ArcGIS Enterprise: Sharing Imagery

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Imagery and Raster team
ArcGIS Enterprise: Sharing Imagery

• PowerPoint slides will be available online.
• Send me an E-mail – if you need it faster: zzhou@esri.com

• Today’s topic: Sharing imagery in ArcGIS Enterprise environment.
  - Keywords:
    - ArcGIS Enterprise and sharing imagery
    - ArcGIS Enterprise’s Federated Servers
    - ArcGIS Enterprise’s Raster Analysis Server
    - ArcGIS Enterprise’s Image Hosting Server
    - Raster Analysis Server’s / Image Hosting Server’s Raster Data Store
    - Hosted image service vs. non-hosted image service
    - Federated server vs. non-federated server
Imagery in ArcGIS – server side

- ArcGIS supports image data management from many sources
  - Over 100 native image formats
  - Over 60 different sensors supported
    - Satellites
    - Aerial cameras
    - UAV/UAS cameras
    - Scientific data NetCDF/GRIB/HDF

- Thermal
- Radar
- Full Motion Video (FMV)
- LiDAR
- Multi-Spectral
- Panchromatic

Satellite
Aerial
Imagery in ArcGIS – client side

- Clients for shared imagery
  - ArcGIS Desktop/Pro
  - ArcGIS Portal/AGOL web mapping apps
  - ArcGIS Mobile apps
  - Customized apps and extensions built upon Image Server REST API, ArcGIS Python API, ArcGIS JavaScript API, ArcGIS Runtime SDKs…
Imagery licensing in ArcGIS Enterprise

• The imagery sharing capabilities of an ArcGIS Enterprise are determined at the ArcGIS Server tier:
  - ArcGIS Server without an Image Server License
    - Sharing single images
  - ArcGIS Server with an Image Server License
    - Sharing mosaic datasets with extended capabilities
    - Sharing image collections
    - Sharing hosted image services/layers
    - Supporting powerful distributed raster analysis and orthomapping services
ArcGIS Enterprise with Raster Analysis and Image Hosting capability

- Portal
- Federated Server 1
  - Hosting Server
- Federated Server 2
  - Raster Analysis Server
- Federated Server 3
  - (optional)
  - Image Hosting Server
- Federated Server N
  - (optional)

- Cloud storage
  - (Azure, S3...)
- File share storage
- Raster Data Store for storing CRFs

ArcGIS Desktop/Pro
Webmap
What is image hosting? Hosted image service? Hosted imagery layer? ...

• Definition:
  - “Hosting” means the imagery data is managed directly by ArcGIS Enterprise. Specifically, the data is stored in the raster data store of the Raster Analysis server (or Image Hosting server if it exists). If the hosted imagery layer item is deleted, the underlying hosted image service and hosted imagery data inside the raster data store will be deleted at the same time.
### “Hosted” vs “Non-hosted” Imagery Layer

<table>
<thead>
<tr>
<th>Hosted Imagery Layer</th>
<th>Non-hosted Imagery Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corresponding image service will be created at “Hosted” folder automatically.</td>
<td>Corresponding image service will be created outside server’s “Hosted” folder.</td>
</tr>
<tr>
<td>Corresponding image service will only be created at the raster analysis server. (or image hosting server if such server is federated with portal)</td>
<td>Corresponding image service can be created at any federated server at publisher’s choice.</td>
</tr>
<tr>
<td>Requests for corresponding image service will be processed through raster rendering system service. As a tenant service, it has no dedicated server instance.</td>
<td>Requests for corresponding image service will be processed through each dedicated individual server instance.</td>
</tr>
<tr>
<td>Underlying imagery data is stored at raster data store registered with the federated server.</td>
<td>When published “by-ref”, data is stored at the reference path registered; When published “by-val”, data is stored at the server system input directory for the service.</td>
</tr>
<tr>
<td>Underlying imagery data will be .crf format only.</td>
<td>Underlying imagery data format persists.</td>
</tr>
<tr>
<td>When the imagery layer item is deleted, the data stored at raster data store is deleted too.</td>
<td>When the imagery layer item is deleted from portal, it will depend on server tier how the data is handled.</td>
</tr>
</tbody>
</table>
Sharing imagery as hosted imagery layer

- Upload Image Collection to ArcGIS Portal and publish as hosted Imagery Layer.
  - Requires one of the portal federated servers acts as Raster Analysis server.
  - Mosaic the collection of imagery to a single Imagery Layer.
  - Limited by Portal file upload size.
    - 1 GB through a web browser.
Sharing imagery as hosted imagery layer – Raster analysis portal UX
Sharing imagery as hosted imagery layer – Orthomapping portal app UX
Sharing imagery as non-hosted imagery layer – by value

- **Share by Value**

  - Imagery will be copied to the ArcGIS Server “directories” folder as service input.
    
    e.g. 
    C:\arcgis\arcgisserver\directories\arcgissystem\arcgisinput\myServiceName.ImageServer

  - Data will be converted to file geodatabase mosaic dataset or raster dataset if source data is in enterprise geodatabase.

  - **NOT** recommended for large image collections and datasets.
Sharing imagery as non-hosted imagery layer by reference

- **Share by Reference**
  - Register a folder type data store for:
    - File geodatabase raster or mosaic datasets
  - Register a database type data store for:
    - Enterprise geodatabase raster or mosaic datasets
  - Data will not be moved.
  - Recommended for publishing mosaic datasets or large single raster datasets.
Sharing imagery in the cloud

- Imagery in the cloud storage
  - Supported cloud storage platform: Azure, Amazon, Alibaba, and Huawei as cloud raster store
  - Convert image to cloud raster format (CRF) then upload to cloud
  - Create portal hosted image service using “CreateService” REST API
  - Update hosted image service
Sharing imagery in the cloud

- Alternatively use Meta Raster Format (MRF)
  - Optimize raster custom tool: https://github.com/Esri/OptimizeRasters
  - Creating proxy MRF file referencing to actual imagery data in the cloud
  - Create mosaic dataset, add MRF, then publish mosaic dataset as image service
Demo Time

1. Sharing an imagery layer item from a non-federated server
2. Sharing an non-hosted imagery layer item by value/ref
3. Sharing a hosted imagery layer item by uploading image collection
4. Sharing a hosted imagery layer item by running Raster Analysis
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