ArcGIS Enterprise: Tuning and Scaling

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GIS INSPIRING WHAT'S NEXT

Related sessions

WORKSHOP	LOCATION	TIME FRAME
• ArcGIS Enterprise: Architecting Your Deployment	• SDCC - Room 04 • SDCC – Room 02	• Tuesday, 1:00-2:00 pm • Wednesday, 2:30-3:30 pm
• ArcGIS Enterprise: Best Practices for Layers and Service Types	• SDCC – Room 16 B	• Thursday, 10:00-11:00 am
• Real-Time and Big Data GIS: Leveraging the Spatiotemporal Big Data Store	• SDCC – Room 05 B • SDCC – Room 14 B	• Wednesday, 8:30-9:30 am • Thursday, 1:00-2:00 pm
• 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

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

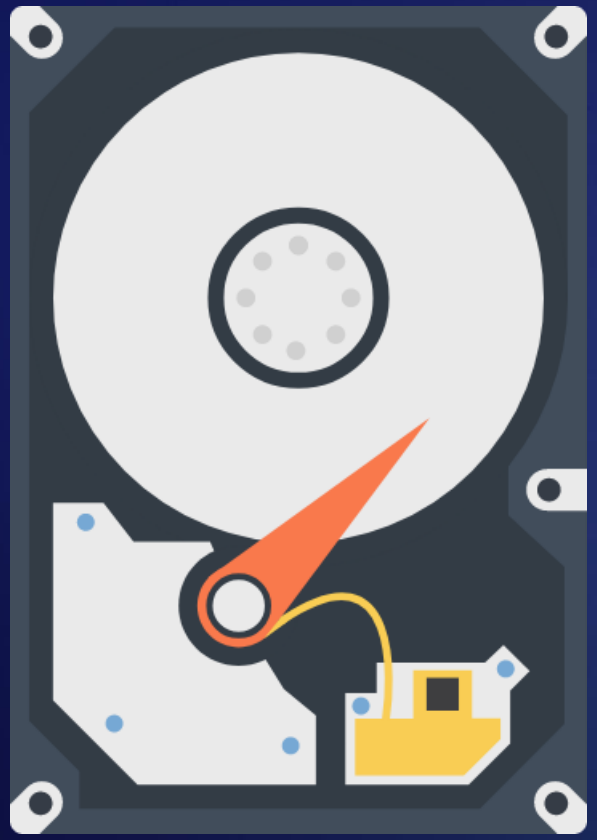
Map authoring: tuning individual services

- 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

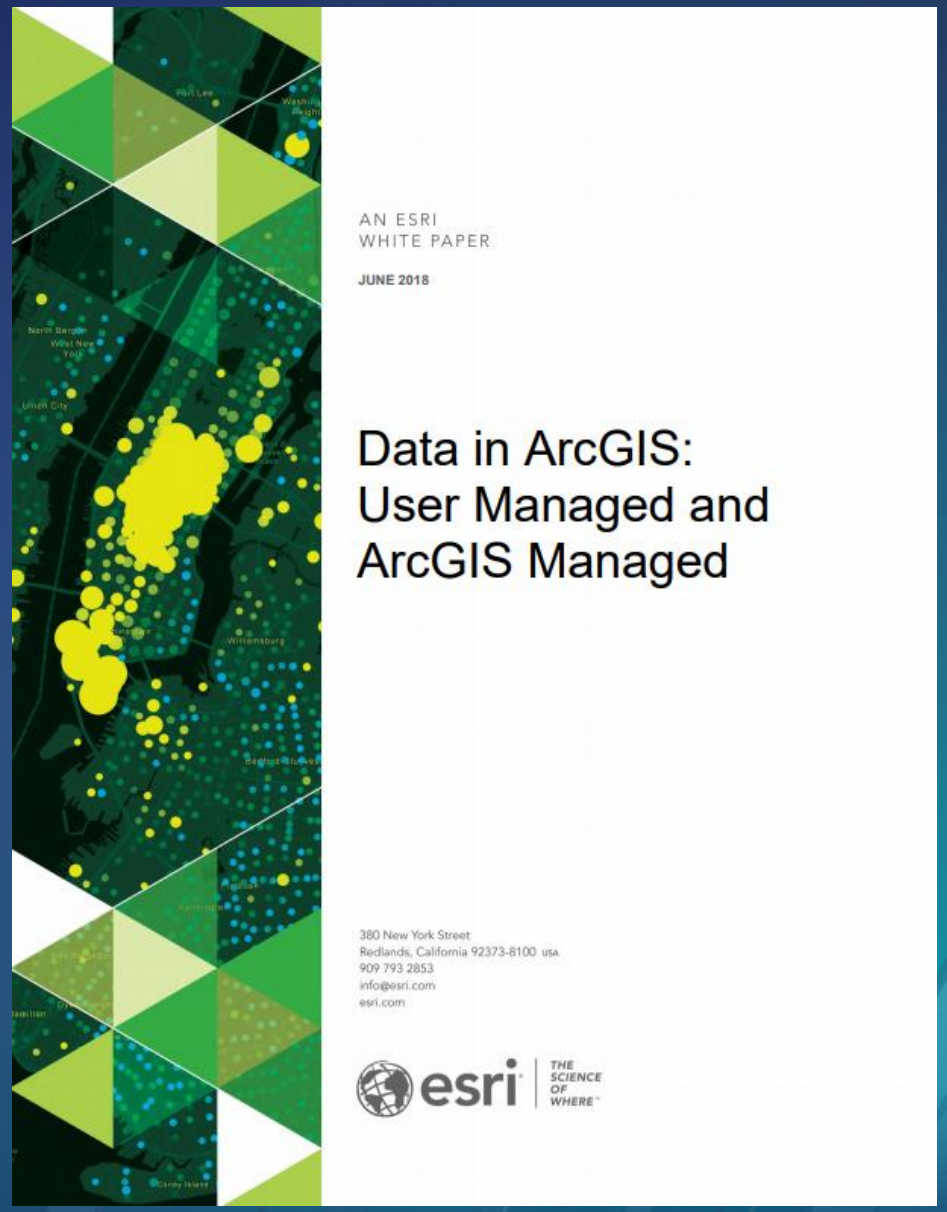
Tuning

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 SOCs).**

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:



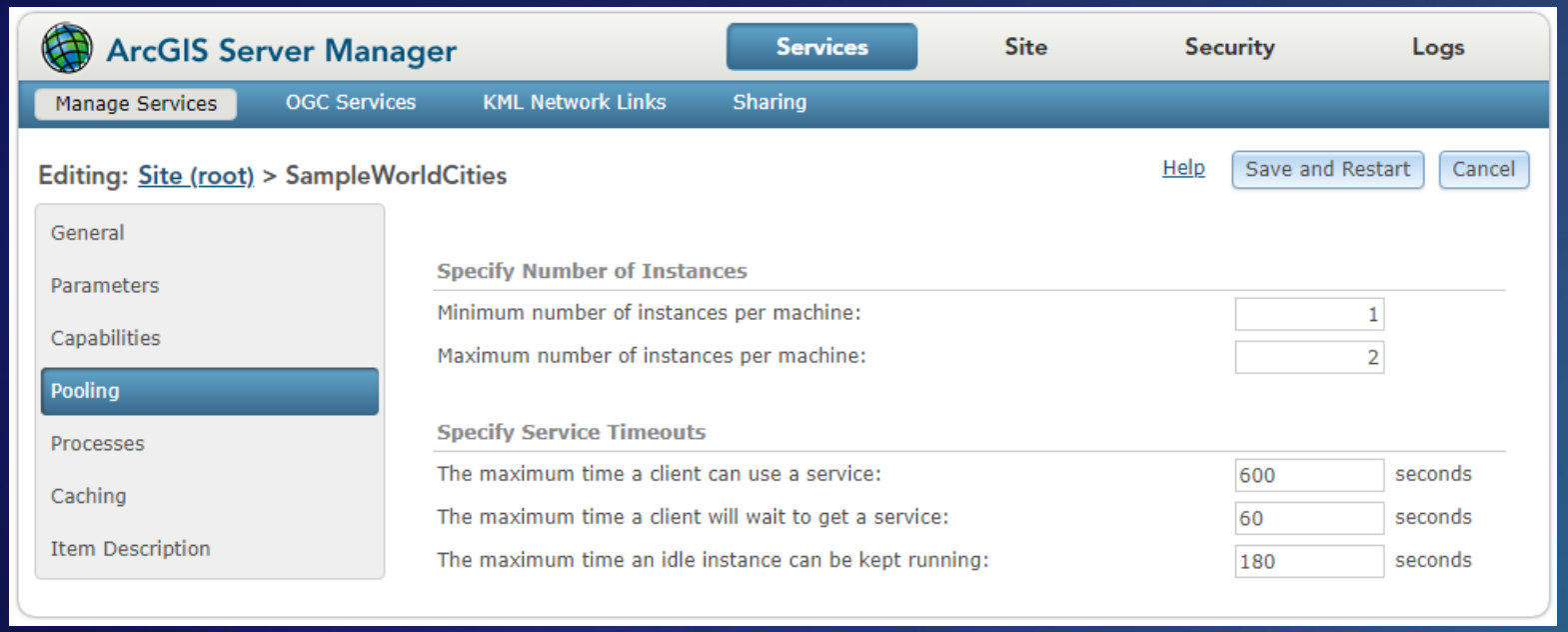
Tuning ArcGIS Server- instance tuning

- **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



- 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

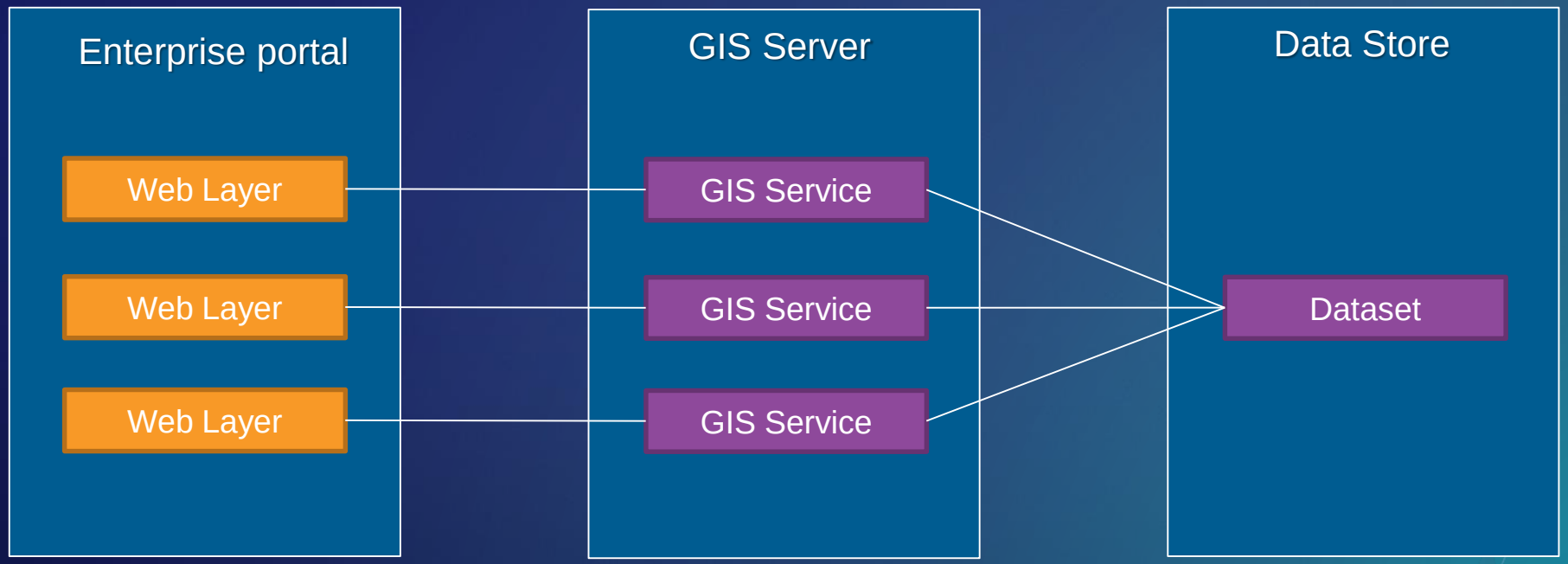
- Avoid overload!
- Realize that concurrent *users* does not equal concurrent *requests*.
- Tradeoff:
  - Services with many layers vs. many services with few layers.
- Services with fewer layers have many advantages, but compete for resources.
- *min = 0* can be an option for rarely used services..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

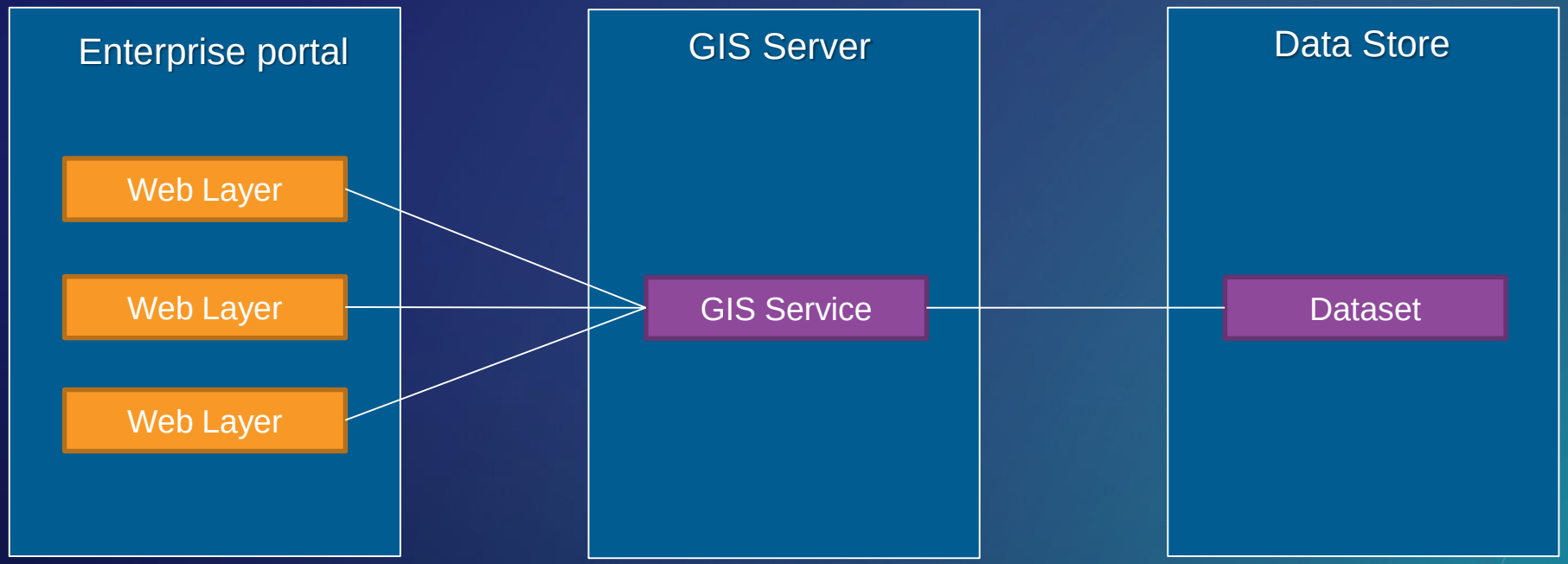
Tuning your Web Map

- **Common setup today:**

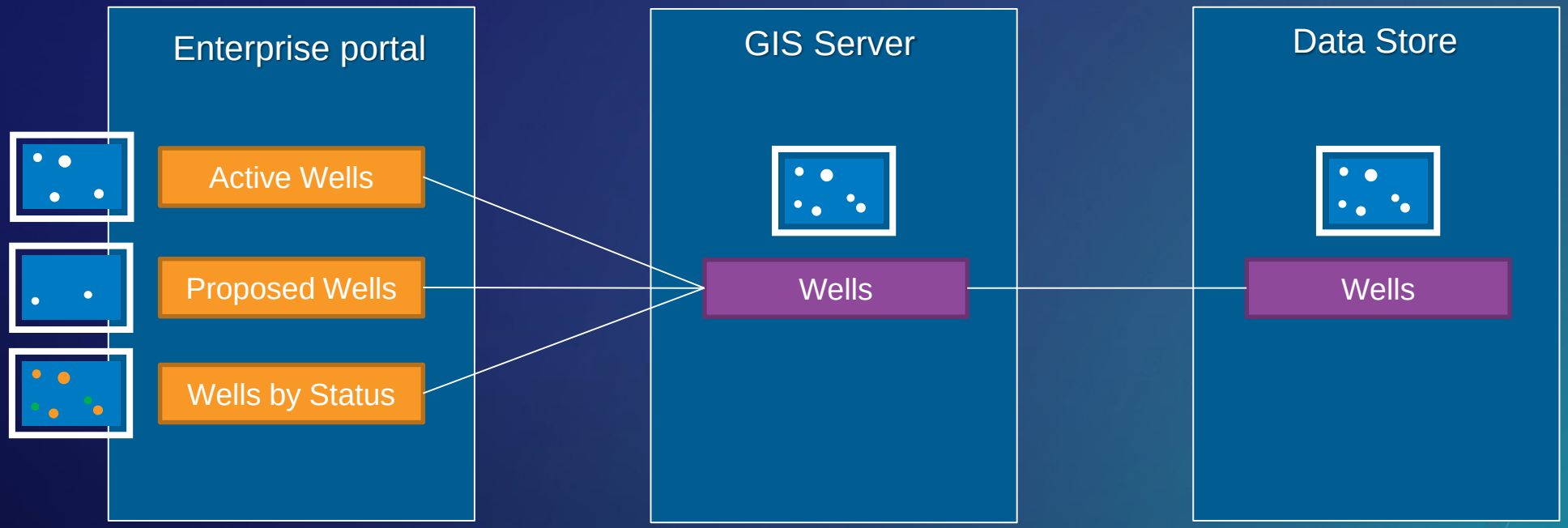


Tuning your Web Map

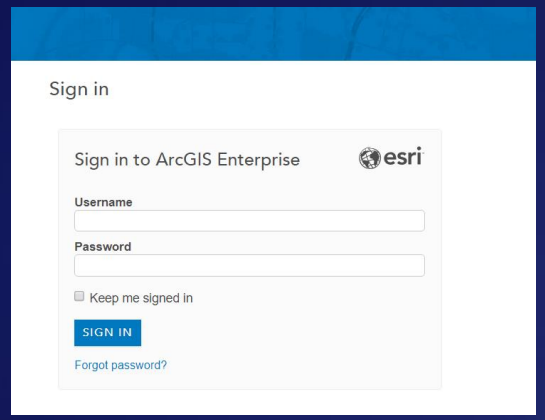
- **More efficient: consolidate layers with like security into a single service**



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 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

Scaling

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

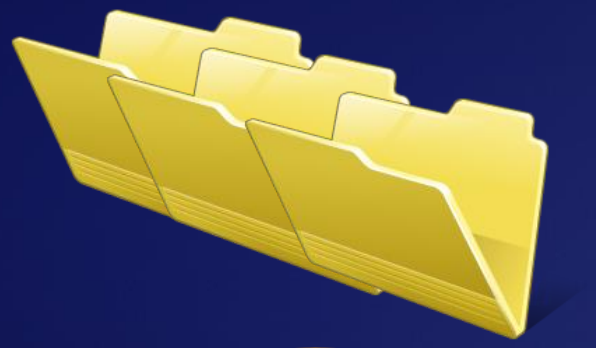
- Pre-planning is important
- Isolate hosting server site from traditional GIS Server duties
- Have dedicated GIS Server sites for various purposes: heavily used map services, geoprocessing services, …

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

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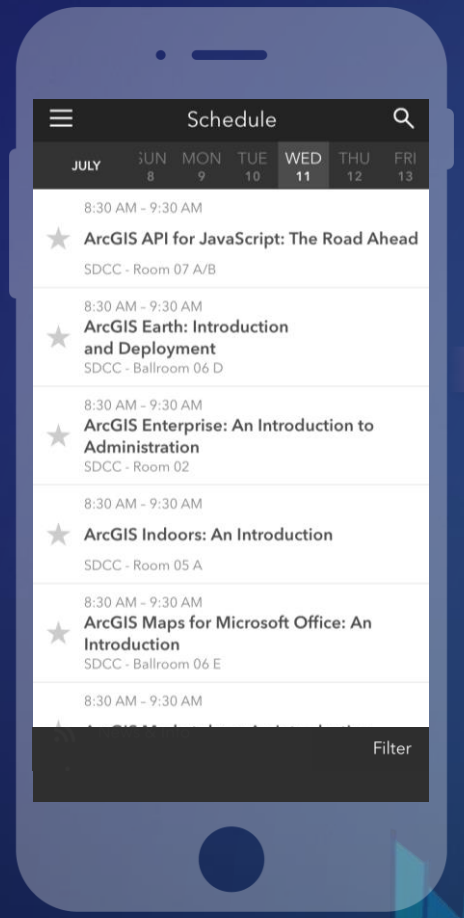
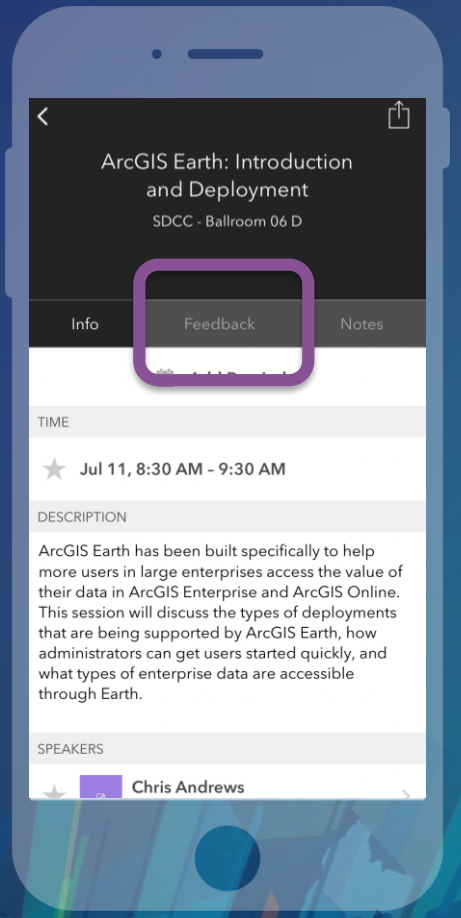
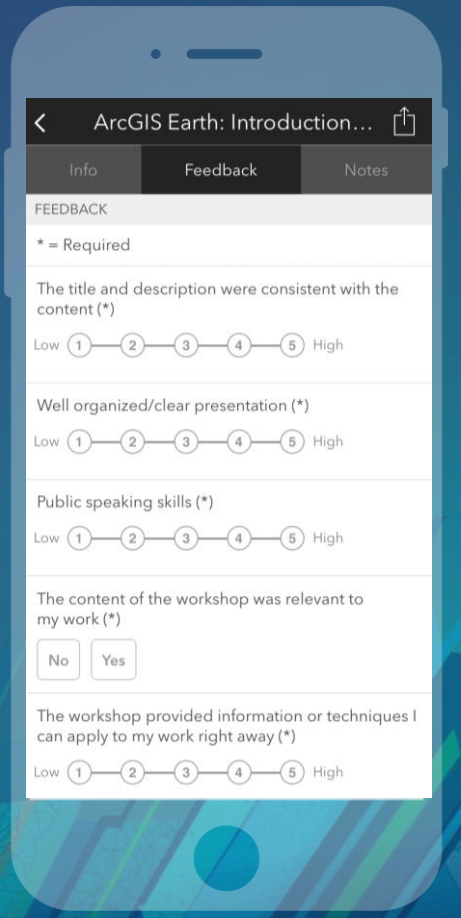


Scroll down to find the feedback section



Complete answers and select “Submit”



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