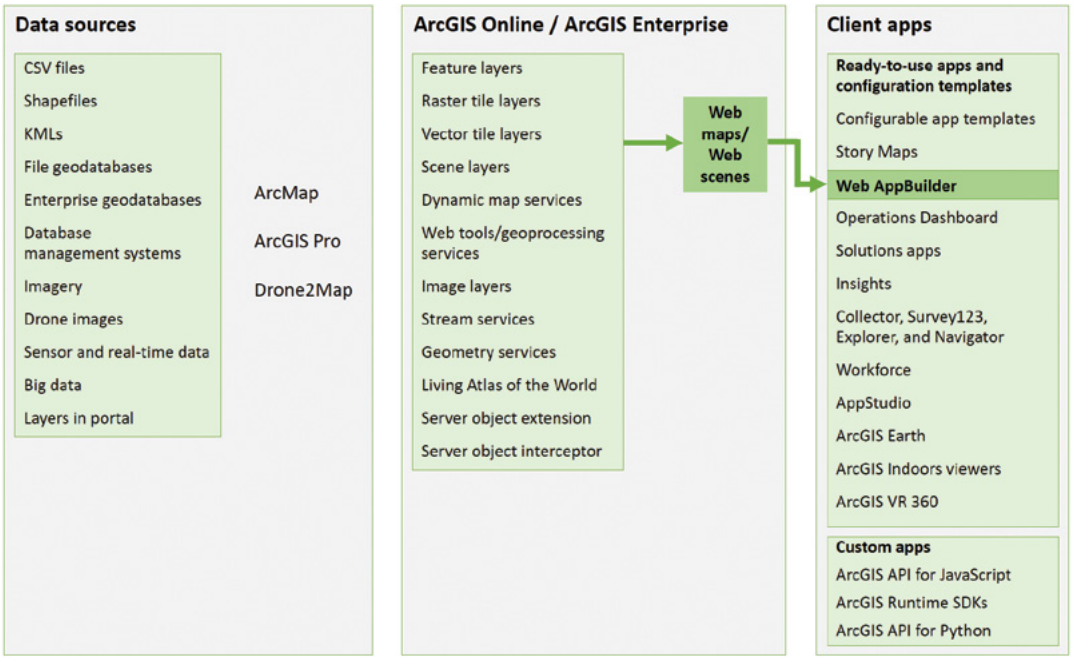
CHAPTER 3

Web AppBuilder for ArcGIS

Have you run into situations where you need more functions than any individual configurable app can provide? Do you wish you could remix the functions of multiple apps? For many users and in many situations, the answers to these two questions are yes. Web AppBuilder for ArcGIS is intended for such needs. It provides more functionality than any other ArcGIS configurable web app or template and is more flexible and configurable. Web AppBuilder comes with more than 30 premade widgets covering functions including mapping, table view, querying, charting, reporting, routing, geoprocessing, and more. The user community also can create more custom widgets. Web AppBuilder allows you to create web apps by selecting, mixing, and configuring widgets interactively—all without programming. Web AppBuilder also provides many themes (in other words, styles and layouts) for you to create easy-to-use, friendly, and responsive user interfaces that work for desktop, tablet, and mobile devices.

Learning objectives

- *Know why and when you need Web AppBuilder for ArcGIS.*
- *Understand the types of widgets and themes of Web AppBuilder.*
- *Learn the workflow to create web apps using Web AppBuilder.*
- *Configure and use charting, filtering, and other various widgets.*

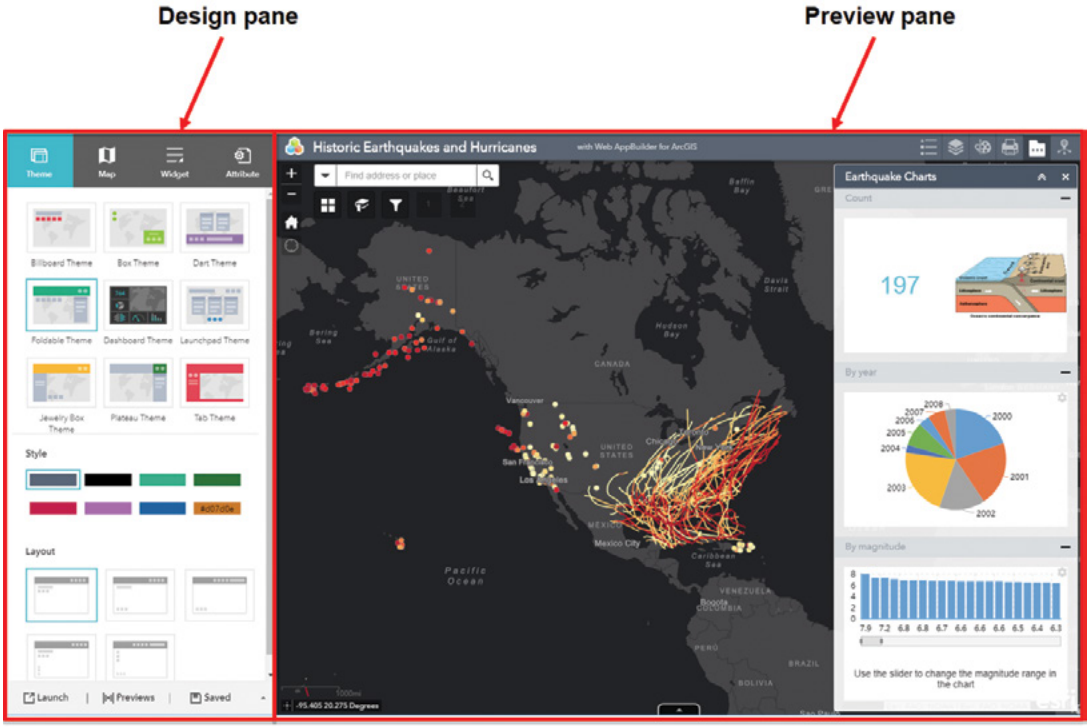


ArcGIS offers many ways to build web applications. The green lines in the figure highlight the technology presented in this chapter.

Web AppBuilder for ArcGIS and its basics

Web AppBuilder for ArcGIS is an intuitive what-you-see-is-what-you-get (WYSIWYG) application that allows you to build 2D and 3D web apps without writing a single line of code. The application includes powerful tools to configure fully featured HTML apps. As you add your map and tools, you can see them in the app and use them right away. Web AppBuilder is based on ArcGIS Online, ArcGIS Enterprise, HTML5, and ArcGIS® API for JavaScript™ technologies and has the following key features:

- Creates pure HTML and JavaScript apps that do not require any plug-ins.
- Uses responsive web design technologies to create web apps that work well on desktops, tablets, and smartphones.
- Comes with numerous out-of-the-box widgets (you can use the widgets immediately) that can be flexibly remixed and configured.
- Has a collection of configurable themes so you can customize the look and feel of your apps.
- Provides an extensible framework for developers to create custom widgets, themes, and applications.



Web AppBuilder allows users to choose from the available user interface themes, web maps, and widgets in a "what-you-see-is-what-you-get" designer experience. You can immediately see how your app will look as you change the configuration.

Editions of Web AppBuilder for ArcGIS

The Web AppBuilder product family has three editions:

- Embedded in ArcGIS Online
- Embedded in Portal for ArcGIS
- Developer Edition

Although the first two editions are embedded, generally, all three editions have similar functionality. For example, they will have the same designer user experience to create web apps, and similar widgets and themes. However, the detailed functionality of the three editions is not equivalent. Typically, new enhancements to Web AppBuilder are added first to the ArcGIS Online edition, then to the Developer Edition, and finally to the Portal for ArcGIS edition. Therefore, the editions may differ in themes, widgets, and other aspects during certain periods. Another difference among these editions lies in their support for custom widgets and themes.

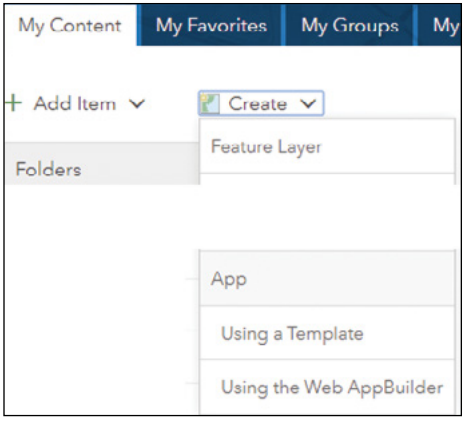
- The ArcGIS Online edition doesn't allow users to use custom widgets.
- The Portal for ArcGIS edition allows users to use custom widgets.
- The Developer Edition allows users to create and use custom widgets.

The chapter tutorial is based on the edition embedded in ArcGIS Online, but the skills you will learn apply to all three editions.

Access to Web AppBuilder

For the embedded editions, you can access Web AppBuilder from the ArcGIS Online and Portal for ArcGIS Map Viewer, Gallery, or Content.

1. If you opt to use Map Viewer, you would click Share, click Create a Web App, and then click the Web AppBuilder tab (see section 3.2).
2. For the second option, you would choose Content > My Content > Create > App, and then click Using the Web AppBuilder.

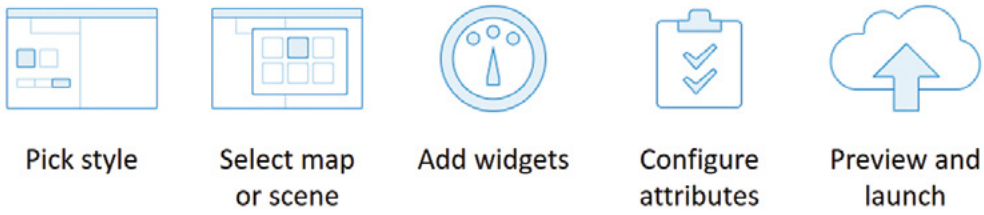


3. If you start from the Gallery, you would go to the Esri Featured Content > Apps section, and choose App Builders.

Using Web AppBuilder to create web apps

You can create a web app using Web AppBuilder for ArcGIS by following these steps:

- **Pick style:** Configure the look and feel of the app by picking a theme. A theme includes a collection of panels, styles, layouts, and pre-configured widgets.
- **Select map or scene:** Select a web map or scene created by you or shared with you.
- **Add widgets:** Widgets give your app functionality, such as print map and query layers. Each theme has its own preconfigured set of widgets. You can hide or show existing ones and add additional ones. You can also configure some widgets to open automatically as your app starts.
- **Configure attributes:** Attributes allow you to customize your app banner with a logo, title, hyperlinks, and so on.
- **Preview and launch:** Preview the responsive app with popular device screen sizes (2D apps only). When ready, you can launch your app directly, or export your app and deploy it to your own web server.



As you configure your web apps interactively, Web AppBuilder generates the configurations in JSON files automatically for you. You do not have to know JSON and the configuration syntax for the widgets themselves. However, if you can edit the JSON files manually, you can have some additional flexibilities in your app configuration.

Widgets

Web AppBuilder provides functions through widgets. Typically, a widget is a JavaScript/HTML component that encapsulates a set of focused functions. Most widgets have a visual user interface.

Web AppBuilder provides more and more widgets with its new releases. As of this writing, Web AppBuilder provides more than 70 core widgets. Based on their relation to map layers, widgets can be categorized into two groups:

- **Data-independent widgets:** For example, Basemap Gallery, Measurement, Draw, and Bookmark widgets are not related to the operational data layers you have in your web map. These widgets need no or little configuration. They are not affected if you switch from one web map to a different web map.

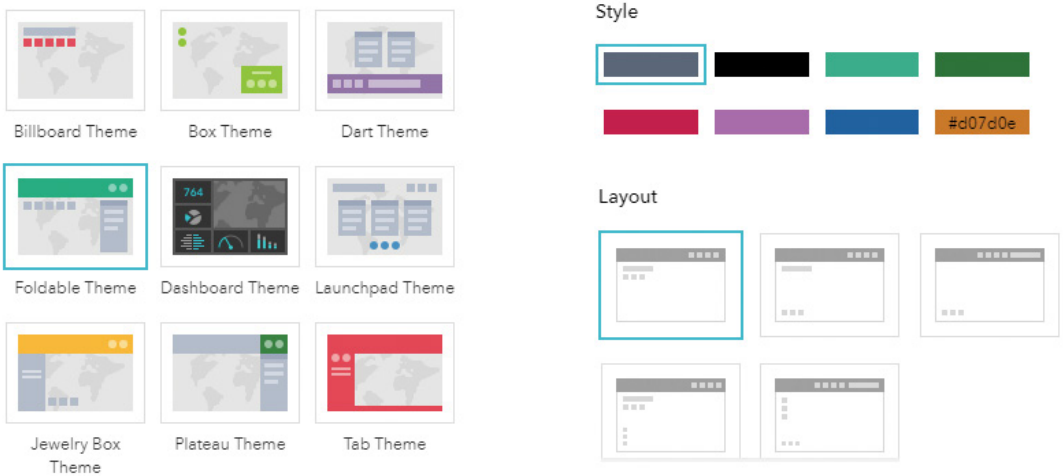
- **Data-dependent widgets:** For example, Query and Chart widgets are related to specific attribute fields of specific layers in your web map. They often require detailed configuration. When you switch from one web map to a different web map, you will need to reconfigure these widgets.

In addition to the out-of-the-box widgets, you can find additional Web AppBuilder widgets from ArcGIS Solutions widgets (**http://arcg.is/2yUXnFC** or **http://solutions.arcgis.com/shared/help/solutions-webappbuilder-widgets**), which is a set of widgets designed to address specific workflows across industries and from the user community (**http://arcg.is/2jdfu1M** or **https://geonet.esri.com/groups/web-app-builder-custom-widgets**). You can download and deploy these widgets to the following editions of Web AppBuilder:

- **Developer Edition:** Simply copy the widget to the stemapp\widgets folder or stemapp3d\widgets folder.
- **Portal for ArcGIS (10.5.1 or later):** First, host the custom widget on a web server, and then register the widget URL in Portal for ArcGIS as an application extension (AppBuilder). When you choose widgets to add in Web AppBuilder, you can find the custom widget under the custom tab. For security reasons, only portal administrators can register the custom widget, and public apps will not load the custom widget when anonymous users access it.

Themes

A theme is a template framework representing the look and feel of an app. Content in a theme includes a collection of panels, styles, and layouts, and a set of preconfigured theme widgets. A single app can only use one theme while running.



Web AppBuilder for ArcGIS provides many themes, and each theme allows users to choose a color scheme and a layout.

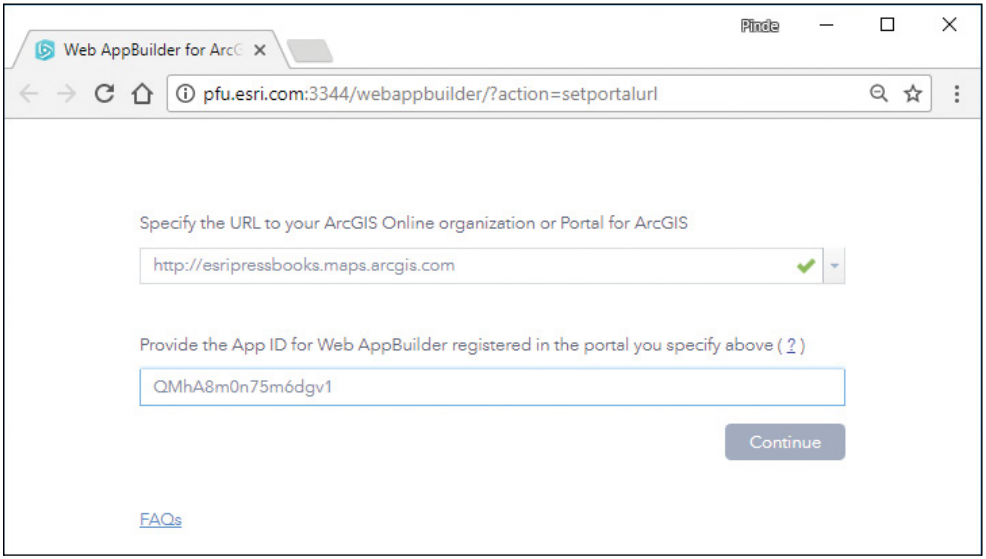
Web AppBuilder for ArcGIS provides the following out-of-the-box themes:

- **Foldable and Tab:** Supports all widget types and can be used for an app with complicated tasks.
- **Dashboard:** All widgets in the panel open simultaneously when the app starts. It is designed to visualize widgets and their communication directly. You can modify the predefined layout by adding or removing grids, or resizing the grids in the panel. Optionally, you can turn on the Header widget to display the logo, the app name, and the links.
- **Billboard:** Designed for apps with simple tasks.
- **Box:** Designed for apps that require a clean look on the map. All on-screen widgets are turned off by default.
- **Dart:** Widgets in the widget controller display like placeholder widgets. You can have multiple widgets open and move them around. All on-screen widgets are turned off by default.
- **Jewelry Box:** Designed for apps with a workflow task. Evolved from the Foldable theme with a focused widget on the left of the app.
- **Launchpad:** Designed for users who like Apple Mac style. Launchpad lets you open multiple widgets, and move, resize, and minimize widgets.
- **Plateau:** Can be used to create a modern and basic application with flat toolbars and widget containers.

Web AppBuilder for ArcGIS Developer Edition

Web AppBuilder Developer Edition provides a great framework for creating new widgets, customizing existing widgets, creating new themes, and building apps with extended functionality. Custom widgets and apps can be shared for free or sold in ArcGIS Marketplace.

In contrast to the embedded editions, you will need to download the Developer Edition, unzip it to a folder on your computer, register its URL, typically as http://[yourmachinename]:3344/webappbuilder, with your ArcGIS Online or Portal for ArcGIS to get an app id, run Web AppBuilder, provide the URL to your ArcGIS Online or Portal for ArcGIS along with this app id, and then you can create web apps in the similar way as the embedded editions of Web AppBuilder. Refer to **http://arcg.is/1C5rYQb** (short for **https://developers.arcgis.com/web-appbuilder/guide/getstarted.htm**) for details about how to get started with the Developer Edition of Web AppBuilder.



The first time you start the Developer Edition of Portal for ArcGIS, you will need to provide the URL to your ArcGIS Online or Portal for ArcGIS and provide an app id. You can get the app id after you register your Web AppBuilder URL in ArcGIS Online or Portal for ArcGIS.

This tutorial

An organization would like to provide a web app that displays data on historic earthquakes and hurricanes to the public.

Data:

A web map is provided to you. This web map uses a map service.

Requirements: The web app should have the following capabilities:

- Zoom to the entire US in its initial view.
- Provide bookmarks so that users can quickly zoom to predefined areas.
- Allow users to print displays as PDFs.
- Allow users to display feature attributes and summaries in charts.
- Allow users to filter features based on their attributes.
- Display the appropriate logo, title, subtitle, and links in the banner.

System requirements:

- A publisher or administrator account in an ArcGIS Online organization.

3.1 Explore the web map

Before you build your app, you will need to familiarize yourself with the web map and the map layers that you will use. A web map has been provided for you in ArcGIS Online. You will explore the web map to understand its layers, fields, and other configurations. Understanding this web map will help you configure the data-dependent widgets later in this section.

1. Sign in to your ArcGIS Online Organization account.

2. In the Search box, type **historic disasters GTKWebGIS v3 Sample owner:GTKWebGIS**, and click Search for Maps from the list. On the left of the page, turn off the Only Search in your organization check box.

You should see the search result as illustrated (sample web map for *Getting to Know Web GIS, third edition*).

3. Click the title of the web map to go to its details page.

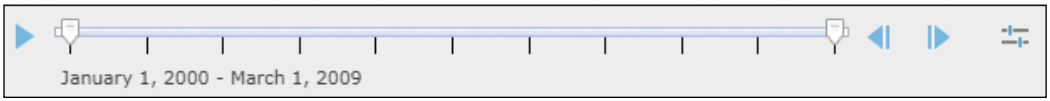
4. On the item details page, under the Layers section, notice that this web map has a dark gray basemap and two operational layers named Earthquakes and Hurricanes.

5. On the item details page, click the thumbnail image or the Open in Map Viewer button to open the web map in the map viewer.

You should see a time slider appear under the map canvas as well as the earthquakes and hurricanes that occurred within the specified time interval in the time slider.

The time slider indicates that at least one of the layers in the web map is time-enabled; in this web map, both the earthquakes and the hurricanes layers are time-enabled. You can use the Time Slider widget to display the earthquakes and hurricanes by time, which will produce an animation effect. Refer to the Real-time GIS chapter to learn how to enable time on your layers.

6. Click and drag the right thumb of the time slider to the far right.



With the left thumb of the time slider at far left and the right thumb at far right, you will see all the earthquakes and hurricanes in the layers.

7. In the Details pane, click Legend to see the styles of the layers.

Note that both layers use a color ramp from yellow to red, with yellow indicating lower earthquake magnitudes and hurricane speeds, and red indicating higher earthquake magnitudes and hurricane speeds.

8. In the map viewer search box, type the name of a hurricane, for example, **Katrina**, and click the Search button or press Enter.

You will find a section of Hurricane Katrina highlighted on the map.

Note: The reason you can search hurricanes by name in the search box here is that your web map is configured to support feature search. Feature search is supported by most ArcGIS web clients, including configurable web app templates and ArcGIS API for JavaScript. See the "Questions and answers" section for instructions about how to configure a feature search.

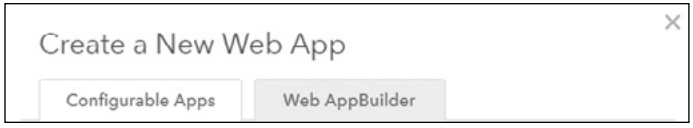
9. In the Contents pane, click the Content tab, point to the Earthquakes layer, click the Show Table button, and study the layer attribute fields.

You will use these fields to configure the chart and query widgets in sections 3.4 and 3.5.

If you need to make changes, for example, change the layer styles, remove pop-ups, and configure pop-ups, you can do so now and save it after you are done. Because you are not the owner of this web map, you will need to save it as a new web map if you made any changes.

3.2 Create a web app

1. Continuing from the last section, click the Share button .
2. In the Share window, click Create a Web App.
3. In the Create a New Web App window, click the Web AppBuilder tab.



4. Specify your app title, tags, and summary, and click Get Started to open Web AppBuilder for ArcGIS.

Web AppBuilder has two panes—the Design pane on the left and the Preview pane on the right. The Design pane has four tabs: Theme, Map, Widget, and Attribute, which correspond to the four different aspects available to configure your web app.

5. Click the Theme tab, click through the themes to experiment with them, and see how they look in the Preview pane.

This tutorial will use the Foldable Theme.

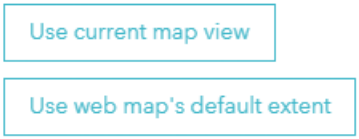
6. Click the Foldable Theme and choose a color style and layout you like.

You can click the Set custom color button to use the color your organization shared, or interactively select a custom color. As you make the changes, look to the Preview pane on the right where you can immediately see how the new setting looks.

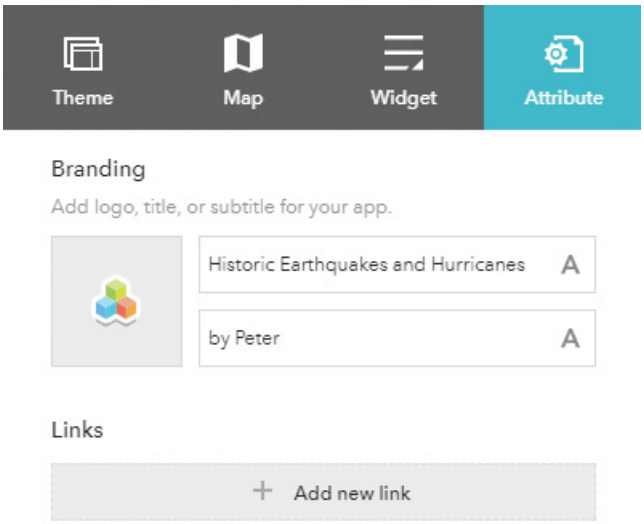
7. Click the Map tab.

The Map tab allows you to choose the web map to use in the app. You started with a suitable web map to use. Otherwise, you can click Choose Web Map to select a different web map.

8. Pan or zoom into the map to cover the earthquakes and hurricanes. Under Set Initial Extent, click Use Current Map View.



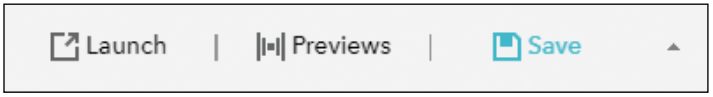
9. Click the Attribute tab, set the title to **Historic Earthquakes and Hurricanes**, and in the subtitle, indicate that you designed the app.



10. Click the logo icon and select the image you would like to use—for example, your organization's logo.

11. Click the Add New Link button to add the URL of your organization or your organization's contact page.

12. At the bottom of the Design pane, click Save.



As you complete the rest of the steps in this tutorial, you should save your configuration frequently so that you do not lose your work accidentally.

13. Explore the default widgets in the Preview pane.

Each theme loads with some commonly used widgets by default.

- Click the My Location widget to zoom to your current location.

The ability to find your location is especially useful on mobile devices. This function is available when your app is using HTTPS and the location service is enabled in your browser settings.

- As you zoom and pan across your map, note the Scalebar widget and Coordinate widget showing your current map scale and cursor location.
- In the Search widget, search for an address or place name, for example, Los Angeles, to zoom your map into that location. Or search for a hurricane, for example, Rita.
- Click the Default Extent widget to zoom back to the initial map extent you set.

14. In the lower-right corner (or another corner depending on the layout you chose) of your map, click the Show Map Overview button to bring up the overview window.

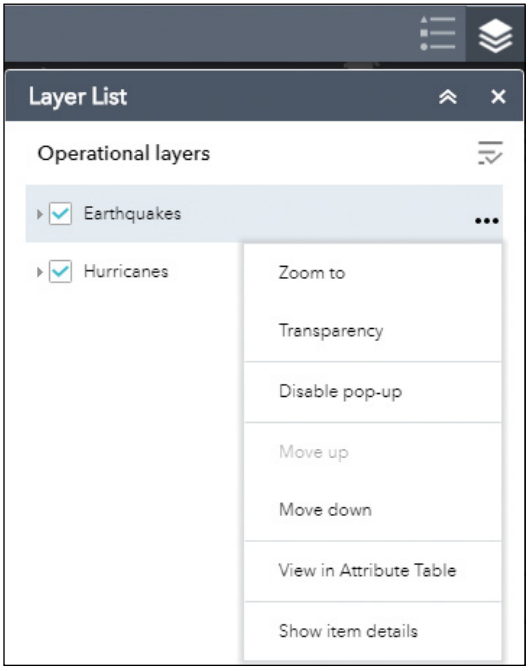
15. Click the arrow (now with a reversed direction) to hide the overview window.

16. In the Preview Pane, click the Legend button to see the legend.

You might see the Legend button in the upper-right corner or another location, depending on the theme and layout you chose.

17. Click the Layer List button .

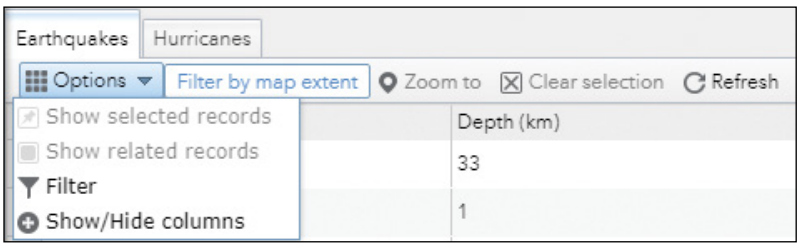
Notice that for each layer, you can click its options button to enable or disable pop-ups, view its attribute table, and view its details.



- At the bottom-center of the map, click the arrow to bring up the Attribute Table widget. Click the Earthquakes and Hurricanes tabs to see the table for each layer.

The table lists the attributes of the features within the current map extent.

18. Click the Options button to see that you can filter the layer, show/hide columns, and select records.



You can allow users to export data to CSVs if you configure the widget to allow so.

19. Minimize the attribute table.

3.3 Configure data-independent widgets

Data-independent widgets often require little or no configuration. For example, About, Basemap Gallery, Bookmark, Draw, Measure, and Share are such type of widgets.

1. In the Design pane, click the Widget tab.

The Widget tab shows some widgets that are already added to your app, for example, the Attribute Table, Coordinate, and Home Button widgets. Widgets that appear dimmed are turned off but can be turned on.

At the bottom of the list are placeholders for five additional widgets. You will begin by adding several widgets here.

2. Click the first empty widget button. In the Choose Widget window, click Basemap Gallery, and click OK.

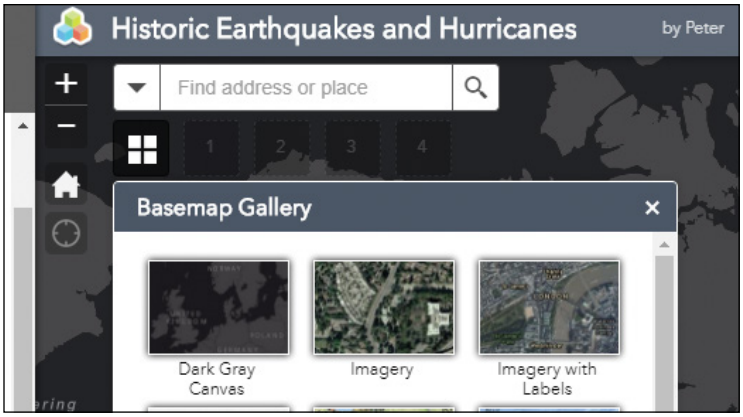
3. In the Configure Basemap Gallery window, click OK.

By default, you are using the basemap gallery setting of your organization. Optionally, you can configure custom basemaps, for example, using your own map services.

Notice that the Basemap Gallery widget has been added to the first widget placeholder in your app.

4. On the Preview pane, click the Basemap Gallery button.

You can choose and switch to a different basemap.

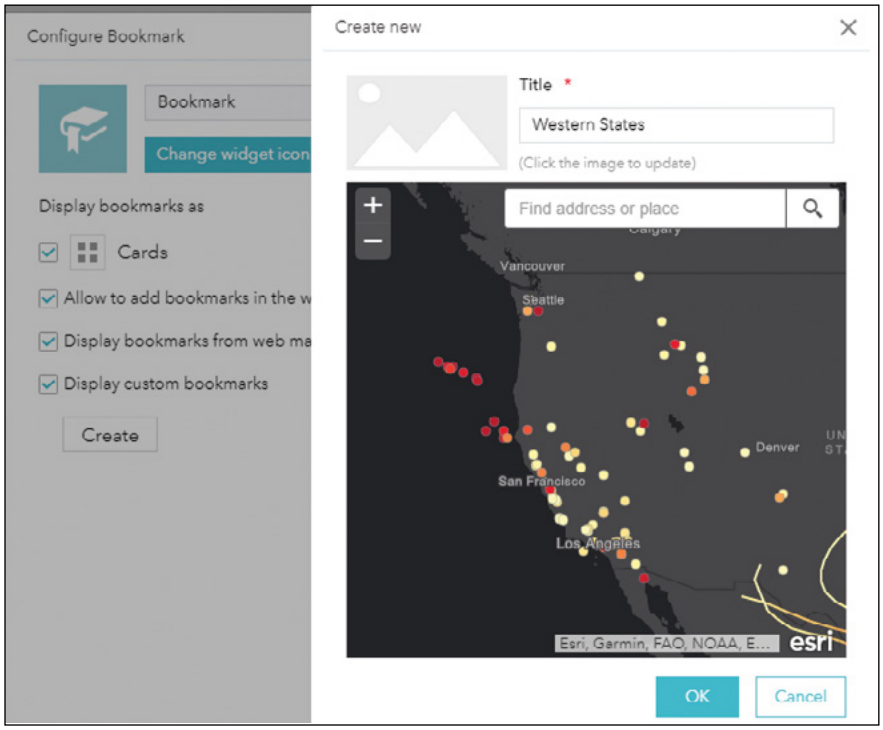


Next, you will add the Bookmark widget.

5. Click the current first empty widget button. In the Choose Widget window, click Bookmark, and click OK.

6. In the Configure Bookmark window, perform the following tasks:

   - Click the Create button.
   - Specify the title as **Western States**.
   - Pan/zoom the map to the western states of the US.
   - Optionally, to specify an icon that represents your bookmark, click the thumbnail.
   - Click OK to add this bookmark.



7. Repeat the previous step to add another bookmark, such as **Southeastern States**.

8. Click OK to close the Configure Bookmark window.

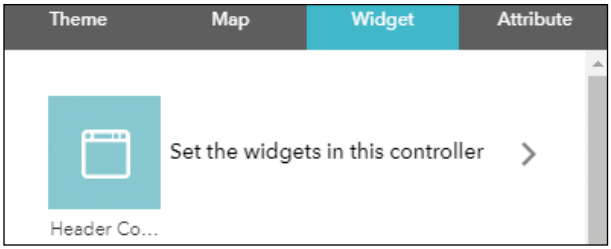
The bookmark widget is added to your app and is ready for use.

9. In the Preview pane of your app, click the Bookmark widget, and then click the bookmarks you defined to see the map extent changes.

Note: The bookmarks you defined in the configuration mode are contained in the app configuration and are globally available to all users of your app. You can also add bookmarks in the running mode of the bookmark widget; however, such bookmarks will only live locally in your browser cache, and thus are available only to you.

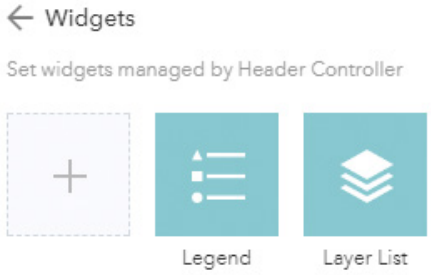
Next, you will add additional widgets to the header controller.

10. Click the Set the widgets in this controller link.



Widgets added to the header controller will appear in the toolbar.

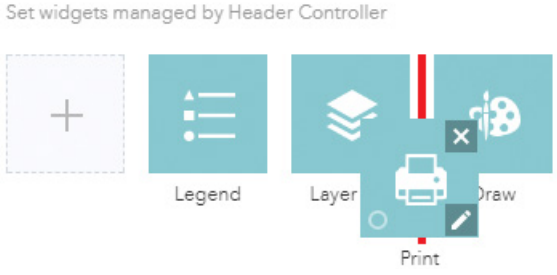
11. Click the Plus button.



12. In the Choose Widget window, click Draw, click Print, and click OK.

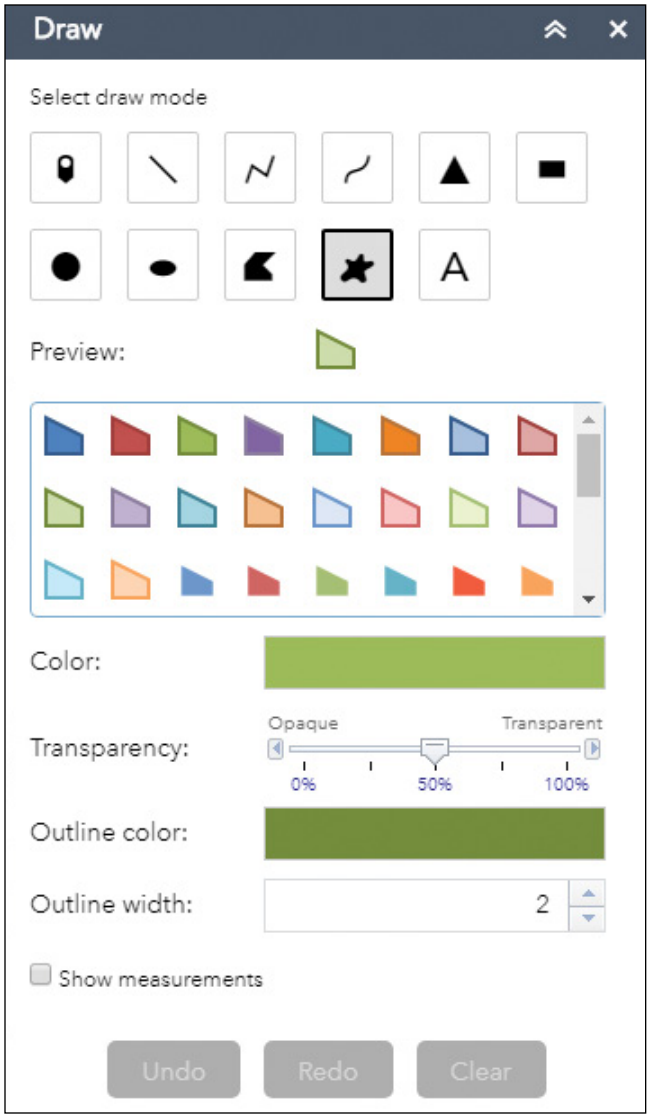
You have now added these two widgets to your app.

13. If you need to change the order of your widgets, click a widget button, drag the button to the desired position, and drop it there.



Your two new widgets are data-independent and have default configurations. You can use them right way.

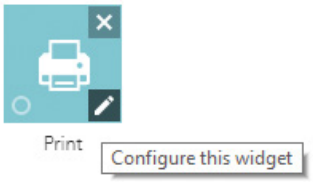
14. In the right corner of the app toolbar, click the Draw button (or the More button, and then the Draw button if your screen size is small). In the Draw window that appears, select a Draw mode.



15. Select a symbol, and experiment with drawing some graphics on your map.

Data-independent widgets may need configuration as well. Next, you will configure the Print widget.

16. In the Design pane, point to the Print widget, and click the pencil .



17. In the Configure Print window, notice that the service URL points to the printing geoprocessing service hosted in ArcGIS Online.

Note: If your map has layers from an internal ArcGIS Enterprise, you will need to change the printing service URL to a URL that has network access to your internal server. (See the "Questions and answers" section for details.)

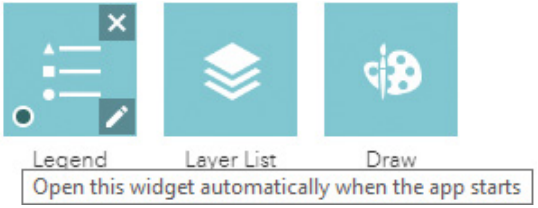
18. Specify the default title as **Historic Earthquakes and Hurricanes**, and the default author as your organization or your name, for instance, and click OK.

19. On your app toolbar, click the Print widget to test how it works, and in the Print window, click Print to print the current map view, including any drawings, to a PDF.

20. When the printing job is done, click the PDF link, examine the PDF, and then close the print window.

The widget added from the widgets collection can be set to open automatically when the app starts. A maximum of two widgets can open automatically: one is on the controller and another is in the placeholder. Next, you will configure the Legend widget to start automatically.

21. In the Design pane, point to the Legend widget, and in the bottom-left corner of the widget, click the dot to change it to dark green.



You will notice that the legend automatically opens in section 3.6 when you launch the app.

22. In the Design pane, click Save to save your configuration.

3.4 Configure chart-type widgets

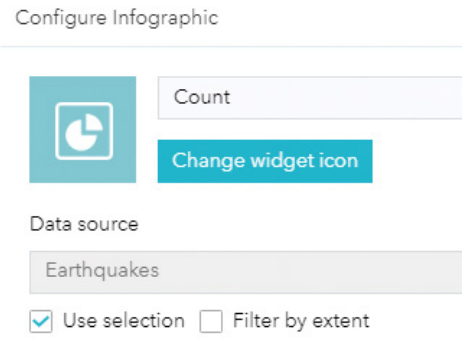
In this section, you will enhance your web app by adding a group of chart widgets. Web AppBuilder for ArcGIS provides charting capabilities via widgets including the Infographics widget and Chart widget. You will use the former in this section. Chart widgets are data-dependent widgets. You will configure the layers and fields by which these widgets will associate.

1. In the Design pane, click the Plus button. In the Choose Widget window, click Infographic, and click OK.

2. In the Choose a template window, click the thumbnail of the Number template, and click OK.

3. In the Set data source window, click the Earthquakes layer, and click OK to enter the settings panel of the template.

4. Change the widget title to **Count**. Leave Use selection selected.

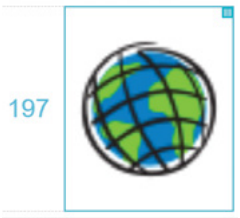


With Use selection selected, the infographic charts will be dynamic to match the earthquake layer selections. You will experiment with it later in this section.

Next, you will modify the layout of the Number widget. Note that the left panel is not only a preview of the graph but also a flexible layout editor.

5. Click the thumbnails to hide the title and description elements.

6. Click the image element to highlight it and drag the handle in the upper-right corner to rearrange it to the right side of the number element. Drag and move the divider between the number and the logo to expand the logo element.



7. Click the logo image to bring up its settings on the right.

8. Click the Upload button, browse to **C:\EsriPress\GTKWebGIS\chapter3**, select USGS_earthquake_cause.gif, click Open, and click OK.

The image displays the main causes of earthquakes in the US. The widget is configured. Next, you will try it.

9. In the upper-right corner of the app toolbar, click the Count button to open the widget. Notice that it displays the total number of earthquakes in the layer along with the image you selected.

Next, you will add a pie chart to show the numbers of earthquakes by year.

10. In the Design pane, click the Plus button. In the Choose Widget window, click Infographic, and click OK.

11. In the Choose a template window, click the thumbnail of the Pie Chart template, and click OK.

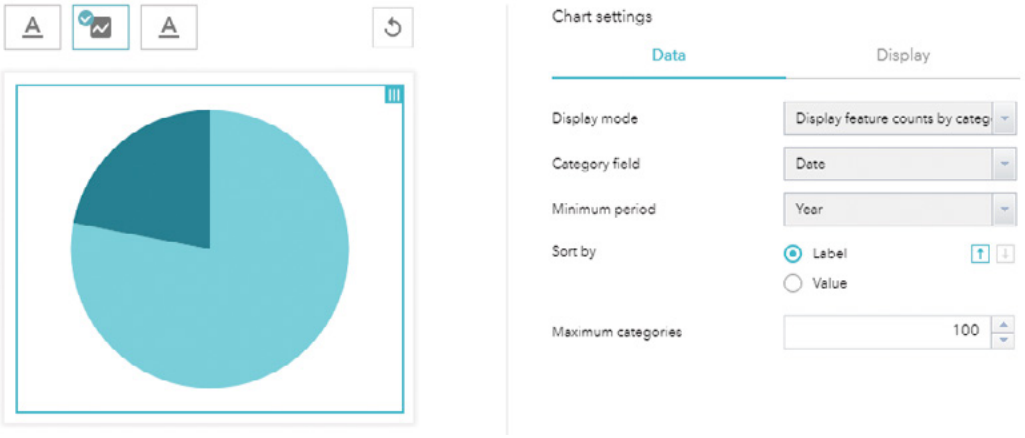
12. In the Set data source window, click the Earthquakes layer, and click OK.

13. Change the widget title to **By year**.

14. Click the thumbnails to hide the title and description elements.

15. Click the chart area. Under Chart settings, perform the following actions:

    - For Display mode, choose Display feature counts by category.
    - For Category Field, select Date.
    - For Minimum period, select Year.
    - Click the Display tab, select Data labels.
    - Click OK.



At this step, you used the Date (earthquake date) field instead of the Year field directly. When you don't have such a year field, or you want to summarize your data by other time units, such as months and days, you can use a date field.

16. In the upper-right corner of the app toolbar, click the By year button to open the widget. Notice that it displays the count of earthquakes each year in a pie chart.

Next, you will chart the earthquakes' magnitudes.

17. In the Design pane, click the Plus button. In the Choose Widget window, click Infographic, and click OK.

18. In the Choose a template window, click the Column Chart thumbnail, and click OK.

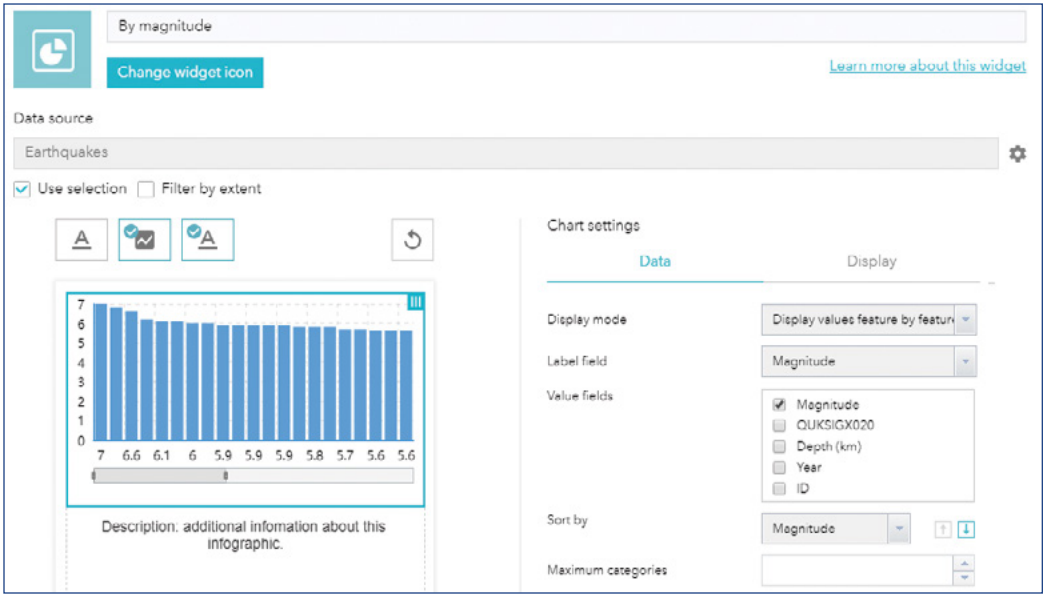
19. In the Set data source window, click the Earthquakes layer, and click OK.

20. Change the widget title to **By magnitude**.

21. Click the thumbnails to hide the title element.

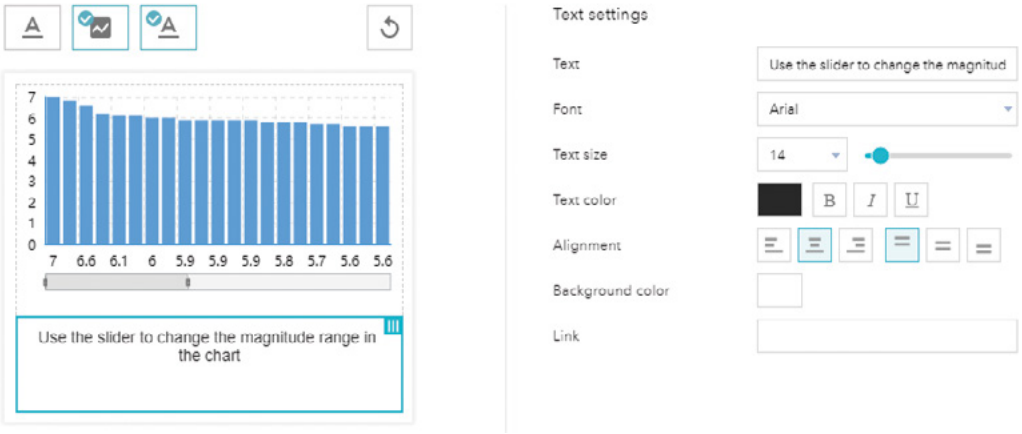
22. Click the chart area. Under Chart settings, perform the following:

    - For Display mode, leave Display values feature by feature as selected.
    - For Label field, select Magnitude.
    - For Value fields, select Magnitude.
    - For Sort by, select Magnitude and click the descending button.
    - Click OK.



For the value fields, you can chart multiple fields, which will create multiple columns per feature.

23. Click the description section. In Text settings, set the Text as **Use the slider to change the magnitude range in the chart**, and click OK.

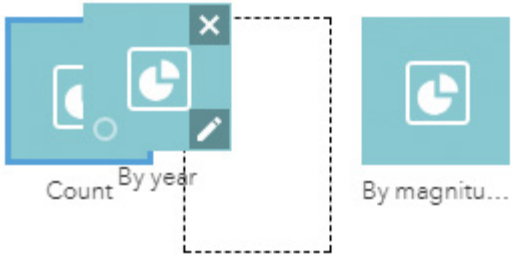


24. In the upper-right corner of the app toolbar, click the By magnitude button to open the widget. Explore the widget by doing the following actions:

- Point to a column to see that the corresponding earthquake is highlighted. You may need to pan the map to include the corresponding earthquake in the map extent.
- Click and drag the slider under the chart to change the magnitude range.
- Click and drag an end of the slider to expand or decrease the magnitude range.

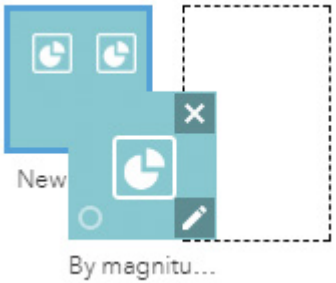
When there are too many buttons on the toolbar, you can arrange them into logic groups and make the toolbar cleaner.

25. In the Design pane, click the By year button, drag and drop it to the Count button.



26. Notice these two widgets became a group.

27. Click the By magnitude button, drag and drop it to the group.



28. Point to the New Group and click the Configure this widget button. In the New Group window, change the Label to **Earthquake Charts**, and click OK.

29. In the upper-right corner of the app toolbar, click the Earthquake Charts button to open the charts. Notice the three charts appear in one panel.

30. In the Design pane, click Save to save your configuration.

3.5 Configure filter-type widgets

In this section, you will further enhance your app by adding filter or query capabilities. Web AppBuilder provides many filter or query types of widgets to perform attribute, spatial, or both query capabilities. Spatial queries can use the current map extent, a point or shape that users will draw, or features from a different layer. Filter and query types of widgets are data-dependent widgets, so you will need to configure their associated layers and fields.

In this section, you will first add the Info Summary widget, and then add a Filter widget. The Info Summary widget queries your layers using the current map extent, and lists the features contained in the extent.

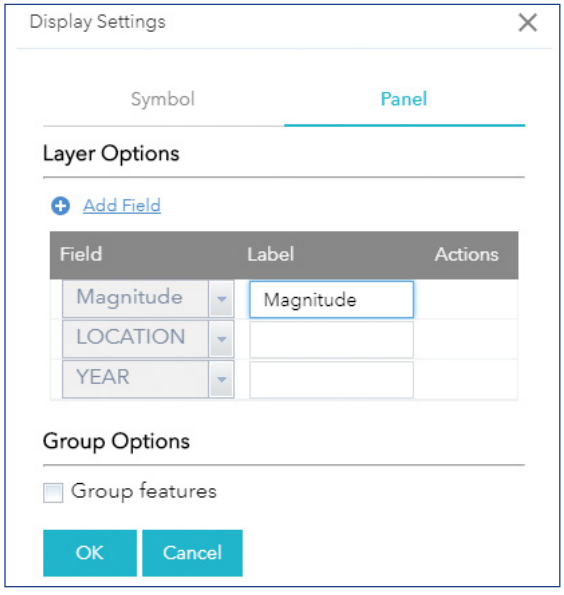
1. Continuing from the last section, click the Plus button to add additional widgets to the header controller.

2. In the Choose Widget window, click Info Summary widget, and click OK.

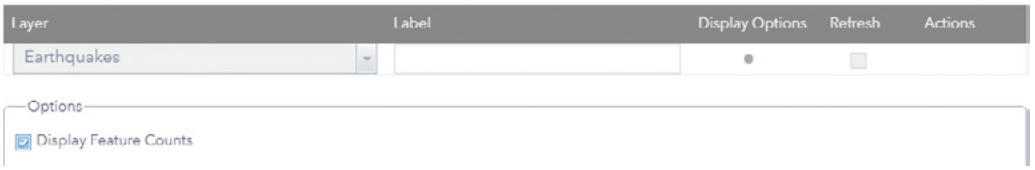
3. In the Configure Info Summary window, click Add Layer. Make sure the Earthquakes layer is added. Point to the Earthquakes layer. Under Display Options, click the Configure this widget button .

4. In the Display Settings window, click the Panel tab, and complete the following actions:

   - Set the three fields to be **Magnitude**, **Location**, and **Year**.
   - Set the label for Magnitude as **Magnitude**.
   - Leave the labels for the other fields blank.
   - Click OK.

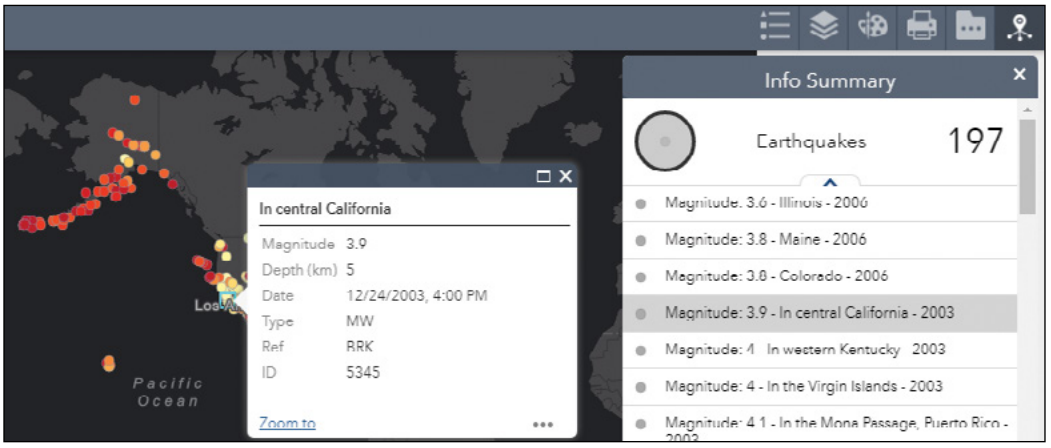


5. Under Options, select Display Feature Counts, and then click OK.



Next, you will try the widget to see how it behaves.

6. In the upper-right corner of the app toolbar, click the Info Summary widget to open it. Click the arrow under the layer to expand the feature list. Pan or zoom the map to see the feature count and list update.



For each feature in the list, the attribute fields you configured previously are displayed.

7. In the Info Summary widget, click a feature in the list and the pop-up of the feature will display on the map.

Similarly, you can add the Hurricanes layer into the widget. If you do so, in the Display Settings of the Hurricanes layer, you should group the features by the Name field. You will group the features because in the data, each hurricane path is broken into multiple lines corresponding to the hurricane wind speed changes. The group option will make it easier for your users to study each hurricane.

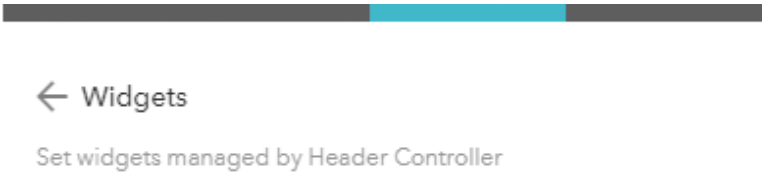
8. In the Design pane, click Save to save your configuration.

Next, you will configure the Filter widget.

All widgets in the header controller or header toolbar share the same panel, which means only one widget displays at a time. As one displays, the previous one closes. For your users to see both

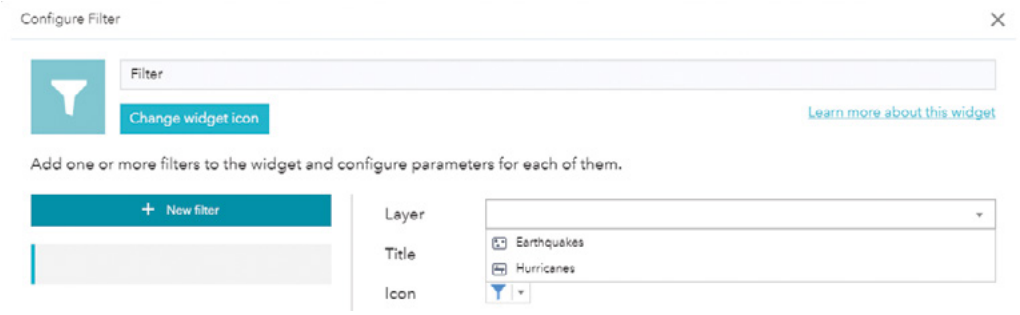
the Filter widget and the Charts widget group at the same time, you will add the Filter widget outside of the Header Controller.

9. In the Design pane, click the left arrow in the Widgets tab to navigate out of the header controller.



10. Click the first empty widget button. In the Choose Widget window, click Filter, and click OK.

11. In the Configure Filter window, click New Filter.

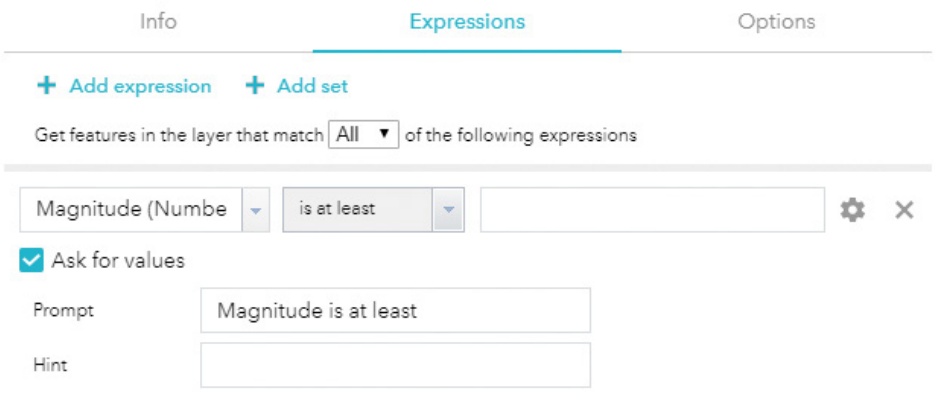


12. In the Layer drop-down list, choose Earthquakes.

Next, you will add a filter expression to filter the layer by earthquake magnitude.

13. Click the Expressions tab, click Add expression, and perform the following tasks:

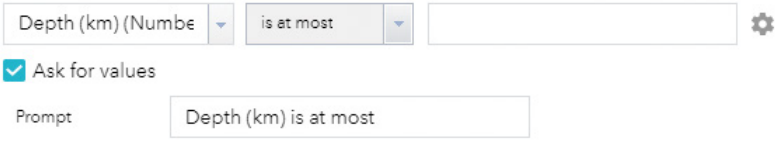
- In the field list, click **Magnitude (Number)**.
- In the operator list, click and choose "is at least."
- Select Ask for values.
- Leave Prompt as "Magnitude is at least."



Next, you will add another filter expression to filter the layer by earthquake depth.

14. Click Add expression again, and perform the following tasks for the new expression:

- Notice "Get features in the layer that match All of the expressions," which essentially means both this expression and the previous expression will have to be met.
- In the field list, click Depth (km) (Number).
- In the operator list, click and choose "is at most."
- Select Ask for values.
- Leave Prompt as Depth (km) is at most.



Next, you will add one more expression to filter the layer by earthquake year.

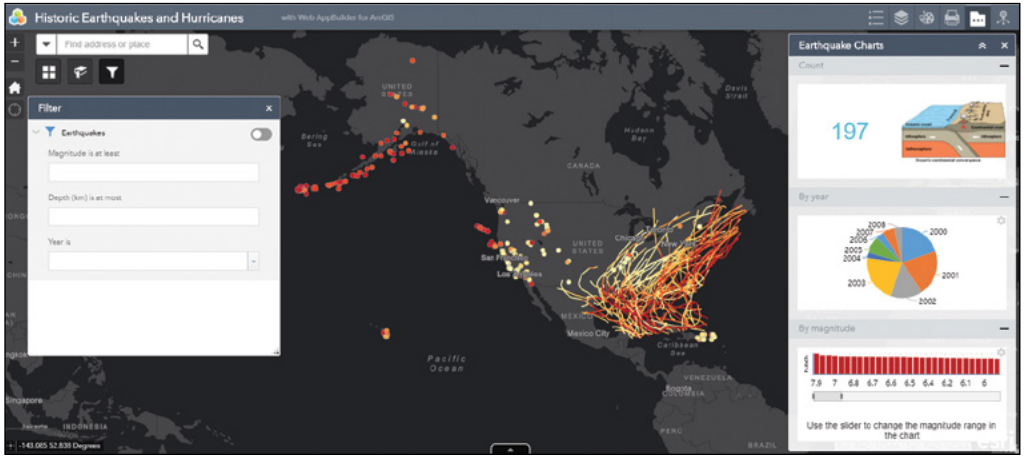
15. Click Add expression again, and perform the following tasks for the new expression:

- In the field list, click Year (Number).
- In the operator list, click and choose "is."
- Click the Set input type button and select Unique.
- Select Ask for values.

- Leave Prompt as Year is.
- Leave List values as Values filtered by previous expressions.
- Click OK.

Next, you will explore this widget to understand what you have configured.

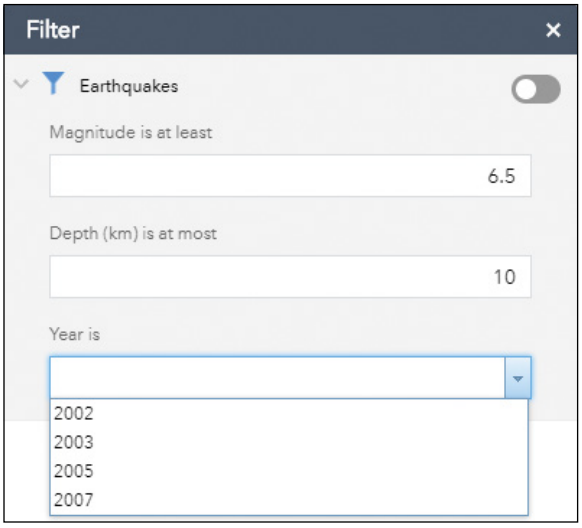
16. In the Preview pane, click the Earthquake Charts button and click the Filter button. Notice both the Charts and the Filter widgets are open.



17. In the Filter widget, click the Year is list and notice it has nine options, from 2000 to 2008.

18. Specify magnitude is at least 6.5, and depth is at most 10 km.

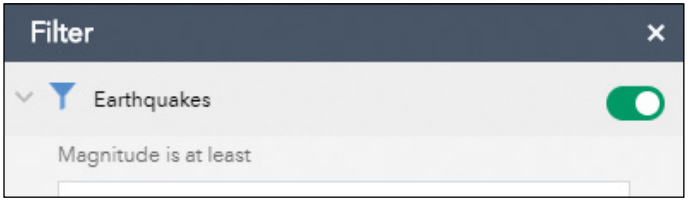
19. Click the Year is list, and notice it has fewer options. Understand that its values have been filtered by the magnitude and depth expressions.



20. Choose Year is 2007, and click the radio button in the upper-right corner of the Filter widget to apply the filters.

21. Notice how the map displays only the earthquakes matching the filters. Also notice how the charts have been updated to display the result of the filters.

22. Click the radio button in the upper-right corner of the Filter widget again to remove the filter. Notice the map and the charts have been updated to display all earthquakes.



23. In the Design pane, click Save to save your configuration.

3.6 Preview and share your app

In the previous steps, you saw the effects of your configurations in the Preview pane. You can further preview your app in various mobile devices and in its own browser window.

1. At the bottom of the Design pane, click Previews.

You will see a list of popular mobile devices.

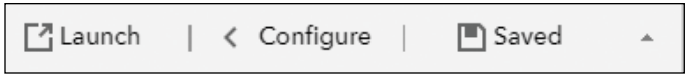
2. Choose the type of device you wish to preview, or specify a custom screen resolution.

3. In the Preview window, try each of the widget buttons and see how your app works on different mobile devices.

4. In the upper-right corner of your browser, click the Phone Orientation button or to change the orientation of the device. Try your app to see how it behaves in the new orientation.

If your smartphone or tablet has a QR scanner app, you can scan the QR code in the lower-left corner area to view your app on your mobile device directly.

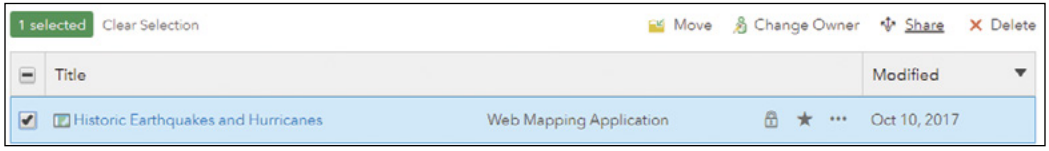
5. In the Design pane, click < Configure to return to the configuration mode.



6. Click Launch to view your app in the full web browser.

Your app will display in a new web browser or tab. The URL is your app URL that you will share with your audience and your instructor.

7. Go to your ArcGIS Online content list, and find and select the app.



8. Click the Share button to share the app with Everyone, and click OK.

In this tutorial, you created a web app that provides a set of functions without programming. You chose the necessary widgets, configured them, and combined them to create a useful and usable web app. The widgets you configured are among the widgets most commonly used. You also can try other widgets and explore how they work.

QUESTIONS AND ANSWERS

1. My Print widget does not work. Instead, an error message appears that reads, "Error. Try again." Why?

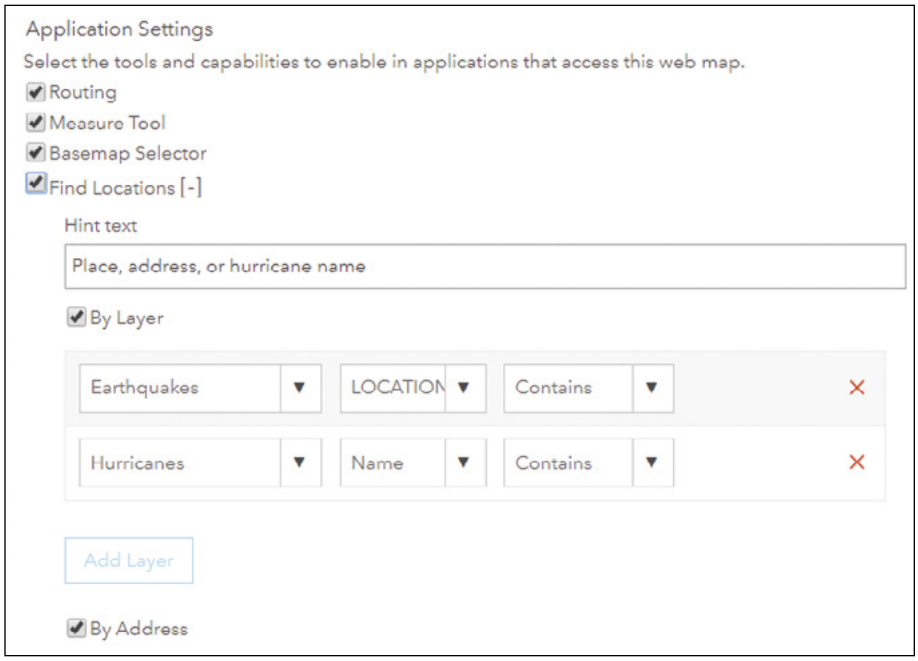
   Answer: A common reason for this error message is that your web map contains a layer from an internal ArcGIS Enterprise, which is inside your network firewall. The default printing service configured in your Print widget often comes from ArcGIS Online. ArcGIS Online printing service sits outside your network firewall and typically cannot access your internal server. As a result, the printing service cannot ask your ArcGIS Enterprise to generate a map or return the data.

   To fix this problem, replace the default printing service URL with an internal printing service URL. Your ArcGIS Enterprise comes with a built-in printing service, which you can find in the Utilities folder of your ArcGIS for Server Services Directory. Some organizations choose to stop this printing service. You can ask your GIS admin to start the service using ArcGIS for Server Manager (navigate to **http://your_ArcGIS_Server_name:6443/arcgis/manager**).

2. In the tutorial, I searched for hurricanes directly in the place/address search box and in Web AppBuilder Search widget. How can I configure my web map to support this?

   Answer: This capability is called feature search, which allows users to locate features in the same search box as the address and place name search. For example, enabling search on your parcel layer would allow users to find specific parcels simply by entering a parcel ID in the search box. For your users, this way to locate features is consistent with the way they locate an address or place name.

   To configure feature search, you can go to the item details page of your web map and click Settings. In Application Settings and under Find Locations, you can enable By Layer, select the Layer and Field you want to allow your users to search, and choose a condition for comparison. You can also configure the Hint text, which will appear in the search text box and tell users for what they can search.



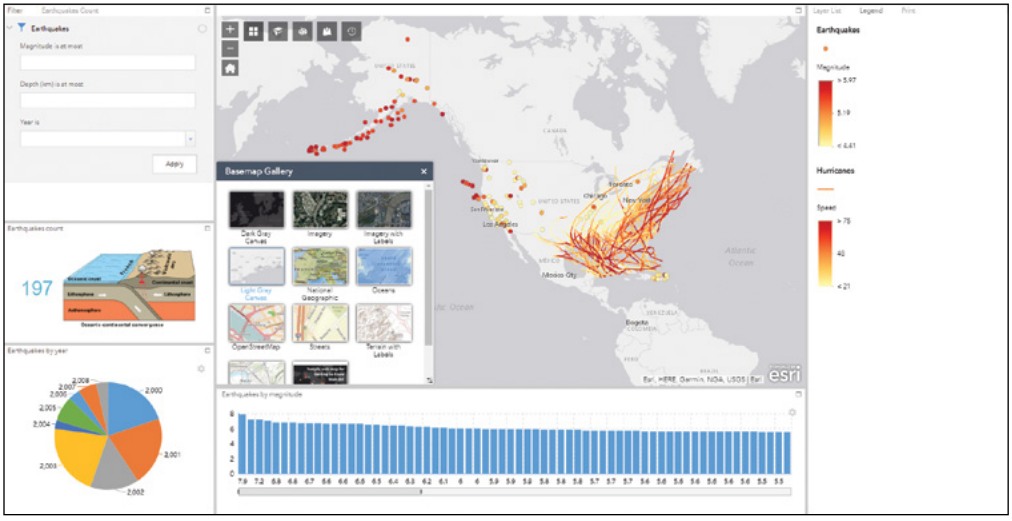
3. Can Web AppBuilder for ArcGIS work directly with web services?

Answer: Yes and no.
Web AppBuilder is not designed to work directly with web services when specifying a web app's map content. This workflow (adding services directly into the map) is not supported and is not recommended. Instead, the Web AppBuilder works with web maps and web scenes, which can encapsulate web services. Authoring a web map is easy and empowers non-GIS experts to make their own maps. Web AppBuilder is designed to extend the reach of non-GIS experts so they can easily create a custom web app for their web maps/scenes. This design strengthens the concept of extending the power of GIS and spatial mapping throughout an organization.

However, Web AppBuilder does work directly with web services via its many widgets. You can configure widgets to work directly with your web services by specifying their REST URLs when you set the properties of a widget. For example, you can specify your own basemap services for the basemap gallery widget, a custom geoprocessing service for the geoprocessing widget, or your own layer as the data source for the add data, query, chart and other widgets.

4. How can I have multiple widgets open at the same time?

Answer: You can use the approach in section 3.5, which can display an in-panel widget and an off-panel widget at the same time. You can also use the Dashboard theme, which allows you to display 4, 6, or 9 widgets at the same time.



5. A layer in my web map doesn't allow me to use it with the query widget. Why?

Answer: Some widgets require certain layer types. The query widget requires a web service layer. Those data you added into your web map directly cannot support the query widget. Try publishing the data as a feature layer or other web service types, and then add the layer to your web map.

ASSIGNMENT

Assignment 3: Build a web app using Web AppBuilder for ArcGIS.

Data:

No data have been provided. Instead, create a web map using the feature layer you published before, or find a web map in ArcGIS Online.

Requirements:

- The initial map extent should zoom to your study area.
- Provide bookmarks that allow users to quickly zoom to predefined areas.
- Let users print their maps as PDFs.
- Enable users to chart selected features with selected attributes.
- Allow users to filter or query for features by specifying values for multiple attributes.

What to submit:

- The URL to your web app.

Resources

"Configuring Web Apps Using Web AppBuilder for ArcGIS," **https://www.esri.com/training/catalog/57f4505e362fd58367ab5302/configuring-web-apps-using-web-appbuilder-for-arcgis** (or **http://arcg.is/2hBpKl1**).

"OSO Mudslide—Before and After," **http://learn.arcgis.com/en/projects/oso-mudslide-before-and-after** (or **http://arcg.is/1MxzBmA**).

"Web AppBuilder for ArcGIS online help document site," **http://doc.arcgis.com/en/web-appbuilder** (or **http://arcg.is/1DAV2Kb**).

"Web AppBuilder for ArcGIS widgets overview," **http://doc.arcgis.com/en/web-appbuilder/create-apps/widget-overview.htm** (or **http://arcg.is/2nywVgy**).

"Web AppBuilder for ArcGIS: An Introduction," Jianxia Song and Derek Law, **https://www.youtube.com/watch?v=nIYE-_Nhdec** (or **http://bit.ly/2zevTvw**).

"Web AppBuilder for ArcGIS: Customizing and Extending," Moxie Zhang and Gavin Rehkemper, **https://www.youtube.com/watch?v=9JttgbuZsEs** (or **http://bit.ly/2yYLbDB**).

"What's new in Web AppBuilder for ArcGIS," **https://www.esri.com/search?filter=Blogs&q=What%E2%80%99s+New+in+Web+AppBuilder+for+ArcGIS&search=Search** (or **http://arcg.is/2yceSSC**).