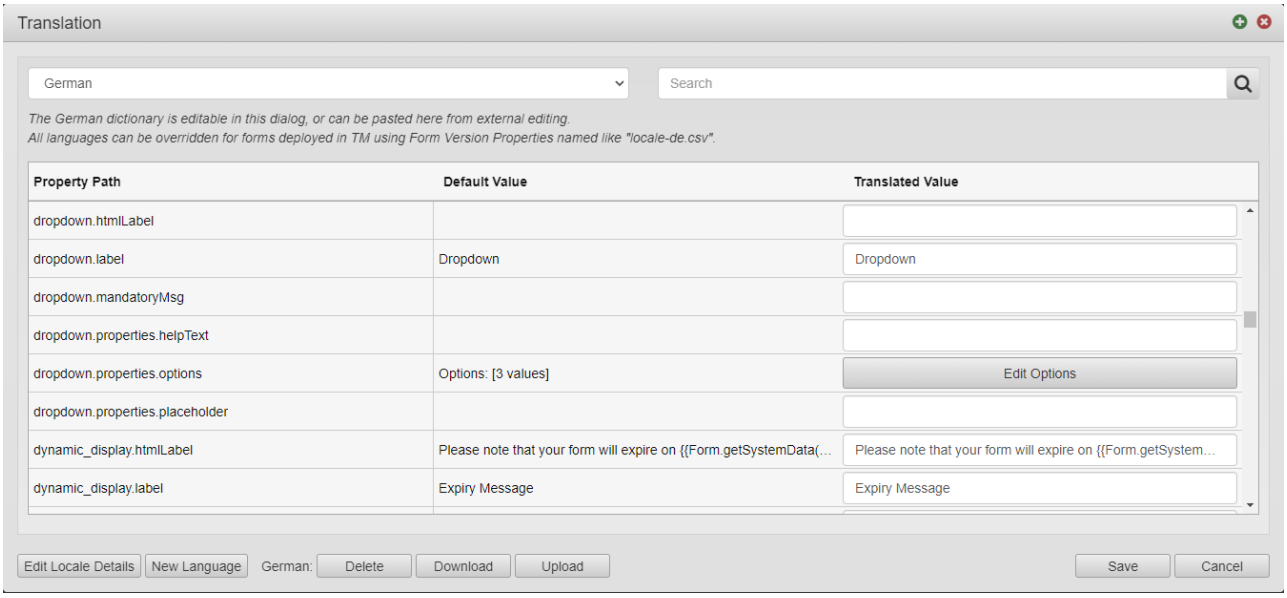
1. Open a form in the Maestro editor and click Translation.



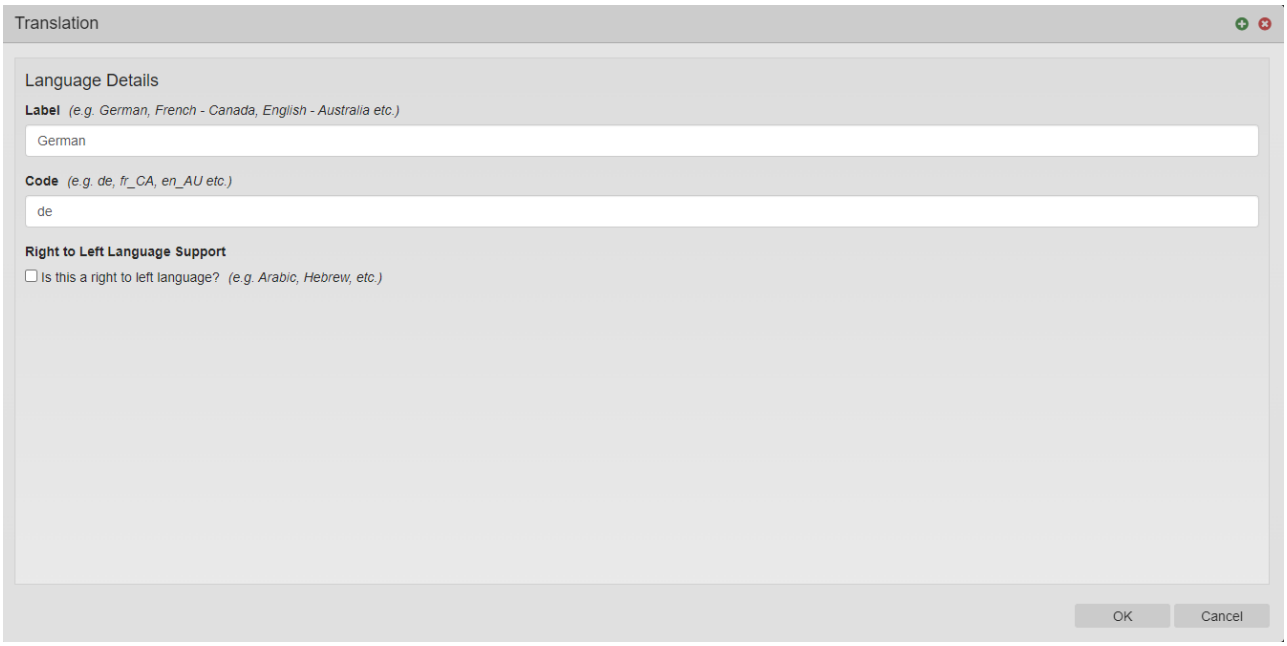
2. Click New Language to add a new language.



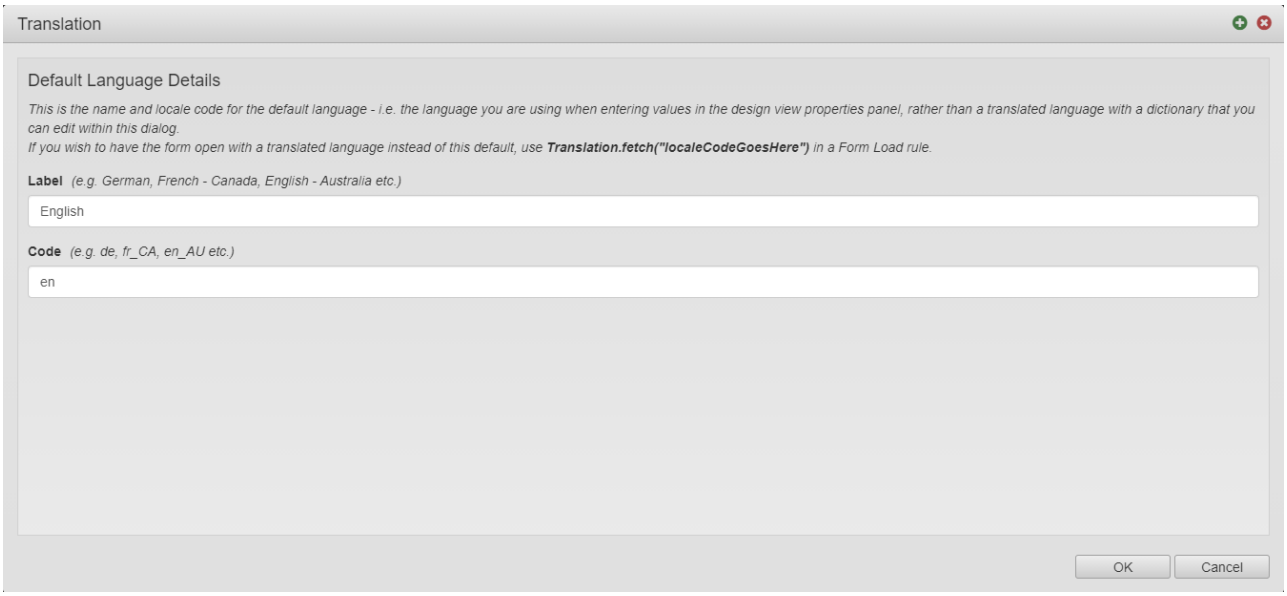
3. Enter a language name in the Label field, for example, German.
4. Enter a locale, which is an identifier for the new language, in the Code field, for example, `de`.
5. Select the Is this a right to left language checkbox to add a right to left language, for example, Arabic.
6. Click OK to add the language. It opens the Translation window displaying the new language in the Translated Value column, when this language is selected, in this example it's the German language.



7. Click Edit Locale Details to update the name and locale code of the new language.



If the selected language is the default one, the following additional information is displayed:



8. Click Close.

It's good to know that after you have added a new language to the form, you can download a form as a JSON file to check that Maestro has added the following section to the file:

```
...
	"translation": {
		"defaultLanguageCode": "en",
		"languages": [
			{
				"code": "en",
				"label": "English"
			},
			{
				"code": "de",
				"label": "German",
				"rtl": false
			}
		]
	},
...
```

When you build a form as a JM Form Version ZIP file, Maestro creates a `locale-<country_code>.csv` file, for example, `locale_de.csv`, under the `locales` directory in the FAR archive file, which you later deploy to Manager. Eventually, the language dictionary is stored in a database.

Remove Languages

If some situations, you may want to delete a language and its dictionary from a design.

To remove a language

1. Open a form in the Maestro editor and click Translation.
2. Select a language, which you want to remove, from the dropdown list.
3. Click Delete to remove the translation for the selected new language.

Next, learn how to edit a language dictionary.

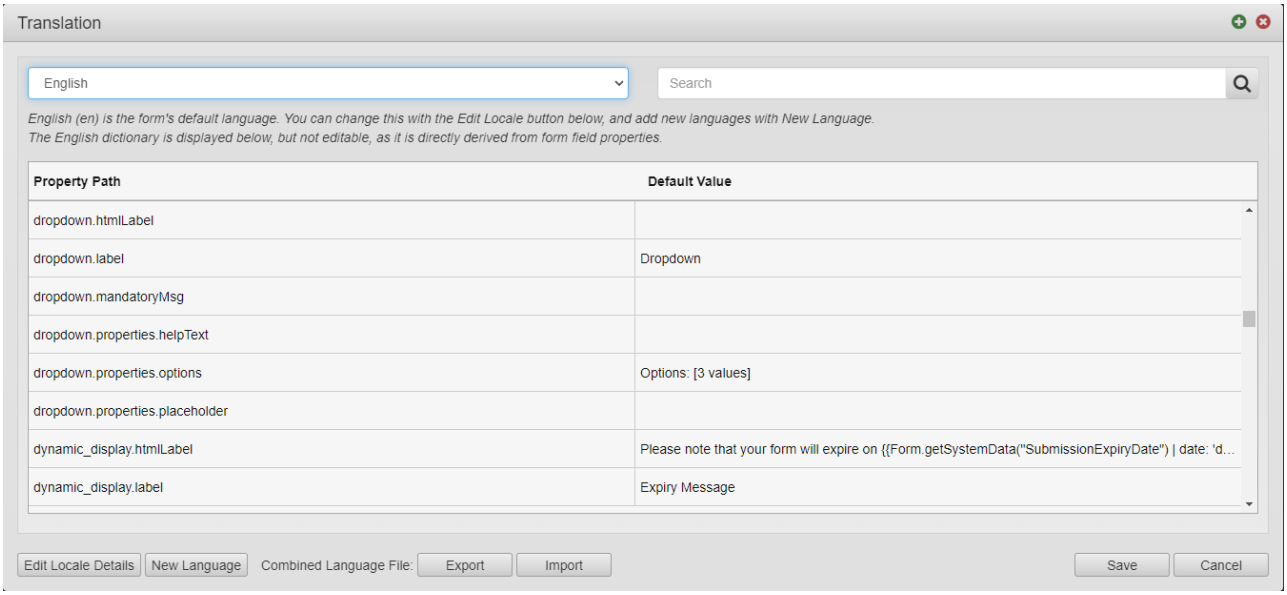
Edit Languages

Maestro allows you to translate form's elements into different languages, including right to left languages. After you added a new language, you need to populate its dictionary with translated version of all labels and messages.

When you drag and drop a new component on a design or add a field to a component, Maestro automatically adds these elements to dictionaries of the default and all other configured languages. This means that you have to update or provide new translations for these new elements, even though it has been previously translated. You also need to edit the language dictionary as requirements for a customer onboarding journey change.

To edit a language dictionary:

1. Open a form in the Maestro editor and click Translation.



   This open the Translation window with the default language selected, for example, English. The Translation windows lists the following details:

   - Property Path - a unique identifier of a property within the design, which can be translated.
   - Default Value - a default value of the property, which is rendered on a form for the default language, for example, English.
   - Translated Value - a translated value of the property for the selected language, for example, German.

> NOTE
>
> If you have a component selected when you click Translation, the list is scrolled to the Property Path of the selected component. The scroll position remains as you switch between languages.

> NOTE
>
> Some UI options, such as Export, Import, Download and Upload, are shown only when there are more than one language configured for the design.

2. Select a language from the dropdown list to switch between multiple languages.
3. Type a part of a property path name or a text of a label or a message and click Search to find a property to want to edit. Alternatively, you can scroll to a property you need.
4. Edit the property's value.

> NOTE
>
> You can copy and paste values from one property field to another as long as the text is shorter than the field it is displayed in. | 23.04 This feature was introduced in 23.04

> NOTE
>
> You are not able to edit the default language, as it is directly derived from the form's component properties.

5. Click Save to save the changes.

Updating each property manually to populate a new language dictionary for the first time can be a daunting task. The Maestro editor allows you to export a new dictionary to a file so you can share it with a translator who professionally converts its content from one language to another. Then you import this file into a design and do small edits as needed. | 18.05 This feature was introduced in 18.05.

Export a Language Dictionary

To export a language dictionary using a CSV file:

1. Open a form in the Maestro editor and click Translation.
2. Click Export to export all form's language dictionaries as a CSV file, for example, `locales.csv`.
3. Alternatively, select a language of a form's translation from the dropdown list and click Download to export that language dictionary only. The CSV file will include only the selected language, for example, `locale-de.csv`.

   > NOTE
   >
   > Use this option to configure form's translation in Manager.

4. Open the downloaded CSV file in a CSV editing tool, such as MS Excel. The file has the following format:
   - 1st column - named as Property Path or System Path - the labels and messages of the design, for example, `addressLine1.label`.
   - 2nd column - named as Default Value or Base Value - the default language of the default locale, which is English, for example, `Address Line `.
   - 3rd column - named as locale-xy - a translated language, for example, `locale-de` for German.
   - Other columns - other translated languages.

     > NOTE
     >
     > 4th, 5th, etc. columns are only present if you clicked the Export button.

   > NOTE
   >
   > If the translation has not been provided yet, then the default language is used as a placeholder.

5. Update the language dictionary in the corresponding column of the file. For example, provide German translation for `Address Line 1` and `Address Line 2`:

```
addressLine1.label,Address Line 1,Adresszeile 1
addressLine2.label,Address Line 2,Adresszeile 2
```

> NOTE
>
> Maestro doesn't support multiple sheets in a single workbook, so when you edit the CSV file, don't create multiple sheets.

6. Save the CSV file. The name of the file is not important but the file type (CSV) is.

> NOTE
>
> If the new language translation uses non-ASCII characters, you need to save the CSV file as UTF-8.

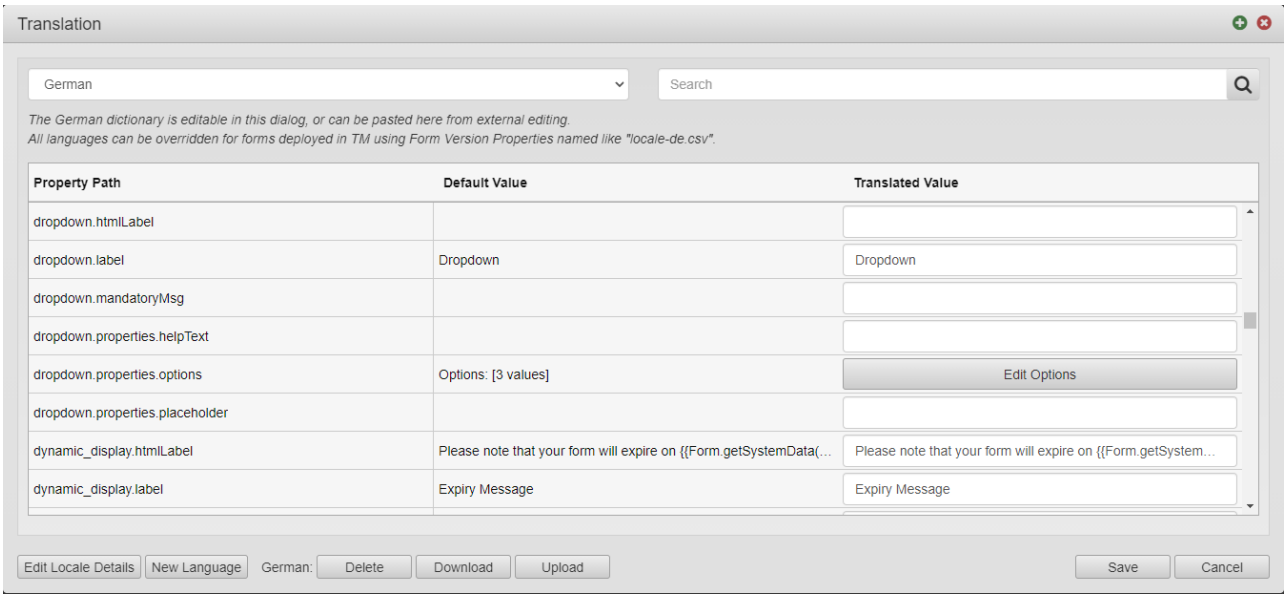
Now, as you have populated the translation file, you can import or upload it.

Import a Language Dictionary

1. Open a form in the Maestro editor and click Translation.
2. Click Import to import the form's translation as a CSV file. Maestro shows a confirmation message that a multilingual file was imported.
3. Alternatively, select a language of a form's translation from the dropdown list and click Upload to import that language dictionary only as a CSV file, for example, `locale-de.csv`.

> NOTE
>
> Use this option to configure form's translation in Manager.

4. Select a language from the dropdown list to work with.



5. Click Save to save the translation.

Next, learn how to mark for translation.

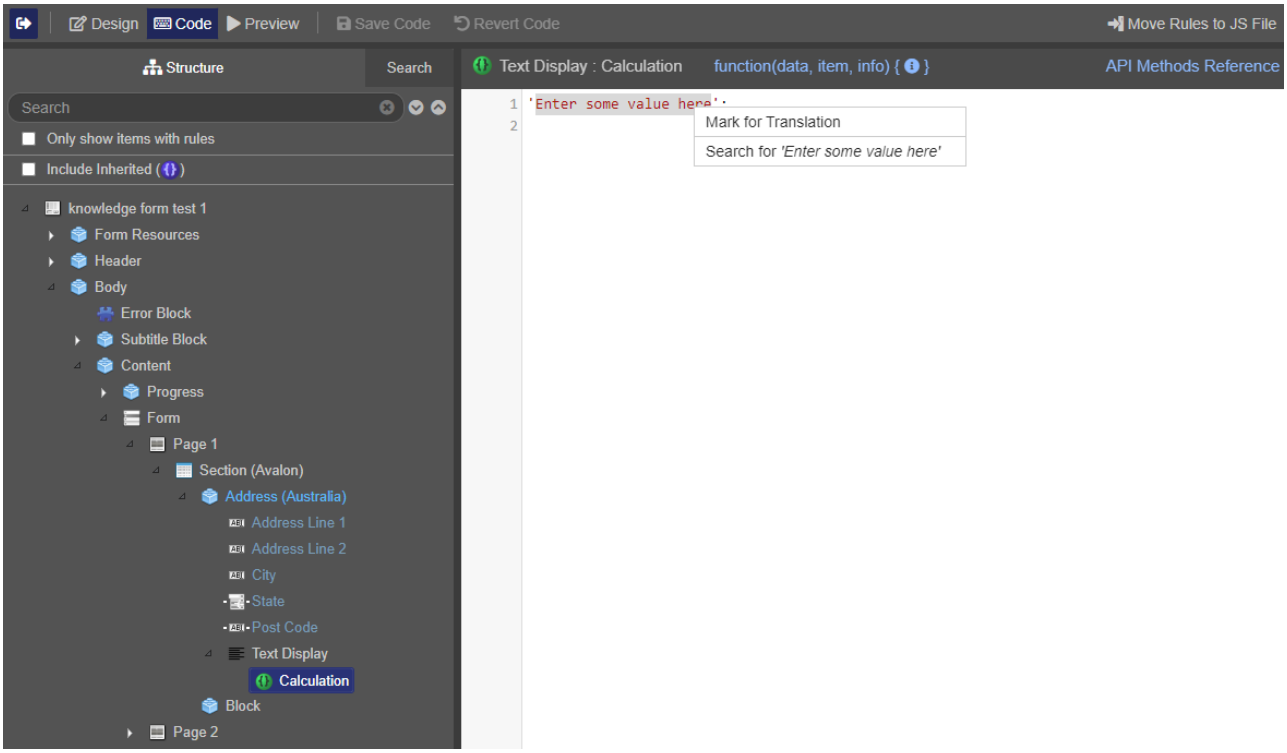
Mark a String For Translation

Maestro allows you to mark an arbitrary string to be automatically translated when a form is rendered in different languages. This is handy for strings of text used in business rules, for example, inside JavaScripts[1]. For the save, cancel and submit calls you can change this value on the root form item and it would also be a translatable key.

> NOTE
>
> You must add and populate a new language in a form before you can mark a string for translate.

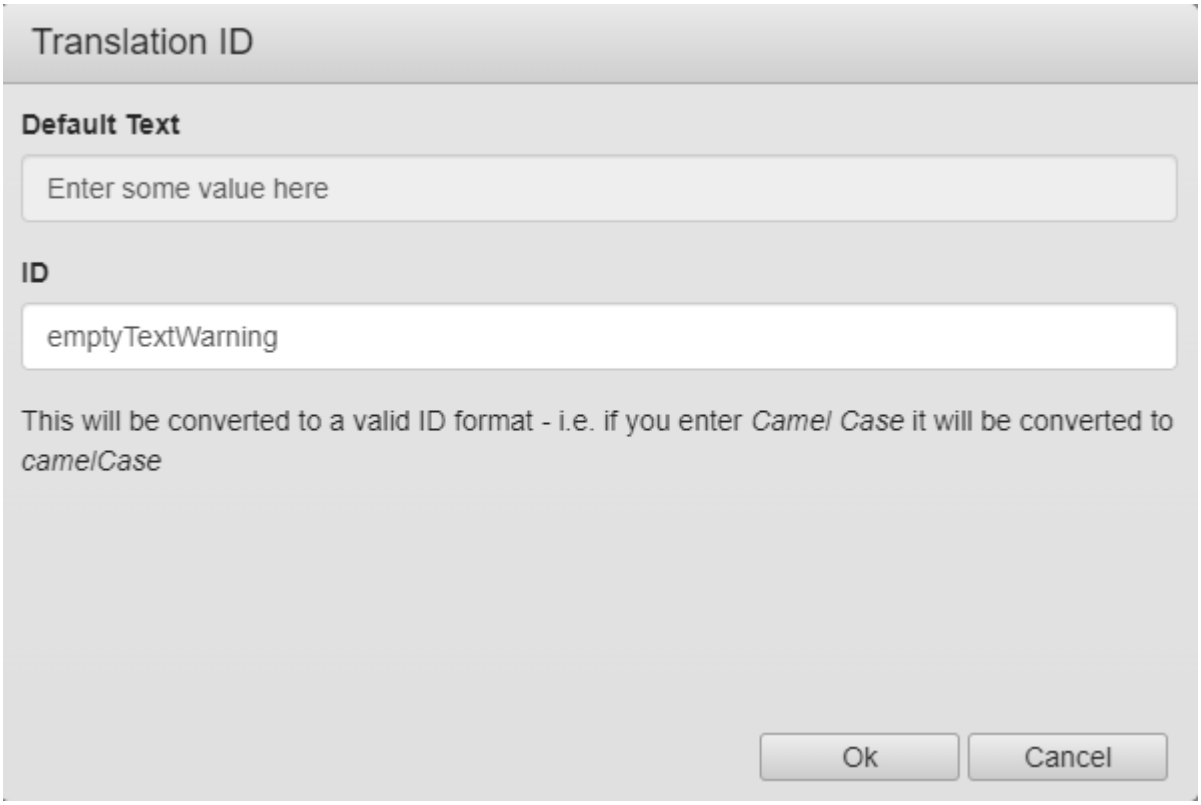
To translate a string:

1. Open a form in the Maestro editor.
2. Select a component and open a rule that contains a text to be translated.
3. Select that text you want to be translated. and right click it.
4. Select Mark for Translation to open the Translation ID window.

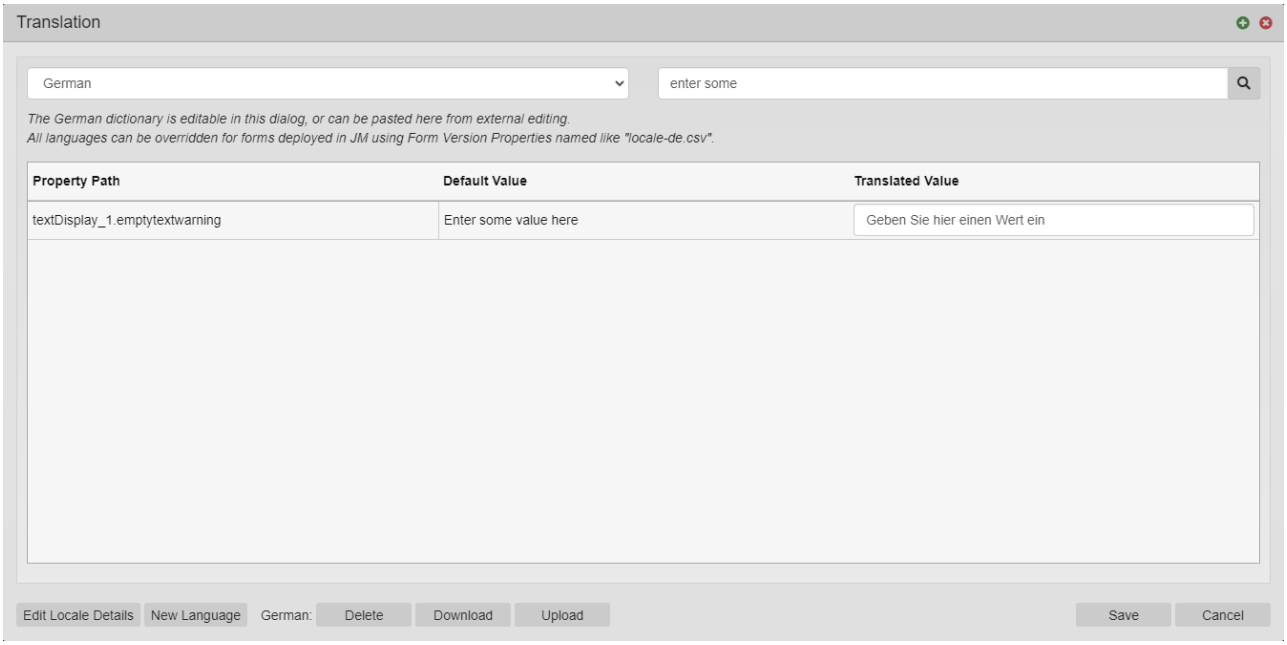


[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

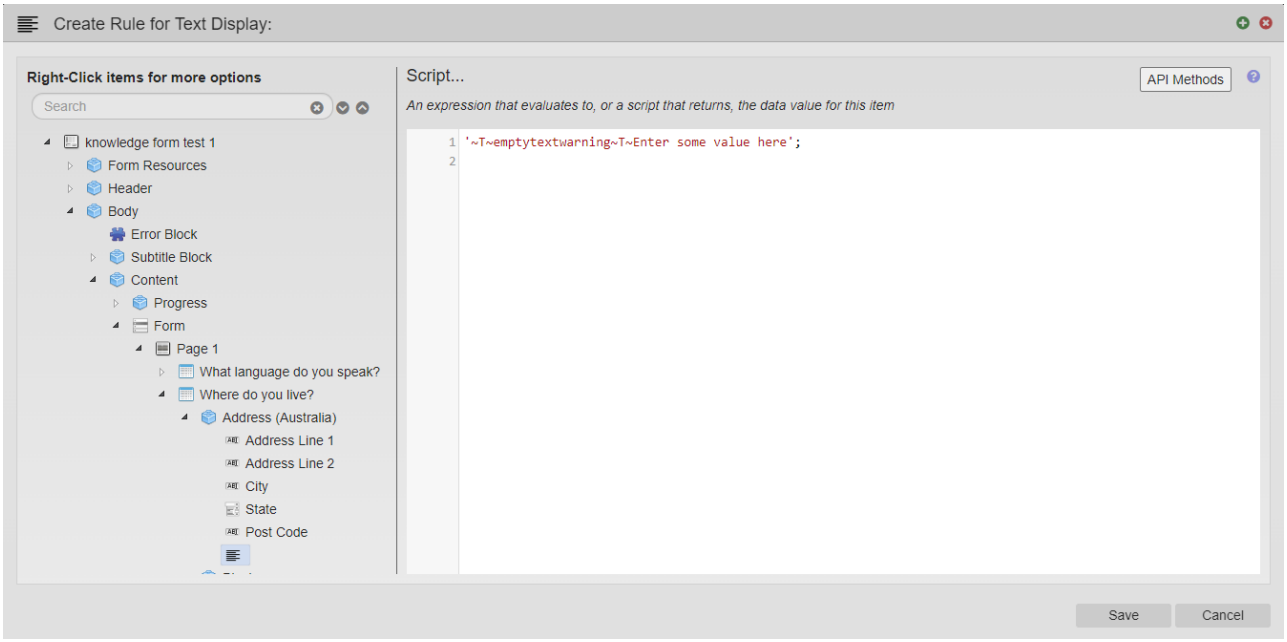
5. Enter a unique ID for the selected text in the ID field.



6. Click OK to add a new entry, identified as `emptytextwarning`, to dictionaries of all configured languages for this form.
7. Find and edit the new entry with required translation. In this example, you need to translate Enter some value here into German language, which is Geben Sie hier einen Wert ein.



8. Open the rule that contains the marked text to see a token at the beginning of the string. In the code, you can still see the default value for your string, as well as the ID you've created: `'~T~emptytextwarning~T~Enter some value here';`.



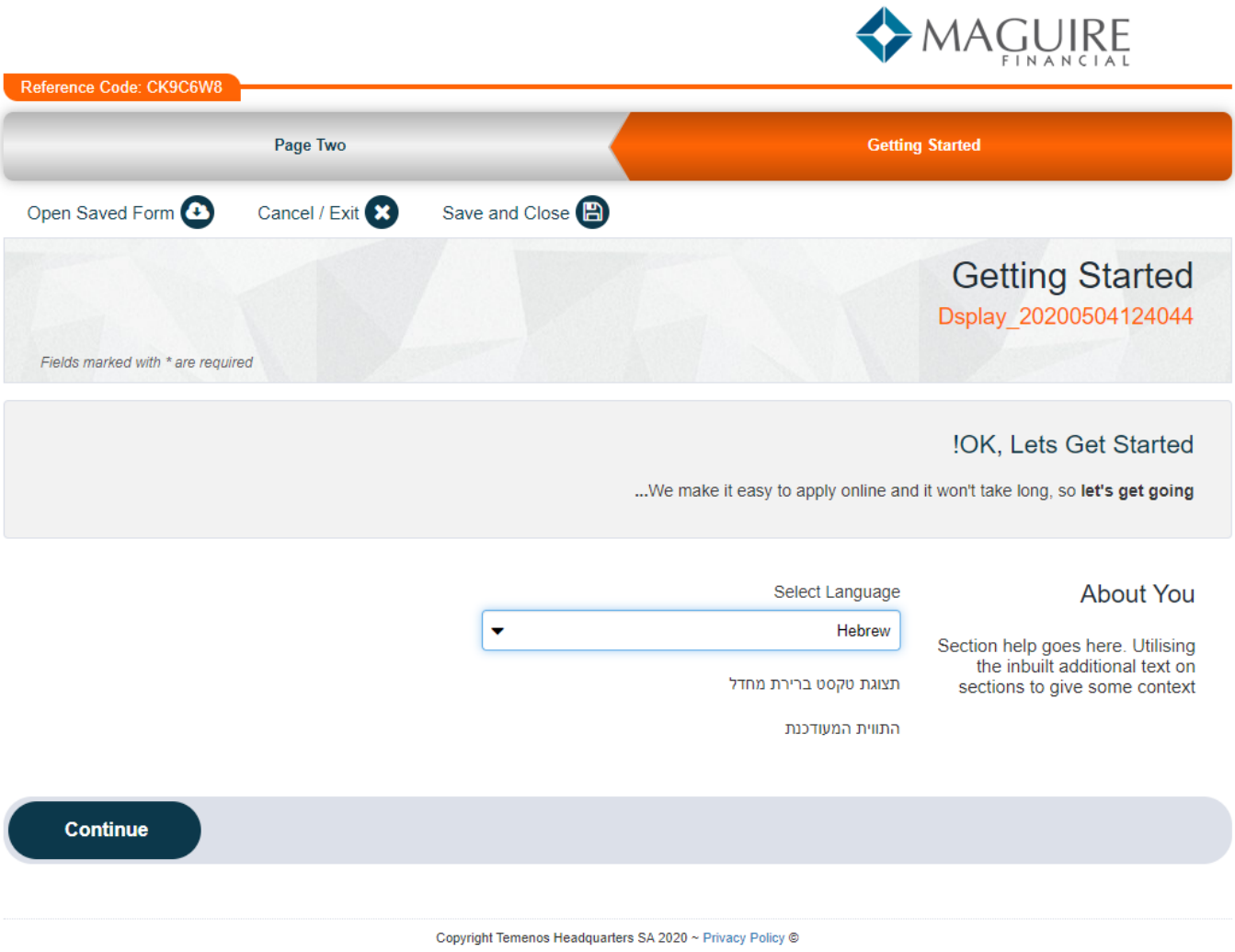
9. Build and render the form with different languages to see the rule fires the correct translated values.

Next, learn about right-to-left language support.

Maestro Right-to-Left Language Support

Maestro allows you to translate form's elements into right-to-left languages, such as Hebrew and Arabic. You can use this feature to translate a single form into any language that helps open up new markets especially in the EMEA region as well as support existing clients wishing to reach a wider customer base.

A sample Maestro form supporting right to left languages is shown below. Select Hebrew language from the Select Language dropdown list to translate and render the form for the right to left language.



Next, learn how to add a new language in Manager.

Configure Translations in Manager

For forms that support multiple languages, you have an option to store their translation files in Journey Manager, as opposed to keeping them with the forms, inside FAR files. The end result is the same - form users are able to switch between different languages, but behind the scene, the forms pull a required translation file file from Manager, depending on a language selection.

You can create and even edit a language definition in Maestro, but then upload it to Manager as a CSV[1] file. This gives you a great flexibility in providing translated versions of forms without redeploying them and even in real-time. Also, you can use a third party to generate or translate a CSV file.

When a form user switches between available languages, the form pulls a CSV file of a selected language from the server. Even though translations are configured outside of Maestro, the form still needs to have the Select Language dropdown or the Select Language component with the correct language options configured, and the new languages must be created in the Translation window. However, you don't need to enter any translation values in Maestro as that will be done directly in the CSV file.

Once the translation file is prepared, you need to store it in Manager in one of the following locations:

- Form Space resources directory
- Organization reference data
- Form property

Let's look at each of these approaches in more detail.

Form Space Resources

This is the default and the most straightforward way to host translations and access them via the Maestro API. All translation files will be available to all forms hosted on this form space.

To store and use a translation CSV file:

1. Add a translation CSV file as a new resource, for example, `/resources/locale-de.csv`, to a form space where a multi-lingual form is hosted.

---

[1]CSV is a comma-separated values fil, which s a delimited text file that uses a comma to separate values. A CSV file stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas.

2. Drag and drop the Select Language component on the form.
3. Configure the component's rule as `Translation.fetch("de", false, "/web-plugin/resources/locale-de.csv")`.
4. Build and deploy the form.

Now, you can test the translation by selecting a language to render the form with, which will retrieve the correct language and refresh the form automatically.

If you need to modify a form's translation, all you need to do is to upload the updated translation CSV file and test the form.

Organization Reference Data

You can store a translation CSV file as a reference data of an organization that a multi-lingual form belongs to. All translation files will be available to all forms belonging to this organization.

To store and use a translation CSV file:

1. Add a translation CSV file as a new reference data using the following configuration:
   - Name - a name of a translation CSV resource as `<form-code>_<locale>`, for example, `apply_locale`. A form code defines a form that this translation file is pertinent to.
   - Locale - a locale as defined in the CSV file, for example, `de_DE`. Each translation file has different locale code, such as `ar_AE`, to distinguish between them.
   - Cache Timeout - use the default one.
   - Data Type - CSV.
   - Click Choose File to upload the translation CSV file.
2. Drag and drop the Select Language component on the form.
3. Configure the component's rule to fetch the CSV file as a reference data. Alternatively, you can create a service populating a form with a correct translation based on a parameter passed in the URL, for example, `&locale=de_DE`.
4. Build and deploy the form.

Form Properties

You can store a translation CSV file as a form property. All translation files will be available to this form only.

To store and use a translation CSV file:

1. Create a new form property using the following configuration:
   - Name - a property name in a specified format, so the Select Language component can correctly match the CSV file with the selected option. For example, `locale-de.csv`,

where `de` is the language ID used to create that language in Maestro.
    - Data Type - CSV.
    - Value - the content of the translation file or click Choose File to upload the CSV file.
2. Drag and drop the Select Language component on the form.
3. Configure the component's rule to fetch the CSV file as a form property.
4. Build and deploy the form. Choose a language from the Select Language dropdown to verify the form content is displayed.

Next, learn how to configure a language in Maestro.

Entity Overview

Maestro uses entities to model the data in a form by grouping components in a way you need to implement your business requirements. This provides several advantages, including more meaningful field identifiers that make for clearer business logic code and support refactoring across component and template definition changes in a more resilient, deterministic fashion. The entities also provide a streamlined way of marshalling data objects between client and server code.

Entities define a domain model of a form and they are connected to properties of components and other entities. The entities of the domain model are stored in the form manifest as a JSON[1] object containing a set of name and value pairs, each representing a real-world concept, such as a street name. The example of JSON definition, stored in a model-schema.json file is presented below:

```
{
	"title": "Model",
	"type": "object",
	"properties": {
		"applicant": {
			"type": "object",
			"properties": {
				"firstName": {
					"type": "string"
				},
				"lastName": {
					"type": "string"
				}
			}
		}
	}
}
```

The name in each pair identifies an entity while the value is either empty (default) or another object which has its own name and value pairs for child entities. The example of an entity in JSON format is shown below:

---

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

```
{
        applicant:
                firstName: "//Applicant/FirstName",
                lastName: "//Applicant/LastName"
}
```

You can create and manage entities in the Maestro editor using the Model pane or a component's ID field in the Properties pane.

The Maestro editor knows that a component is an entity by checking for an underscore in a component ID field. If you add a prefix ending with an underscore to the component ID, Maestro adds the entity and the data item (property) to the domain model. For example, the prefix `applicant1_` applied to the `firstName` component results in the component ID `applicant1_firstName`, which identifies that the `firstName` component belongs to the `applicant1` entity.

Any existing component IDs, including those with an underscore, will not cause entities to be created. An entity is only created using the Model pane or when a user modifies a component ID.

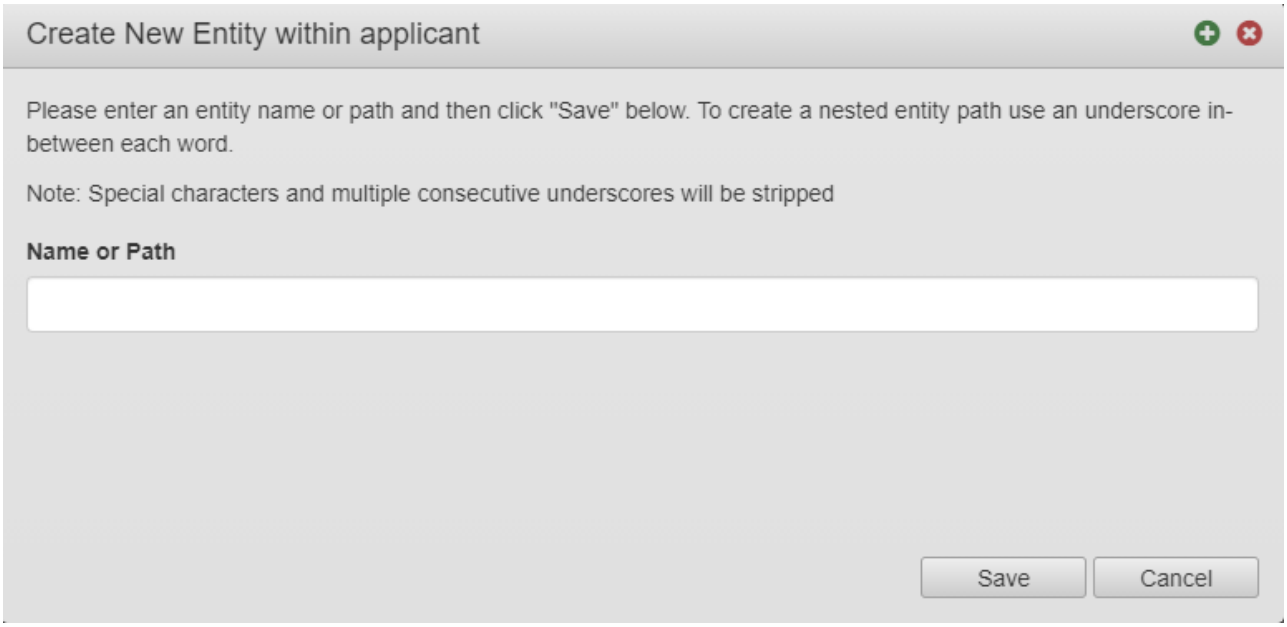
Next, learn how to create an entity.

Create an Entity

Maestro allows you to create new entities and map them to form's fields. This provides logical groupings of fields regardless of their physical position in the form. You can create a new entity using either the Model pane or the Properties pane. This is described below.

To create a new entity in the Model pane:

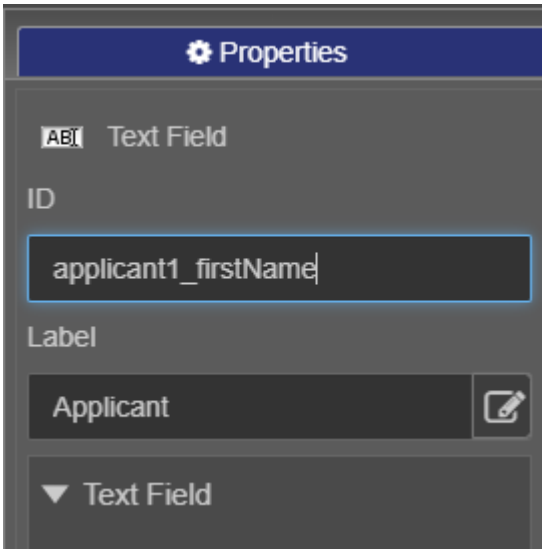
1. Open a form in the Maestro editor.
2. Click the Model pane and expand the Entities root element.
3. Select an existing entity or select the Entities root element, if there are no entities available, and right-click on it.
4. Select Add Entity from the dropdown menu to add a new entity to the selected element.



5. Enter an entity name or a path in the Name or Path field. You can create a nested entity by adding underscores in the entity name, for example, `applicant_name`. Maestro recognizes the underscores as entity separators and creates all the required entities for your nested entity.
6. Click Save to update the changes.

To create a new entity in the Properties pane:

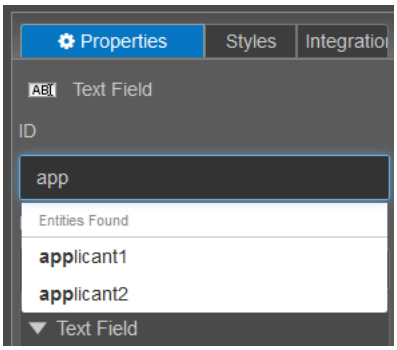
1. Open a form in the Maestro editor.
2. Select a field of a component and click the Properties pane.
3. Enter an entity name in the ID property field using the underscore "_" to logically separate a component ID name, for example `applicant1_firstName`.



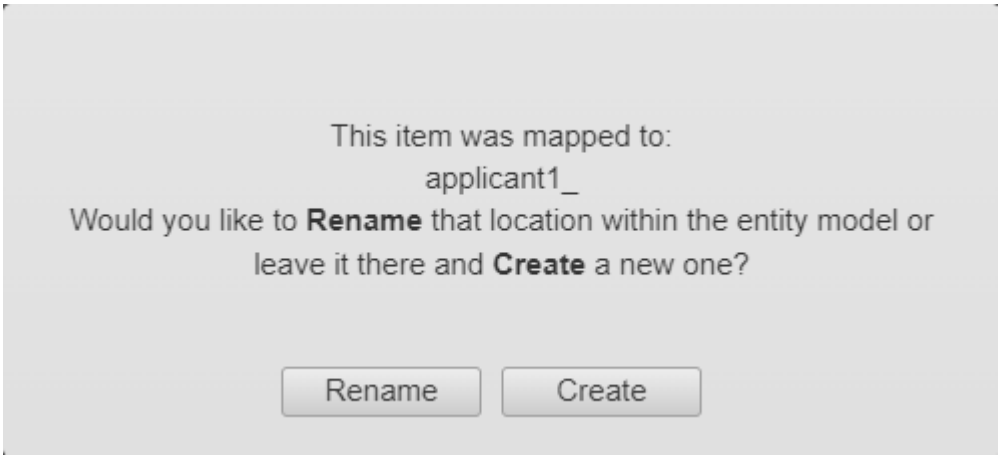
NOTE

You can have many levels of entity's hierarchy. The easiest way is to include as many underscores in the name as you need, for example, `application_applicant_clientProfile_userName`.

To speed up the entity creation process, Maestro looks up all existing entities as you type a new entity name in the ID field, so you can select a name you need from the list.



4. Click Enter. Maestro displays a message informing you that a new entity will be created. For example, the prefix `applicant1` applied to the `firstName` component results in the component ID `applicant1_firstName`, which tells Maestro that the `firstName` component belongs to the applicant1 entity.



5. Click Save to update the changes.

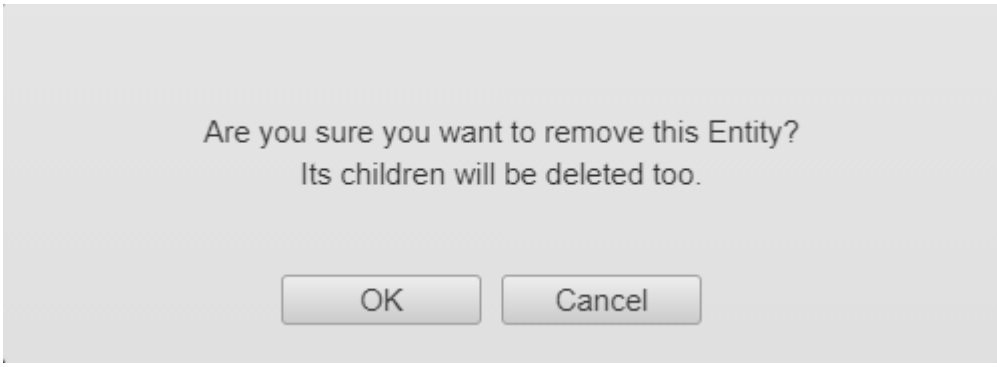
Next, learn how to delete an entity.

Delete an Entity

Maestro allows you to delete entities and entities' properties so you can clean up your data model.

To delete an entity in the Model pane:

1. Open a form in the Maestro editor.
2. Click the Model pane and expand the Entities root element.
3. Find an existing entity and right-click on it.
4. Select Delete Entity from the dropdown menu to remove the entity and all children as well. Click OK to confirm.



> NOTE
>
> Maestro will not delete any form fields that are mapped to the entity.

5. Select Delete Property from the dropdown menu to remove a property of the entity. Click OK to confirm.

> NOTE
>
> Maestro will not delete any form fields that are mapped to the entity.

Next, learn how to apply an entity path of a component to its children.

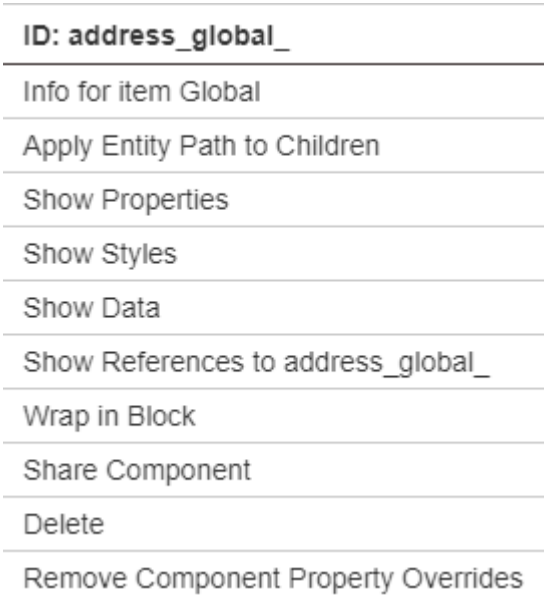
Apply an Entity Path of a Component to its Children

Some components, such as an address component, are made up of multiple components, which we call children components. Maestro allows you to apply the same entity path to all children components that make up such a component. For example, if an address component is dragged onto a form and an `address` entity is created, the street, suburb, state and postcode children components, which make up the parent component, can be associated with the address entity.

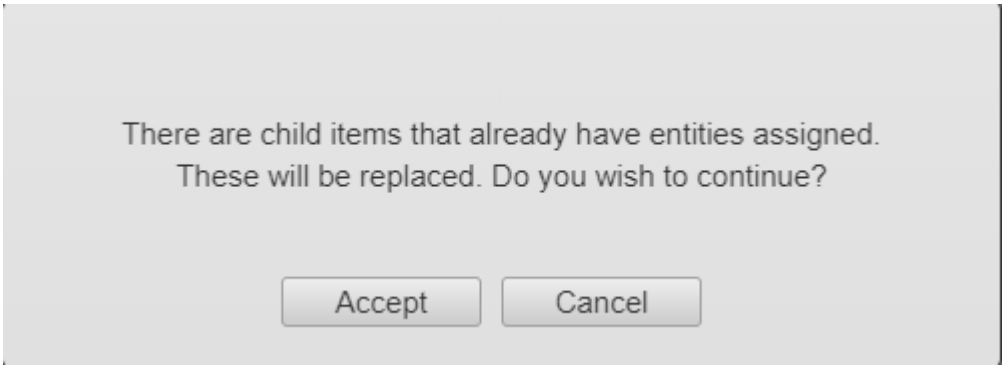
For an entity path to be applied to the children of a component when an entity is created, you must end the entity name with an underscore; for example, applicant_address_. This underscore at the end tells Maestro where it fits in the domain model configured for the form.

To apply a component's entity path to its children components:

1. Open a form in the Maestro editor.
2. Select a component that contains multiple children components.
3. Create an entity with a trailing underscore, for example, `applicant_address_`.
4. Select the component in the View pane and right-click on it.
5. Select Apply Entity Path to Children from the dropdown menu.



6. Click Accept to confirm the changes.



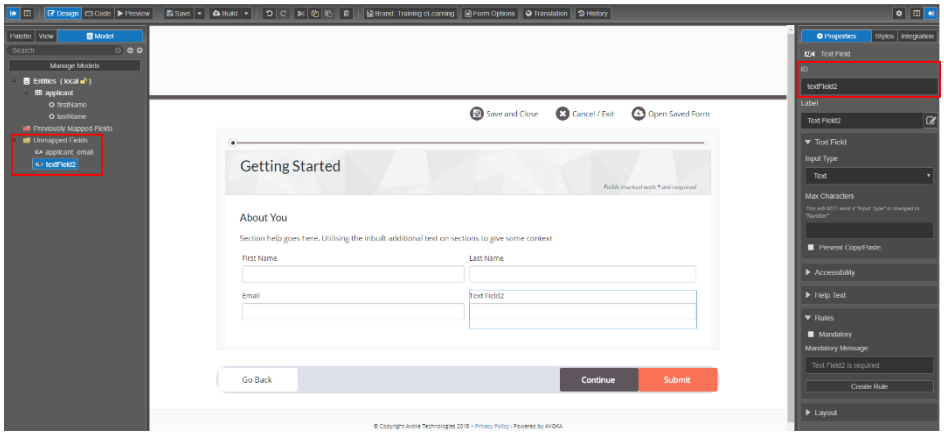
7. Open the Model pane to verify the new entities have appeared in the domain model.

Next, learn how to map a component to an entity property.

Map a Component to an Entity Property

As you drag and drop components on a form in the Maestro editor, Maestro populates them with the default data that has a flat XML[1] structure, in the same order as the visual layout. Using entities provides you with control over the structure of the form data, allowing fields to form logical groupings regardless of their physical position in the form. Additionally, fields can be mapped to a pre-defined entity model, guaranteeing the structure of submitted data.

When you add a new component, identified by its ID, to a form without mapping it to an entity or an entity property, it appears in the Unmapped Fields folder of the Model pane. There it stays until it is mapped to an entity. This is illustrated below.



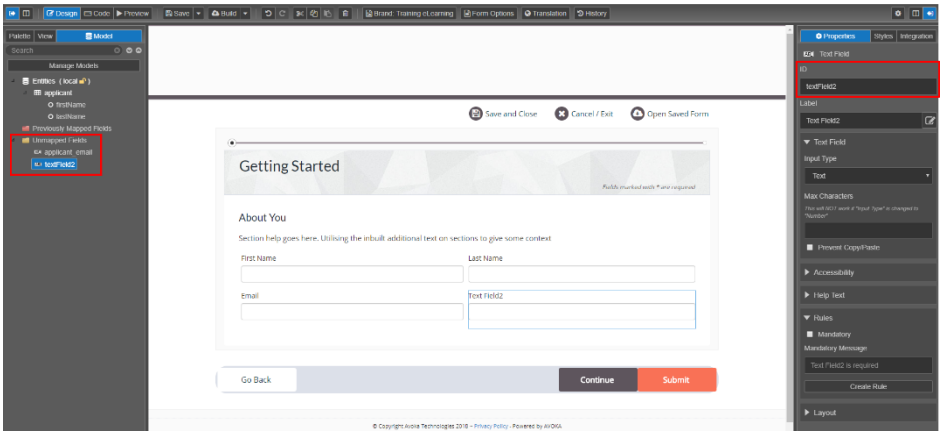
When entity's properties are created, they are not saved within the data of the form, instead, they are saved in the domain model, which holds all data. This means that even if you delete the component from the form, the entity property are still accessible to the form so you can continue mapping other components to it.

To map a component to an entity property:

1. Open a form in the Maestro editor.
2. Select a component on the form or select it from the Unmapped Fields folder.

[1]XML (Extensible Markup Language) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

3. Select the Properties pane and update a component ID in the ID field.



Use the underscore "_" between an entity name and the name of the property, belonging to this entity, that you want to create.

For example, if you want to create an entity property called `firstName` for an entity called `applicant`, you must type `applicant_firstName` as a ID of the component. Maestro will create a corresponding entity property, using the underscore as a delimiter, to map it to the component model and also populates the label for the selected component.

> NOTE
>
> If you already have entities defined, select the field first and then double-click the entity's property you want to map it to.

4. Click Rename to confirm the change of ID name.

> NOTE
>
> If you delete the text field, the `firstName` entity property is still available to be mapped to another component. See the explanation above.

> NOTE
>
> You can use Data Mapper to load an existing XML file with data definition and then map form fields to submission data.

Map a Repeating Block Component

Our forms often use repeating block components. It's crucial that a repeat element is mapped to an entity so you need to map it to your submission data model, which can be an existing XML structure. The process is very similar to that of described above, with a few additional steps.

Let's assume you need to configure a repeating block template so a submitted form produces the following XML file:

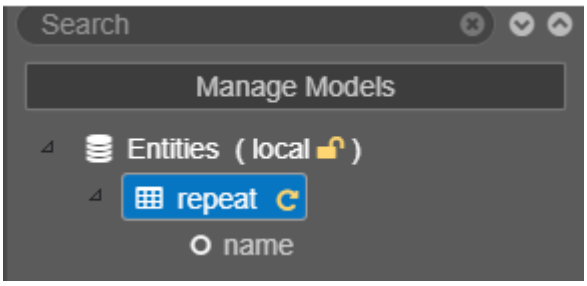
```
<applicant>
    <repeatingFields>
        <individual>
            <name>John</name>
            <age>40</age>
        </individual>
    </repeatingFields>
    <repeatingFields>
        <individual>
            <name>Mark</name>
            <age>47</age>
      </individual>
    </repeatingFields>
</applicant>
```

To map a repeating block component to create a the above XML structure:

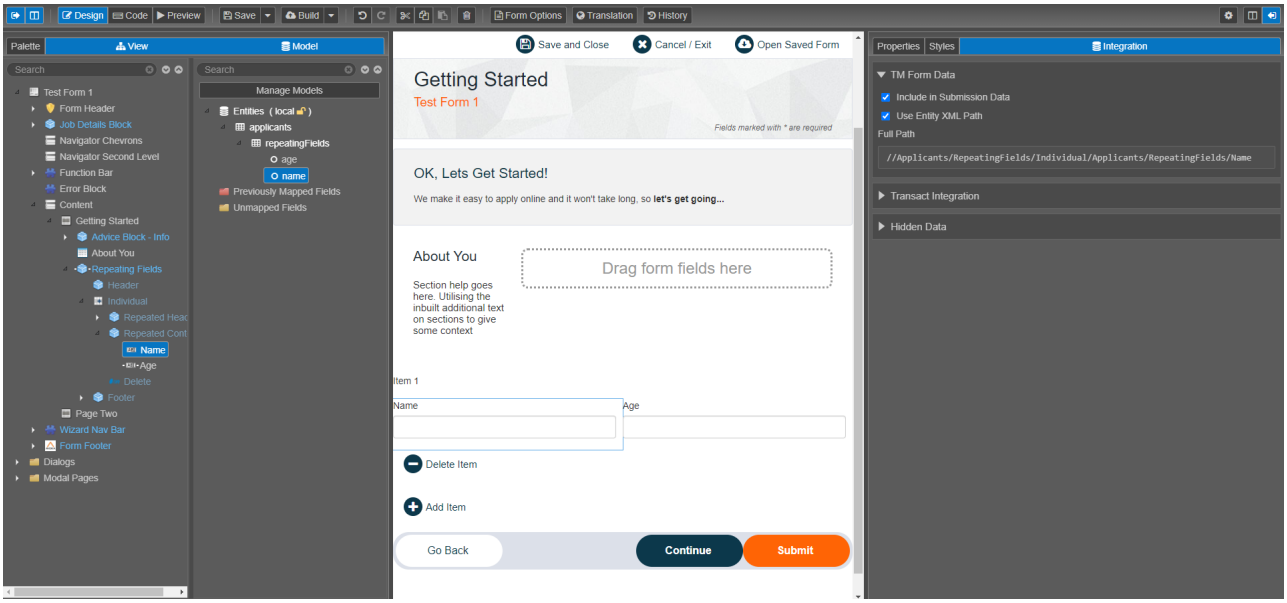
1. Select a repeating block template and drag it onto a form.
2. Select it and update its name in the ID field according to your requirements. For example, `applicant_repeatingFields_`.

   > NOTE
   >
   > The name must end with the underscore "_", so Maestro knows it's a repeating pattern.

3. Open the Model pane to verify a new entry has appeared under Entities. Check the yellow arrow in the entity tree to verify that the element is mapped correctly.



4. Select the Content element of the repeating block template and update it as needed, for example, `Individual`.
5. Open the Palette pane and drop a Text Field component onto the repeating block template component.
6. Change the Text Field component ID to `applicant_repeatingFields_name`. Maestro will prefill this field for you so you only need to update the last part of the name after "_".
7. Click Rename to confirm the name change.
8. Do same for another text field, that is called `applicant_repeatingFields_age`.
9. Select the Integration tab to verify the XML path is correct in Full Path field.



> NOTE
>
> If the path is incorrect, clear the Use Entity XML Path checkbox and select it again.

10. Save the form and click Preview.
11. Fill in the form and click Submit.
12. Click Show form XML to view the resulting XML structure of the repeating block component and compare it with your required XML structure.

13. Click Design to continue working with your form.

Next, learn about the domain model.

Domain Model Overview

Maestro comes with the Domain Model framework that allows you to define the conceptual structure of the information domain independently of how they are used in any visual user interface. The Domain Model is made up of entities that represent real-world concepts. You can share the Domain Model so it is available across multiple forms. A shared domain model can be used in global forms – for example, with collaboration jobs – and thus it can re-use existing elements including those created by other developers.

Having domain models provide a number of benefits for you to design and develop forms, including:

- Helps focus on what the form does and how it does it
- Allows form design and development to support an object-oriented approach
- Provides an alternative view on form design and development when data structure is used rather than form field elements
- Provides Groovy[1] developers with the ability to use domain models for data mapping
- Supports re-use by allowing multiple forms to consume the same data, for example, collaboration jobs
- Binds form fields to application data by importing JSON[2] files
- Retrieves application data as an object using an Maestro API
- Makes it easier to understand the logic behind the form by looking at its domain model structure
- Simplifies creation of complex rules by using entity mapping and relationships between form fields as objects
- Helps to use long field names, which are difficult to read otherwise, by using underscores to separate entity names from component and property names

When you create a new form in Maestro, a single domain model is created and populated with entities. New entities are added as you work on the form. A domain model file is added as a form

---

[1]Groovy is a powerful scripting language which runs on the Java Virtual Machine. Across theTemenos Journey Manager platform, Groovy is used to create services in Manager. These services are primarily used to create plug-in style systems that interact with Manager.
[2]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

resource, for example, `model-schema-json`, which is stored in the Resources folder of a form version. You can check the file in the Maestro Dashboard.

Maestro also allows you to create domain models manually. Once the model is established and configured, you can share it across multiple forms. Domain models can also be imported from other sources and shared using a library. You can manage domain models in the Model pane.

The domain model is based on a JSON schema, which is stored in a separate JSON file, so each domain model has its own JSON file. Maestro uses a limited denormalized JSON schema subset to create a domain model, so you will not be able to use all the features available from JSON schema; in particular, the ability to create a type `$ref`, for example, an applicant address type.

NOTE

Prior to Maestro 18.05, models were stored as part of a Maestro form.

NOTE

If a Maestro 17.10 form, with entities configured, is imported into a Maestro 18.05 environment, all entities will be extracted and automatically moved to a domain model file.

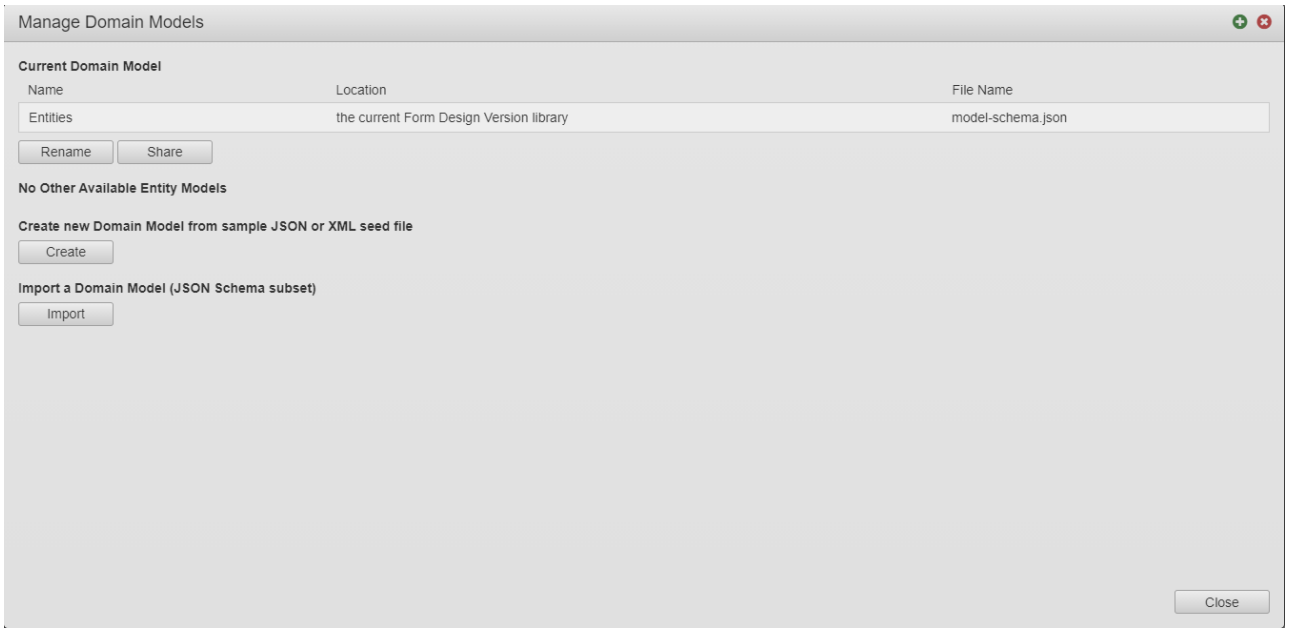
Next, learn how to create a domain model.

Create a Domain Model

Maestro creates a domain model automatically for every new form, but it also allows you to create a new domain model based on a JSON[1] or an XML[2] seed files manually.

To create a domain model:

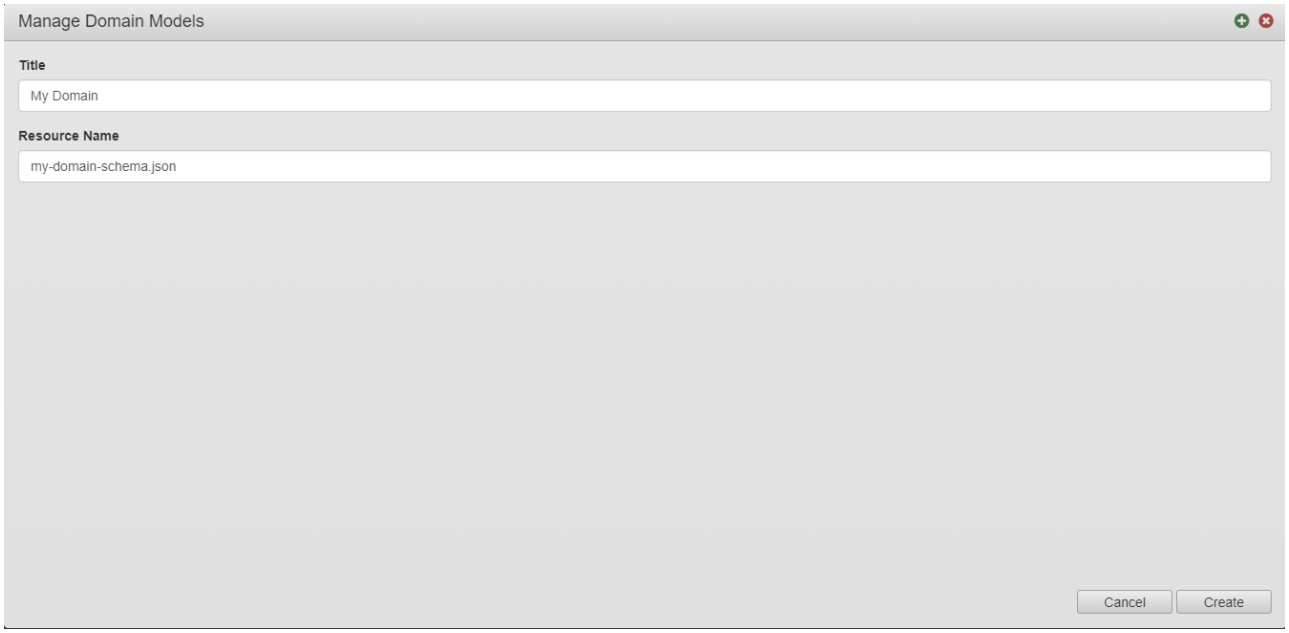
1. Open a form in the Model pane and select Manage Models.



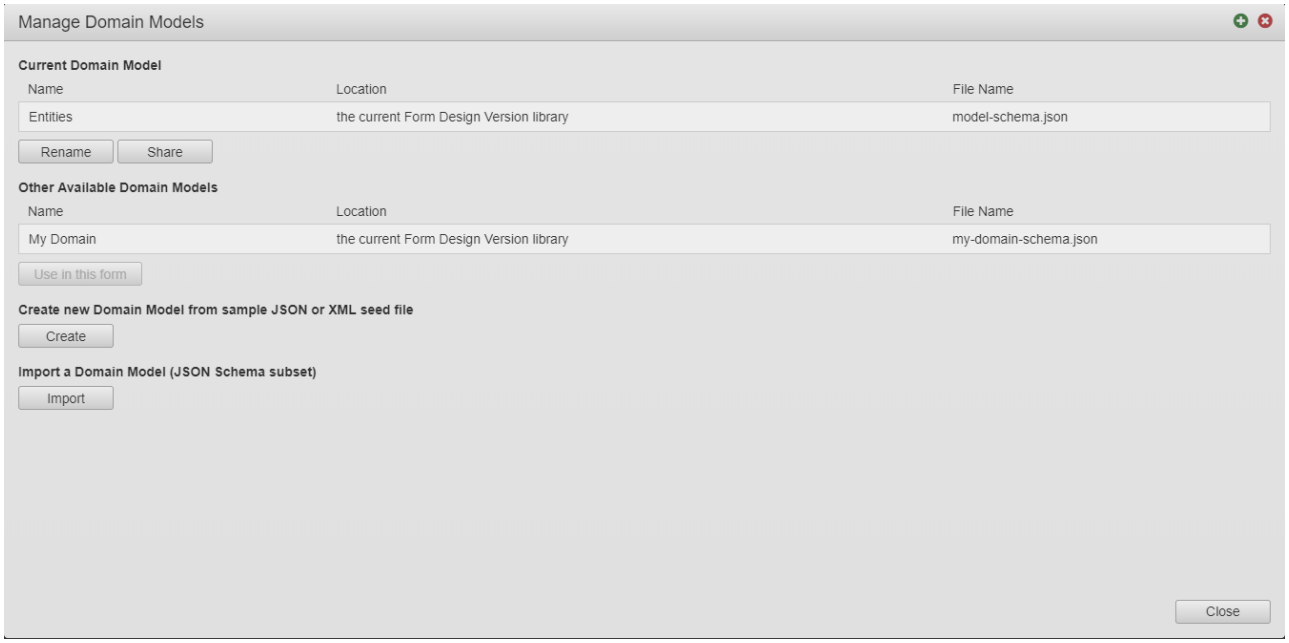
2. Click Create.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

[2]XML (Extensible Markup Language) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.



3. Enter a new name in the Title field.
4. Update a new unique file name including a file extension, such as JSON or XML, in the Resource Name field. Maestro populates the Resource Name field automatically based on the title by adding `-schema.json`.
5. Click Create.
6. Choose a JSON or XML file to import from your PC. Maestro converts all imported domain models to the JSON format.
7. Review the new domain model.



8. Select other domain models from the Other Available Models list and click Use in this form to change your domain model.
9. Click Create to create another data model.
10. Click Import to import a domain model.
11. Click Close to go back to the Model pane where you can check the imported domain model. By default, the domain model remains local (unshared) to the form, which is depicted with the open lock. For more information, see how to share a domain model.

Next, learn how to import a domain model.

Import a Domain Model

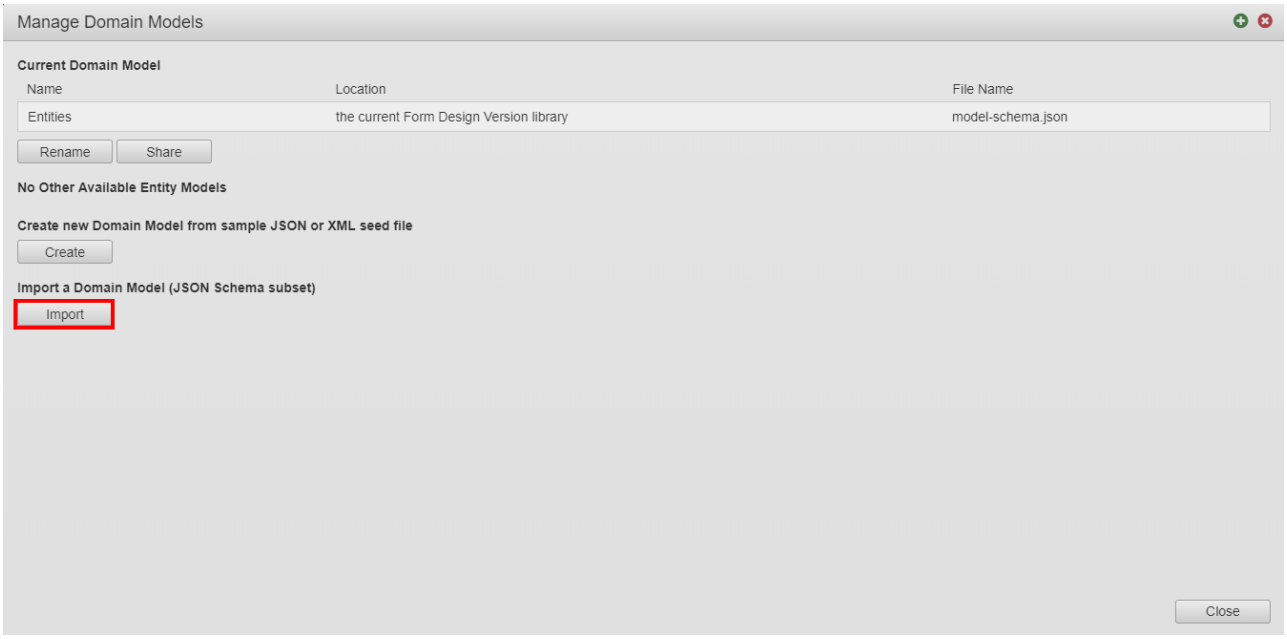
Maestro allows you to import a domain model into a form. Usually, you export a domain model from a form using the Export all Resources option. Then, you edit it, for example, by adding a new entity, and, finally, import the domain model back into Maestro.

NOTE

Maestro supports a limited subset of JSON[1] schema.

To import a domain model based on a JSON schema subset:

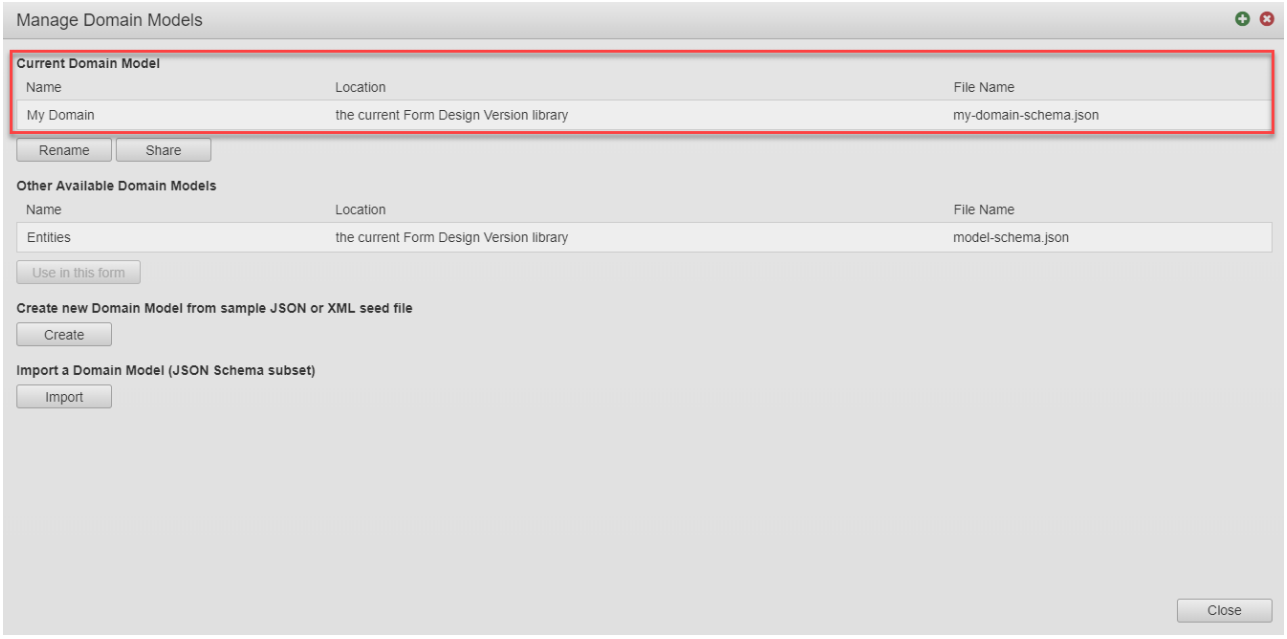
1. Open a form in the Model pane and select Manage Models.
2. Click Import.



3. Select the JSON Schema file then click Open.

[1]JSON (JavaScript Object Notation) is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays.

4. Check the JSON schema file is imported as the Current Domain Model.



5. Click Close.

Next, learn how to share a domain model.

Share a Domain Model

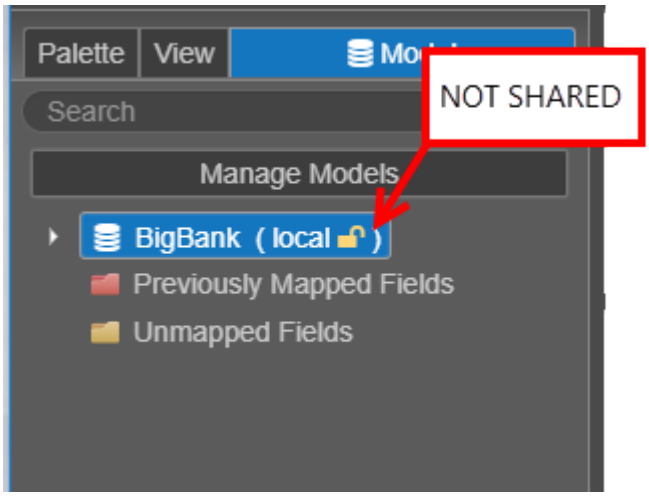
Maestro allows you to share a domain model so you can use it across different forms. A shared domain model can be used in global forms, for example, with collaboration jobs, so you can re-use existing form elements including those created by other developers.

NOTE

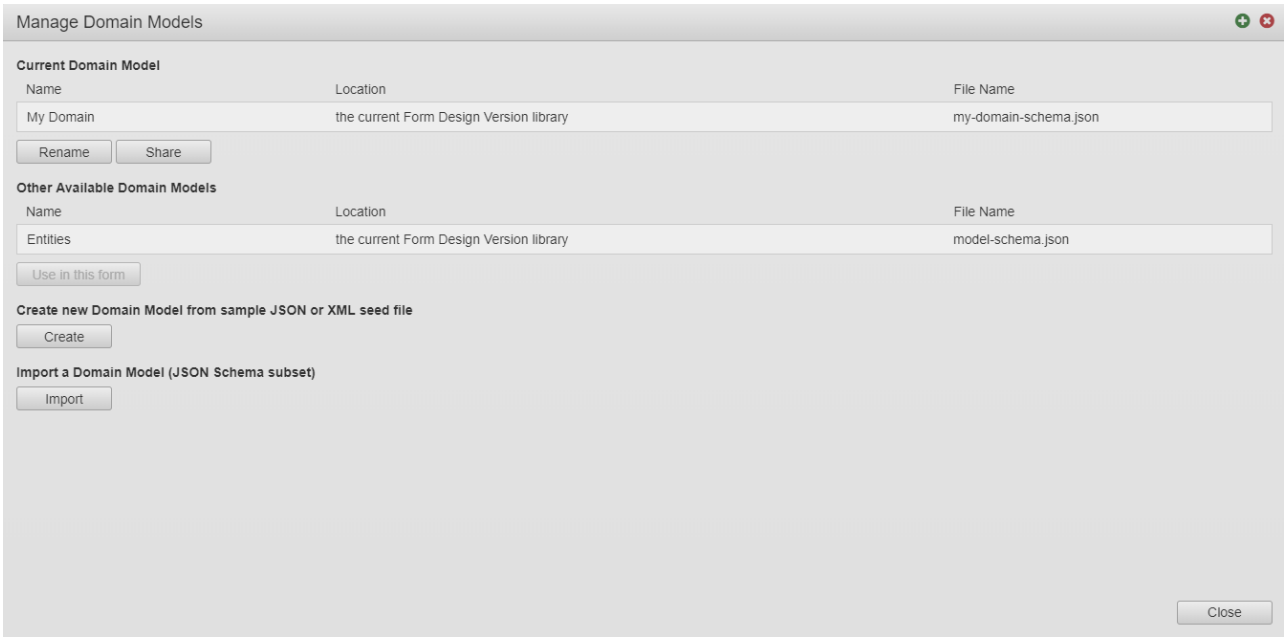
To share a domain model, your Manager user account must be assigned a role that has the necessary permissions; for example, the **Maestro Administrator** role in its default configuration.

To share a domain model:

1. Open a form in the Model pane. If the domain model has not been shared, the unlocked padlock icon is displayed. You can share the domain model now.



2. Select Manage Models.



> NOTE
>
> If any other domain models are available to the form, they will be displayed in this dialog under Other Available Domain Models.

3. Click Share.



4. Provide a domain model name in the Title filed.

5. Provide a domain model resource file name in the Resource Name field.
6. Select a library, which you want to share the domain model to, from the Library dropdown list.

   NOTE

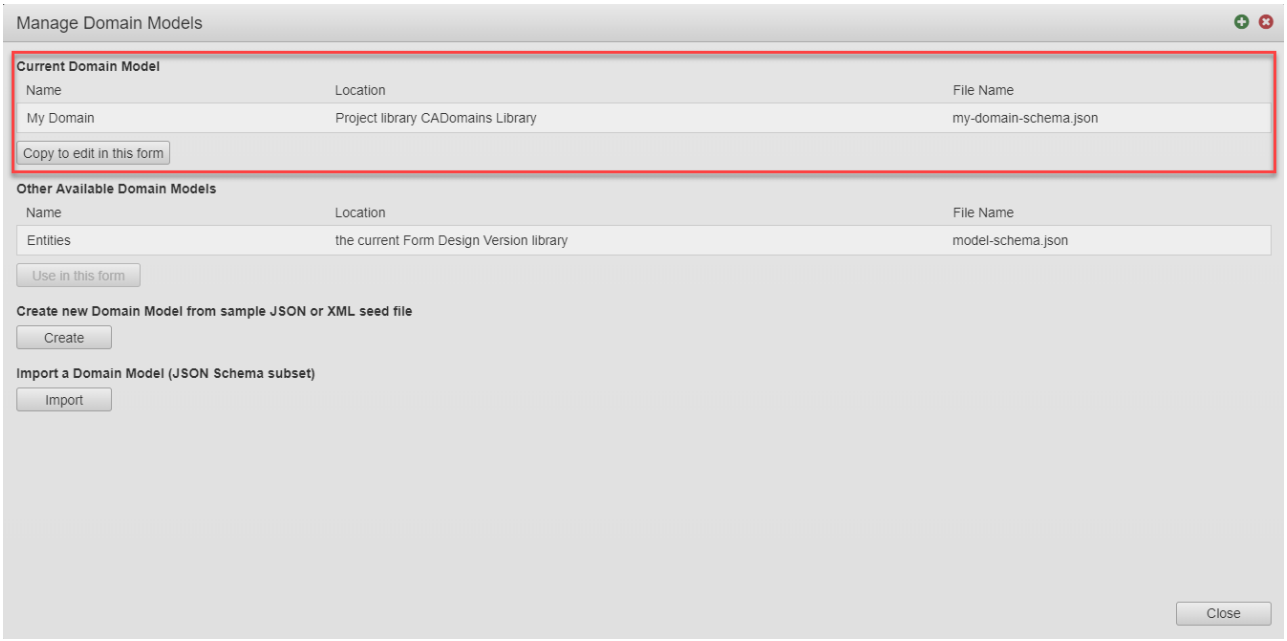
   All forms with access to that library will have access to the this shared domain model.

7. Select the Keep local copy for further editing checkbox to store a local copy of the domain model. This is the default option.

   NOTE

   If you do not want to keep a local copy of the Domain Model, clear the Keep local copy for further editing checkbox.

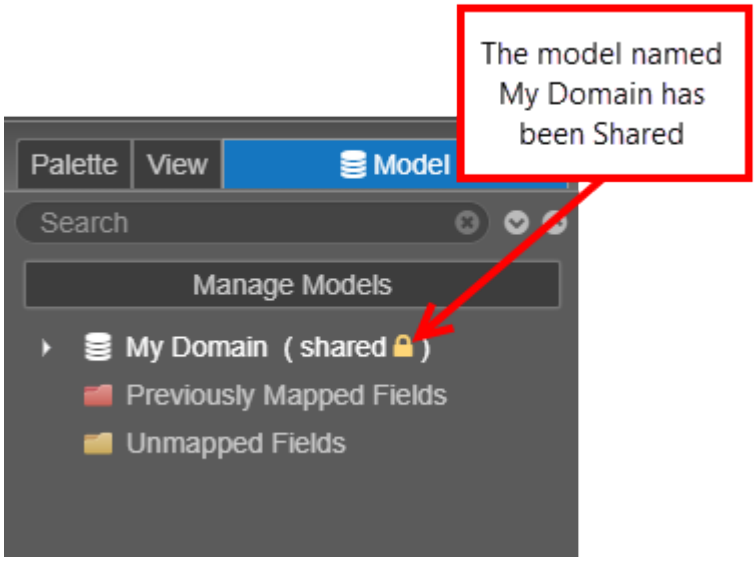
8. Click Share.
9. Check the library that the domain model has been shared to.



   It also displays any other domain models that are available to the selected form. You can select any of the available domain models and share them to a library.

10. Click Copy to edit in this form to copy the domain model and edit it in your form.

11. Click Close. Now, as the domain model has been shared, the locked padlock icon is displayed.



When a domain model has been shared, the lock icon next to the domain model's name will change from open (unlocked) to closed (locked). Any new entities created in a shared locked domain model will not be mapped or shared with other forms and libraries.

When sharing a domain model, it is important to note that the local copy of the domain model takes precedence over the shared domain model. Therefore, it is recommended that when you share a domain model and choose to keep a local copy to edit, you should rename the local copy of your domain model to avoid any confusion about which domain model you are using.

Next, learn about entities.

Build a JM Form Version

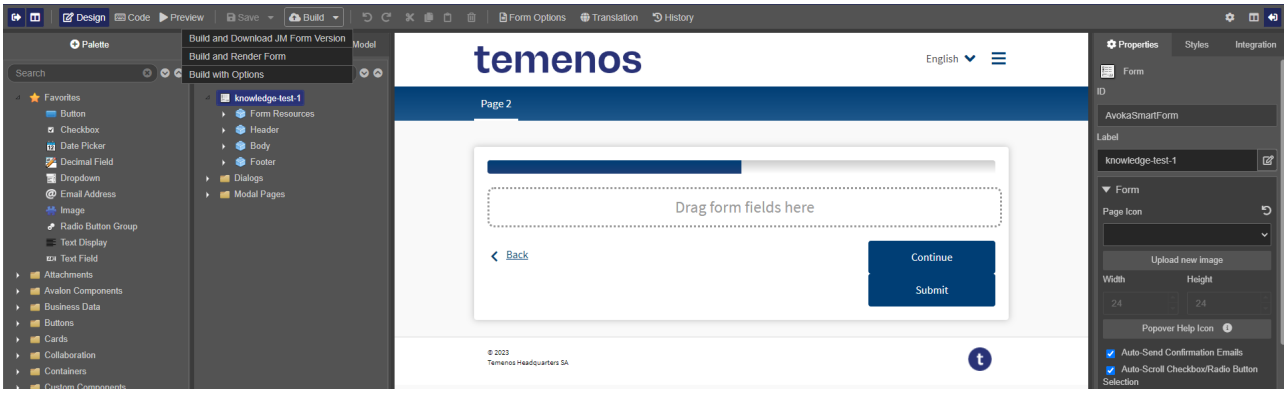
Maestro allows you to build a form version as a ZIP file (further referred as JM Form Version), which includes a FAR file and all related form's assets, so you can easily deploy it in a form space in Journey Manager. You develop and build the form in the same tool - the Maestro editor, which is handy and saves you time.

If the form containing multiple brands, you can build the form using one or many brands available to the form.

If you don't need to deploy a form version ZIP file right away, you can build and review it first, and import it into Manager later, when you need to. Usually, you import the form version ZIP file to Test and UAT environments first, then you promote a form to a production environment by exporting and importing it using Manager's functionality.

To build the JM Form Version of a Maestro form:

1. Open a form in the Maestro editor and select one of the following options from the Build dropdown menu:



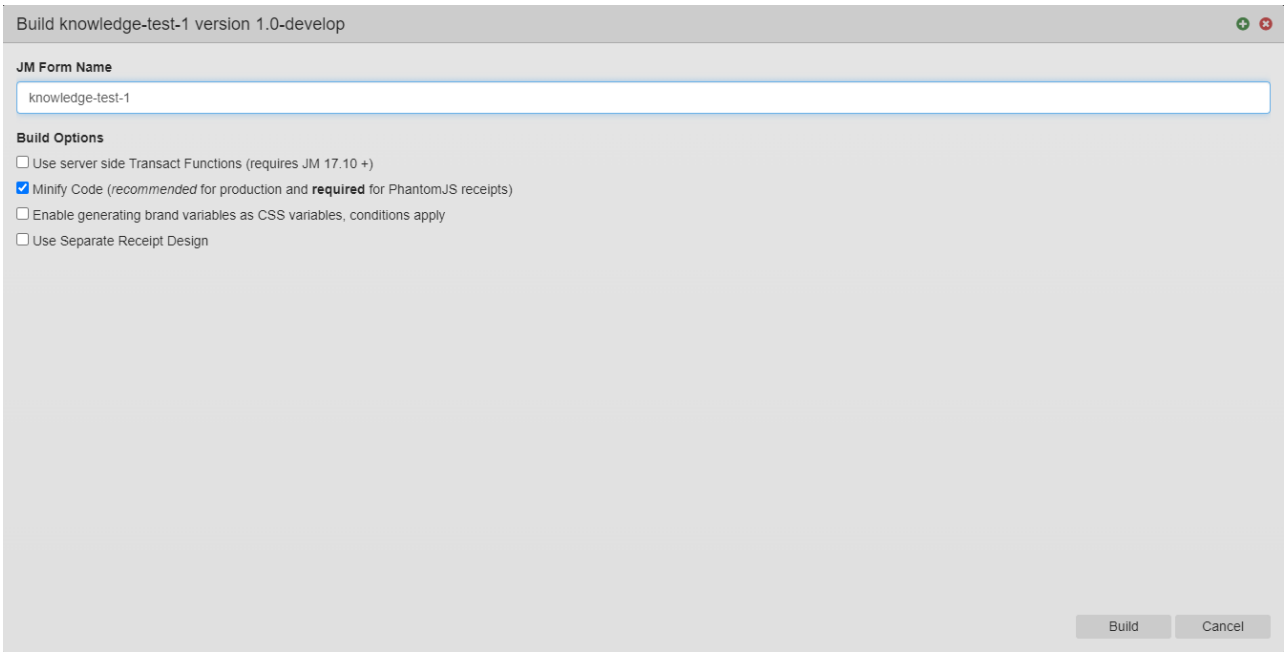
2. Click Build to build a JM Form Version. This doesn't download the ZIP file or display the rendered form, which is useful when you are re-building and updating a JM Form Version that has already been imported into Journey Manager.

   > NOTE
   >
   > Use `Control+Enter` keys on Windows or `Command+Enter` keys on Mac to build the form.

3. Click Build and Download JM Form Version to build a ZIP file and then immediately download it, which is needed to import the form version into Manager.

4. Click Build and Render Form to build a ZIP file and render the form in a new tab. You can download the JM Form Version later from the Management Dashboard. This option is handy when you need to view or test a rendered version of the form.
5. Click Build with Options to apply the build and brand options before building the JM Form Version.

> NOTE
>
> Use `Control+P` keys on Windows or `Command+P` keys on Mac to open the Build modal window.



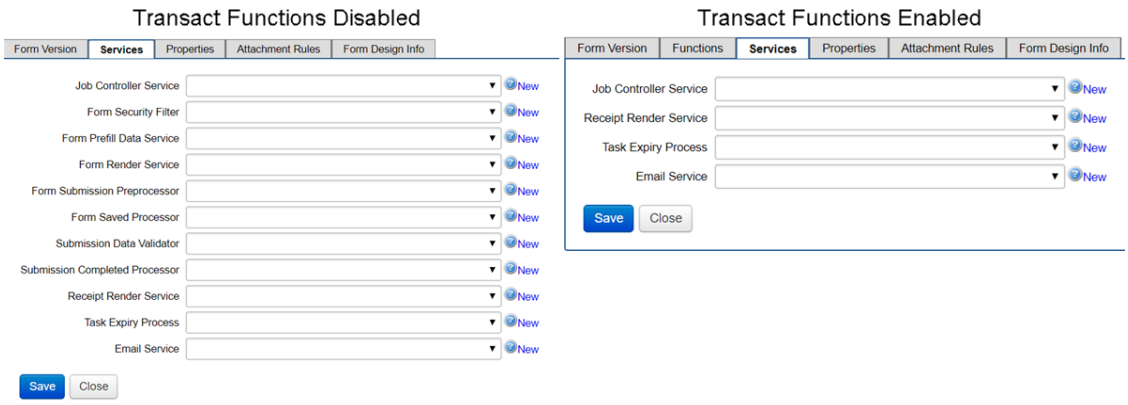
Enter a new name of a ZIP file in the JM Form Version field, in case you want to change it from the default name. The default is the existing name of the form.

Specify Build Options to build the form according to your requirements:

- Select the Use server side Transact Functions (requires JM 17.10 +) checkbox to use Transact functions to call services in Manager. | 17.10 This feature was introduced in 17.10.

  It's important to notice that enabling Transact functions causes the following:

  1. It limits the number of available services you can configure for your form version, as shown below:



2. It removes a number of `SystemProfile` properties, such as `<TestMode>-false</TestMode>`, from the form and from the submission XML data.

However, enabling Transact functions allows you to configure Transact functions, which were not available before that.

> NOTE
>
> You can see whether the Transact function are available in a form when you configure a form version in Manager.

> NOTE
>
> Transact functions require Journey Manager 17.10 and higher.

- Select the Minify Code checkbox to reduce the size of the form and related JavaScript[1] resources without changing its functionality so they can be sent out to a client browser more efficiently.

[1]Javascript (JS) is a scripting languages, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code. JavaScript is an interpreted language. Thus, it doesn't need to be compiled.

NOTE

Code minification[1] functionality has been enhanced in the following Maestro versions:

- Prior to 18.05 - JavaScript resources are concatenated into the `app.js` and then minified, but not transpiled[2].
- In 18.05 - JavaScript resources are concatenated into the `app.js`, then minified and transpiled. The transpiling support to the rules, the runtime framework and any widget scripts so that users could use ES6[3] constructs in their rules while maintaining IE 11 support as it is still a supported browser. External JavaScript files are the responsibility of the form developer to maintain for minification and IE 11 compatibility.
- Since 19.05 - JavaScript resources are added as they are as separate resources and provided to the form as-is. External JavaScript files that are loaded with just a URL are not processes at all other than to add the script tag that adds them to the form.
- Since 22.10 - a reference to Internet Explorer 11 was removed from this option.

NOTE

JavaScript resources are the object dropped on to a form and a user has selected a JavaScript resource that is in the form or other available library. External JavaScript files are added through the JavaScript object and setting the URL property.

---

[1]Minification is the process of removing all unnecessary characters from the source code of interpreted programming languages or markup languages without changing its functionality.
[2]Ttranspiler is a source-to-source translator, source-to-source compiler, transcompiler, which is a type of translator that takes the source code of a program written in a programming language as its input and produces an equivalent source code in the same or a different programming language.
[3]ECMAScript (ES6) is a general-purpose programming language, standardized by Ecma International according to the document ECMA-262. It is a JavaScript standard meant to ensure the interoperability of Web pages across different Web browsers.

NOTE

Reducing the code makes it difficult to read it, so you have to consider clearing the Minify Code checkbox when debugging the form.

- Select the Enable generating brand variables as CSS variables, conditions apply checkbox to include CSS variables into a form, so they can be updated at runtime.
  | 23.04 This feature was introduced in 23.04

  NOTE

  This functionality has the following limitations:
  - It won't work with Internet Explorer 11 as it doesn't support CSS variables
  - Your styles should not use `Less` color functions, such as `lighten()` and `darken()`
  - Using `Less` mixins that utilize `iscolor()` will not work as it will be passed a value that looks like `var(--av-primary-color)`, which will not be a color
  - The Maestro editor 23.04+ will attempt to use CSS variables when it loads the form, so if any errors are detected, the form publish options will not allow CSS variables to be enabled

  NOTE

  To view the list of all CSS variables in a generated form:
  1. Click `Preview` to inspect a form.
  2. Click `Inspect` and search for `:root {` from `form-app-styles.css` that should have all the CSS variable declarations. For more information, see Using CSS custom properties (variables).

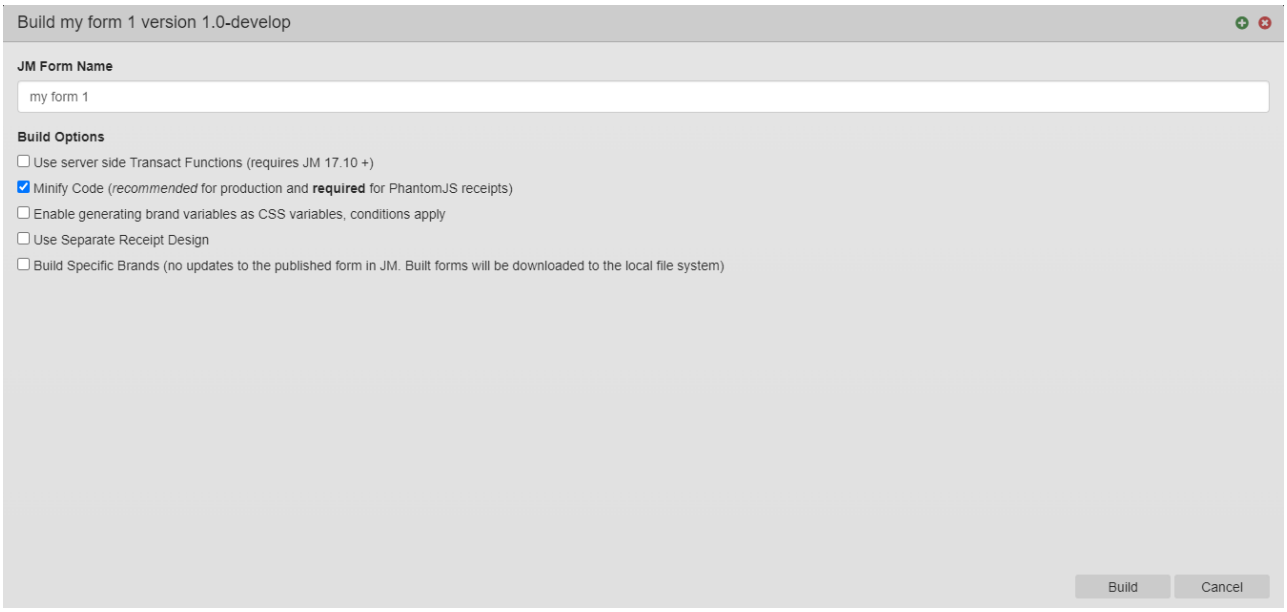
- Select the Use Separate Receipt Design checkbox to use a separate receipt, if a receipt design is available in the form, so all built receipt assets are pulled into the FAR file. This FAR is different as it effectively has two complete Maestro designs - a form and a receipt. There is an XML file in the FAR that tells Manager that the form uses a specific HTML file for the interactive form and a different HTML for the receipt.

NOTE

When Maestro builds the form, it doesn't rebuild the receipt form. It simply takes the latest version of the receipt that has been built and checks whether the last update time on the receipt is after the last built time on the receipt or not. If the receipt has been changed since its last built, Maestro shows a warning that the receipt needs to be republished.

- Select the Remove Automation Framework checkbox to remove the MAF code, which reduces the download size of the form and prevent misuse of the API in production forms. The Maestro Automation Framework (MAF) provides an API which can be used by other tools to automate and investigate the state of a Maestro form. Once a form is ready for production, MAF is not required.

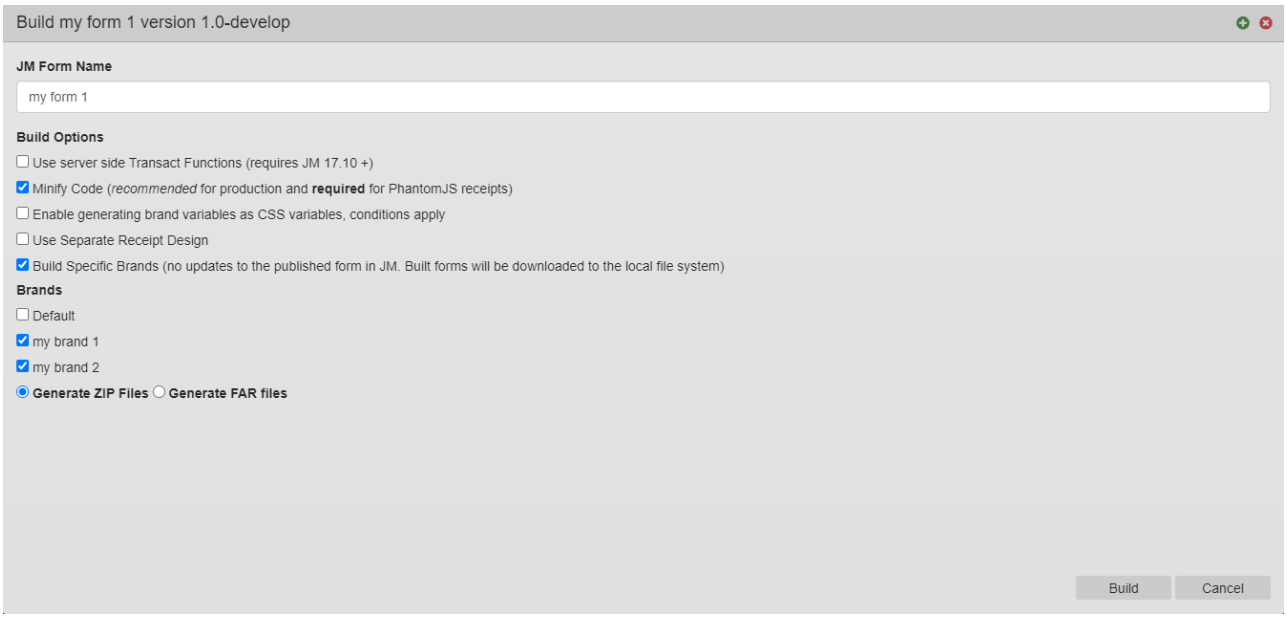
If the form containing multiple brands, Maestro gives you additional options to choose which brand, or all of them, to use to generate a ZIP file.



Select the Build Specific Brands (no updates to the published form in JM. Built forms will be downloaded to the local file system) checkbox to see the the list of brands available to the form.

NOTE

You can't select the Build Specific Brands (no updates to the published form in JM. Built forms will be downloaded to the local file system) checkbox if the form has only one brand.

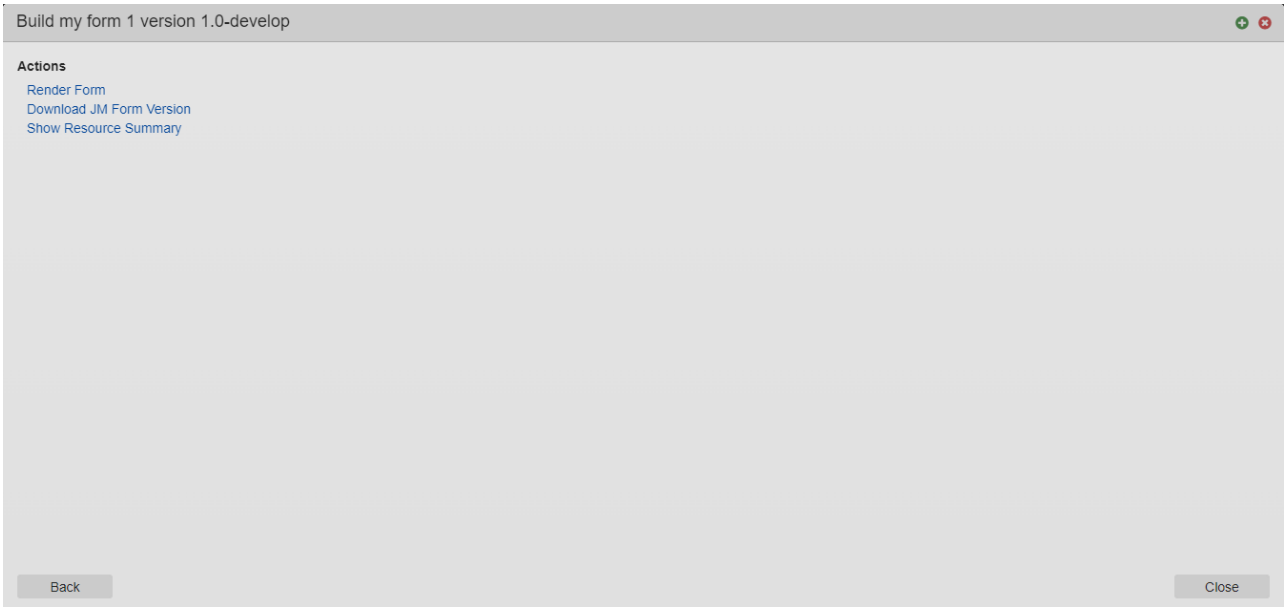


Specify Brands to build the form using specific brand or brands:

- Select one or many brands from the available list of brands defined in your template. The Default brand is always available.
- Select Generate ZIP Files to bundle the form and all relevant resources in a ZIP file, which you can deploy in various Manager environments.
- Select Generate FAR files to bundle the form and all relevant resources in a FAR[1] file, which you can deploy in various Manager environments.

Click Build to build the form. Check the build result and perform some actions as described below.

[1]FAR is a Form Archive that contains a form and all related resources that can be deployed as a package in various Journey Manager environments.



- Click Render Form to render the form in a new tab. It's similar to the Preview Mode.
- Click Download JM Form Version to download the ZIP file on your local PC.
- Click Show Resource Summary to see resources associated with this form and included in this ZIP file.
- Click Back to go to the previous screen.

Once a JM Form Version is built, you can download it at any time from the Maestro Management Dashboard using the Download JM Form Version option.

When building the JM Form Version, you may encounter errors; some of them you can try to resolve yourself, otherwise, contact your Client Services team.

Next, learn how to update JM Form Version.

JM Form Version Build Errors

When you build a form as a ZIP file, an error can occur. Below are some common errors which you can easily resolve yourself. In other cases, you may need to contact your system administrator or our Client Services team.

A Form with This Name Already Exists

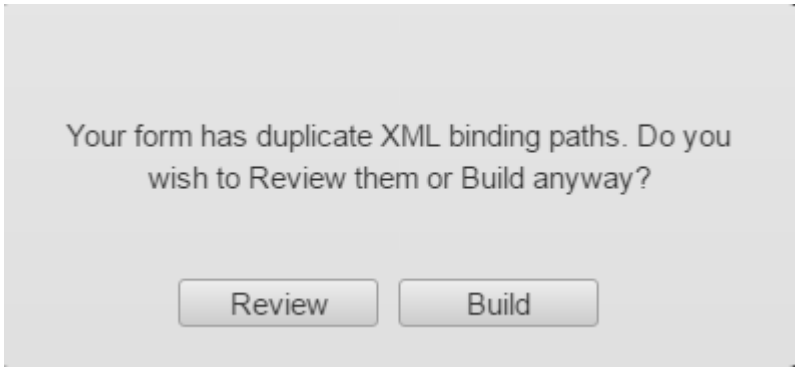
This error tells you that a form with this name already exists in your organization in a Maestro instance. This can happen if you want to move a form (by exporting and then importing it) from one project folder to another and you want to keep the form name the same.



To resolve this error, you should use the Delete JM Form Versions option to delete the JM Form Versions from your Maestro instance.

Duplicate Binding

A Duplicate Binding error occurs when a Form Builder tries to build a JM Form Version with duplicate submission data bindings on the form. Maestro detects that two or more components share the same data binding location and shows the message below.



This is a warning to a developer that users may experience unintended behavior during data entry. Click Build to confirm that you are aware of the duplicate binding and want to proceed.

Otherwise, click Review to stop the build and review a list of the duplicate bound components. You can resolve the duplicates and try to build the form again.

Composer Users

There are significant differences in the publishing and building process between Maestro and Composer.

As a standalone tool, Composer requires the form designer to choose the Manager server to host the form. When published the designer, or an administrator, is then required to choose the organization and form update strategy - New Version or Update Existing.

By design, Maestro is a form space associated with a Journey Manager server, so it can only build to the same server. Also, by design, Maestro requires Forms to be arranged in organizations that align with those configured on the server. Finally, the Form Builder controls the versioning of forms in the Maestro Management Dashboard.

Next, learn how to update JM Form Version.

Update a JM Form Version

You may want to update a Maestro form after it has been deployed to Manager. This is usually the case to accommodate customer feedback or follow continuous improvement processes within your company.

To update a JM Form Version:

1. Open a form in the Maestro editor and edit it as required.
2. Build a new JM Form Version.
3. Log in to a Manager server where you originally uploaded the JM Form Version as a ZIP file.
4. Select Forms > Forms and find the form that you want to update. This form is the same form that you just updated in Maestro.
5. Open the form, select a form version and click Update Design from Maestro to automatically update it form the Maestro server.

NOTE FOR ON-PREMISE AND AMAZON VIRTUAL PRIVATE CLOUD (VPC) MANAGER INSTALLATIONS

If the VPC is not managed by Temenos, in order for the updating process to function correctly, the Manager environment needs to send an outbound request over HTTPS to a Maestro host (for example, `maestro.avoka.com.au`). For this reason, it is recommended that before you attempt any update of a form version using Maestro, you first check your firewall rules and ensure that they allow this outbound request.

Next, learn about the SCM tool.

Maestro SCM Overview

Journey Maestro comes with the Source Code Management (SCM) command line interface[1] (CLI) that enables you to integrate your Maestro projects with external source code management systems, such as Git or SVN. It provides support for collaborative Journey form development using a flexible approach towards version control allowing you to use various source control strategies, such as feature branches, to work on new features or bug fixes simultaneously using the same form code.

Getting Started

To start using Maestro SCM, you need a few things set up first:

1. Maestro SCM requires Java 8 or later installed on your computer. If you don't have Java installed, you need to download a JDK runtime for your operating system, which are available for Linux, Mac and Windows.
2. Obtain a user account to log in to the Maestro server that you will be integrating with.

   > NOTE
   >
   > The user account must be assigned with the Maestro **SCM Project** role.

3. Download the latest SCM version from our community web site.

   > NOTE
   >
   > You must be logged into the community web site to be able to download installers.

4. Unpack the archive into a directory on your computer.

Using Maestro SCM

Maestro SCM is similar to Git CLI, so you will get the hang of it fairly quickly.

To start using the SCM client:

Windows

Run the `scm.bat` file on your local computer:

---

[1] A command line interface (CLI) is a text-based user interface (UI) used to view and manage computer files.

```
Microsoft Windows [Version 10.0.17134.407]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\jsmith>scm.bat

<not-connected>/ C:\users\jsmith\
$
```

Linux or Mac

Open a terminal and type the following command:

```
$ java -jar scm.jar

<not-connected>/ \home\
$
```

To list all SCM commands and get help, type `help` at the prompt.

```
$ help
Maestro Source Code Management (SCM) shell, version 19.5.0
Type help 'name' to find out more about a named command:

cd                      Change the current working directory.
ls                      List the files in the current or specified directory.
cat                     Displays the contents of a text file.
start                   Start the specified program or OS shell command.
del                     Delete the specified file or empty directory.
cls                     Clear the screen.
rm                      Delete the specified file or empty directory.
dir                     List the files in the current or specified directory.
pwd                     Print working directory path.
type                    Displays the contents of a text file.
mkdir                   Make a new directory.
scm                     Maestro Source Code Management (SCM) integration commands.
scm connect             Connect to remote Maestro server.
scm design clone        Clone remote design to the local directory.
scm design diff         Compare differences between local design files and remote design.
scm design pull         Pull remote design file differences to local directory.
scm design push         Push local design file differences to remote design.
scm design rm           Remove remote design file.
scm design status       Compare local design files with remote design files.
scm library clone       Clone remote library files to the local directory.
scm project add         Add a new project to Maestro server using local project files.
scm project clone       Clone remote server project to the local directory.
scm project diff        Compare differences between local project and remote project.
scm project delete      Delete remote server project.
scm project list        List remote server projects.
scm project pull        Pull remote project file differences to local project.
scm project push        Push local file differences to remote project.
scm project rm          Remove remote project file.
scm project status      Compare local project files with remote project files.
```

For more information on how to use Maestro SCM, see SCM Quick Start for your Maestro version.

You can migrate your existing Maestro projects to SCM projects to align form development with your existing practices.

Next, learn how to use Maestro SCM to implement a Git Feature Branch workflow.

Best Practices for Maestro SCM Feature Branch Workflow

Introduction

Maestro Source Code Management (SCM) provides support for collaborative Journey form development using a flexible approach towards version control. This article provides an example of how to use Maestro SCM to implement a Git Feature Branch workflow.

The Feature Branch workflow scenario starts by creating an SCM project in Maestro and cloning it to your local computer. The Maestro SCM project source code is used to initialize a Git repository which becomes the source of truth for all subsequent development. While form development still occurs in Maestro, all version control activities, such as branching and merging, are performed in Git. In order to follow the Feature Branch workflow, Maestro projects are mapped to Git master and feature branches.

The following diagrams illustrate two perspectives on the relationship between Maestro SCM and Git in a Maestro SCM Feature Branch workflow. The first diagram shows how changes flow between Maestro projects and Git branches using Maestro SCM and Git commands. The second diagram shows how changes move between a project on a Maestro server and a remote Git repository on a Git server via the user's local Git repository using the SCM shell (also known as the SCM client) and a Git client.

These diagrams serve as a useful point of reference for the process described in this article. They are also used in this Maestro SCM v18.11 video to support an introductory explanation of how Maestro SCM is used in a feature branch workflow.



Prerequisites

This article assumes that:

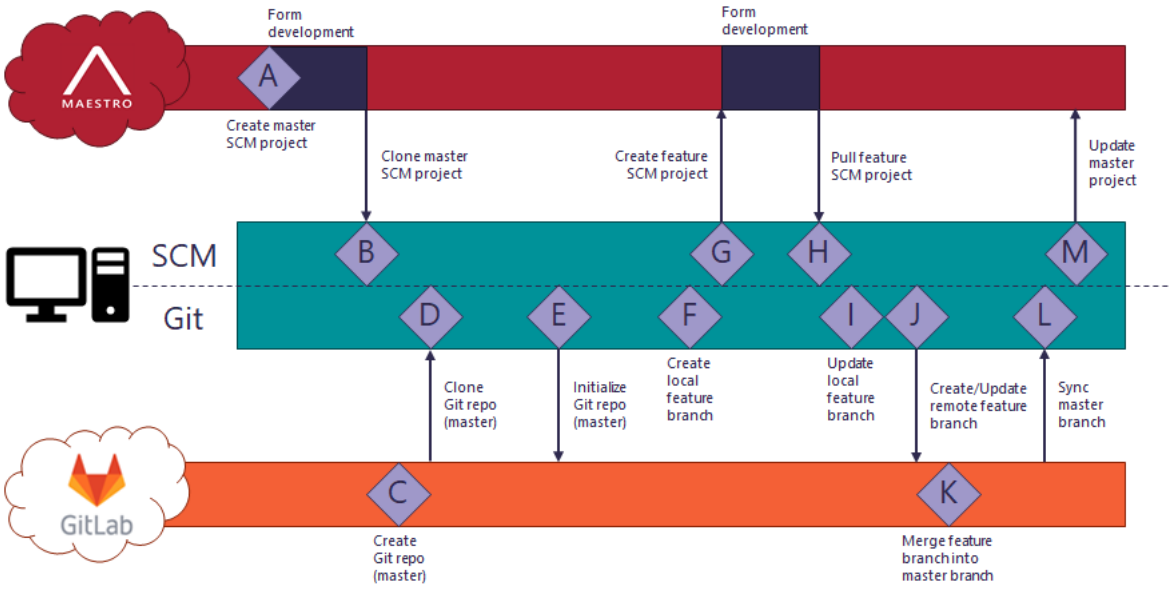
- The Maestro SCM shell is installed on your computer and you know how to start it.
- You know how to create a Maestro form.
- You have access to a Journey Maestro environment.
- You Maestro user account has the SCM Project permission.
- You have a working knowledge of Git.
- You have a Git client installed on your computer.
- You have a working knowledge of (and access to) a Git server, such as GitLab.
- You are using a Windows computer. (The `scm` and `git` commands are operating system agnostic, but some Windows-specific commands and tools are used in this example.)

Maestro SCM Feature Branch Workflow

The Feature Branch workflow is implemented across three environments:

- Maestro.
- GitLab (or another Git server).
- Your local computer.

The following diagram shows that the majority of commands are performed on your local computer using the SCM shell and your preferred Git client, while form development occurs in Maestro, and key Git actions happen on your Git server.



Follow these steps to implement a Maestro SCM Feature Branch workflow. The letter diamonds in the previous diagram are referenced throughout these steps using the format X. Sample `scm` and `git` commands are provided that you can adjust to follow along with the example.

Part 1: Getting Started

1. Create a Maestro SCM project. A

   Login to Maestro and select your organization. Click Create Project to display the Create Project modal. Enter the required details and select SCM as the Project Type.

   > NOTE
   >
   > SCM projects appear in the Navigator pane with a different icon than standard Maestro projects. This new icon shows at a glance that the project supports Maestro SCM.

2. Create a form in your Maestro SCM project.

3. Open a command prompt, start the Maestro SCM shell, and change to the directory that you want to clone your Maestro project into.

   ```
   scm.bat
   cd \c\projects\scm-example
   ```

4. Clone your Maestro SCM project's source code. B

   The Maestro SCM command to clone your project's source code can be found on your Maestro project's Project Details page, in the SCM Clone field. The command is of the form `scm project clone <org>/<proj>` where `<org>` is your project's organization and `<proj>` is your project's name.

   Enter the SCM Clone command.

   ```
   scm project clone know/scm-example
   ```

   You can verify that your project's source code is on your computer and up-to-date using the `dir` and `scm project status` commands.

```
dir
scm project status
```

5. Create a blank repository on your Git server. C
6. In your Git client, execute the commands to clone the new repository and initialize it with the Maestro project files. These commands can be obtained from GitLab after creating the repository. Use the **Existing folder** commands. D E

```
git init
git remote add origin <path-to-remote-repo>
git add .
git commit -m "Initial commit"
git push -u origin master
```

Part 2: Feature Branches

At this point, the Maestro master project and Git master branch have been created and initialized. We are now ready to create the feature branch and project.

7. In your Git client, create a local feature branch. F

```
git checkout -b "scm-feature"
```

8. In your SCM shell, create a Maestro feature project using the `scm project add` command. G

```
scm project add 'Add a new feature'
```

9. Refresh Maestro to confirm that the feature project is now available. The Project Details page should show that it's of the type SCM Private. Only project owners and administrators have access to projects of this type.

> NOTE
>
> In the Navigator pane, feature projects are distinguished from the master SCM project by a differently colored icon.

Part 3: Feature Development

At this point, the Maestro feature project and Git feature branch have been created and are ready for development of the new feature. While the feature project is available in Maestro, the Git feature branch only exists on the local computer.

10. In Maestro, open the form in the feature project, make necessary changes to implement the new feature, and save your form.
11. Return to your SCM shell and check the feature project's status:

    ```
    scm project status
    ```

    You'll find differences between your local project and the remote project on your Maestro server.

    Update your local project with the changes from the Maestro server: H

    ```
    scm project pull
    ```

    When you pull the changes, you need to confirm which changed files to accept. You can type `A` to accept all file changes, `N` to reject all file changes, or `Y` to interactively accept or reject each file change.
12. Return to your Git client and check the local repository's status. Git will report that there are modified files that need to be staged for commit. Stage and commit these files, except for `scm.properties` which we'll deal with later. I

    ```
    git status
    git add *.json
    git commit -m "Implemented the new feature"
    ```

Part 4: Merging Features

At this point, work on the new feature has been completed in Maestro, and the Maestro feature project and local Git feature branch have been updated. Next, we need to merge the feature branch into the master branch and update the master project from the master branch.

13. In your Git client, push the local feature branch to the remote repository, thereby creating a remote feature branch. J

    ```
    git push origin scm-feature
    ```

14. In GitLab, merge the feature branch into the master branch. K

    A good (and sometimes mandatory) practice is to merge the feature branch into the master branch via a merge request. When creating the merge request, you can choose to have GitLab remove the feature branch for you once it is merged. If you don't select this option, you can delete the feature branch manually after it has been merged.

15. In your Git client, checkout the master branch and synchronize your local master branch with the remote master branch. L

    ```
    git checkout master
    git pull
    ```

16. Checking the local Git repository's status reveals that the modified `scm.properties` file remains in the local working directory. As this file contains the project name, we want to restore the version of this file from the original SCM project created in Maestro before we update the master Maestro project. To do this, check the `scm.properties` file out of the master branch.

    ```
    git status
    git checkout scm.properties
    ```

17. With the local working directory updated, we can now update the master Maestro project. M

    In your SCM shell, push the local master Maestro project up to your Maestro server:

    ```
    scm project push
    ```

    Then delete the feature project:

```
scm project delete know/scm-example
```

Part 5: Project Cleanup

At this point, the master Maestro project has been updated with the work carried out in the feature project. You can confirm this in Maestro, then finish up by removing any left-over artifacts of the development process.

18. Refresh Maestro to confirm that the feature project has been deleted.
19. Open your master Maestro project and confirm that the changes made in the feature Maestro project are now applied to the master Maestro project.
20. In your Git client, delete the local feature branch and the local tracking branch for the deleted remote feature branch.

```
git branch -d scm-feature
git fetch --prune
```

The Feature Branching workflow used in this article offers a simple approach to collaborative development, wrapping Maestro SCM commands and processes around a Git feature branching strategy. If, however, you prefer to use a different branching strategy, you can still use the Maestro SCM version control commands to manage version control of your Maestro project assets.

Getting Help

If you need help with Maestro SCM command syntax, type `help` at the prompt to see the following list of available commands.

```
$ help
Maestro Source Code Management (SCM) shell, version 19.5.0Type help 'name' to find out more
about a named command:
cd                      Change the current working directory.
ls                      List the files in the current or specified directory.
cat                     Displays the contents of a text file.
start                   Start the specified program or OS shell command.
del                     Delete the specified file or empty directory.
cls                     Clear the screen.
rm                      Delete the specified file or empty directory.
dir                     List the files in the current or specified directory.
pwd                     Print working directory path.
type                    Displays the contents of a text file.
mkdir                   Make a new directory.
scm                     Maestro Source Code Management (SCM) integration commands.
scm connect             Connect to remote Maestro server.
scm design clone        Clone remote design to the local directory.
```

Next, check the Maestro SCM Quick Start for your Journey SDK release.

Maestro Offline Build Tool Overview

Journey Maestro comes with the Offline Build Tool, which is a command line interface (CLI) for building Maestro forms. This tool is a faster and more flexible alternative to building forms using the Maestro editor and it enables you to:

- Build one or all forms in a project with a single command
- Create a script to automate the form building process
- Integrate the form building process with your Continuous Integration / Continuous Deployment (CI/CD) pipeline
- Adapt Maestro development to your own workflow

The Offline Build Tool relies on Maestro Source Code Management (SCM) to clone a project and related libraries to your local file system before building forms. You can use this tool for both SCM and non-SCM (standard Maestro) projects.

> NOTE
>
> Maestro forms prior to version 19.05 may not build correctly with the Offline Build Tool.

The Offline Build Tool is especially handy when you need to build and deploy services using ANT tasks, such as `app-package` or `app-deploy`. These tasks may require a TM Form Version of a form to be locally available to a CI/CD pipeline, in order to succeed. You can easily achieve this by using one of the Maestro CLI tasks, for example, `maestro build-form`, which you add to a build script.

Next, learn more about the Offline Build Tool, which is available for your Maestro version.

Migrate to a SCM Project

Journey Maestro allows you to create SCM projects so you can use your favorite version control tools to branch project's source code. If you have a Maestro Standard project, once you are ready use Continuous Integration (CI)[1] practices on Maestro code base, which consists of templates, forms, components and libraries, you can convert it to the Maestro SCM Project type.

NOTE

It also works in the opposite direction - if you have a Maestro SCM project, you can migrate it to the Standard project type as the project type doesn't affect the content of forms.

Migration Challenges

The main problem here is that the SCM project doesn't support multiple versions of any asset types it contains. There must be only a single version number of each form, component, library, and template in the project. It's assumed that the GIT branch it was pulled from identifies what version of the asset this is (or will be deployed as).

Due to the above, we are hitting a big problem in the migration to SCM projects. Generally, there would always be multiple versions of any of the assets in the legacy maestro projects. That's just the way we used to do it. Since the SCM project can have only one version, we need to pick the initial one which will make it to GIT as the first one at the migration time. Picking the right version number of any of the assets is not as of an issue as making sure we pick and migrate only that one while removing (or skipping) all the other ones during the migration process.

Just imagine we are migrating a project with 10 forms where each of them has 30+ versions (same for templates, components, libraries). When creating the SCM project only the most updated version needs to be migrated.

The restriction of a single version only takes us to the next challenge: a new folder structure of the SCM projects. The folder structure of a legacy project downloaded via maestro UI or SCM is different to the folder structure of the scm project type. The version folders were removed decreasing the depth of the folder structure by 1.

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[1] Continuous Integration (CI) is a development practice that requires developers to integrate code into a shared repository several times a day. Each check-in is then verified by an automated build, allowing teams to detect problems early.

Migration Strategies

There are several ways to migrate an existing Maestro standard project to a SCM one. Let's look at them in details.

Recreate the original project

As the heading suggest this approach recommends to create an empty SCM project where all necessary assets from the original one will be manually copied to. The coping is done via Maestro dashboard export and import of each asset one by one.
Pros

- Great opportunity to clean up the project by skipping any litter
- A good opportunity to review the project structure, dependencies between assets, such as forms, components, libraries, and refactor them if possible

Cons

- Too lengthy - can time too much time
- Error prone - easy to miss or copy wrong assets

Converting a legacy project to the SCM project type

If you chose to convert an existing legacy project to the SCM project type as it is a few steps must be executed manually. The steps are listed below:

1. Pick asset's current versions:
    - remove or skip any outdated asset versions and pick only the current one you wish to push into the GIT master branch.
    - this would likely be the latest or highest version of your asset.
2. Delete remaining asset versions. It must be done on forms, components, templates, libraries.
3. Migrate asset's content. Copy all asset current version's content into the asset's root folder. For example, if you picked the version 1.0.0 as the current one: `forms/cc-application/1.0.0/* to forms/cc-application/*`.
4. Update asset's lib-manifest.json. remove the delete version numbers from the `designVersions` node.
5. Update the asset's `form-manifest.json`.
6. Validate. Test library associations. Make sure the SCM project has the same libraries associated as the legacy (original) project. Note that the project version libraries will be on the version 1.0.0 though.

Next, learn how to use Maestro SCM to implement a Git Feature Branch workflow.