ESRI DEVELOPER SUMMIT

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ArcGIS for Server: Publishing and Using Map Services

Matthias Schenker m.schenker@esri.ch
Gerhard Trichtl g.trichtl@mysynergis.com

Agenda

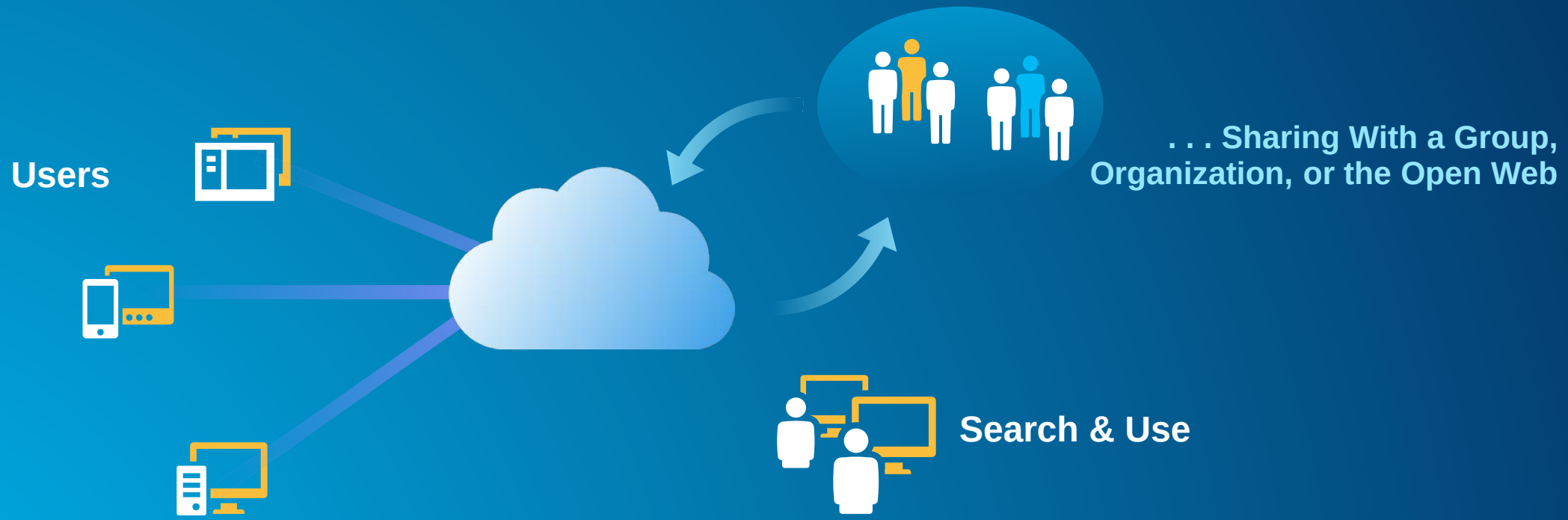
- Platform overview
- Publishing services
  - Demo: Publishing hosted feature service
- Map services
  - Demo: layer IDs, pagination, dynamic layers
  - Standardized queries with services
- Questions

The ArcGIS Platform

- Online / Portal
- Desktop
- Server
- Apps
- Developer
- Solutions

Publishing services

Information Sharing is Critical



Transparency and easy information access are now expected…

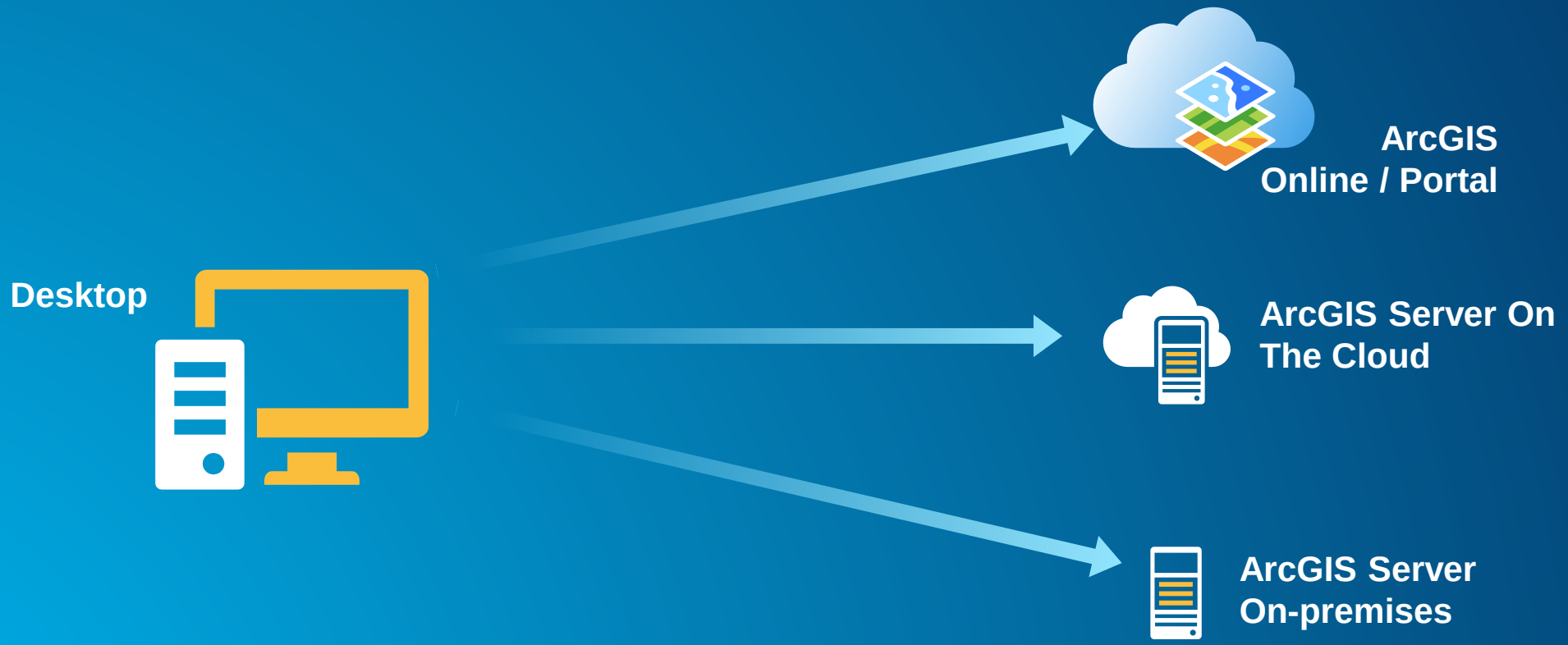
Sharing as Services

Professional to Everyone

Vision

- **Our goal: make it easier to share GIS resources**
  - **Unified sharing experience**
  - **Comprehensive analysis**
  - **Sharing to servers in the enterprise and to ArcGIS Online / Portal**

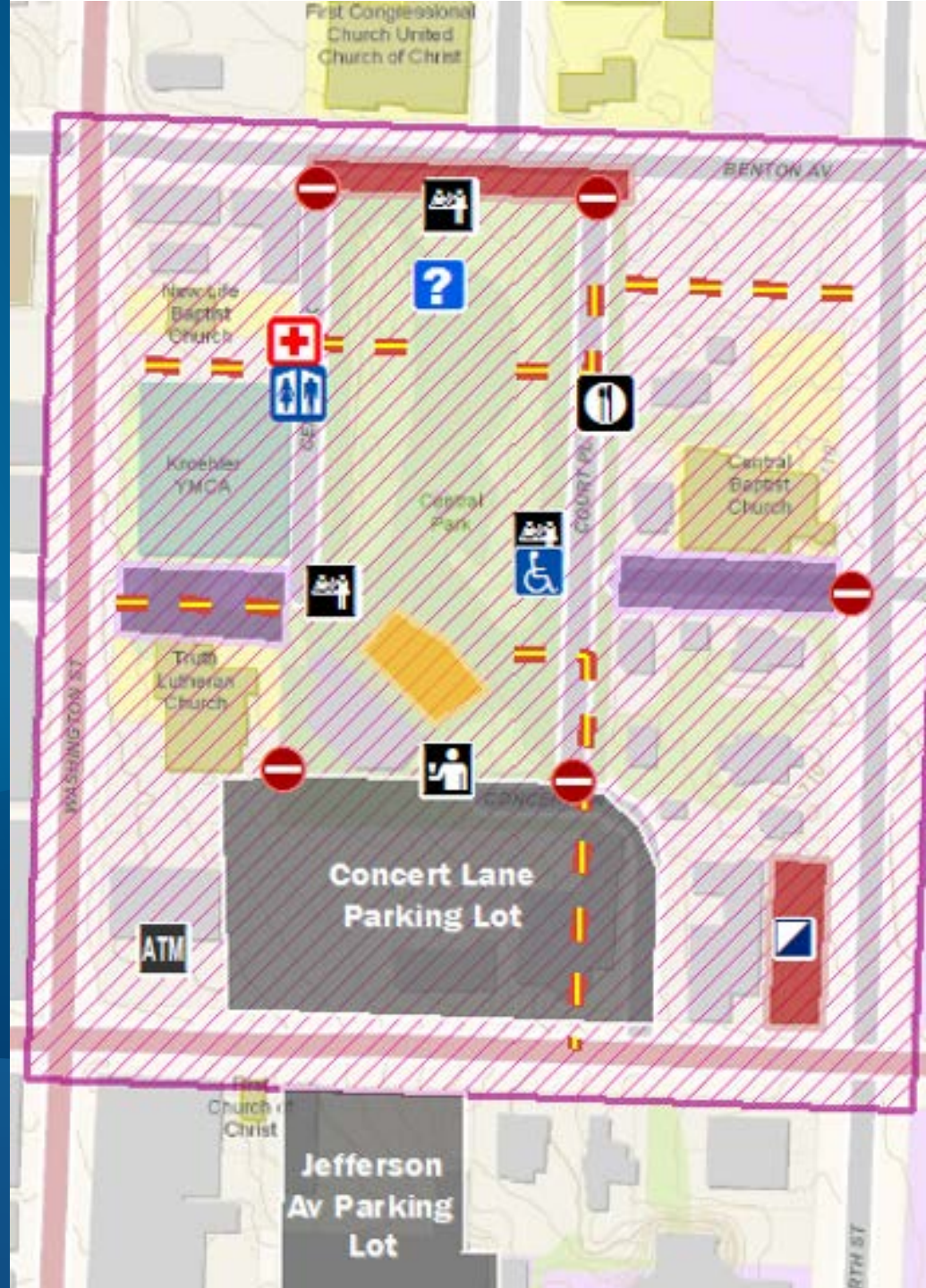
Sharing as Services



Sharing Layers Online

Hosted feature services – Demo

Script see:
https://github.com/khibma/update-hosted-feature-service



Hosted Mapping on ArcGIS Online

- **Sharing the easy way**
  - No Server to buy, install, or maintain
  - Scales automatically
  - No Firewall or IT issues

- **Limitations**
  - Only Tiled Map and Feature Services (*) supported
  - Data is private to each service

(*) New Default value for 10.4

ArcGIS Server in the Enterprise

- Recent improvements
  - Successful publishing of shared data
  - Comprehensive analysis
  - Simple publishing with copying of data
- When to use?
  - Need the full functionality of ArcGIS Server
  - Want full control over all hard and software
  - Want to publish services on live, shared data

ArcGIS Server Data Stores

- Server has a list of registered Data Stores
- Data Store is of type
  - Enterprise Geodatabase or supported Database
  - Folder
    - Tip: register top-most folder level possible for maximal benefit
  - ArcGIS Data Store (recommended for many FeatureServices, required for Portal)
- Access to the Data Store is validated during registration
  - On all machines in the site
- Replicated data stores for separate data instances
  - Tip: Read Help Topic About registering your data with the server

Data Stores are a key concept for publishing to ArcGIS Server

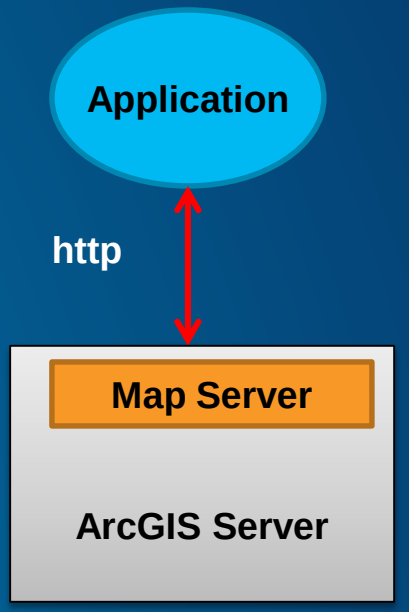
Service Definition (.sd)

- File format for publishing all services
  - For all services (Map, Geoprocessing, etc.)
- Contains everything required to create a service:
  - GIS resources (Map, Globe, etc.)
    - embeddable fonts (if needed)
  - Service Configuration
  - Data (if it needs to be copied to the server)
- Uploaded to the server when publishing
- Can be saved and published later
  - Using ArcCatalog/Catalog-Window or Server Manager

Map Services

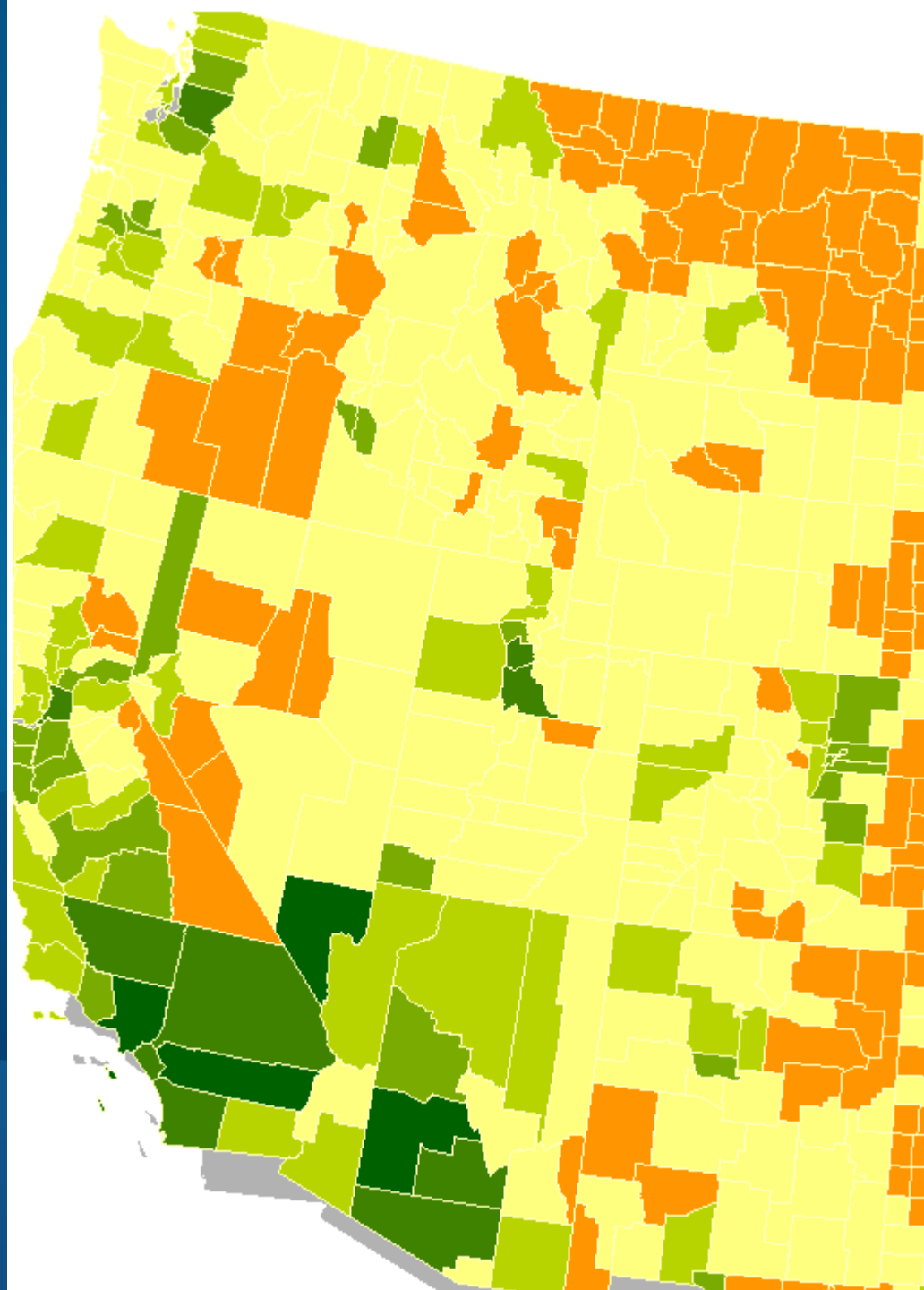
Review of Map Services Since ArcGIS 10.1

- One unified map service
  - An updated optimized map service
  - Supports additional capabilities, data types, layers, renderers
- New extension capabilities:
  - Network Analysis
- Can be used to display Geoprocessing results



MapService Demos

Preserve Layer/Table IDs
Pagination
Query By Distance
Query ReturnExtent
DynamicLayers
Query to return statistics
QueryLayer



Map Services: New at 10.3x

User Assignable Layer Ids for REST Map Services

Implemented

Promote

Demote

1250
Points

I am constantly adding and removing layers from map services. Each time I do, the layerid shifts. This is a pain. If I add a new layer, I have modify the source of my apps to reflect the updated layerid for querytasks, etc etc. This would be a huge plus.

Note from Esri (Dec 16, 2014): Implemented in ArcGIS 10.3 for Server. Please this help topic for details.

Tags : LayerID REST

Posted by Buddhatown to ArcGIS Server, Web Apps and APIs Aug 19, 2011

Demo

Preserving Layer/Table IDs

Layer/Table IDs do not change when map service is republished

- Introduced at 10.3
- This ensures that Layer IDs are unique (as usual)
- and preserves the IDs originally assigned

Service directory

Layers:

- Water Control Valves (0)
- Water Fittings (1)
- Water Hydrants (2)
- Water Mains (3)

Re-publish

Without immutable layers

Layers:

- Water Control Valves (0)
- Water Fittings (1)
- Water Hydrants (2)
- Water Casings (3)
- Water Lateral Lines (4)
- Water Mains (5)

With immutable layers

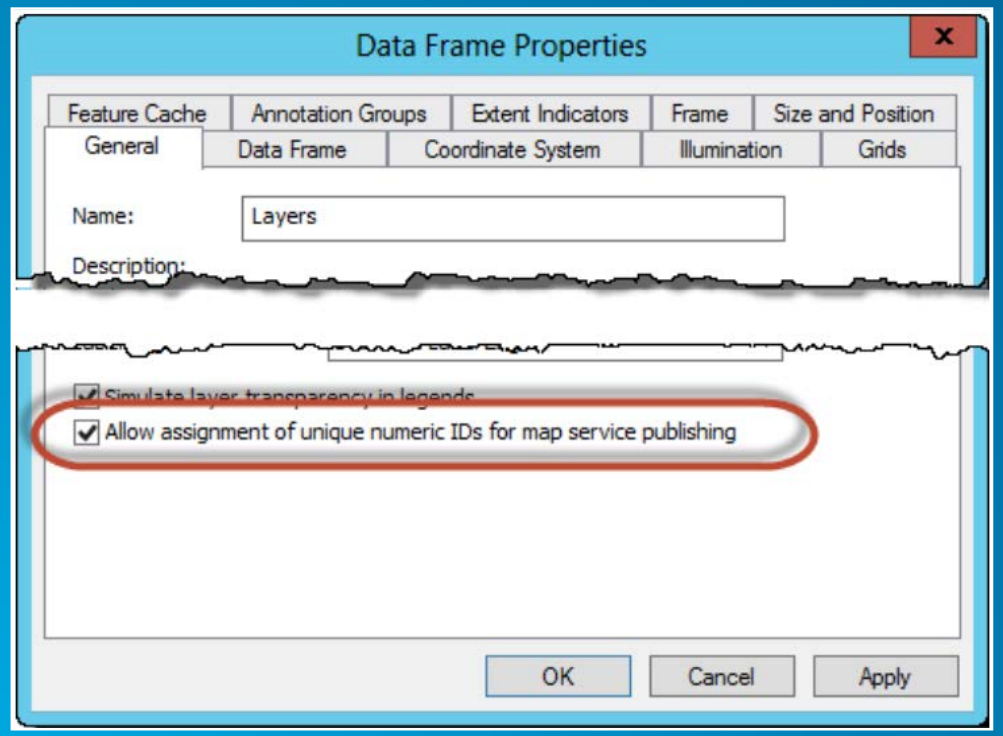
Layers:

- Water Control Valves (0)
- Water Fittings (1)
- Water Hydrants (2)
- Water Casings (5)
- Water Lateral Lines (4)
- Water Mains (3)

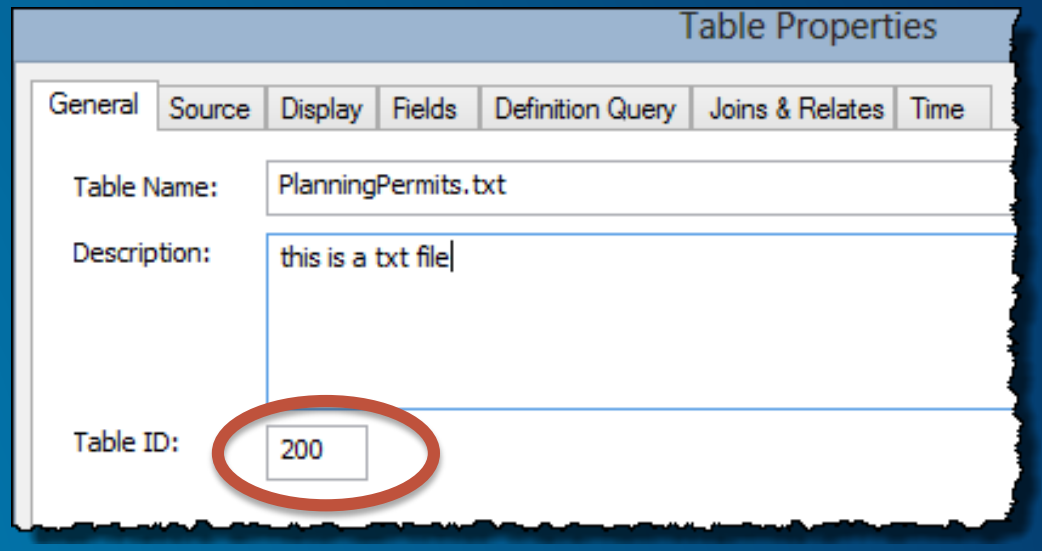
Preserving Layer/Table IDs

How to enable?

In ArcMap, set *Data Frame Properties* …



By default the option is unchecked

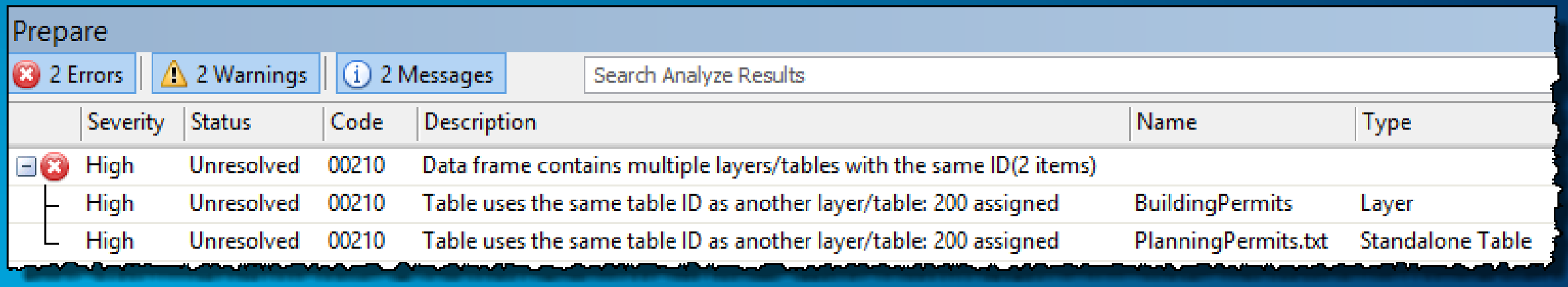


In the *Layer Properties* you can assign your own ID if you like. ArcGIS will ensure it is unique.

Preserving Layer/Table IDs

Analyzer

- **In the case of duplicate layer IDs, the analyzer will detect**



Preserving Layer/Table IDs

Things to remember

- You can now add, remove, shuffle layers
- Your layer IDs will remain and your apps won’t break

- You need to **republish …**

Remove the ObjectID Only option from the REST Query Operation and replace it with a Start Index and Offset Length

Promote

Demote

As far as I know the ObjectID Only option of the REST Query Operation is to allow a client application to build a record paging mechanism, similar to ArcMap, for viewing the Attribute Table of a Layer. The idea is to get an ordered list of ObjectIDs in memory on the client and then fetch pages of records maybe 100 at a time using ObjectIDs. So if the table has a 1000 records and each page is 100 records after getting all 1000 ObjectIDs then you can fetch pages of 100 records each as the uses pages through the table.

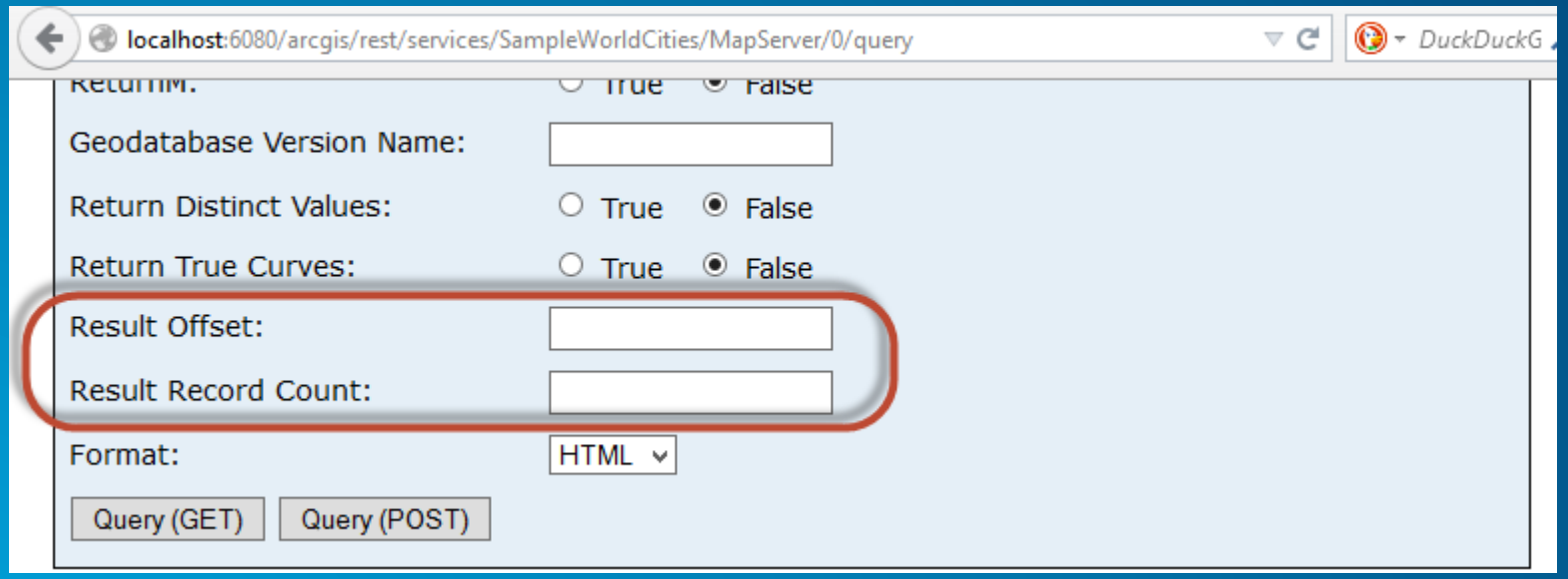
Posted by paitz49199 to ArcGIS Server May 20, 2013

Share this idea

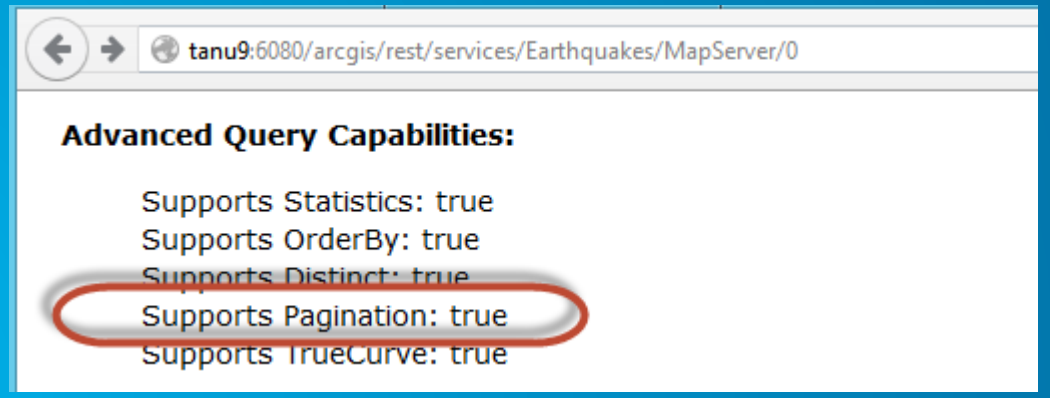
Report Abuse

Pagination (ver 10.3)

- **Two properties are added to the Query operation**



- **Check the layer/table resources to make sure it support pagination**



Pagination (JavaScript API for ArcGIS)

- **Two properties are added to the Query class**

Class: Query

[**AMD Module Require** | Legacy Module Require]

Constructors | Constants | Properties

```
require(["esri/tasks/query"], function(Query) { /* code goes here */ });
```

Properties

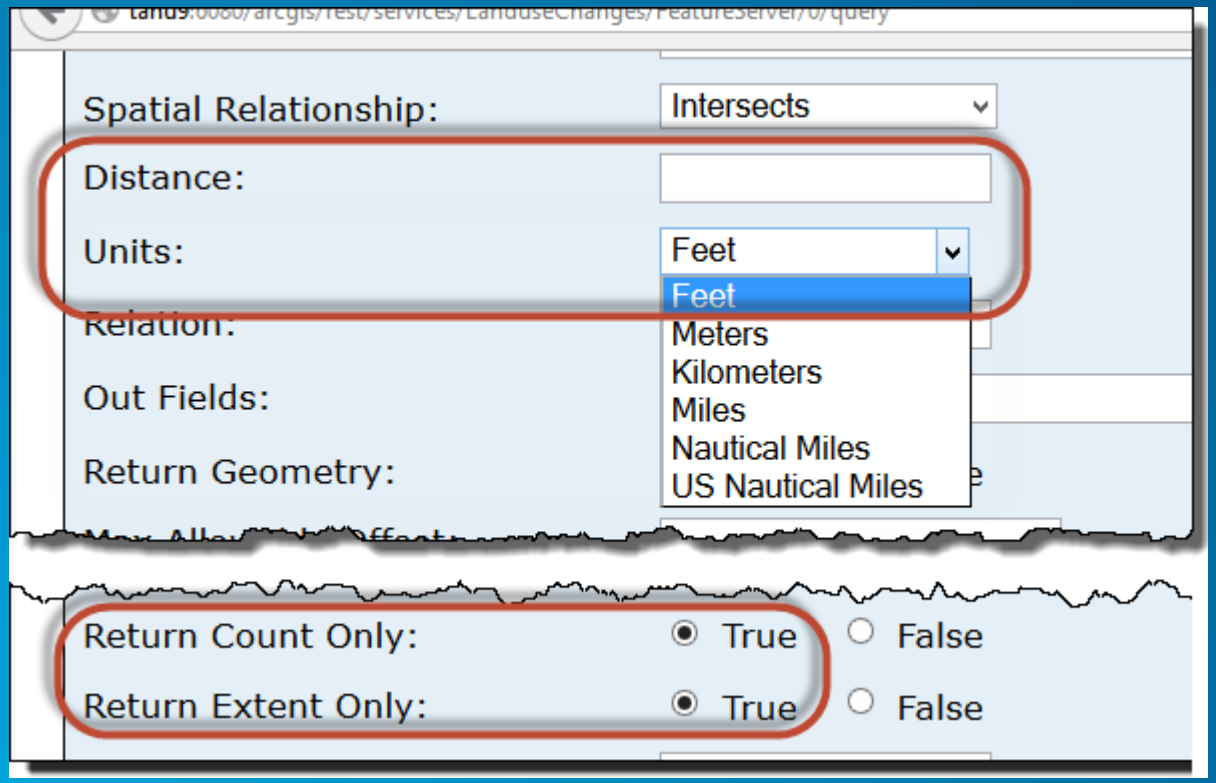
Name	Type	Summary
distance	Number	Distance to buffer input geometry.
geometry	Geometry	The geometry to apply to the spatial filter.
num	Number	Number of features to retrieve.
objectIds	Number[]	A comma delimited list of ObjectIds for the features in the layer/table that you want to query.
start	Number	Zero-based index indicating where to begin retrieving features.
text	String	Shorthand for a where clause using "like".
timeExtent	TimeExtent	Specify a time extent for the query.
units	String	Distance unit.

Pagination (ver 10.3)

- Supported data sources
  - Most enterprise databases e.g. SQL Server (ver 2012+), Oracle, PostgreSQL
  - QueryLayer
- FileGDBs support at 10.3.1
- File based datasource e.g. Shape files do not support pagination

Query by Distance and ReturnExtents (ver 10.3.1)

- 3 properties are added to the Query operation



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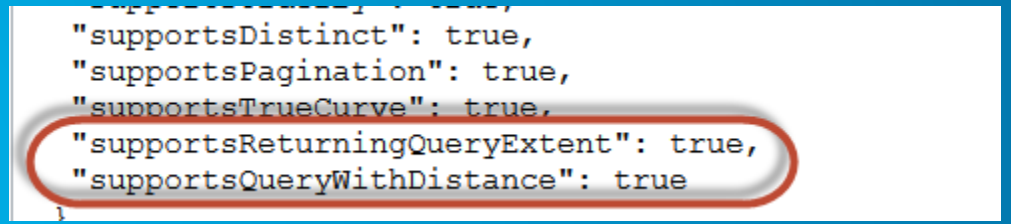
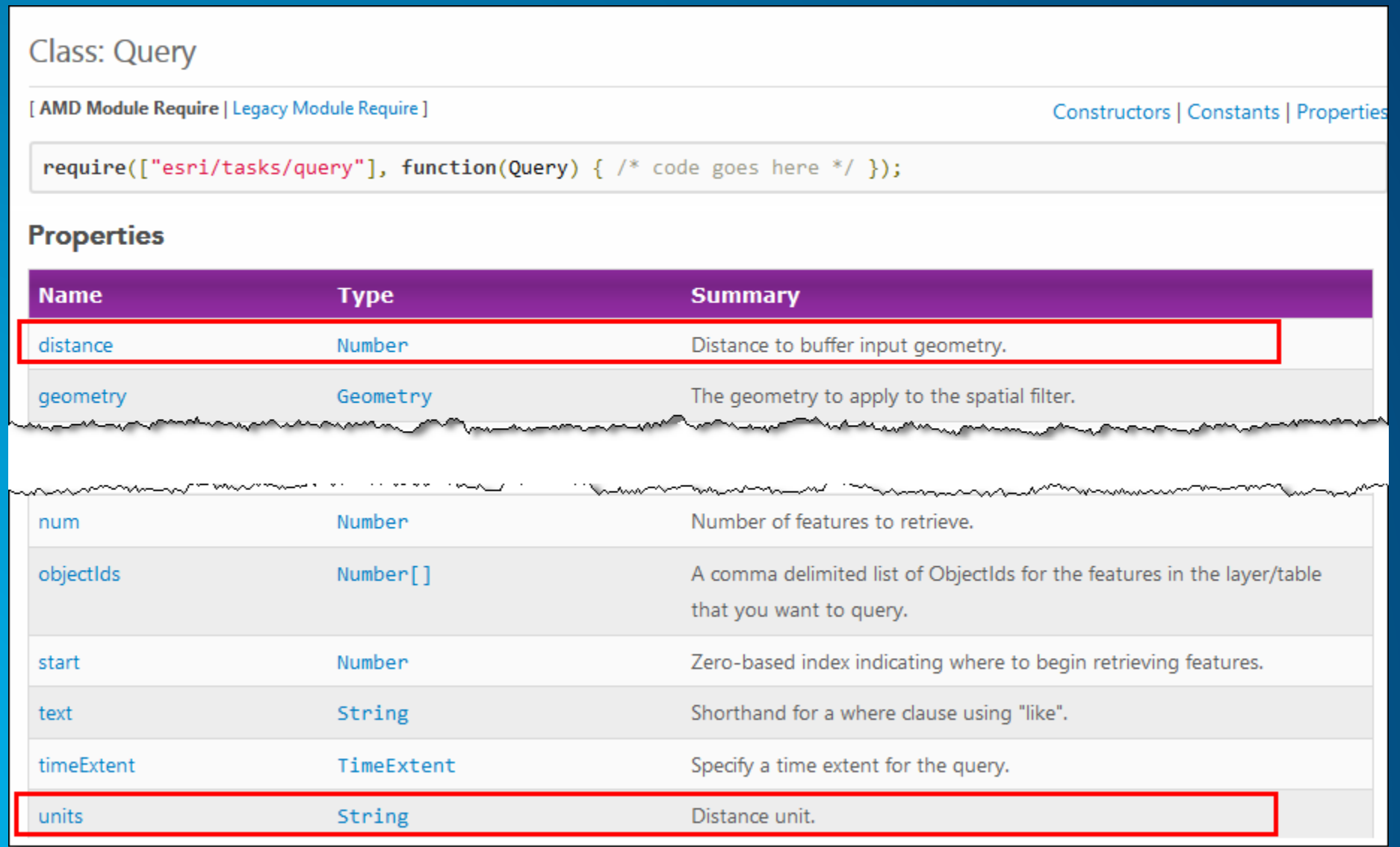


Query by Distance (JavaScript API for ArcGIS)

- **Two properties are added to the Query class**



Class: Query

[**AMD Module Require** | Legacy Module Require]

Constructors | Constants | Properties

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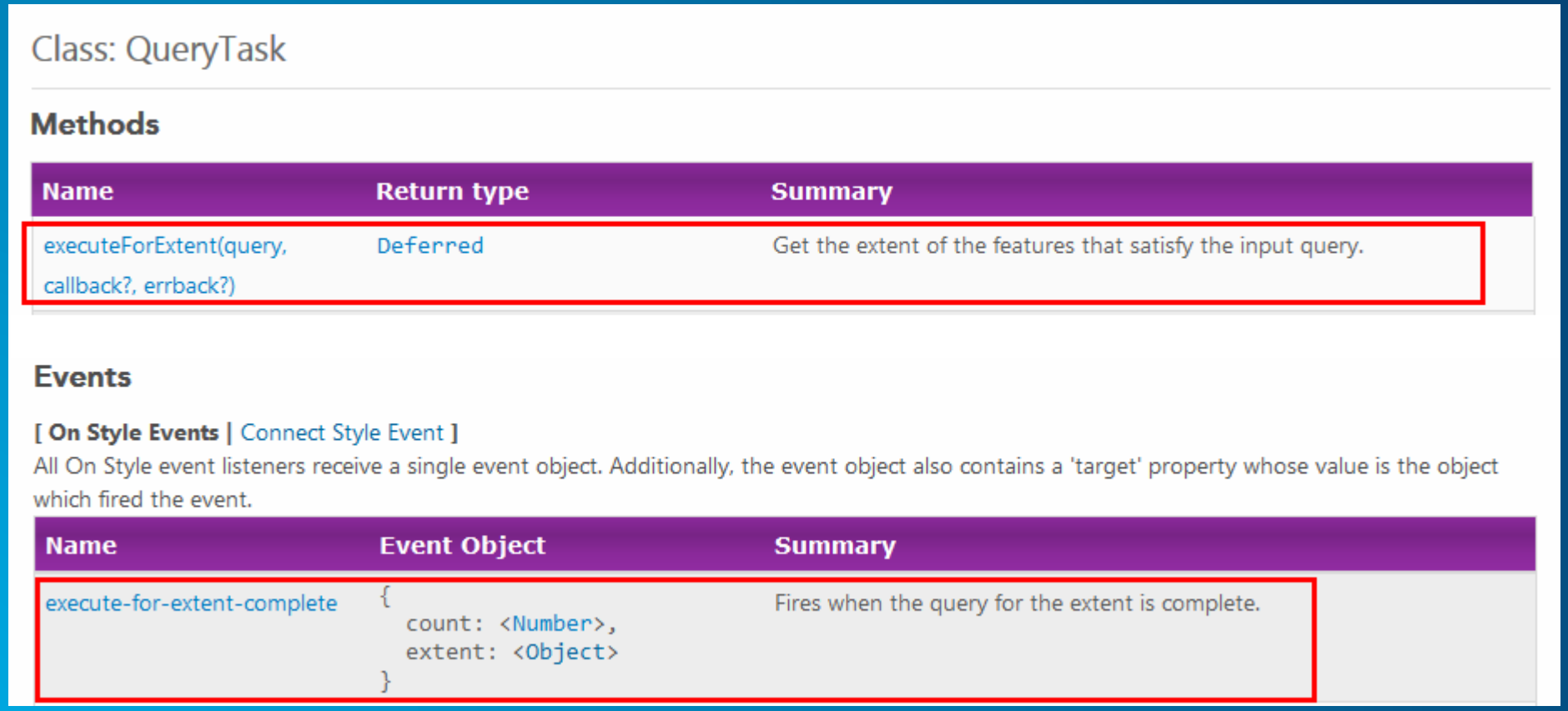
objectIds	Number[]	A comma delimited list of ObjectIds for the features in the layer/table that you want to query.
start	Number	Zero-based index indicating where to begin retrieving features.
text	String	Shorthand for a where clause using "like".
timeExtent	TimeExtent	Specify a time extent for the query.
units	String	Distance unit.

Query to ReturnExtents (JavaScript API for ArcGIS)

- **New method and event in the QueryTask class**



Class: QueryTask

Methods

Name	Return type	Summary
executeForExtent(query, callback?, errback?)	Deferred	Get the extent of the features that satisfy the input query.

Events

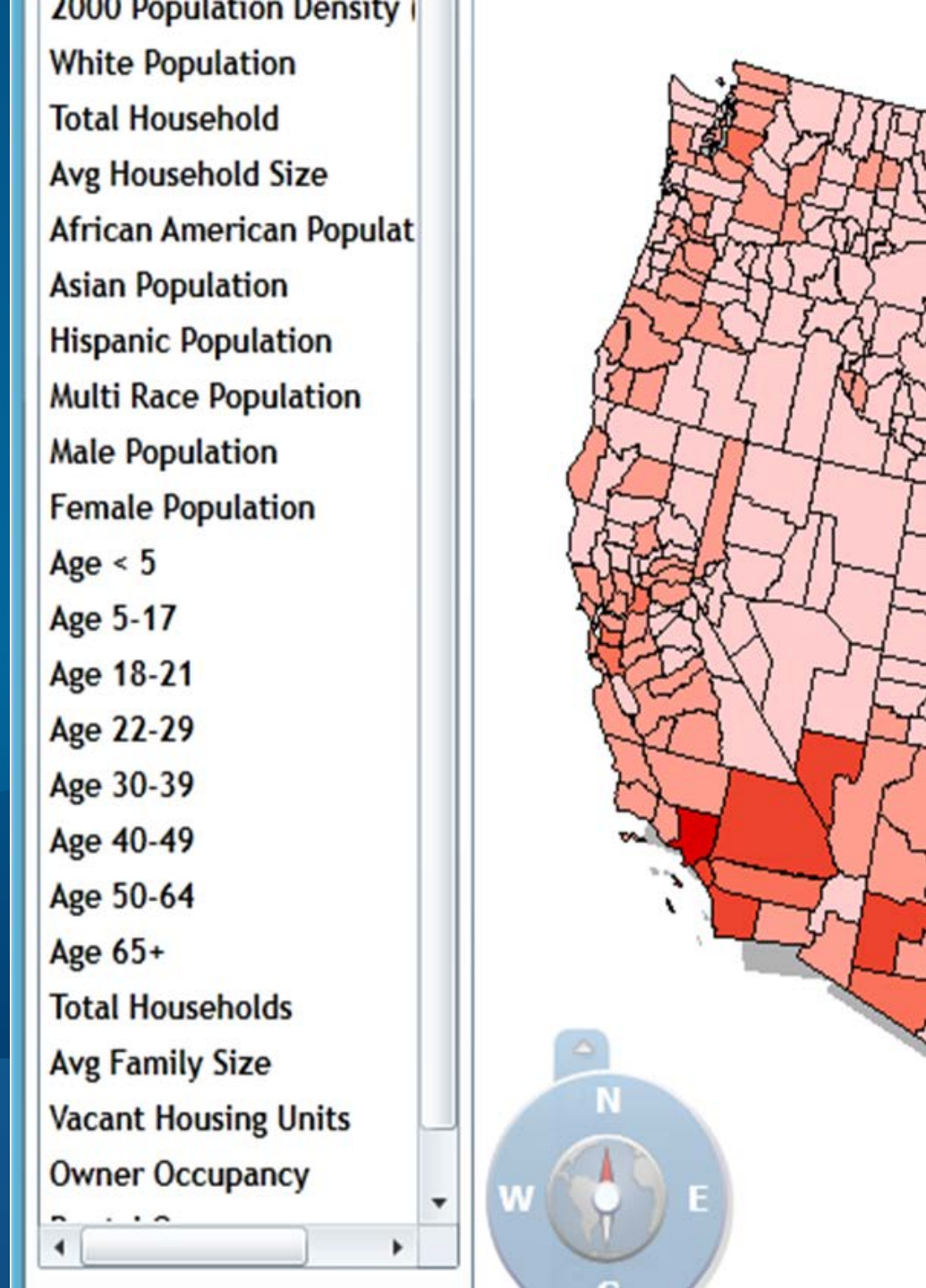
[On Style Events | Connect Style Event **]**

All On Style event listeners receive a single event object. Additionally, the event object also contains a 'target' property whose value is the object which fired the event.

Name	Event Object	Summary
execute-for-extent-complete	{ count: <Number>, extent: <Object> }	Fires when the query for the extent is complete.

MapService: DynamicLayers

How to enable dynamicLayer?
Change layer's renderer
Add new layer
Use client side data with map service
Query layer



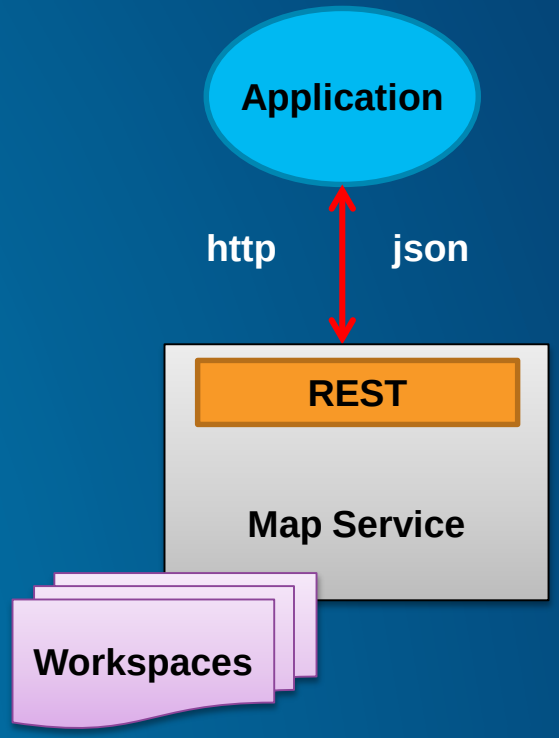
Dynamic Layers: The Concept

- **Capability with the map service that allows for per-request changes to the map**
  - **Optional capability of map services**

- **Allows for:**
  - **Updating renderers and symbols**
  - **Removing and reordering layers**
  - **Changing layer data sources**
  - **Adding new layers from registered data sources**

Dynamic Layers: Use Cases

- Simple updates to the map service
  - Remove layers or reorder layers
- Thematic mapping
  - Updates to renderers
- Adding content to the map service
  - Add data from registered workspaces
    - Including query layers
- Add to the map on a per-request basis
  - ArcGIS APIs handle this for you



Thematic Mapping

- Special case of dynamic layers supported via
  - Ability to change renderer
  - Ability to change data sources – including joins
  - Map service API for constructing renderer classes

- Generate renderer operation
  - Supports class breaks and unique value class generation
  - Popular classification types from ArcGIS for Desktop

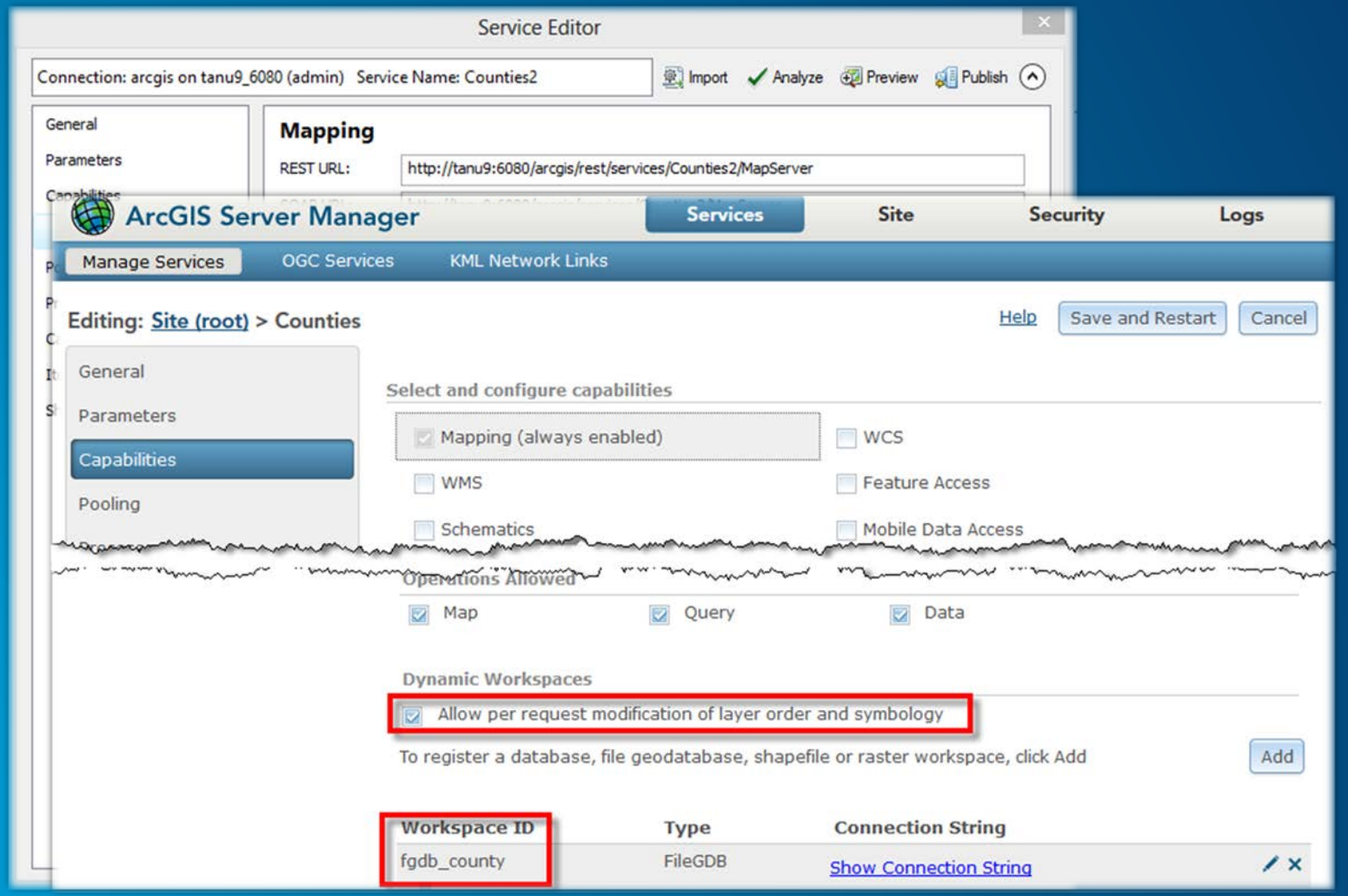
Thematic Mapping

When to use?

- When do I use dynamic layers instead of feature layers on the client for thematic mapping?
  - large number of features
  - complex geometries that cannot be generalized
  - when it provides a performance advantage

- Each approach has tradeoffs
  - e.g. Client side features scale better and provide more interactive behavior
  - Generate renderer can be used with both approaches

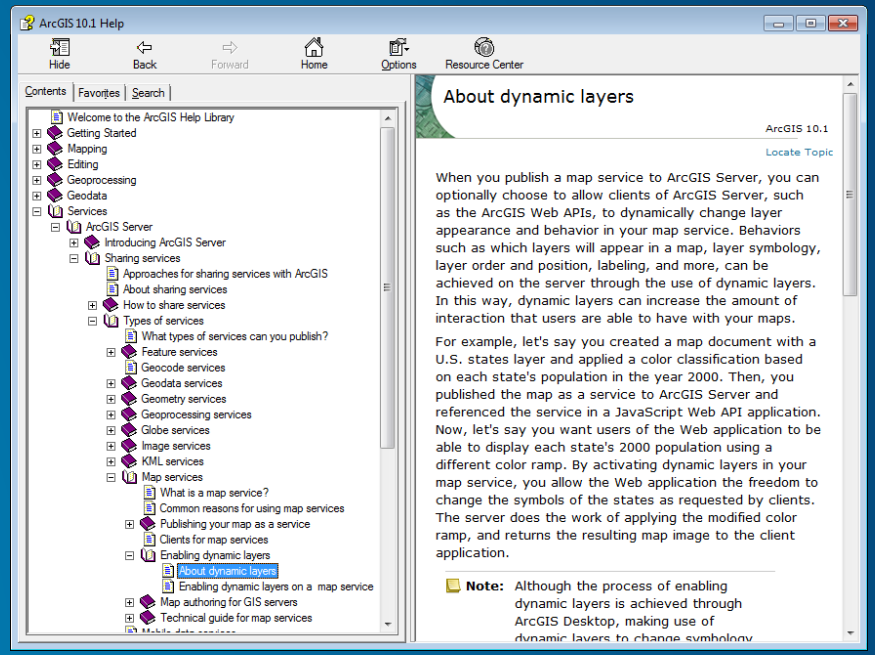
Enabling Dynamic Layers



Dynamic Layers

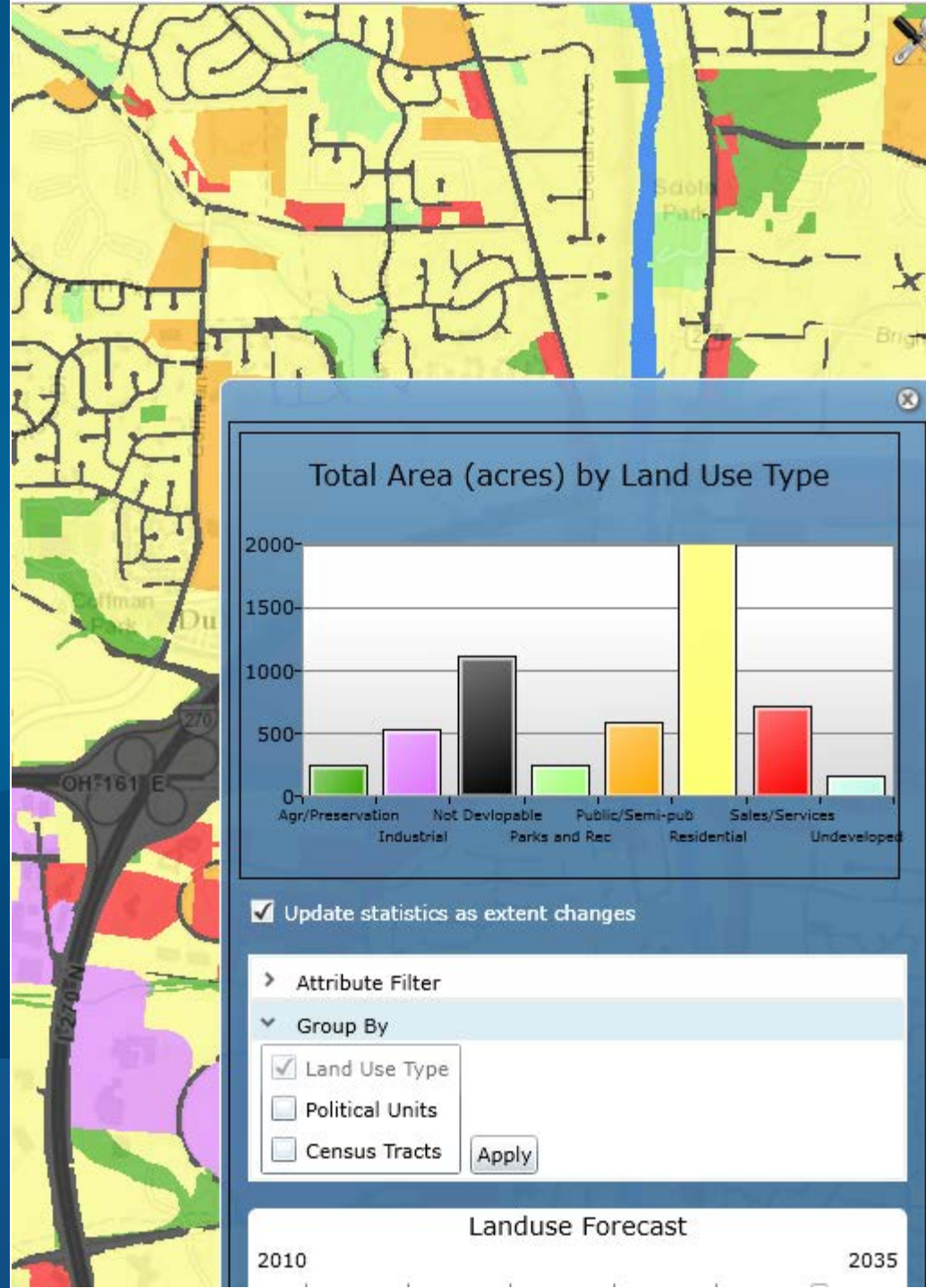
More Information

- **See the topic About dynamic layers in the ArcGIS Server help**
- **REST API – See the Dynamic Layer / Table resource help**



MapService: Queries

OutStatistics
StandardizedQueries



Getting aggregated values in a Query result in Map Services

- **Support for order by, output statistics, and group by statistics was added for both layers / tables**
  - **count | sum | min | max | avg | std dev | var**

- **Additional query capabilities**
  - **Optional ability to return M and Z values for features**
  - **Can query a specific geodatabase version**
  - **Query response contains a flag when maxRecordCount was reached by the query**

Database Agnostic Way to Query

Standardized Queries - Introduced at ArcGIS 10.2

- One SQL syntax runs against all databases!
  - e.g. one date query syntax --- YEAH!
    - incident_time = date '3/16/2000 3:45:47 PM‘
    - upper(name) = ‘JOHN EDWARD’
- Based on SQL92 query syntax and functions
  - Does not accept any DB vendor specific queries
  - http://resources.arcgis.com/en/help/main/10.2/index.html#/Supported_SQL_functions_in_ArcGIS_Server/015400000686000000/
- StandardizedQuery is turned on by default

Database Agnostic Way to Query

Standardized Queries - Introduced at ArcGIS 10.2

- **Limitations**
  - **Only a subset of functions available**
  - **Not supported for**
    - **Joined table/layer from multiple workspaces or OLE DB tables**

- **Server level property**
  - **To switch back:**
  - **http://<server>/arcgis/admin/system/properties/update**
  - **{"standardizedQueries":"false"}**

Questions?

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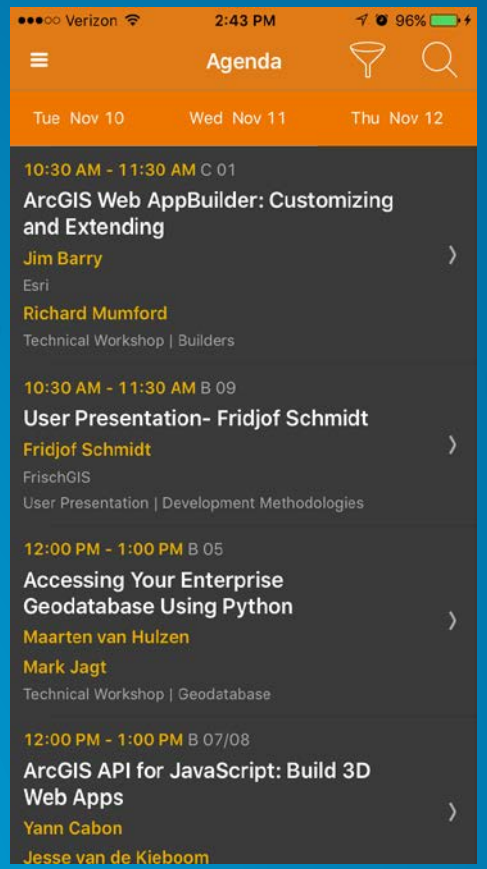
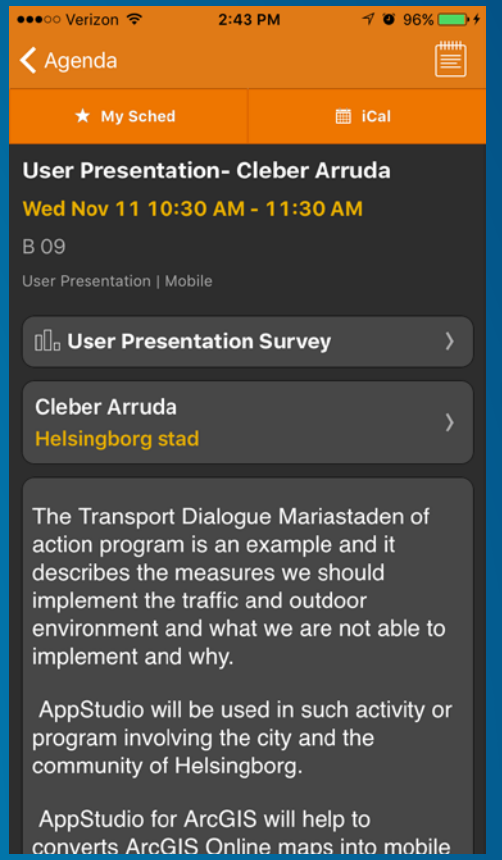
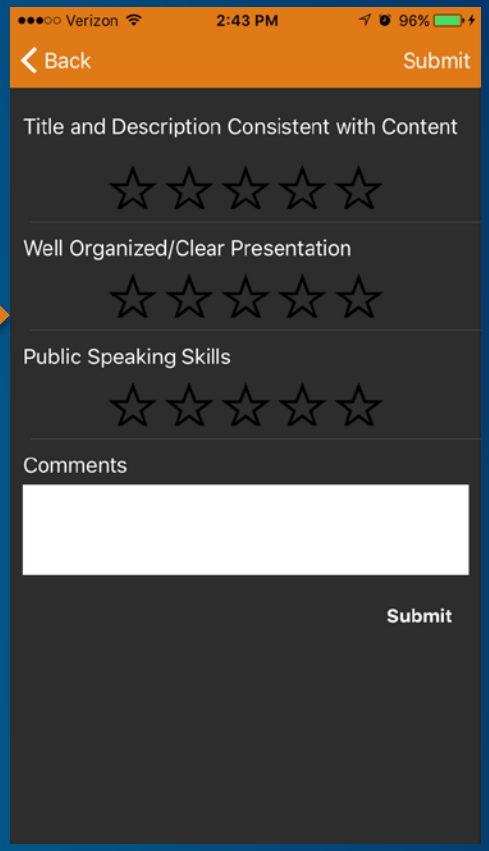


Select “User Presentation Survey” or “Technical Workshop Survey”



Complete Answers and Select “Submit”

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