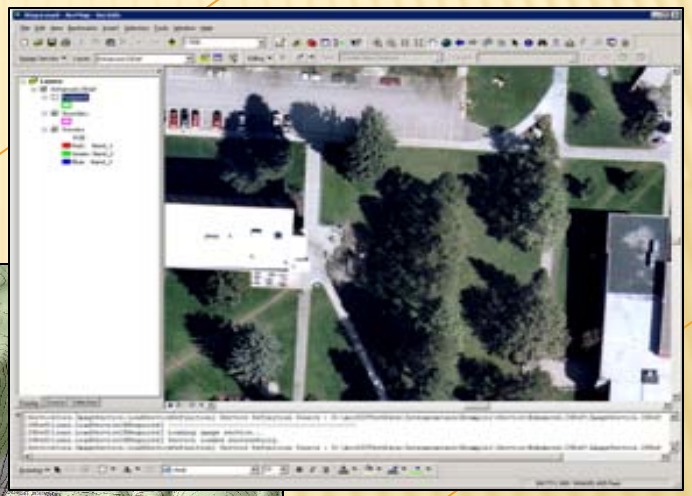
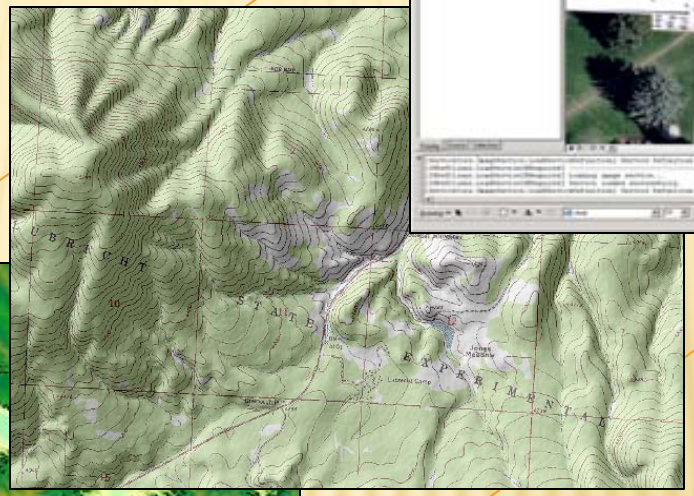
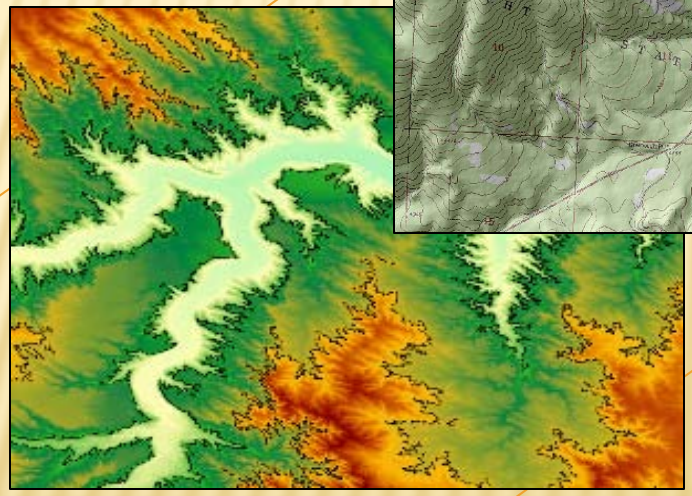
ARCGIS SERVER IMAGE EXTENSION

presented by
Michael Sweet





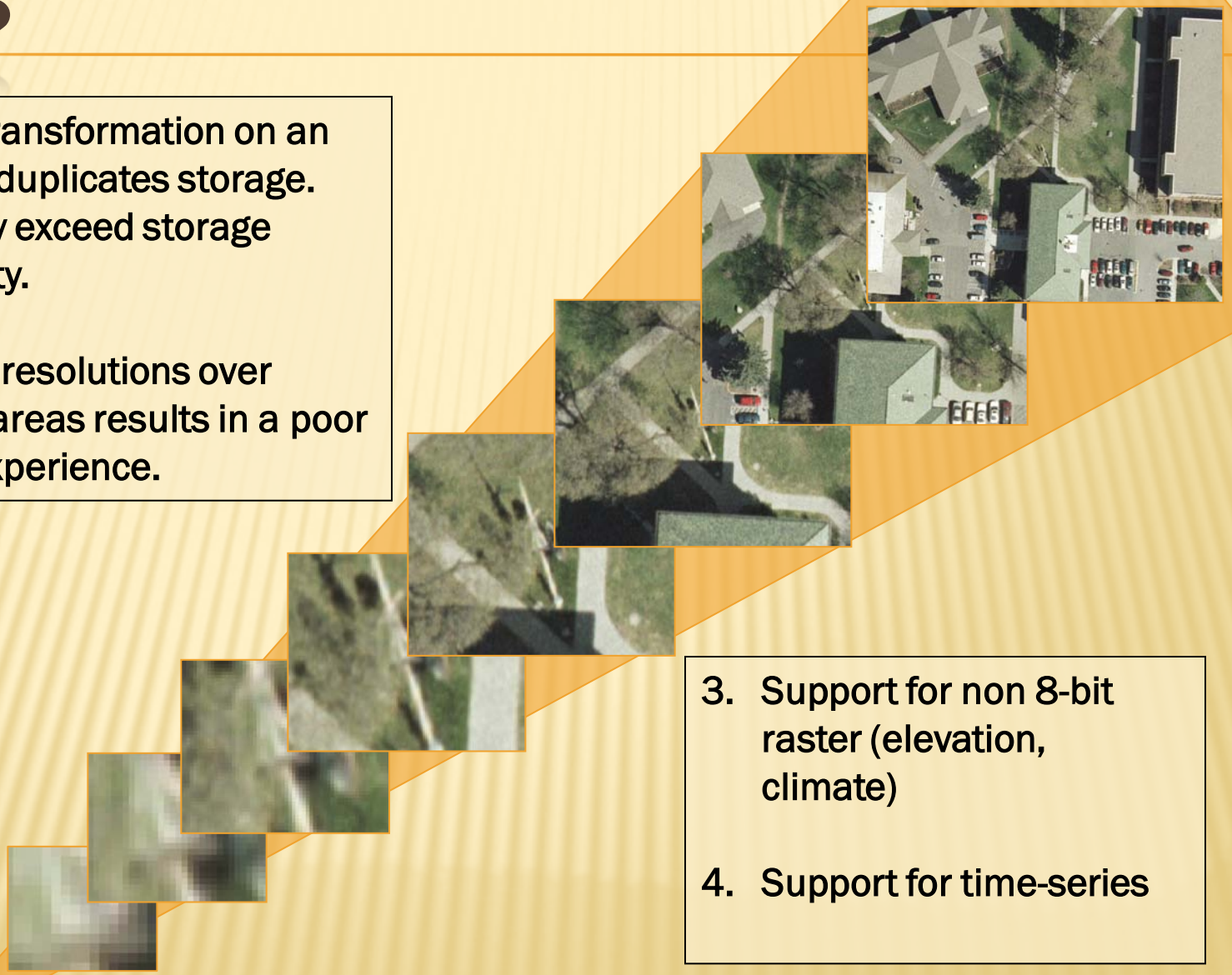


COLLEGE OF FORESTRY AND CONSERVATION
Where Ideas Take Flight

WHY?

1. Each transformation on an image duplicates storage. Rapidly exceed storage capacity.

2. Higher resolutions over larger areas results in a poor user experience.



3. Support for non 8-bit raster (elevation, climate)

4. Support for time-series

CAPABILITIES

- Technologies are similar to that utilized by Google and Microsoft to index a collection of imagery (tiles)
- Transformations (projections, color-balancing, etc.) are done on-the-fly rather than stored. Support for other than RGB raster.
- In an analysis or extraction the request goes back to the source image(s) … an option not available through image services (Google Earth, Virtual Earth, ArcIMS, etc.).
- Good foundation for Internet-based delivery of services (reduced maintenance overhead, build once)

	Number of Images	From network file server	From Image Server
Display Refresh Speed	1	> 10 seconds	1 second
	160	> 53 minutes	1-2 seconds
	11700	Not likely	2 seconds

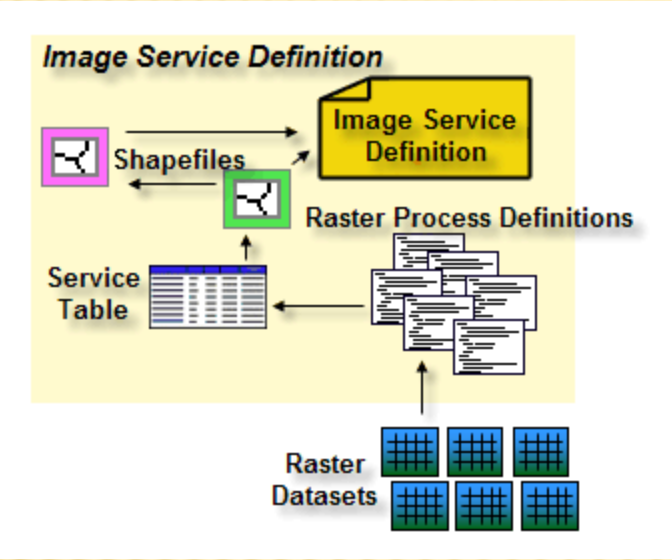
ARCHITECTURE & LICENSING

- Stand-alone or **Extension**
- When used as an extension in ArcGIS Server, it becomes part of the ArcGIS Server architecture.
- Four components installed:
  - Service Editor, Manager, Provider, Image Server
- Licensing
  - Additional cost; recently added to higher education site license.

ARCGIS SERVER IMAGE EXTENSION

- Extends ArcGIS Server by enabling dynamic mosaicing and on-the-fly processing of imagery.
  - Manage and process a lot of raster data
  - Create image services that can include data in different formats, projections, and at different resolutions
  - Multiple representations of the same data
  - Quick acquisition to dissemination time
  - More than a picture (Map Service)
    - Client processing (change band, contrast, brightness, extract, etc.)

IMAGE SERVICE DEFINITION



Footprints
Outlines of the raster datasets

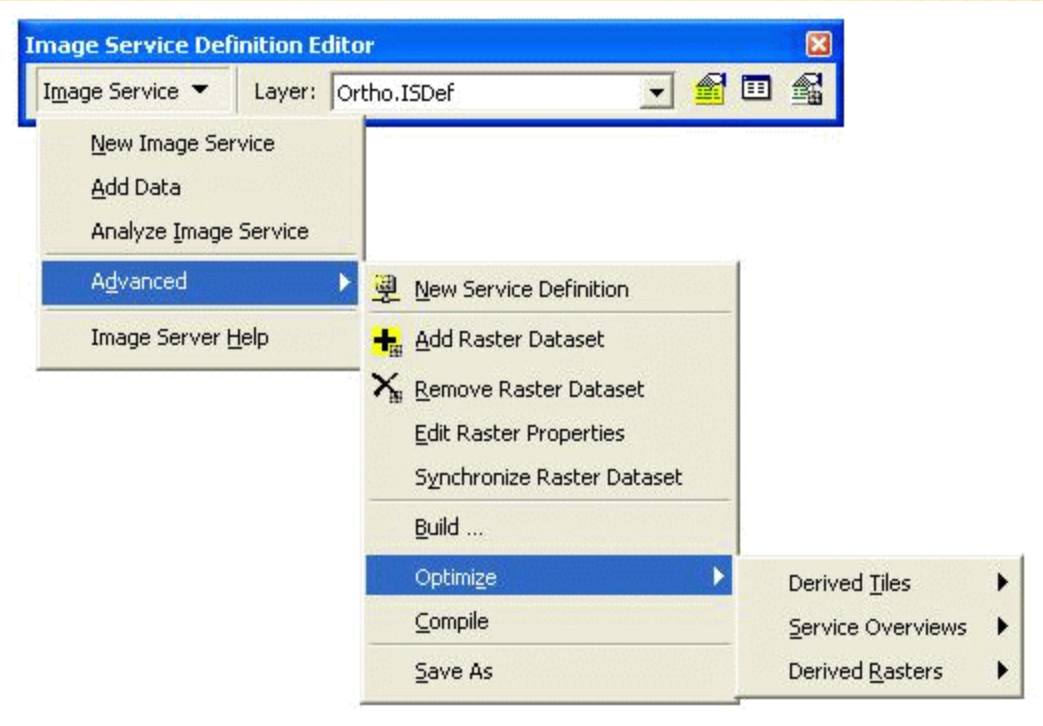
Boundary
Extent of all raster datasets

Image Service Definition
Used to define an image service including the data, processing, rendering, metadata, extent, and properties

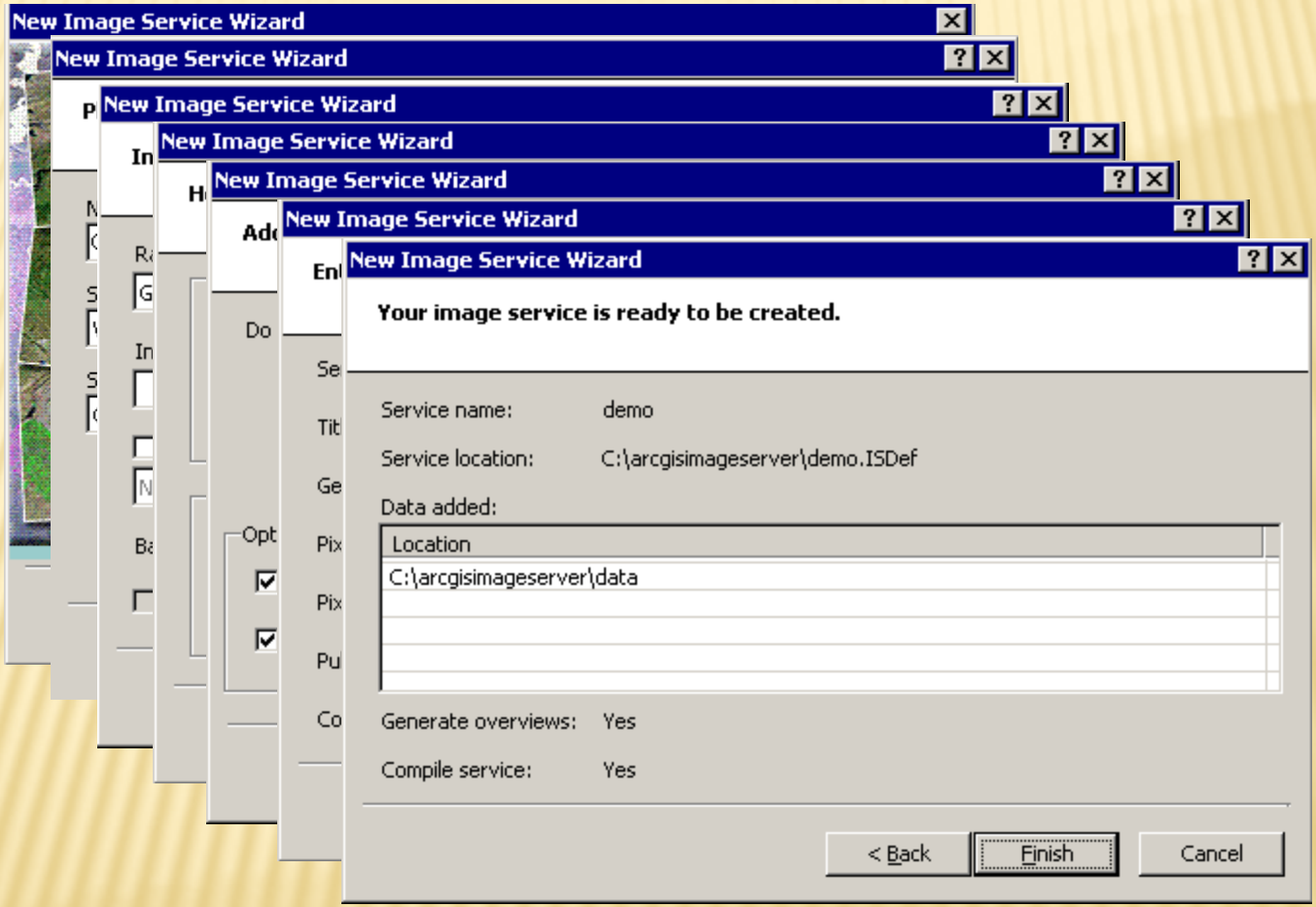
Raster Process Definitions
Defines each raster dataset and any processes to be applied to them directly

Service Table
List of the raster datasets that make up an image service definition

IMAGE SERVICE DEFINITION EDITOR TOOLBAR

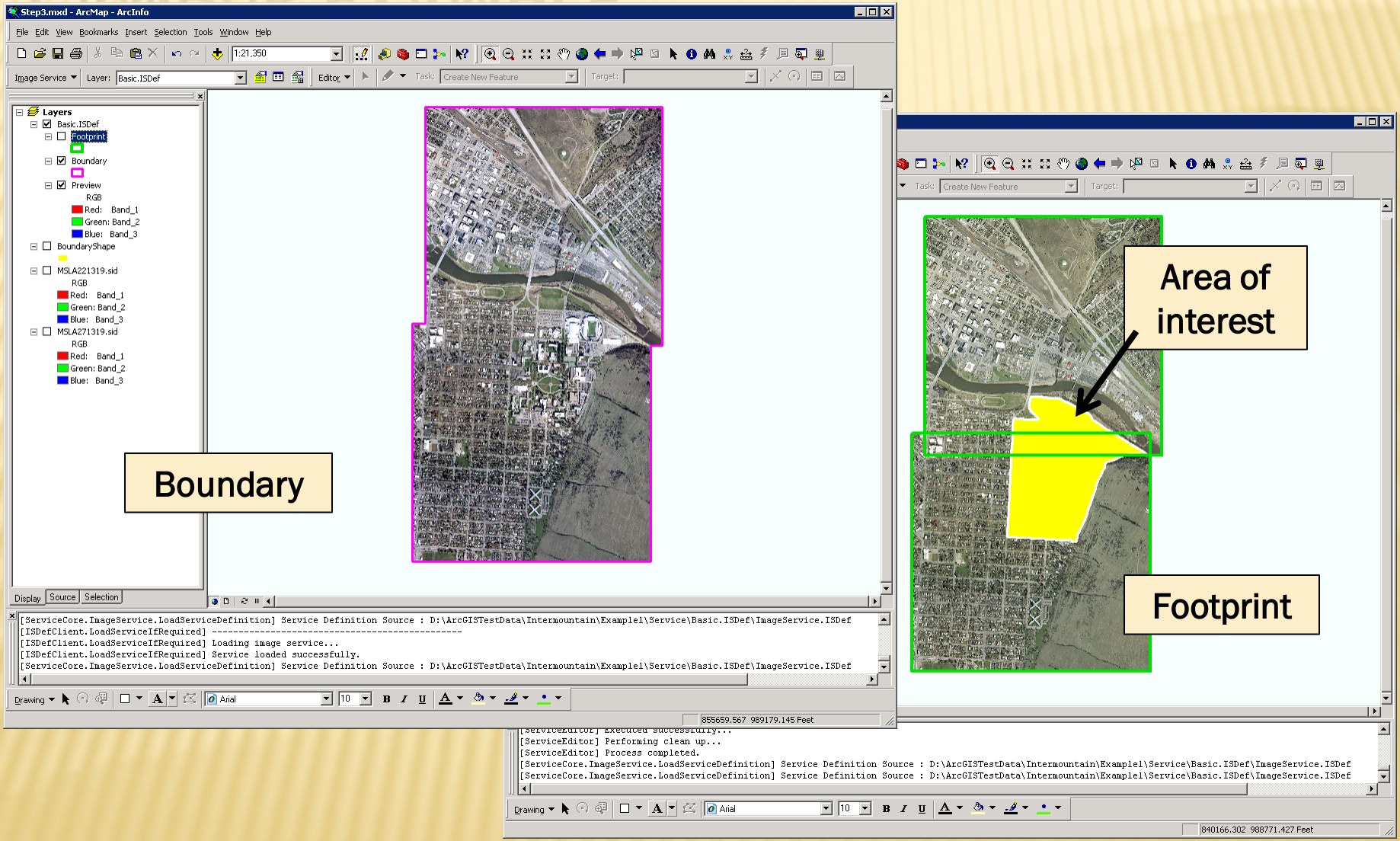


NEW IMAGE SERVICE WIZARD



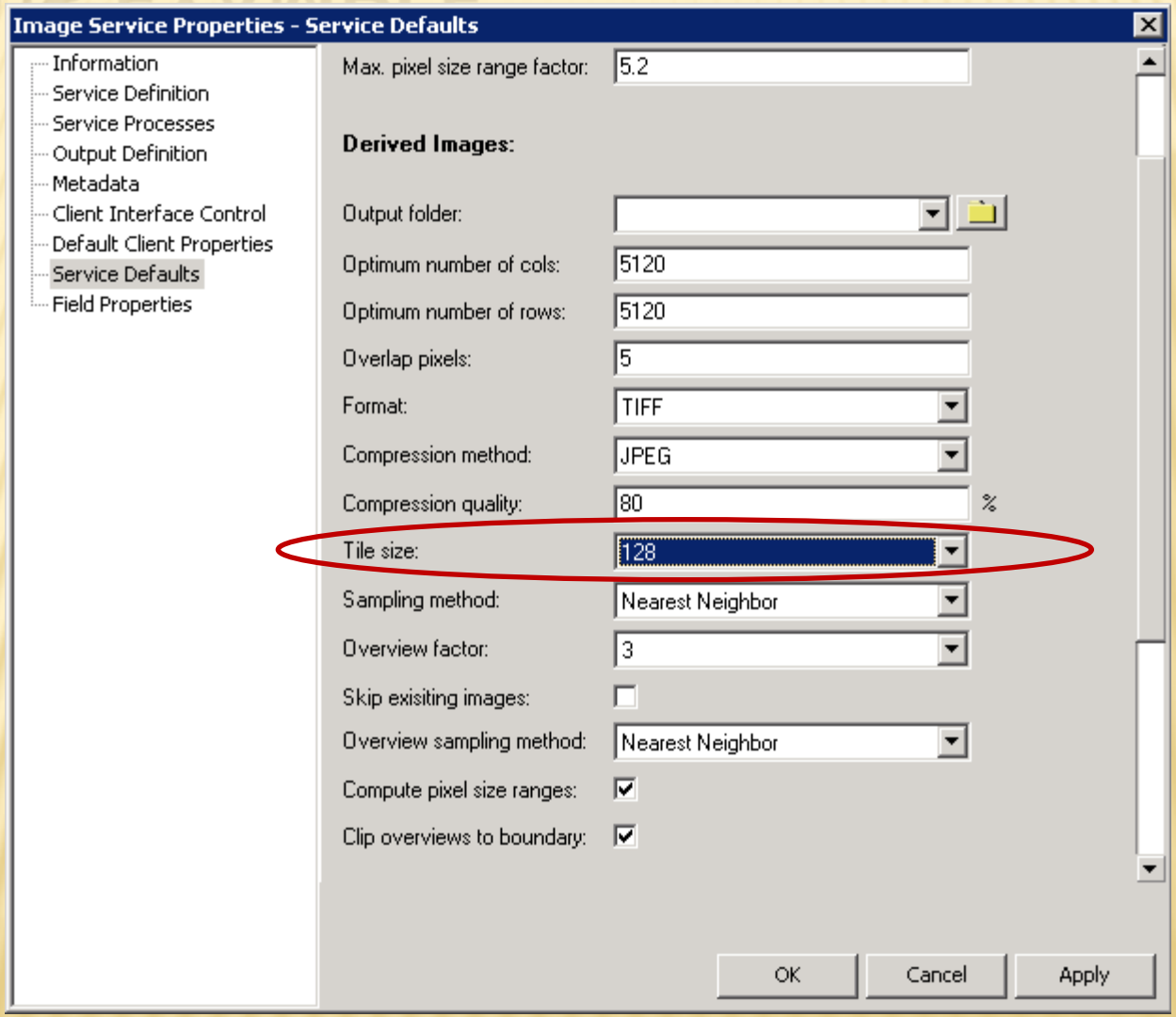
CAMPUS EXAMPLE

Original service



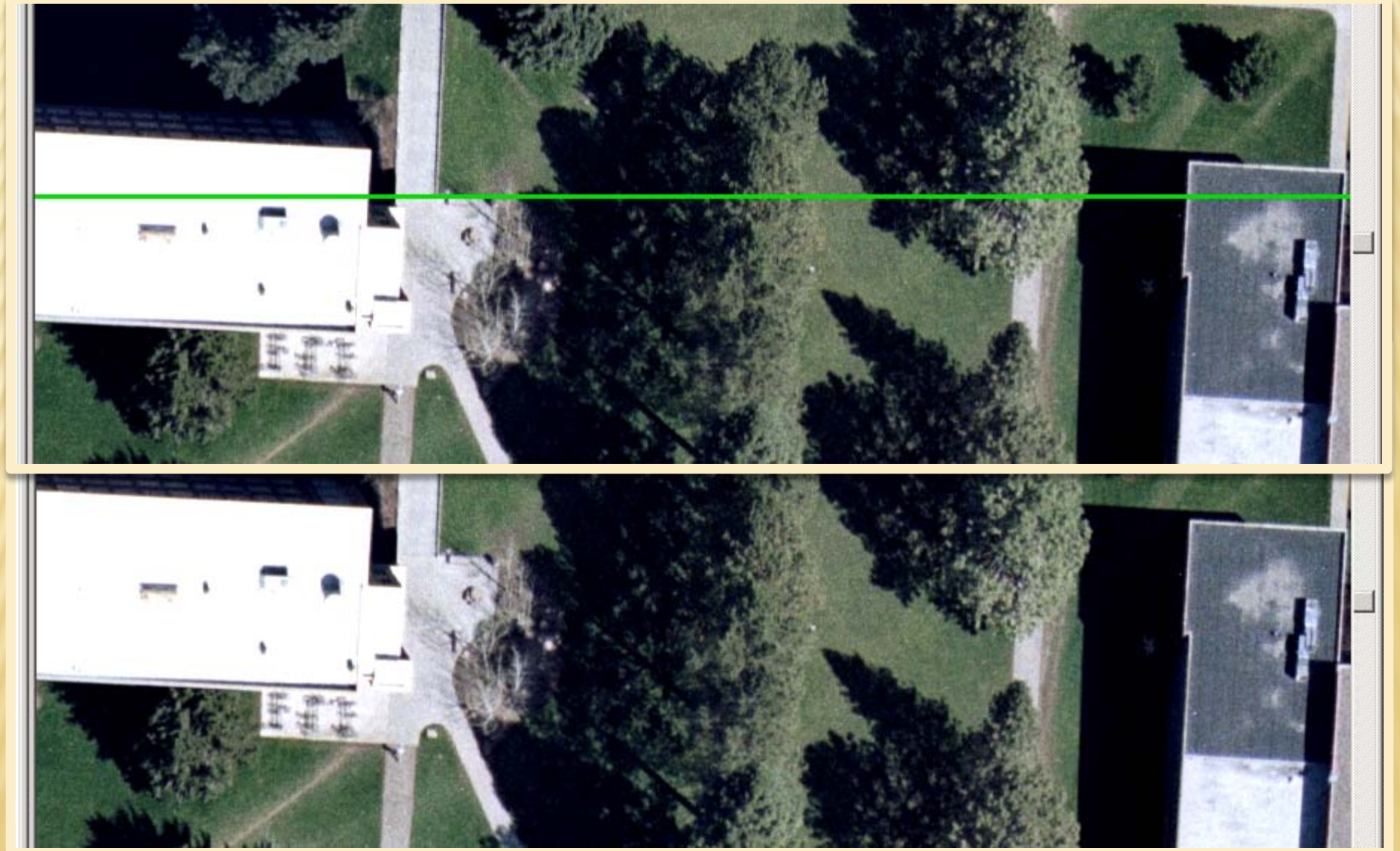
CAMPUS EXAMPLE

Optimize for display speed



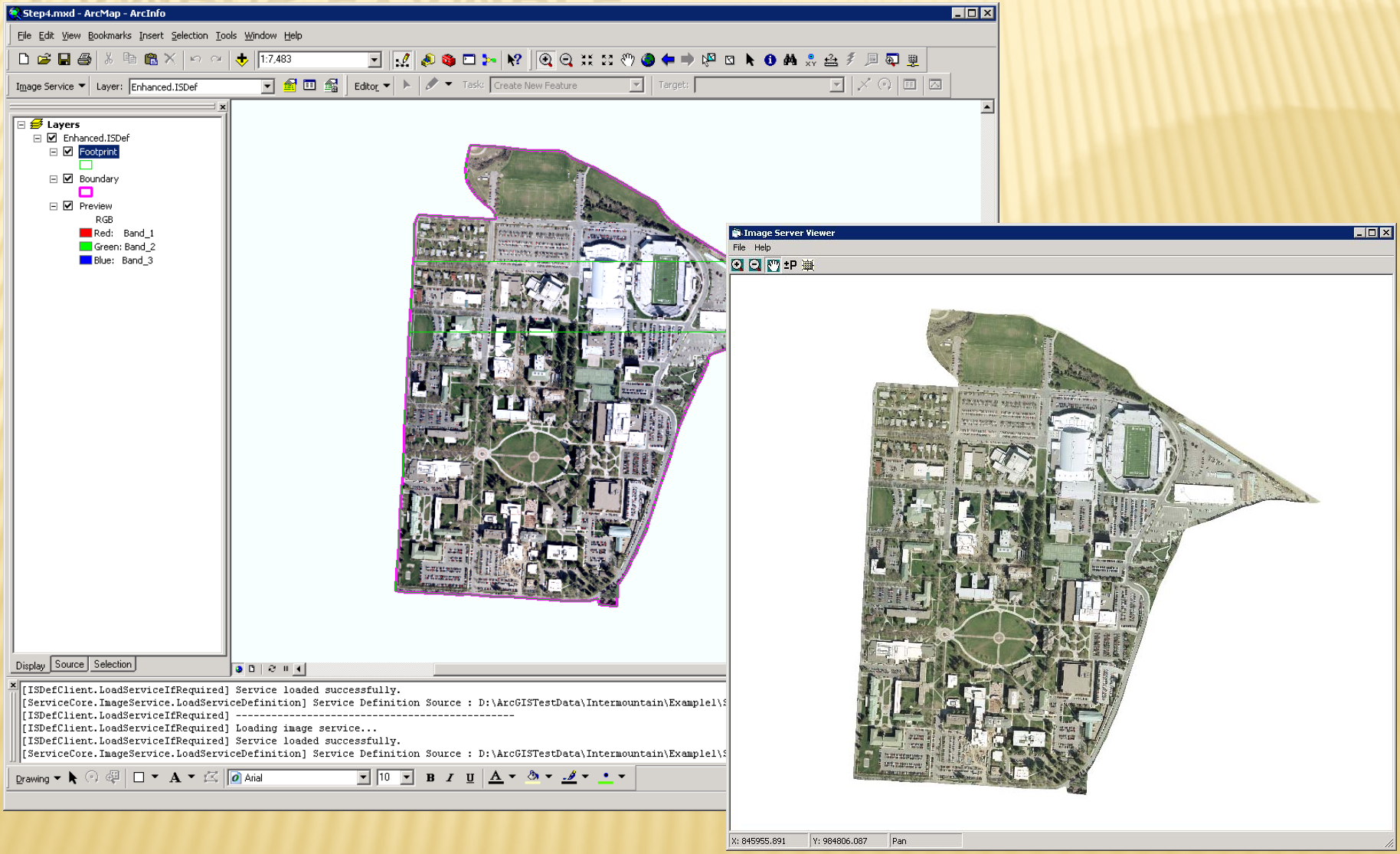
CAMPUS EXAMPLE

Image footprint boundaries



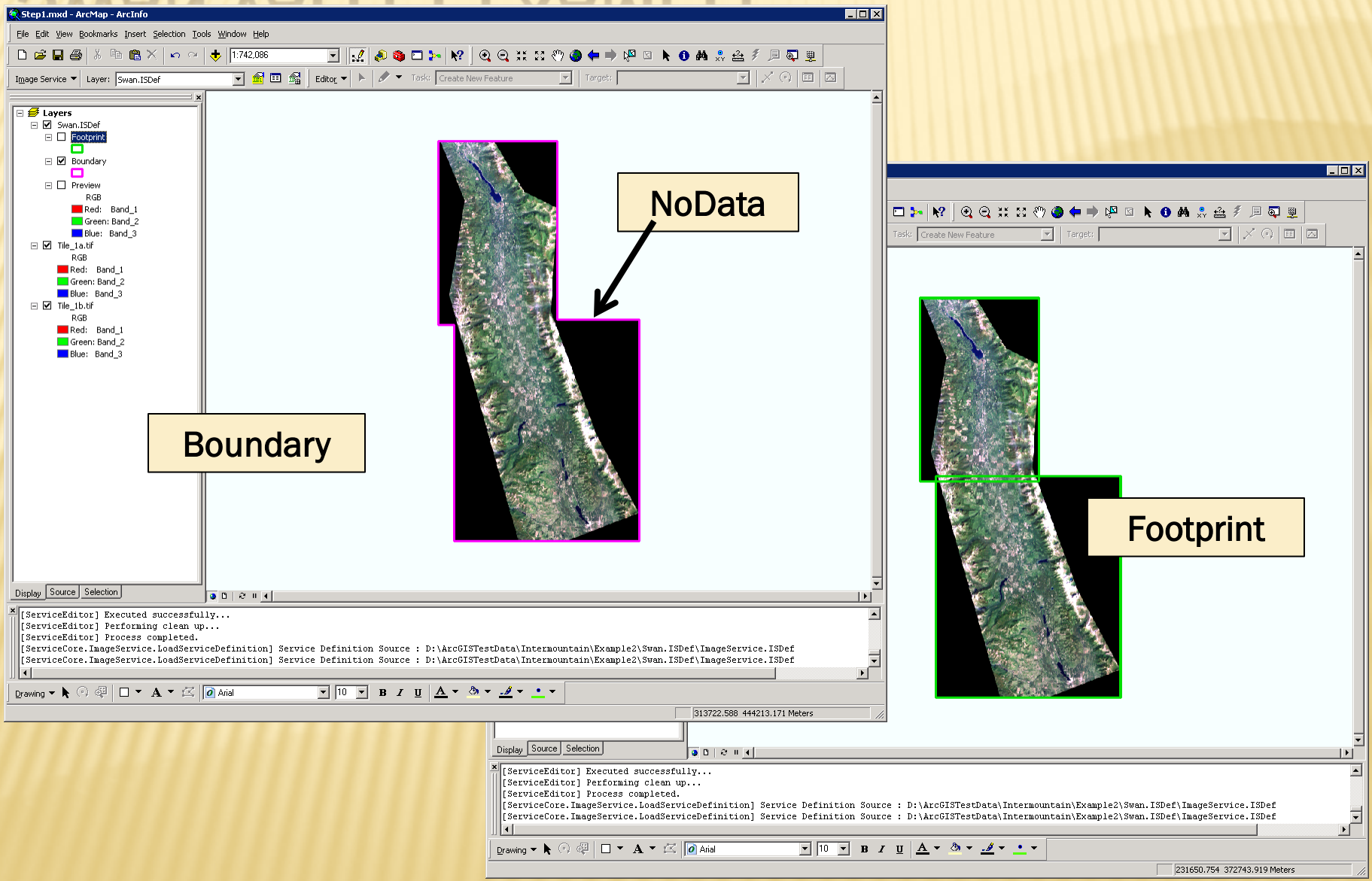
CAMPUS EXAMPLE

Limit service boundary



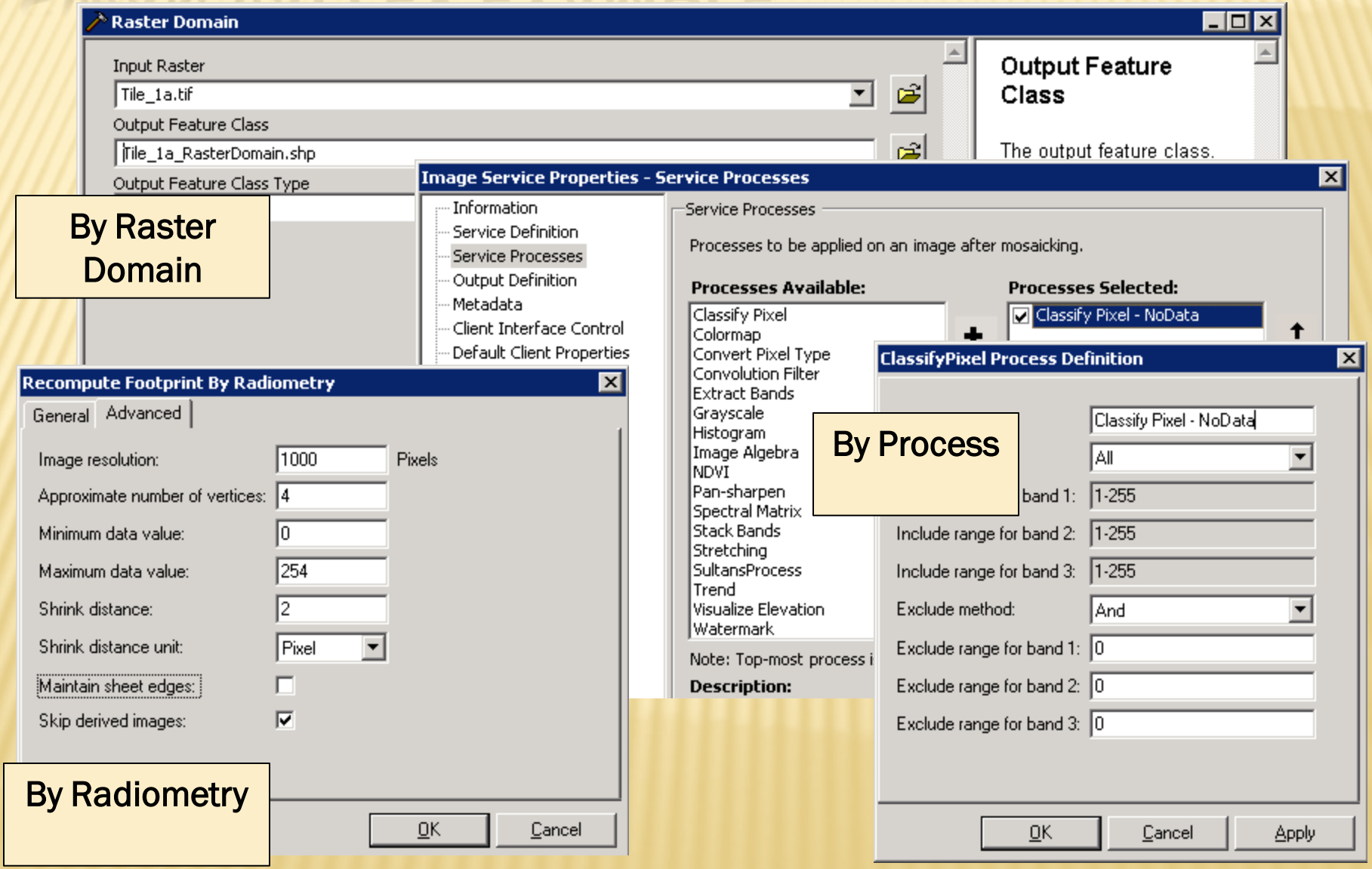
SWAN VALLEY EXAMPLE

Original service



SWAN VALLEY EXAMPLE

Modify footprints

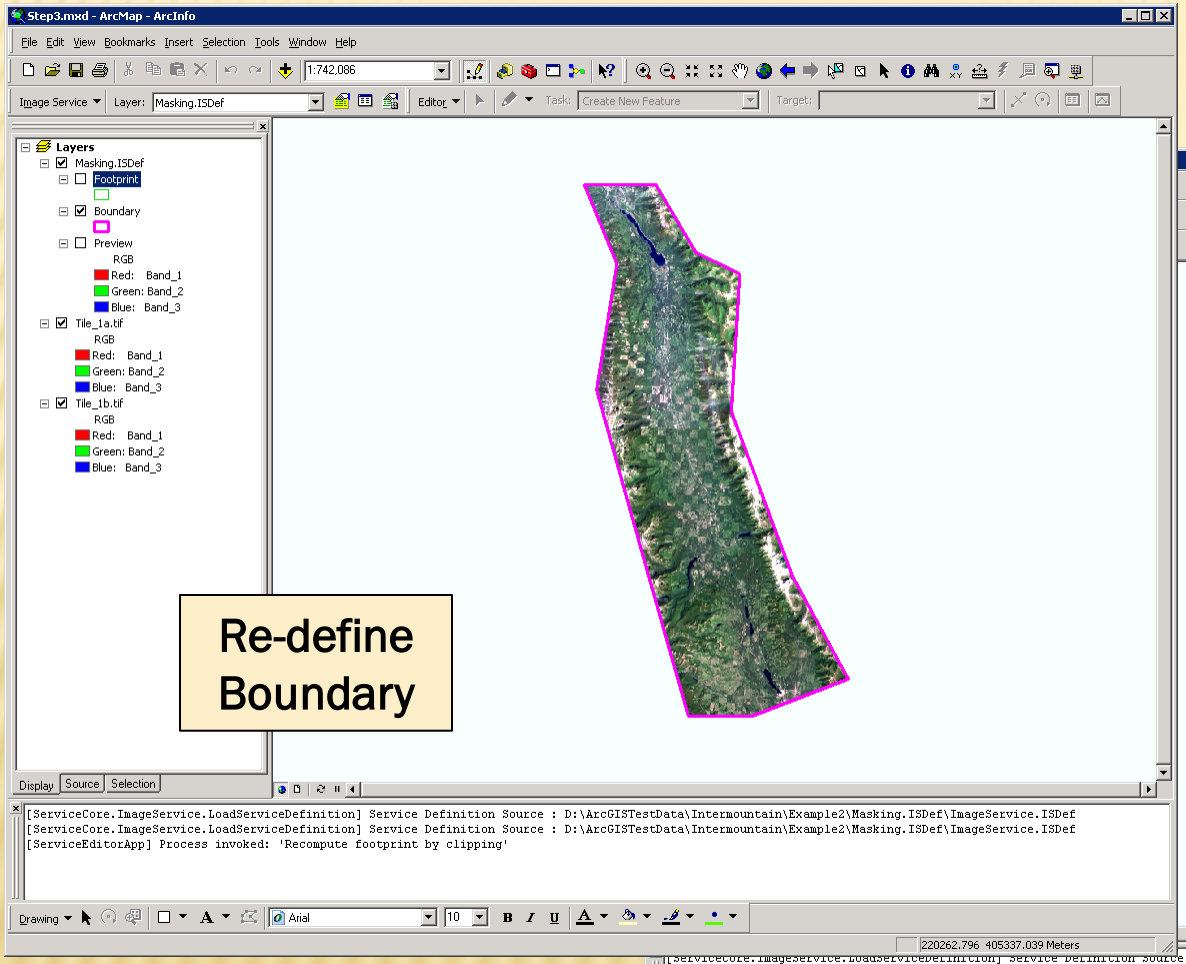


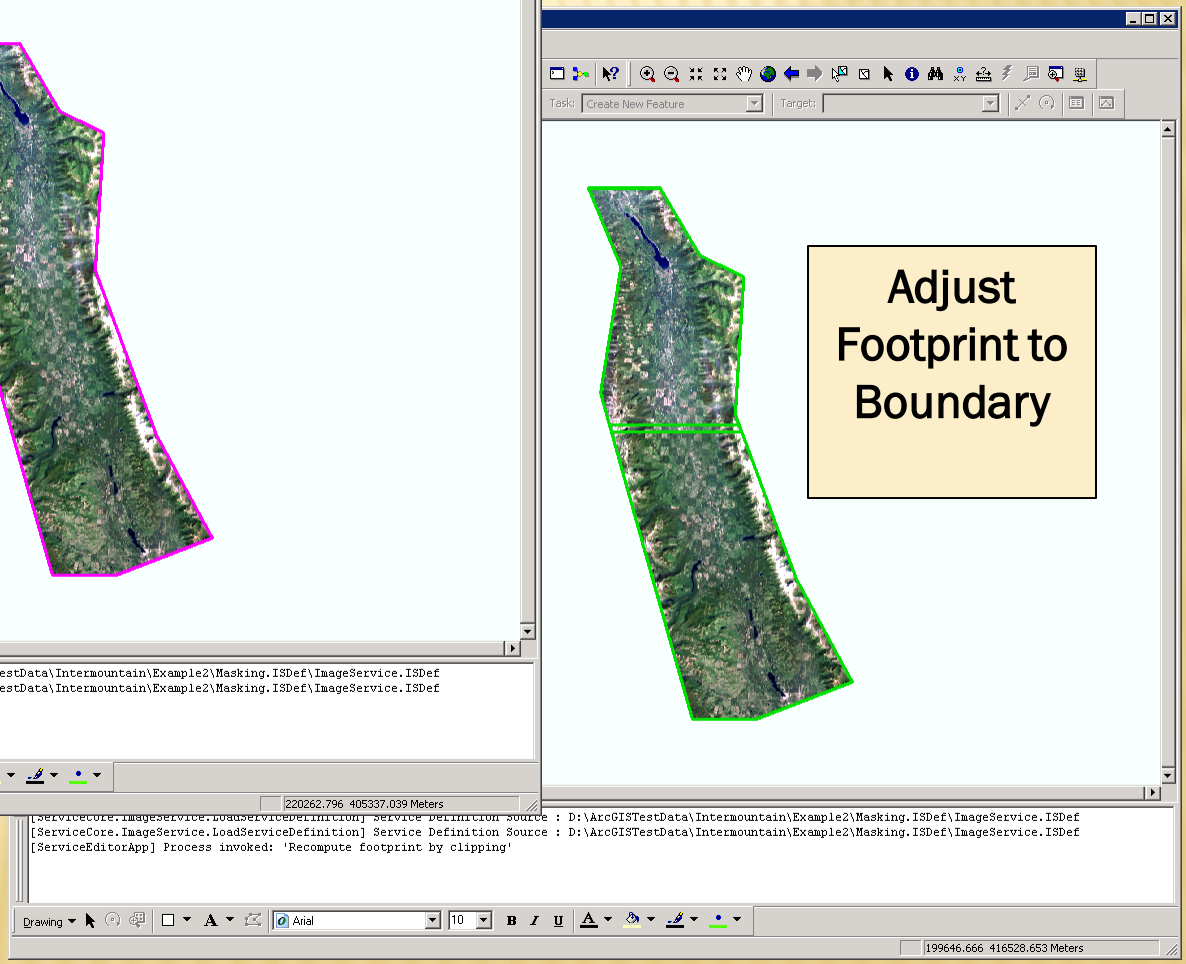
NODATA IS YOUR FRIEND

- Cells or pixels that have missing information
- NoData and "0" (zero) are not the same. "0" is a valid value
- A value for file-based raster
- A bit mask for ArcSDE and file-GDB raster
- NoData does not participate in statistics calculation
- NoData cells can be displayed (set a color or transparent color)
- NoData can be used to define footprints (Raster Domain Tool or Radiometry)

SWAN VALLEY EXAMPLE

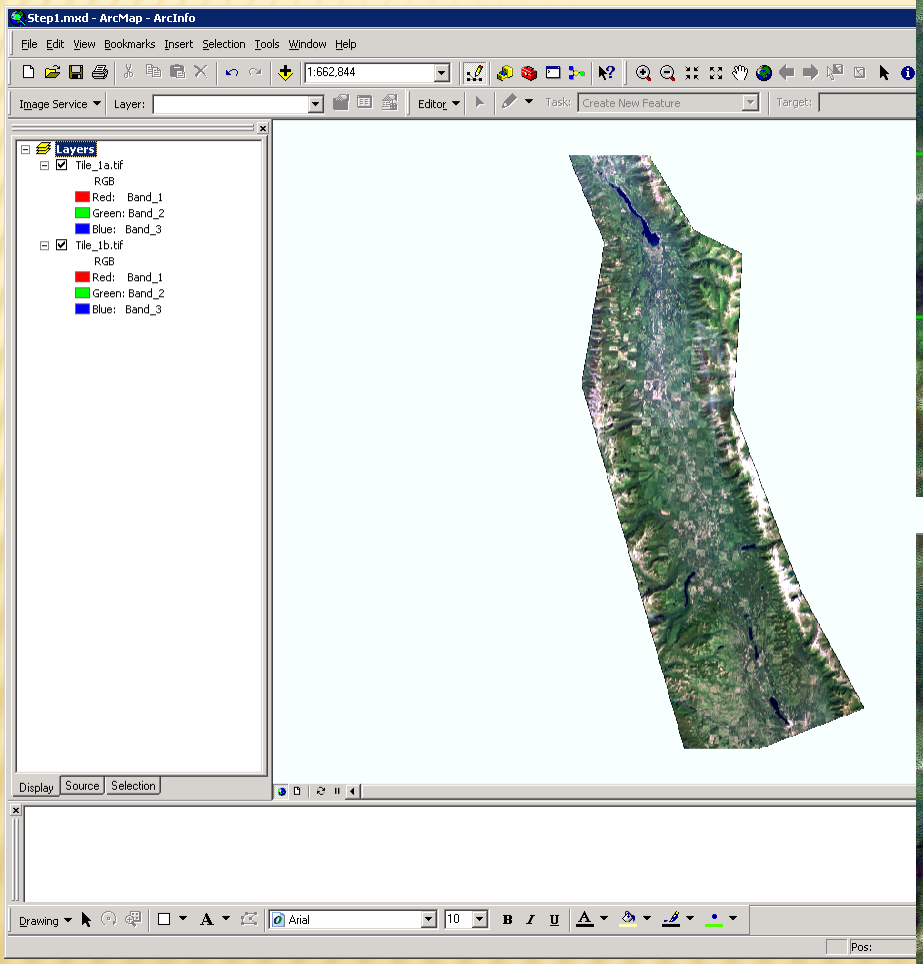
Limit service boundary





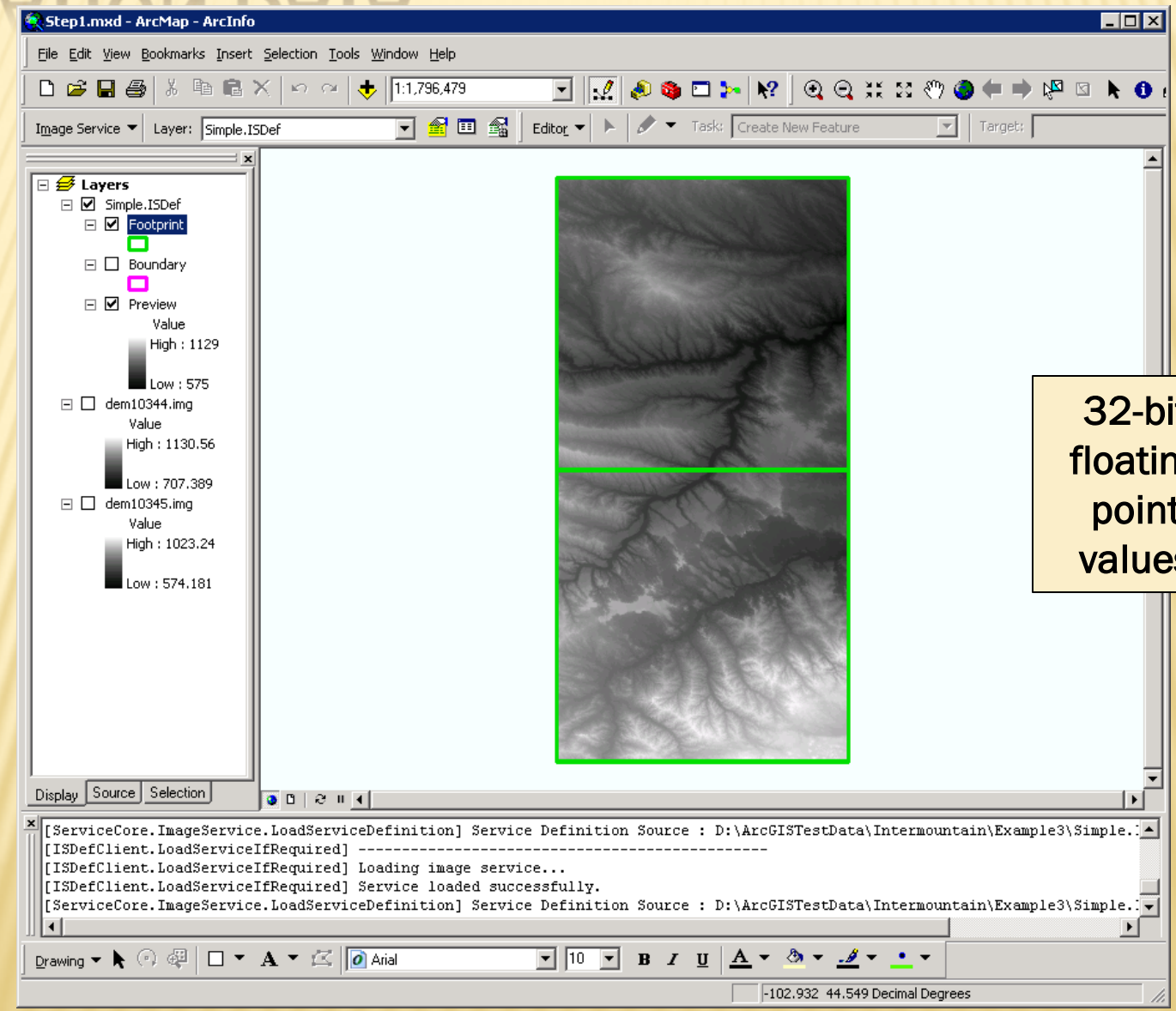
SWAN VALLEY EXAMPLE

Image Service



ELEVATION DATA

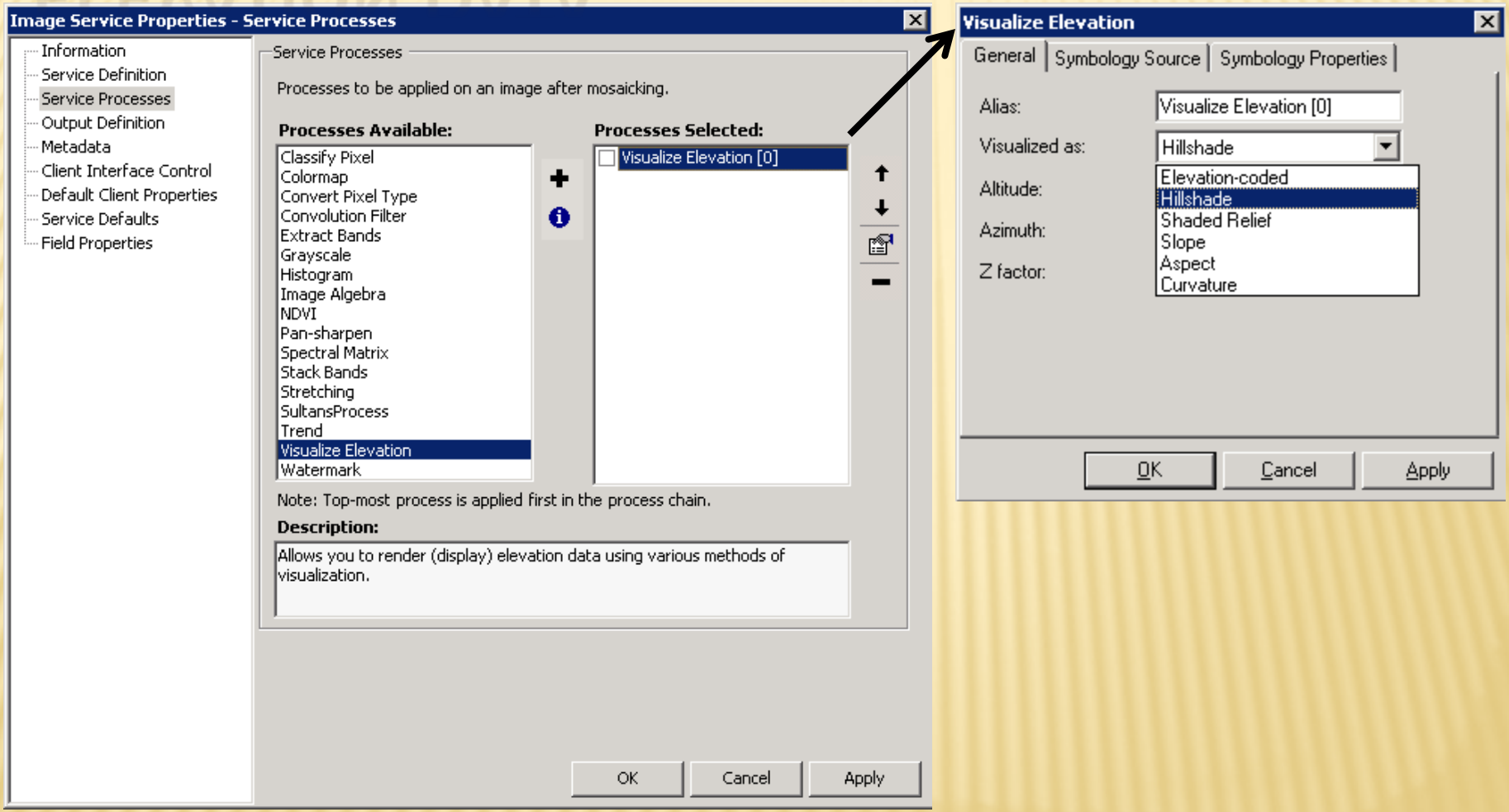
Other than 8-bit, 3-band (RGB) raster



32-bit floating point values

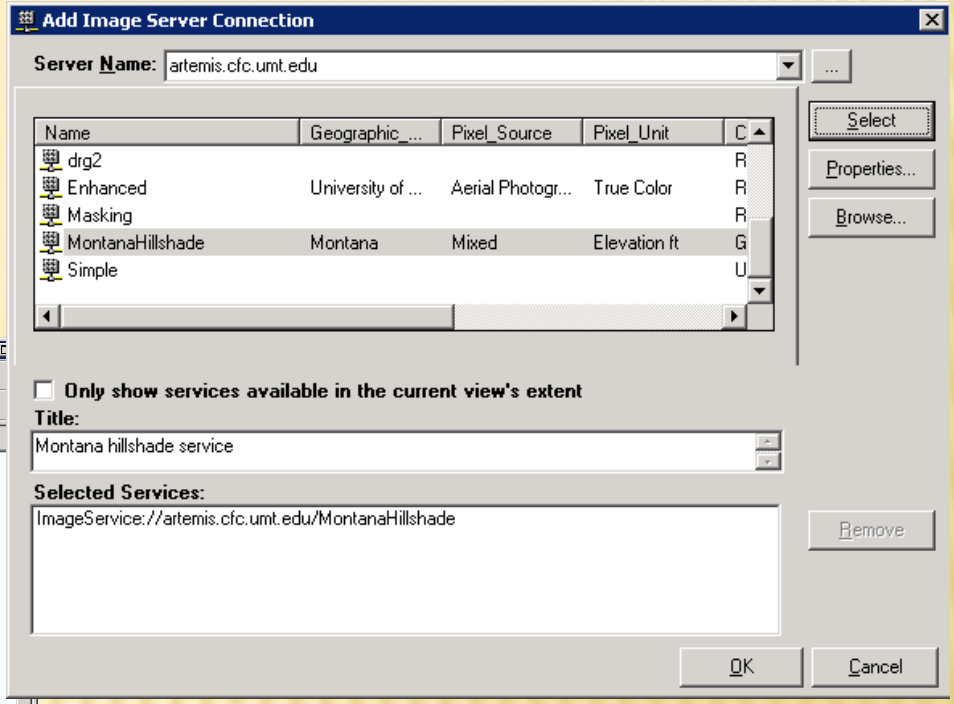
ELEVATION DATA

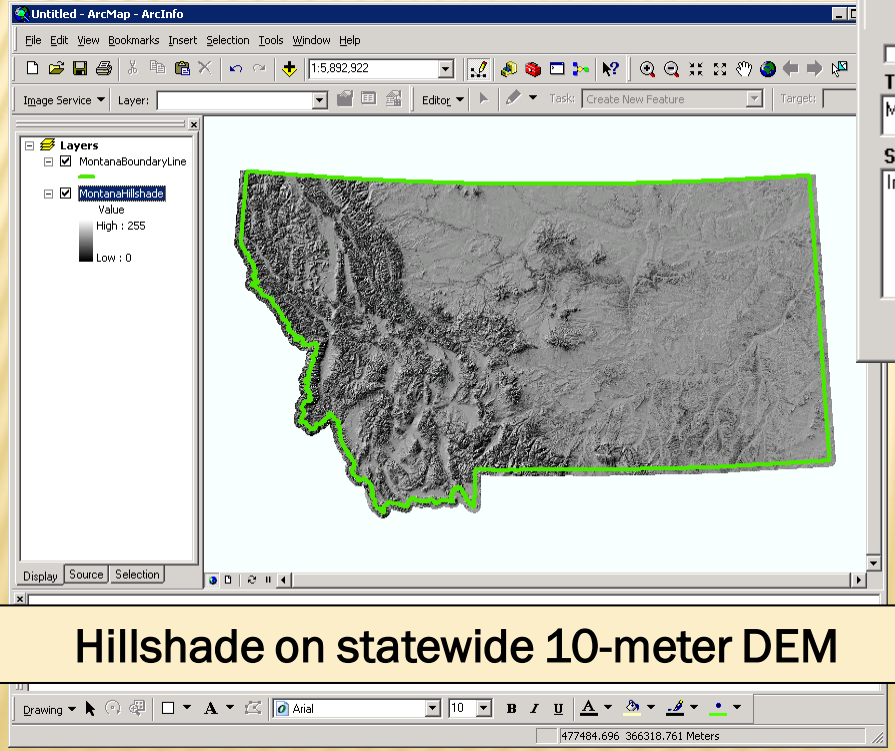
Server-side processing



ELEVATION DATA

Server-side processing

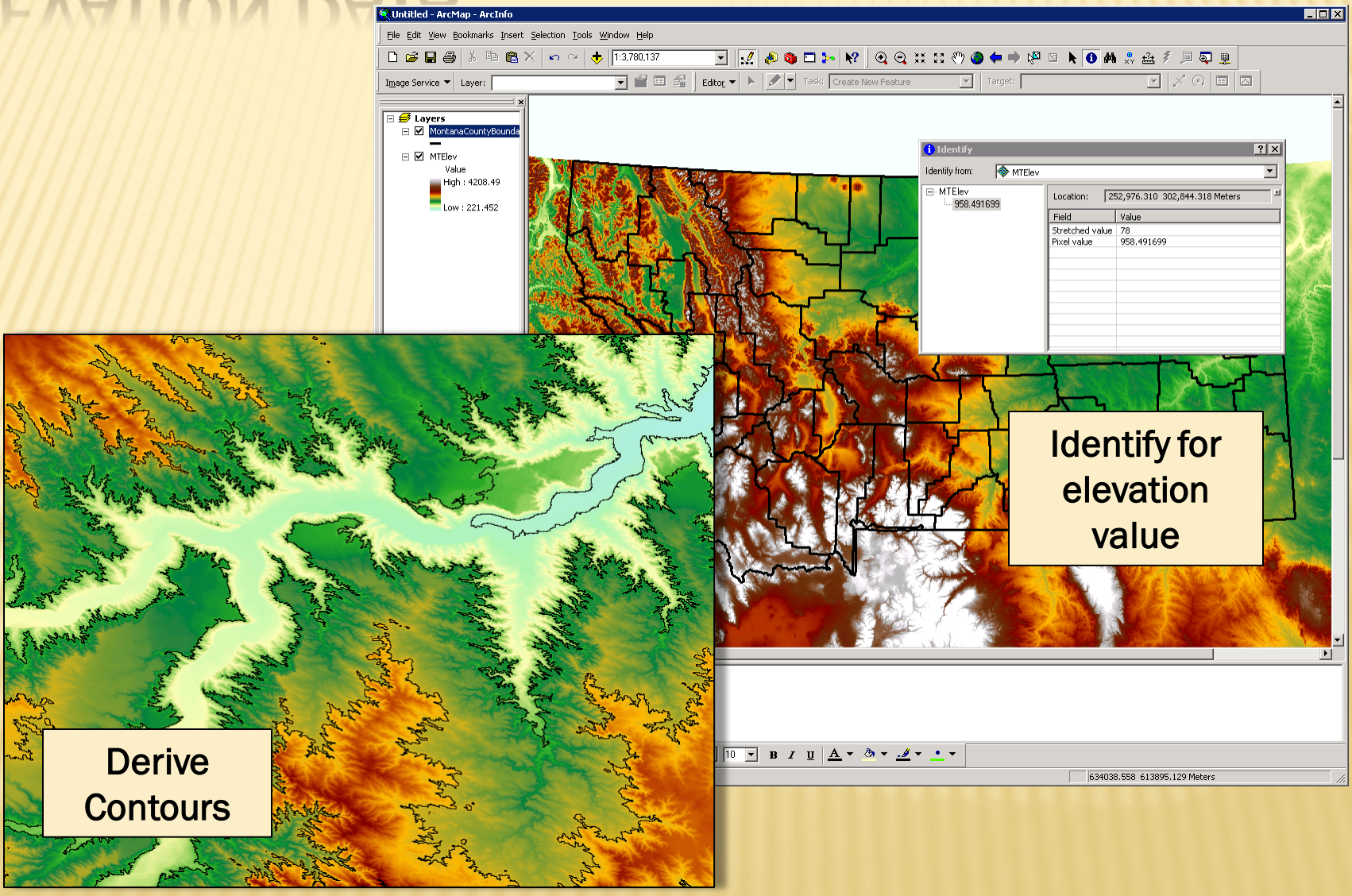




Hillshade on statewide 10-meter DEM

ELEVATION DATA

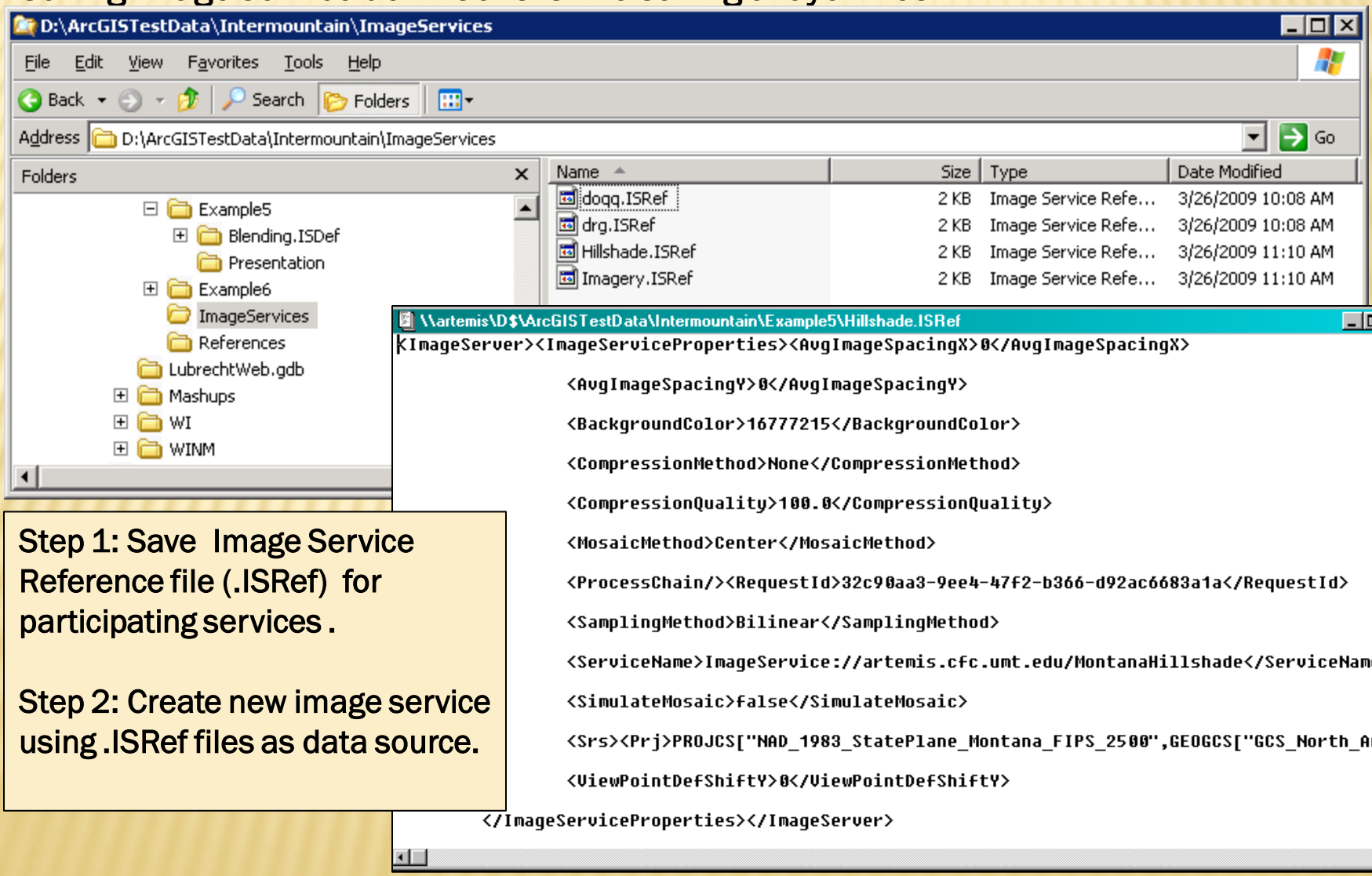
Query and client-side geo-processing



BLENDING SERVICES

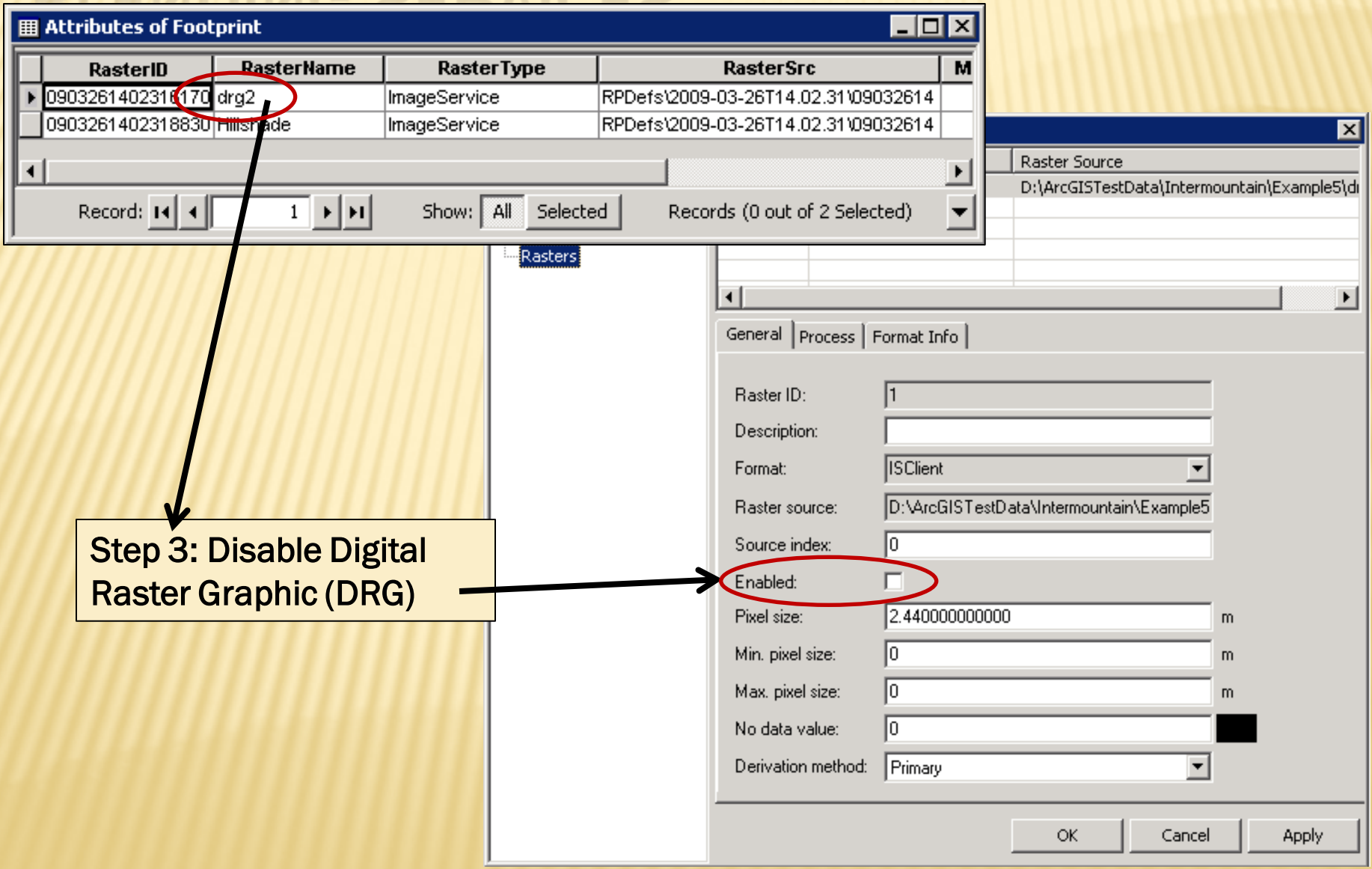
Image service of image services

Saving image service definitions is like saving a layer files.



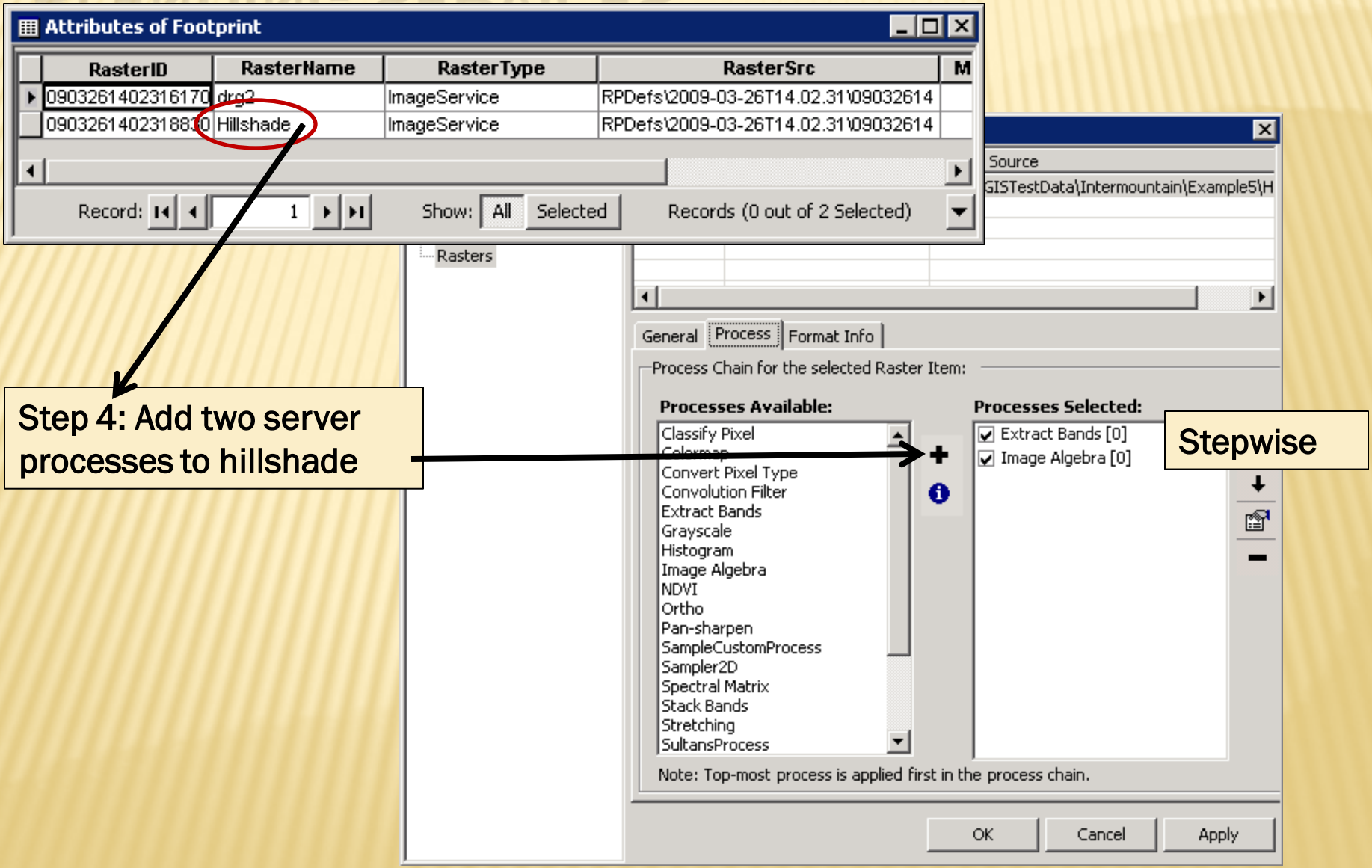
BLENDING SERVICES

Processing parameters



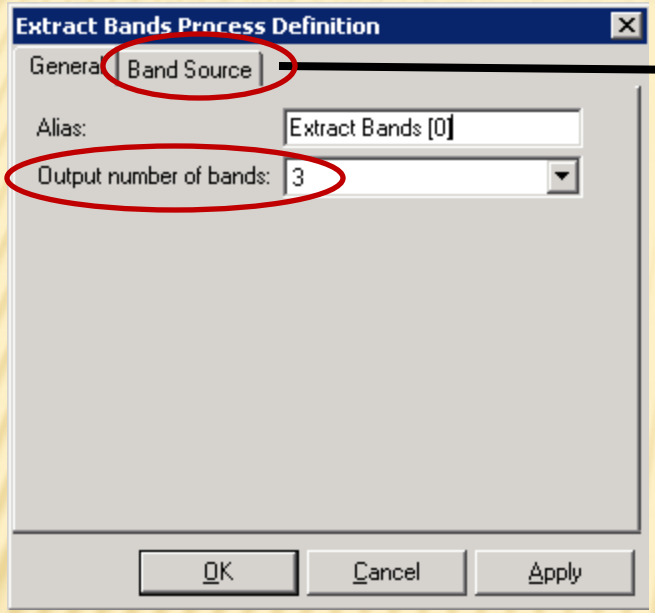
BLENDING SERVICES

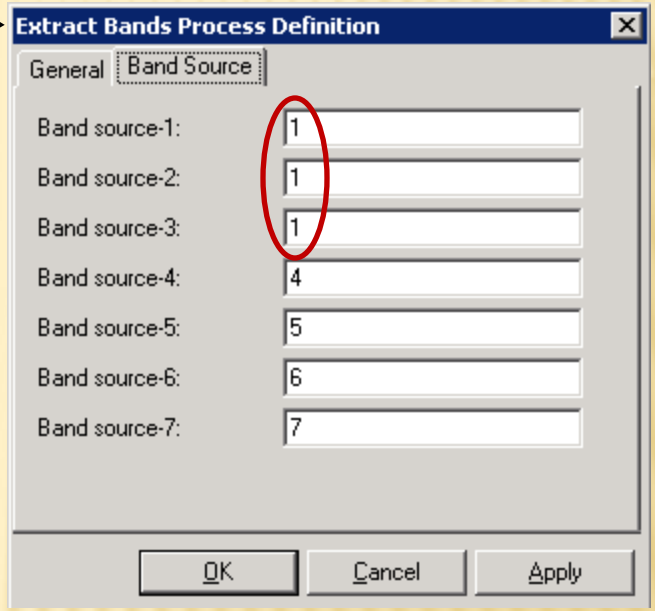
Processing parameters



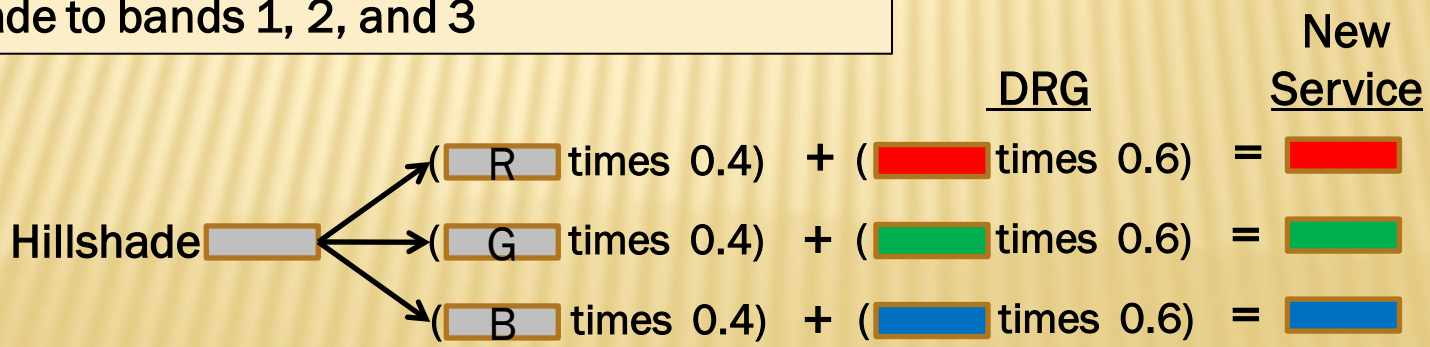
BLENDING SERVICES

Processing parameters





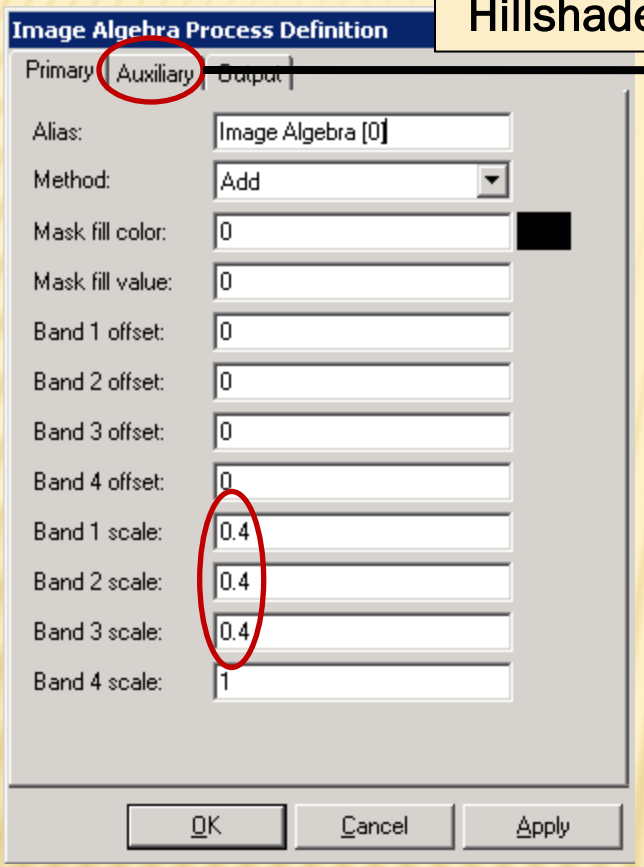
Step 5: Map band 1 of single-band panchromatic hillshade to bands 1, 2, and 3



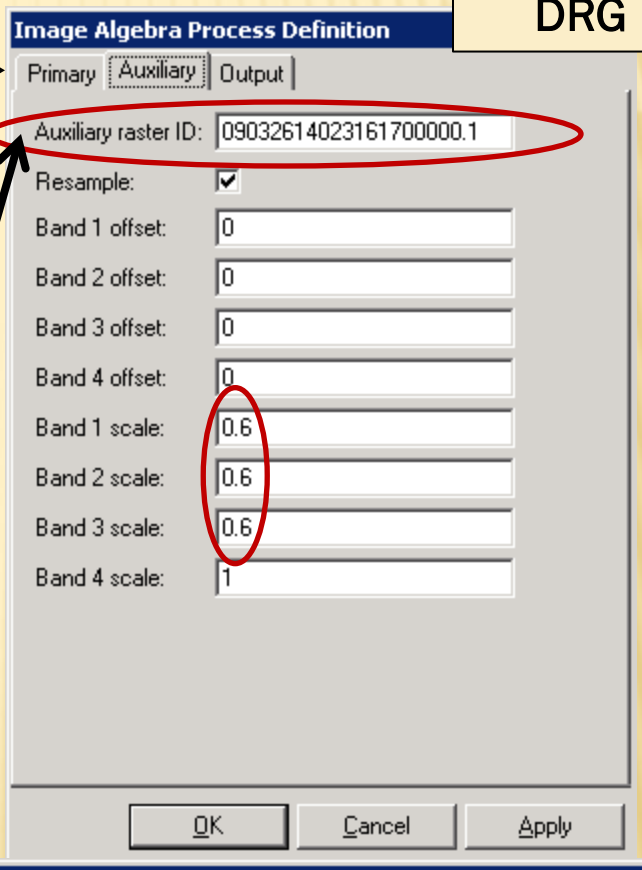
BLENDING SERVICES

Processing parameters

Hillshade



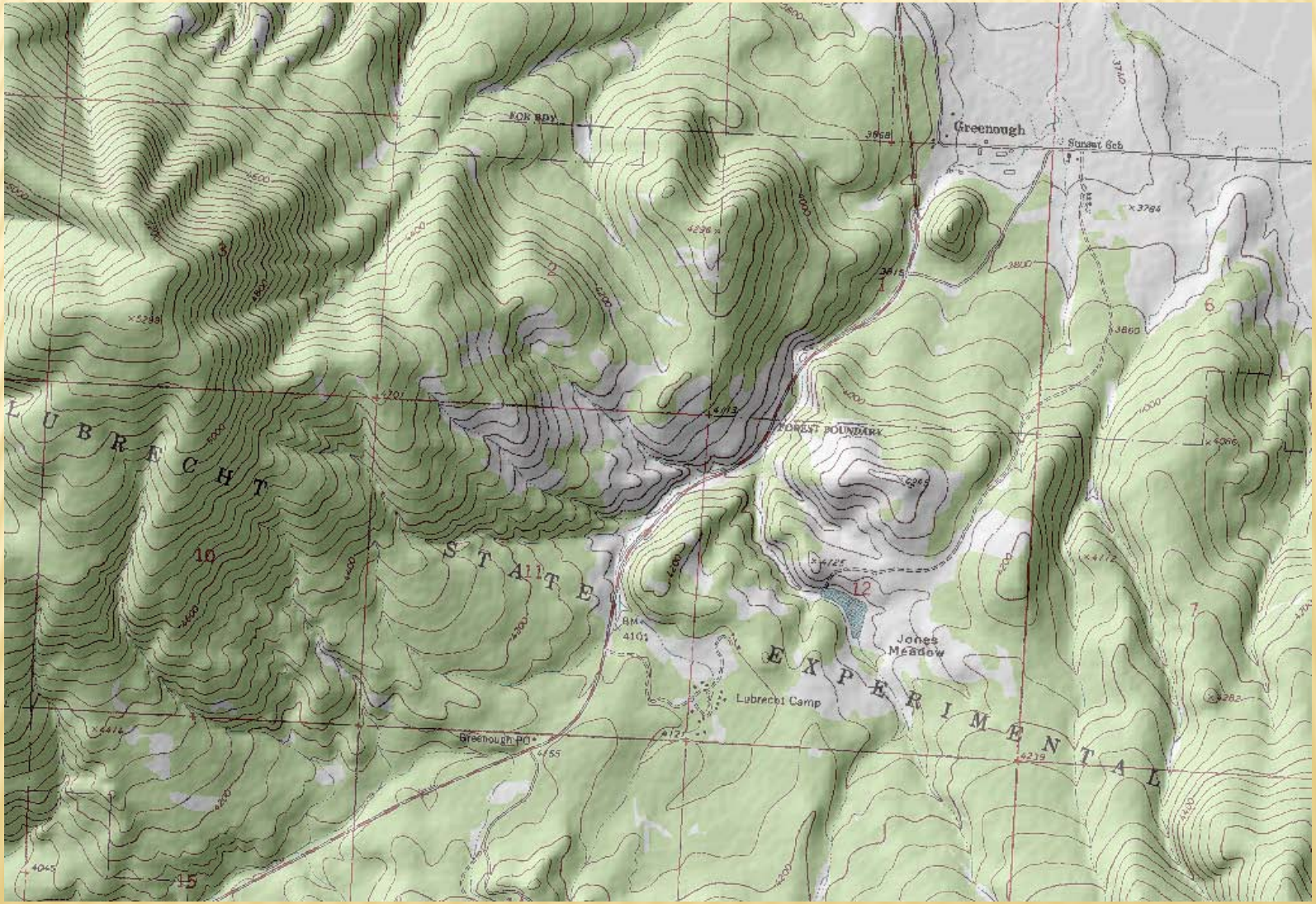
DRG



Step 6: Blend hillshade with DRG to create composite image

BLENDING SERVICES

Blended image service

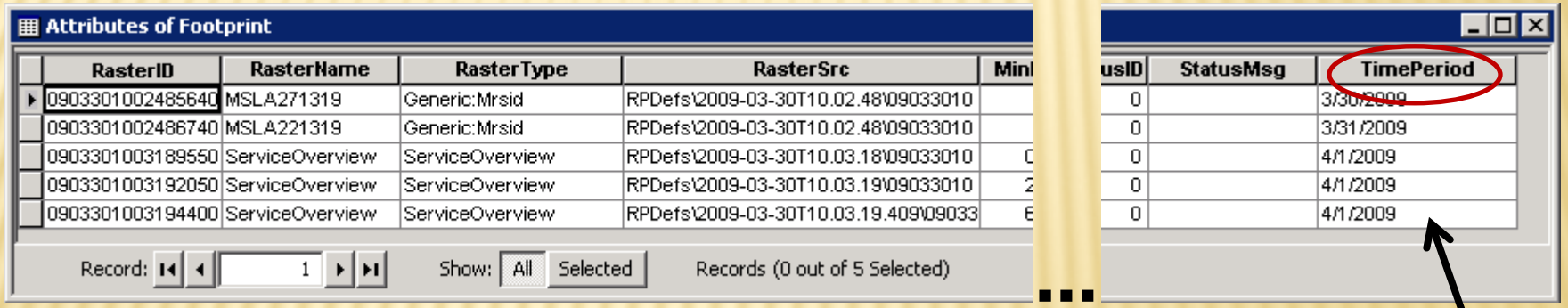


TIME SERIES

Working with raster metadata

2	2	2	2	2
2	2	1 or 2	2	2
2	2	1 or 2	2	2

Factoid: You can modify an image service definition file without stopping the service. The only time the service has to be stopped and started is after (while?) compiling the service.

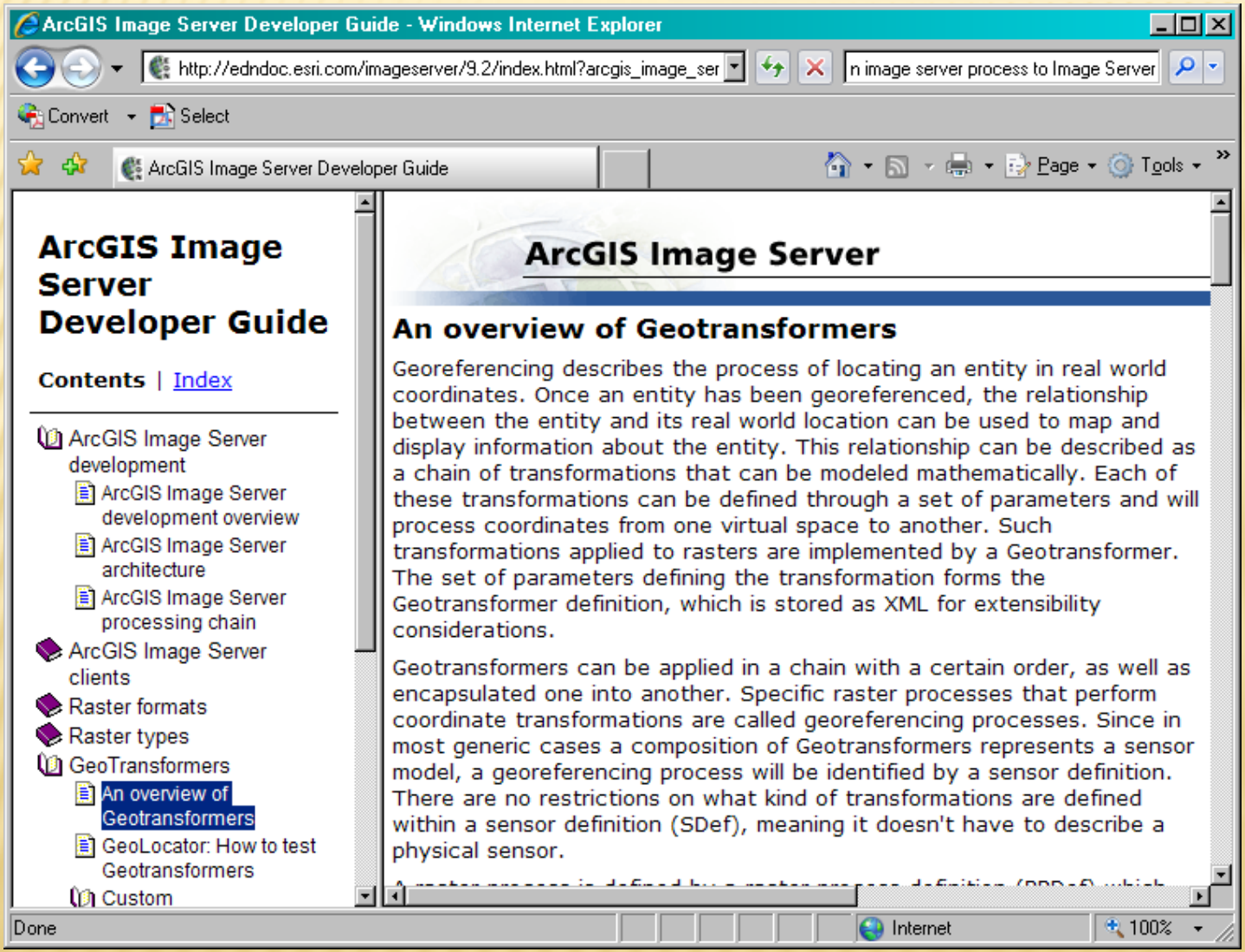


- Define additional attributes for footprints, such as collection period.
- Can be of type date or numeric
- This field is defined in process editor as type “metadata”
- Enable the mosaic process “by attribute” in properties dialog box
- Raster can be selected by attribute value (client- or server-side)

USER-DEFINED PROCESS

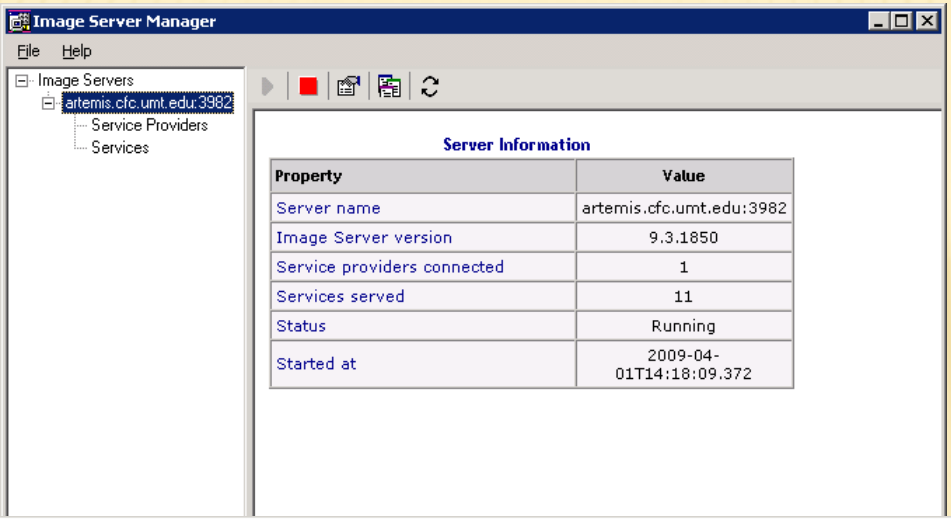
GeoTransformers

http://edndoc.esri.com/imageserver/9.2/



PUBLISHING A SERVICE

Image Server Manager



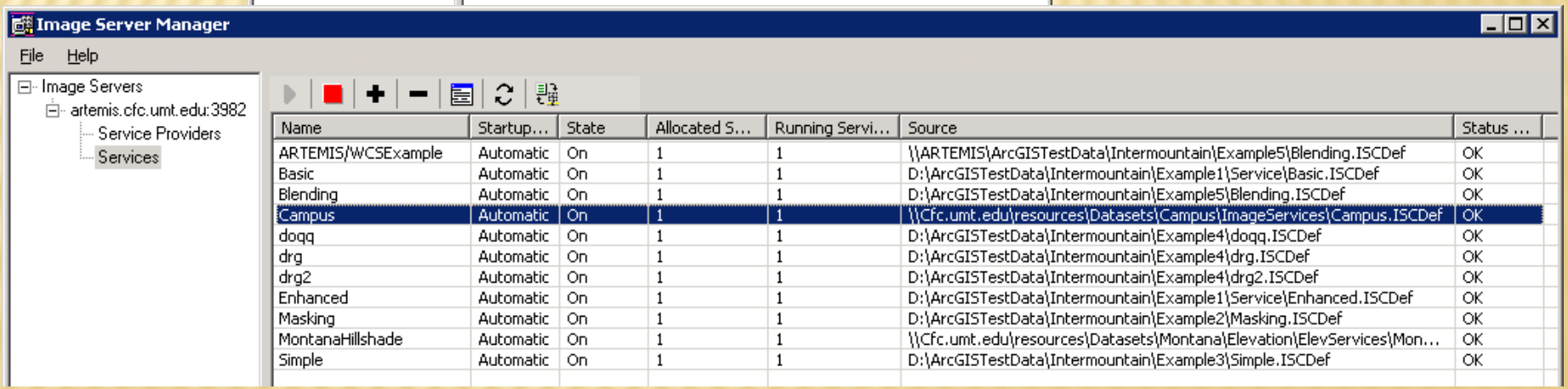


IMAGE SERVER CLIENTS

Image Server Desktop Client

Image Server client must be installed to access image services with in ArcGIS desktop. This is a free download from ESRI for the following products:

- ArcGIS Desktop 9.2 SP6
- ArcGIS Desktop 9.3
- AutoCad
- GeoMedia
- MapInfo
- Microstation
- Open Geospatial Consortium (WMS, WCS)

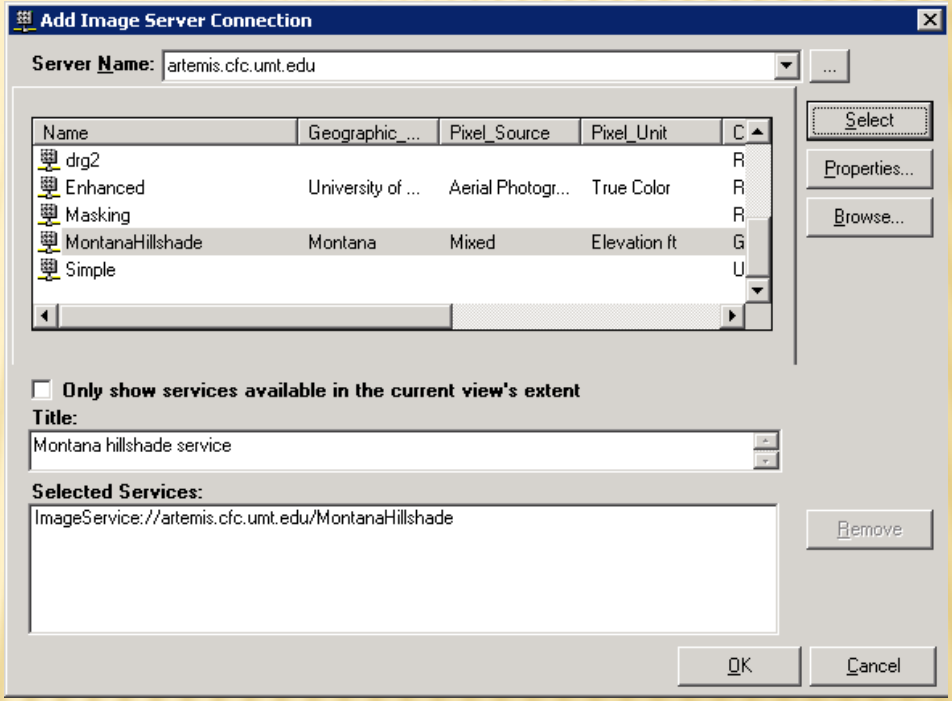
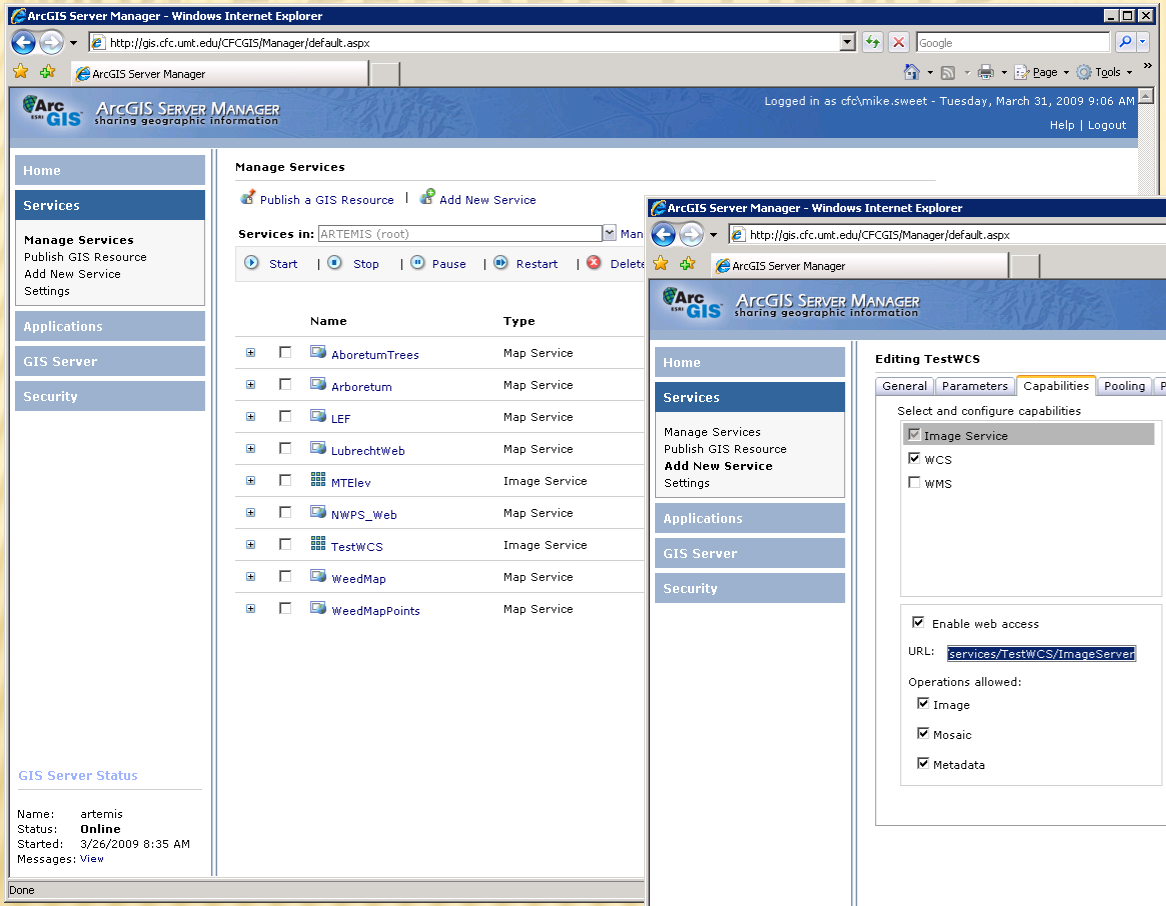
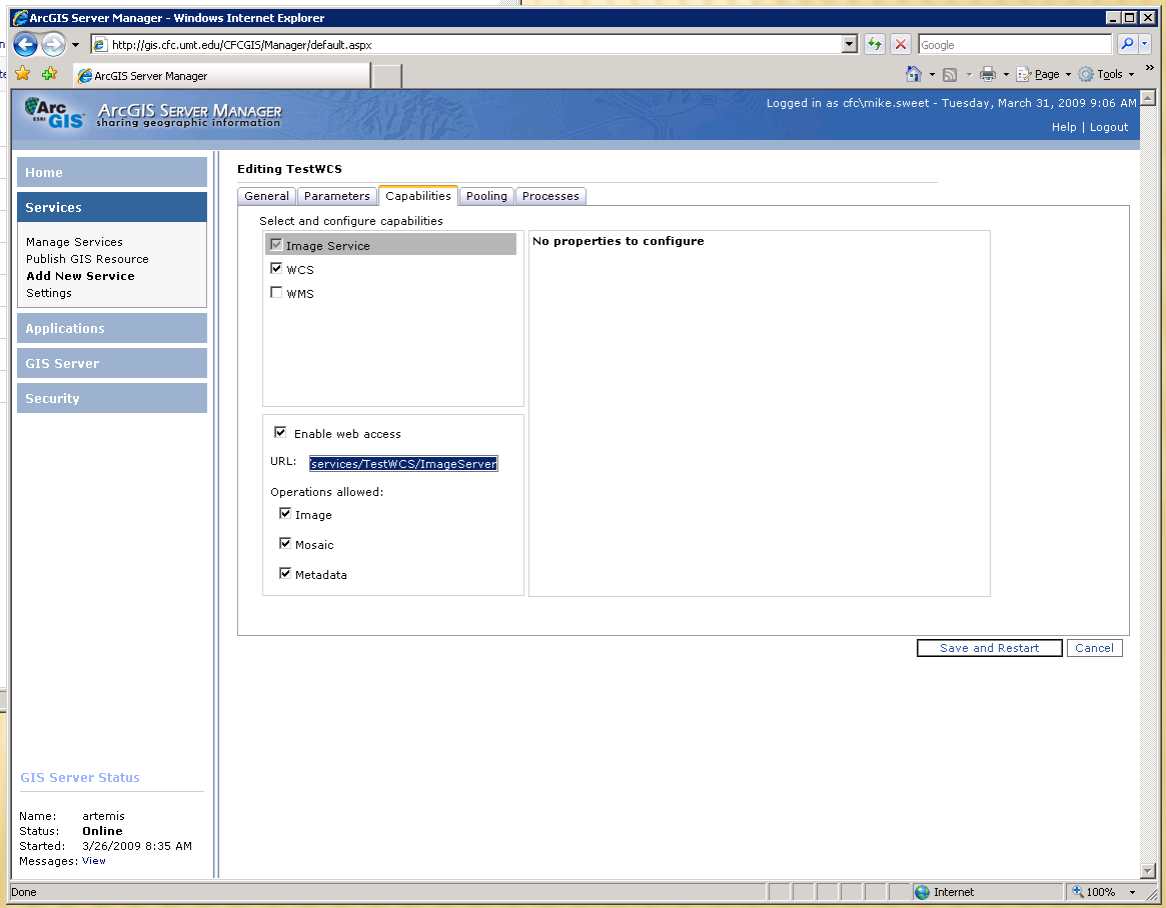


IMAGE SERVER CLIENTS

ArcGIS Server Services

Port 80 versus
Port 3982/3983

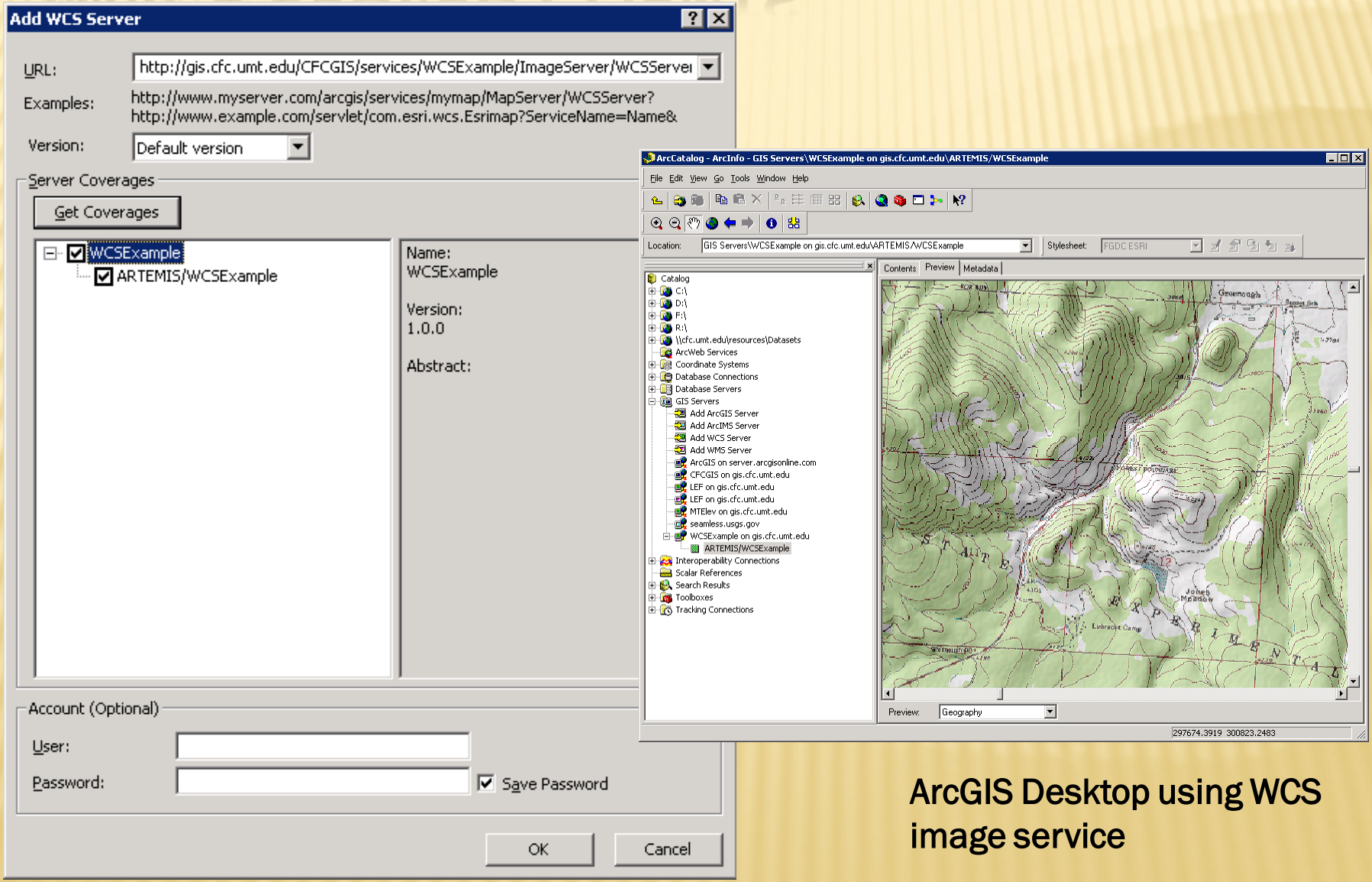




ArcGIS Server Image Service with WCS enabled

IMAGE SERVER CLIENTS

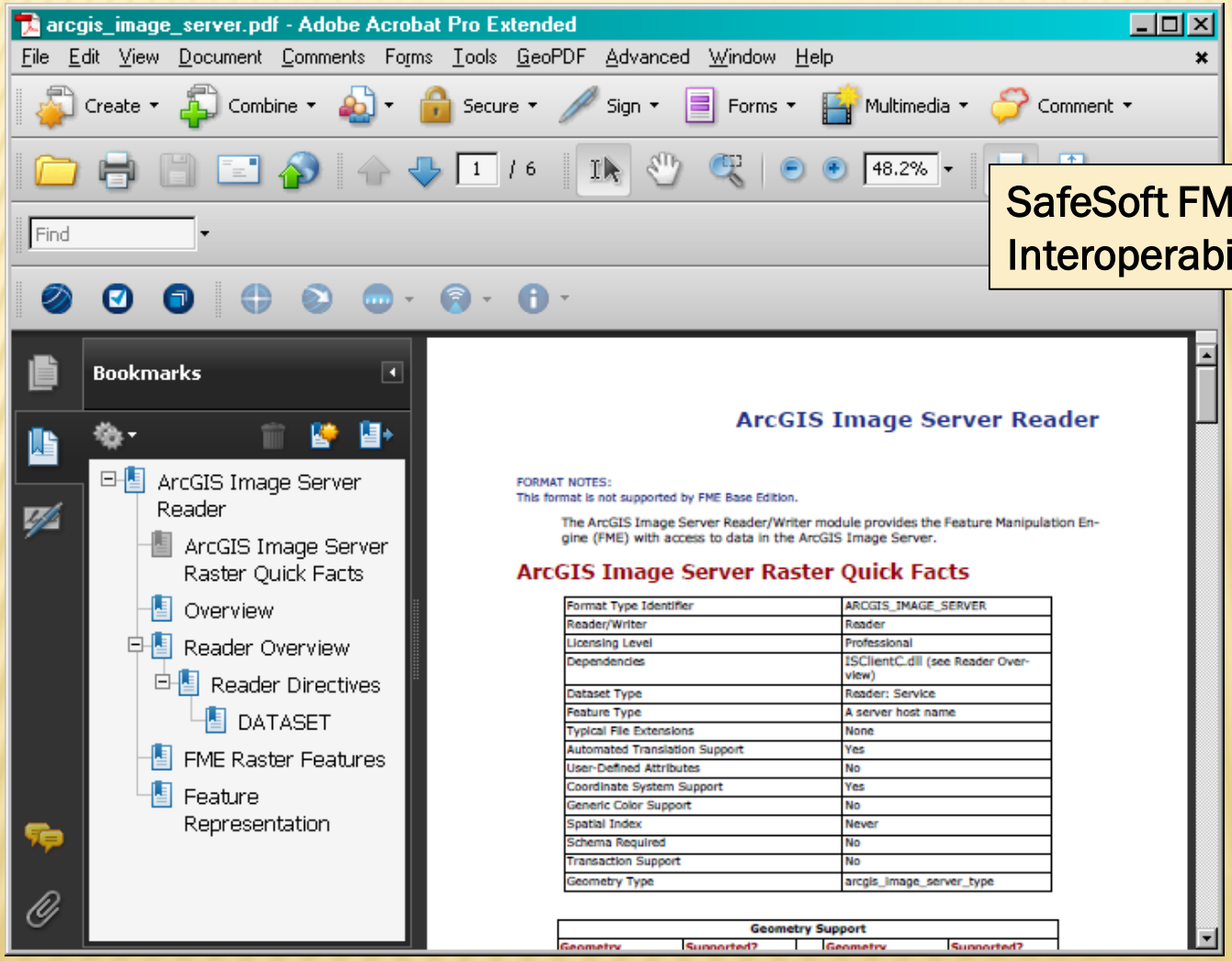
ArcGIS Desktop WCS Service



ArcGIS Desktop using WCS image service

IMAGE SERVER CLIENTS

Interoperability Client



SafeSoft FME and ArcGIS Interoperability Extension

IMAGE SERVER CLIENTS

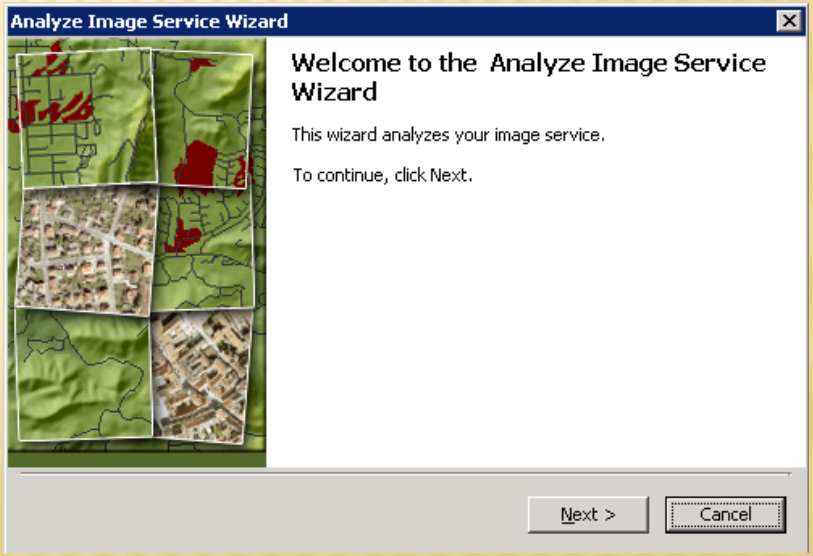
Interoperability Client

- The ArcGIS Server Image format is a reader only, since the product itself doesn't have it's own format (we read from a service). However for writing, it (the ArcGIS Server Image product) supports as source many of the same formats FME supports as a destination, plus I strongly suspect it would also accept a service as input, so you could create an "on-the-fly" FME writer using an FME Server service as an ArcGIS source.
- *To get access to this format requires installation of the **ArcGIS Image Server Client Core.***

http://www.safe.com/reader_writerPDF/arcgis_image_server.pdf

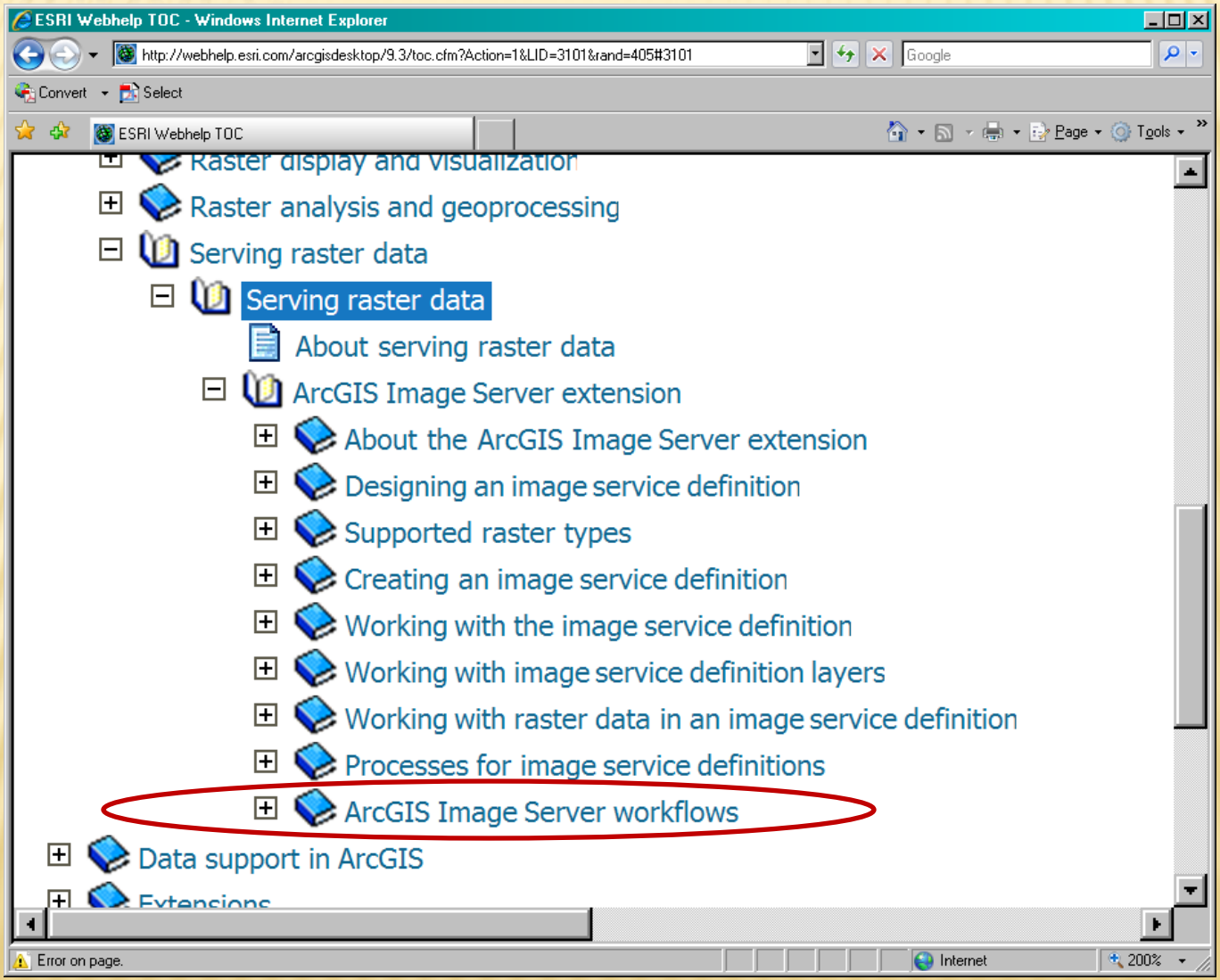
TIPS AND TRICKS

- ETL (Error, Trial, and Learn)
- Stepwise development (analyze for errors)
- Raster definition files (XML) are handy
- Prototype then scale problem
- NoData is your friend
- Scripting



RESOURCES

http://webhelp.esri.com/arcgisdesktop/9.3/



RESOURCES

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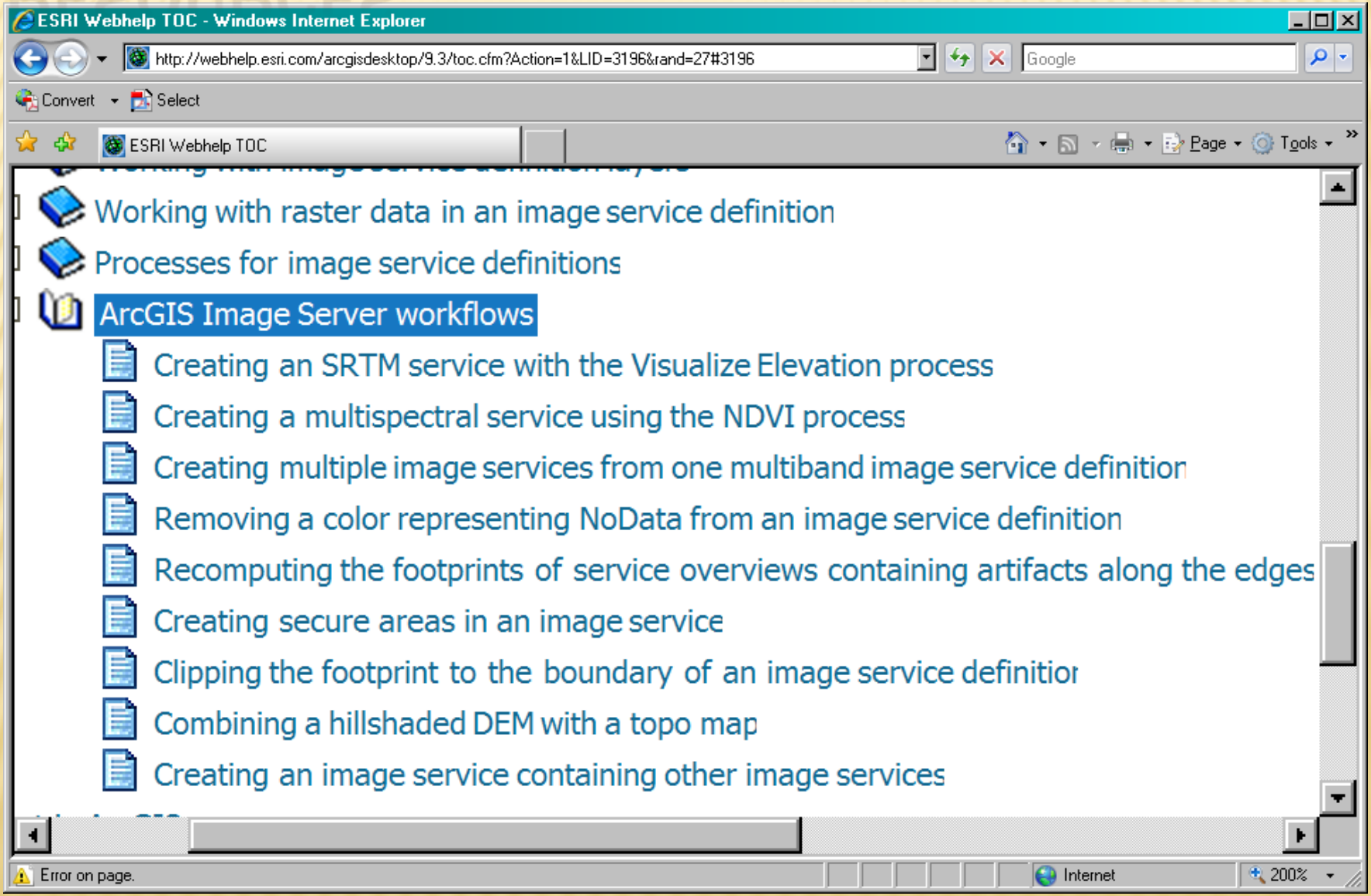
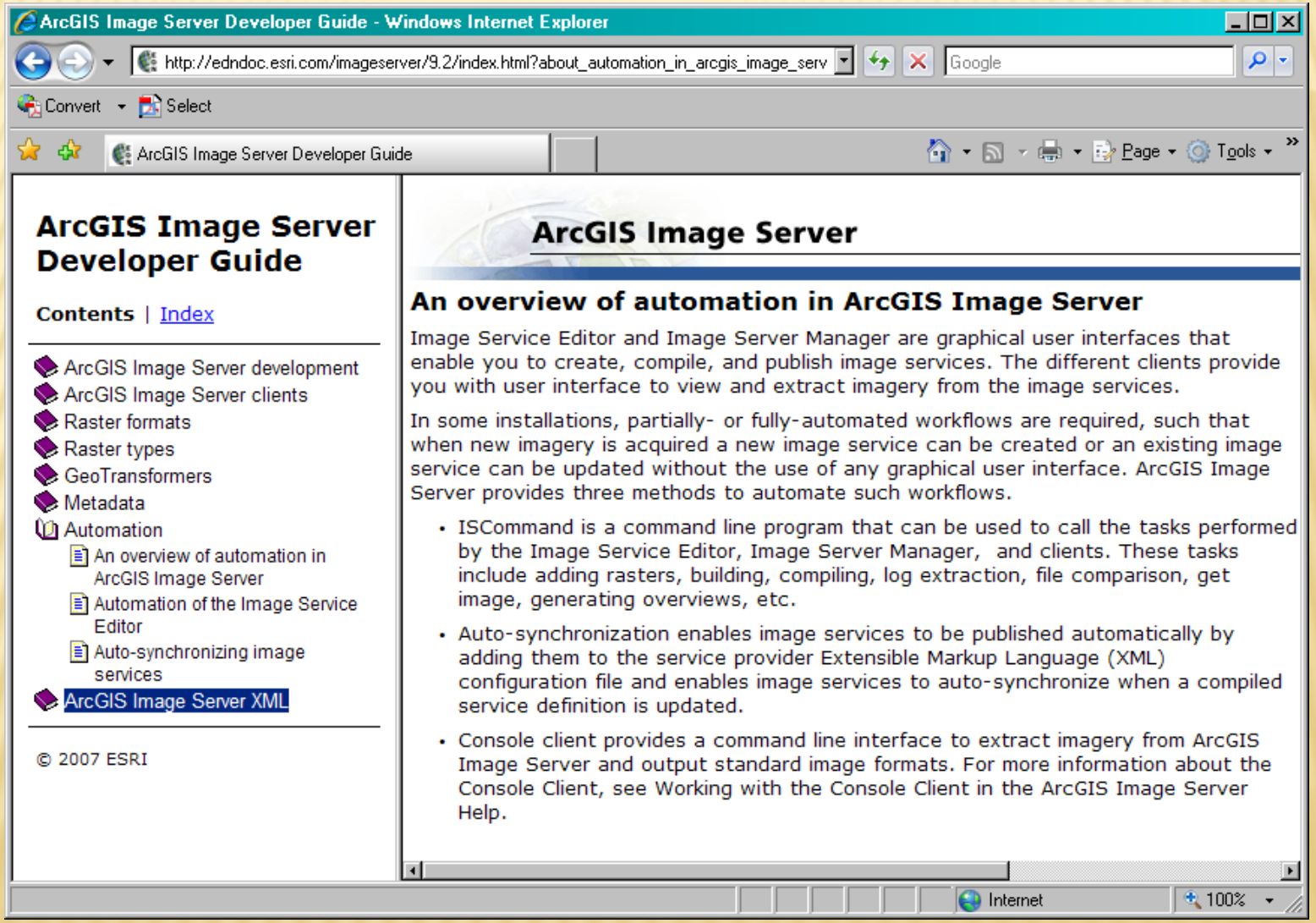


RESOURCES

http://edndoc.esri.com/imageserver/9.2/



OBSERVATIONS

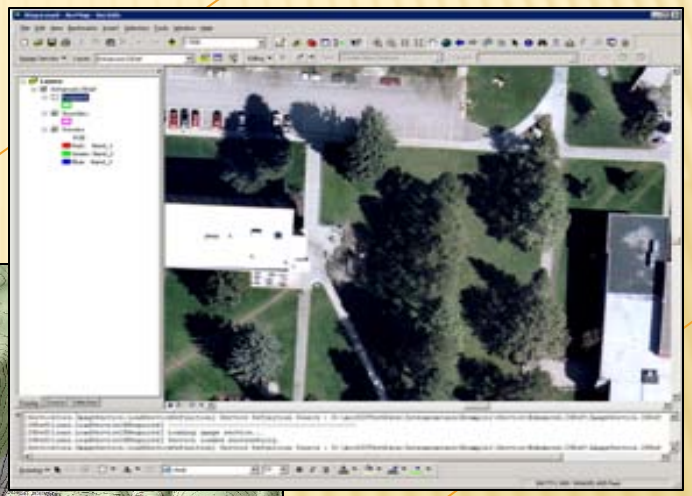
- 10-20% storage overhead.
- Great potential. Meets our objectives.
- Steep learning curve.
- Image Server tutorial is excellent introduction.
- It's not a bug, it's a workflow issue.
- Image services are not (yet) supported in 3D applications like ArcGlobe and ArcExplorer

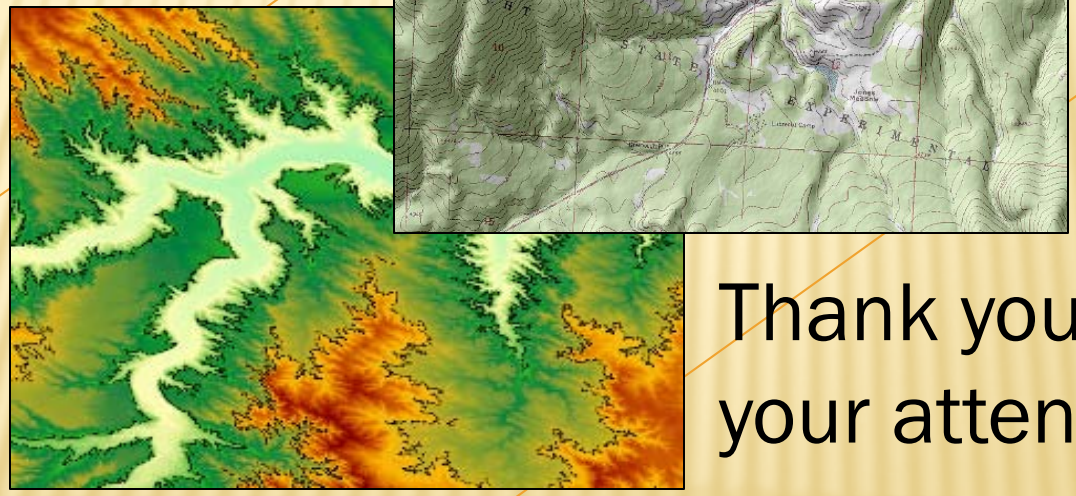
OBSERVATIONS

Advantages:

- Data management/storage
- Less processing
- Quick acquisition to dissemination time
- Server processes (client-enabled dynamic layers in an ArcGIS Server map service)
- Client processes (client can modify service locally)
- Different views of the same data without duplicating source

ARCGIS SERVER IMAGE EXTENSION





The End

Thank you for your attention

COLLEGE OF FORESTRY AND CONSERVATION
Where Ideas Take Flight