Managing Imagery using Mosaic Datasets and Image Services

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Agenda

• Introduction
• Managing Imagery
• Sharing Imagery
• Imagery in the cloud
• Summary
• Questions
ArcGIS Provides a Comprehensive Imagery Platform

Seamless integration and analysis of imagery with all spatial data

A scalable platform for working with all forms of imagery (drone, aerial, and satellite) to create valuable information products, integrated with GIS.
Imagery content on the Living Atlas

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Image Modalities

• Platforms: Satellite, Aerial, Drone, Terrestrial
• Sensors: Camera (Pan, Multispectral, Hyperspectral), Lidar, Radar, Bathymetric...
• Levels of Imagery
  - Static Cache (Backdrop)
  - Preprocessed (GIS Ready) – Orthos, Elevation, Categorical, Scientific, ..
  - Raw (Unprocessed) – Directly from Sensor

• Data Structure: Bands, Bits, Tiling, Pyramids, NoData
• Format: TIF, NITF, HDR, GRIB, MrSID, IMG, JP2, ...
• Compression: Lossless, Lossy, Limited Error
• Georeferencing: Extent, SRS, RPC, Orientation Angles, ...
• Metadata: Acquisition Data, Color Map, Source, Copyright, ...
Managing Imagery
Mosaic Dataset
What is a Mosaic Dataset?

ArcGIS Imagery Information Model

- Catalog of
  - Imagery
  - Associated metadata
  - Processing to be applied
- Stored in Geodatabase
- Authored using ArcGIS for Desktop
- Enables
  - Dynamic Mosaicking
  - On-the-fly processing
Image Management Using Mosaic Datasets

The optimum model for managing large image and raster collections

- Support multiple sources and modalities
- Support multiple metadata formats
- Support multiple formats
- Maintain Image quality
- Handle overlapping and disparate datasets
- Support over 50 Raster (Sensor) Types
- Support Rich Web services (Image Services)
Ways to Create Mosaic Datasets

- Context Menu
- Geoprocessing Tools
  - Data Management Tools / Raster / Mosaic Dataset
- Model Builder
- Ortho Mapping
- Imagery Workflows
- MDCS
Creating Mosaic Dataset In ArcGIS Pro

- Create GeoDatabase (File or Enterprise)
- Create Mosaic Dataset
- Add Rasters
  - Define Raster Type
- Set Properties
- Enhance
- Build Overviews
Add Rasters

- Crawls for specific images
- Out of the box Raster Types
  - Python Raster Types
Structure of a Mosaic Dataset

- **Group Layer with:**
  - Footprint – Extent of each raster + Key Properties + Metadata as attributes
  - Boundary – Extent of mosaic dataset
  - Image – Rendering of data after applying processing and mosaicking
  - Seamlines – Optional, geometry for more advanced blending
Mosaic Dataset Properties

- General
  - General properties
- Defaults
  - Direct use of Mosaic Dataset
  - When Published
  - Sets some limits on Publishing
Overviews

• Like pyramids for the Mosaic Dataset
• Used for faster access at small scales
• Optional - If not created blank at small scales
• Consider adding smaller scale imagery instead
Mosaic Dataset – Processing items

- Initial Raster Function Chain defined by Raster Type
- Function can be applied differently to each raster
- Use
  - Raster Item Explorer
  - Batch Edit Raster Functions
Mosaic Dataset – Processing mosaic

- Apply functions on mosaic dataset
  - Changes mosaic dataset
- Attach functions
  - On demand
  - Many
Create a Mosaic Dataset

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Sharing Imagery
Image Service
Sharing Imagery in ArcGIS

• Share a Single Raster as Image Service
• Share a Mosaic Dataset as Image Service
• Generate and Share a Tile Cache on Enterprise
• Generate and Share a Tile Cache on ArcGIS Online
• Run Raster Analytics and create a persisted product
Sharing Imagery

- **Share by Value**
  - Imagery is copied to the ArcGIS Server configuration store
  - Data will be converted into File Geodatabase
  - **NOT** recommended for large image collections
Sharing Imagery

- Share by reference
  - Register a file share and/or enterprise geodatabase(s) with the server data store
  - Data is not moved
  - Recommended for publishing mosaic dataset or large single images or large single raster data
Tile Layers

- **Simple Background for Visualization**
  - Only RGB 3Band
  - Single mosaicked image
  - No Enhancement, No Processing,

Cuts image into very large number of small tiles
Each tile 256x256 pixels
Multiple Levels, factor 2
Compressed as JPEG and or PNG
JPEG compression quality
In Defined projection (Mostly WebMercator Aux Sphere)
No Size Limit
Stored as Compact Cache format
Create and Publish Tile Cache from ArcGIS Pro

From Contents Pane
Sharing Mosaic Datasets
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Imagery in the Cloud
ArcGIS Image Server in the Cloud

• Advantages
  - Lower cost resilient storage
  - Lower cost enterprise compute
  - Simpler install
  - Simpler scalability

• Disadvantages
  - Data needs to be uploaded
  - Different storage types
  - Infrastructure changes
  - Potential security concerns
  - Potential for complex data access policies
Scaling to the Cloud

- **Difference of the Cloud**
- **Data Formats / Structure** - Consider
  - **Tiling** – Enable faster random access
  - **Pyramids** *(Overviews or RRDs)* – Enable faster access a lower resolutions
  - **Compression** – Reduces storage and transmission
  - **Metadata access**
Summary

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Questions
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