Building a Mobile App with Oracle Visual Builder Cloud Service

In this lab you'll create an application that automates a process of approving travel requests that is currently done in spreadsheets. You will also call a public REST service and incorporate the results into your application.

Connect to Oracle Visual Builder Cloud Service (VBCS)

Open the chrome browser and navigate to:

https://oicvbcs-gse00015502.uscom-east-1.oraclecloud.com/ic/builder/

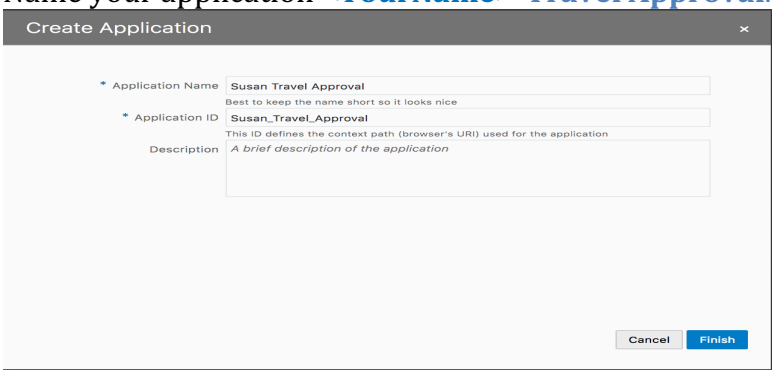
Login: cloud.admin
Password: Stoic@1LUster

Creating a New Application

First we will create an empty application.

1. Click the **New** button.

2. Name your application **<YourName>-Travel Approval.**

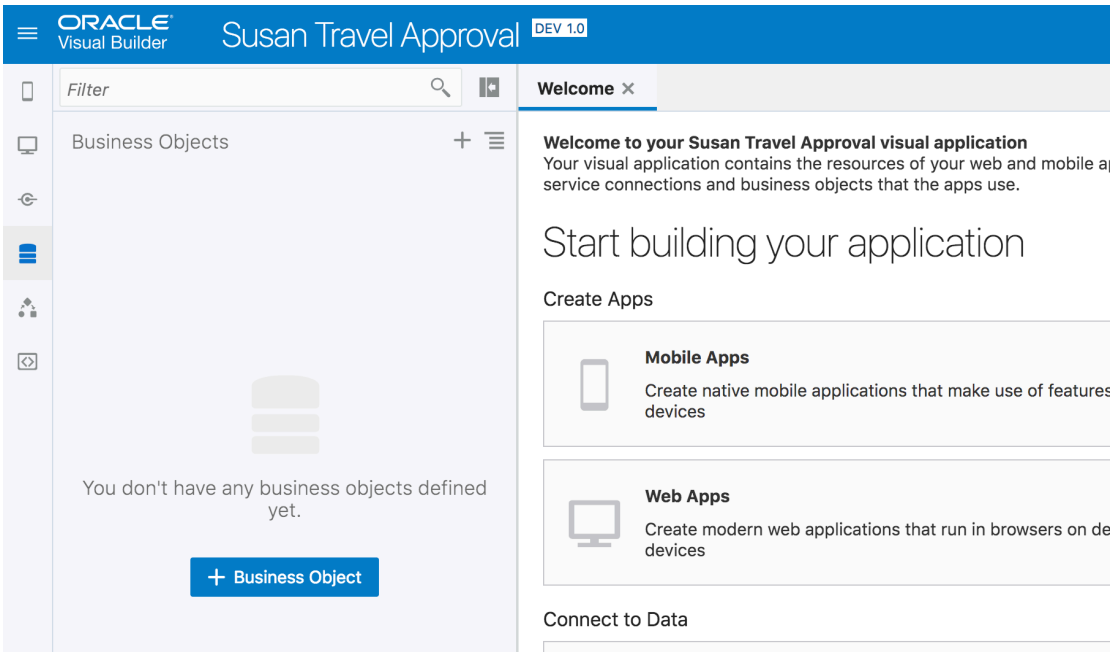


3. Click **Finish** to complete the creation of your application.

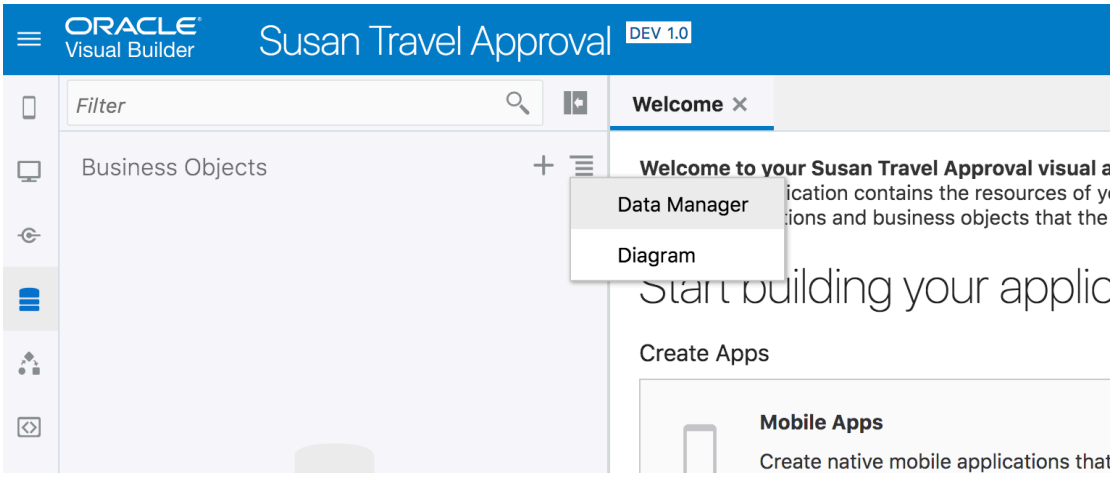
Creating Business Objects

You will create Business Objects to store data by importing an existing spreadsheet. You will then edit the Business Objects, adding fields and setting default values and creating a relationship between objects

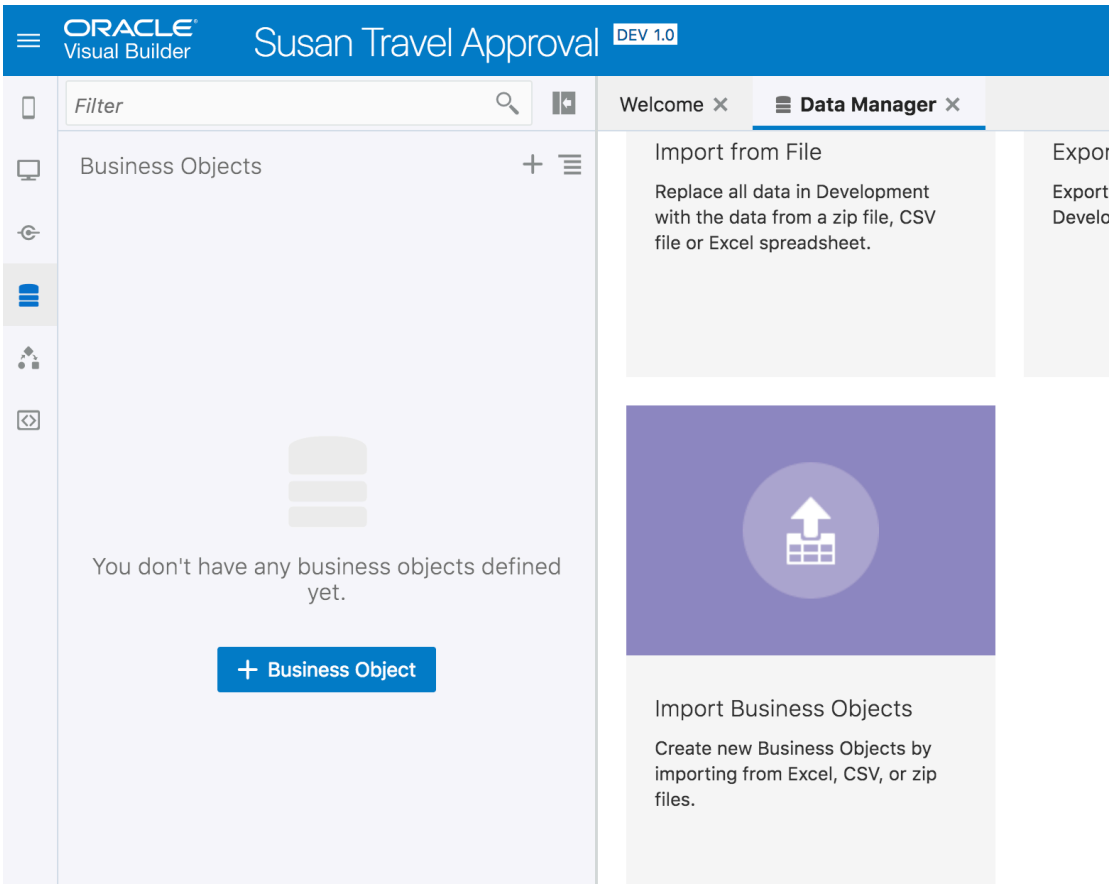
1. Click on **Business Objects icon** to the left of the navigator. Note that the **Business Objects** navigator opens in the left panel.



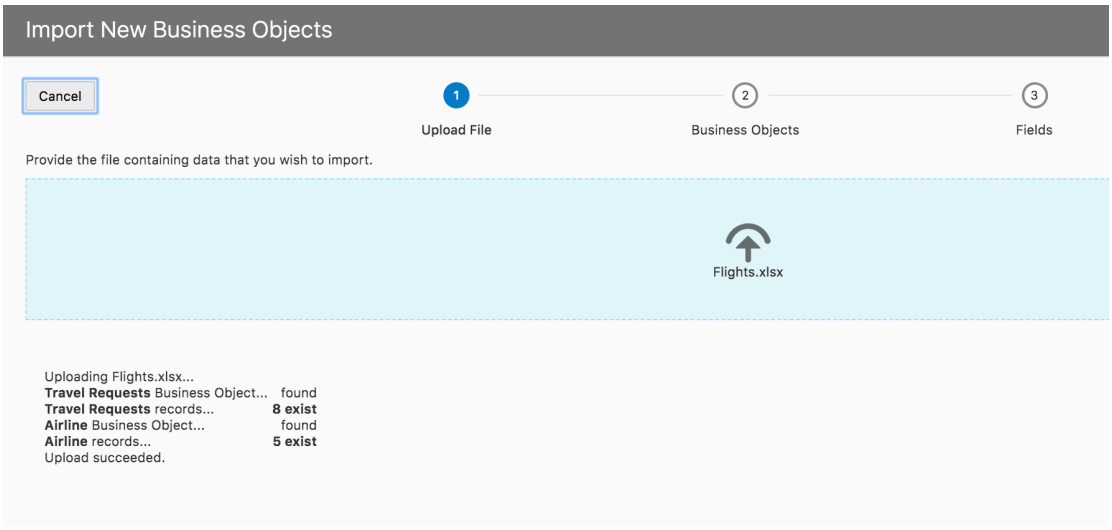
2. At the top of the navigator, click the **Business Objects** menu and select **Data Manager.** This provides short cuts when creating business objects.



3. Click **Import Business Objects** to import data from a spreadsheet. Note click the purple Import Business Objects, not the orange **Import From File**.

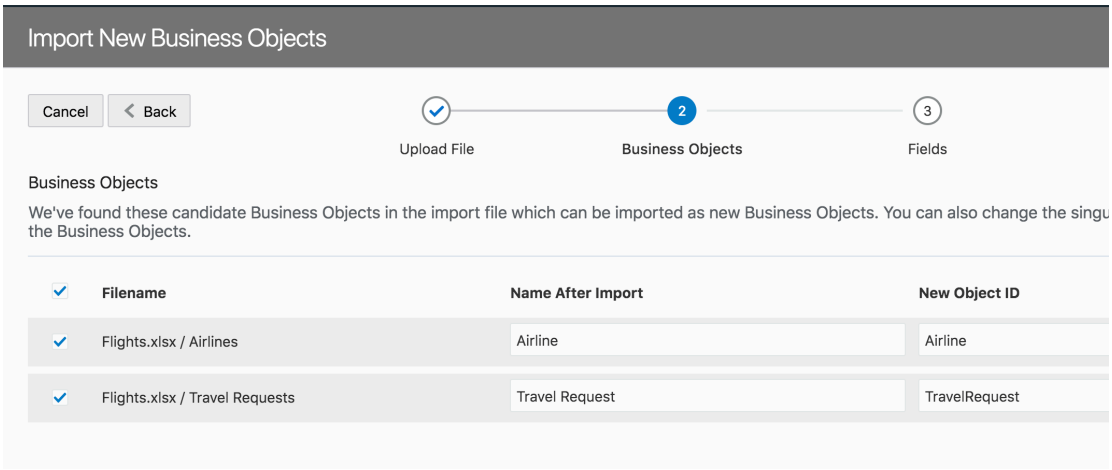


4. Inside the Import Business Objects wizard upload the **Flights** spreadsheet.



5. Once you see the upload has succeeded click **Next**.

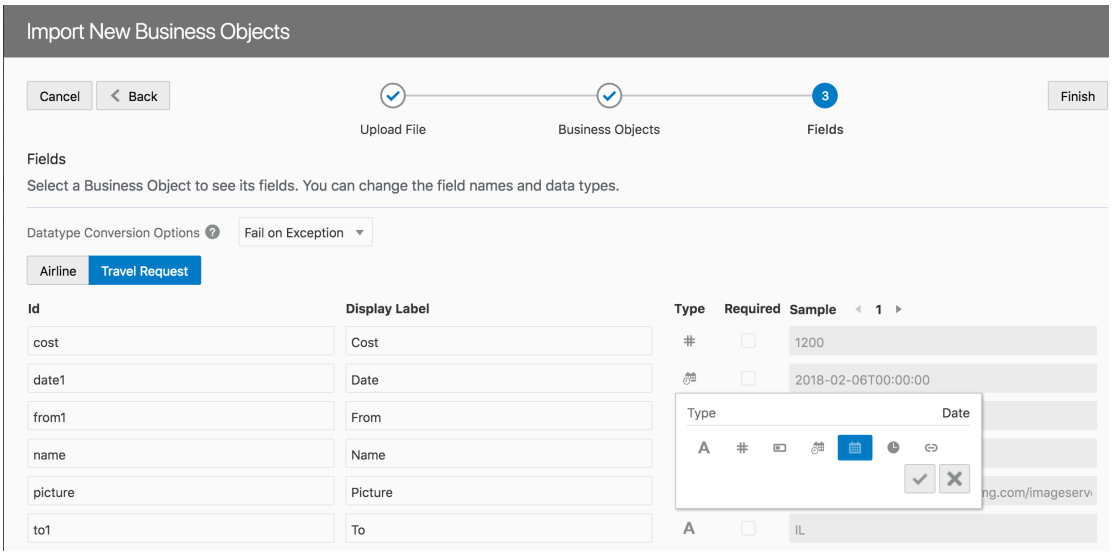
6. Change the Name After Import and New Object ID from **TravelRequests** to **TravelRequest** and from **Airlines** to **Airline**.



7. Click **Next.**

8. **Click TravelRequest** to see details of that Business Object.

9. Change the **Type** of the field with the display label **Date** field from **DateTime** to **Date.**



10. Click **Finish** to complete the data import and **Close** to finish. **Note:** If your business objects do not appear in the list of business objects, refresh your browser.

Visual Builder creates the business objects – it creates a table in the database, adds primary key (ID) and audit fields, imports the data from Excel into it and exposes a set of REST services that allow you to do the CRUD on that new business object

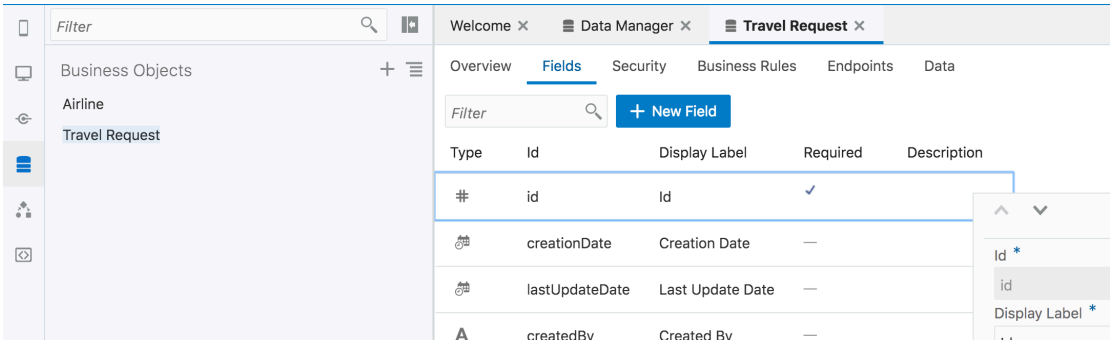
Editing the Business Objects

Now you will start adding additional fields to the business objects. We'll start by adding a Boolean field to track whether the request is approved.

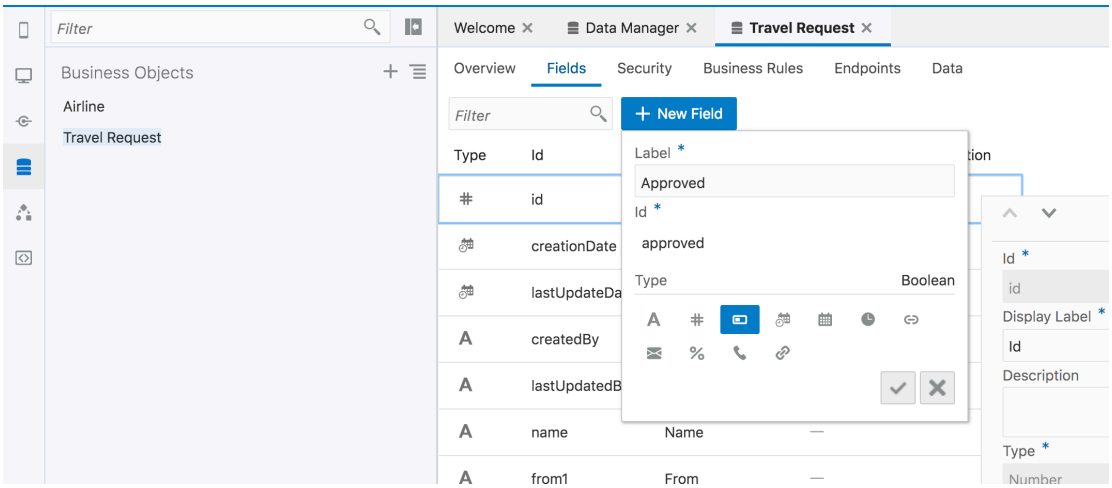
1. In the **Business Object navigator**, click on **Travel Request** to open it in the editor

2. Click on the **Fields** tab

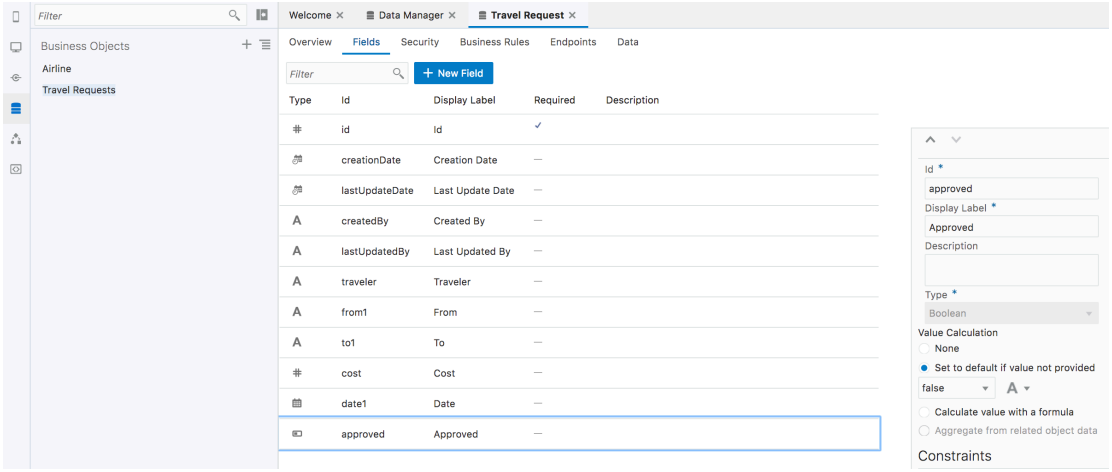
3. Click on **New Field** to add a new field to this business object



4. Add a field called **Approved** of type **Boolean**



5. Select the **Approved** field. In the **Property Inspector** on the right, scroll down to the **Value Calculation** section. Select **Set to default if value not present** and set the default value to **false.**

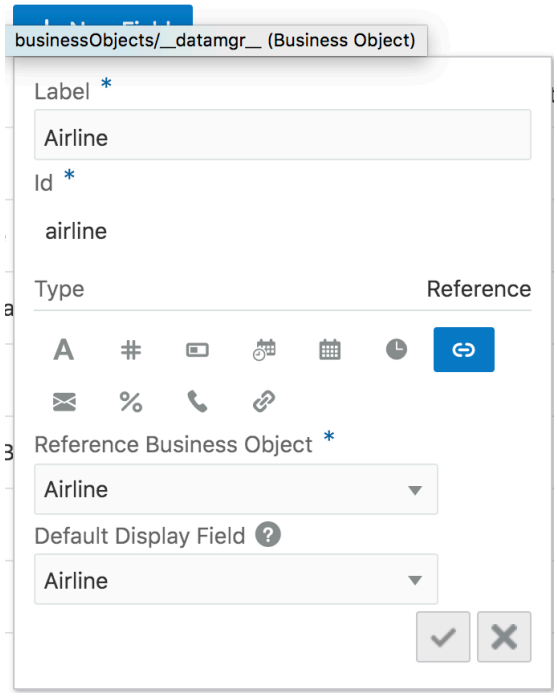


Adding a Relationship to Another Object

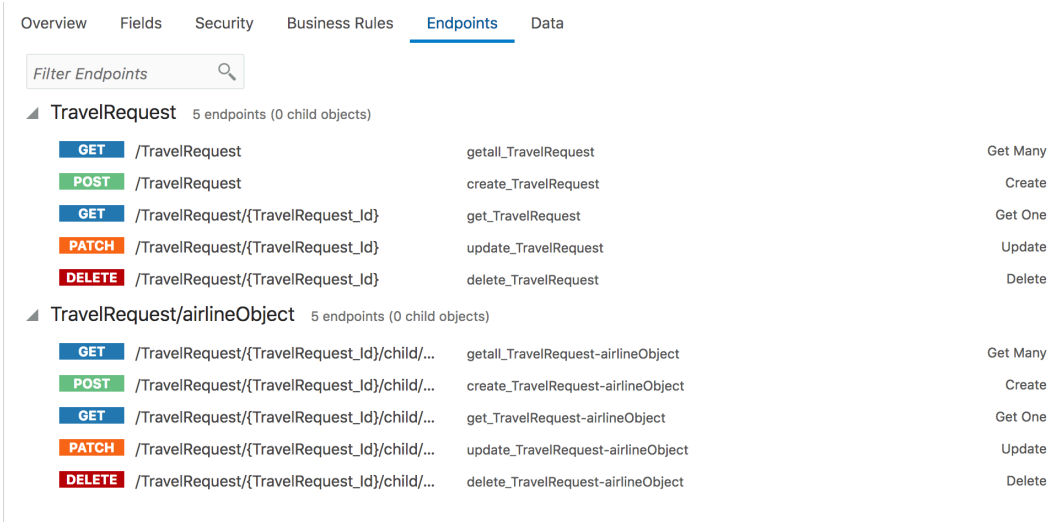
You will now create a reference from the **Travel Request** object to the **Airline** object.

1. Add another field to **Travel Request**. Set the name to **Airline** and the type to **Reference.**

2. Select **Airline** as the **Business Object**. The tool automatically uses the **ID** field as the foreign key. Select the **Airline** field as the **Default Display Field**.



3. Click on the Endpoints tab. Note the REST Endpoints that have been exposed to access the Business Objects in your apps

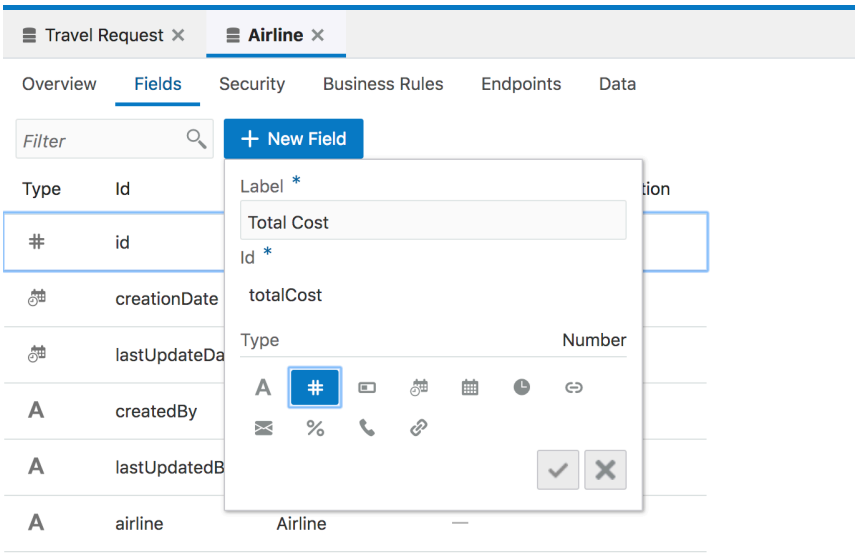


Adding Aggregate Fields to an Object

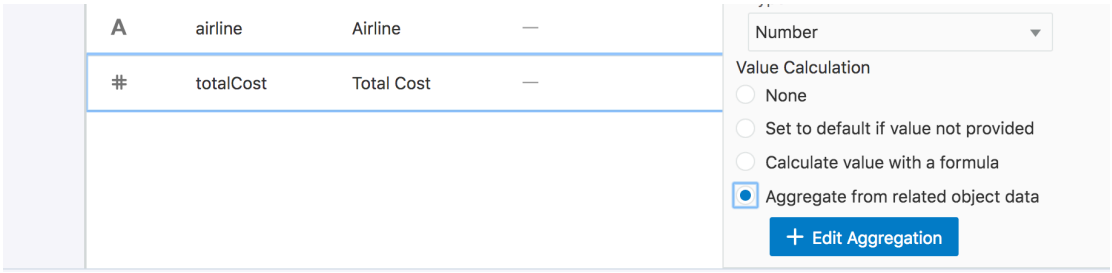
Now you will add some fields that aggregate data in the Airline object. We will use this data to populate charts in the web apps showing statistics of our trips.

1. Select the **Airline** object's editor by clicking **Airline** in the list of business objects.

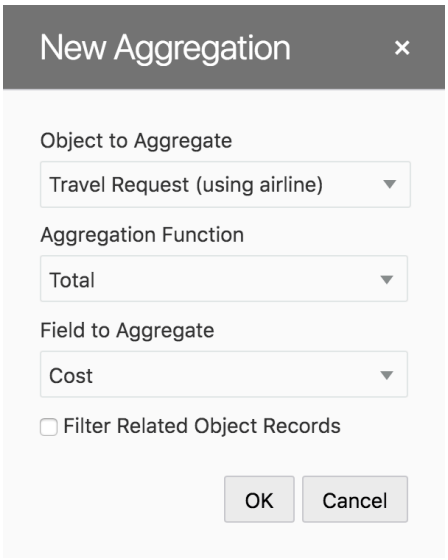
2. Add a field: **Total Cost**, of type **Number** that is going to show the total cost of air travel expense requests by airline.



3. With the **Total Cost** field selected, go to the Value Calculation section of the Property Inspector and select **Aggregate from related object data**



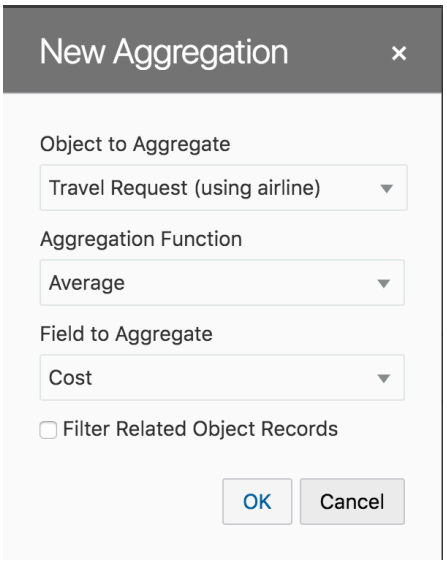
4. Click the + **Edit Aggregation** button. See that the object to be aggregated has defaulted to Travel Request, using airline. Select **Total** as the function and select **Cost** as the field to be totaled. Click OK



5. Add a field: **Average Cost**, type **Number,** that is going to show the average cost of air travel expense requests by airline

6. Again, with the **Average Cost** field selected, go to the Value Calculation section of the Property Inspector and select **Aggregate from related object data**

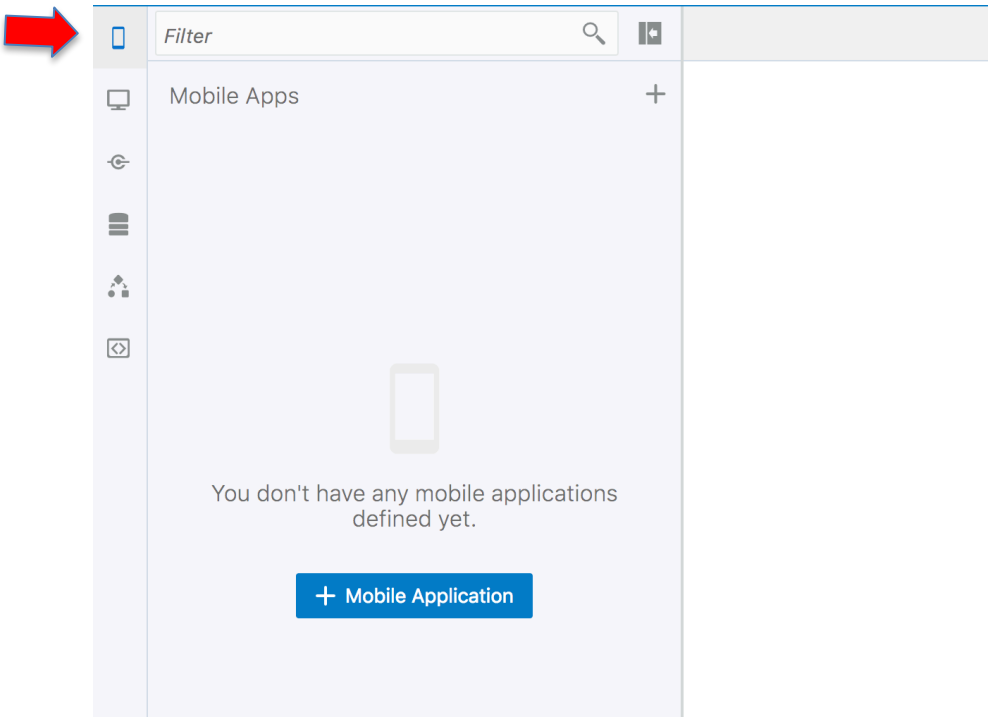
7. From the **Travel Request** object, select **Average** as the function and **Cost** as the field to aggregate



Create the Mobile Application

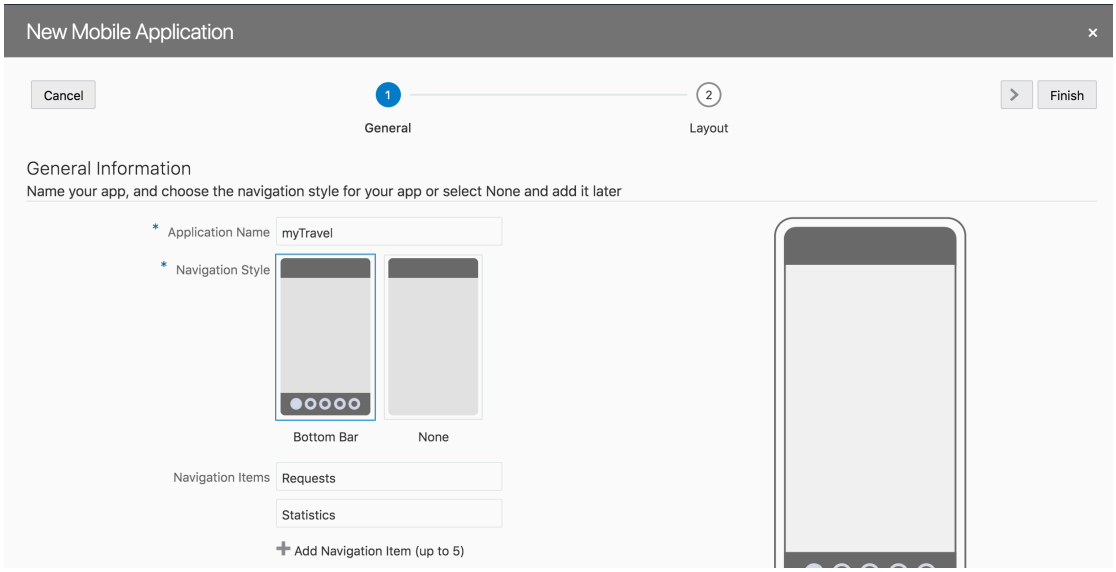
In this section you will create a mobile app to enable the travel approval process, using the Business Objects you created earlier

1. Click the **Mobile Apps** icon in the navigator and click the **+ Mobile Application** button (you can also close the open tabs in the editor)

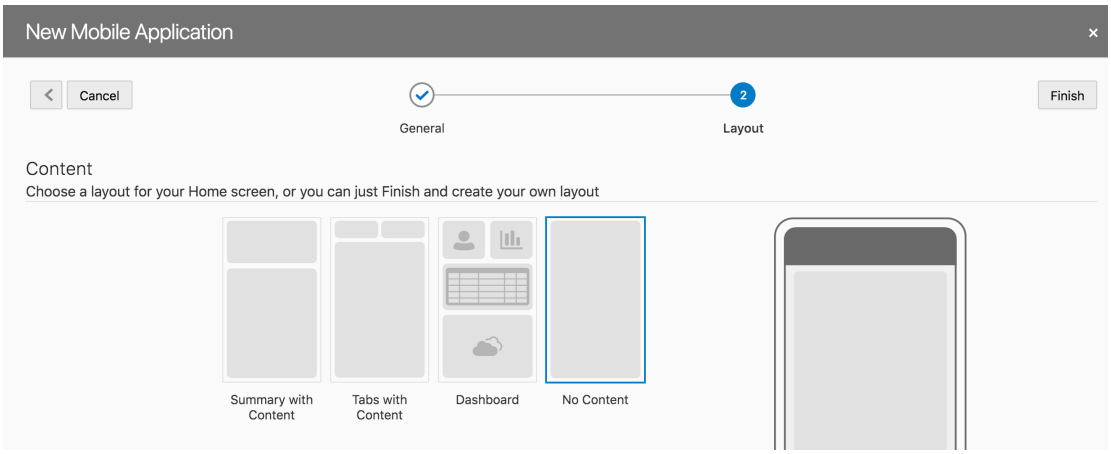


2. Name the Mobile Application **myTravel**. Keep the default **Navigation Style (Bottom Bar).**

3. Name the first two **Navigation Items** **Requests** and **Statistics**. Delete the third navigation item.



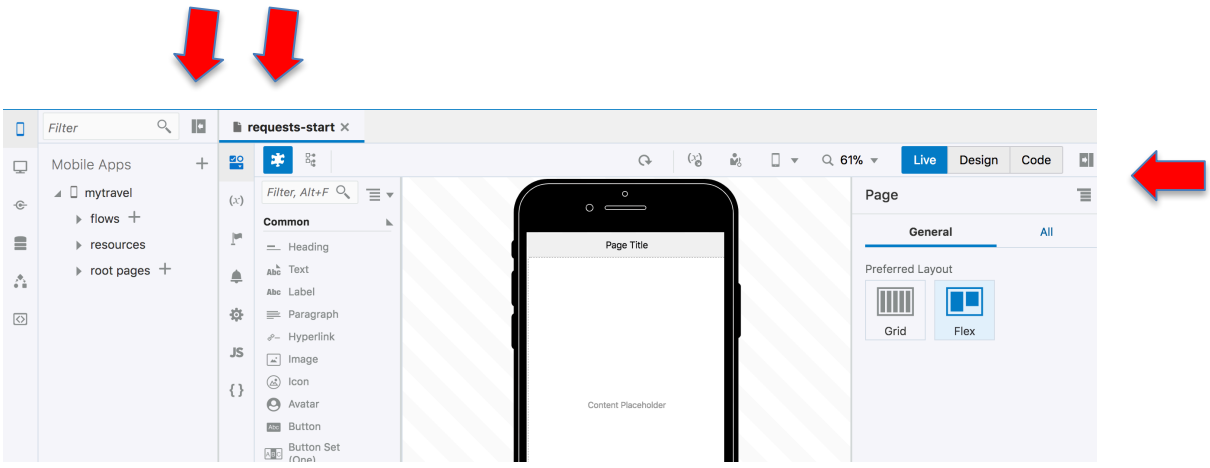
4. Click the **>** button. Now you can choose a default layout for your home screen. Select **No Content**.



5. Click Finish.

VBCS creates the application. Expand it in the **Mobile Apps** window to see its structure. The app has a page flow for each of the **Navigation Items** you specified earlier. Each flow has a default home screen and the first of these, **requests-start,** is open in the **Editor**. This is the entry point to your application.

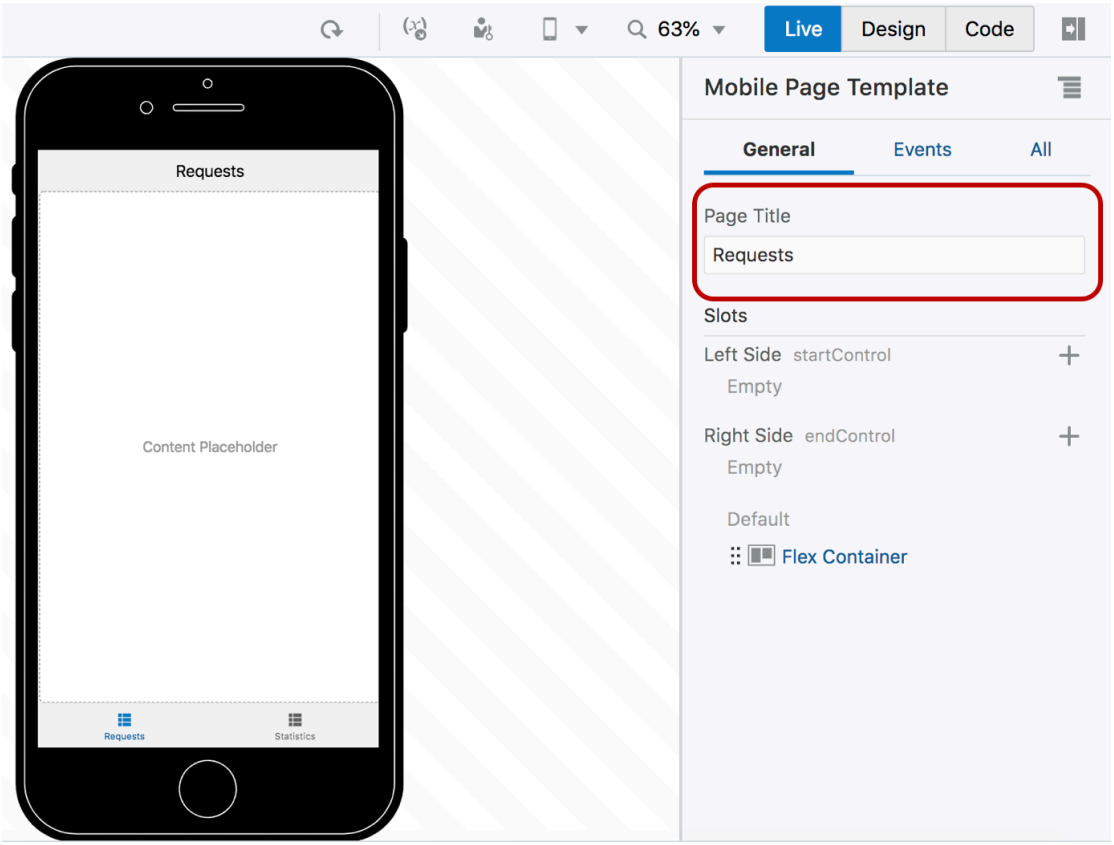
You can collapse the **Application Navigator** and the **Page Structure** viewer as necessary by clicking on the collapse icons.



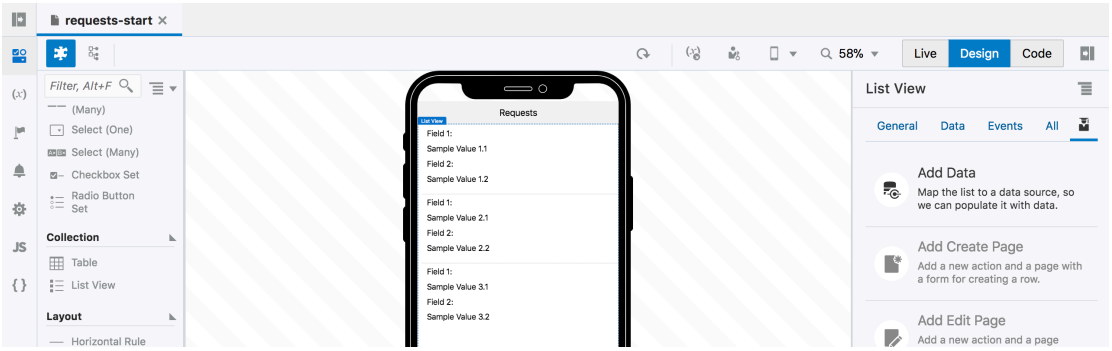
Now you are in the **Visual Page Editor**. On the left is the **Component Palette**, the main area is the **Page Editor** and to the right is the **Property Inspector**.

Adding a List to the Screen

1. In the **Editor**, select **Page Title**. The **Property Inspector** updates to show the properties of the Mobile Page Template, which includes the text **Page Title**.
2. Change the **Page Title** to **Requests**.



3. From the Component Palette drag a **List View** onto the page

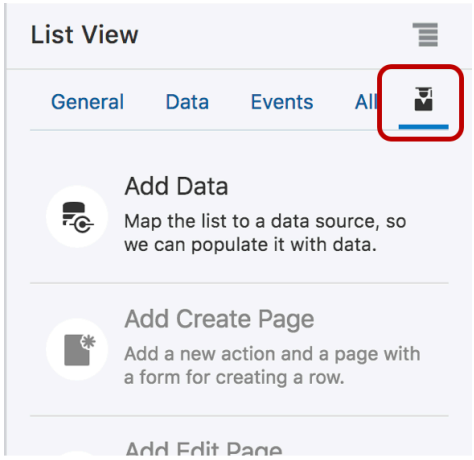


Binding Data to the Screen

In this section you bind the elements on your screen to data – in this case the **TravelRequest** business object. You access and update the data in the underlying table using the REST Endpoints that were created as part of the business object when you imported the spreadsheet.

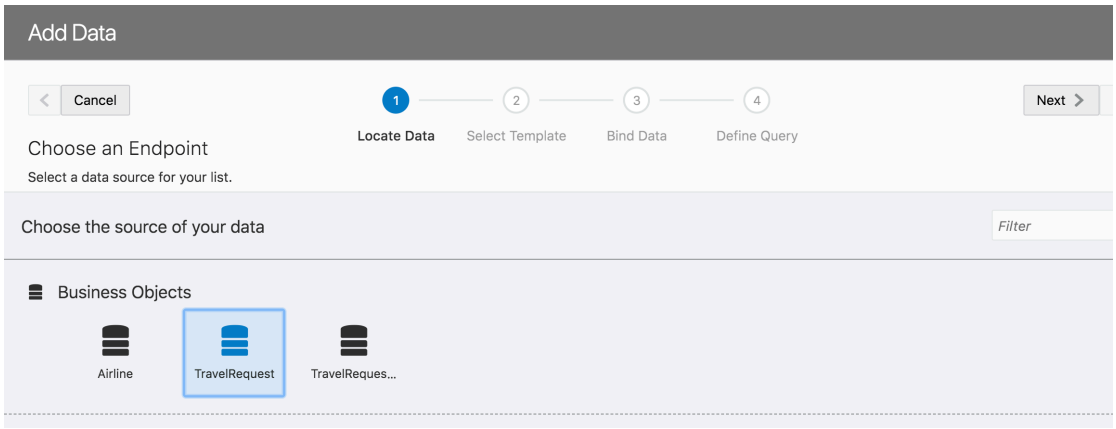
We will use **Quick Starts** to quickly bind our table and generate our Edit page for the data.

1. In the **Property Inspector**, note the **Quick Start** tab is open by default when you first drop a List View on the page.

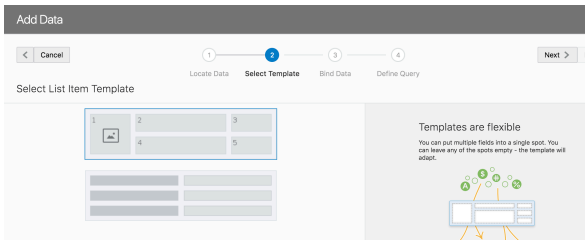


2. Click **Add Data**.

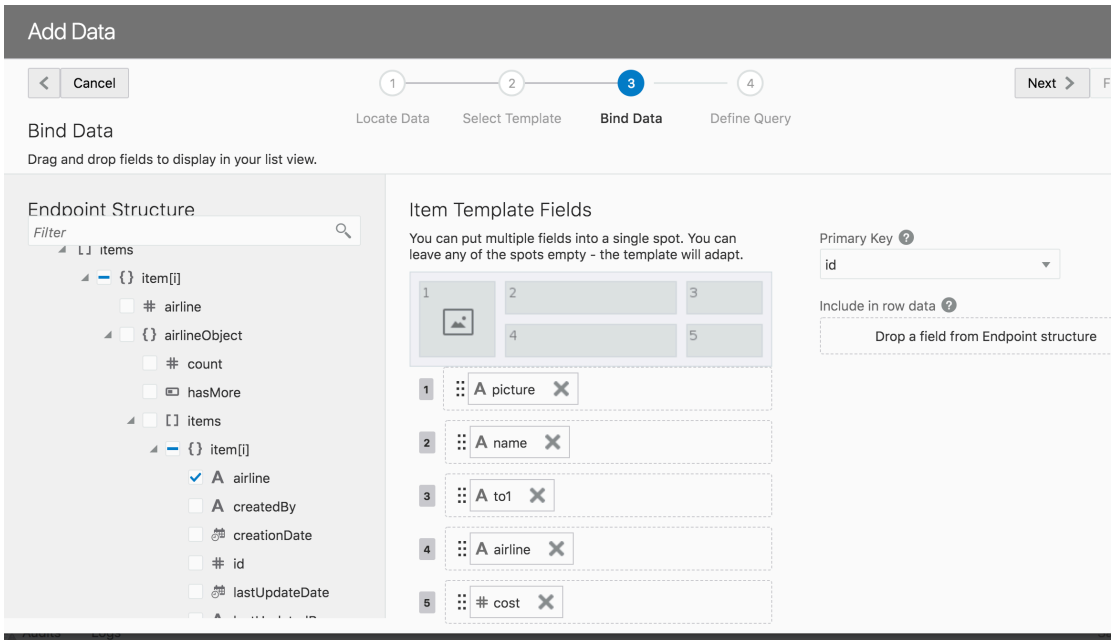
3. Select the **TravelRequest** Business Object and click **Next**.



4. Now choose the **List Item** template and click **Next**.

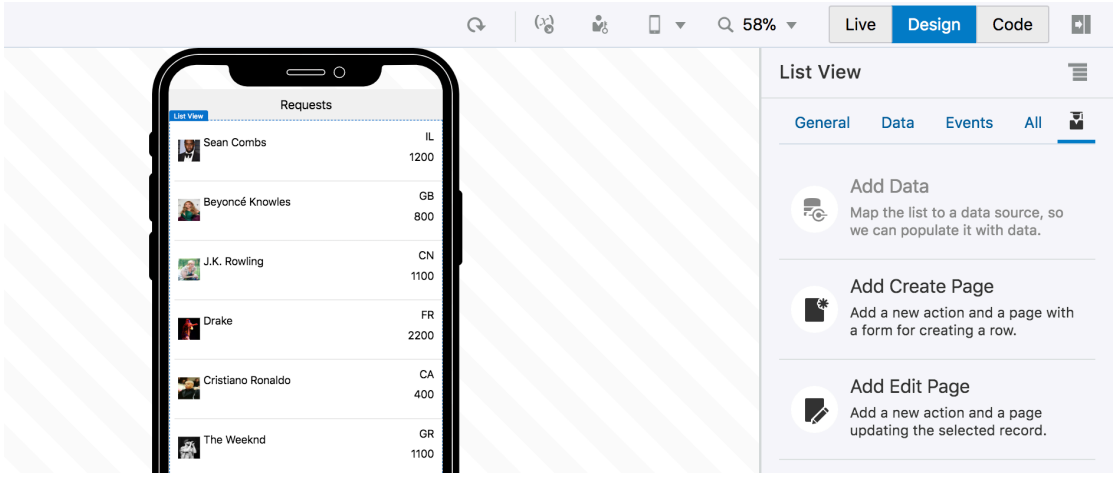


5. Now select which fields to show in the list. Drag and drop the following fields to the slots in the wizard as shown in the picture below:
   - **picture**
   - **name**
   - **to1**
   - **cost**
   - **airlineObject > items > airline**



6. Click **Next** and then **Finish**

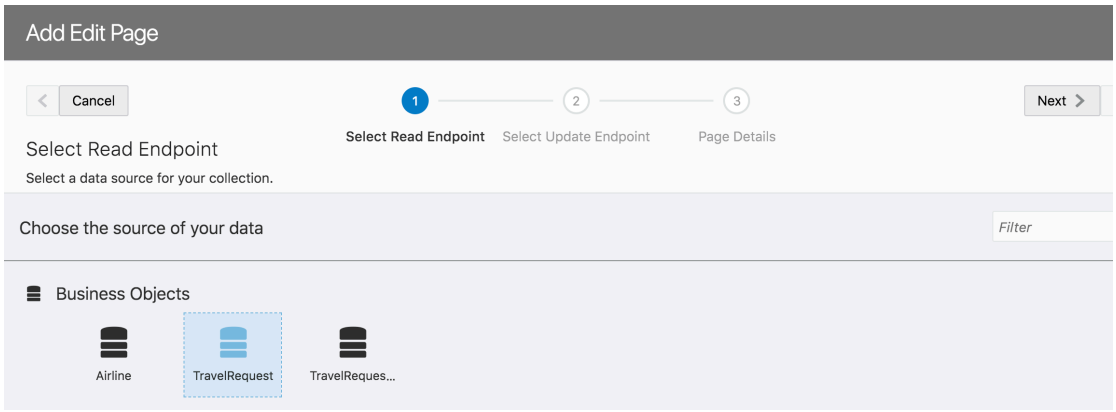
7. Note that the Editor is now showing the live data from the Business Object, even in Design view



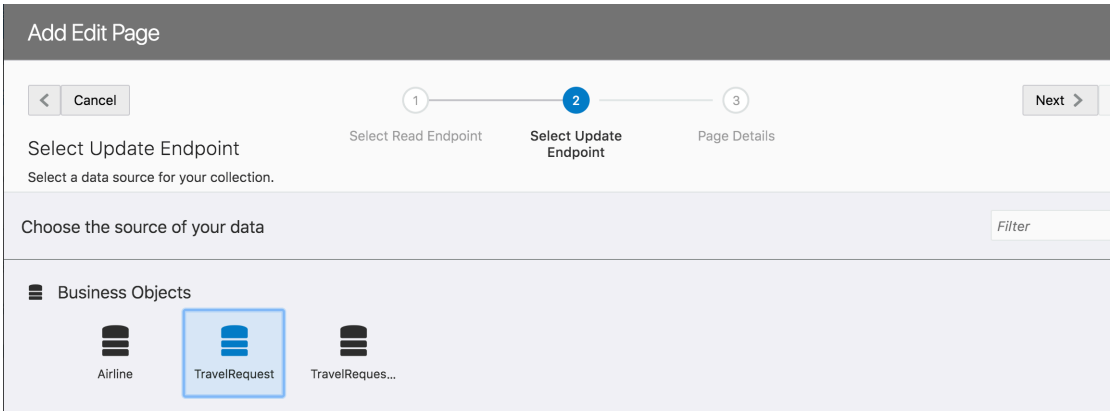
Adding an Edit Page

1. In the Quick Start panel of the Property Inspector, click **Add Edit Page**.

2. Select the **TravelRequest** Business Object as the source data for this edit page and click **Next**.

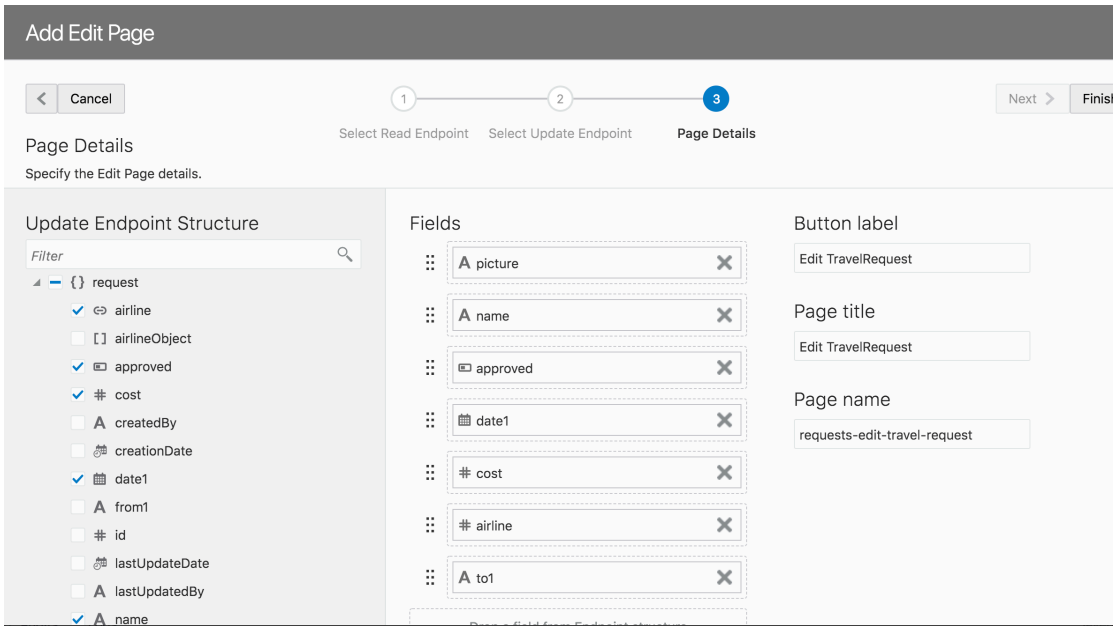


3. In the **Update Endpoint** page of the wizard, select the **TravelRequest** business object and click **Next**.



4. Select the following fields to be displayed on the Edit Page:
   - **picture**
   - **name**
   - **approved**
   - **date1**
   - **cost**
   - **airline**
   - **to1**

You can reorder the fields once you've selected them using drag and drop. Note that you select the **airline** reference field, not the **airlineObject**.

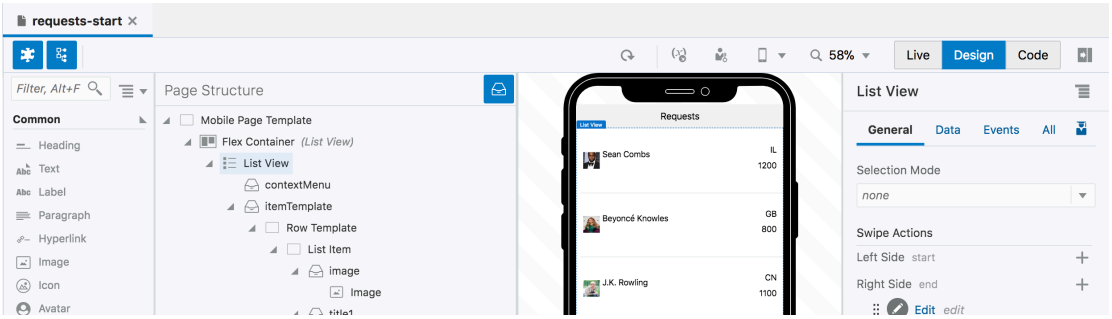


5. Click Finish.

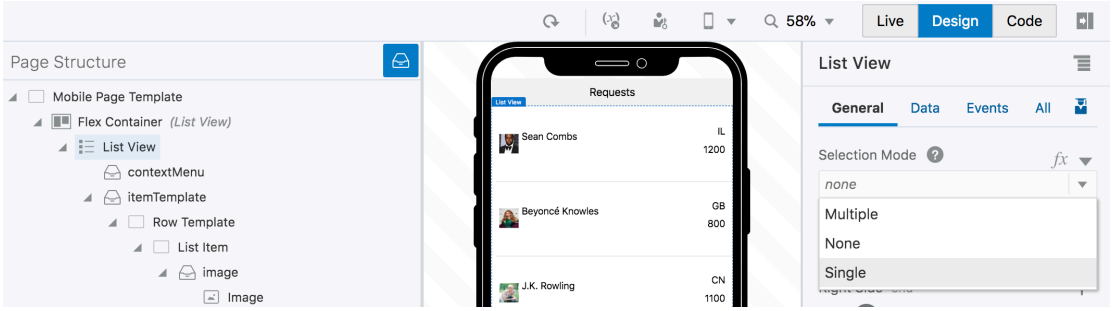
Adding Navigation from the List View to the Edit Page

Now you set up the selection event on the **Requests** list to call an action chain that navigates you to the corresponding Edit page.

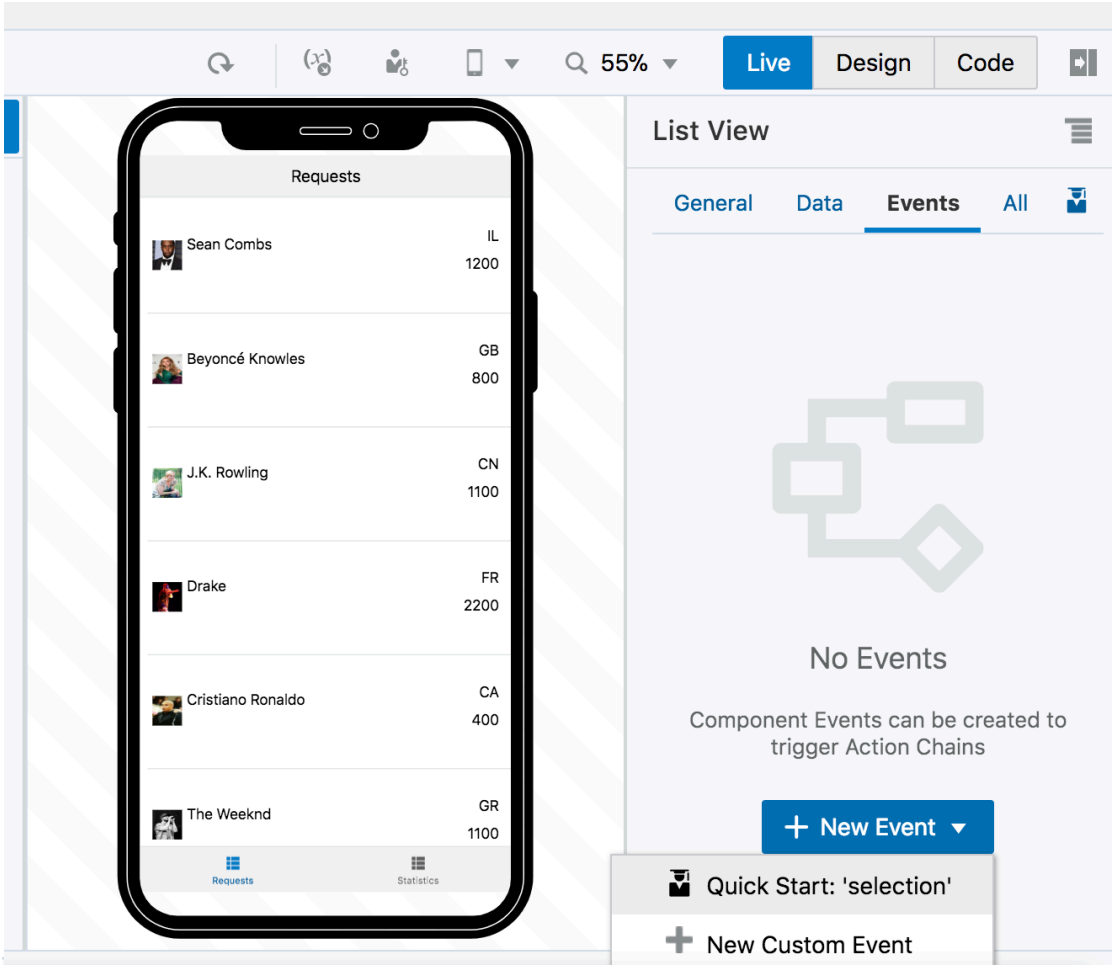
1. Make sure the **List View** component is selected. You can select it in the **Page Editor** or in the **Page Structure** window.



2. On the General Properties for the List View – set the **Selection Mode** property to **Single**.

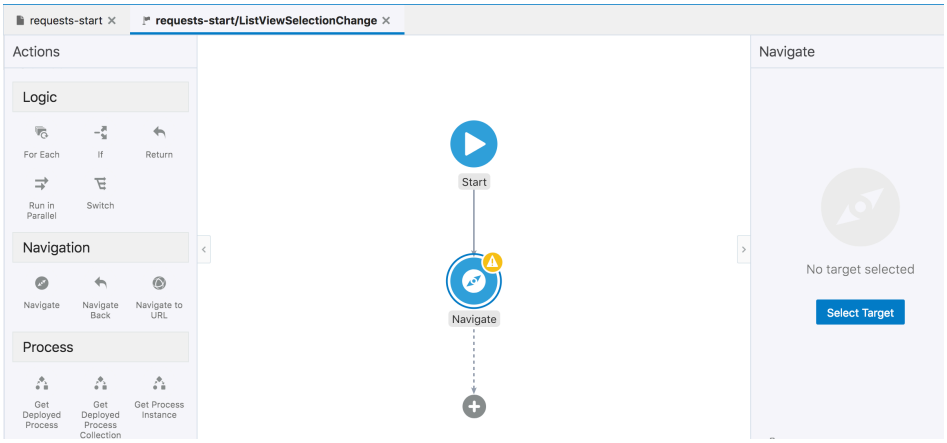


3. Click the **Events** tab in the Property Inspector. Click **New Event** and select **Quick Start: selection**.

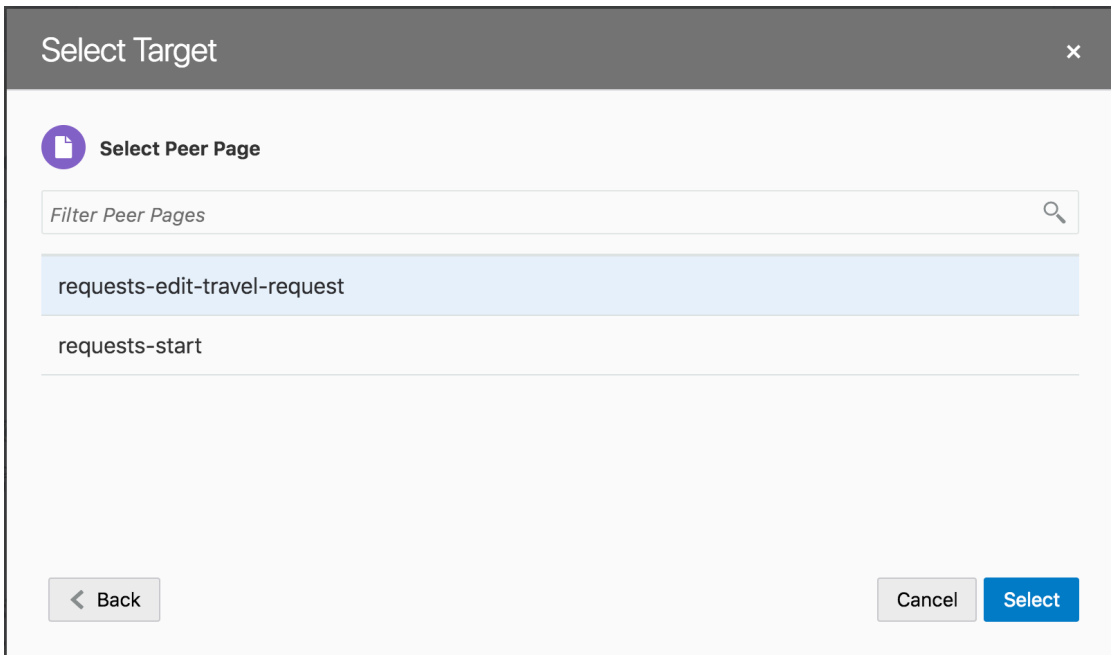


Now you are in the **Action Chain Designer** – where you can map the exact event process that you want to happen when the user selects a row in the list

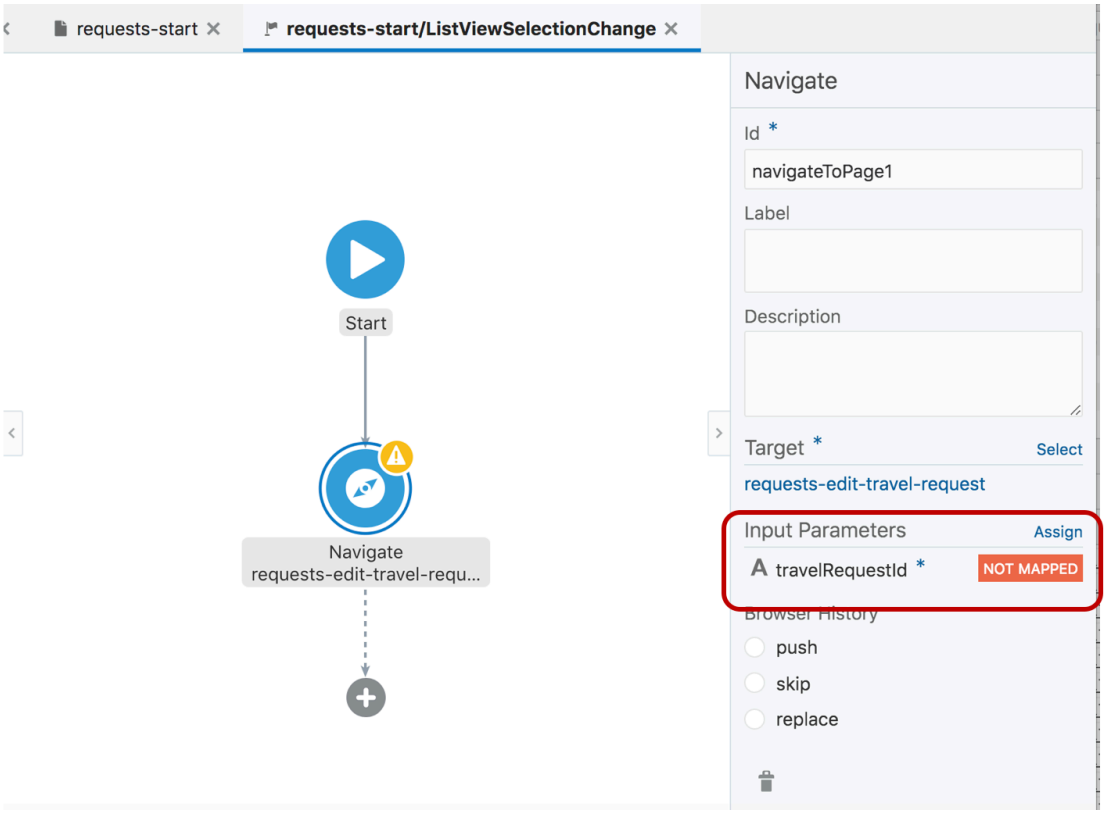
4. Drag a Navigate component onto the editor. In the Property Inspector, click **Select Target**.



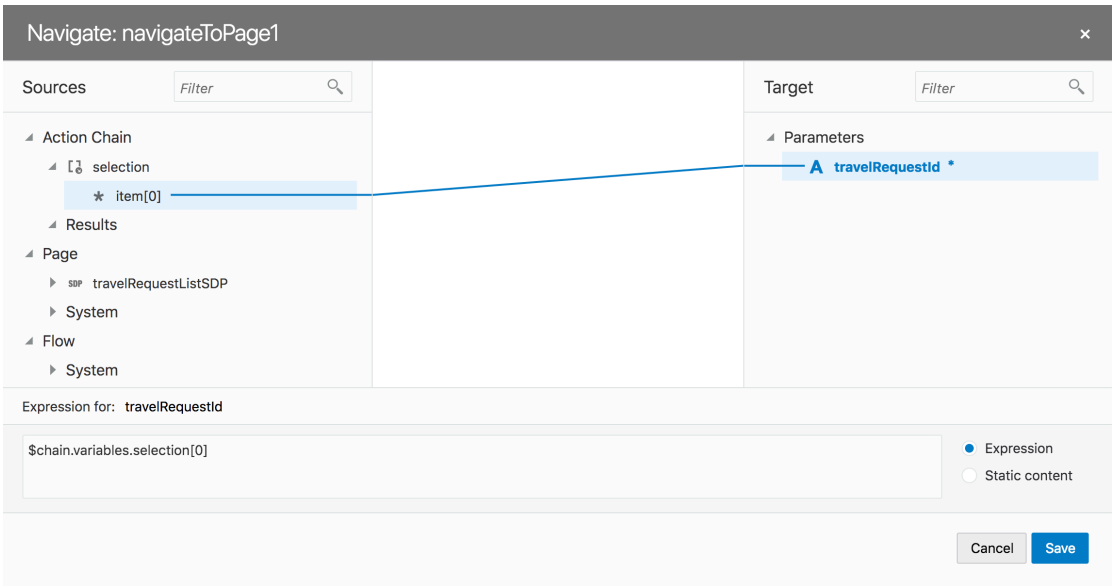
5. Click **Peer Pages >** requests-edit-travel-request and click **Select**.



6. The Edit page has a mandatory input parameter called **travelRequestId** that tells it which record to load. You need to pass in this parameter when you navigate to the page. Click **travelRequestId** in the **Property Inspector**.



7. Map **Action Chain > selection > item[0]** on the left to **travelRequestId** on the right.

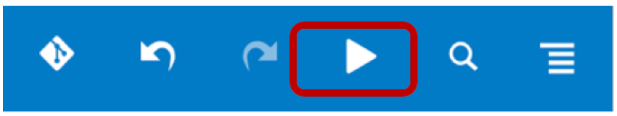


8. Click **Save**.

Running the Application

You can run the application either in **Live** mode in the **Page Designer** or in a separate preview window.

1. To run in a separate window, click the **Run** button in the top right of the designer.



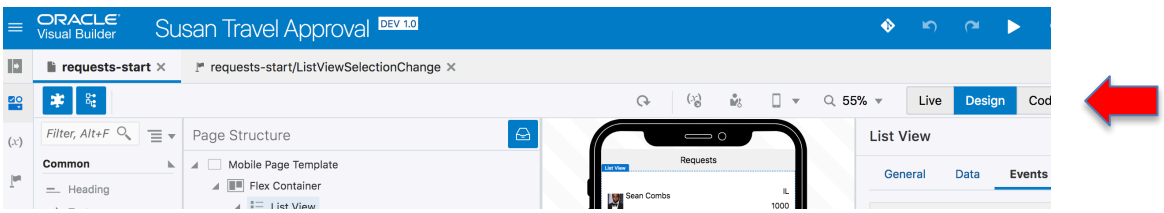
2. You can view how the mobile app will render for different device types by selecting the **mobile device type** in the dropdown at the top of the window.

3. Update a few of the records:

Sean Combs – El Al, Approved
Beyonce, JK Rowling – British Airways
Drake – KLM, Approved
Christiano Ronaldo – KLM, Approved, Cost 2000

You can also run the application in the Page Designer by switching to Live mode.

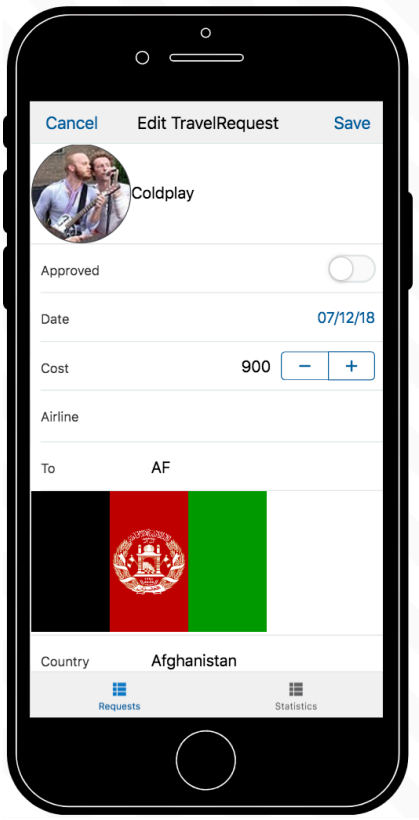
4. In the Designer, open the **requests-start** tab and click the **Live** button. Then select a record. The Edit page opens and loads the record you selected.



5. Return to Design mode by clicking the **Design** button

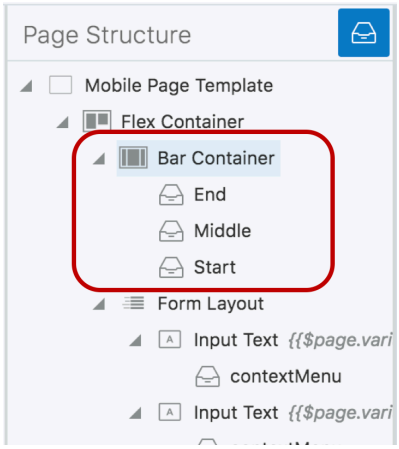
Modifying the Edit Page

Now you will modify your edit page to make it look a bit better and to display some information about the country that the Travel Request took place in. Here's what your completed page will look like:

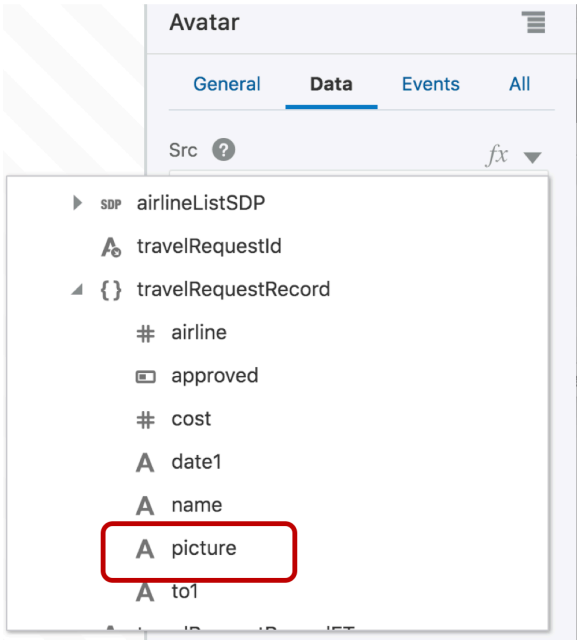


1. Open the Page Structure editor. It's often easier to drag and drop onto the Page Structure than onto the Page Designer.

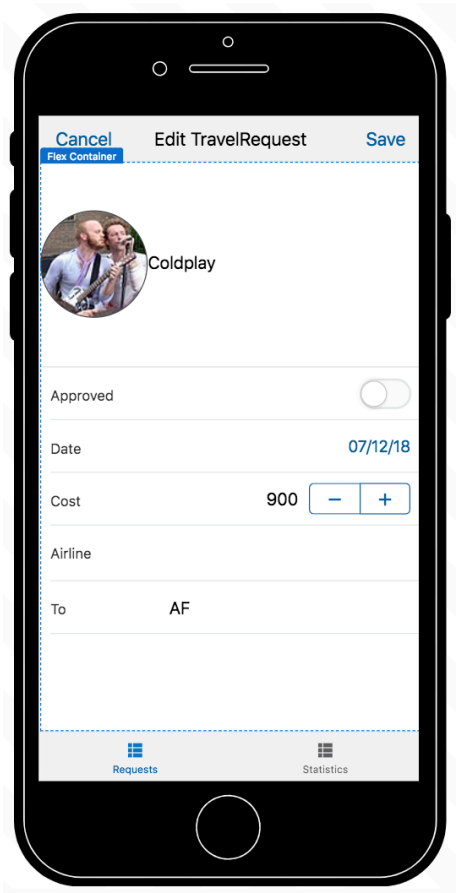
2. Drag a Bar Container into the Flex Container and place it above the Form Layout component.



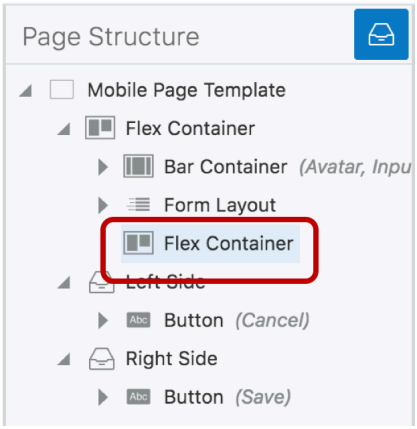
3. Drag an **Avatar** component into the **Start** slot in the **Bar Container**.
4. In the Property Inspector, set the Size to LG. Click the Data tab and set the Src property to travelRequestRecord > picture.
5. Delete the picture (text field) from your page



6. Grab the **Name** field (in the page) and drag it up to the **End** slot in the **Bar Component**. Note that you have to grab the value for the field ("**Coldpay**") and not the label "**Name**". Your app should now look like this:



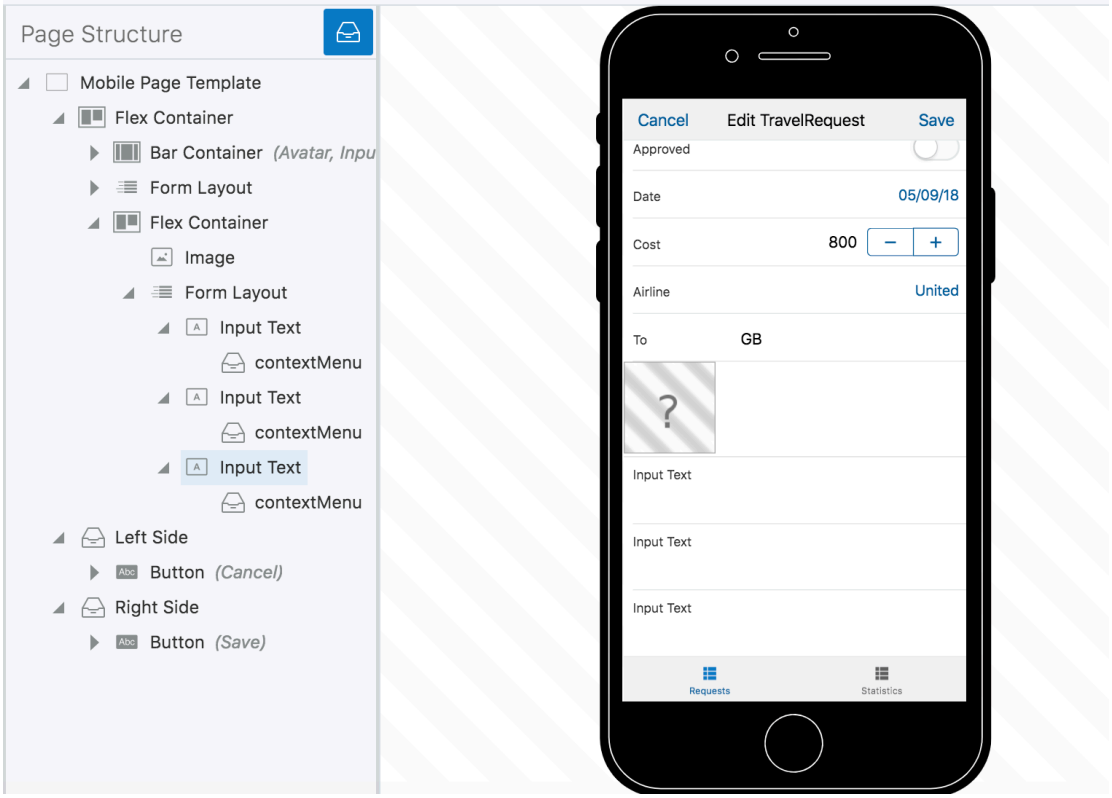
7. Drag another **Flex Container** below the **Form Layout** but still inside its parent **Flex Container**.



8. Place an **Image** component into the **Flex Container** you just added.

9. Place a **Form Layout** below the Image.

10. Place three **Input Text Components** into the **Form Layout**. Your page should look like this:

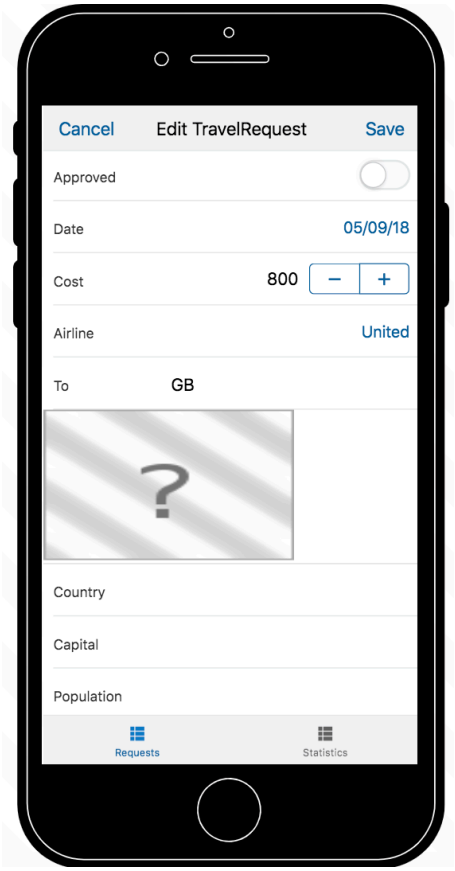


11. Select the **Image** component. In the **Property Inspector**, set the **Width** to **250** and the **Height** to **150**.

12. Select the **Form Layout** and set **Label Edge** to **Start**.

13. Change the labels on the Input Fields by selecting each field and changed in the **Label Hint** property in the **Property Inspector**. Change the fields to:
    - **Country**
    - **Capital**
    - **Population**

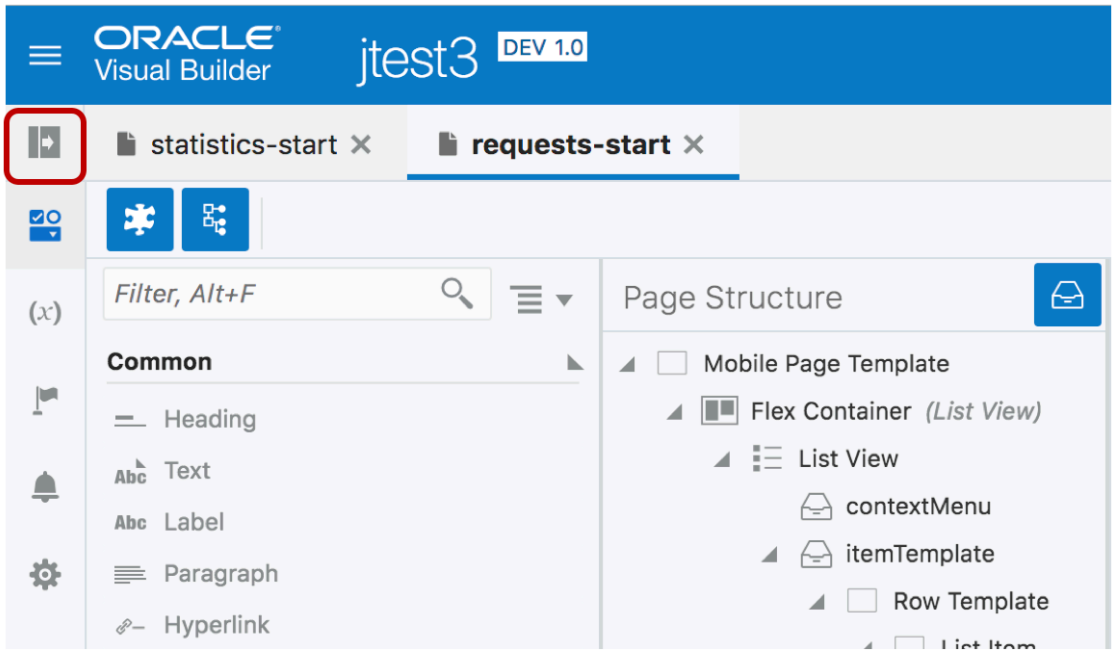
Your app should look like this:



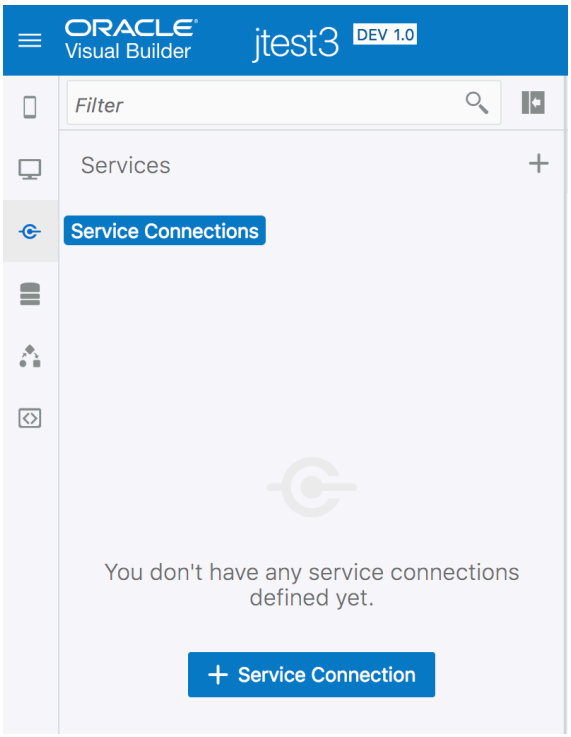
Now you are going to call an external Rest Service from this page to provide some additional information about the country to be visited.

Registering an External REST Service

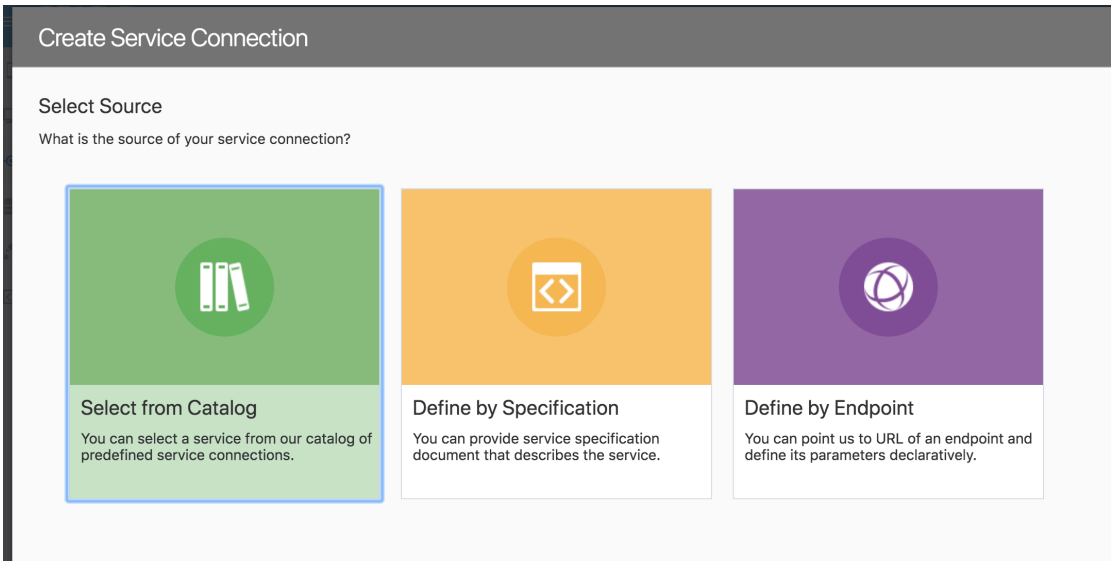
1. If it isn't already open, open the Application Navigator by clicking the  icon on the left.



2. Click **Service Connections** in the right **Application Navigator** to open the **Services** window.



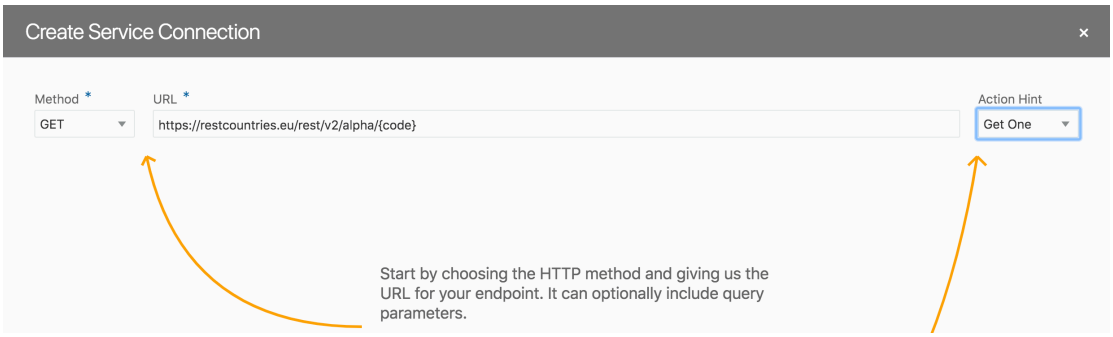
3. Click **+ Service Connections > Define By Endpoint**.



4. Set **URL** to **https://restcountries.eu/rest/v2/alpha/{code}**

   This is the REST API that returns the info on a country. Since it returns an object rather than an array we need to tell VBCS to treat it as a Get One action.

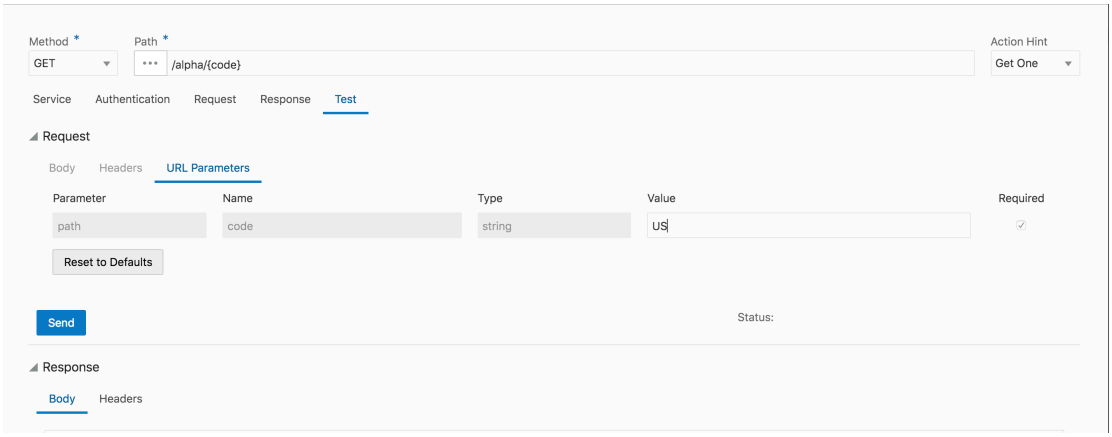
5. Set **Action Hint** select **Get One**.



6. Click **Next**.

7. Under the **Service** tab, set **Service Name** to **GetCountry**.

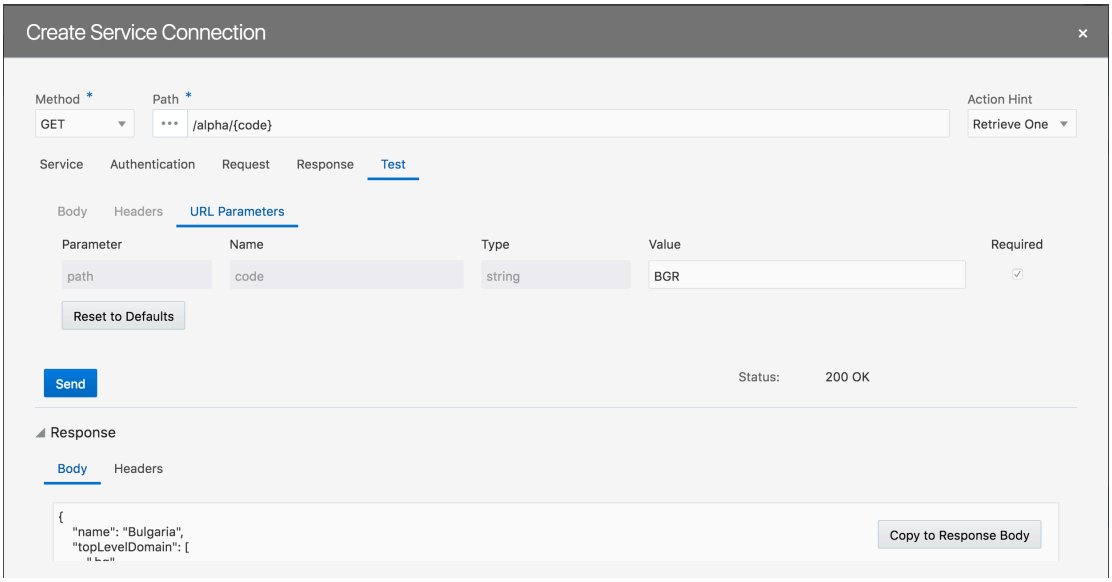
8. Click the **Test** tab. In the **URL Parameters** section, add a value of **US** to the **code** parameter and click **Send**.



VBCS calls the API and the response is shown in the Response section.

9. Click **Copy to Response Body**.

10. Click the **Response** tab. This shows the format of the response that you copied from the **Test** tab that will be returned by the **GetCountry** service. VBCS stores the response body so it knows how to deal with responses to this REST call.

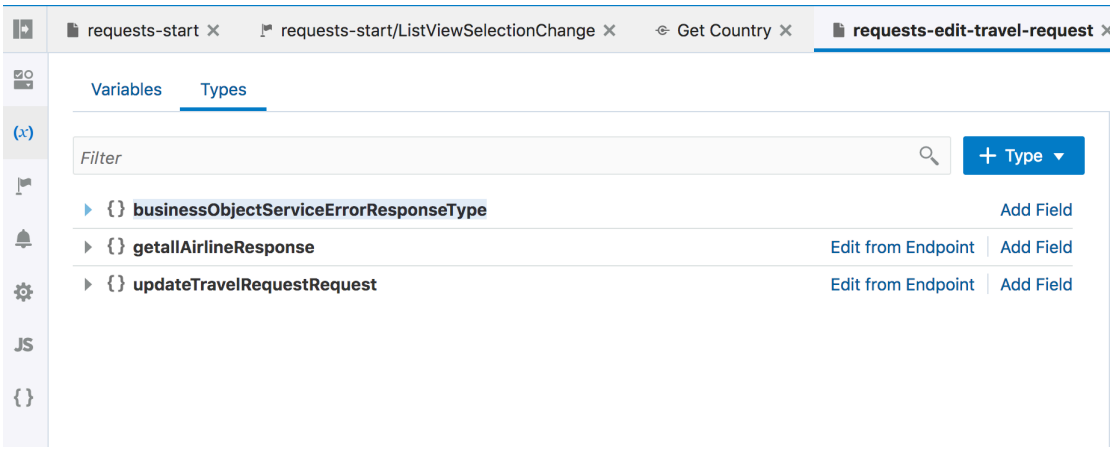


11. Click **Create** to create the service.

Creating a Variable Based on the Service

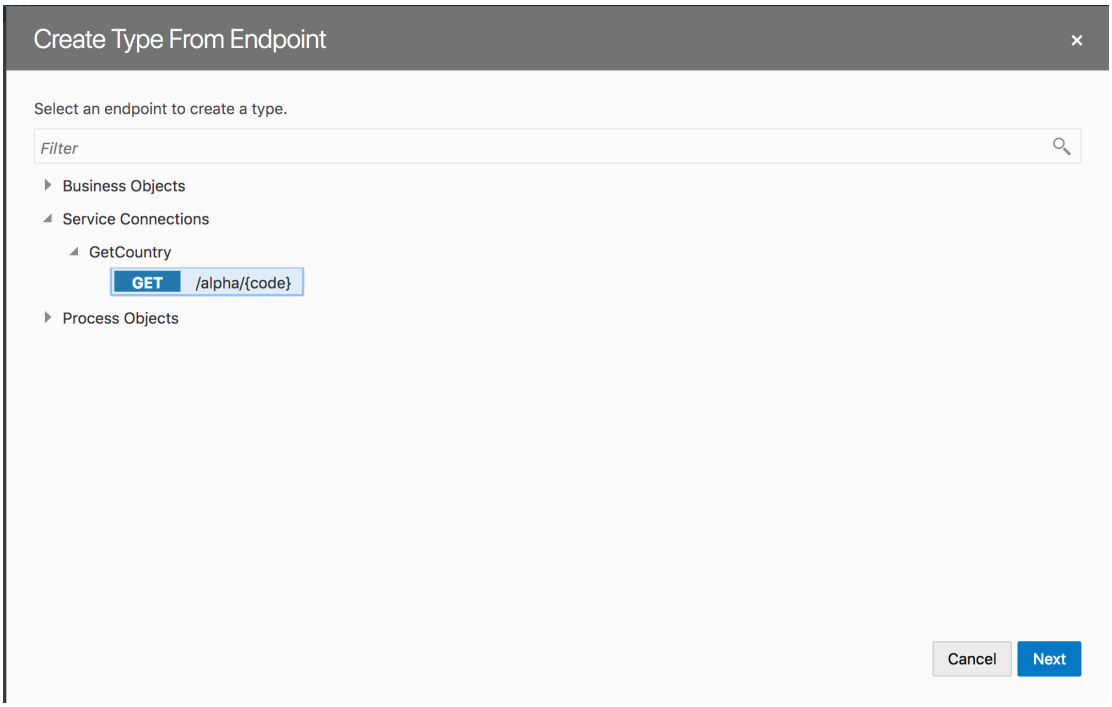
In order to use the data returned in the REST Service call, you create a Type based on the format of the data returned. Then you create a variable based on that Type to use in your pages.

1. Click the **Variables** icon of the **requests-edit-travel-request** page, and select the **Types** tab.



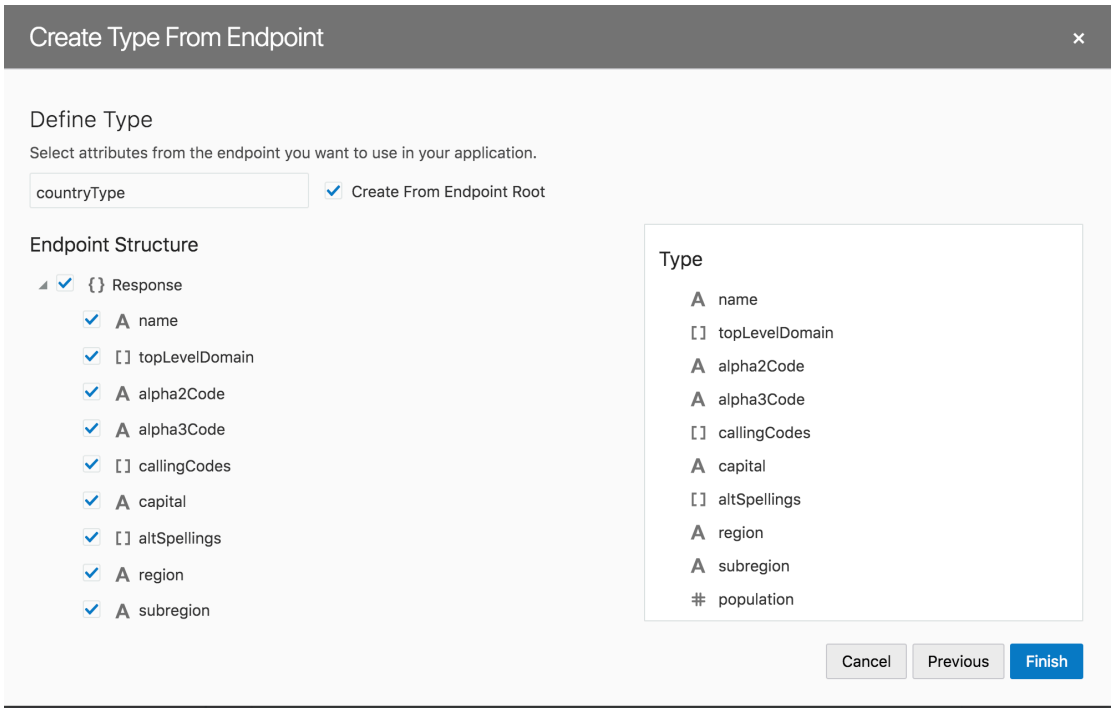
2. Click on the **+ Type** dropdown and select **From Endpoint**

3. Expand Service Connections, **GetCountry** and select **GET**

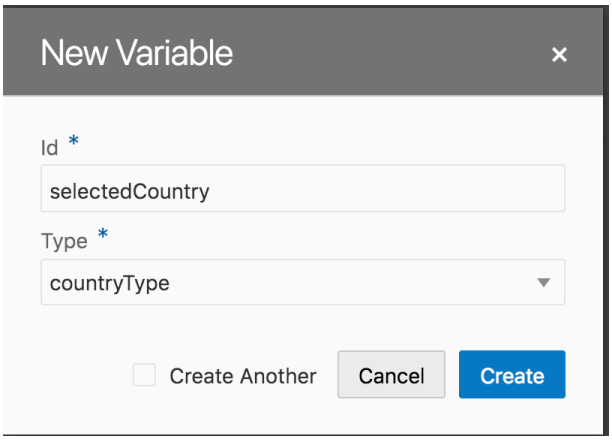


4. Click **Next**.

5. Call the type **countryType** and check the **Response** checkbox to select all the attributes returned by the service



6. Click **Finish**.
7. Click the **Variables Tab** to create a **Variable** based on **countryType.**
8. Click **+ Variable**.
9. Set the **Id** to **selectedCountry** and the **Type** to **countryType.**



10. Click **Create**.

Connect the Page Fields to the Variable

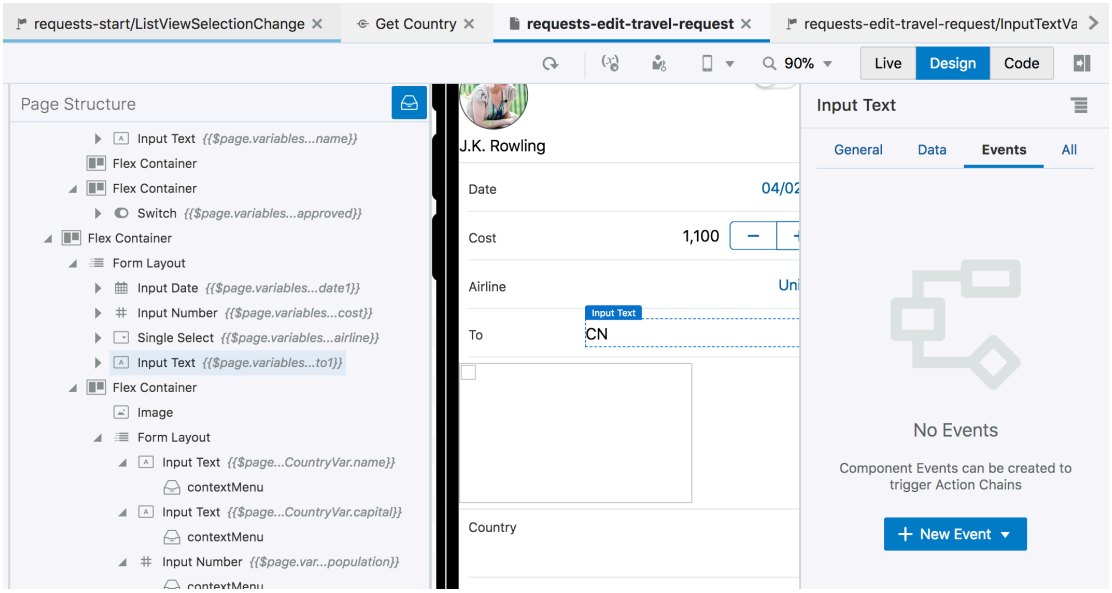
1. Return to the Page Designer.
2. Select the **Image**. In the **Data** tab of the **Property Inspector**, set the Source URL to **selectedCountry > flag**.

3. Select the Country field in the Form Layout below the image. In the **Data** tab of the **Property Inspector**, set the **Value** to **selectedCountry > name**.

4. Do the same to bind **Capital** to **selectedCountry > capital** and Population to **selectedCountry > population.**

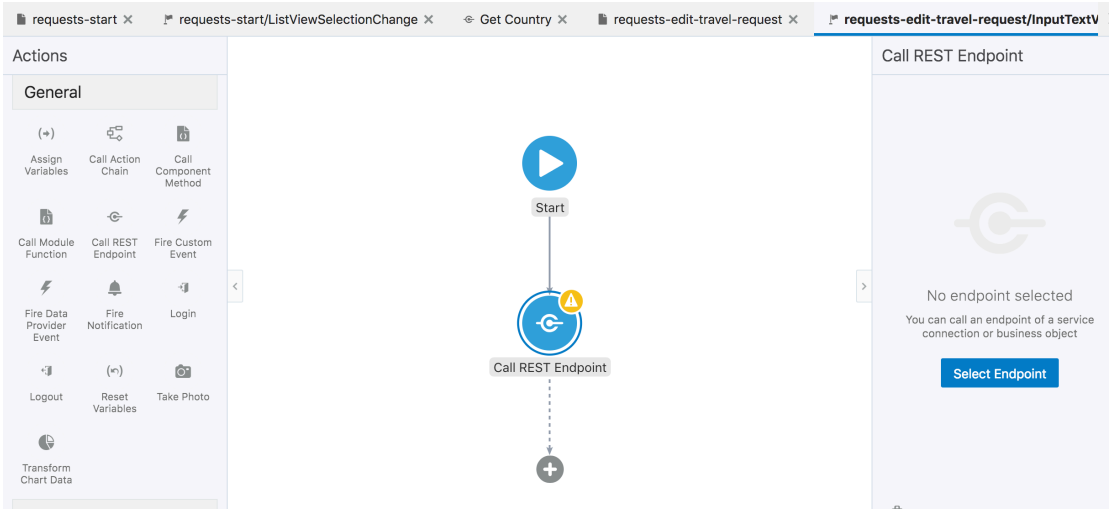
Calling the REST API

1. Select the **To** field in the Page Designer. In the Property Inspector, click the **Events** tab.



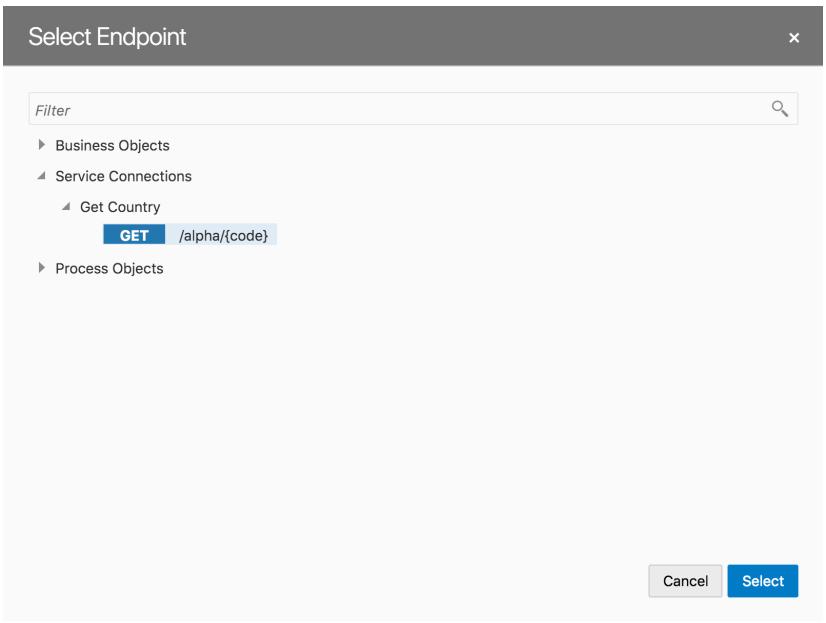
2. Click **New Event > Quick Start: 'value'**. VBCS creates an event for you on the value change of the **To** field. It also creates and opens the **InputTextValueChange** action chain.

3. From the **Actions** palette, drag **Call REST Endpoint** onto the action chain.



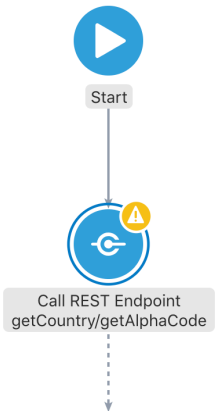
4. Click **Select Endpoint**.

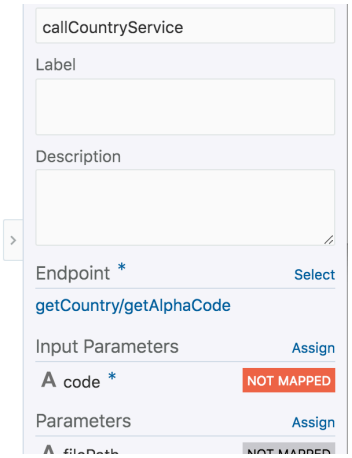
5. Select **Service Connections** > **GetCountry** > **Get /alpha/{code}** and click **Select**.



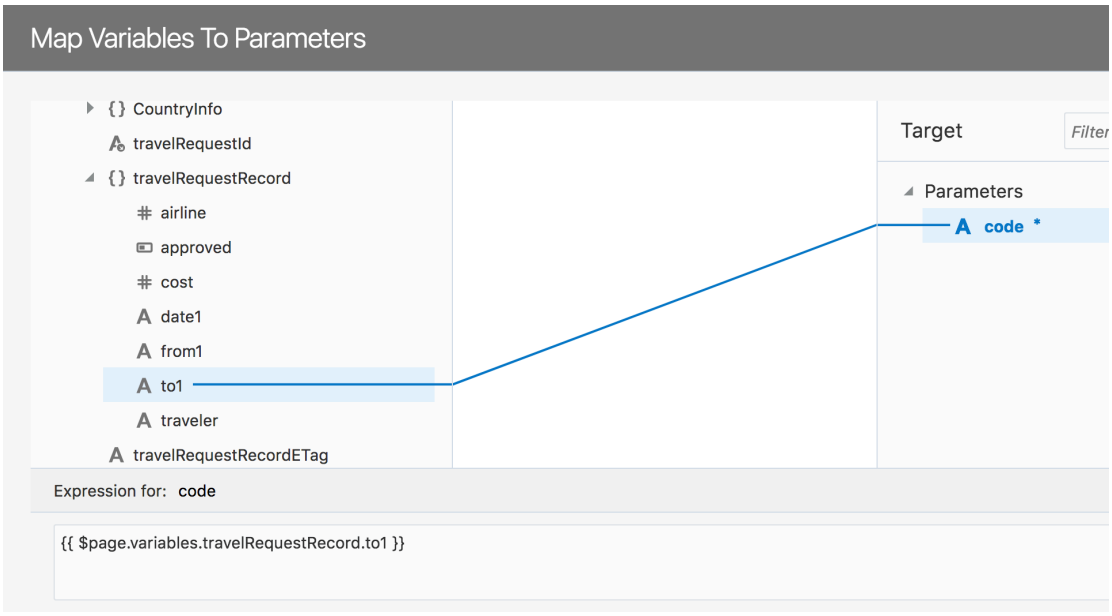
6. In the Property Inspector, set the **ID** to **callCountryService.**

7. Now you need to pass in **travelRequestRecord.to1** as the **code** input parameter. Under Input Parameter click **code**.



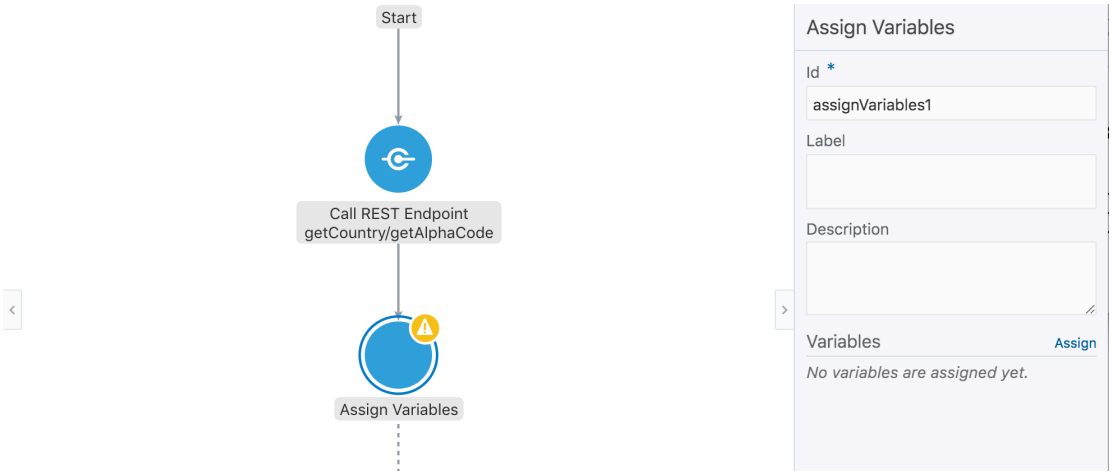


8. Map **Page** > **travelRequestRecord** > **to1** on the left to **Parameters** > **code** on the right.



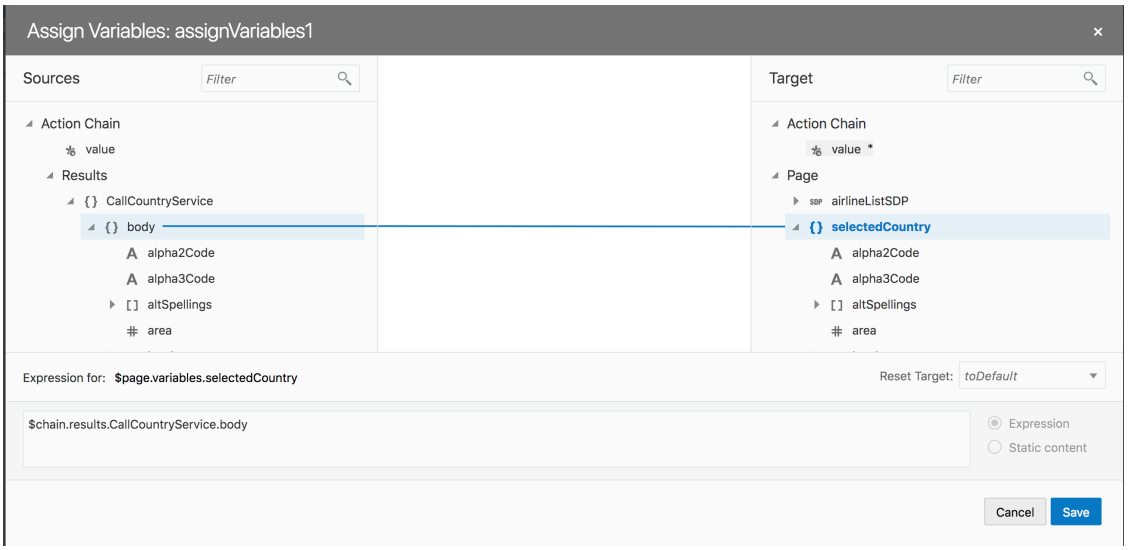
9. Click **Save.**

10. Now you map the data returned by the call to the REST Service to the variable based on the response data format. Drag and drop an **Assign Variable** action below the **Call REST Service** action.



11. In the **Property Inspector**, click **Assign**.

12. Map **Results > CallCountryService > body** on the left to **Page > selectedCountry** on the right.



13. Click **Save**.

Running the Completed Application

1. Click **Run** to run the application.

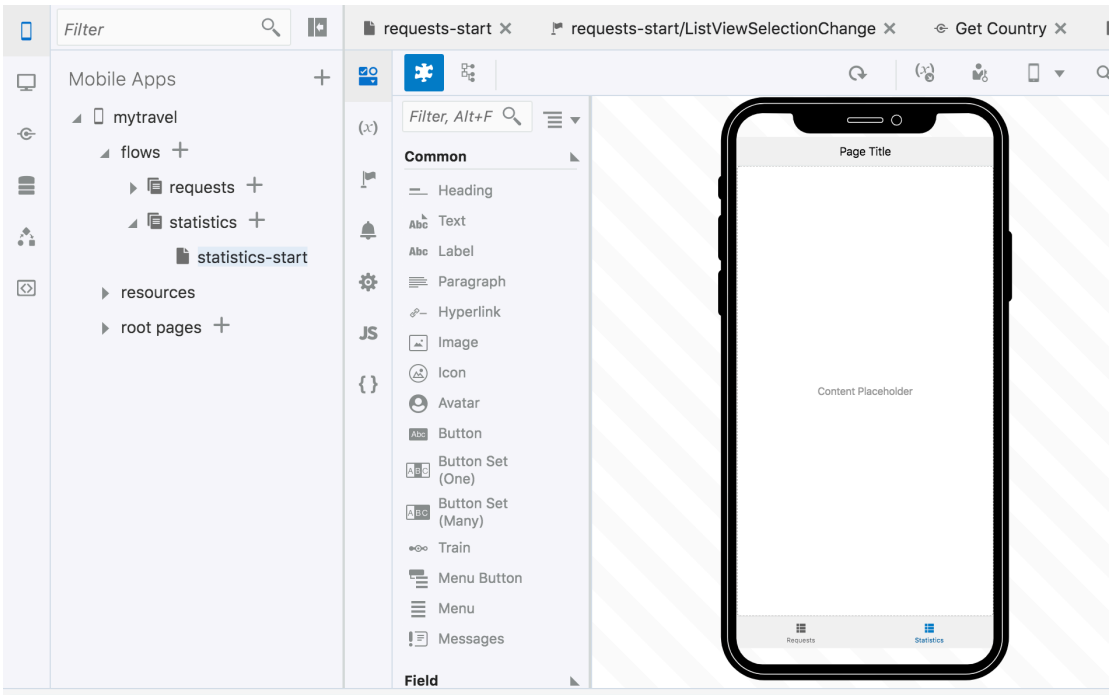
2. Select a row and click to open the **Edit TravelRequest** page.

3. Change the destination to another country (ISO code, i.e. IT or US) and ensure that the country field and data update.

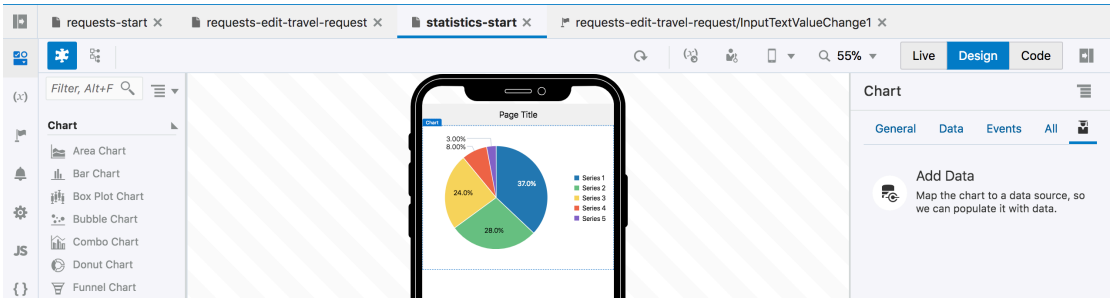
Creating Visualizations of Data

In this section you will add some visual components to the **Statistics** tab that you created at the start of this lab.

1. Expand the main **Application Navigator**, open the Mobile Apps tab, and click **myTravel** > flows > statistics > statistics-start.

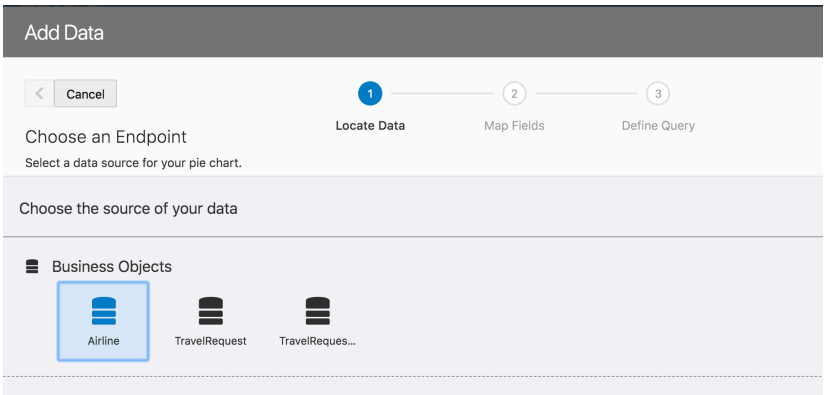


2. Drag a **Pie Chart** from the **Component Navigator** onto the page.



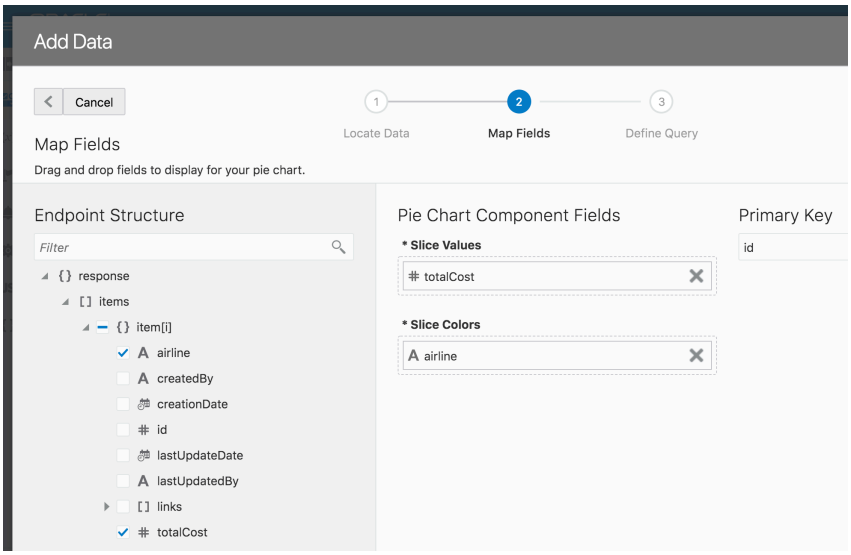
3. Click **Add Data**.

4. Choose the **Airline** business object and click Next.



5. Drag **totalCost** into the Slice Values.

6. Drag **airline** into the Slice Colors.

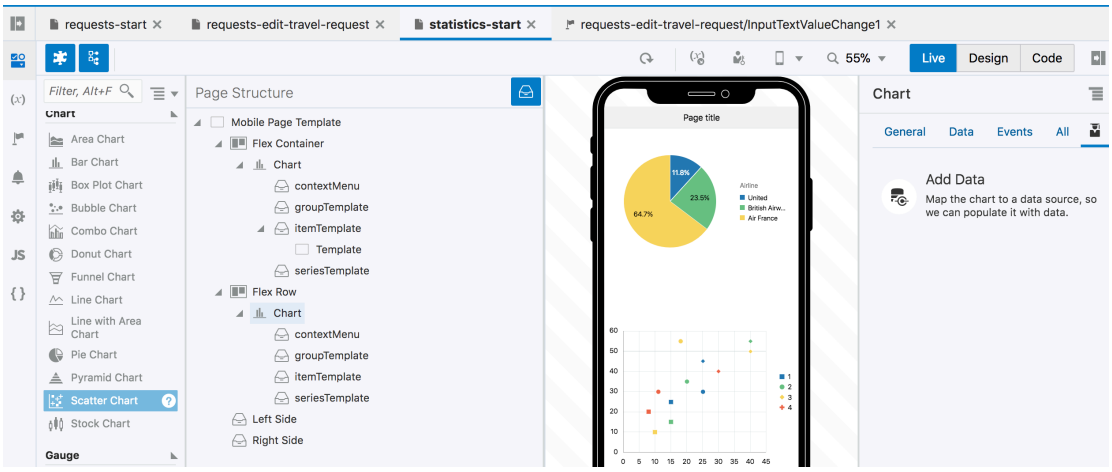


7. Click **Next**, then click **Finish**. Data from the **Airline** business object is immediately rendered on the chart. Note that if you did not edit some records to specify an Airline then there is no data to display here.

8. In the Property Inspector for the chart, click the **General** tab and change the **animation-on-display** to **zoom**.

9. Drag a **Scatter Chart** onto the page below the pie chart.

10. Click **Add Data**.

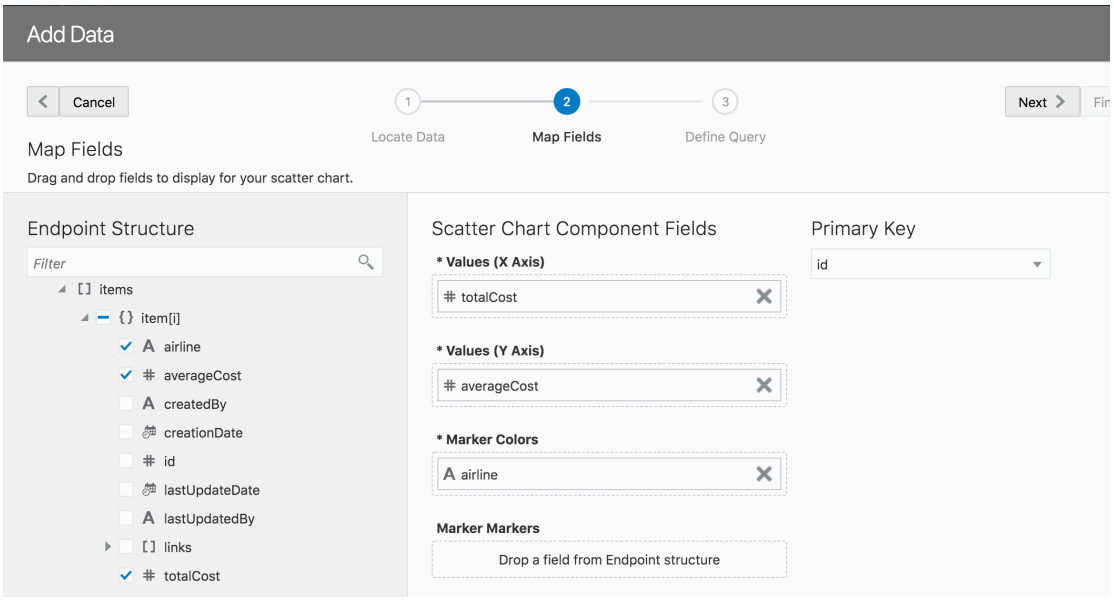


11. Choose the **Airline** business object and click Next.

12. Drag **totalCost** onto the **x Axis**.

13. Drag averageCost onto the **y Axis**.

14. Drag airline onto **Marker Colors**.



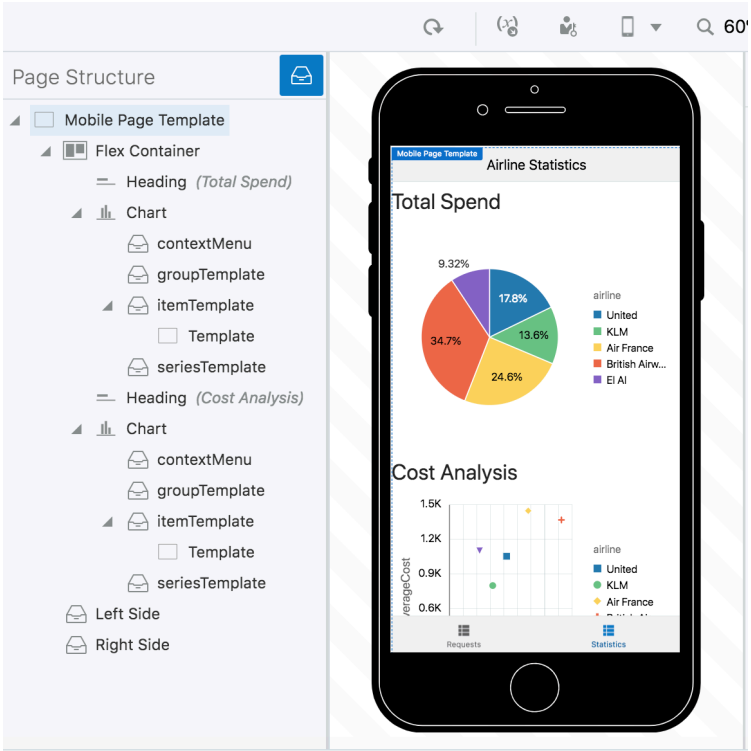
15. Click **Next**, then click **Finish**.

16. Click the header at the top of the page to select the page template. In the Property Inspector, set **Page Titl**e to **Airline Statistics**.

17. Drag a **Heading** above each of the charts and name them:

    - Pie Chart – Total Spend
    - Scatter Chart – Cost Analysis

    Your app should look something like this:

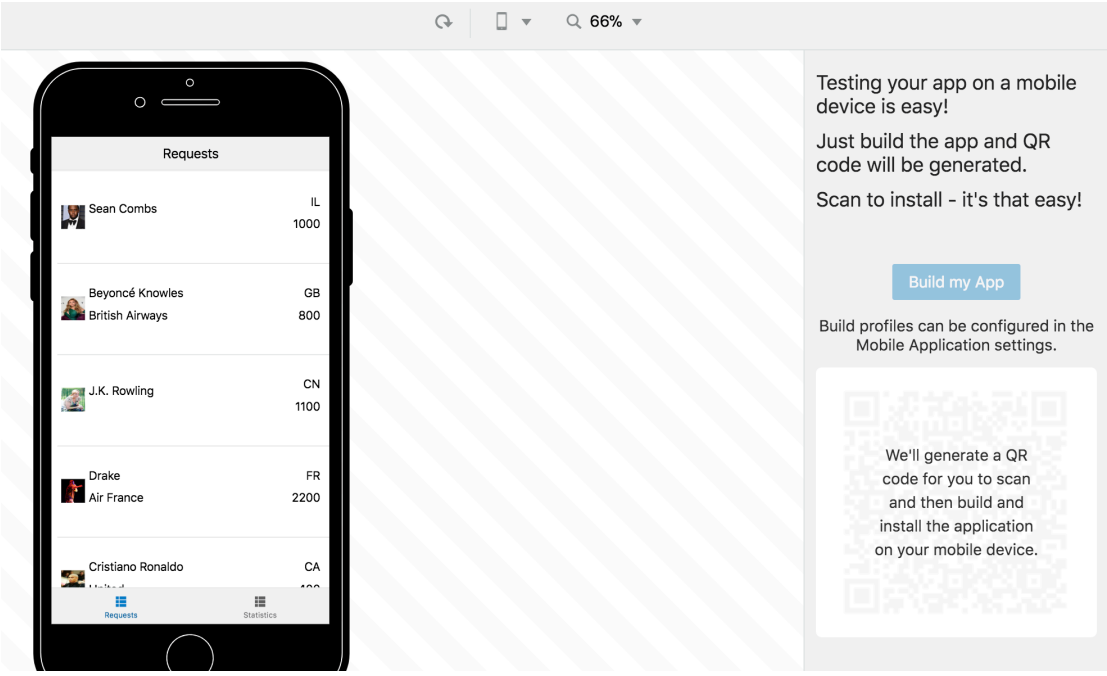


18. Click on the Code tab. You can edit all the elements in your page from here if you prefer – for instance, find the **legend.title="Airline"** for one of the charts and edit it to **legend.title="Airline Spend"**

This concludes the main part of this Lab. Congratulations, you have created your first mobile application complete with Business Objects, a REST Service call and visualizations – all done in the **Visual Builder Cloud Service** primarily declaratively, but with access to the code if you prefer to work at the code level.

If You Have Extra Time

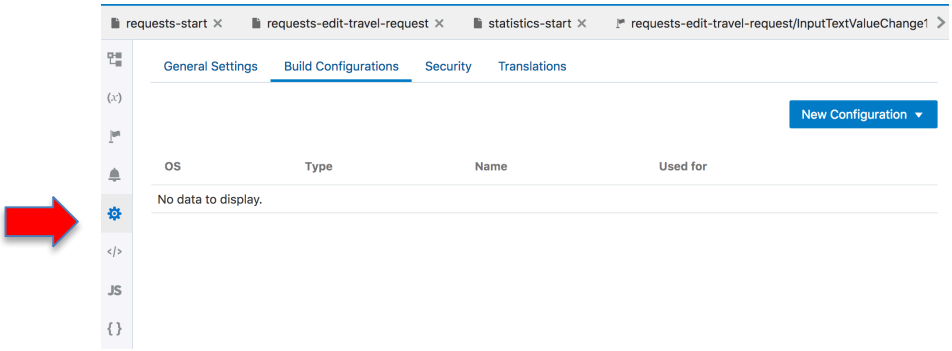
In this lab you have run your app using the built-in mobile application simulator. You will have noticed that the 'Build My App' option was disabled



Before you can build the app for installation on an iOS or Android device, you have to create a Build Configuration

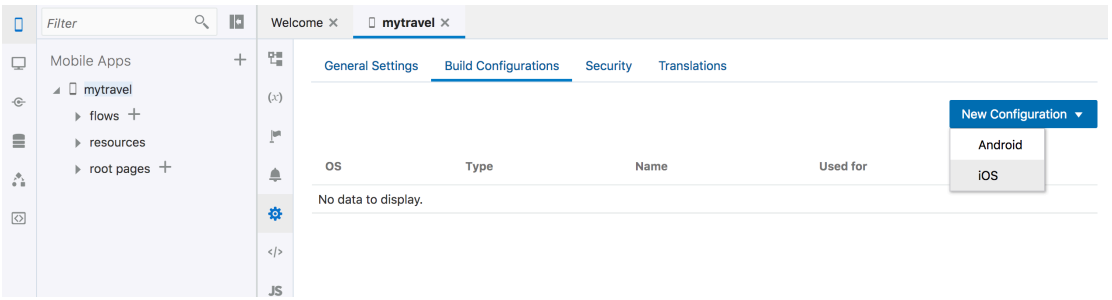
Below follows an example of how to setup and build an iOS version of your mobile app. The lab does not provide the elements for you to complete this setup. This section is for information only

1. Click on the **Settings** icon for your mobile app and click on the **Build Configurations** tab



2. Click **New Configuration**

3. To follow this example, click on **iOS**, but if you are more familiar with Android, go there too



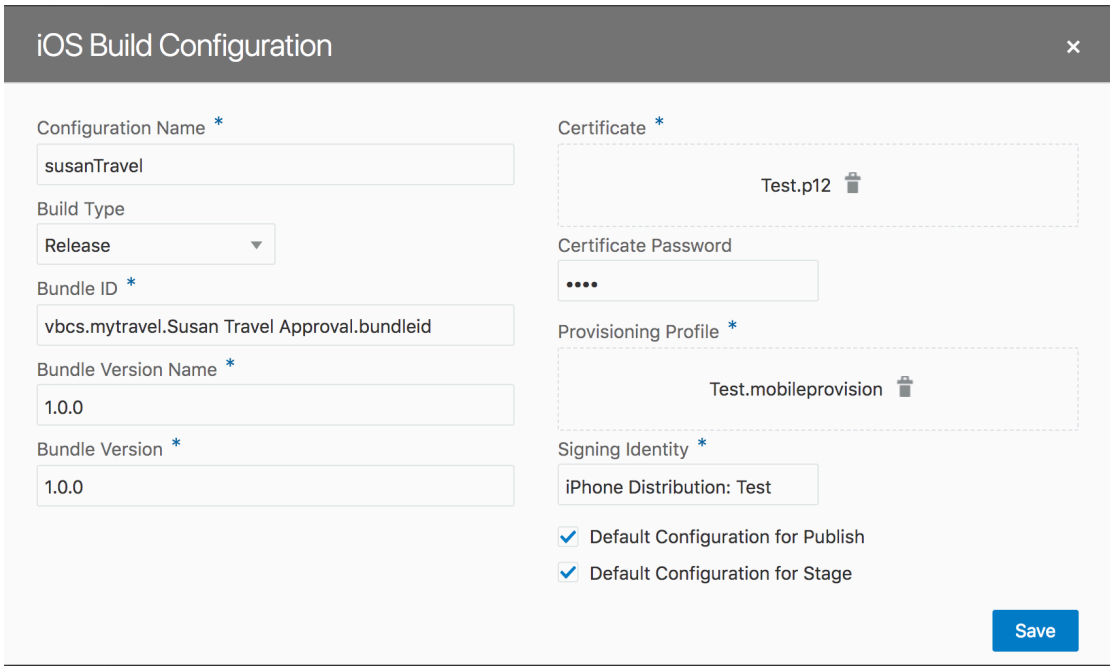
4. The configuration settings on the left side are defaulted by VBCS, but can all be edited to suit your needs

5. On the right side you must add your Apple Developer program credentials – whether an Enterprise or Standard program, developer of distribution profile etc.

Note: it is outside the scope of this lab to provide instruction on how to get an Apple Developer Program account. Go to developer.apple.com for more details

6. Add your provisioning profile, certificate and certificate password details to the configuration. Ensure that the Signing Identity is exactly as shown in your MAC Keychain entry for the certificate. To ensure this, use Get Info in keychain and copy the complete entry from the Common Name property

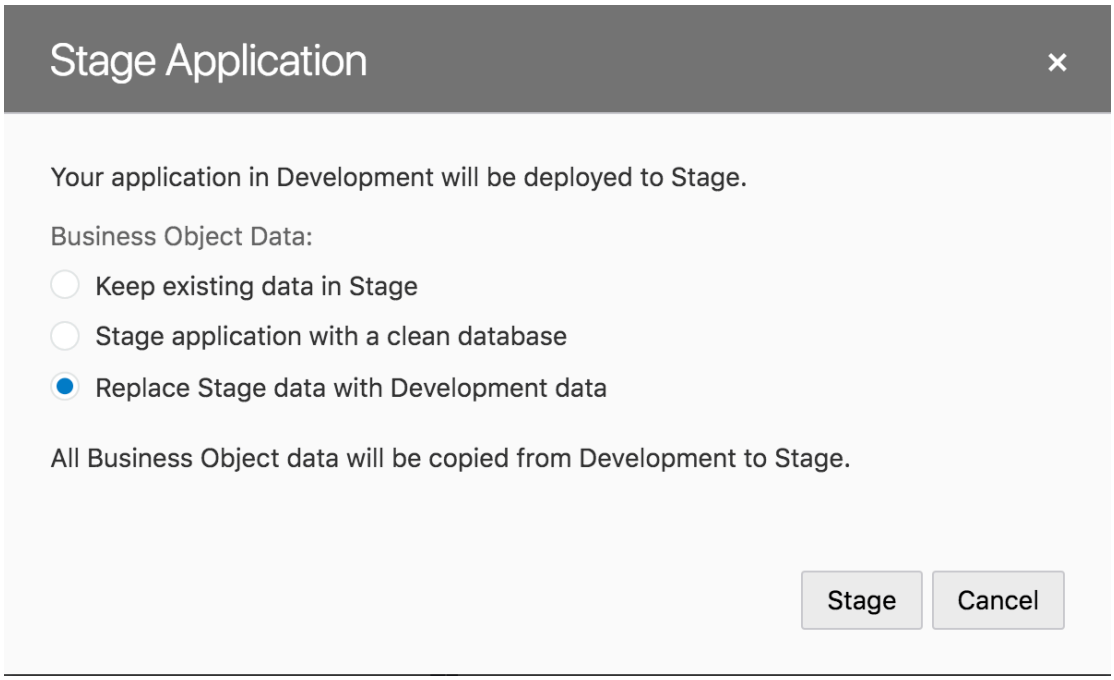
7. If you want to use this profile as the default build when you ask VBCS to build your mobile app, click on the appropriate checkboxes



8. Now when you run the app the Build My App button will be enabled.

9. Clicking on it takes you to Stage Application. Here you can select how the business data should be deployed:

If this is a first Stage deployment you may want to take the development data into the app, or start with a clean database. For subsequent deployments you may want to keep any data that was in the previously staged version, start from clean or start from the development data again.



11. Once you hit the Stage button the Mobile application is staged and you can install on your device (via the QR scan or by downloading the .ipa file) and start the next stage of your development process

12. You can have multiple build configurations for iOS and Android releases