Map Caching in ArcGIS for Server
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Schedule

• Planning and building a cache
• Architectures for caching
• Caching in the cloud

• We will hold periodic breaks for questions
Demo of caching with ArcGIS

- CachingTools geoprocessing service
- Defining cache properties
  - Build automatically or manually
  - Min and max cached scales
  - Image format
- Calculating cache size
- Asynchronous caching
- Real-time cache status updates
- Viewing job status and fixing problems
- Visualizing cache creation over time
Short break for questions
Architecture for caching and cache updates
Clusters allow you to isolate cache creation

ArcGIS Server Site

Cache cluster

Map service cluster

Cache folder

Cache cluster can scale out while the cache job is running
Update a cache using a staging server

Staging ArcGIS Server Instance

Map service

All layers for cartography of map service

Production ArcGIS Server Instance

Layers for TOC and Query

Map service

Cache folder

(On-demand caching needs the full map to build the cache)
Cache update strategies

- Rebuild the entire cache
  - Size of cache
  - Time to cache
- Rebuild specific tiles
  - Rebuild at specific scales
  - Rebuild areas based on change detection
Cache Update Automation

- Use Model Builder to script Cache Update Automation
  - Rebuild Specific Tiles
  - Export to Python
  - Schedule Run Time

Compare feature classes
Show edits since reconcile
How much of a cache should you generate?

- **Cache by feature**
  - Geographic elements
  - Generates tiles for intersecting supertiles

- **Saves on…**
  - Generation time
  - Processor resource
  - Disk usage

*NM highway case study:*
Build 20 of 64 supertiles for the bundle shown
Pre-create coupled with cache on demand

- Pre-create high use areas
  - Population centers
  - Parks, roads, attractions

- Features
  - Cover popular extent
  - Generate key tiles
  - All others generated on demand
Handling tiles you do NOT create

- Create “No Data” tile
  - Same image format (JPG or PNG)
  - Same size (256 x 256)
  - Save in cache folder
    …\<dataframe>\_alllayers

- Knowledge base article [36939](#) has sample files
Other caching techniques

- Image Services
- ArcGIS Online
- Tile Packages
- Multiple tile servers
What is image service caching

- Fast access to images as a tiled service
  - Outperforms / scales mosaic dataset and raster dataset
  - Imagery is not processed on the fly
- Uses image extension
Image resolution and cache scales

- ArcGIS Server chooses the optimal scales for Imagery
  - ArcGIS will not exceed raster resolution
- Neither should you!
  - ArcGIS Server resamples imagery exceeding raster resolution
  - ArcGIS Desktop zoom to raster resolution
- Scale based on 96 DPI

\[
\text{Scale (Ft)} = \left( \frac{x}{12} \right) \times 96 \\
\text{Scale (m)} = \left( \frac{x}{0.0254} \right) \times 96
\]

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Choosing the best image format

• Large number of continuous colors
  - JPEG (start with quality = 55)
  - Mixed (if transparency required)

Which one looks better?

JPEG 96 – 25KB

JPEG 96 – 30KB
Why should I cache image services

- Improved performance for basic images
  - Can not modify mosaic methods
- Skip overview generation
  - Tiles generate from large scales to small scales
- Improve performance for slow formats
  - Recommended for highly compressed formats – e.g. JPEG2000, MrSID
- Caching image services is much faster than caching map services with imagery
  - Faster rendering engine for imagery
Building an image service cache

1. Prepare Mosaic Dataset
2. Share as Image Service
3. Setup Image Service Parameters
4. Create tiles
Switching to a Dynamic Request

• Supported by Map and Image Services & the Web API’s
• Force a Cached Service to Render Dynamic
  - Use ArcGISDynamicMapServiceLayer(Cached Service URL)
• Render cached tiles from smaller scales levels 0 – 15
• Render dynamic services at larger scale levels 16 – 19
  • Large scales = less area to draw features = faster
Caching in ArcGIS Online

- ArcGIS Online subscription allows for caching
- No need to worry about capacity
- Charged by tile creation and storage
- Two approaches
  - Upload data to AGOL
    - Build and store cache with AGOL
  - Upload tile package to AGOL
    - Build cache on premise but store with AGOL
- Understanding credit usage: [http://www.esri.com/software/arcgis/arcgisonline/credits](http://www.esri.com/software/arcgis/arcgisonline/credits)
Why create a tile package?

- Local cache for Desktop and Runtime applications
- Transport a map cache
- Upload a map cache to ArcGIS Online
Creating a tile package

- **ArcMap Options > Sharing > Enable ArcGIS Runtime tools**
- **Two options for creation**
  - Create tile package within ArcMap
    - Single processor
    - File > Share As > Tile Package
  - Create cache with server
    - Tile Cache > Export Tile Cache
      - Uses Parallel Processing Factor Geoprocessing Environment setting
Using multiple domains

- With multiple services
  - Use a different domain for each service
- With one service
  - API’s support multiple web services endpoints for a single layer

```javascript
var layer = new esri.layers.ArcGISTiledMapServiceLayer(
  "http://www.mydomain.com/ArcGIS/rest/services/myservice/MapServer",
  { tileServers: [
    "http://cache1.mydomain.com/ArcGIS/rest/services/myservice/MapServer",
    "http://cache2.mydomain.com/ArcGIS/rest/services/myservice/MapServer"
  ]
});
```

- Use with small cache tiles
- Can reduce browser caching and result in more HTTP connections
Thank You

• Please fill out session survey
• Offering ID: 262

• Questions?