Designing and Using Cached Map Services

Tom Brenneman & Eric Rodenberg
What’s covered in this session

• Agenda
  - Why cache maps?
  - Map cache best practices
  - Map cache administration
  - Caching in the cloud
Why Cache Maps
Understanding caching concepts
Why cache maps?
What should you cache?
How do you make a map cache?
Choosing image formats

• Let the ArcGIS Service Editor choose for you!
  • Vector only caches (few colors)
    • PNG (auto selects bit depth)
  • Vectors only caches (many colors)
    • PNG (auto selects bit depth)
  • Imagery
    • MIXED with 55 quality
  • Vectors or labels + Imagery
    • MIXED with 90 quality
Does Compression really make a difference?

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

Which one looks better?

- JPEG 96 – 25KB
- JPEG 96 – 30KB
Does antialiasing make a difference?

- High quality line/label rendering on vector maps
- Web standard (Google, Bing, AGOL)
- Takes LONGER to cache
Map caching
best practices

Strategies and techniques
Understanding cache structure

- **Bundle**: 8 x 8 Supertiles
- **Supertile**: 16 x 16 tiles
- **Standard tile**: 256 x 256 pixels
- Total tiles: 16,384
Supertiles and Labeling

- ArcGIS Server Draws Large Areas
  - Reduces duplicate labels
- Duplication May Occur
  - Use Annotation or MapPlex Labels with Rules
  - Use Map Server Cache Tiling Scheme To Polygons
You don't need to generate everything

- Cache by feature
  - Polygon features
  - Generates all tiles for intersecting supertitles

- Saves on...
  - Generation time
  - Processor resource
  - Disk usage

NM highway case study:
Build 20 of 64 Supertiles for the bundle shown
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

- How to
  - Knowledge base article [36939](#) has sample files
Build a test cache and note the following

- Creation time
- Appearance
- Client performance
- Cache size validation
Tracking cache status & fixing errors

- Status.gdb
- CacheStat
- JobDetails
- JobStatus
- TaskStatus

- Report Errors...
- Fix Errors
- Export Errors to File...
- Details...
DEM0

Recovering from cache failure
Map cache administration

Generate and update techniques
Setting the Number of Instances

- Cache Tools Geoprocessing Service
  - Start with N
  - N = CPU’s per server
  - See cloud session for Amazon recommendations
System caching services

- **System services**
  - **Caching Tools**: Sets caching instance per machine
  - **Caching Controllers**: Assign cache jobs to instances

- **Manage Map server Cache Tiles**
  - Controls instances per job
  - Set to -1 to use all instances
Update a cache using a staging server

Staging ArcGIS Server Instance

- Map service
- All layers for cartography of map service

Production ArcGIS Server Instance

- Map service
- Layers for TOC and Query

Cache folder

(On-demand caching needs the full map to build the cache)
Isolate caching to certain servers

- Organize GIS Servers into Clusters
  - Generate Cache on its own cluster
  - Scale or reconfigure while caching

![Diagram of ArcGIS Site and Caching Clusters](image-url)
Cache update automation

- Use Model Builder to script update automation
  - Rebuild Specific Tiles
  - Export to Python
  - Schedule Run Time

- Useful update tools
  - Compare feature classes
  - Show edits since reconcile

- See demo theater
  - Automating Cache Workflows and Building Tile Usage Heat Maps
Cache export & import tools

- **Export tiles**
  - Based on extent or polygon features
  - Convert storage format
  - Use for cache import or as a disconnected cache

Import from a previously exported map cache.
Caching in the Cloud

ArcGIS Online Map Caching
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 premises (ArcMap) but store with AGOL
- Understanding credit usage:
  http://www.esri.com/software/arcgis/arcgisonline/credits
Why create a tile package?

- Local cache for Desktop, Runtime and productivity applications (Collector)
- Transport a map cache
- Upload a map cache to ArcGIS Online
Creating a tile package

• ArcMap Options > Sharing > Enable ArcGIS Runtime tools
• Three options for creation
  - Create tile package within ArcMap
    - Single processor
    - File > Share As > Tile Package
  - Create Cache with ArcMap & Geoprocessing
    - Parallel Processing
    - Data Management > Tile Cache Toolset
      - Manage Tile Cache
      - Export Tile Cache
  - Create cache with ArcGIS Server
    - Tile Cache > Export Tile Cache
      - Uses Parallel Processing Factor Geoprocessing Environment setting
ArcGIS Online Caching
Indiana State Fairgrounds Example Credit Usage

- ArcGIS Online Tile storage = 1.2 credits per 1 GB per month
  - 1 Credit is 10 cents or less
- This cache = 8.91 MB
- Credits per month
  - 8.91 MB / 1024 MB * 1.2 Credits
  - 0.01044 Credits * 10 = 0.1044 Cents
- 0.1044 cents per month * 12 months = 1.25 cents per year

- ... In 20 years this cache will cost a quarter
Related Caching Sessions

- **Caching Imagery using ArcGIS**
  - Room: Ballroom 06 D
  - Tuesday, July 15, 2014 3:15PM – 4:30PM

- **Automating Cache Workflows & Building Heat Maps of Tile Usage**
  - Room: Demo Theater – Web & Server GIS Exhibit Hall C
  - Wednesday, July 16, 2014 12:30 PM – 1PM & 2:30 PM – 3PM
Thank you...

- Please fill out the session survey:

  First offering ID: 1115  
  Second Offering ID: 1345

Online – [www.esri.com/ucsessionsurveys](http://www.esri.com/ucsessionsurveys)  
Paper – pick up and put in drop box
Understanding our world.