

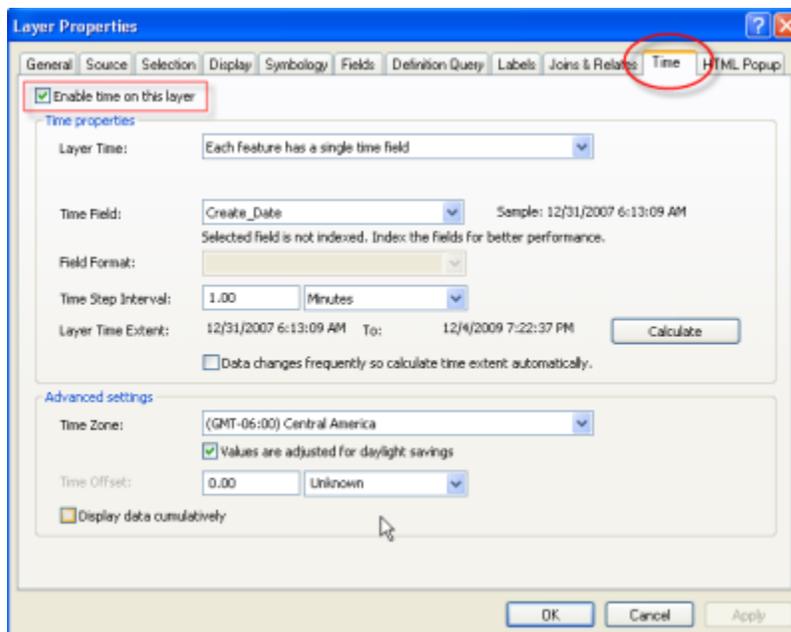
Chapter 11: Working with Time Data

New at ArcGIS 10 is the ability to store temporal information as part of a layer. These time-aware layers store information about the changing state of a dataset over time. By stepping through periods of time you can reveal patterns and trends in your data that may not have been obvious. Some examples include the mapping and progression of wildfires, floods, and hurricanes, the visualization of the spread of disease, and tracking historic demographic patterns. Much like a spatial extent, a Map object built using the AGIS API for JavaScript can also contain a time extent.

When time aware layers are present in a web application the Map object automatically contains a time extent. Setting the time extent is similar to setting the spatial extent of a map. Layer information changes automatically in response to any change in the time extent.

Enabling Time for a Layer

Before your web application can display time-aware data you will need to configure the layers in your map document that contain time data. This is done in ArcMap. Open the map document file that will be published as a map service and open the layer properties dialog for the layer(s) you'd like to make time-aware in your application.



Please note that any layers that you intend to publish as time-aware layers in your web application will need to contain a field(s) containing date information. Once configured, you then publish your map document file to ArcGIS Server as a map service. Time aware layers are then referenced from your web application through either the ArcGISDynamicMapServiceLayer or FeatureLayer class.

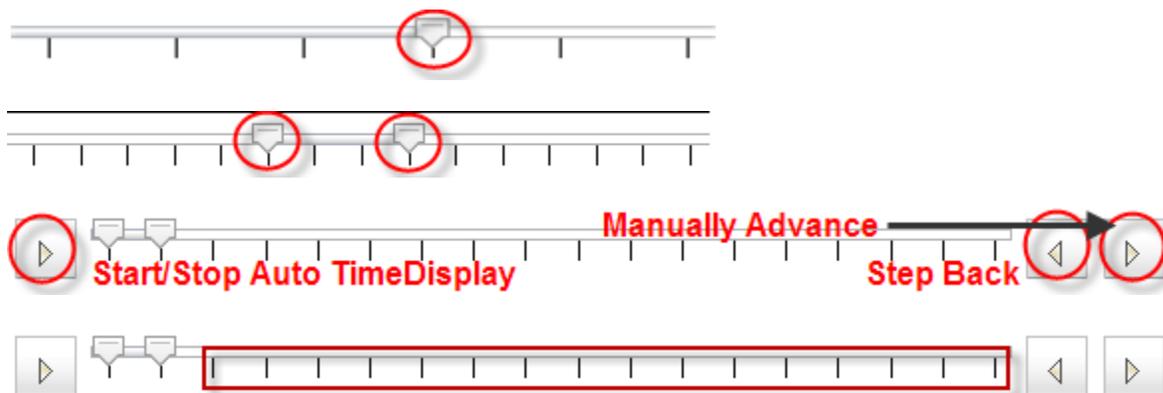
Working with Time-Aware Layers in JavaScript API

There are two ways to work with time-aware layers in your AGIS API for JavaScript web application. You can use the TimeSlider widget which is a user interface component that handles updating the maps time

extent. This widget contains a reference bar, thumbs, and controls for starting and stopping the component. You can also work with time-aware layers through the Web API to perform temporal queries, filter layers using time definitions, and to set the map's time extent.

The Time Slider Widget

The TimeSlider widget simplifies the process of visualizing temporal data through a user interface component. TimeSlider has a number of elements that you need to understand before using it in your applications. Each widget can contain one or two thumbs. As a general rule, using one thumb displays either data at a point in time or cumulative data up to a point in time. Two thumbs are used to display data within a time range. In addition to thumbs, the TimeSlider also contains controls for starting and stopping the progression of time, manually advancing the thumb(s), and stepping back in time. Finally, tic marks represent specific dates along the timeline. The TimeSlider widget is represented in the API by a TimeSlider class which can also be used to filter the map display to show cumulative data to a point in time, a single point in time, or data that falls within a time range.



A TimeSlider is added to your web application through the TimeSlider class in the API. The process of adding a TimeSlider requires six steps.

Add time aware map or feature service to Map

1. Use ArcGISDynamicMapService or FeatureLayer
2. Create TimeSlider instance
3. Associate time slider with map
4. Define thumbs, time slice, tics
5. Define time slice to visualize
6. Call startup() method

```

var earthquakes = new esri.layers.FeatureLayer("http://servicesbeta.esri.com/ArcGIS/rest/services/Earthquakes
{
  mode: esri.layers.FeatureLayer.MODE_SNAPSHOT,
  outFields: ["Magnitude"]
});
map.addLayer(earthquakes);
timeSlider = new esri.dijit.TimeSlider({}, dojo.byId("timeSliderDiv"));
map.setTimeSlider(timeSlider);
timeSlider.setThumbCount(2);
timeSlider.setThumbIndexes([0,1]);
//manually add time stops
timeSlider.setTimeStops(myTimeStepIntervals);
dojo.connect(timeSlider, "onTimeExtentChange", extentChanged);
timeSlider.startup();

```

TimeSlider Properties

There are a number of properties on TimeSlider that you should be aware of. TimeSlider.loop is a boolean value that controls continuous looping. TimeSlider.thumbCount defaults to 1 and controls how many thumbs appear on the slider. You can control the speed at which the thumb advances through the TimeSlider.thumbMovingRate property which by default is set to 1000 milliseconds or 1 second. You can change this value to speed up or slow down the advancement. Finally, TimeSlider.timeStops is an array of dates. Each date represents one tic mark that will appear on the slider.

Filtering Time Data

Data for time aware layers can be filtered in a couple different ways. The Map.setTimeExtent() method filters by a specific input time. You can also apply a time definition to Feature Layers. This limits the data loaded to the initial query and is similar to setting a definition expression with the difference being that features are only displayed if they match the input time extent. In the code example you see on this slide, only features between the start and end date will be displayed.

```

var timeDef = new esri.TimeExtent();
timeDef.startTime = new Date("09/25/2003 UTC");
timeDef.endTime = new Date("10/25/2005 UTC");
featureLayer.setTimeDefinition(timeDef);

```