

The banner features a dark grey background with a faint, light grey grid and a stylized map of Berlin. Two large, bright orange arrow shapes point towards each other from the left and right sides, framing the central text. The text 'ESRI DEVELOPER SUMMIT' is centered in a bold, white, sans-serif font. Below the title is a thin white horizontal line. Underneath the line, the dates and location '10-12 November | Berlin, Germany' are written in a smaller, white, sans-serif font. The overall design is modern and tech-oriented.

ESRI DEVELOPER SUMMIT

10-12 November | Berlin, Germany

ArcGIS for Server: Publishing and Using Map Services

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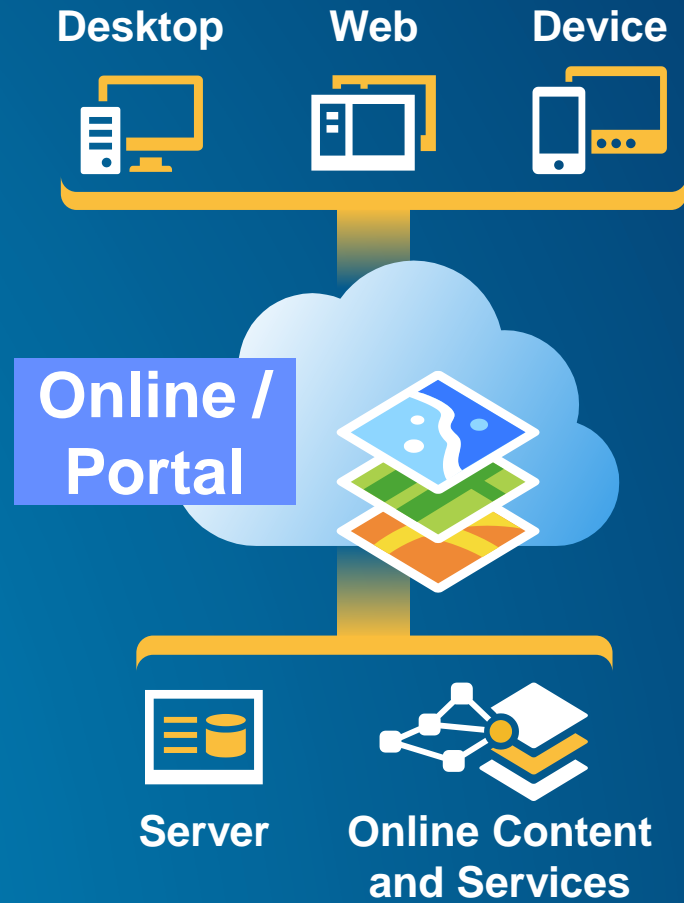
Agenda

- **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

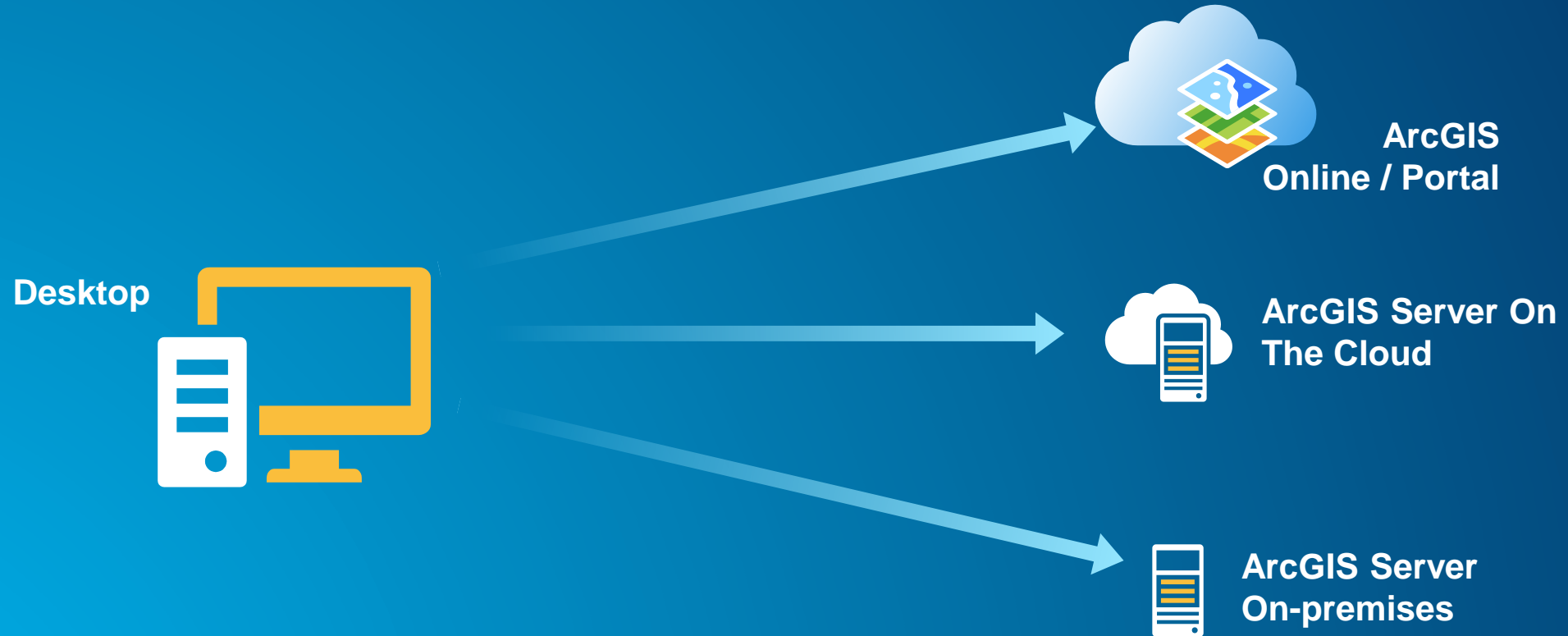
Professional to Everyone

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



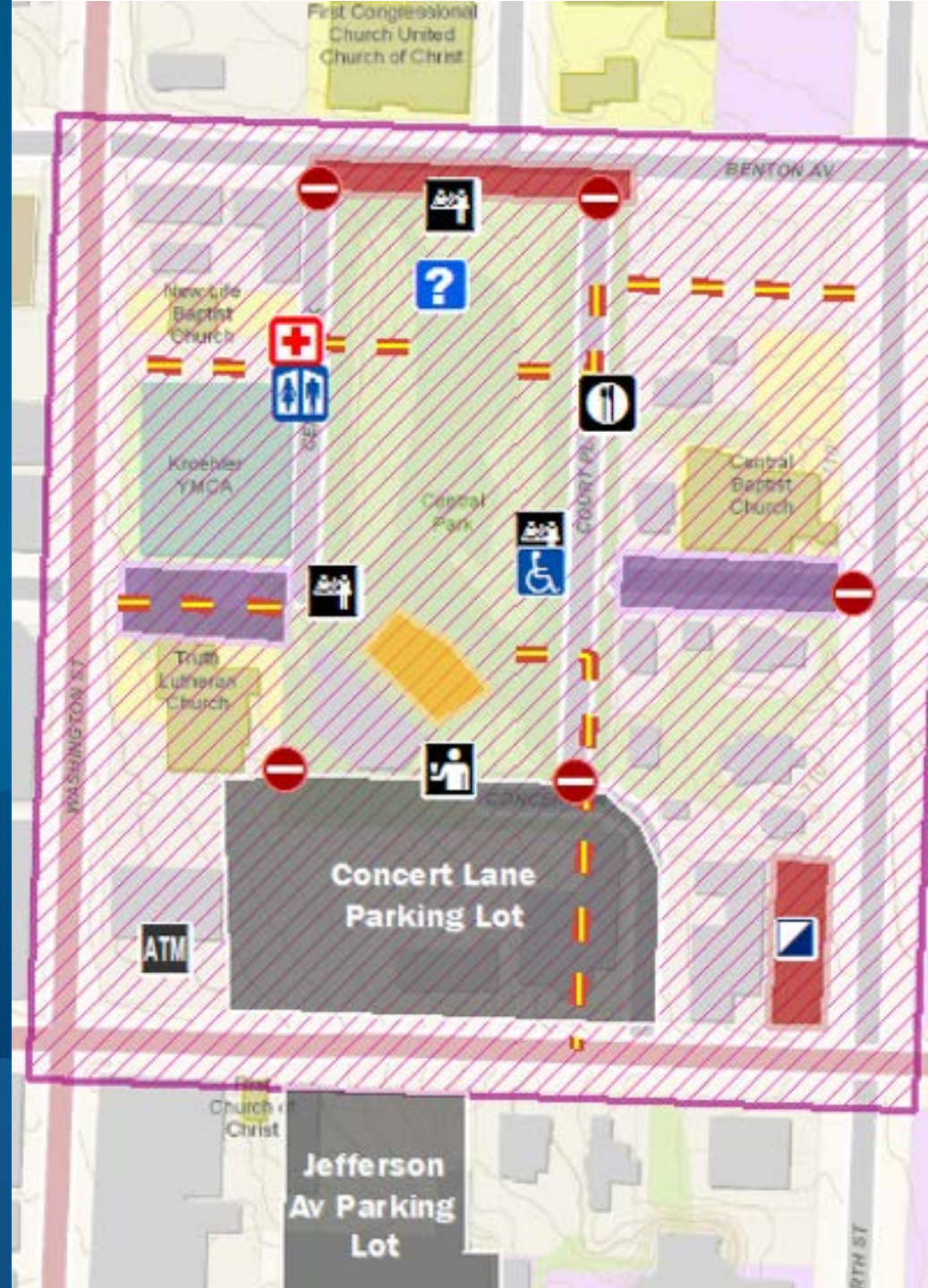
Sharing as Services



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

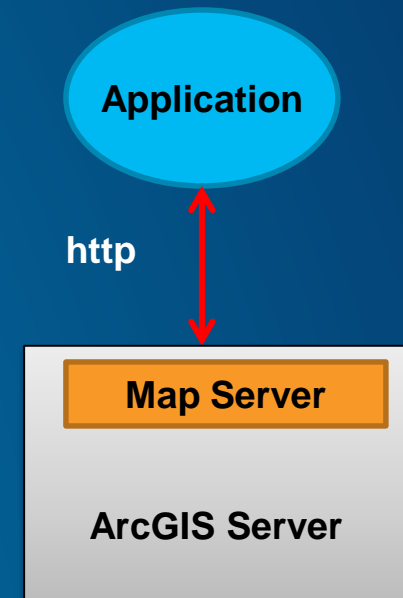




Map Services

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

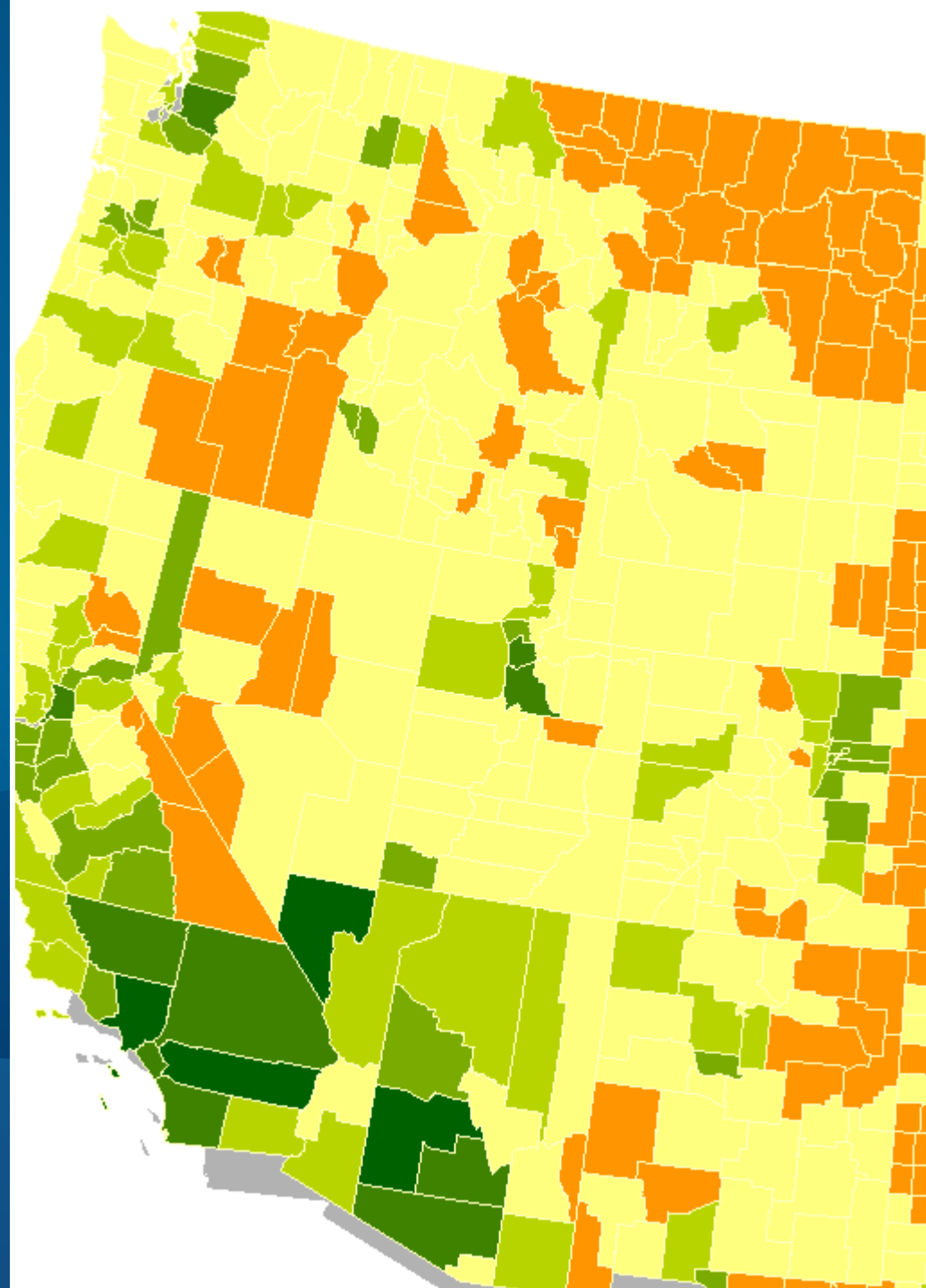
Query By Distance

Query ReturnExtent

DynamicLayers

Query to return statistics

QueryLayer





Map Services: New at 10.3x



User Assignable Layer Ids for REST Map Services

Implemented



Promote

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.



Demote

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

1250
Points

Tags : LayerID REST

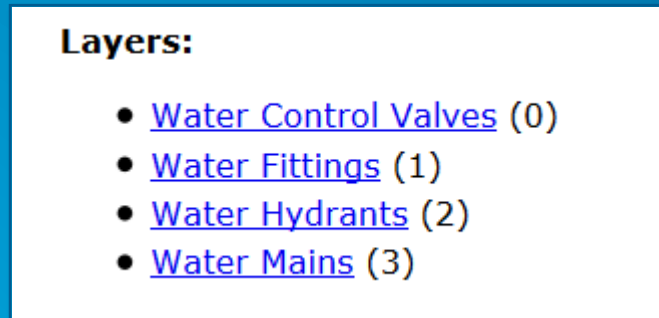
Posted by Buddhatown to ArcGIS Server, Web Apps and APIs Aug 19, 2011

Preserving Layer/Table IDs

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

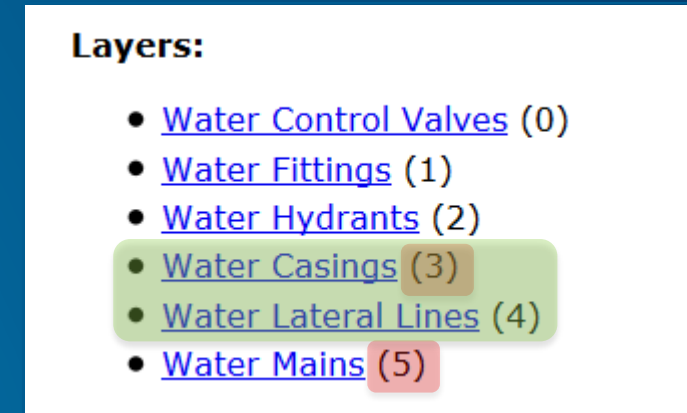
- Introduced at 10.3
- This ensures that Layer IDs are unique (as usual)
- and preserves the IDs originally assigned

Service directory

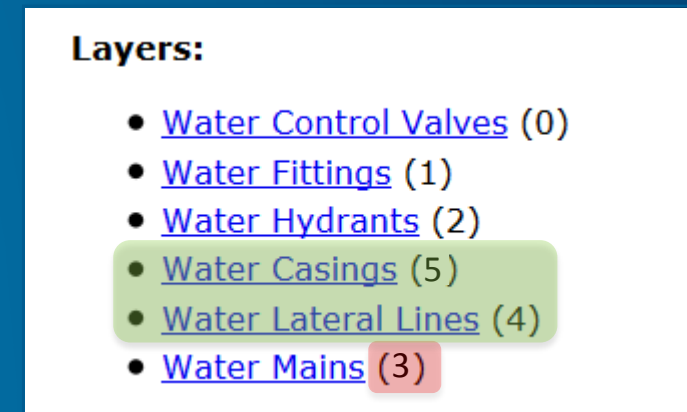


Re-publish

Without immutable layers



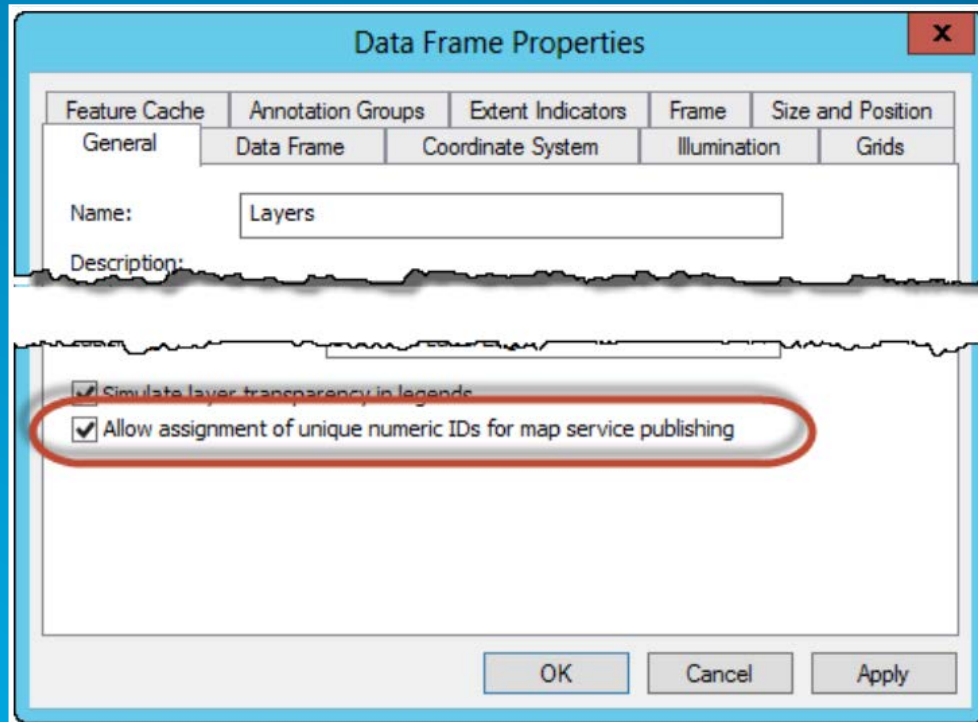
With immutable layers



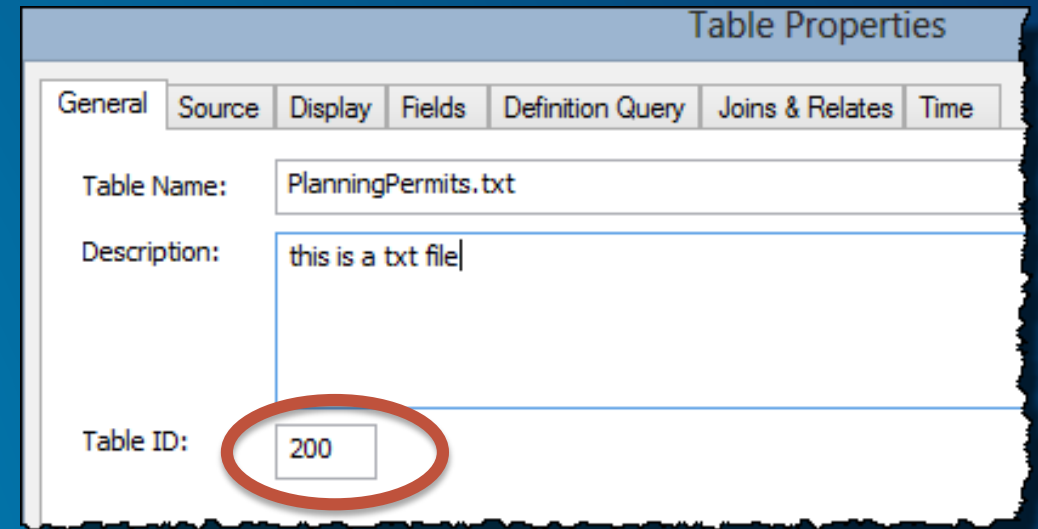
Preserving Layer/Table IDs

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

Prepare							
2 Errors		2 Warnings		2 Messages		Search Analyze Results	
	Severity	Status	Code	Description	Name	Type	
		High	Unresolved	00210	Data frame contains multiple layers/tables with the same ID(2 items)		
	High	Unresolved	00210	Table uses the same table ID as another layer/table: 200 assigned	BuildingPermits	Layer	
	High	Unresolved	00210	Table uses the same table ID as another layer/table: 200 assigned	PlanningPermits.txt	Standalone Table	

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

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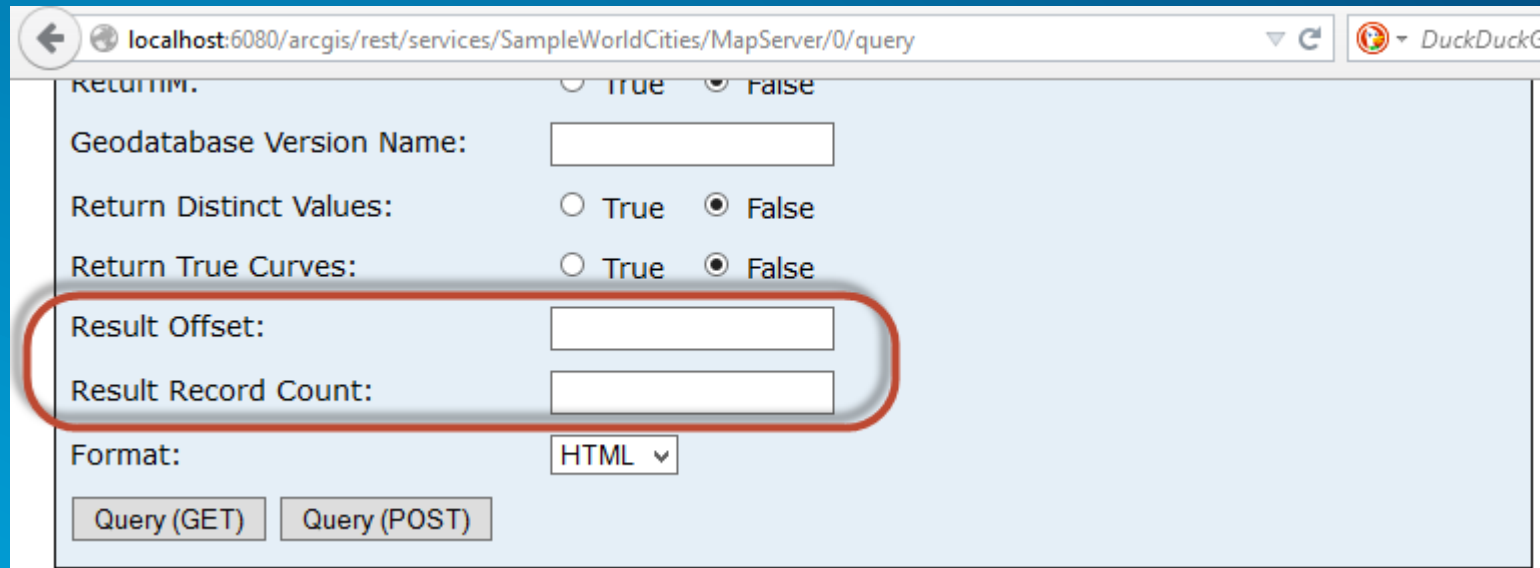
0

 Share

14

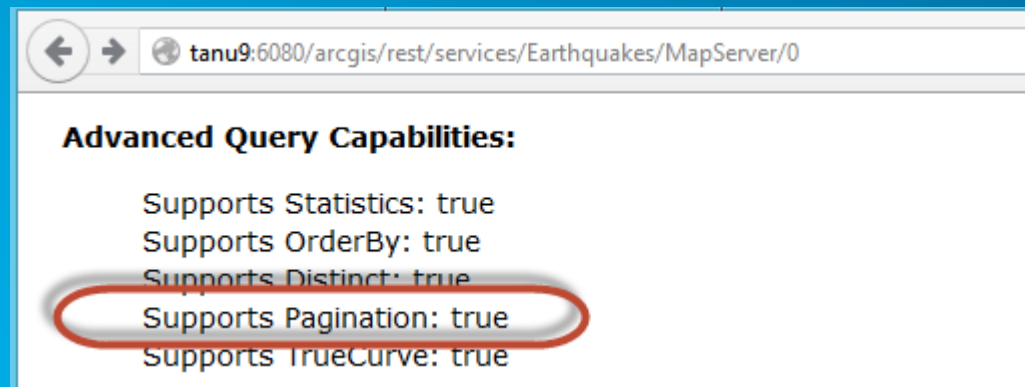
Pagination (ver 10.3)

- Two properties are added to the Query operation



A screenshot of a web browser window showing the ArcGIS REST query interface. The address bar displays the URL: localhost:6080/arcgis/rest/services/SampleWorldCities/MapServer/0/query. The interface includes several form fields and radio buttons. The 'Return Distinct Values' and 'Return True Curves' options are set to 'False'. The 'Result Offset' and 'Result Record Count' fields are highlighted with a red oval. The 'Format' dropdown is set to 'HTML'. At the bottom, there are two buttons: 'Query (GET)' and 'Query (POST)'.

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



A screenshot of a web browser window showing the ArcGIS REST layer resource page. The address bar displays the URL: tanu9:6080/arcgis/rest/services/Earthquakes/MapServer/0. The page content includes a section titled 'Advanced Query Capabilities:' with the following text: 'Supports Statistics: true', 'Supports OrderBy: true', 'Supports Distinct: true', 'Supports Pagination: true', and 'Supports TrueCurve: true'. The 'Supports Pagination: true' line is highlighted with a red oval.

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

The screenshot shows the ArcGIS Query tool interface. The 'Spatial Relationship' is set to 'Intersects'. The 'Distance' field is empty. The 'Units' dropdown menu is open, showing 'Feet' selected. The 'Return Count Only' and 'Return Extent Only' options are both checked (True).

Spatial Relationship: Intersects

Distance:

Units: Feet

Relation: Meters, Kilometers, Miles, Nautical Miles, US Nautical Miles

Out Fields:

Return Geometry:

Return Count Only: True False

Return Extent Only: True False

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

```
"supportsDistinct": true,  
"supportsPagination": true,  
"supportsTrueCurve": true,  
"supportsReturningQueryExtent": true,  
"supportsQueryWithDistance": true
```

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](#)

```
require(["esri/tasks/query"], function(Query) { /* code goes here */ });
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timeExtent	TimeExtent	Specify a time extent for the query.
units	String	Distance unit.

Query to Return Extents (JavaScript API for ArcGIS)

- New method and event in the QueryTask class

Class: QueryTask

Methods

Name	Return type	Summary
<code>executeForExtent(query, callback?, errback?)</code>	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
<code>execute-for-extent-complete</code>	<pre>{ count: <Number>, extent: <Object> }</pre>	Fires when the query for the extent is complete.

MapService: DynamicLayers

How to enable dynamicLayer?

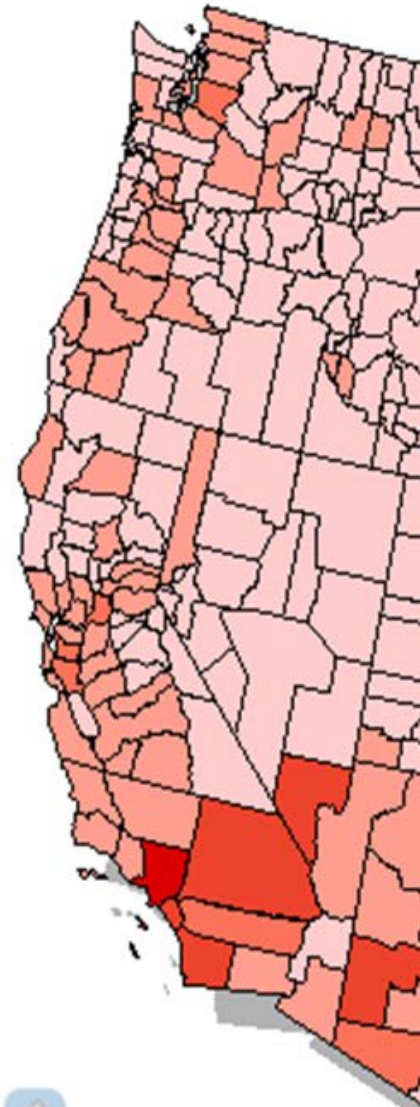
Change layer's renderer

Add new layer

Use client side data with map service

Query layer

- 2000 Population Density
- White Population
- Total Household
- Avg Household Size
- African American Populat
- Asian Population
- Hispanic Population
- Multi Race Population
- Male Population
- Female Population
- Age < 5
- Age 5-17
- Age 18-21
- Age 22-29
- Age 30-39
- Age 40-49
- Age 50-64
- Age 65+
- Total Households
- Avg Family Size
- Vacant Housing Units
- Owner Occupancy

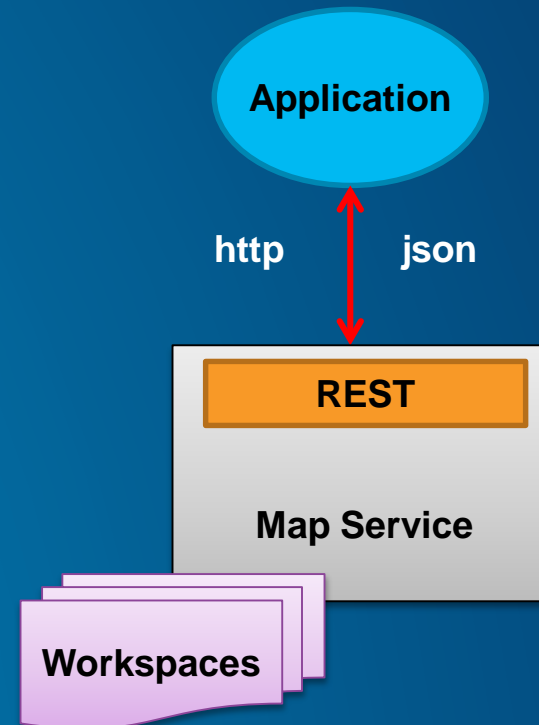


Dynamic Layers: The Concept

- **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

Service Editor

Connection: arcgis on tanu9_6080 (admin) Service Name: Counties2

Mapping

REST URL:

ArcGIS Server Manager

Services Site Security Logs

Manage Services OGC Services KML Network Links

Editing: Site (root) > Counties

General Parameters Capabilities Pooling

Select and configure capabilities

- Mapping (always enabled)
- WMS
- Schematics
- WCS
- Feature Access
- Mobile Data Access

Operations Allowed

- Map
- Query
- Data

Dynamic Workspaces

- Allow per request modification of layer order and symbology

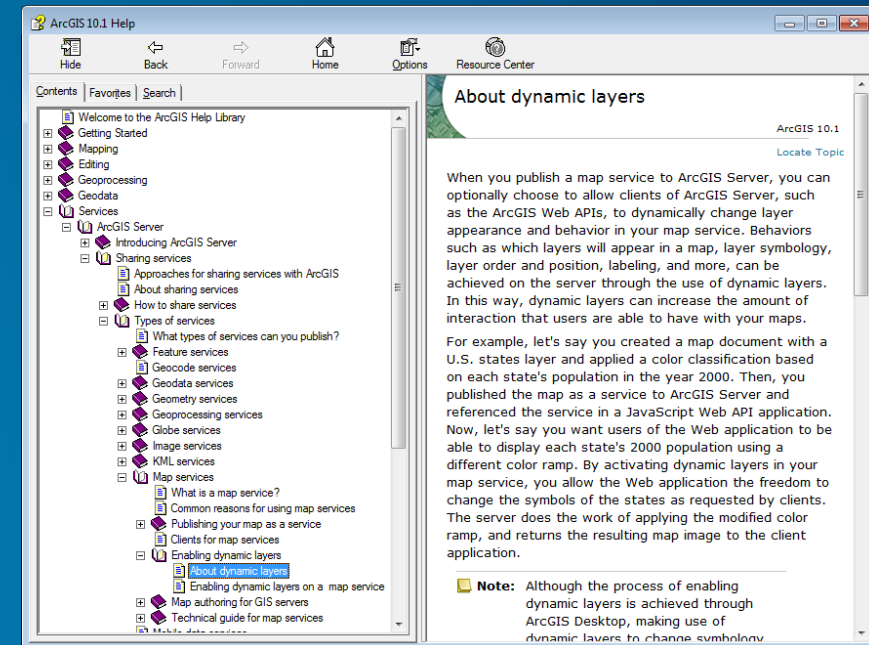
To register a database, file geodatabase, shapefile or raster workspace, click Add

Workspace ID	Type	Connection String
fgdb_county	FileGDB	Show Connection String

Dynamic Layers

More Information

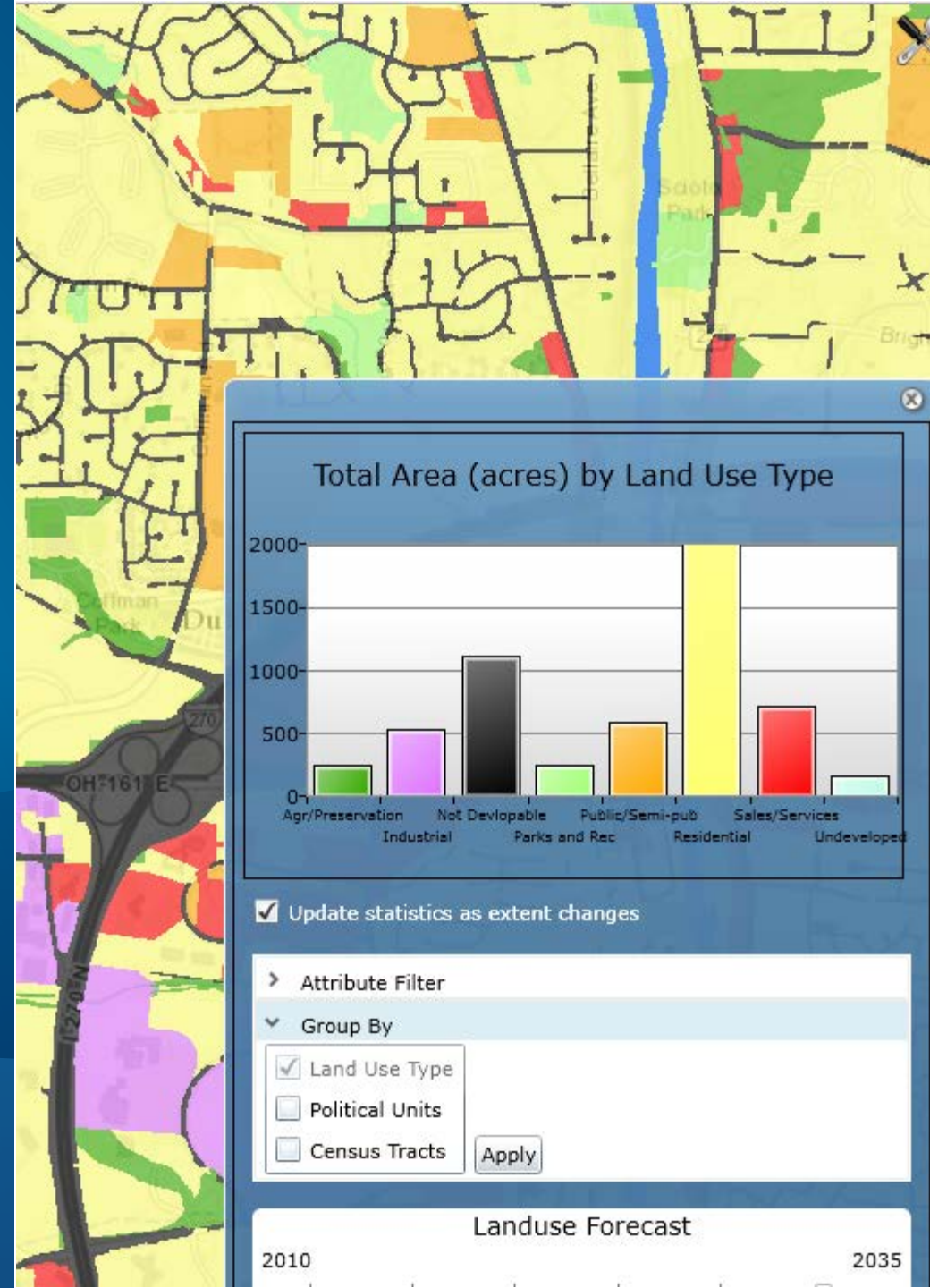
- See the topic [About dynamic layers](#) in the ArcGIS Server help
- REST API – See the [Dynamic Layer / Table](#) resource help



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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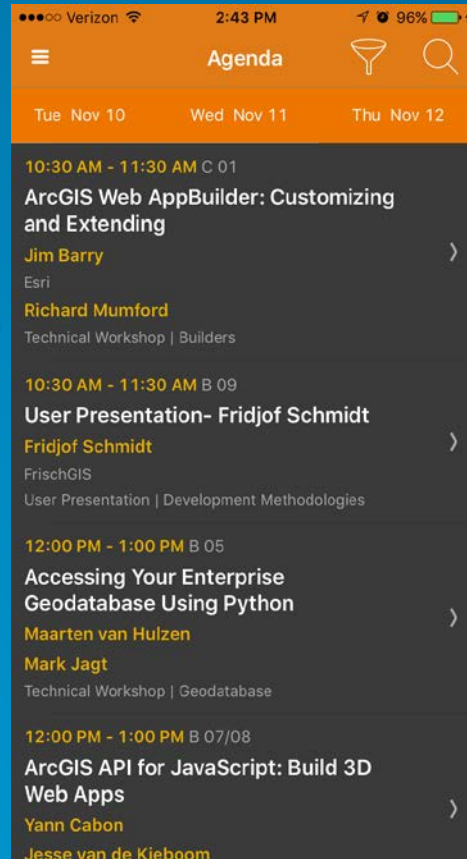
con•terra

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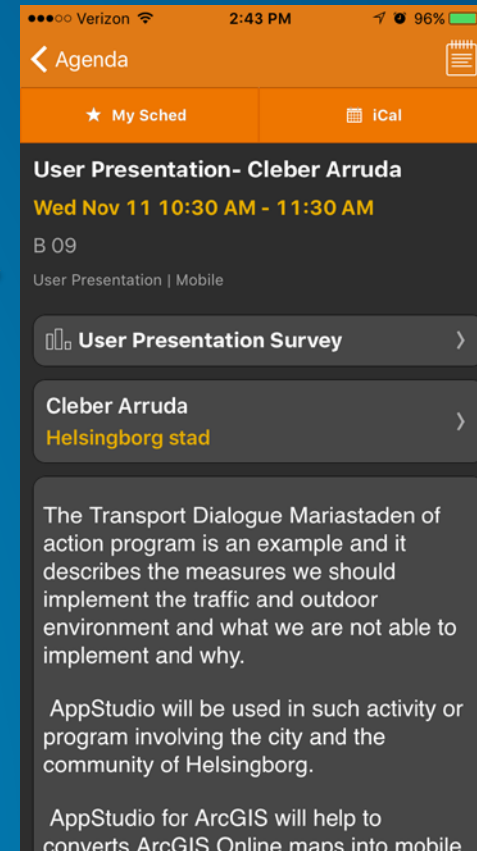
Download the Esri Events app
and find your event



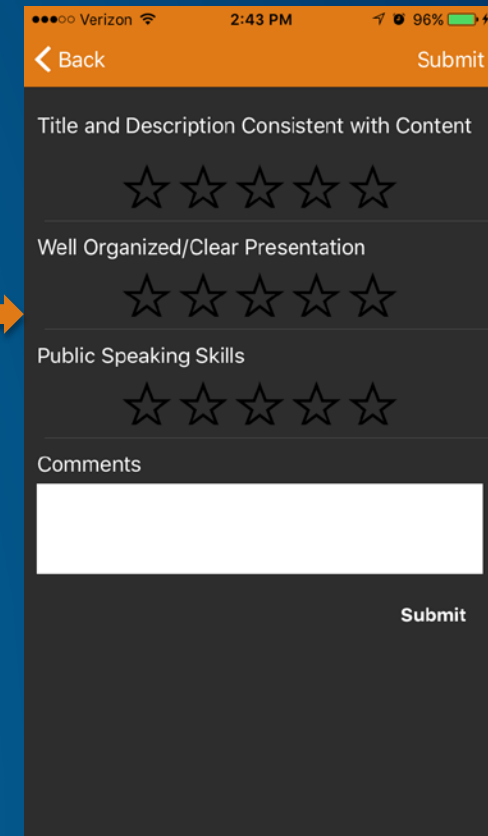
Select the session you
attended



Select
"User Presentation Survey"
or
"Technical Workshop Survey"



Complete Answers
and Select "Submit"





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