ArcGIS Enterprise: Advanced Topics in Administration

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Outline

• Overview: Base ArcGIS Enterprise Deployment
  - Key Components
  - Administrator Endpoints

• Advanced Workflows:
  - Expanding
  - Upgrading
  - Monitoring
  - Tuning and configuring services
ArcGIS Enterprise Overview
ArcGIS Enterprise Base Deployment, Key Components & Administrator Endpoints
ArcGIS Enterprise Base deployment Overview

- Four software components, one product.

- Each component has its own administrative endpoints.

- Supported on Windows and Linux
  - Windows examples used in this session, but also applies to Linux

- Supported on cloud deployments
  - Full support on AWS and Azure
ArcGIS Enterprise Base deployment overview

Steps to build:

1. Create the portal site
2. Create the ArcGIS Server site
3. Register the ArcGIS Data Store
4. Register the Web Adaptors
   - Portal for ArcGIS
   - ArcGIS Server
5. **Federate** ArcGIS Server with Portal for ArcGIS
6. Define the **Hosting Server**

Key Components:

- Installed Locations
- Content directories/Configuration Store
- Service Accounts
- Administrator Accounts
Key Administrator Endpoints

Portal for ArcGIS website
ArcGIS Server Manager
REST API Directories
Command Line Utilities
ArcGIS REST API Directories

ArcGIS Portal Directory
ArcGIS Server Administrator Directory

- Virtualized interfaces for the ArcGIS REST API
- Designed to help administer ArcGIS Enterprise programmatically
- Works with many scripting languages that can make HTTP requests

- Work with advanced system settings and properties:
  - Configuring certificates and other security settings
  - Unregister web adaptors
  - Import/Export for backing up site configurations
ArcGIS Enterprise
Administrative Endpoints

Portal for ArcGIS Website
- Organization settings, license and user management interface

Additional:
- Enterprise sites admin

Overview of Configurable Organization Settings available from the Portal for ArcGIS Website
ArcGIS Server Administrative Endpoints

- **ArcGIS Server Manager**
  - Web browser based administrative console
  - Pre-installed web services in System and Utilities folders
  - Site, Security, and Logs/Statistics information available

**Additional:**
- GeoEvent Server Manager
Command Line Utilities

- Found in the installation directories for:
  - Portal for ArcGIS
  - ArcGIS Server
  - ArcGIS Data Store

- Administer from batch files or command line

- Perform tasks such as:
  - Scan your portal and server for security best practices
  - Recover portal when no administrator accounts are available
  - Start and stop server-based services
  - Publish services from service definition (.sd) files
  - Back up or restore a server site configuration
Advanced Enterprise Workflows

Expanding
Upgrading
Monitoring
Tuning & Configuring Server-based Services
Advanced Enterprise Workflows

Expanding – Why expand, Ways to Expand, How
Upgrading
Monitoring
Tuning & Configuring Server-based Services
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 ways to expand)
  - Multiple Sites – Add further ArcGIS server sites
  - Multiple Machines – Additional machines to an ArcGIS 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
Advanced Enterprise Workflows: Expanding

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  - Multiple Machines – Additional machines on an existing server site
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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
Upgrading – Considerations & Recommended order of upgrades
Monitoring
Tuning & Configuring Server-based Services
Advanced Enterprise Workflows: Upgrading

Considerations before upgrading

- Take snapshots of your machines
- Make backups of your ArcGIS Enterprise:
  - Content directories for Portal for ArcGIS
  - Configuration store and content directories for ArcGIS Server
  - Content directories for ArcGIS Data Store
- Do not unfederate your Hosting server or other federated ArcGIS Servers

- Extensive documentation available on upgrading
Advanced Enterprise Workflows: Upgrading

Recommended order of Upgrades

1. Upgrade Portal for ArcGIS
2. Upgrade your Portal’s ArcGIS Web Adaptor
3. Upgrade ArcGIS Server
   a) In a multi-node ArcGIS Server site, it is recommended to upgrade one server at a time
4. Upgrade your Server’s ArcGIS Web Adaptor
5. Upgrade ArcGIS Data Store *Requires ArcGIS Server to be upgraded first*
   a) Relational
   b) Tile-Cache
   c) Spatiotemporal
Advanced Enterprise Workflows

Expanding
Upgrading
Monitoring – Enterprise Logs, Statistics, View Job Status, Quick Tips
Tuning & Configuring Server-based Services
Advanced Enterprise Workflows: Monitoring

ArcGIS Enterprise Logs: An Overview

- Audit, monitor and troubleshoot events in Enterprise.

- **Portal for ArcGIS logs**
  - Portal Administrator directory

- **ArcGIS Server logs**
  - ArcGIS Server Administrator directory
  - ArcGIS Server Manager UI

- **ArcGIS Data Store logs**
  - Primarily through ArcGIS Server Administrator directory

- **Levels** - SEVERE, WARNING, INFO, FINE, VERBOSE, DEBUG
  - Default – WARNING
  - DEBUG – only for troubleshooting. Not recommended in production for long periods.
Statistics: Overview of Usage Statistics in ArcGIS Server

- Useful tool included with ArcGIS Server for monitoring service usage
- Displays information such as:
  - Total number of requests
  - Avg. response times
  - Max response times
  - Timeouts
  - Count of running instances
- Allows GIS Administrators to:
  - Tune service instances
  - Identify peaks in usage
  - Perform capacity planning – make the case for more resources
  - Combine statistic information with logs for effective troubleshooting
Advanced Enterprise Workflows: Monitoring

Viewing usage statistics in ArcGIS Server Manager
- Found in “Logs” tab
- Statistics can be customized and exported as .CSV
Advanced Enterprise Workflows: Monitoring Usage Statistics in the ArcGIS Server Administrator Directory

Generate report
Edit Settings

ArcGIS Server Administrator Directory
Home > usagereports

Usage Reports

Usage Reports:
- 152960667990
- 1529697995548
- 1529698175094
- Max response times for the last 7 days
- Timed-out requests for the last 7 days
- Total requests for the last 7 days

Resources: settings
Supported Operations: add
Supported Interfaces: REST

ArcGIS Server Administrator Directory
Home > usagereports > Total requests for the last 7 days

Usage Report - Total requests for the last 7 days

Usage Report Parameters:
Name: Total requests for the last 7 days
Since: LAST WEEK
Metrics to be reported:
- RequestCount
- Resources

Metadata:

Supported Operations: add, delete, data

ArcGIS Server Administrator Directory
Home > usagereports > settings > edit

Usage Reports Configuration

Usage Reports Configuration
Usage Reports Enabled: Yes
Aggregate statistics every (minutes): 2
Keeps statistics history for (days): 
Format: HTML

Save Edits
Advanced Enterprise Workflows: Monitoring

Create your own Multi-Metric Reports
- Not available in ArcGIS Server Manager
Advanced Enterprise Workflows: Monitoring

Ability to View/Update the Status of Jobs for GeoProcessing Services

- Available in the ArcGIS Server Administrator Directory

Applications:

- Allows for greater control over what jobs are running on your system
- Ability to cancel lower priority jobs to save resources for higher priority ones

- View jobs for individual Asynchronous GeoProcessing Services
- Query by various fields:
  - Status
  - Duration
  - User
  - Machine
- Get details for individual jobs
- Cancel/Delete 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

ArcGIS Server Administrator Directory

Query Jobs

Job Filter
Start Time: [ ]
End Time: [ ]
Status: [ ]

User: [ ]
Machine Name: [ ]
Jobs Per Page: [ ]

Format: [HTML] [ ]
Query

Job

Job Details:
Job Id: jfc39f3f75e7c4677bc881186450a454d
Submitted Times: 2018-06-25T15:30:02
End Time: 2018-06-25T15:30:49
Status: esriJobSucceeded

Username: dev01093.esri.com
Url: [url]

Supported Operations: cancel delete
Supported Interfaces: REST

Total Jobs: 52
- jfc39f3f75e7c4677bc881186450a454d (status: esriJobSucceeded)
- jfc39f3f75e7c4677bc881186450a454d (status: esriJobSucceeded)
- jfc39f3f75e7c4677bc881186450a454d (status: esriJobSucceeded)
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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
- 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
Advanced Enterprise Workflows

Expanding
Monitoring
Tuning & Configuring GIS Services
Upgrading
Advanced Enterprise Workflows: Tuning and Configuring Services

Does not apply to Hosted Services

Helpful Configurations
- Parameters
- Capabilities
- Pooling
- Processes

Overview of Service Settings in ArcGIS Server Manager
Advanced Enterprise Workflows: Tuning and Configuring Services

Helpful Parameters

1. Time Zone
2. Number of Records Returned
3. Lock Database Schema
Advanced Enterprise Workflows: Tuning and Configuring Services

Helpful Capabilities
1. Depends on the service
2. Operations Allowed
Advanced Enterprise Workflows: Tuning and Configuring Services

Pooling Settings
1. Instance information
2. Service Timeouts

Processes
- Recycling Settings
Advanced Enterprise Workflows: Tuning and Configuring Services

Instances vs. ArcSOC.exe processes
- Instance: Handles requests to a specific service
- ArcSOC Process: An Operating System process, related to instance(s)
  - Default configuration: One instance per ArcSOC process
  - Service instances should be tuned depending on service demand

Can't find ArcSOC.exe information in Task Manager?
1. Open Task Manager, navigate to “Processes” tab
2. Add the field “Command line” to the processes view
3. The command line contains information about the corresponding service, such as service name
Advanced Enterprise Workflows: Tuning and Configuring Services

- Increasing the minimum instances running results in more ArcSOC.exe processes running
  - Improved response time
  - Increased RAM usage on ArcGIS Server machine

Viewing ArcSOC information from Task Manager for a service with 3 instances running
Advanced Enterprise Workflows: Tuning and Configuring Services

Example scenarios for service tuning

Scenario 1: High response times for services

**Potential Cause:** Not enough instances running to satisfy demand

**Steps:**
- Check statistics on the service for:
  - Usage spikes
  - Average response times
  - Max response times
- If service response times are too high, raise the number of instances
  - Minimum number of instances – More instances available for immediate requests
  - Maximum number of instances – Additional instances created
- Keeping the minimum number of instances low is recommended to lessen resource use
Scenario 2: Periodic system slowdown, some services unavailable in the mornings

**Potential Cause:** Large volumes of services spinning up instances at the same time

- For example:
  - 200+ services, each with default setting of 1 minimum instance
  - All services are recycled at the same time (12:00 AM by default)

**Steps:**

- Check statistics on the server for services which are not used heavily
  - These services can have their minimum instances set to 0
  - They will only spin up an instance when requested
- Stagger recycling times for services with 1 or more minimum instances
  - E.g. Have some services recycle at 12:00 AM, others at 12:30 AM, 1:00 AM, etc.
- If these steps do not help, consult the ArcGIS Server logs for further troubleshooting
Recommended Sessions **TODO**

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<th>WORKSHOP</th>
<th>LOCATION</th>
<th>TIME FRAME</th>
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<tbody>
<tr>
<td>• ArcGIS Enterprise: Architecting Your Deployment</td>
<td>• Where</td>
<td>• 12:00 – 1:00</td>
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<tr>
<td>• ArcGIS API for Python: Administering your WebGIS</td>
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<td>• ArcGIS Enterprise: Securing Content</td>
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<td>• ArcGIS Enterprise Security: Threat Mitigation and Prevention</td>
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<td>• ArcGIS Enterprise Security: Security Integration</td>
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<td>• Data Store Management Best Practices</td>
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<td>• ArcGIS Enterprise: Tuning and Scaling</td>
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<td>• Caching Maps and Vector Tile Layers: Best Practices</td>
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4. Complete answers and select “Submit”.

ArcGIS Earth: Introduction and Deployment
SDCC - Ballroom 6E-D

- Time: Jul 11, 8:30 AM - 9:30 AM
- Description: ArcGIS Earth has been built specifically to help more users in large enterprises access the value of their data in ArcGIS Enterprise and ArcGIS Online. This session will discuss the types of deployments that are being supported by ArcGIS Earth, how administrators can get users started quickly, and what types of enterprise data are accessible through Earth.

Feedback:
- Consistent with the title and description
- Well organized/clear presentation
- Public speaking skills
- Content was relevant to my work
- Workshop provided information or techniques I can apply to my work right away