ESRI Developer Summit

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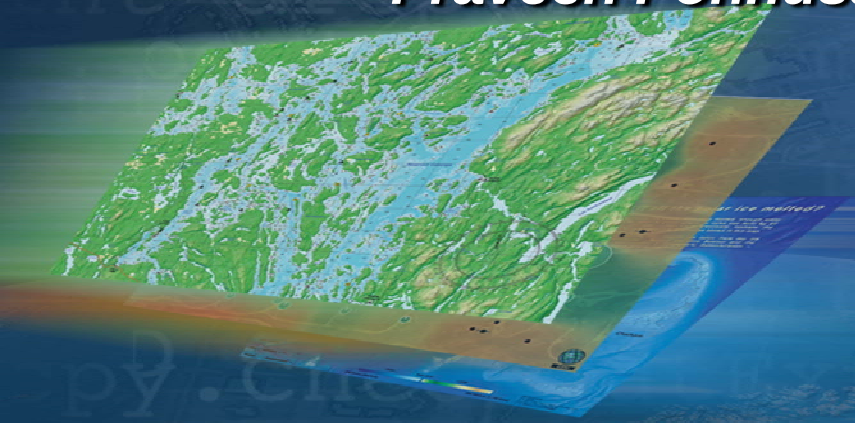
Working with the ArcGIS API for JavaScript 2.0

Jeremy Bartley
Kelly Hutchins
Praveen Ponnusamy



ESRI

What is new in the ArcGIS API for JavaScript at 2.0

- Client side FeatureLayer
- Integrating Time into your applications
- Building Editing applications
- Enhanced ImageServer layer and Network Analyst task
- Making the API easier for you
- Leveraging the platform – HTML5

esri.layers.FeatureLayer

FeatureLayer – A new type of Operational Layer

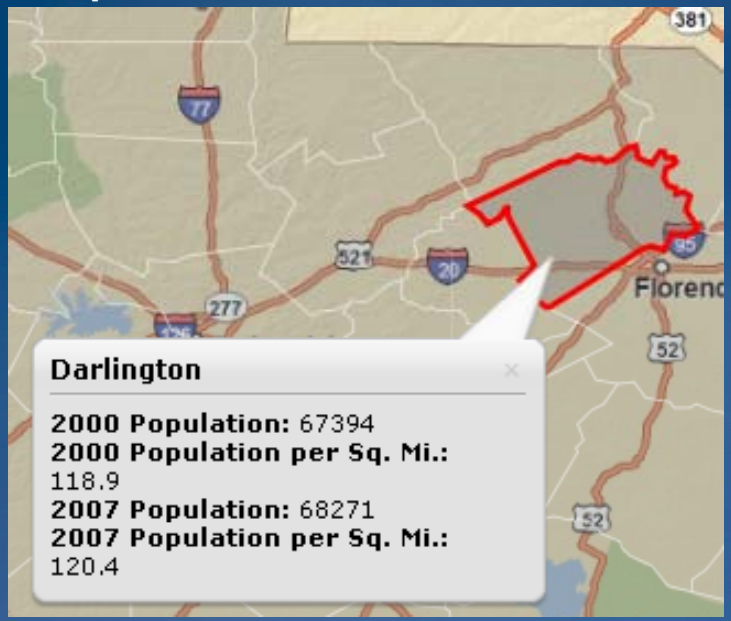
- Extends GraphicsLayer
- Works against a Layer / Table in a
  - Map Service
  - Feature Service
- Supports
  - Selection
  - DefinitionExpression
  - Query
  - QueryRelated
  - Edits (when working with a FeatureService)

FeatureLayer – A new type of Operational Layer

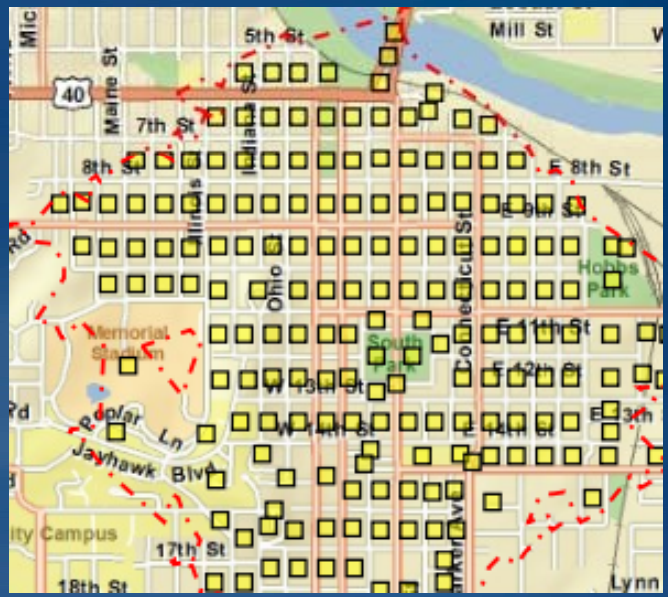
- Honors
  - Scale dependency
  - Renderer (with ArcGIS Server 10 services)
  - Labeler definition (not in public beta)
- Advertises
  - Field level domains
  - Attachments
  - Templates (editing)
  - Relationships (with ArcGIS Server 10 services)
  - Types and Templates (when working with ArcGIS 10 FeatureService)
- Mode
  - How are the features delivered to the client?

FeatureLayer View Mode

Snapshot – All Features on Client



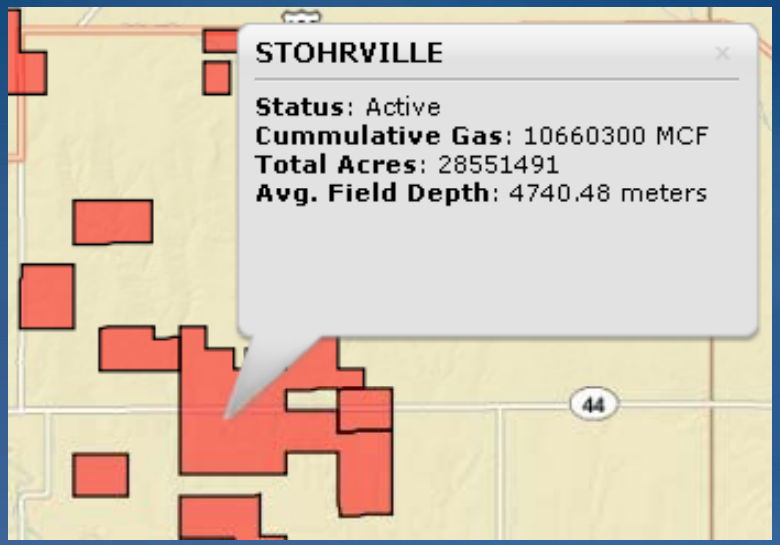
Selection Only – Only Selected Features



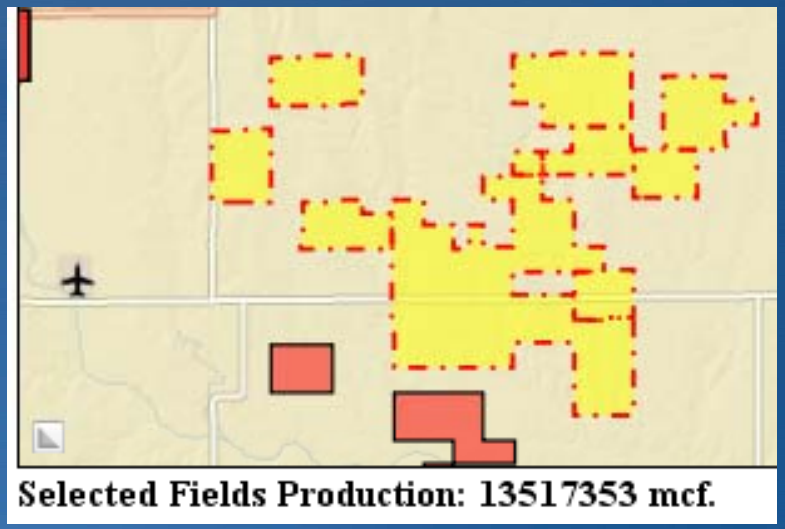
OnDemand – Request Features as map moves

FeatureLayer – Layer definition and Selection

Layer definition applied by FeatureLayer



FeatureLayer supports selection

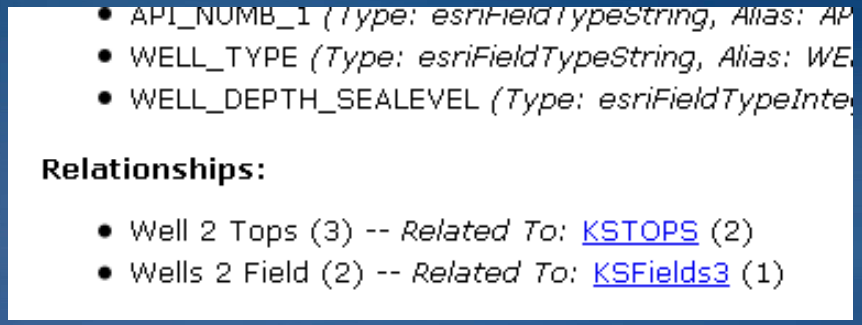


FeatureLayer QueryFeatures and SelectFeatures Details

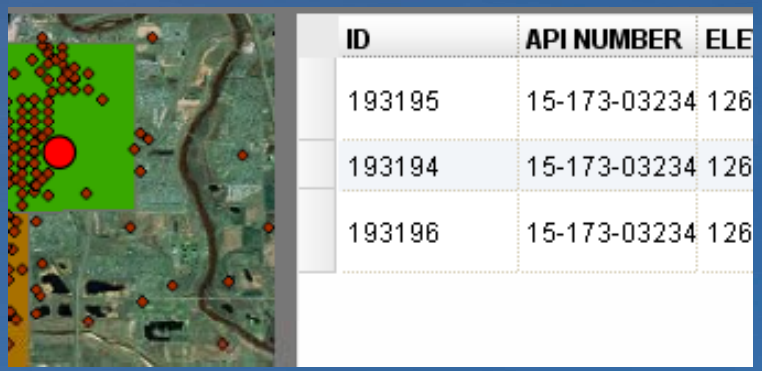
- Both take esri.tasks.Query() as input
- Selected Features are always held on the client
- Mode dictates where query is executed.
- queryFeatures and selectFeatures happen on the server except for the following cases:
  - Snapshot: Queries by TimeExtent, ObjectIds, and Extent based Geometry with intersection relationship are done on the client
  - On-Demand: Queries by extent based Geometry with intersection relationship are done on the client if the extent is within the current map extent
- Selection Only Mode: Always executed on the server

FeatureLayer QueryRelatedFeatures

- **FeatureLayer advertises Relationships as defined in the GDB and exposed via the REST API**

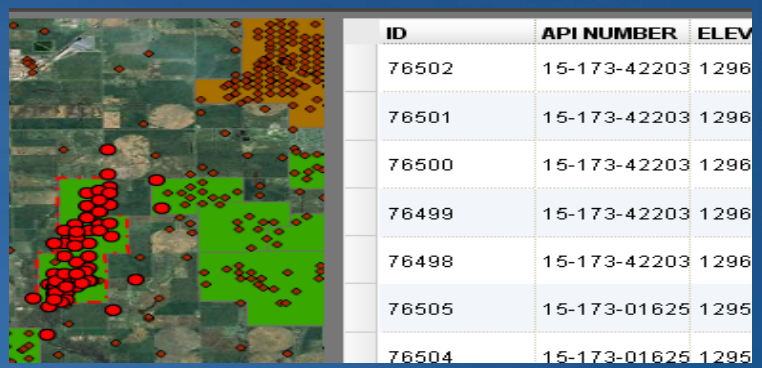


Query related features from 1 feature



ID	API NUMBER	ELE
193195	15-173-03234	126
193194	15-173-03234	126
193196	15-173-03234	126

Query related features from multiple features



ID	API NUMBER	ELEV
76502	15-173-42203	1296
76501	15-173-42203	1296
76500	15-173-42203	1296
76499	15-173-42203	1296
76498	15-173-42203	1296
76505	15-173-01625	1295
76504	15-173-01625	1295

Integrating Time into your applications

Arroyo Field Production by Time - Mozilla Firefox

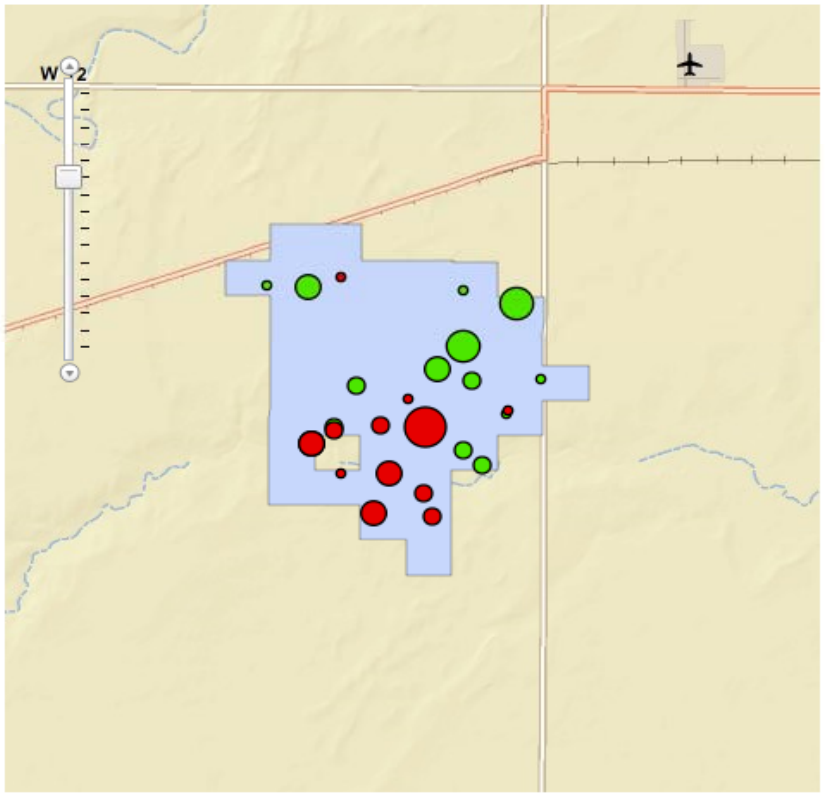
File Edit View History Bookmarks Tools Help

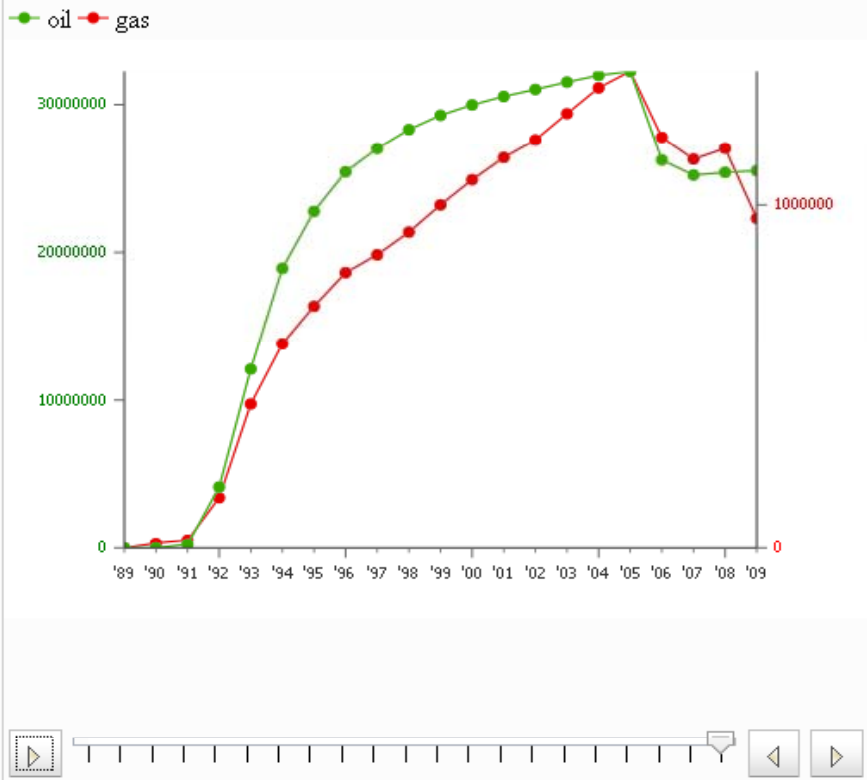
http://json/jsapidemos/2.0/Time/chartsample.html

prepetual time

ArcGIS Server Blog | Basic Service Area | Editable Points of In... | Feature Layer: Poin... | JavaScript API Refe... | Arroyo Field Pro...

Arroyo Field Production in *2009* Stanton County Gas Leases produced 25522524 Mcf with 17 wells. Stanton County Oil Leases produced 961128 bbls with 12 wells.





Find: ontime Next Previous Highlight all Match case

Waiting for serverapi.arcgisonline.com...

Map is time aware!

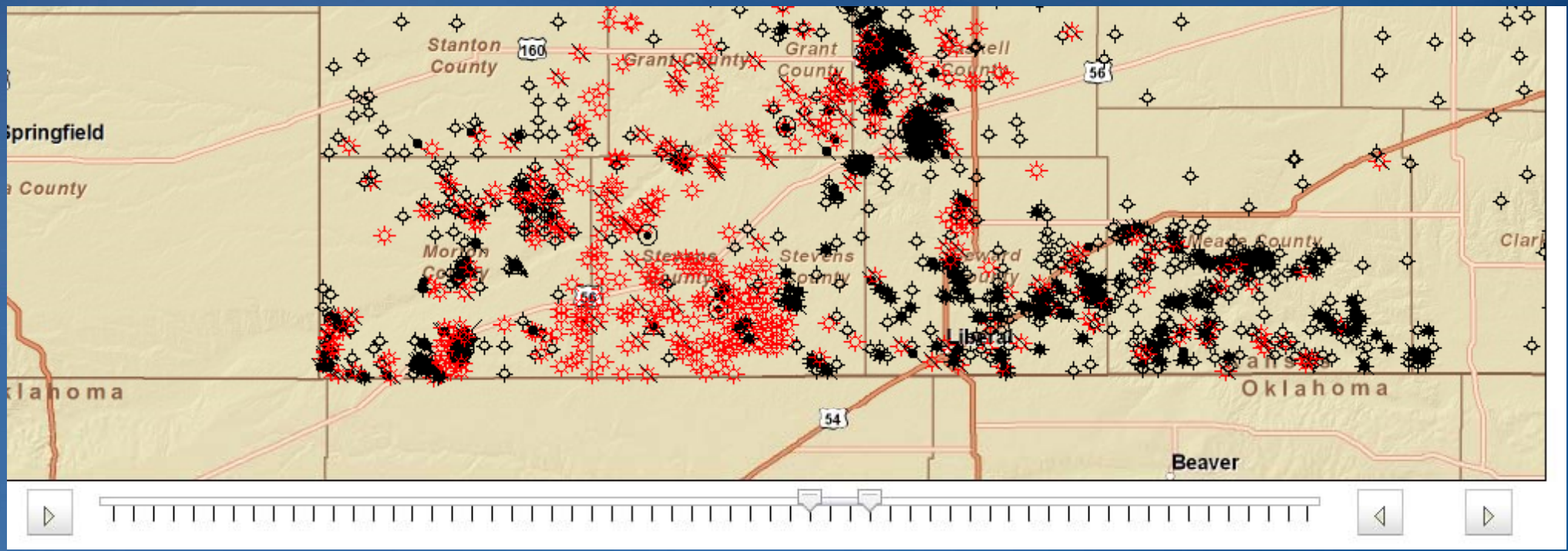
- Map includes a setTimeExtent() method
  - Control time like you control spatial extent
- Map can be driven by a TimeSlider
- Map drives time aware layers
- TimeSlider is an out of the box Dijit that can be placed anywhere
- Map and TimeSlider fire onTimeExtentChange event

esri.TimeExtent()

- TimeExtent has startTime and endTime properties
- If startTime and endTime are equal then timeExtent represents a time instant.
- startTime and endTime are Date objects
- var endTime = new Date(); //represents now
- var startTime = new Date(2001); //represents 1/1/2001 UTC

More about TimeSlider

- One thumb to represent cumulative or time instant
- Two thumbs for end user controllable start and end time
- End users can control time slider manually or by animating over the time span



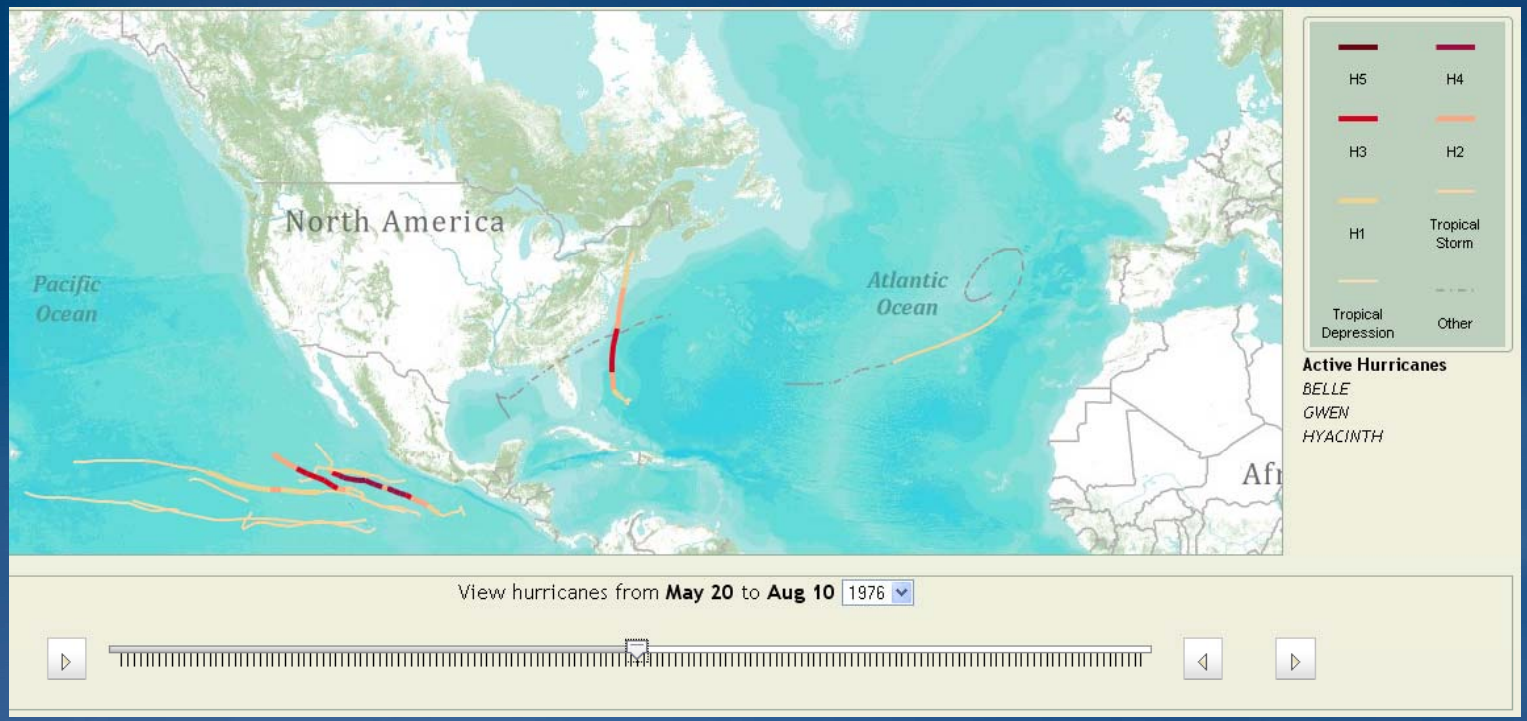
Time-aware ArcGISDynamicMapServiceLayer and ArcGISImageServiceLayer

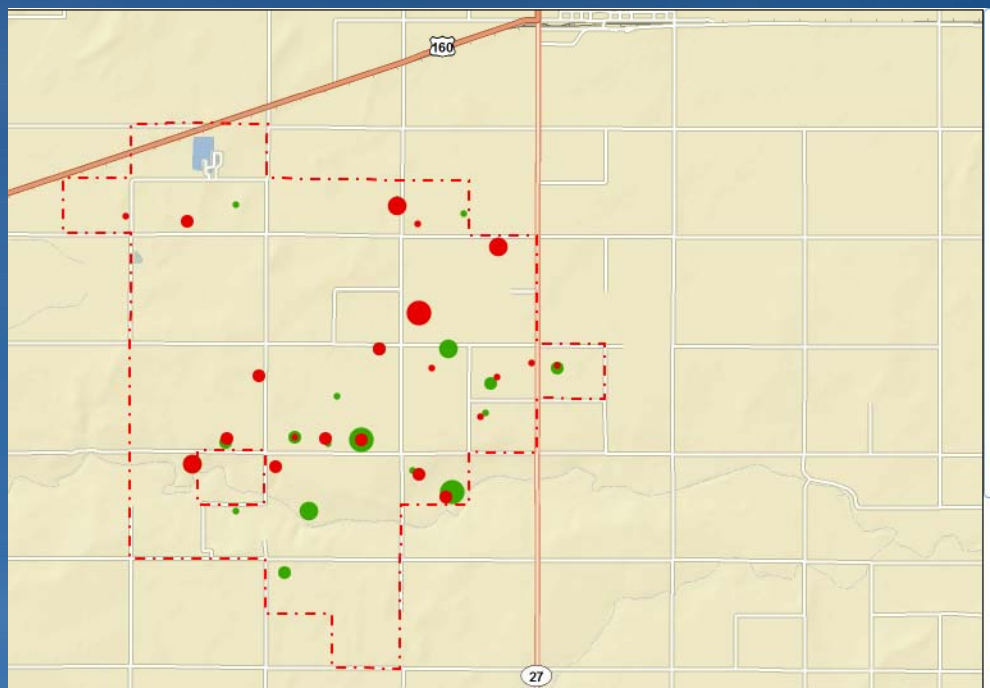
- Created as an image on the server
- Each time step interval is a new image request
- Use ArcGISDynamicMapServiceLayer if you have too many features that cannot be drawn as a FeatureLayer

Time-aware FeatureLayer

- Client-side rendering with a Symbol
- Temporal Renderer
- Event handling
- InfoWindow
- Client side queries for time
  - If FeatureLayer Snapshot mode
- Use if you can handle all features on the client (snapshot)

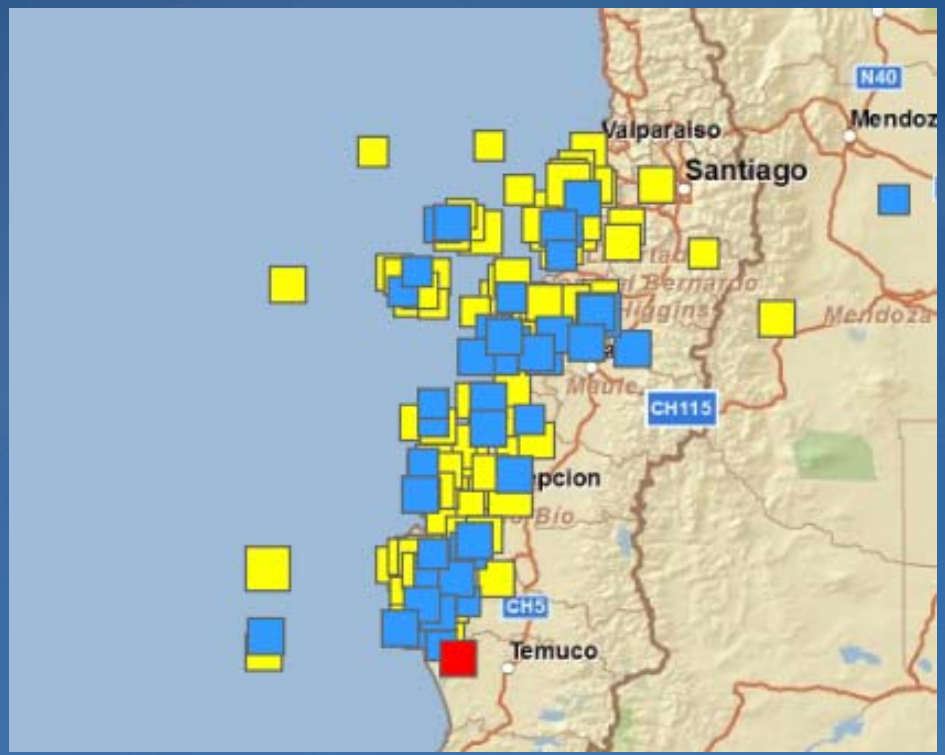
Time aware FeatureLayer

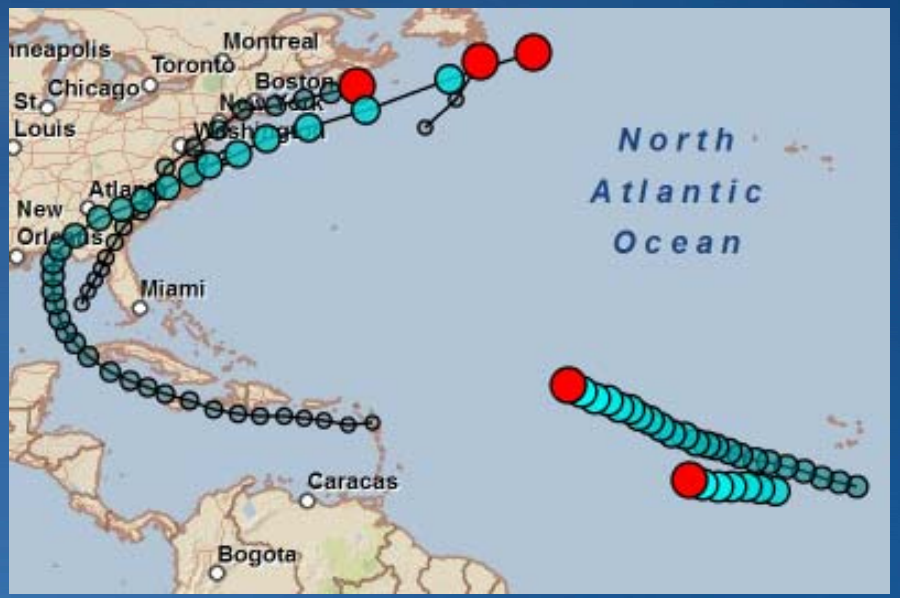




Temporal Renderer

- Observation renderer
- Last Observation renderer
- Track renderer
- Time Class Breaks Ager





Time Tips and tricks

- Leverage Dojo for common time calculations
  - Compare two dates: dojo.date.compare(currentDate,minDate)
  - Difference between two dates: dojo.date.difference(timeStart, currentTime, time units)
  - Add to an existing date: dojo.date.add(date, interval, amount)
  - Format Dates based on locale: dojo.date.locale.format

```
var formattedDate = dojo.date.locale.format(date, {
            selector: 'date',
            datePattern: 'MMM dd, yyyy' }
```

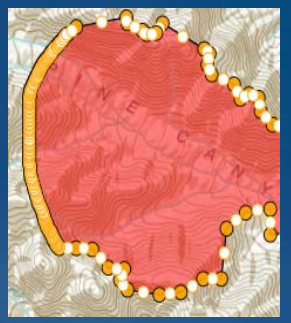
Editing

Editing Basics -- Server

- Works against ArcGIS Server Feature Service
- Template style editing
  - Type symbol and template (default values) are returned by service
- Last in wins
- Domains and subtypes exposed and supported
- You can edit stand alone tables and attachments
- All edits to FeatureService are through HTTP POST
  - If your app is not on the same domain as your GIS server make sure you set up your proxy!

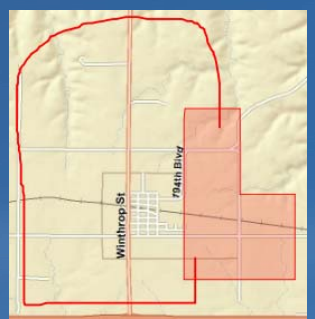
Strong low level support for Editing in API

- FeatureLayer
  - Constructed with a layer in a Feature Service: FeatureLayer.applyEdits(adds, updates, deletes)
- Edit Toolbar
  - API for manipulating/transforming geometry of existing graphics
- Generate symbol shapes on custom DOM node
  - esri.Symbol.getShapeDescriptors()
- Enhanced GeometryService task to support editing operations
  - Auto Complete, Reshape, Cut, Union, Intersect, Difference, Trim Extend, Convex Hull
  - DEMO



FeatureLayer + Edit Toolbar

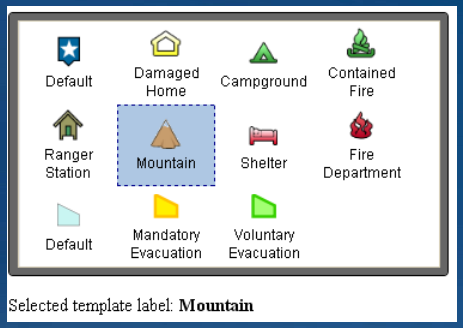
FeatureLayer + Geometry Service Reshape



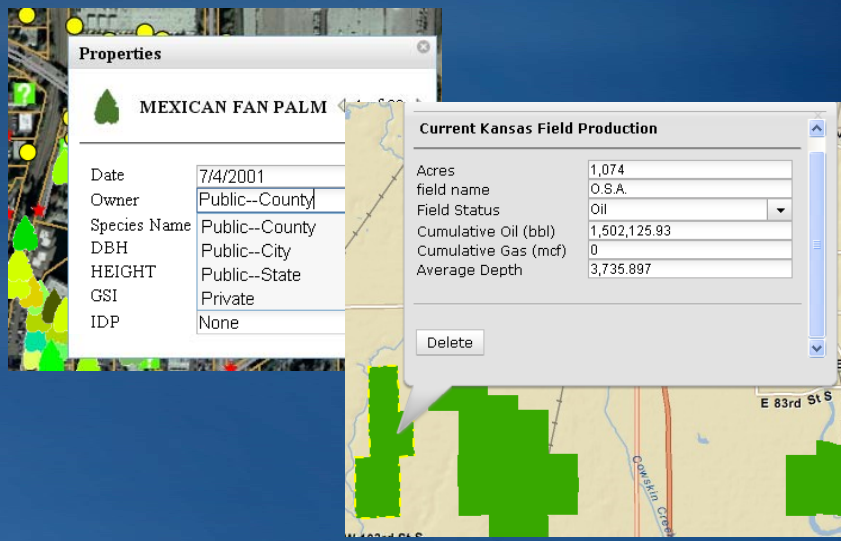
*GS task now works with geometries!

JSAPI includes a set of easy to use Widgets

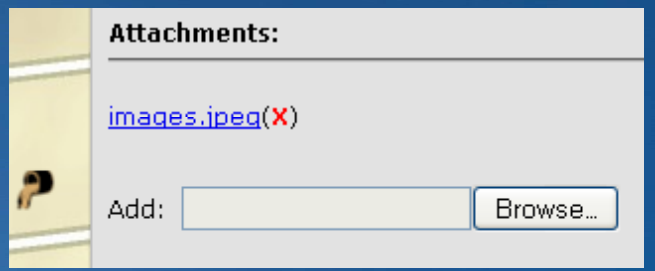
- **Template Picker**
  - Client side widget to display symbols as defined in FeatureLayer
  - Can also be used as a legend



- **Attribute Inspector**
  - Widget to support modifying attributes and deleting features
  - Honors domains set in FeatureLayer
  - Fires onAttributeChange event
  - Can be placed in any div
  - Updates after FL.onSelectionComplete and FL.onEditsComplete



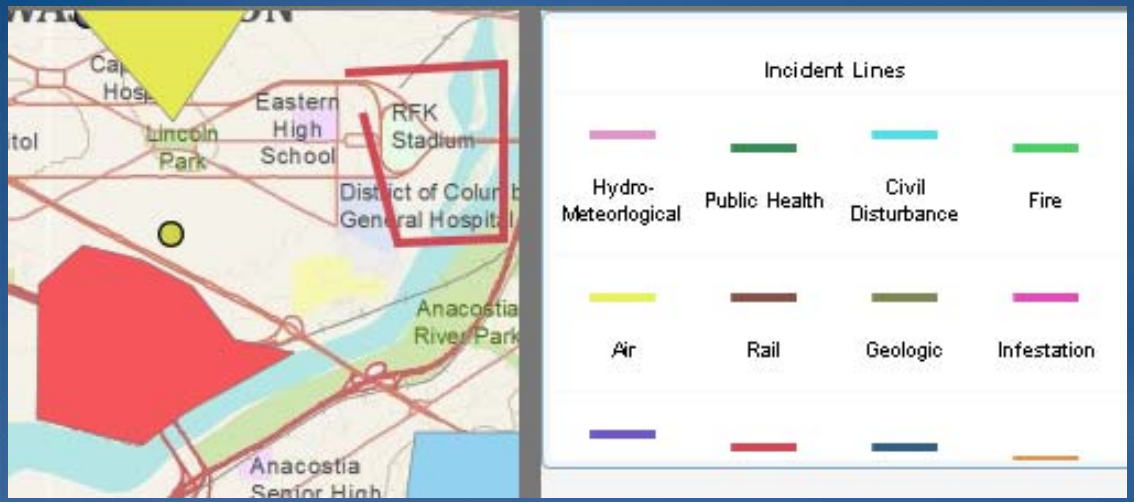
- **Attachment Editor**
  - Widget to support viewing, creating, and deleting attachments



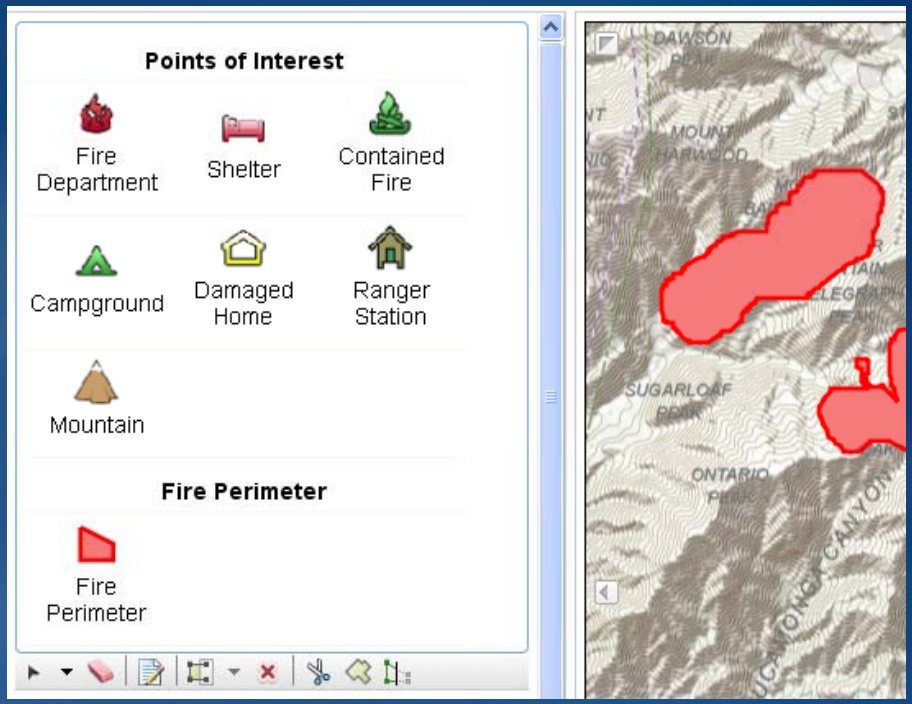
Editor Widget

- Web APIs support creating focused editing applications built using the underlying building blocks of the API
- Web APIs also support a complete, configurable Editing Widget
- Editing Widget is similar to ADF Editor Task, but works with Feature Service Templates
- Editing Widget can be configured to add/remove functionality
- New ArcGIS.com WebMap will leverage the Editing Widget

Editor Widget



Simple Editor Widget – Template based editing



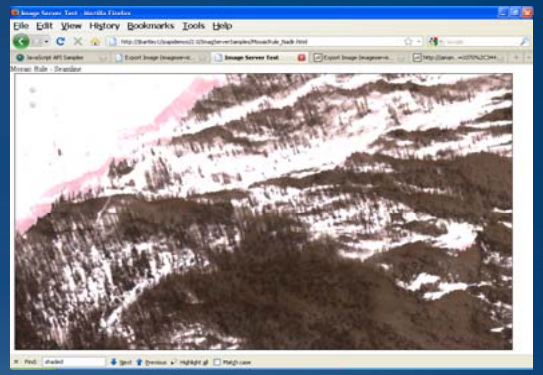
Editor Widget configured with advanced tools

Editing work left for 2.0

- Snapping
- Undo/Redo

Enhanced ImageServer layer and Network Analyst task

Enhanced ArcGISImageServiceLayer



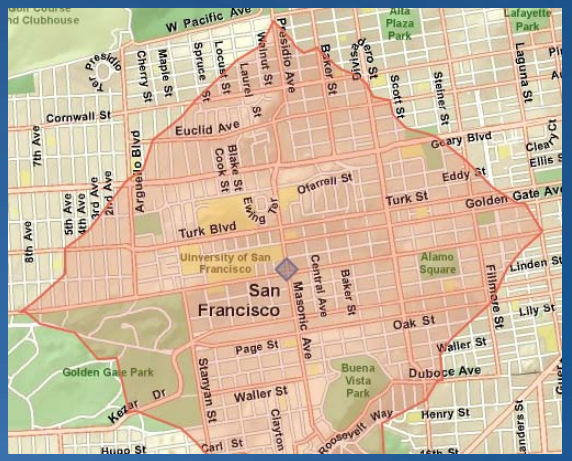
- Control mosaic definition
  - LockRaster, Nadir, Seamline, Center, and others
- Query raster catalog
  - Query footprints and get access to raw image
- Identify on ImageService
  - Get access to the pixel values against default service or by custom MoasicRule
- Perform Raster functions
  - Slope, Hillshade, NDVI, Colormap, Stretch

Network Analyst Task updates

- **RouteTask**
  - Now supports polyline and polygon barriers

- **ClosestFacilityTask**
  - Route to the closest facilities

- **ServiceAreaTask**
  - Drive time



Making the API easier for you

Making the API easier: Helper methods and overall enhancements

- Support for Well Known Text with ArcGIS server 10
  - Watch out for URL length!
- A new way to control layer visibility
  - layer.setVisible(true/false);
- Get access to the Layer that contains the Graphic.
  - var layer = graphic.getLayer();
- Convert arrays of Graphics to arrays of Geometries
  - var geoms = esri.getGeometries(graphics);
  - Array index order is the same

Making the API easier: Helper methods and overall enhancements

- Client side spatial query
  - if (extent.intersects(geometry)) { //geometry intersects extent }
- Rename the dojo namespace that is returned by the JSAPI
  - Change dojo.connect() to esriDojo.connect() New at 1.6
- Add multiple layers to the map at one time.
  - dojo.connect(map,"onLayersAddResult",layersAddedFunc);
  - map.addLayers([layer1,layer2]); //array order defines order on map
- Layer definition support for Identify and Find
- Support for out spatial reference in locator

Smarter API

- Team is working on optimizing the delivery of the API
- Smaller download
- Device Recognition (iPhone versus IE on Windows)
- Device specific event support

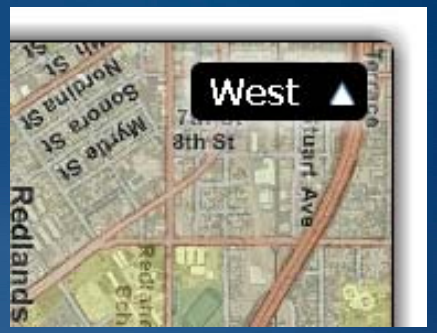
Leveraging the HTML 5 platform

HTML 5

- Not a standard yet, but a collection of functionality for developing rich internet applications without a plugin.
- You can leverage it now
  - Local Storage
  - Geolocation
  - Timed Media playback (movies/audio)
  - Native Rich Text Editor
- Not all browsers are equal. Only use if you can guarantee browser control (Phone for example) or your app can gracefully fallback.

Leveraging HTML5 enhancements in the JSAPI*

- CSS Transitions with CSS Level 3
  - Smooth animation between zoom levels and pans
  - Ease while panning
  - CSS Transforms



- Web Workers
  - Browser has 1 thread.
  - Web workers allow you to spawn several threads to do things like: calculations, information retrieval, and parsing

- Canvas
  - Immeadiate Draw mode, may support in Graphics Layer for devices that only support Canvas
  - No Native events

*Still experimenting. No promises at this time.

Questions?