



ArcGIS Enterprise: Tuning and Scaling

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**GIS
INSPIRING
WHAT'S
NEXT**

Related sessions

WORKSHOP	LOCATION	TIME FRAME
<ul style="list-style-type: none">• ArcGIS Enterprise: Architecting Your Deployment	<ul style="list-style-type: none">• SDCC - Room 04• SDCC – Room 02	<ul style="list-style-type: none">• Tuesday, 1:00-2:00 pm• Wednesday, 2:30-3:30 pm
<ul style="list-style-type: none">• ArcGIS Enterprise: Best Practices for Layers and Service Types	<ul style="list-style-type: none">• SDCC – Room 16 B	<ul style="list-style-type: none">• Thursday, 10:00-11:00 am
<ul style="list-style-type: none">• Real-Time and Big Data GIS: Leveraging the Spatiotemporal Big Data Store	<ul style="list-style-type: none">• SDCC – Room 05 B• SDCC – Room 14 B	<ul style="list-style-type: none">• Wednesday, 8:30-9:30 am• Thursday, 1:00-2:00 pm
<ul style="list-style-type: none">• Many, many geodatabase sessions..		

Agenda

Session will cover all components and tiers of ArcGIS Enterprise:

- **ArcGIS Server**
 - Service authoring and tuning
 - Optimizing *individual* services
 - Tuning the system for many overall services
- **Portal for ArcGIS**
 - Operational aspects like backup models
- **ArcGIS Data Store**
 - Understanding the three types of data stores provided with the system
- **Outside the scope of this session: enterprise geodatabases**

Initial setup

The background is a solid dark blue gradient. In the top-left corner, there are several overlapping, semi-transparent geometric shapes in shades of teal, green, and red, some with white outlines. In the bottom-right corner, there is a large, complex geometric shape composed of many smaller, overlapping rectangles and polygons in various colors including orange, yellow, green, and blue, creating a sense of depth and movement.

Provide good infrastructure

- Portal content store
- Server config store
- Server directories
 - input, output, cache, jobs, ..
- Data Store data directory
- Options vary across different types of environments:
 - Bare metal and VMs: file shares, NAS
 - Cloud: cloud storage like S3 and Azure Storage for some locations



Service fundamentals

The background is a solid dark blue. In the top-left corner, there are several parallel diagonal lines in shades of teal and orange. In the bottom-right corner, there is a complex arrangement of overlapping geometric shapes, including rectangles and triangles, in teal, orange, and light blue. A faint, light blue line art map of a city is visible in the background, particularly on the right side.

Map authoring: tuning individual services

- Desktop maps don't always make good Server maps
- Scale dependencies
- Focus your map
 - Definition queries
 - Remove unneeded layers
 - Hide fields you aren't using
 - Annotations over labeling
- Use same coordinate system for data frame as data
- Pro tip: `cacheControlMaxAge`



General Data Considerations

- Match resolution of your feature class to the accuracy of the data.
 - If your data is accurate to the meter, then no need for millimeter resolution
- For file and enterprise geodatabases remember to index your data appropriately
- For enterprise geodatabases use the recommended spatial type for your RDBMS (st_geometry, native spatial type, ..)

File Geodatabase



- **Local file geodatabase data**
 - Better than shapefiles
 - Fastest
 - Scales with hardware
 - Best with static data
 - Make your FGDB read-only

Enterprise Geodatabase



Enterprise Geodatabase

- Fast
- Live data
- Requires database expert
- Traditional Versioning
 - fine for desktop editing, may be problematic for server
- Branch Versioning
 - New with Pro 2.1 and Enterprise 10.6. Not supported with ArcMap.
 - Designed for better scalability with many concurrent users and a web editing model

Keep statistics up-to-date

Index fields that will be queried

Tuning

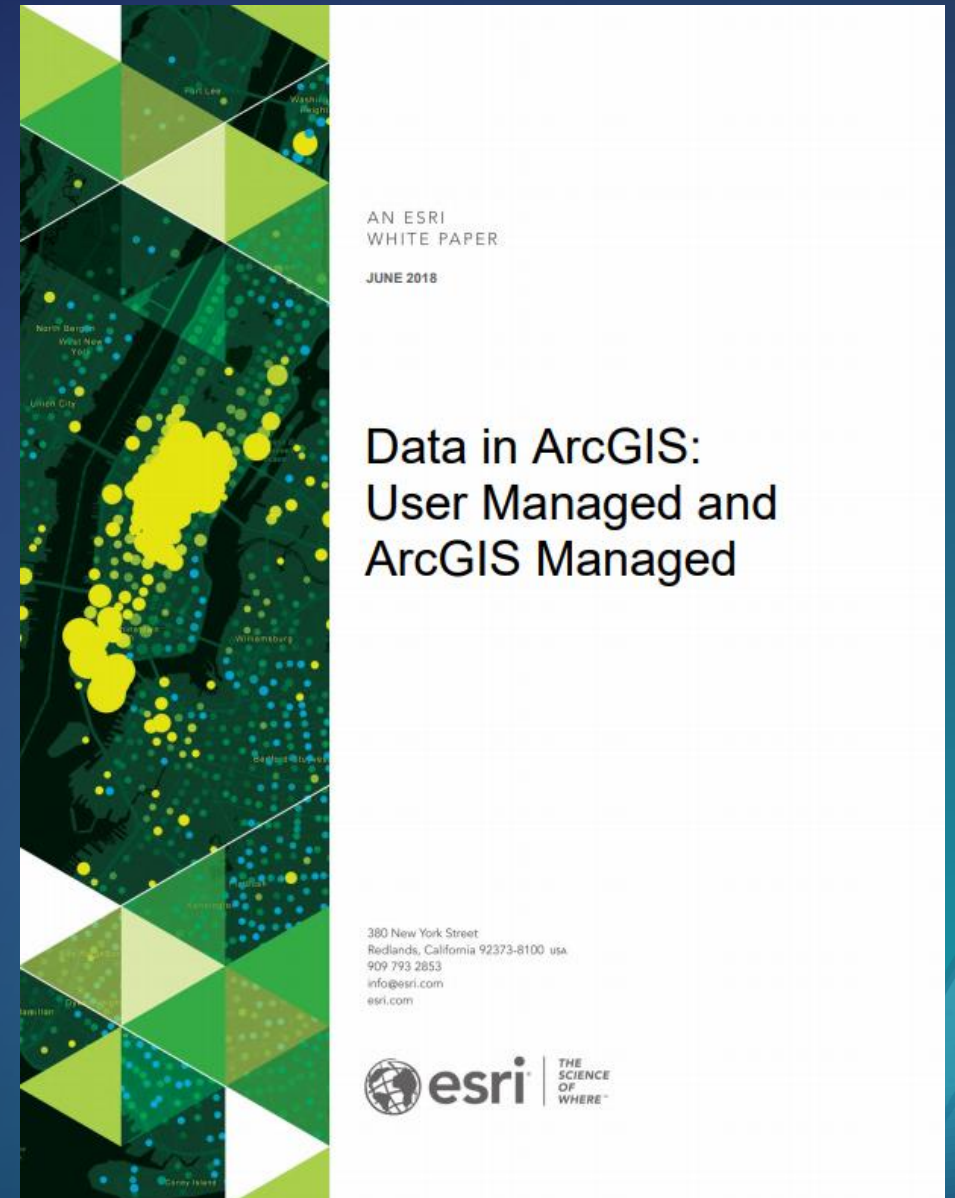
The background is a solid dark blue gradient. On the left side, there are white, wavy, organic lines. In the top-left corner, there are several parallel diagonal lines in shades of teal, green, and red. In the bottom-right corner, there is a complex arrangement of overlapping geometric shapes, including rectangles and polygons, in various colors like orange, yellow, green, and dark blue, creating a sense of depth and movement.

Tuning ArcGIS Server- instance tuning

- Two models that services run under: hosted and traditional.
- Any service that references user-managed data in place – like file geodatabase or enterprise geodatabase – is run under the traditional model.
- Traditional model has concept of *service instances* (also known as SOC's).

Tuning ArcGIS Server- an aside..

- Two models that services run under: hosted and traditional.
- For background and more information on the hosted model, how it relates to the traditional model, where data is stored, and why:



Tuning ArcGIS Server- instance tuning

- The number of instances impacts:
 - memory usage at rest (and during use)
 - determines number of *concurrent*
 - requests that can be serviced

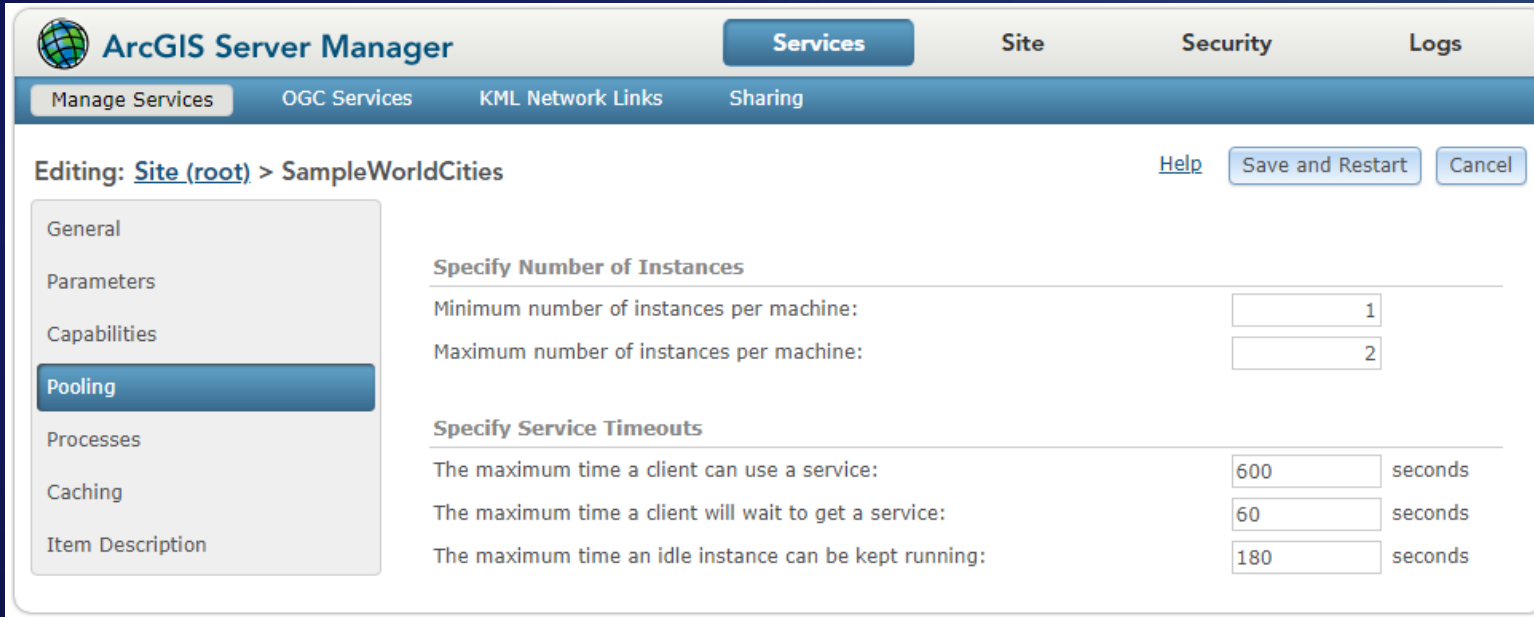


How Instances Handle Requests

1. Requests get sent to an ArcGIS Server machine by the web adaptor or a load balancer.
2. The "handler" (REST, SOAP, or OGC) waits for a free instance for that service.
 - 1.If it exceeds the wait timeout (60 seconds) it sends back an error.
 - 2.If it finds a free instance, it sends back a response.



Tuning ArcGIS Server- instance tuning



The screenshot shows the ArcGIS Server Manager web interface. The top navigation bar includes 'Services', 'Site', 'Security', and 'Logs'. Below this, a sub-navigation bar shows 'Manage Services', 'OGC Services', 'KML Network Links', and 'Sharing'. The main content area is titled 'Editing: Site (root) > SampleWorldCities'. On the left, a sidebar lists configuration categories: General, Parameters, Capabilities, Pooling (selected), Processes, Caching, and Item Description. The 'Pooling' section is expanded, showing two sub-sections: 'Specify Number of Instances' and 'Specify Service Timeouts'. The 'Specify Number of Instances' section has two input fields: 'Minimum number of instances per machine:' set to 1 and 'Maximum number of instances per machine:' set to 2. The 'Specify Service Timeouts' section has three input fields: 'The maximum time a client can use a service:' set to 600 seconds, 'The maximum time a client will wait to get a service:' set to 60 seconds, and 'The maximum time an idle instance can be kept running:' set to 180 seconds. At the top right of the configuration area, there are buttons for 'Help', 'Save and Restart', and 'Cancel'.

ArcGIS Server Manager

Services Site Security Logs

Manage Services OGC Services KML Network Links Sharing

Editing: [Site \(root\)](#) > SampleWorldCities [Help](#) [Save and Restart](#) [Cancel](#)

General

Parameters

Capabilities

Pooling

Processes

Caching

Item Description

Specify Number of Instances

Minimum number of instances per machine:

Maximum number of instances per machine:

Specify Service Timeouts

The maximum time a client can use a service: seconds

The maximum time a client will wait to get a service: seconds

The maximum time an idle instance can be kept running: seconds

- For predictable performance use *min* = *max*
- Default is *min* = 1, *max* = 2. Consider changing this!
- Swap space/page file is not a dirty word
- Cached service : set *max* = 1 to conserve memory. Individual tile requests not serviced by the SOC process.

Tuning ArcGIS Server- instance tuning

- Avoid overload!
- Realize that concurrent *users* does not equal concurrent *requests*.
- Tradeoff:
 - Services with many layers vs. many services with few layers.
- Services with fewer layers have many advantages, but compete for resources.
- *min = 0* can be an option for rarely used services.. but should be an option of last resort.



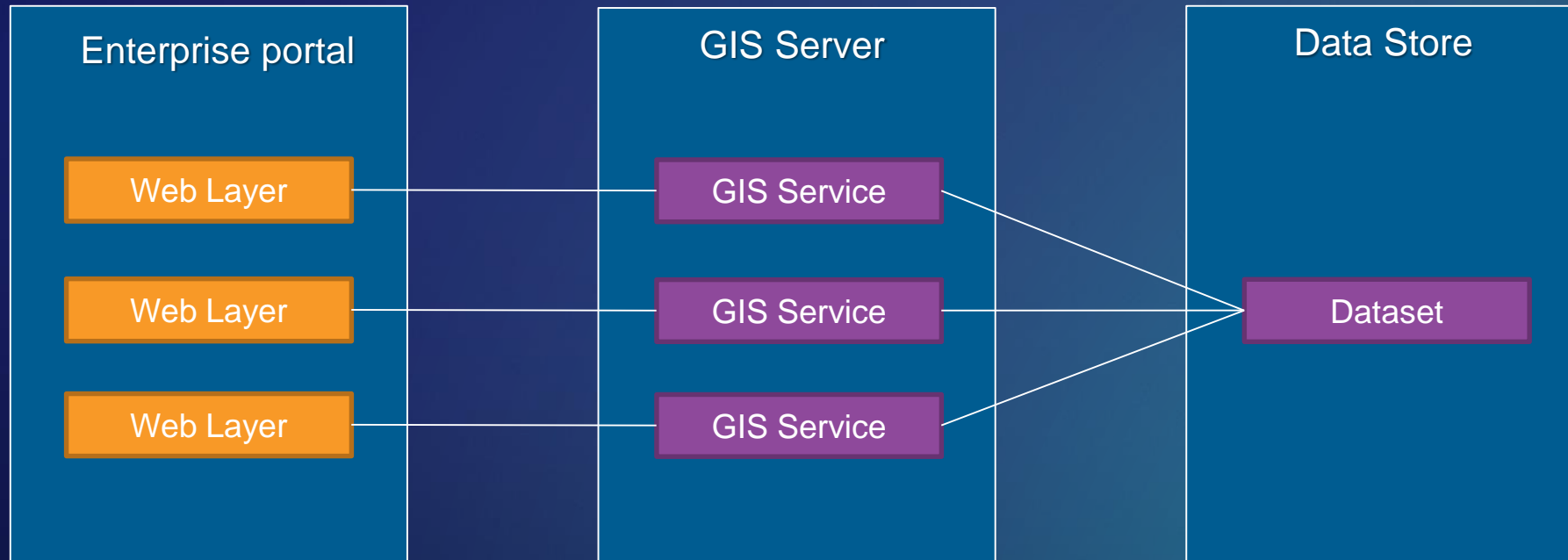
Tuning your Web Map

- **Hosted feature service considerations**
 - Read-only feature services are smaller, use generalized data.
 - If you need some people to edit and some to only read, then use views.
- **Reduce clicks - pick your default extent carefully**
- **Cache (tiles) may reduce the amount of traffic**
- **Large amounts of data can be slow and overwhelming**
 - Aggregate data using smart mapping
 - Latest release (10.6.1) has new features for on-the-fly generalization and smaller data transfer (quantization)



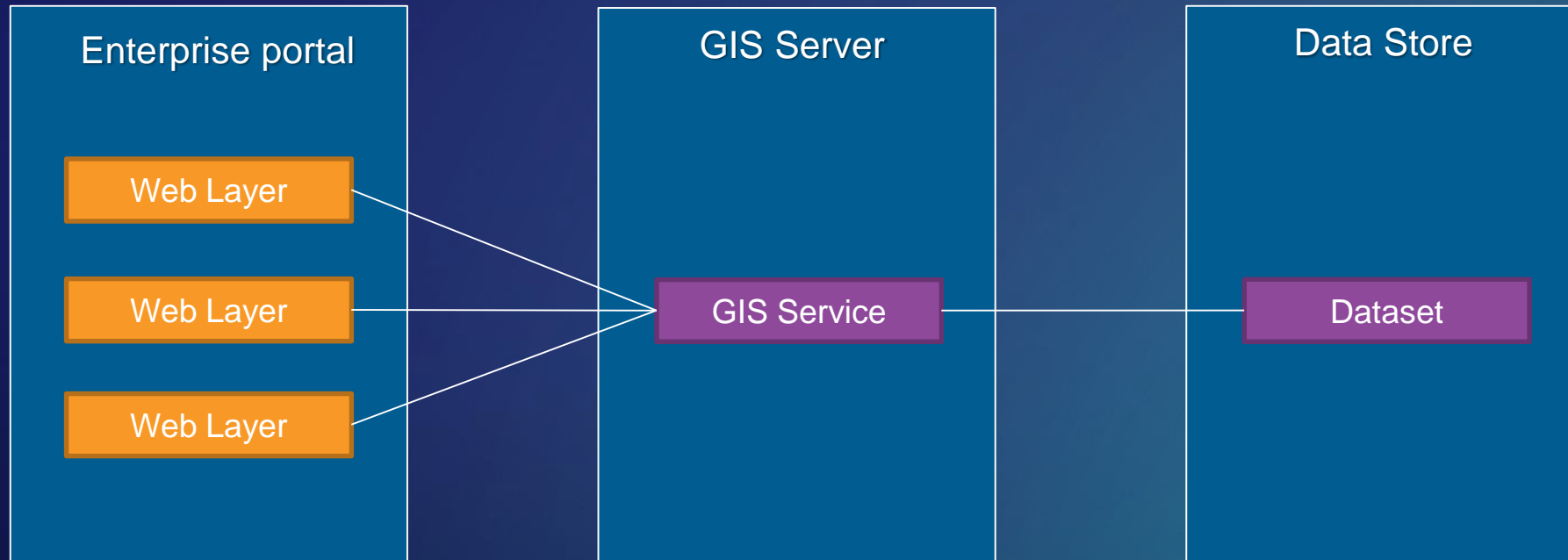
Tuning your Web Map

- Common setup today:

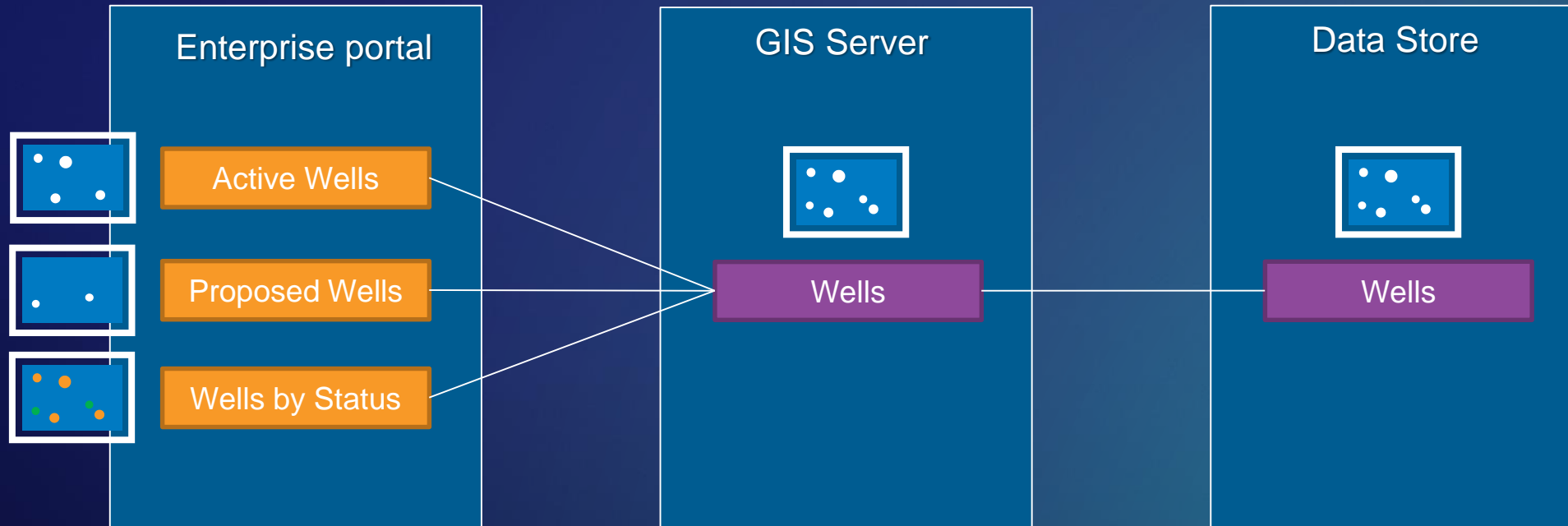


Tuning your Web Map

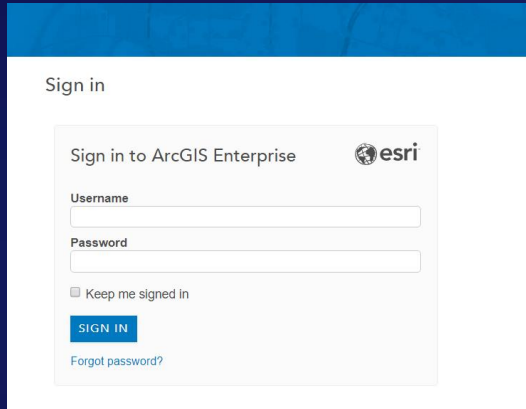
- **More efficient: consolidate layers with like security into a single service**



Tuning your Web Map



Tuning your Enterprise portal



Login settings

- Identity and group stores can affect login performance significantly
- Example: Active Directory where users are in many groups can affect performance (newer releases handle this better)



- Backups – choose the right combination of full and incremental
 - Pro tip: after you run the first full backup the portal will begin to allow its database to grow unbounded. Be sure to continue to perform backups on a regular basis to keep the size under control.

Tuning ArcGIS Data Store



- Understand the three types of data stores powered by the ArcGIS Data Store components:
- Relational data store
 - Powers most hosted feature layers
- Tile Cache data store
 - Powers 3D scene layers and services
- Spatiotemporal big data store
 - Powers high volume archiving from GeoEvent Server and large result data from GeoAnalytics Server

Tuning ArcGIS Data Store

- Many command-line tools for managing and tuning ArcGIS Data Store
 - `changedatastoremode` (relational data store)
 - go to/from read-only mode
 - `changedbproperties` (all types)
 - disk space thresholds, RAM heap size for spatiotemporal big data store
 - `changeloglocation` (all types)
 - `changebackuplocation` (all types)
 - `updatebackupretaindays` (all types)
 - `updatebackupschedule` (all types)
 - etc.
- The *describedatastore* command gives insights into configuration on current machine.

Tuning ArcGIS Data Store

[ArcGIS Enterprise](#) [Portal](#) [Server](#) [Data Store](#) [Cloud](#)

 [Sign In](#) [English](#) 

Portal for ArcGIS

[Home](#) [Use](#) [Administer](#)

[Administer](#) / [Using your portal with ArcGIS Server](#) / [Use ArcGIS Data Store with your portal](#) / [Reference](#)

What is ArcGIS Data Store?

[› Configure a data store](#)


[› Manage data stores](#)

[▼ Reference](#)

[What's new in ArcGIS Data Store 10.6](#)

[ArcGIS Data Store 10.6 system requirements](#)

ArcGIS Data Store command utility reference

[ArcGIS 10.6 \(Windows\)](#) | [Other versions](#) 

Command utilities, installed with ArcGIS Data Store, provide the data store administrator tools to manage data stores. This topic describes the utilities and provides syntax and examples.

All utilities must be run on the ArcGIS Data Store machine. You can find the utilities in the

In this topic

[allowconnection](#)

[backupdatastore](#)

[changebackuplocation](#)

[changedatastoremode](#)

[changedbproperties](#)

[changeloglocation](#)

[changenosqlslocation](#)

[changepassword](#)

Scaling

The background is a solid dark blue gradient. In the top-left corner, there are several thin, parallel diagonal lines in shades of teal, green, and red. In the bottom-right corner, there is a complex arrangement of overlapping geometric shapes, including rectangles and polygons in various colors like orange, yellow, green, and dark blue. Some of these shapes have a grid-like pattern or a dotted texture.

Scaling Direction

- **Scaling up**
 - Adding resources to your existing machine
 - Usually RAM
 - Commonly, due to lots of service instances
- **Scaling out**
 - Add more machines
 - Usually to get more compute power, sometimes for high availability
 - Commonly, due to increased user demand



The Enterprise portal: Portal for ArcGIS

- When do you need to scale out the Portal for ArcGIS tier?
 - Rarely!
 - Provide more resources for your existing machine(s)
 - Note: Use two machines with Portal for ArcGIS for high availability purposes *not* for scaling
 - Monitor CPU and memory usage to see if you need more resources



ArcGIS Server sites



Adding additional GIS Server sites

- Pre-planning is important
- Isolate hosting server site from traditional GIS Server duties
- Have dedicated GIS Server sites for various purposes: heavily used map services, geoprocessing services, ...

Scaling existing sites:

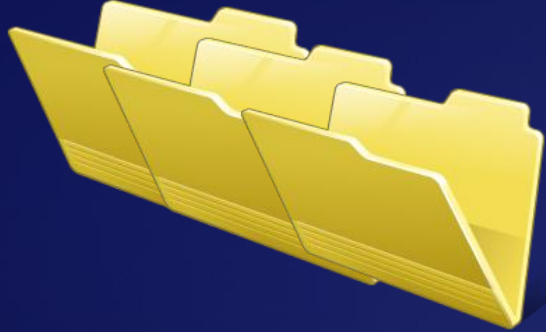
- Vertically- adding resources to existing machines
- Horizontally- adding additional machines to existing site



OR



Scaling ArcGIS Server may also require....



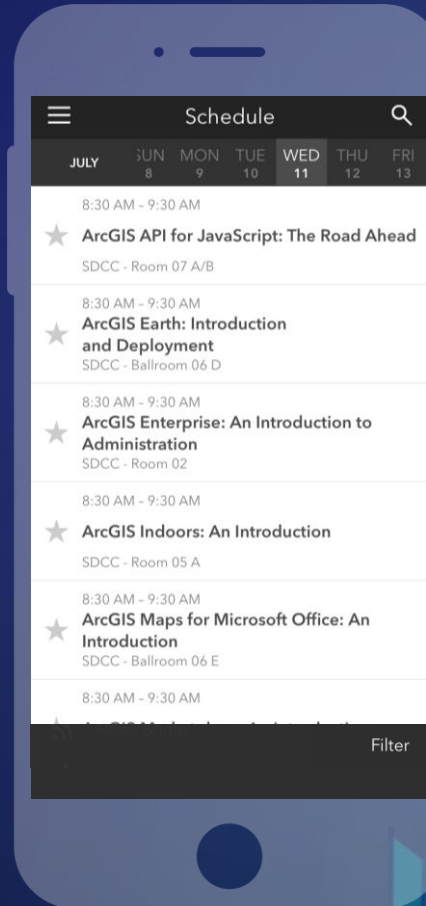
- **Scaling file servers**
 - Config-store
 - Data
- **Scaling databases**
- **Scaling your network infrastructure**

Please Take Our Survey on the App

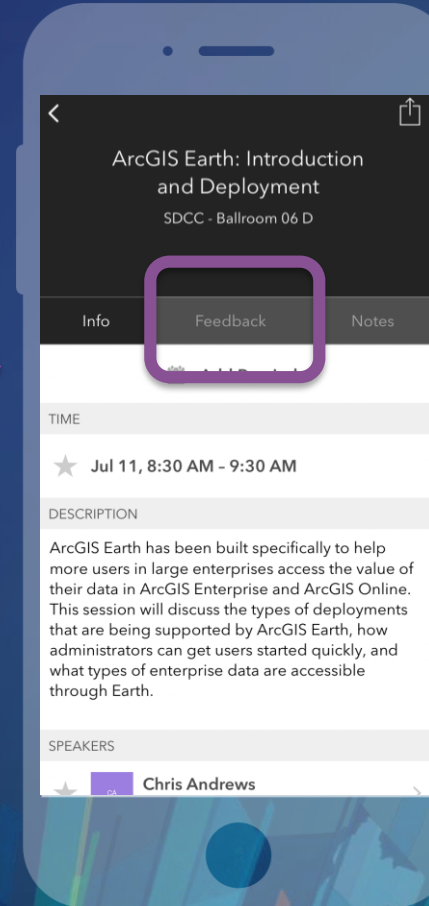
Download the Esri Events app and find your event



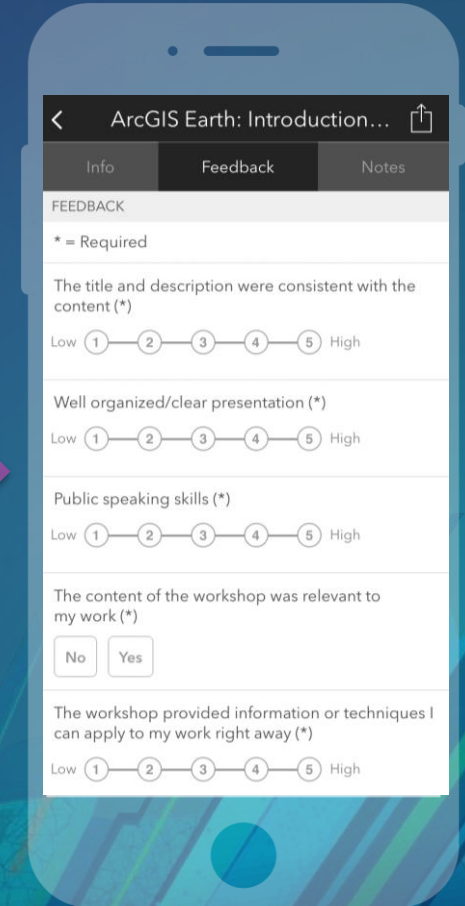
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"





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