

Esri Federal GIS Conference

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esri.com/fedcon



Imagery Management and Analysis in ArcGIS 10

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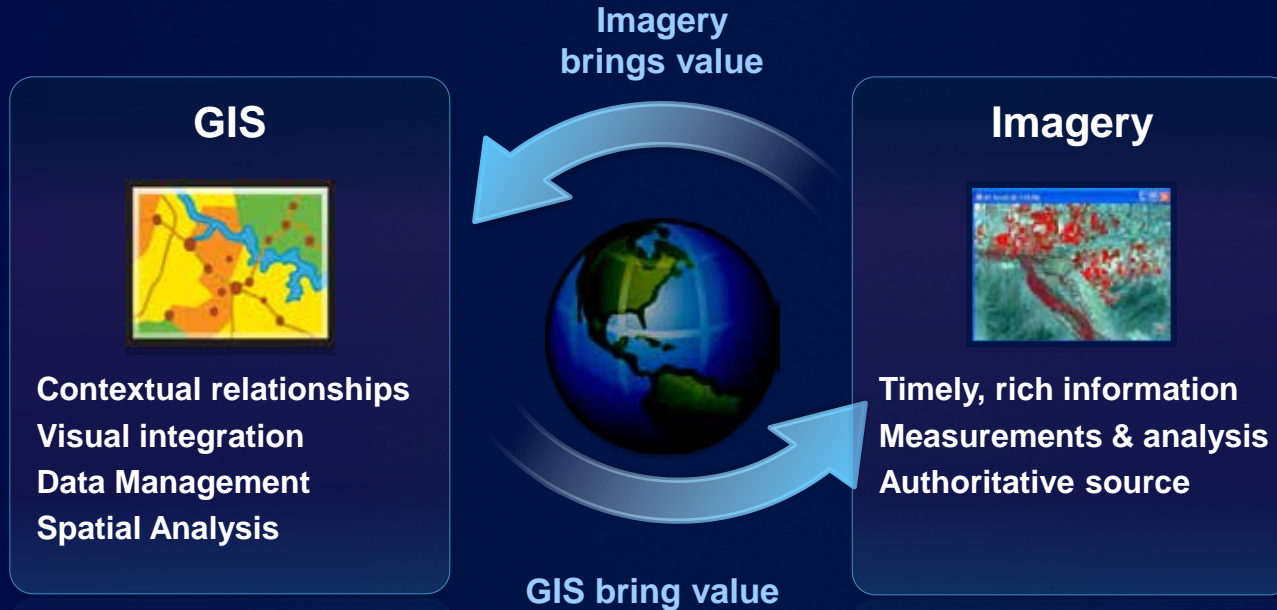
ArcGIS 10 — A Complete System

Easier
More Powerful
and Everywhere



Deriving Value from GIS and Imagery

Capabilities have evolved along separate but parallel paths



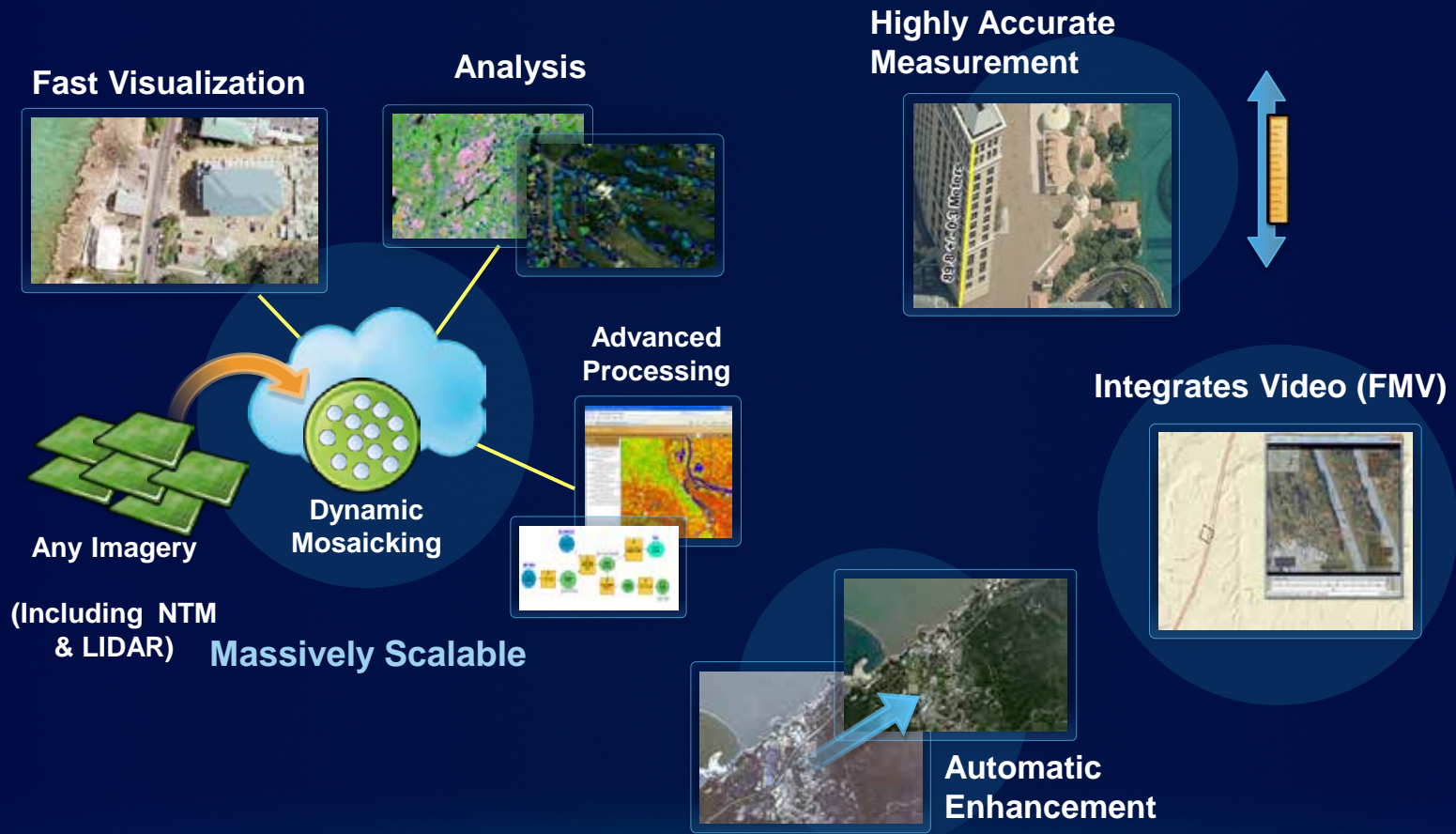
Barriers to integration have fallen

Earlier integration and use brings maximum value

Opportunities to improve this pattern...

ArcGIS Is A Powerful Platform For Imagery

Management, Analysis, Visualization and Dissemination



Simplifies Workflows and Automates Processing

What This Means To Me

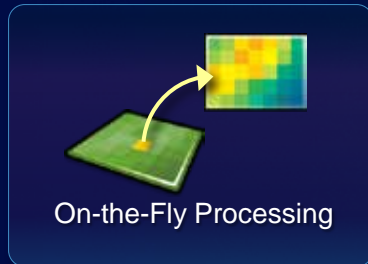
Optimizing the Value and Use of Imagery



Reduces the 'Time To Use' Problem

Direct from the sensor

Dynamic rendering

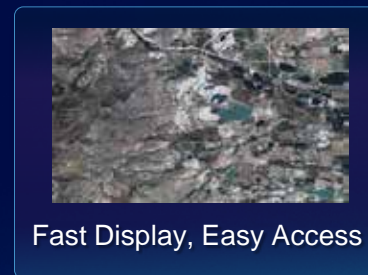


Reduces Resource Requirements

One copy of raw images

Multiple image services from raw images

Analysis using dynamic image service



Improves Productivity

Accelerated display

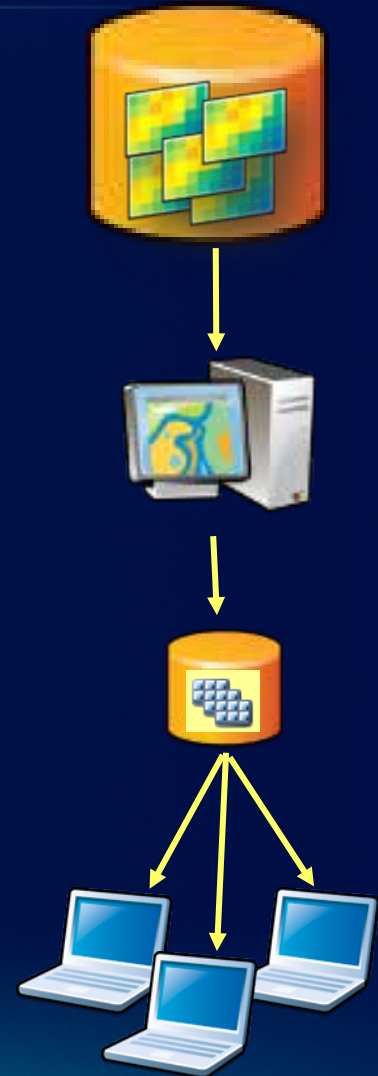
Image Metadata and indexing for easy access

A Complete Platform for Geospatial Analysis

What is an ESRI Mosaic Dataset?

- **Catalog / Library of**
 - Imagery and rasters
 - Associated metadata
 - Processing functions to be applied
- **Stored in Geodatabase**
 - Only Mosaic file, not Imagery!
- **Authored using ArcGIS Desktop**
- **Dynamic Referencing and Processing**

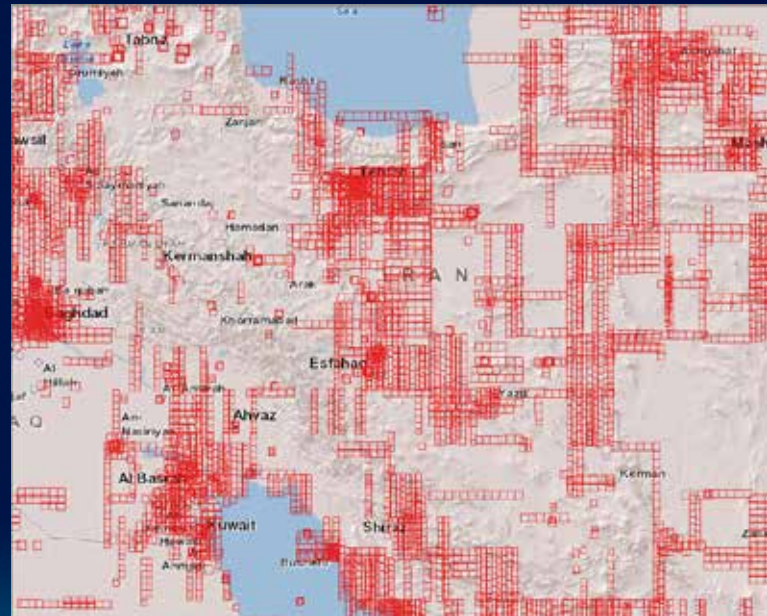
****Classic Mosaic is one large fused product**



Mosaic Dataset (Dynamic Abilities)

Optimum Model for Image Data Management

- **Quickly Catalog**
 - All raster datasets
 - Different Sensors and Types
- **Define**
 - Metadata
 - Processing to be applied
 - Default viewing rules
- **Access**
 - **As Image Service**
 - Desktop
 - Web Viewer\
 - 3rd Party Software



Dynamic Radiometric Processing

- Extract / Stack Bands
- **Stretch**
- Image Algebra, NDVI
- Classify
- Colormap
- Convolution Filter
- PanSharpen
- Histogram
- Elevation Visualization
- Hillshade
- Slope

Org.



Enh.



Shadow
Detail

When to Use the Mosaic Dataset / Image Service?

- When you:
 - Have multiple images
 - Do not wish to pre-mosaic or pre-process
 - Need different image products
 - Exploit overlap (i.e. temporal)
 - Want image specific metadata
 - Fast authoring and updates
 - Accessed by multiple clients and locations



Accessing Imagery through ArcGIS Server

As Direct, Static or Dynamic

ArcGIS Desktop: Full function GIS & Imagery

- All Dynamic Capabilities
Mosaic Method, Bands, Time



Web APIs: Web accessibility / Dynamic

- SOAP/REST – JavaScript, Silverlight, Flex
- Static Internet Layers
- Image Services



ArcGIS Explorer: Limited Dynamic

- Dynamic Mosaic Method



Open Interoperability/Standards: Static

- WMS, WCS, KML



Demonstration

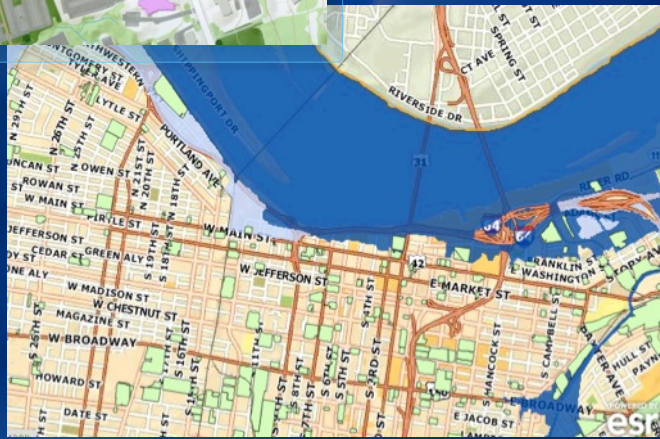


Image Service Vs Map Service

Image Service	Map Service
Used in Visualization or mathematical analysis and processing	Visualization only
Provides True Pixel / Data Values	Provides “Picture of a Picture”, where the values are stretched “RGB” values, not necessarily raw data
Contains image metadata -Sensor Information -Security Information -Etc....	No sensor metadata
Can display mosaiced images of the same location over different times	Display single flat layer – what’s on top stays on top

Imagery in Web Applications

Should I Use a Cached Map Service or an Image Service?

- The answer...it depends on the purpose of your application...
- If imagery is only for visualization, with moderate to high amounts of traffic, you should use a cached map service.
- If you want to expose analysis and manipulation of the imagery, use an image service.

Imagery in Web Applications

Other Factors to Consider

- **Great blog post on the ArcGIS Server Blog**
 - http://blogs.esri.com/Dev/blogs/arcgisserver/archive/2010/05/04/Imagery-in-Web-applications_3A00_-Should-I-use-a-cached-map-service-or-an-image-service_3F00_.aspx
- **There are four main factors to consider to help make your decision:**
 - **Speed**
 - **Scalability**
 - **Functionality**
 - **Maintainability**
 - **Releasability**

Imagery in Web Applications

Speed

- **Under any circumstance, it's pretty hard to beat the responsiveness of a cached map service.**
 - **The two may get close, but caching usually wins**
- **Cached services really hold the speed advantage when panning, largely due to browser caching. If a tile or a portion of a tile has already been fetched, it doesn't have to be requested again from the server**
- **An image service, in contrast, makes a new request on every pan.**

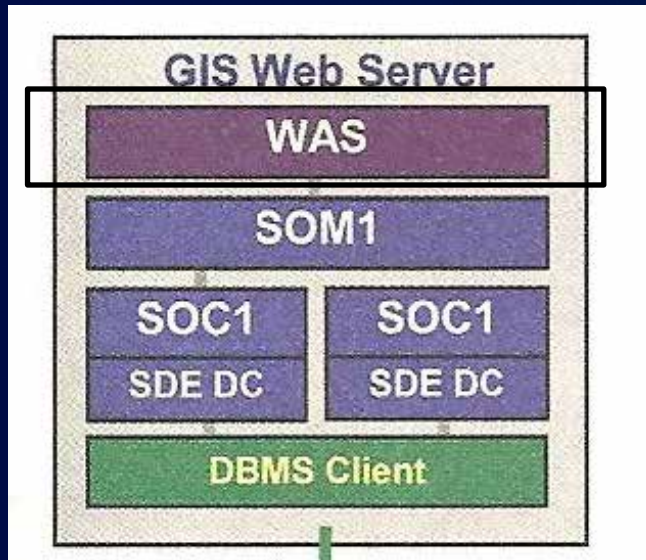
Imagery in Web Applications

Scalability

- **No matter how fast an image service can produce an image, ArcGIS Server still has to work to make it happen.**
- **The cached map service does virtually no work on ArcGIS Server.**

Imagery in Web Applications

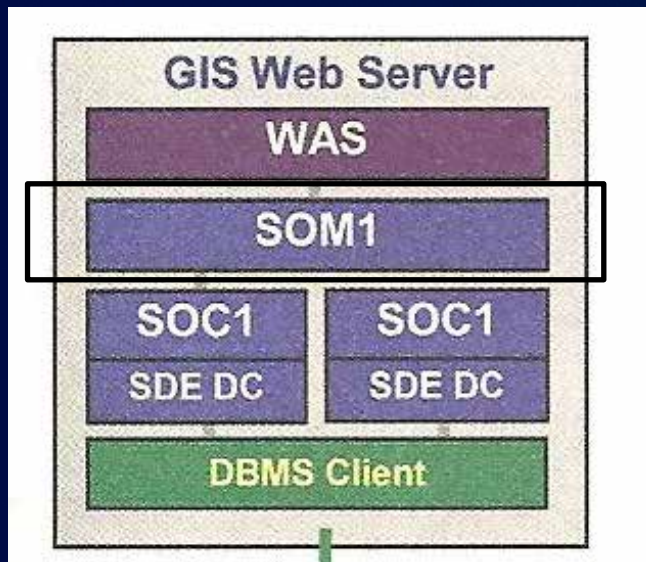
Scalability (Cont.)



- The **Web Application Server (WAS)** tier creates SOAP and REST endpoints for all of the services published by the ArcGIS Server.

Imagery in Web Applications

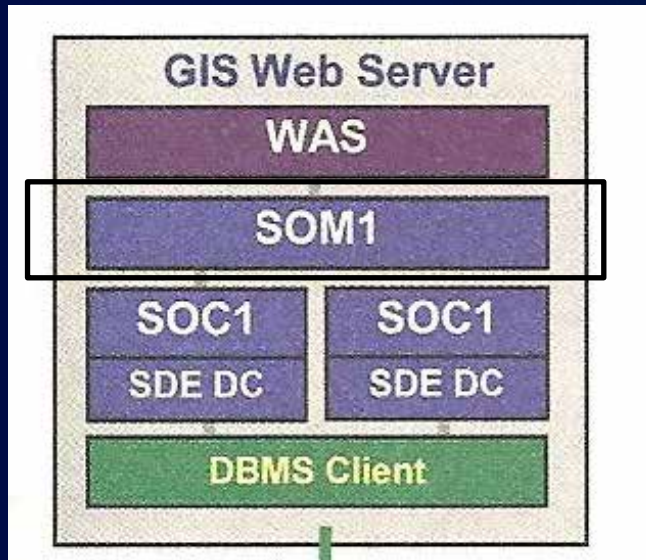
Scalability (Cont.)



- The **Web Application Server (WAS)**
- The **Server Object Manager (SOM)** is essentially a message handler which manages requesting coming into the ArcGIS Server machine

Imagery in Web Applications

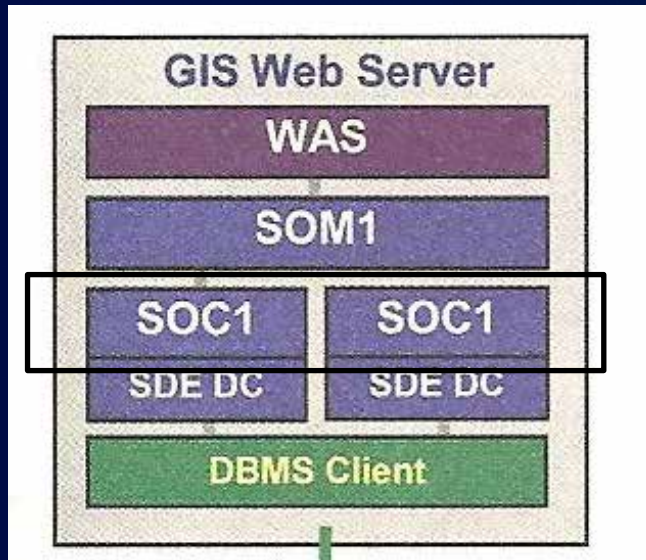
Scalability (Cont.)



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Imagery in Web Applications

Scalability (Cont.)

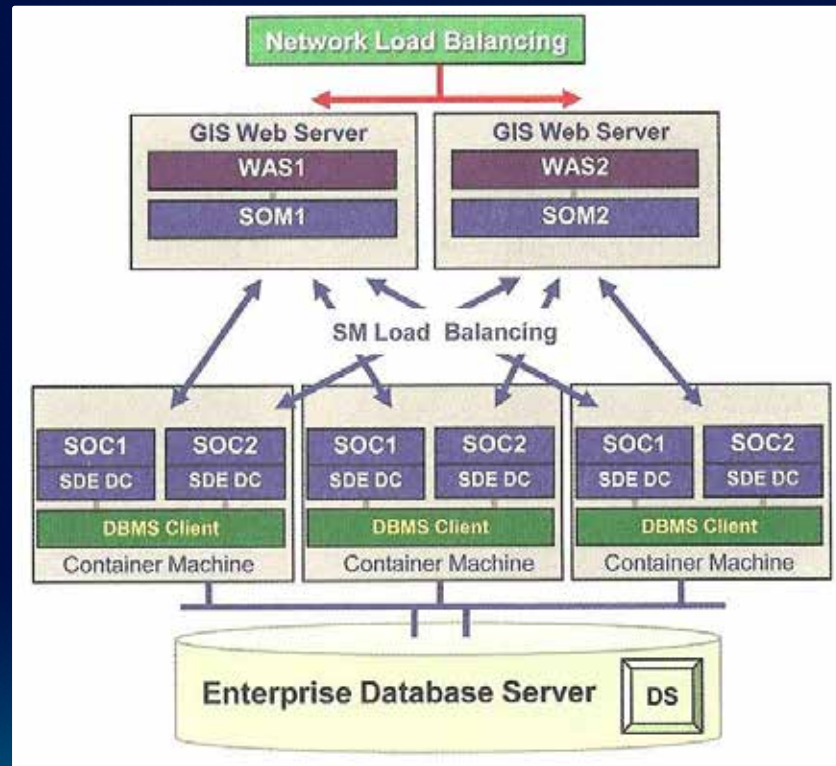


- Web Application Server (WAS)
- Server Object Manager (SOM)
- The **Server Object Container (SOC)** is the portion of the ArcGIS Server instance that performs the work. You may have one or more SOC instances in your enterprise for both failover and load balancing.

Imagery in Web Applications

Scalability (Cont.)

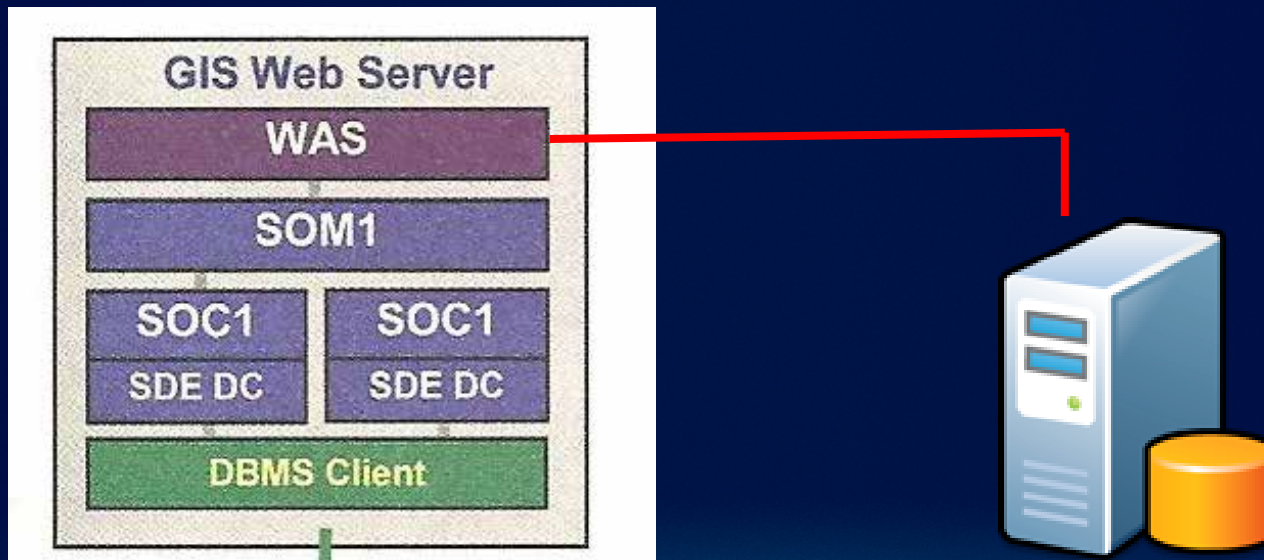
- True enterprise configurations will have multiple SOM machines for failover, as well as multiple SOC instances on separate hardware for load balancing.



Imagery in Web Applications

Scalability (Cont.)

- After you make an initial "handshake" with ArcGIS Server to determine whether a cache is available, the Web server just hands you the tiles you want.



Imagery in Web Applications

Functionality

- **Image services are decidedly more functional than cached map services. When working with an image service, you can request a custom projection, image format, resampling technique, band combination, and so on...**
- **If your application requires one of these things, an image service may be a better choice.**
- **Image services also let you specify a compression value that can be helpful over low bandwidth networks**

Imagery in Web Applications

Maintainability

- **For all its performance benefits, caching comes with some overhead**
 - You need time and server power to create the tiles
 - You need hardware to store them.
 - You also need to perform cache updates at some interval to prevent your imagery from becoming stale

Imagery in Web Applications

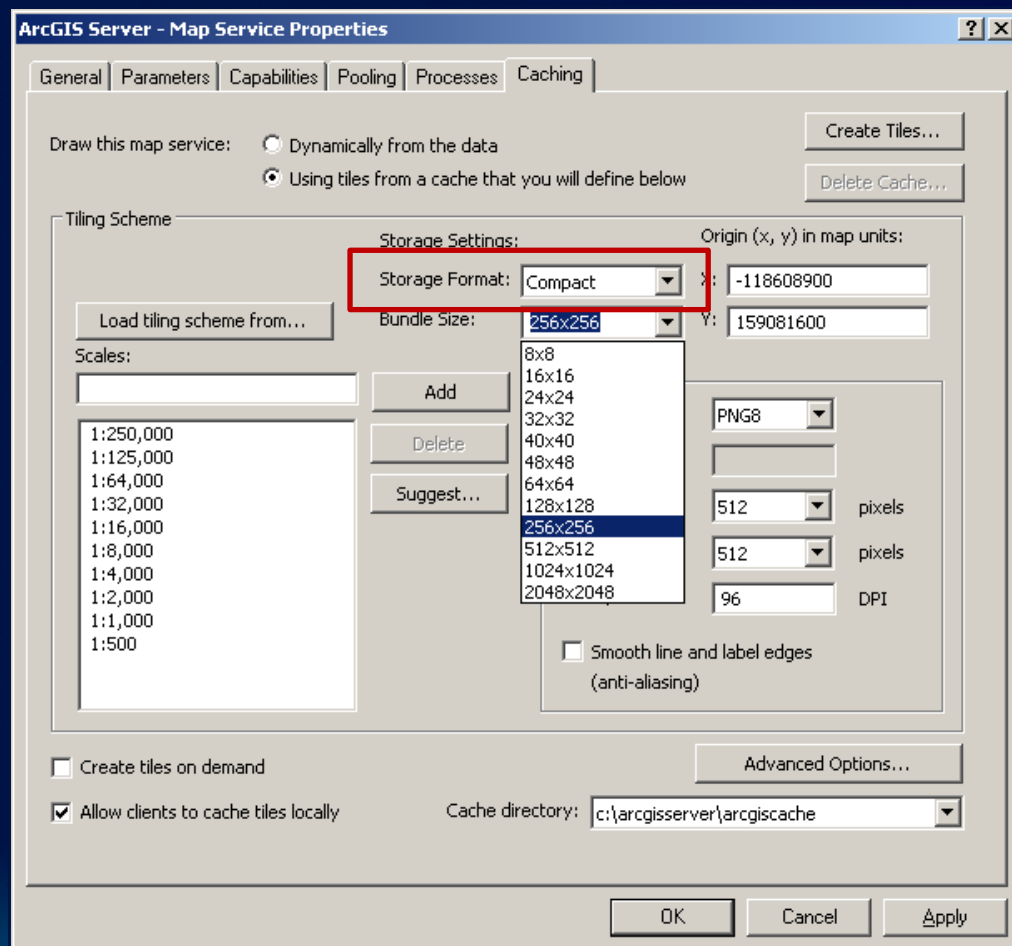
Maintainability (Cont.)

- You may consider only caching strategic places (such as urban areas) at the largest scales, and displaying uncached areas with a "Data not available" tile.
 - This is the approach used by Bing Maps, Google Maps
- Another option for filling uncached areas is to create tiles on demand.
 - This requires the source cache to remain in tact

Imagery in Web Applications

Releasability

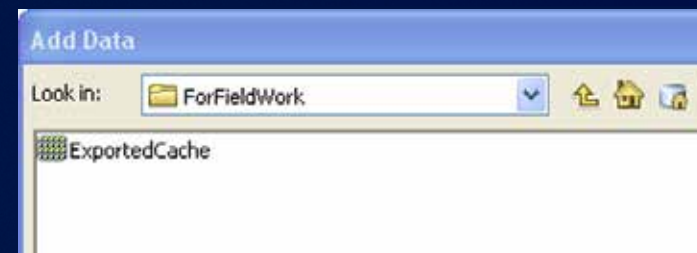
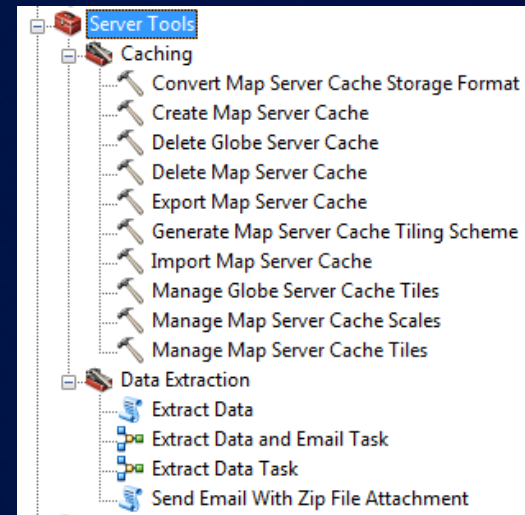
- **New Storage Format**
 - Exploded (Old)
 - **Compact (New)**



Imagery in Web Applications

Releasability (Cont.)

- **Export caches for disconnected field work**
 - **Export to compact format recommended**
- **Add Data and browse to cache directory**
 - **Cache Treated as Raster Dataset in ArcGIS**



Upcoming Events (www.esri.com/events)

March 8 - MeetUp at Esri (Vienna, VA)

April 12 - MeetUp in DC area (location TBD)

Mar 24-27 – Esri Partner Conference (Palm Springs, CA)

Mar 26-29 – Esri Developer Summit (Palm Springs, CA)

July 21-24 – Esri Homeland Security Summit (San Diego, CA)

July 23-27 – Esri International User Conference (San Diego, CA)



Thursday Evening Reception

- 6:30 – 9:30 pm
- **Smithsonian Air and Space Museum**
- **Logistics:**
 - 6:15 – 10:00 pm Buses transport between convention center and reception
 - Conference Badge needed for reception
 - Coat check – available at entrance
 - Serving hot hors d'oeuvres and beverages



Friday Closing Session and Hosted Lunch

- **Join conference attendees for lunch and closing session**
- **11:30 am – 1:30 pm**
- **Ballrooms A-C, Third Level**
- **Closing Speaker – Chris Smith, United States Department of Agriculture**
- **Wrap-up and request for feedback with Jack Dangermond**



Thank You

Please complete session evaluation form





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