ArcGIS Enterprise: Advanced Topics in Administration

Thomas Edghill & Moginraj Mohandas

SEE WHAT OTHERS CAN'T

Topics

- Advanced ArcGIS Enterprise Workflows
  - Expanding your site
  - Multi-Machine site administration
  - Applied Monitoring Techniques & Tips
- Resources

Expanding your site

Why expand?
How can ArcGIS Enterprise Expand?
Expanding ArcGIS Server to a multi-machine site

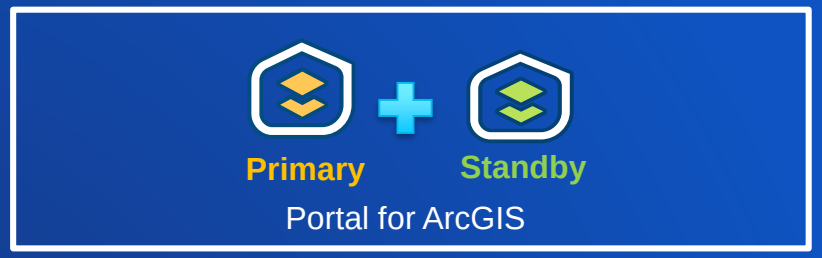
Advanced Enterprise Workflows: Expanding

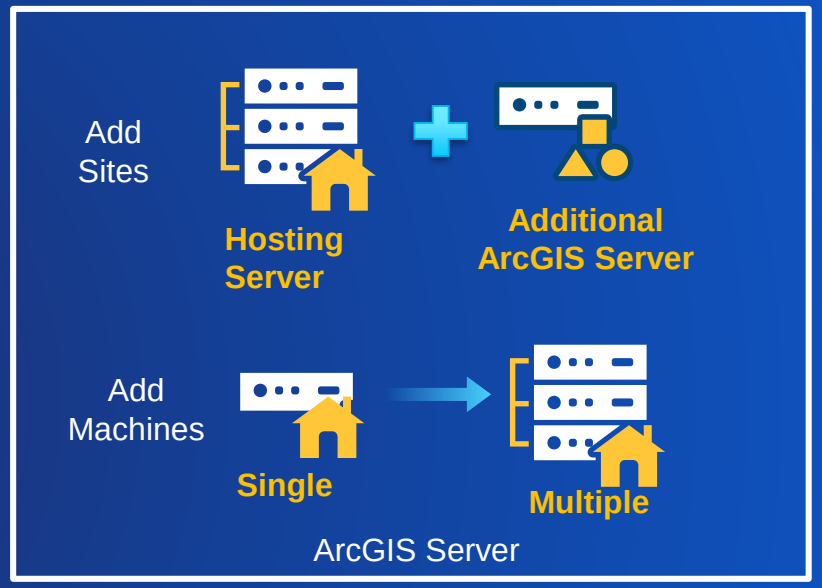
Why Expand?

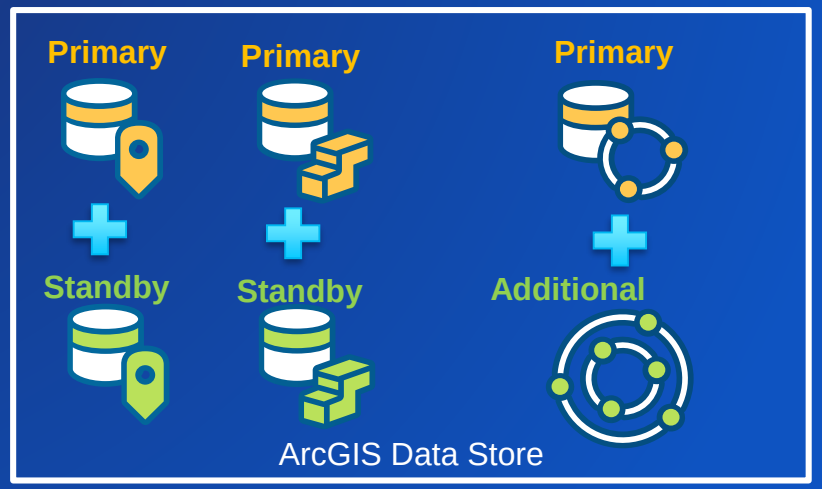
- To handle increased load/usage
- Utilize additional ArcGIS Server capabilities
- Workload and functionality separation
- High Availability

How can ArcGIS Enterprise Expand?

- Portal for ArcGIS
  - Can add a single Standby Enterprise portal
- ArcGIS Server (two approaches)
  - Multiple Sites – Add further server sites to the deployment
  - Multiple Machines – Additional machines on an existing server site
- ArcGIS Data Store
  - Relational Data Store – Add a single Standby data store
  - Tile Cache Data Store – Add a single Standby data store
  - Spatiotemporal Big Data Store – Add multiple data stores







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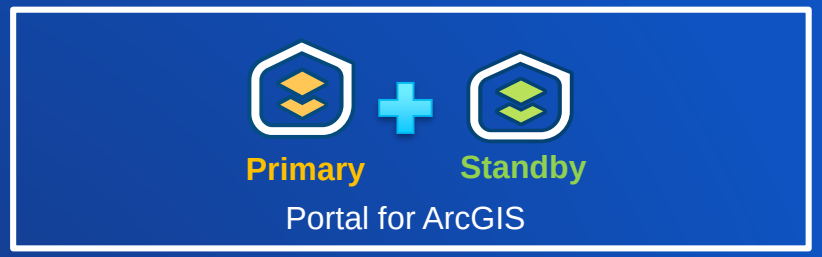
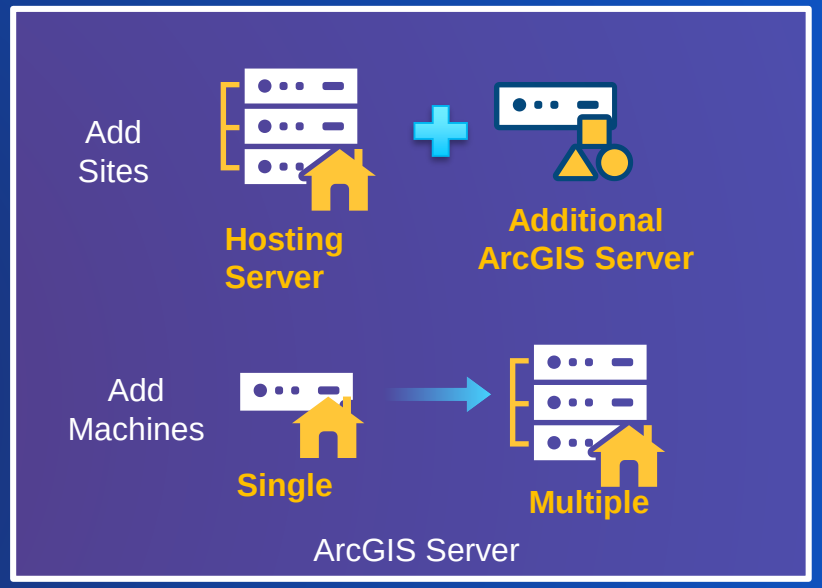
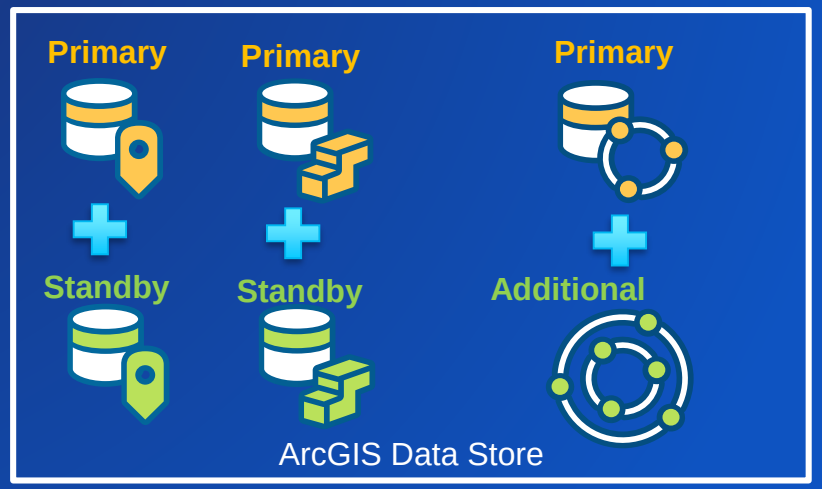






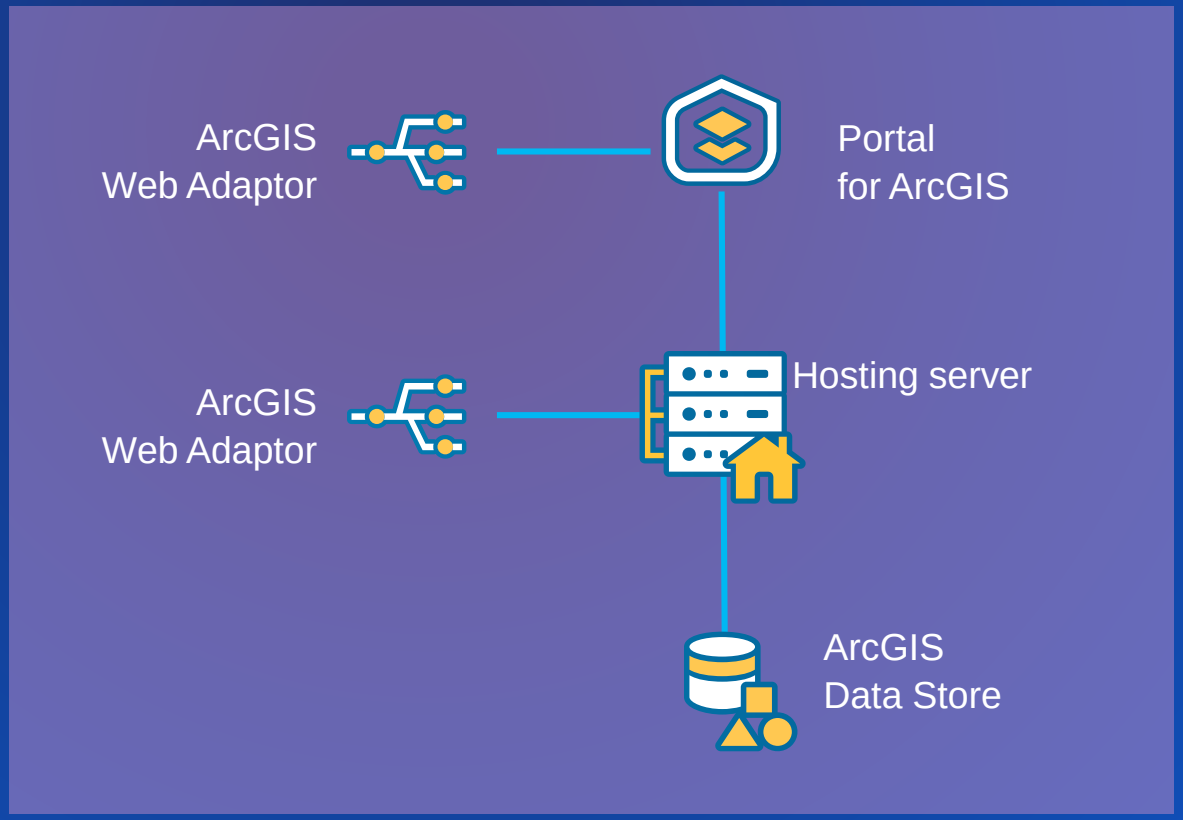
Advanced Enterprise Workflows: Expanding ArcGIS Server

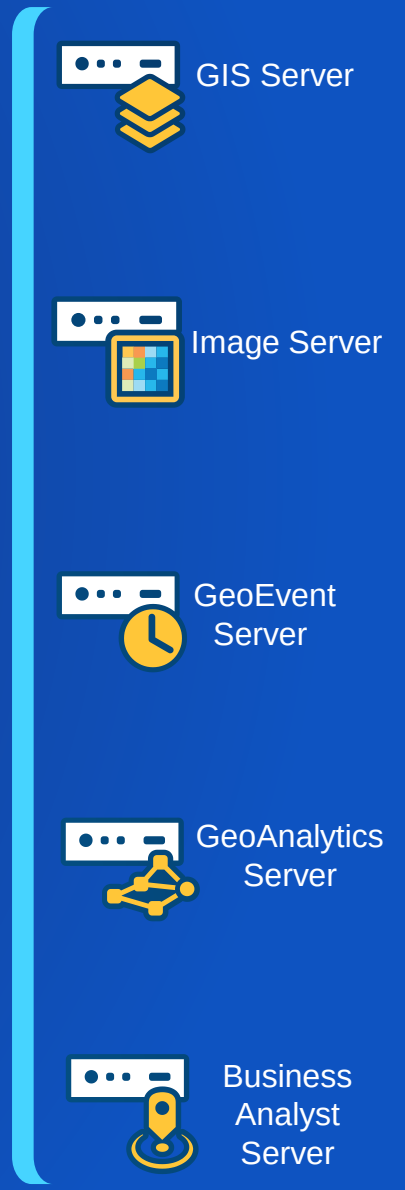
Adding further ArcGIS Server Sites to the Base Deployment

- Benefits:
  - Isolates the Hosting Server from other specialized GIS Server duties
  - Separates out ArcGIS Servers that serve specific functionality or workload/services

Workflow:

- Provision machines
- Install + License
- Create new site
- Federate new site with portal



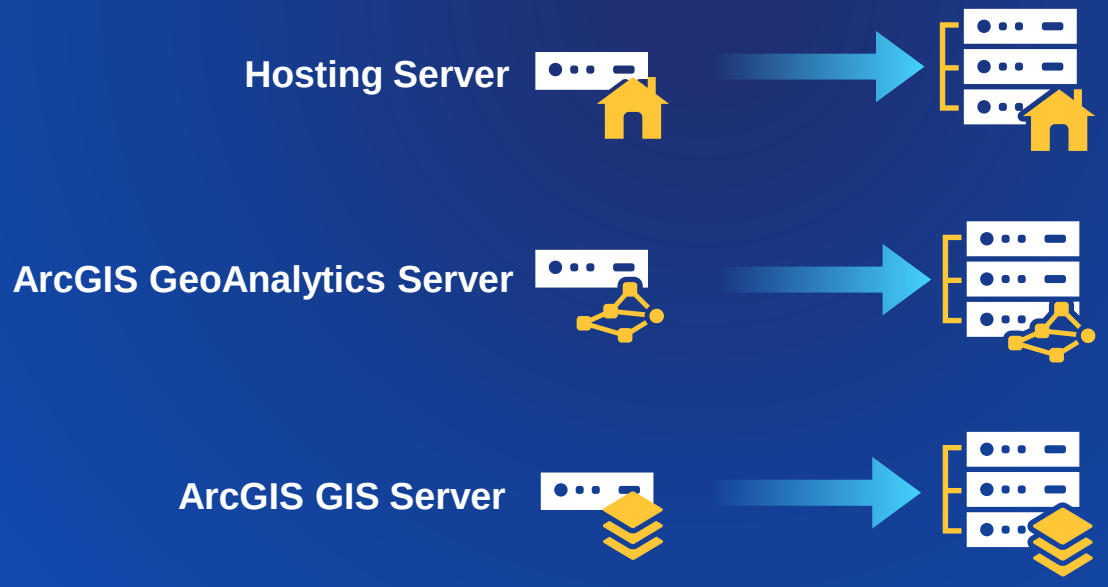


Advanced Enterprise Workflows: Expanding ArcGIS Server

Add more machines to the same ArcGIS Server site

Scenarios:

- Scale out the Hosting Server site
  - Heavy usage of Analysis tools, higher number of Insights users, etc.
  - Doubles up for other functionality/workload.
- Scale out your GeoAnalytics or Image Server sites for computational requirements
- Scale out your GeoProcessing or Mapping GIS Server sites due to heavy usage



Advanced Enterprise Workflows: Expanding ArcGIS Server

Prerequisites for Expanding an ArcGIS Server site

- Server directories and Configuration store must use shared paths
- Same Operating System and Hardware Resources (Recommended)
- Same ArcGIS Server version number
- Same licenses applied
- Running using the same ArcGIS Server account (Windows Service Account)
- Can read/write from the shared server directories and config-store locations
- Can communicate with all other machines in the ArcGIS Server site through documented ports
  - May require adjusting firewall settings
- Can read all data sources referenced by the server site

How to expand an ArcGIS Server site

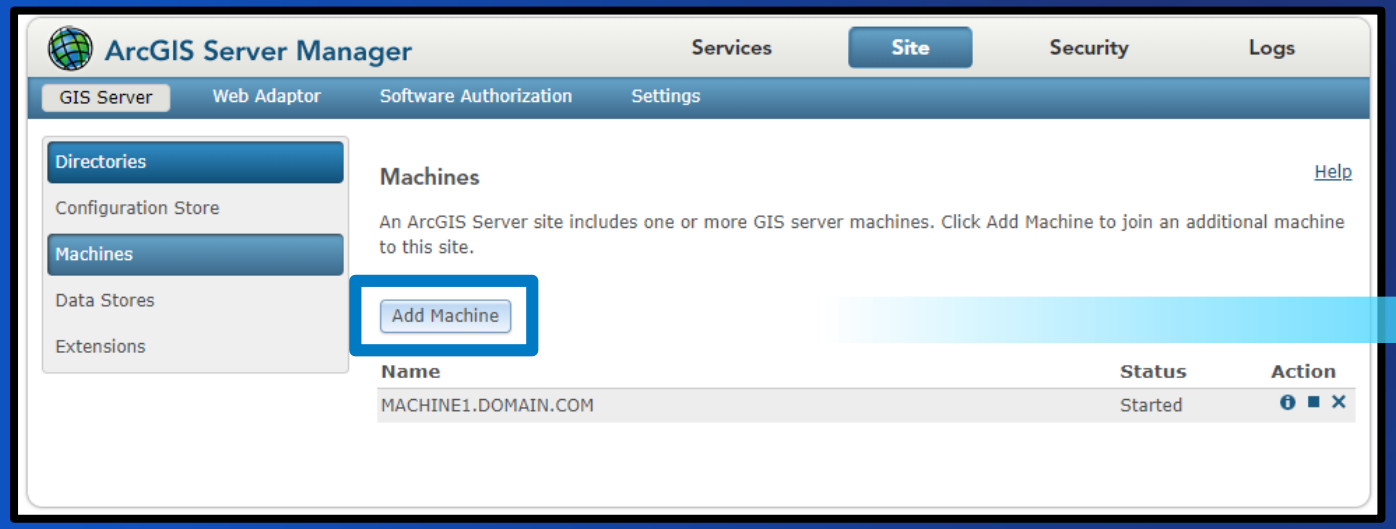
Two possible workflows:

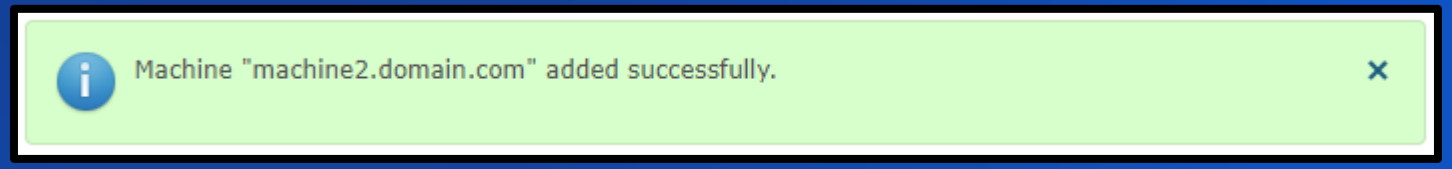
1. Add machine
2. Join site

Advanced Enterprise Workflows: Expanding ArcGIS Server

Expanding an ArcGIS Server site with the Add machine operation

- ArcGIS Server Manager > Sites tab > Machines > Add Machine
- Enter machine name and URL for second ArcGIS Server machine, click “Add”

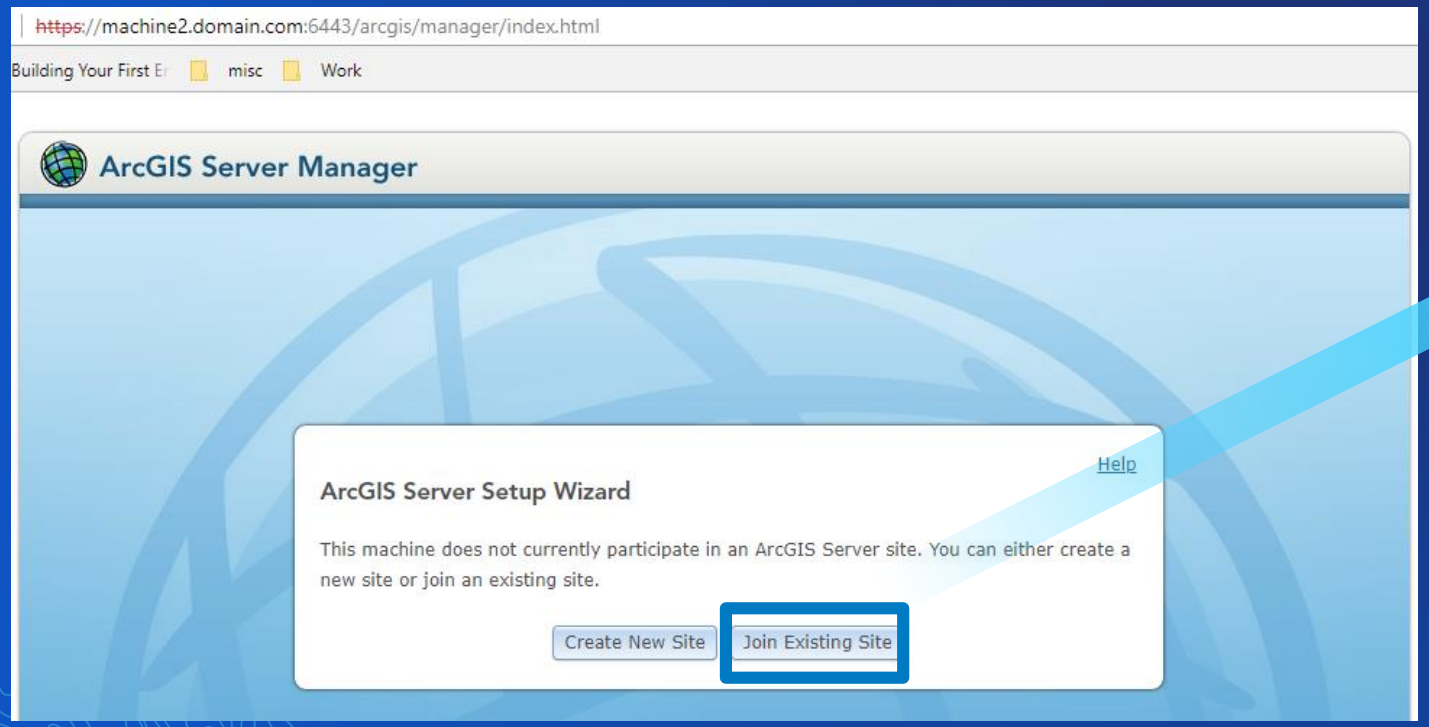


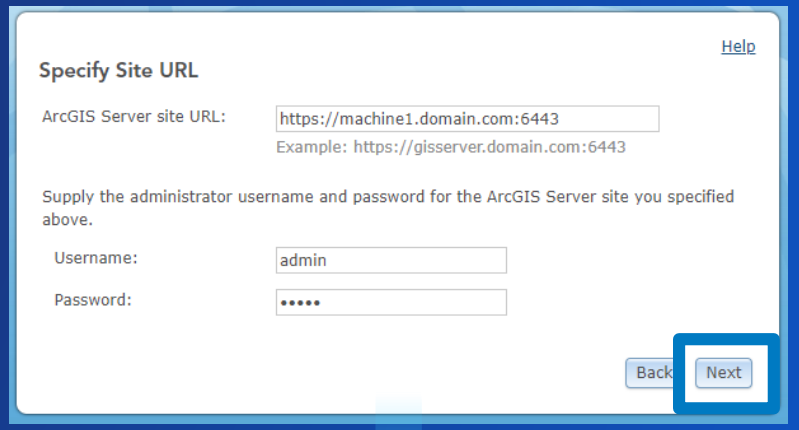


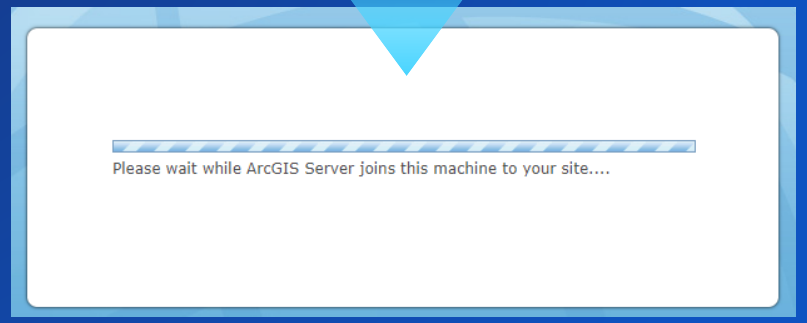
Advanced Enterprise Workflows: Expanding ArcGIS Server

Expanding an ArcGIS Server site with the Join site operation

- On the new ArcGIS Server machine, navigate to ArcGIS Server Manager > Select “Join Existing Site”
- Enter URL and Server Administrator credentials for the first ArcGIS Server > Select “Next”
- After joining, directed to ArcGIS Server Manager login page

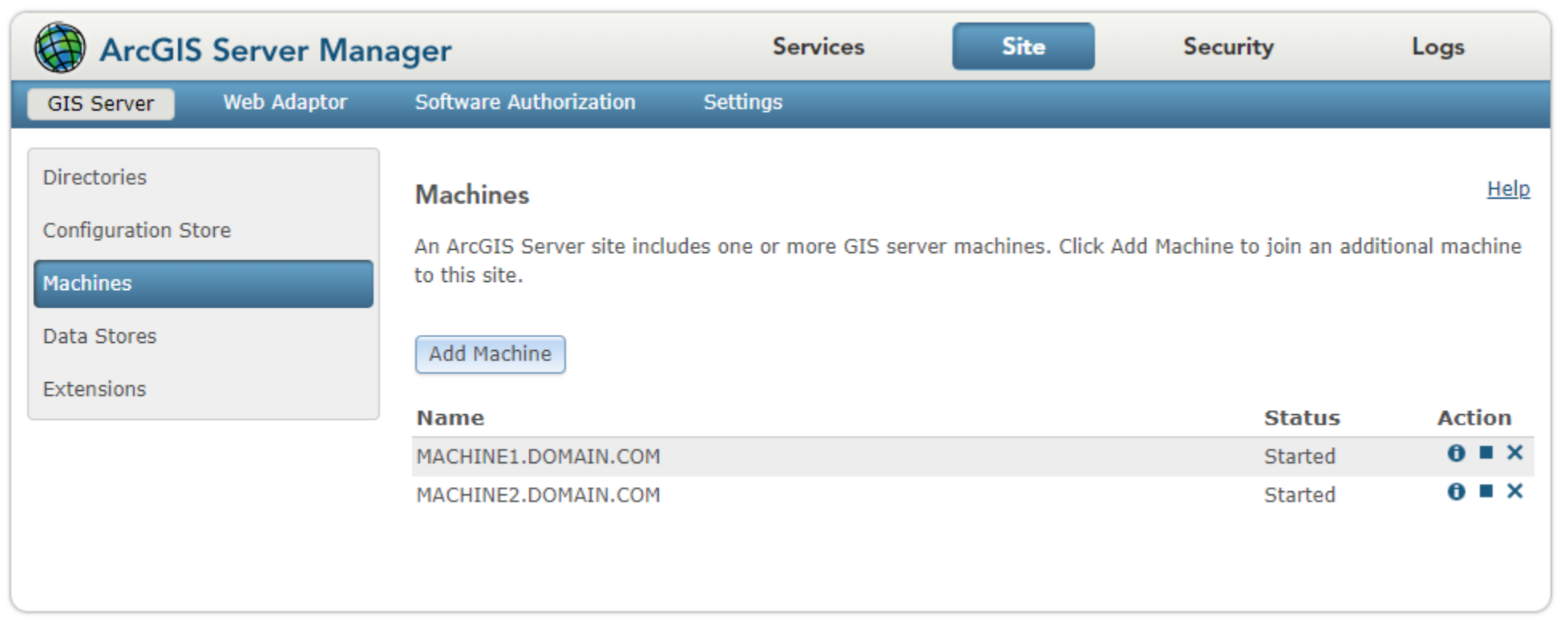






Advanced Enterprise Workflows: Expanding ArcGIS Server

Final Result: Multi-Machine ArcGIS Server Site

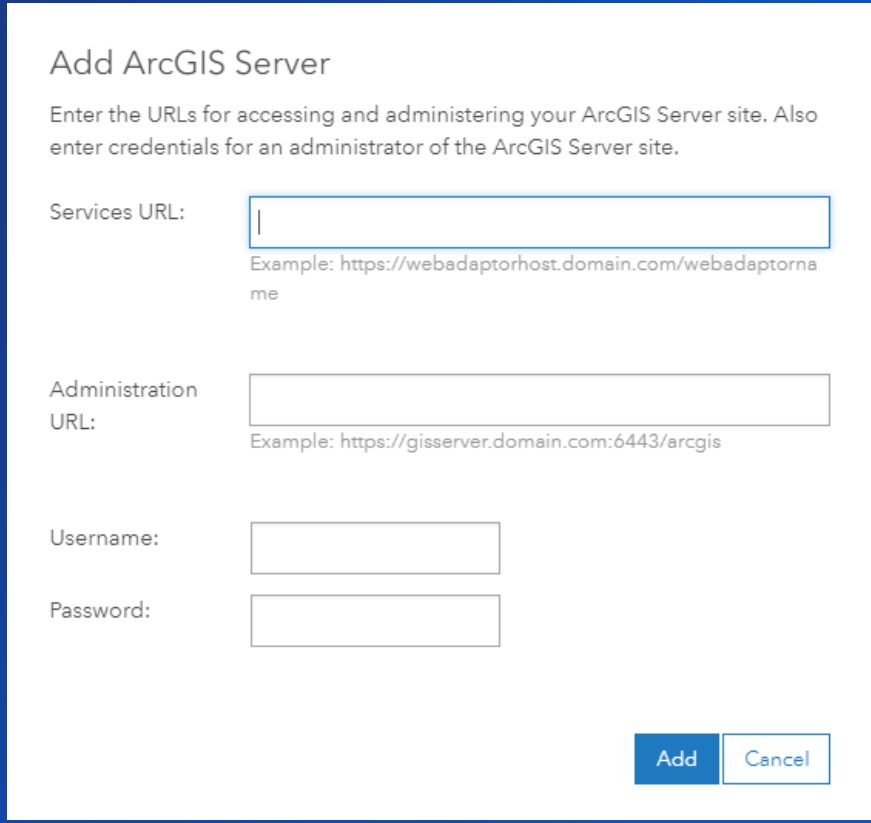


Advanced Enterprise Workflows: Expanding ArcGIS Server

Additional considerations when expanding ArcGIS Server

We recommend configuring a Web Adaptor (or Reverse Proxy)

- Web Adaptor/Reverse Proxy acts as a load balancer, routing requests among machines in the site
- When federating, we recommend using the Web Adaptor/Reverse Proxy URL
  - Both the Services URL and Administration URL



Advanced Enterprise Workflows: Expanding ArcGIS Server

Additional considerations when expanding ArcGIS Server

I want to expand, but Server is already federated. How do I update my URLs?

- Update the administrator URL for the federated server in the portal
- Validate your ArcGIS Server from the portal

Advanced Enterprise Workflows: Expanding ArcGIS Server

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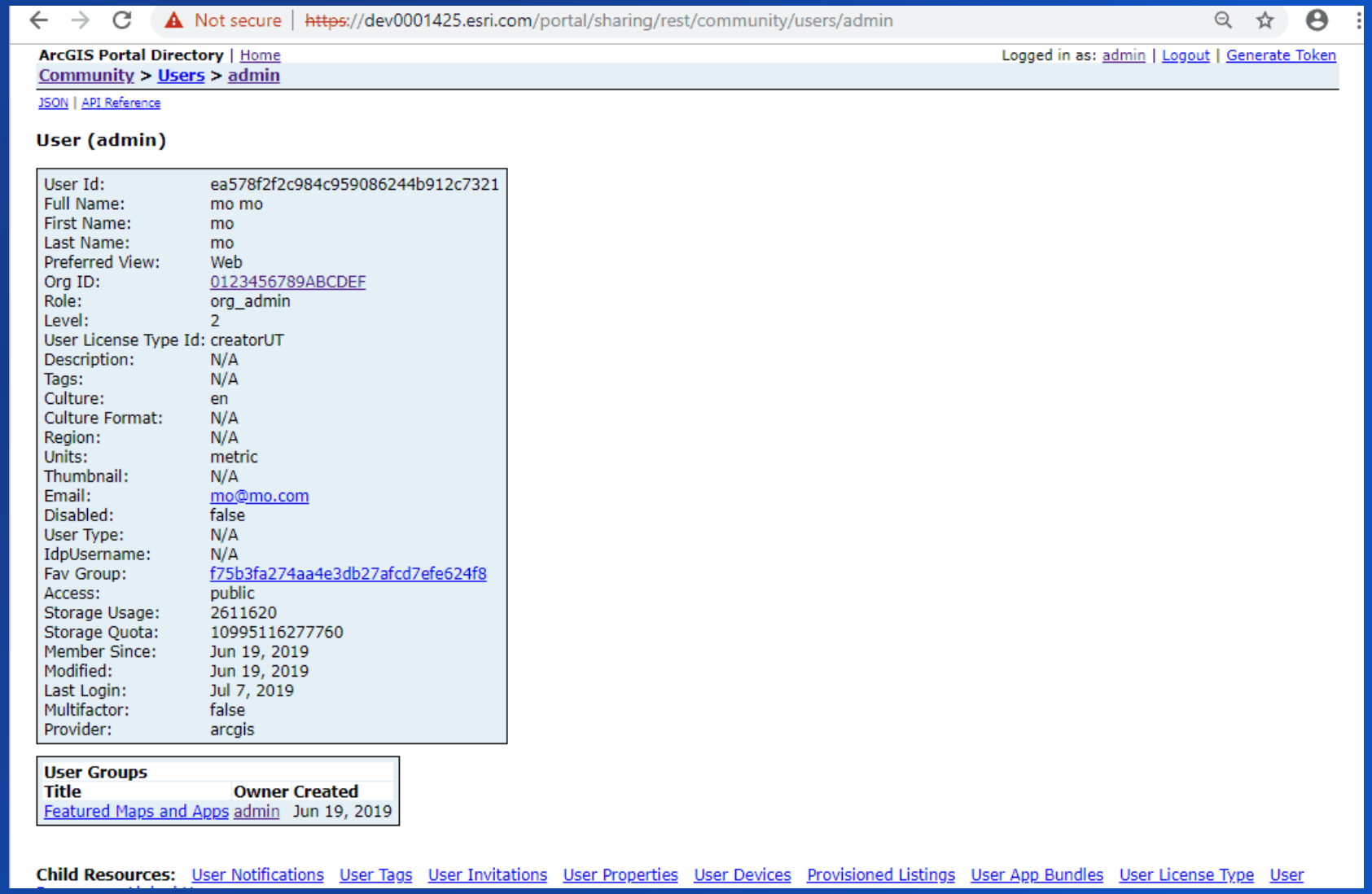


Updating Server URLs through the portal

Multi-Machine Site Administration

Understanding request traffic scenarios
Common issues with multi-machine configuration
Mitigation

Understanding Multi-Machine ArcGIS Server Sites : Request Types

Service Requests

- Requests to a service endpoint for a supported operation
- Request is handled by the machine which receives it
- No modifications to site configuration needed
- Examples:
  - Querying map service records
  - Passing edits through a feature service

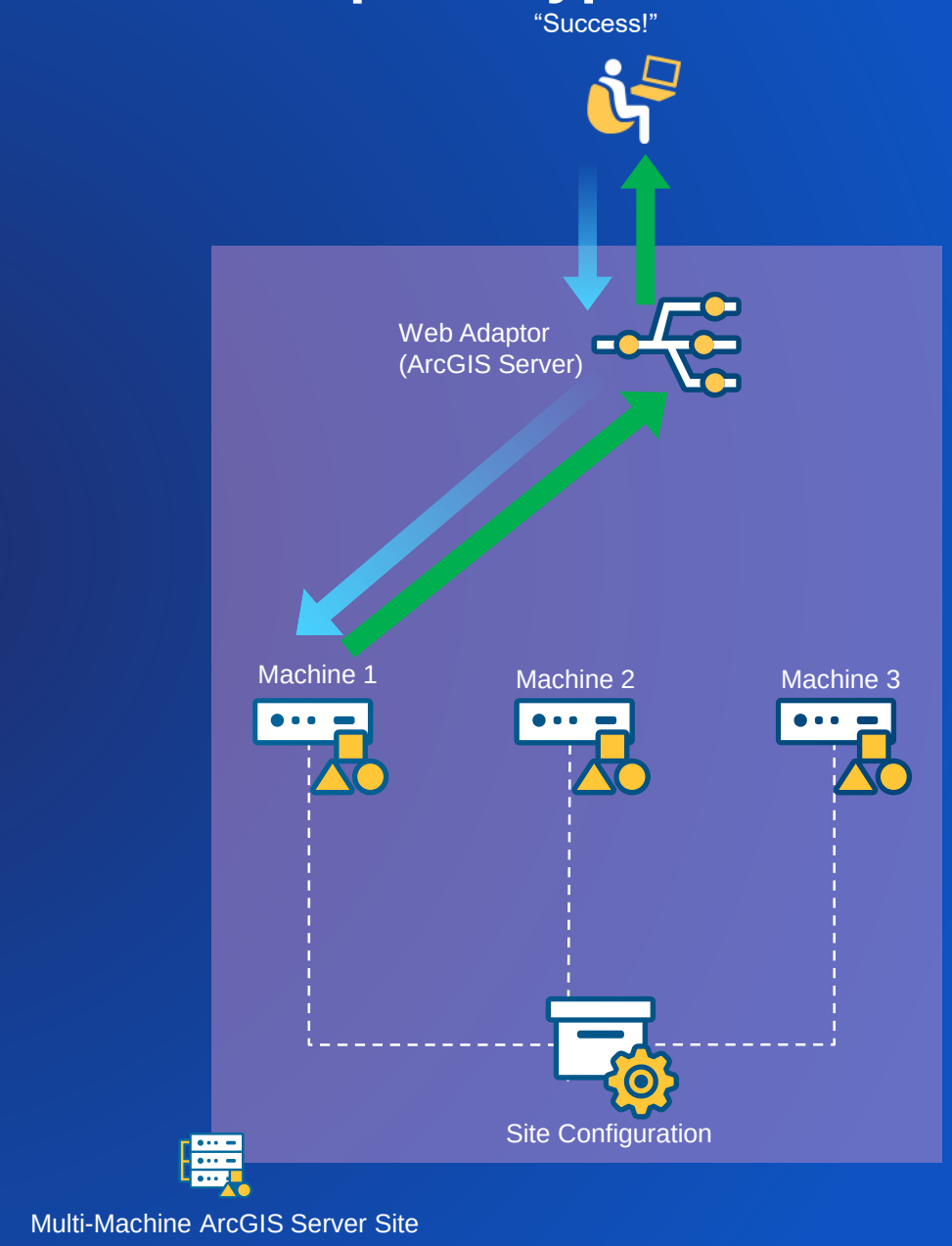
Administrative Requests

- Requests to the ArcGIS Server site to add or modify configured information
- Request is handled by the machine which receives it, and is then propagated to additional machines in the site
- Examples:
  - Publishing a new service
  - Registering a data store

Understanding Multi-Machine ArcGIS Server Sites : Request Types

How does a multi-machine ArcGIS Server site handle incoming service requests?

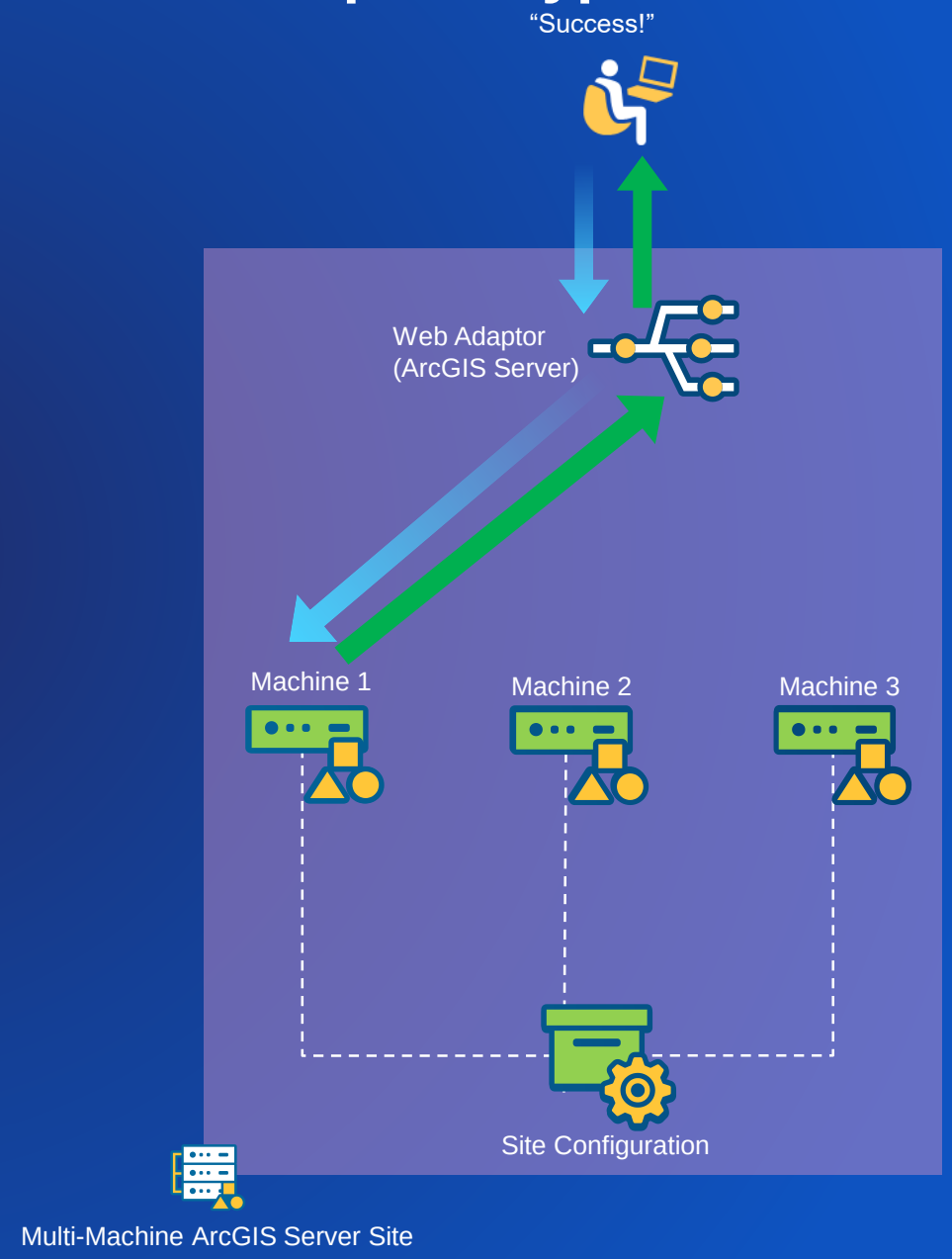
- An incoming request comes to the Web Adaptor, and is routed to one of the server machines
- The server machine accepts and processes the request
- A successful response is returned



Understanding Multi-Machine ArcGIS Server Sites : Request Types

How does a multi-machine ArcGIS Server site handle incoming administrative requests?

- An incoming request comes to the Web Adaptor, and is routed to one of the server machines
- The server machine accepts and processes the request, writing changes to the site configuration
- Other machines in the site sync with these changes
- A successful response is returned



Common issues encountered with multi-machine sites

- My site performs poorly when one or more of the machines in the site are unavailable/down.
- I want to perform updates/maintenance on individual machines without any service disruption.
- I want to control and enforce when publishing can happen on my site.
- I want my server site to still function when there are temporary disruptions to the shared site configuration.

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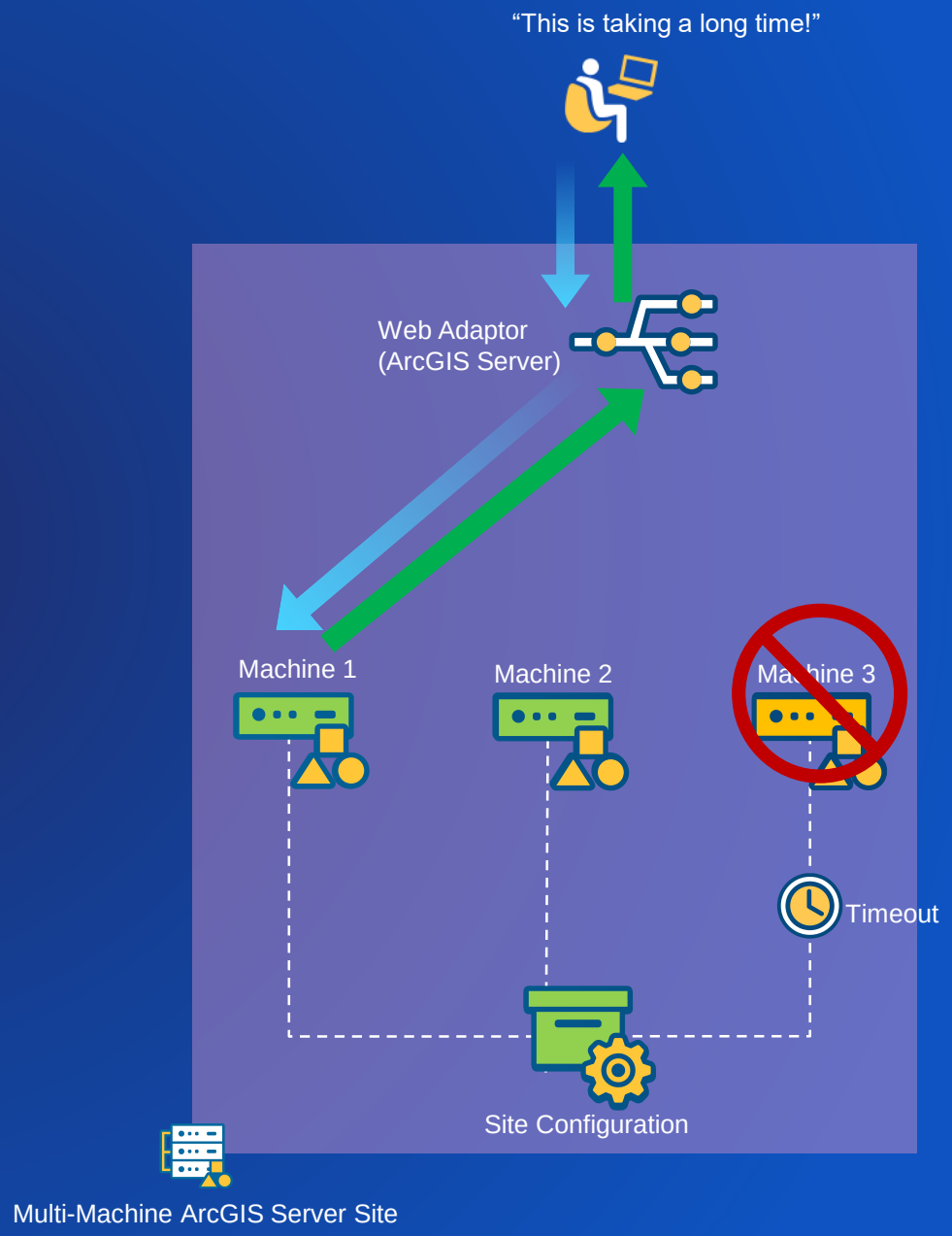
Common issues encountered with multi-machine sites

Site slow to respond to operations

For example:

- One of the machines in the site is unreachable temporarily – Machine 3
- An incoming administrative request comes to the Web Adaptor, and is routed to one of the server machines
- The server machine accepts and processes the request, writing changes to the site configuration
- The internal request to the unreachable machine eventually times out when attempting to sync.
- This makes the administrative request slow to provide a response back.
- Imagine this whenever you administer or publish.

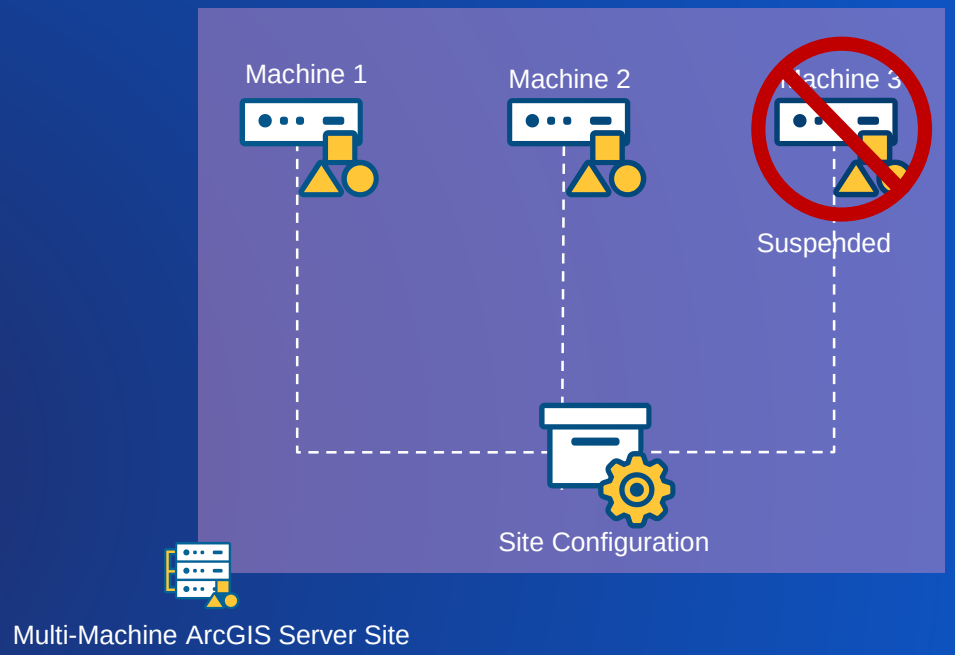
<u>We've added new features to help with this!</u>



New Improvements to Multi-Machine Site Performance

MachineSuspendThreshold and Machine “heartbeats’

- New at 10.7!
- Each machine periodically reports its status to the site directories – a “heartbeat” health check
- When a machine doesn’t report back after a set period of time, it is marked suspended – this machine is ignored for any administrative or publishing events.
  - Configurable parameter: MachineSuspendThreshold
    - Default: 1 hour
- Once the machine is back up and reporting its status, it is unsuspended and syncs with the rest of the site
- A suspended machine can be automatically removed from the site after a configurable amount of time
  - Configurable parameter: suspendedMachineUnregisterThreshold
    - Default: -1 (Disabled)



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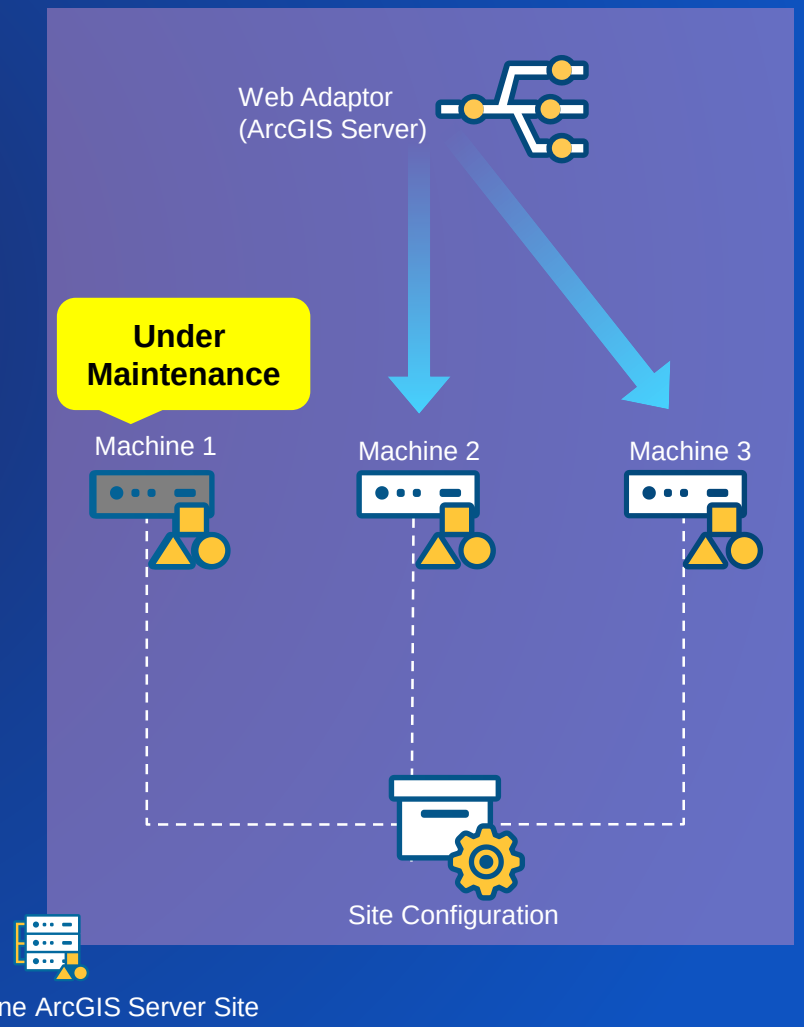
“Under Maintenance” Mode for ArcGIS Server

- New in 10.7!
- An individual machine is configured to be “Under Maintenance”
  - Configured in ArcGIS Server Administrator Directory
  - Parameter: underMaintenance (‘true’)
- Causes the machine to fail any health check requests sent to it
- The Web Adaptor will not route any service requests
  - Can work with third-party load balancers/reverse proxies
- The Web Adaptor will start routing requests to the machine once underMaintenance is set back to ‘false’

Benefits

- Make changes without disrupting service availability
  - E.g. OS Updates, one-off machine updates



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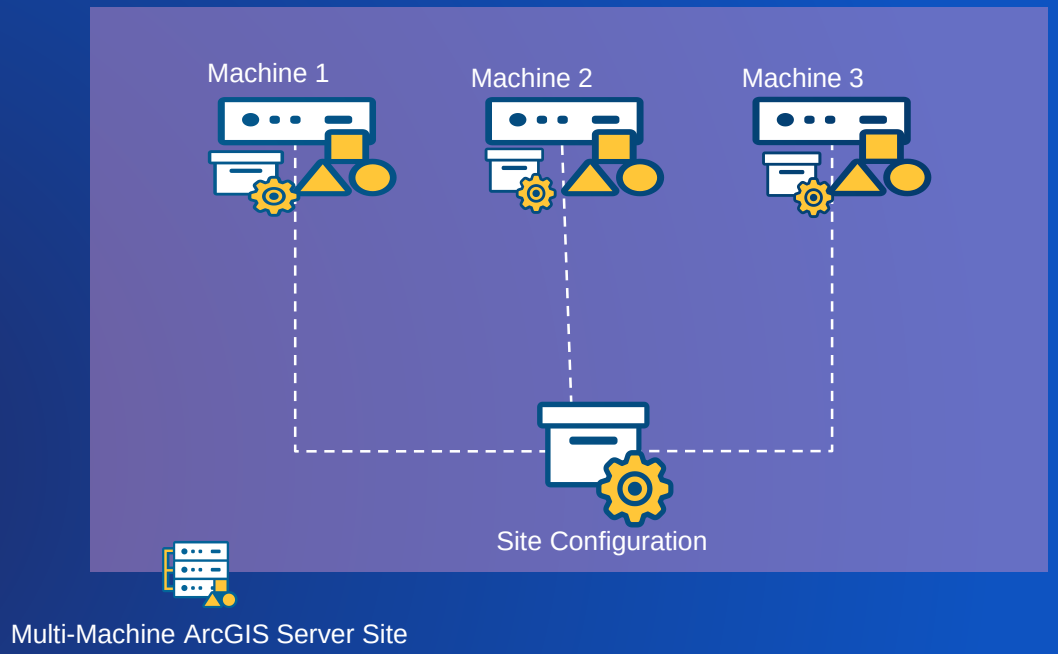
Exploring read-only mode for ArcGIS Server

How does read-only mode (ROM) work?

- Site becomes locked down – no administrator or publishing operations allowed
- Site configuration files are copied to a local repository on each machine in the site.
  - Configurable in ArcGIS Server Administrator Directory

Benefits of Read-only mode

- Enable admins to enforce publishing/administering tasks
  - E.g. Allow publishing only on certain days/times.
- Allow site to handle temporary disruptions to the site configuration.
  - E.g. A file server that contains the site configuration is unavailable temporarily. With ROM, the site is accessible, most services and operations work. Without ROM, site is dead until access is back.



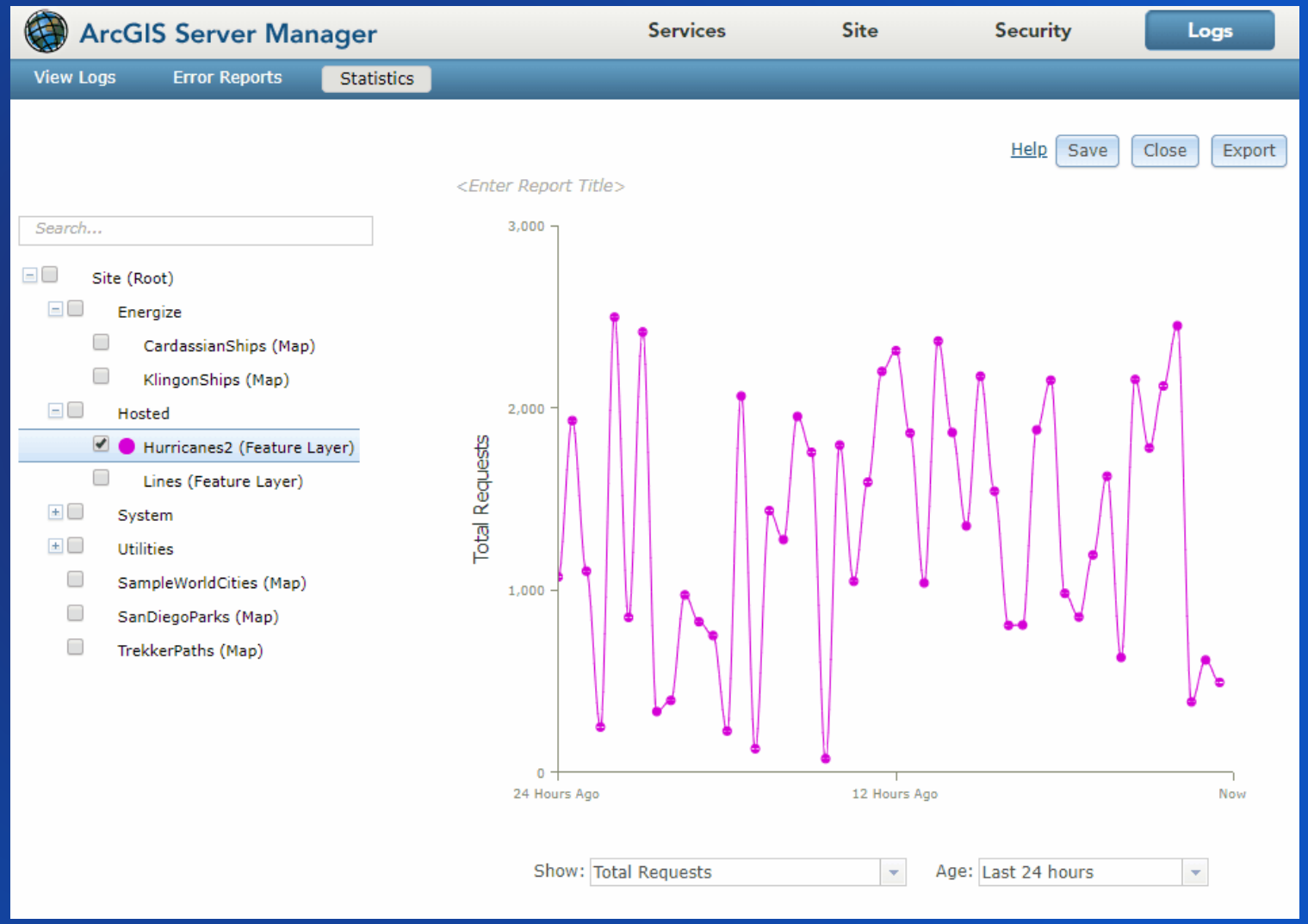
Applied monitoring techniques

Usage Statistics
Request ID tracking
Job ID tracking
Additional quick tips for monitoring

Advanced Enterprise Workflows: Monitoring

Usage Statistics: Overview of Usage Statistics in ArcGIS Server

- Displays information such as:
  - Total number of requests
  - Avg. response times
  - Max response times
  - Timeouts
  - Count of running instances
- Helpful for:
  - Tuning service instances
  - Identifying peaks in usage
  - Performing capacity planning
  - Reports for management
- Combine statistic information with logs for effective troubleshooting

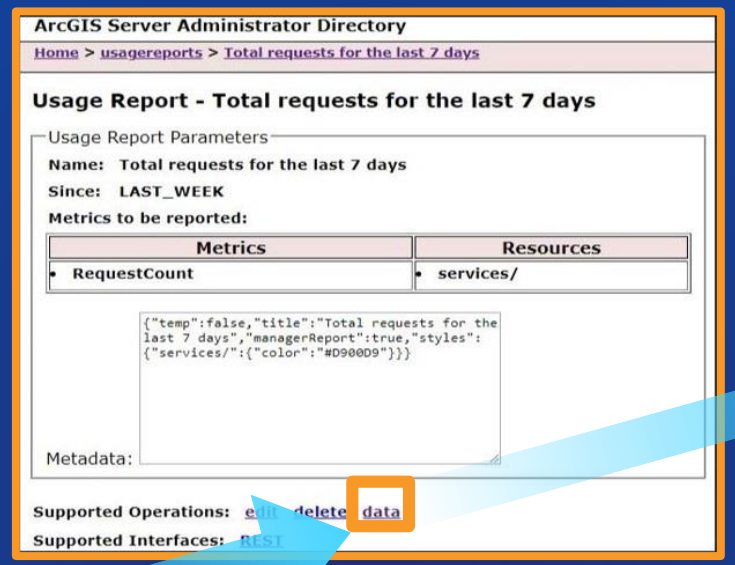


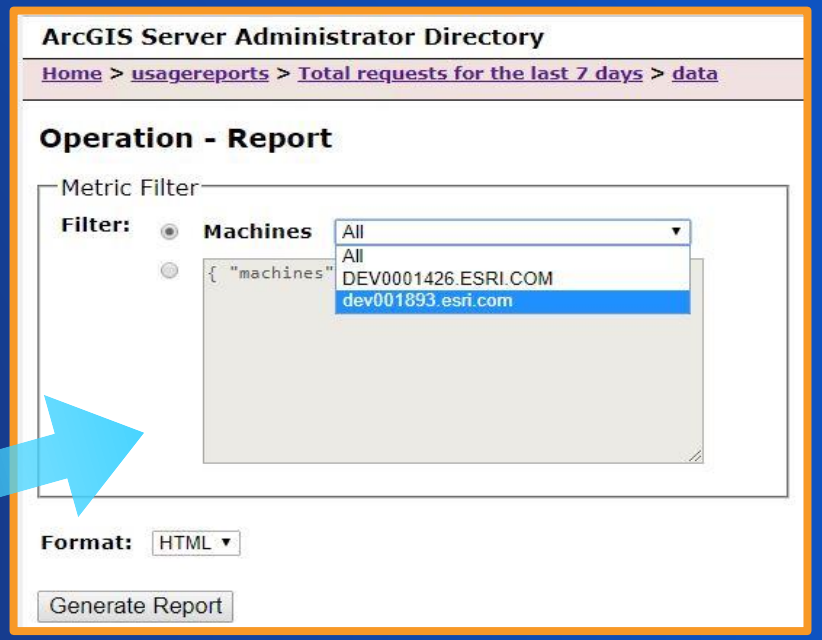
Statistics in ArcGIS Server Manager: Service, Folder, and Site-level statistics shown

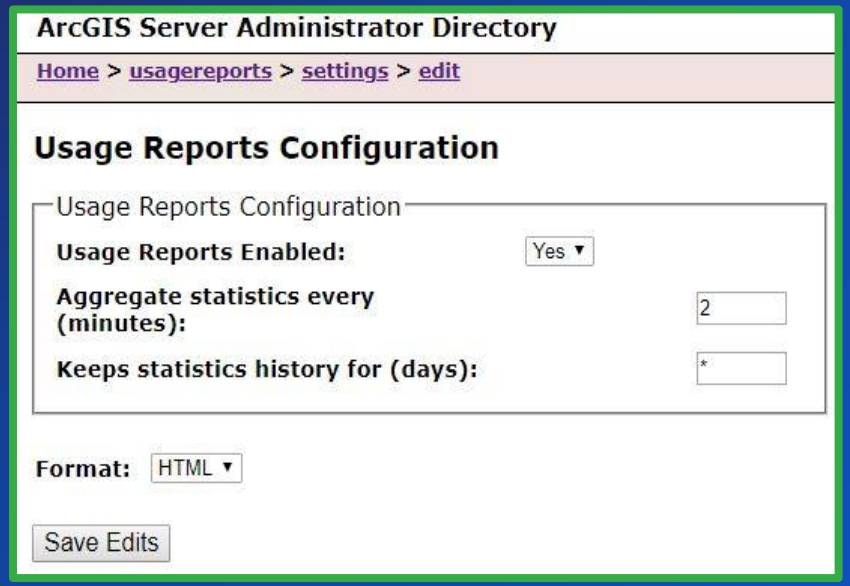
Advanced Enterprise Workflows: Monitoring

Usage Statistics in the ArcGIS Server Administrator Directory

Generate report
Edit Settings



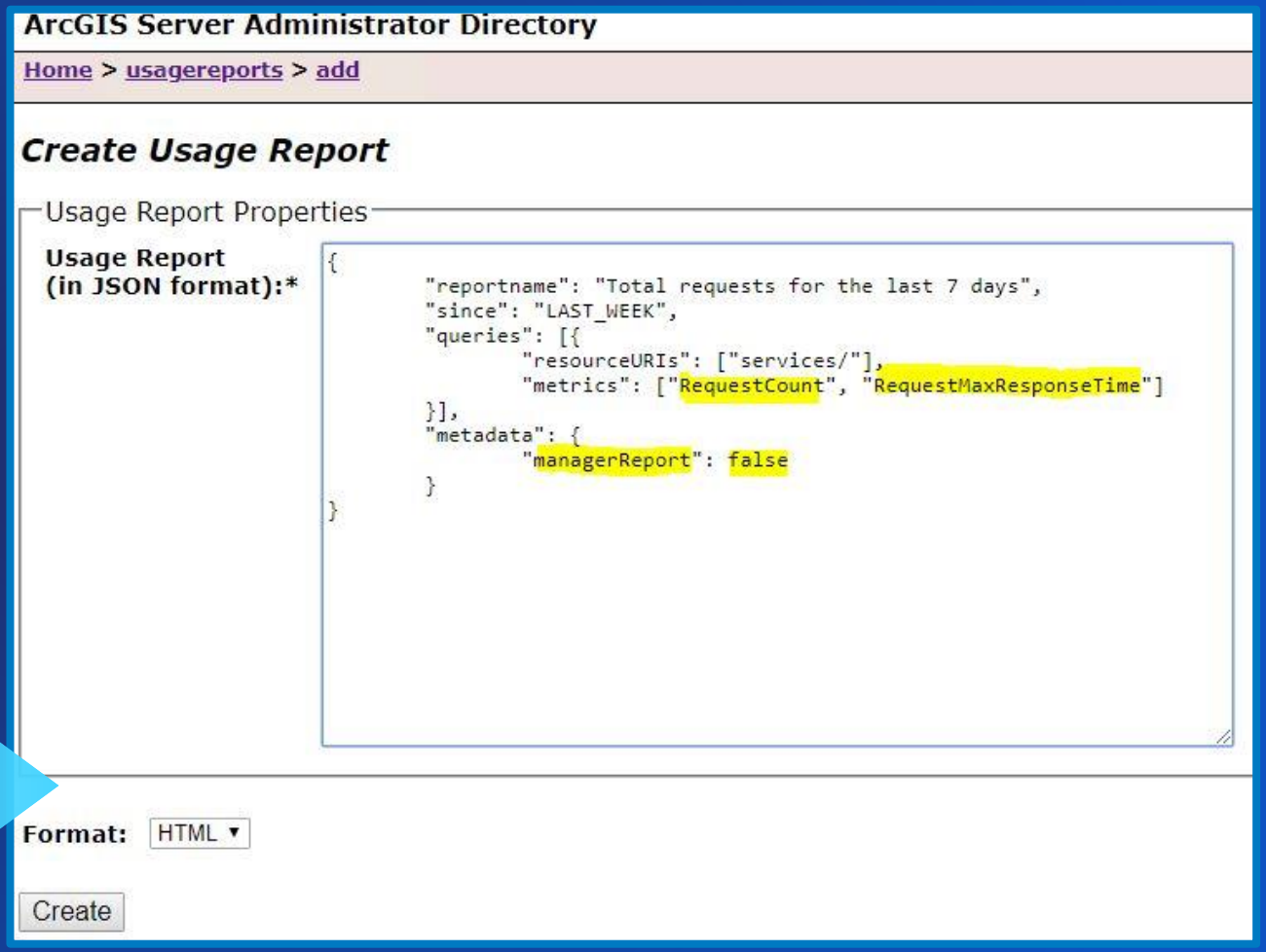




Advanced Enterprise Workflows: Monitoring

Create your own Multi-Metric Reports

- Not available in ArcGIS Server Manager



Advanced Enterprise Workflows: Monitoring

Request IDs

- New Request ID field in ArcGIS Server logs
  - Tagged with all log messages for REST and SOAP requests
- Track a specific request through its pipeline within the server
- Ability to query using Request ID
- Currently only available for service requests

Change the level of detail that the log messages are generated at by clicking Settings.

Log Filter: Fine Age: Last 24 Hours Source: All Machine: All Machines Query

Message	Source	Request ID
Extent:-188.543922,-20.785769,-56.640954,111.117198; Size:400,400; Scale:138584921.96	map_egdb_shared11.MapServer	0f3ff92b-68ca-478e-bd28-c276ec1333ec
Begin ExportMapImage	map_egdb_shared11.MapServer	0f3ff92b-68ca-478e-bd28-c276ec1333ec
REST request received. Request size is 120 characters.	map_egdb_shared11.MapServer	0f3ff92b-68ca-478e-bd28-c276ec1333ec
Wait time for 'map_egdb_shared11.MapServer' service request is 0 milliseconds.	Server	0f3ff92b-68ca-478e-bd28-c276ec1333ec
Request user: Anonymous user, Service: map_egdb_shared11/MapServer	Rest	0f3ff92b-68ca-478e-bd28-c276ec1333ec
HTTP Referer: Not Available	Server	0f3ff92b-68ca-478e-bd28-c276ec1333ec
REST request successfully processed. Response size is 377 characters.	Map_File_Shared_Pro11.MapServer	3181ef25-67ef-4931-9792-f3a936c2dc4c

ArcGIS Server Administrator Directory

Home > logs > query

Query Logs

Log Filter

Start Time:

End Time:

Level: FINE

Filter:

Log Codes

Process IDs

Request IDs: 60af6c96-8bff-4f94-ac7e-f2

Component: All

Service: All

Machines: All


```
{"codes":[],
"processIds":[],
"requestIds":["60af6c96-8bff-4f94-ac7e-
f29700e2e961"],
"server": "*",
"services": "*",
"machines": "*"}
```


Messages Per Page: 1000

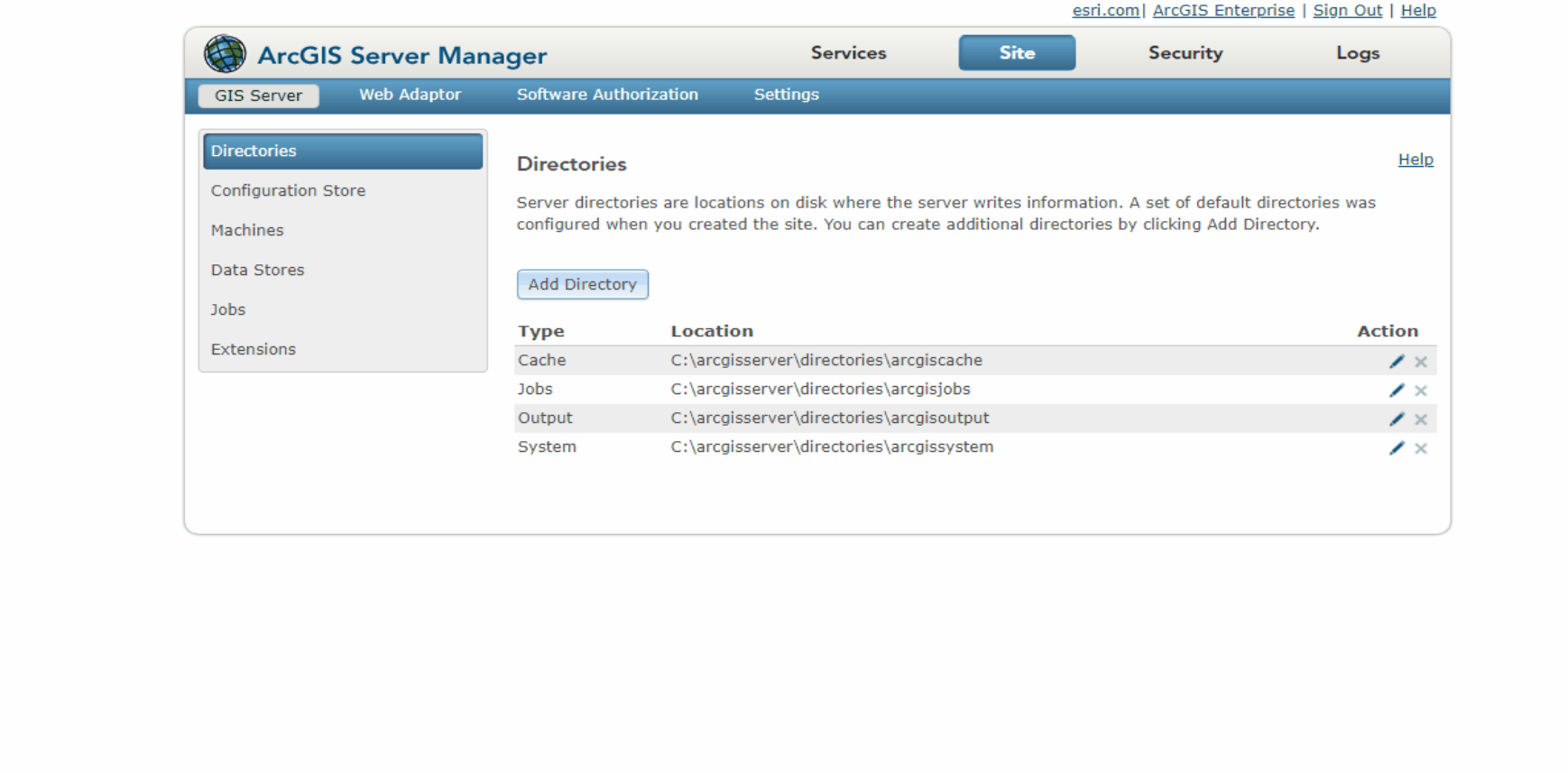
Format: HTML

Query

Advanced Enterprise Workflows: Monitoring

Job IDs – View and update status of Geoprocessing Jobs

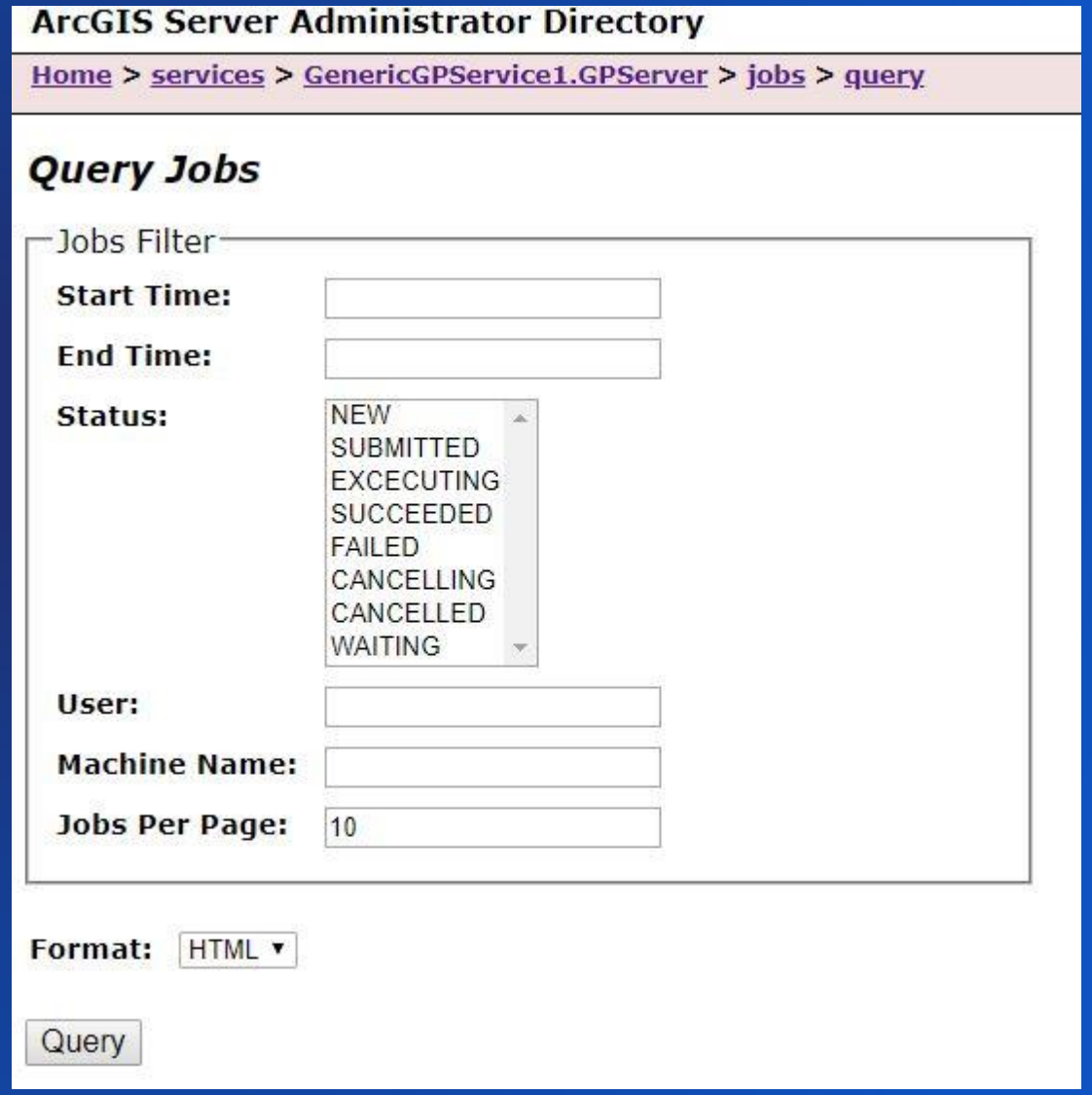
- View and update status of jobs for Asynchronous GP services.
- Filter by service, job status, duration, user, machine
- Get details for individual jobs
- Cancel and Delete jobs



Geoprocessing Job ID information in ArcGIS Server Manager

Advanced Enterprise Workflows: Monitoring

- View and update status of geoprocessing jobs.
  - View and update status of GP jobs

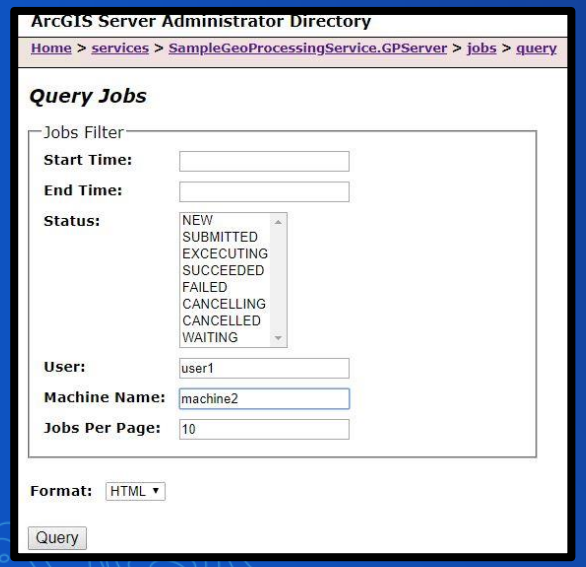


Advanced Enterprise Workflows: Monitoring

Viewing/Updating the Status of Jobs for GeoProcessing Services

- Example of UI in ArcGIS Server Administrator Directory

1. Query Jobs



2. Select Job ID

3. View Job Details and/or Perform supported operation

Advanced Enterprise Workflows: Monitoring

Additional Quick Tips for Monitoring your ArcGIS Enterprise

- Wait time information for ArcGIS Server-based GIS services
  - Viewable at FINE level in ArcGIS Server logs

FINE	Feb 4, 2019, 9:56:56 PM	Wait time for 'SampleWorldCities.MapServer' service request is 3 milliseconds.	Server

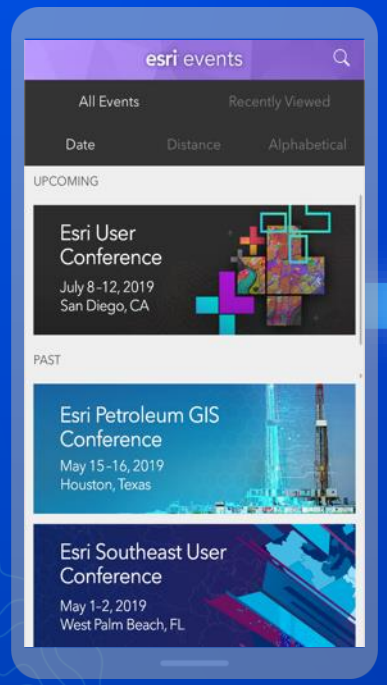
- Disk space monitoring for ArcGIS Server, Portal for ArcGIS, ArcGIS Data Store
  - Periodic WARNING messages in logs when an intermediate threshold is reached
  - Periodic SEVERE messages in logs when a critical threshold is reached
- Roll over of internal logs (ArcGIS Server, Portal for ArcGIS)
  - service.log
  - service_error.log
- INFO-level information about locks acquisition/release in ArcGIS Server logs
- Hardware information for ArcGIS Server available through REST API

Resources

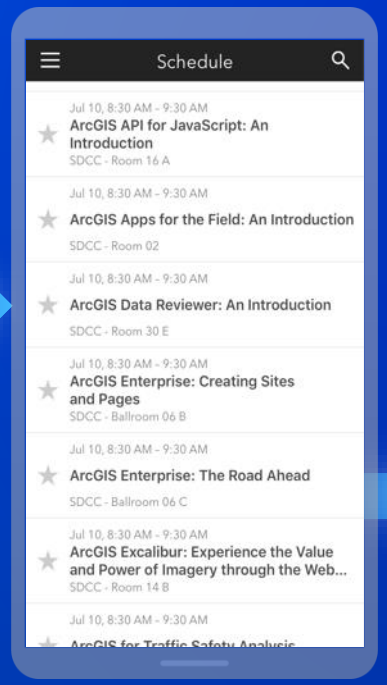
- Official Documentation: https://enterprise.arcgis.com
  - Helpful Sections:
    - Expand from one ArcGIS Server machine to multiple machines
    - Configure service instance settings
    - Administer a Federated Server
    - Work with server statistics
    - Work with server logs
    - “Common administrative tasks” section links
- Technical Support: https://support.esri.com
- Esri Showcase – ArcGIS Enterprise Area

Please Share Your Feedback in the App

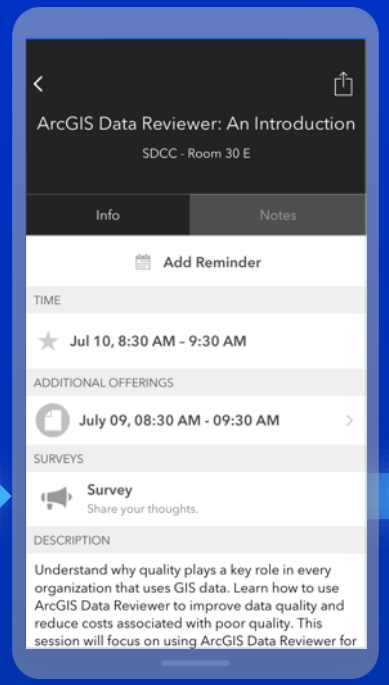
Download the Esri Events app and find your event



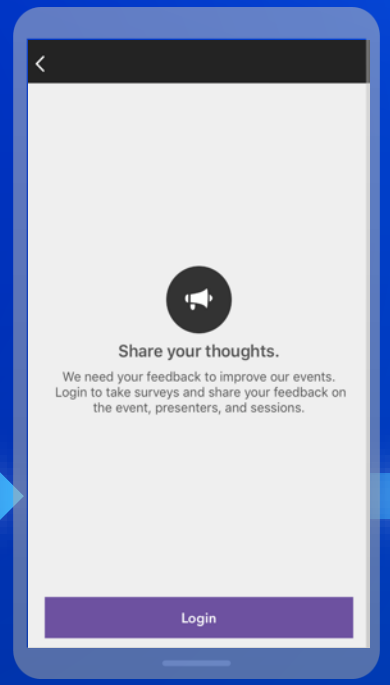
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



Complete the survey and select "Submit"