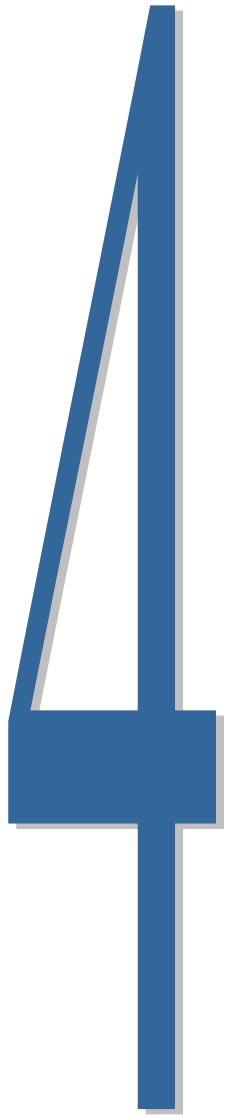


Map content optimization



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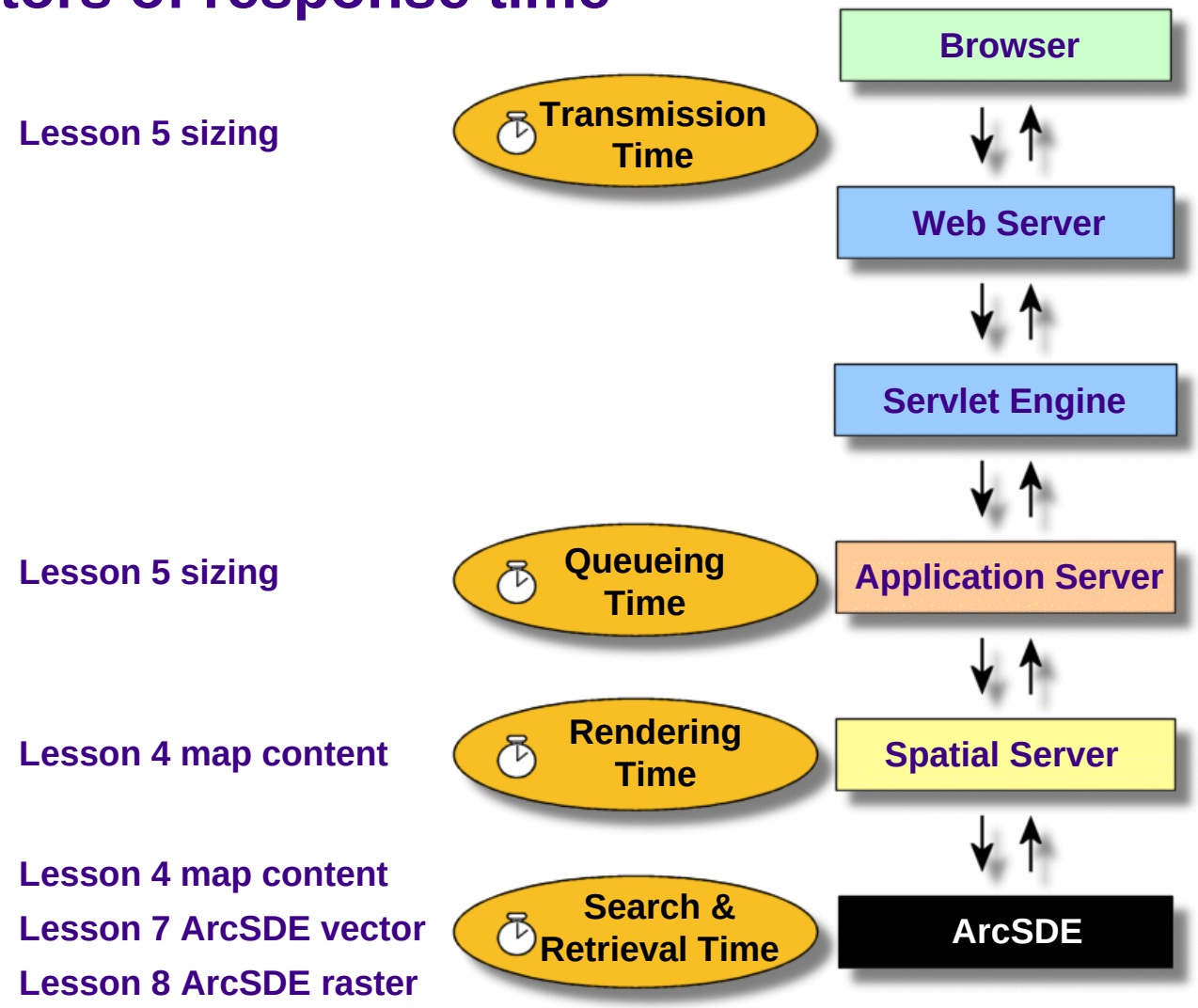
Lesson 4 goals

- Explore Spatial Server log files
- Data generalization
- Map configuration file tuning
- Output image options

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Response time factors

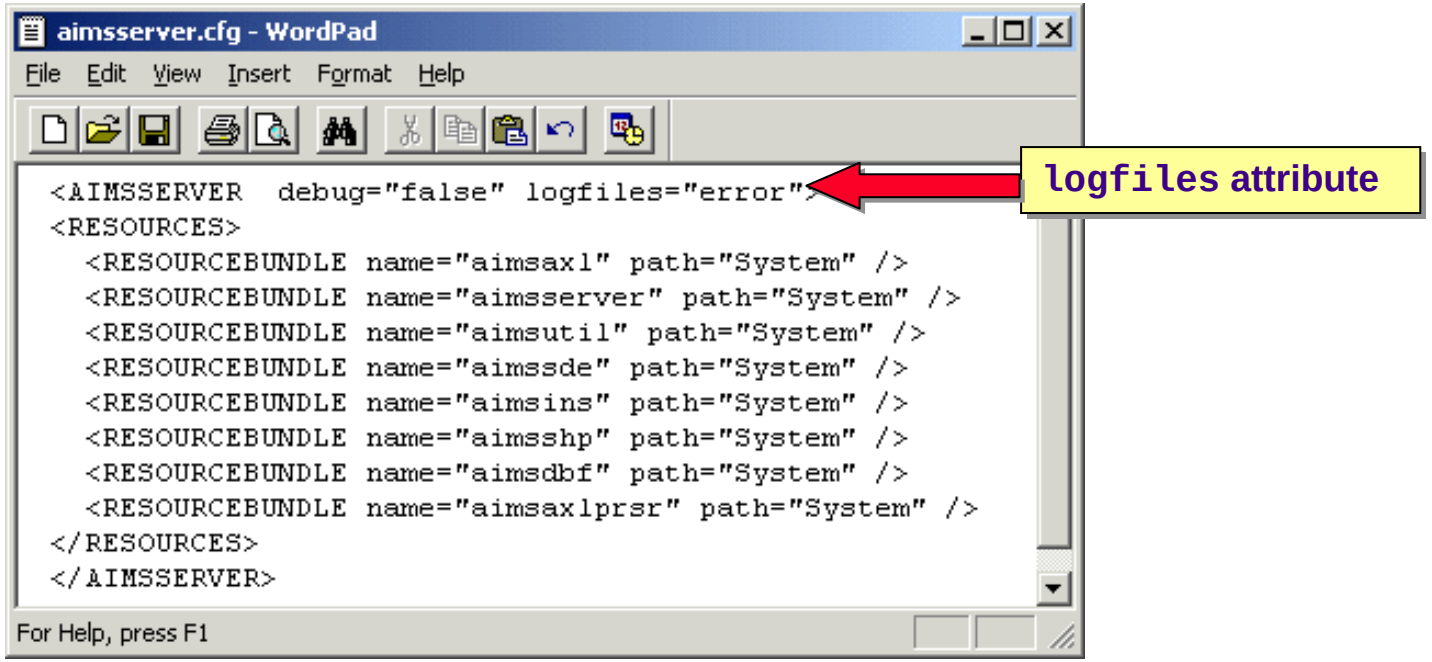
- Four main factors of response time



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Interpreting log files

- Each Virtual Server has a log file
- By default only error messages will be recorded
- Edit aimsserver.cfg to enable logging of server response time
  - `logfiles` attribute



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Log file logging modes

- Values for `logfiles` include:
  - `error`: (the default): Errors only
  - `minimal`: Records service response time for each request
  - on: Records time spent on each layer in service, total time for service, and complete ArcXML request/response
  - `off`: Nothing is written to log files
- To change the logging mode, the ArcIMS services must be restarted
- `logfiles` values set to `minimal` or on reduce ArcIMS performance
  - Use for development only

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ImageServer log file

Example: ImageServer log file with `logfiles` set to on

```
[Feb3 02 10:11:19AM][22722INFO1] Begin Request
[Feb3 02 10:11:19AM][22722INFO3] REQUEST: <GET_IMAGE>
<PROPERTIES>
</PROPERTIES>
</GET_IMAGE>

[Feb3 02 10:11:19AM][22722INFO1] GET_IMAGE: Wilson

[Feb3 02 10:11:19AM][22722INFO2] FEATURE LAYER: soils
[Feb3 02 10:11:20AM][22722INFO2] DATA SEARCH TIME: 0.100000s
[Feb3 02 10:11:21AM][22722INFO2] VMR FEATURES PROCESSED: 502
[Feb3 02 10:11:21AM][22722INFO2] DATA RETRIEVAL TIME: 1.622000s

[Feb3 02 10:11:21AM][22722INFO2] FEATURE LAYER: parcels
[Feb3 02 10:11:26AM][22722INFO2] DATA SEARCH TIME: 5.077000s
[Feb3 02 10:11:34AM][22722INFO2] SR FEATURES PROCESSED: 7529
[Feb3 02 10:11:34AM][22722INFO2] DATA RETRIEVAL TIME: 8.162000s

[Feb3 02 10:11:35AM][22722INFO2] FEATURE LAYER: streets
[Feb3 02 10:11:35AM][22722INFO2] DATA SEARCH TIME: 0.120000s
[Feb3 02 10:11:36AM][22722INFO2] GR FEATURES PROCESSED: 1278
[Feb3 02 10:11:36AM][22722INFO2] DATA RETRIEVAL TIME: 0.992000s

[Feb3 02 10:11:36AM][22722INFO2] FEATURE LAYER: rail
[Feb3 02 10:11:36AM][22722INFO2] DATA SEARCH TIME: 0.020000s
[Feb3 02 10:11:36AM][22722INFO2] SR FEATURES PROCESSED: 11
[Feb3 02 10:11:36AM][22722INFO2] DATA RETRIEVAL TIME: 0.020000s

[Feb3 02 10:11:37AM][22722INFO2] TOTAL PROCESSING TIME: 17.586000s
[Feb3 02 10:11:37AM][22722INFO2] OUTPUT TIME: 0.150000s

[Feb3 02 10:11:37AM][22722INFO3] RESPONSE: <?xml version="1.0" encoding="UTF-8"?>
<ARCXML version="1.1">
<RESPONSE>
<IMAGE>
<ENVELOPE minx="2301529.42534811" miny="721267.139684625" maxx="2325554.52310751" maxy="739285.963004175" />
<OUTPUT url="http://bricker/output/wilson_BRICKER227220.jpg" />
</IMAGE>
</RESPONSE>
</ARCXML>

[Feb3 02 10:11:37AM][22722INFO1] Total Request Time: 17.756000s
[Feb3 02 10:11:37AM][22722INFO1] End Request
```

GET_IMAGE: Request coming from a client for a particular service (service name is Wilson)

FEATURE LAYER, DATA SEARCH TIME, SR FEATURES PROCESSED, DATA RETRIEVAL TIME: Information about an individual layer in a service

ArcXML response logged

Total Request Time: Time for request to be processed by the Spatial Server

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Using log files

```
GET_IMAGE: wilson
AXL Parse Time: 0.171000s
RENDERER SETUP: 0.000000s

FEATURE LAYER: soils
DATA SEARCH TIME: 0.511000s
VMR FEATURES PROCESSED: 501
DATA RETRIEVAL TIME: 1.712000s

FEATURE LAYER: parcels
DATA SEARCH TIME: 1.612000s
SR FEATURES PROCESSED: 7633
DATA RETRIEVAL TIME: 6.690000s

FEATURE LAYER: runway
DATA SEARCH TIME: 0.080000s
SR FEATURES PROCESSED: 8
DATA RETRIEVAL TIME: 0.000000s

FEATURE LAYER: greenway
DATA SEARCH TIME: 0.100000s
SR FEATURES PROCESSED: 3
DATA RETRIEVAL TIME: 0.070000s
FEATURE LAYER: streets
DATA SEARCH TIME: 0.201000s
GR FEATURES PROCESSED: 1281
DATA RETRIEVAL TIME: 1.532000s

FEATURE LAYER: rail
DATA SEARCH TIME: 0.100000s
SR FEATURES PROCESSED: 11
DATA RETRIEVAL TIME: 0.060000s

TOTAL PROCESSING TIME: 13.990000s
OUTPUT TIME: 0.110000s
Total Request Time: 14.311000s
End Request
```

- What is the name of the service?
- Are there any bottlenecks?
- How long did the Spatial Server spend processing this request?

One log file is created for each Virtual Server

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Image output size

- Rendering time is proportional to number of features
- Large images impact performance
  - More time to write to disk
  - More time to send to client (discussed in Lesson 5)

Example: same extents

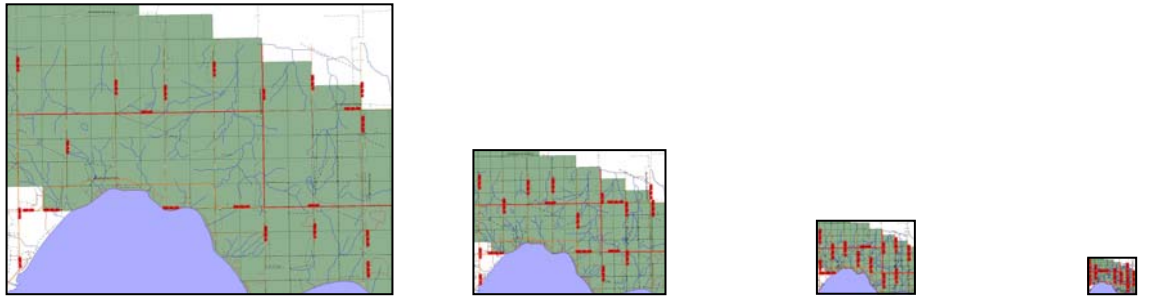
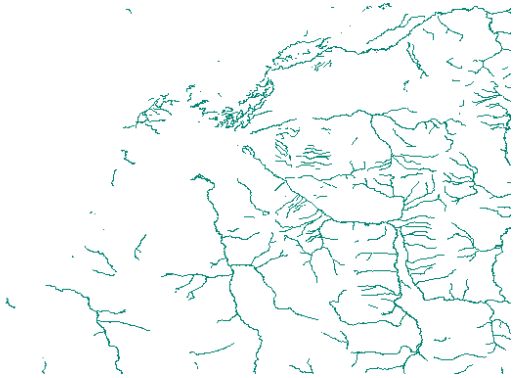


IMAGE SIZE (pixels)	1600x1200	800x600	400x300	200x150
FILE SIZE	264KB	115KB	47KB	17KB
TOTAL PROCESSING TIME	0.39s	0.36s	0.34s	0.34s
OUTPUT TIME	0.50s	0.20s	0.09s	0.05s

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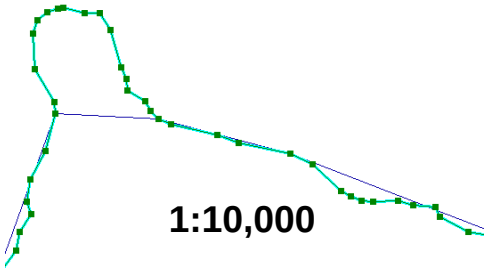
Data generalization

- Some data may be too detailed for full extent
- By generalizing data
  - Increased performance can be achieved
  - Little visible difference in an ArcIMS client should be seen at normal viewing scales

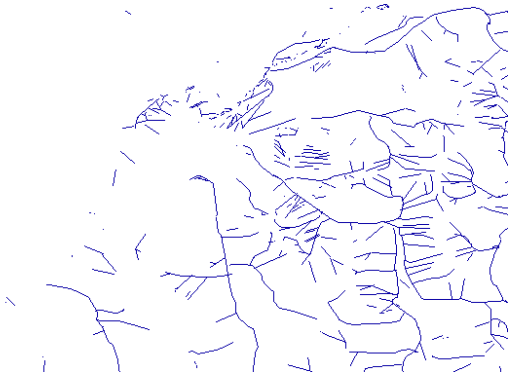


Not Generalized

1:900,000



1:10,000



Generalized

dataset 1/3 of the size

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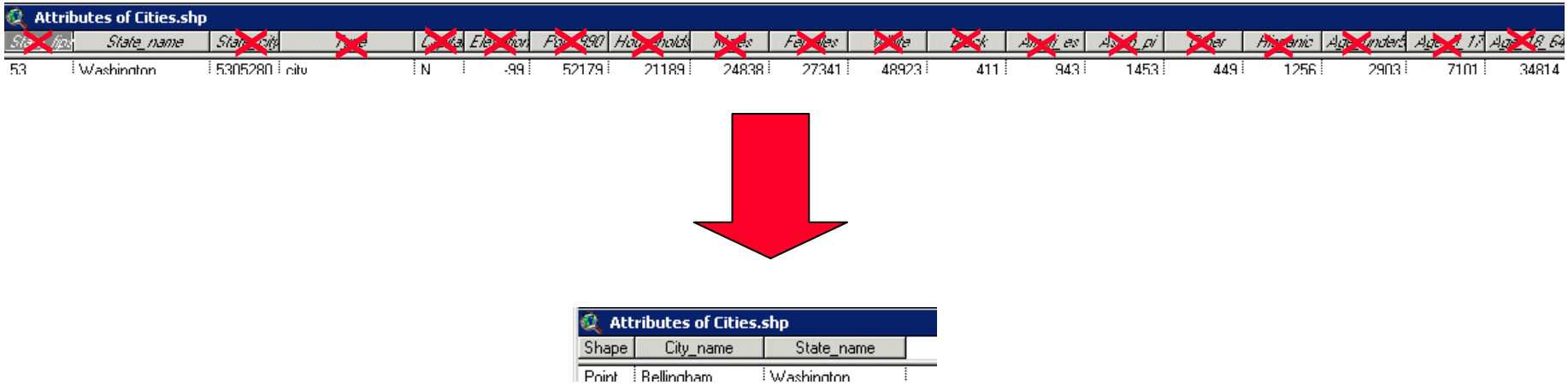
Data generalization options

- How to generalize:
  - ArcView 3.x: Theme.GeneralizeFeatures sample script
  - ArcObjects: Generalize sample
  - ArcInfo Workstation: GENERALIZE command
    - Works on coverages only (convert data to coverage)
    - Accessible through ArcToolbox
    - Use UNSPLIT command first for maximum results

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Reducing shapefile attributes

- To reduce Spatial Server processing time
  - Delete fields from shapefiles that are not of interest



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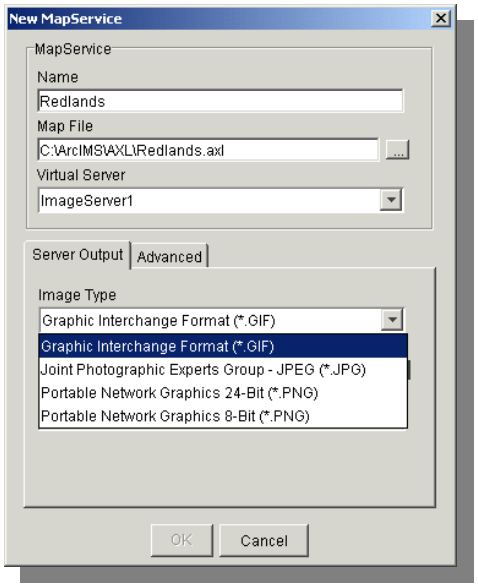
Handling multiple images

- **Multiple image options**
  - **Add each individually: Can result in a large map configuration file if many images need to be added**
  - **ArcIMS image directory: Allows reference to a directory containing multiple images**
  - **ArcView image catalog: A .dbf file that contains the paths to images in many different directories**
  - **ArcSDE raster: Option for loading all images into a database so there is no tiling**

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Image Virtual Server output

- Criteria for Image Virtual Server output format
  - Source data format
  - Transparency requirement
  - Compatibility with client display
  - Image file size
- One of three output formats can be used
  - GIF: Best choice for vector data where there are sharp transitions between colors
  - JPEG: Best output choice for photo-realistic imagery, transparency not supported
  - PNG: Similar to GIF but does not require licensing



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Image output options

- **File size comparison**



Image 1 (vector only)



Image 2 (vector and image)

	Image 1	Image 2
JPEG	94 KB	109 KB
GIF*	20 KB	197 KB
PNG (8 bit)	14 KB	170 KB
PNG (24 bit)	17 KB	433 KB

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Changing JPEG quality

- To improve overall performance, JPEG image quality can be reduced
  - Default: 85 percent
- To change quality
  - Edit aimsms.cfg

```
<parameters>
<parameter name="jpegquality" value="85" />
</parameters>
```

- Small reductions in quality may not be noticeable and will result in smaller file sizes

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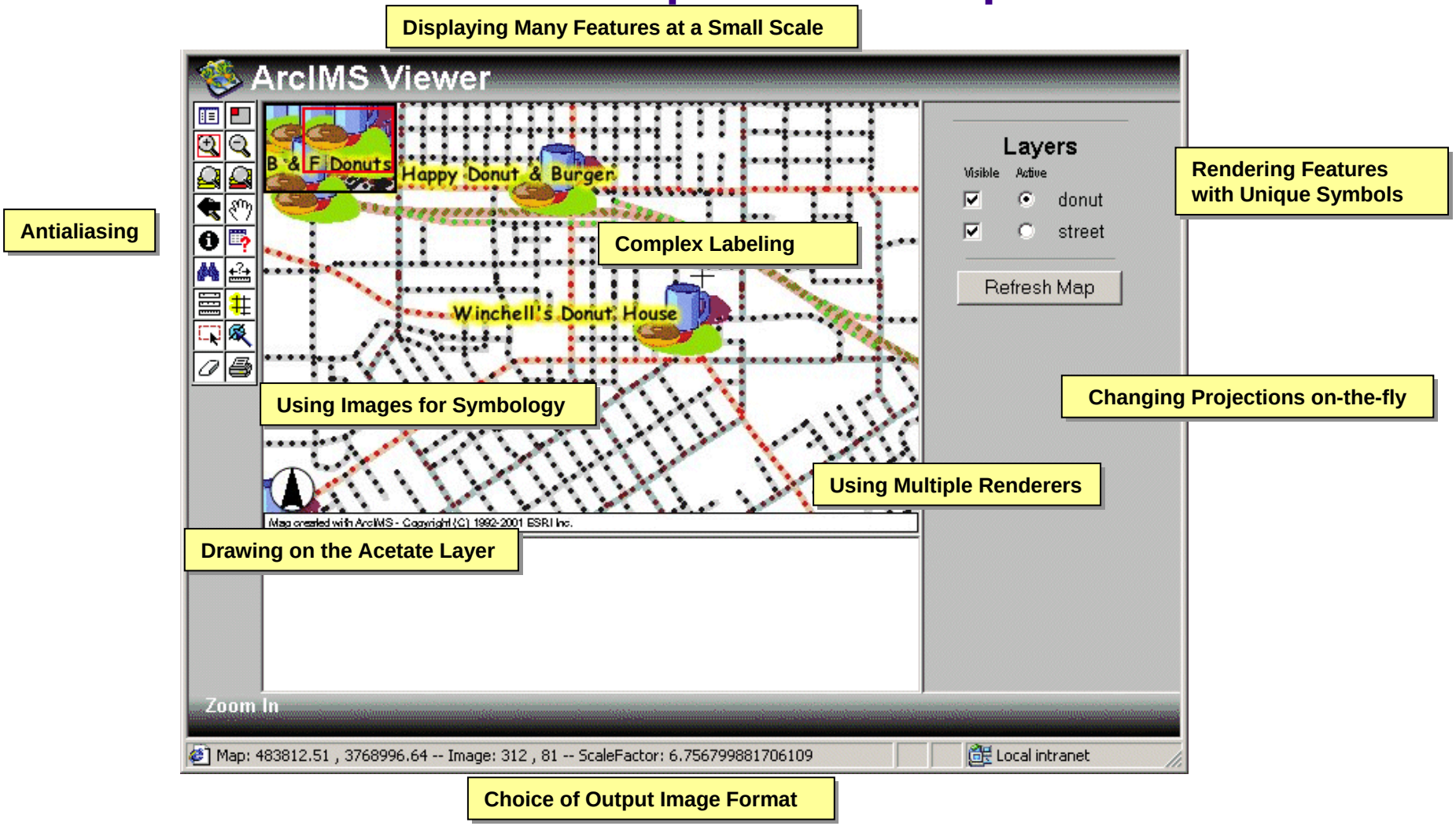
Map configuration file tuning

- **Increasing performance with map configuration file tuning**
  - **Does not require additional hardware/software**
  - **Many small changes to configuration files can have a big overall effect on performance**
  - **Configuration tuning choices can result in a less cluttered map and faster performance**

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Map configuration file tuning

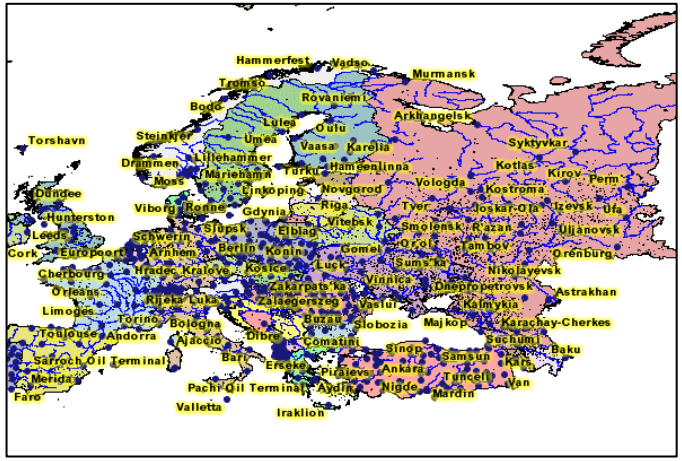
- **Factors that decrease Spatial Server performance**



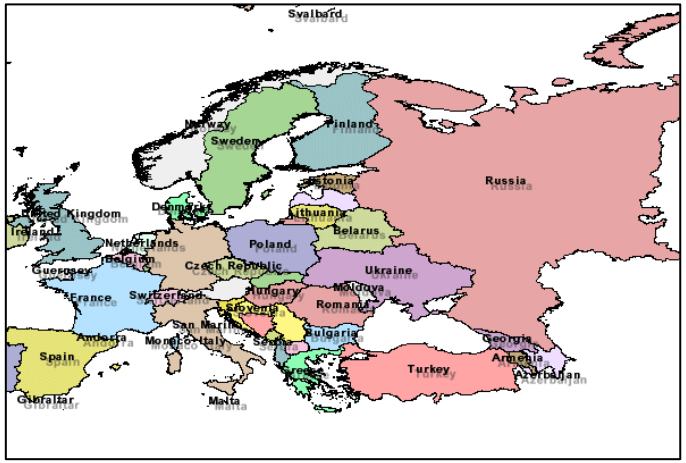
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Scale factors

- Control the features that are visible at a given scale
  - Make maps more visually appealing and less cluttered
  - Can significantly increase ArcIMS performance
    - Less features to render
  - The most cost-effective way of increasing performance



No use of scale factors



Good use of scale factors

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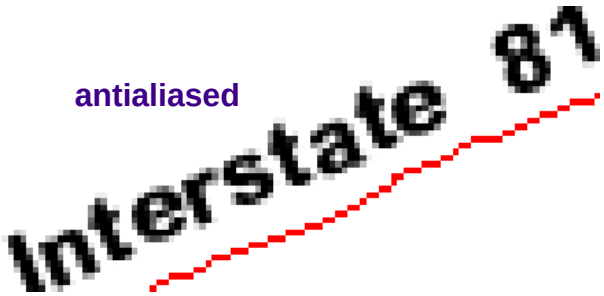
Labeling performance considerations

- Labels that are not antialiased render faster
- Using effects increases rendering time
  - Shadow, glow, background

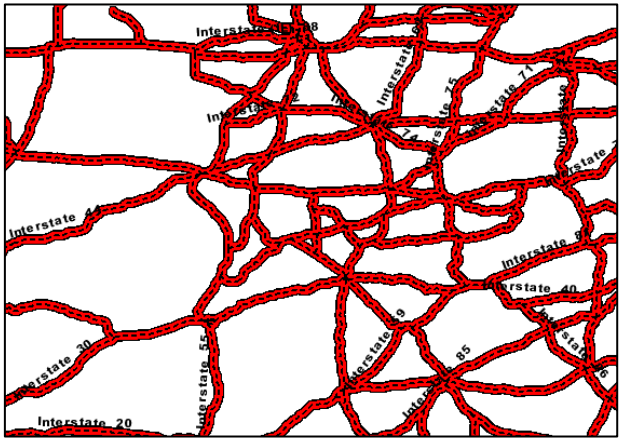
Not antialiased



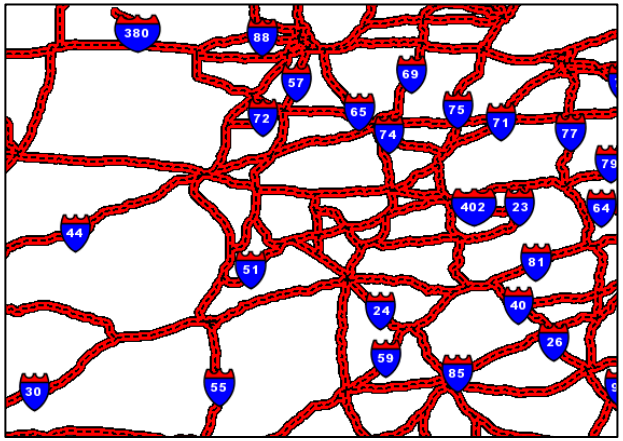
antialiased



Text labels



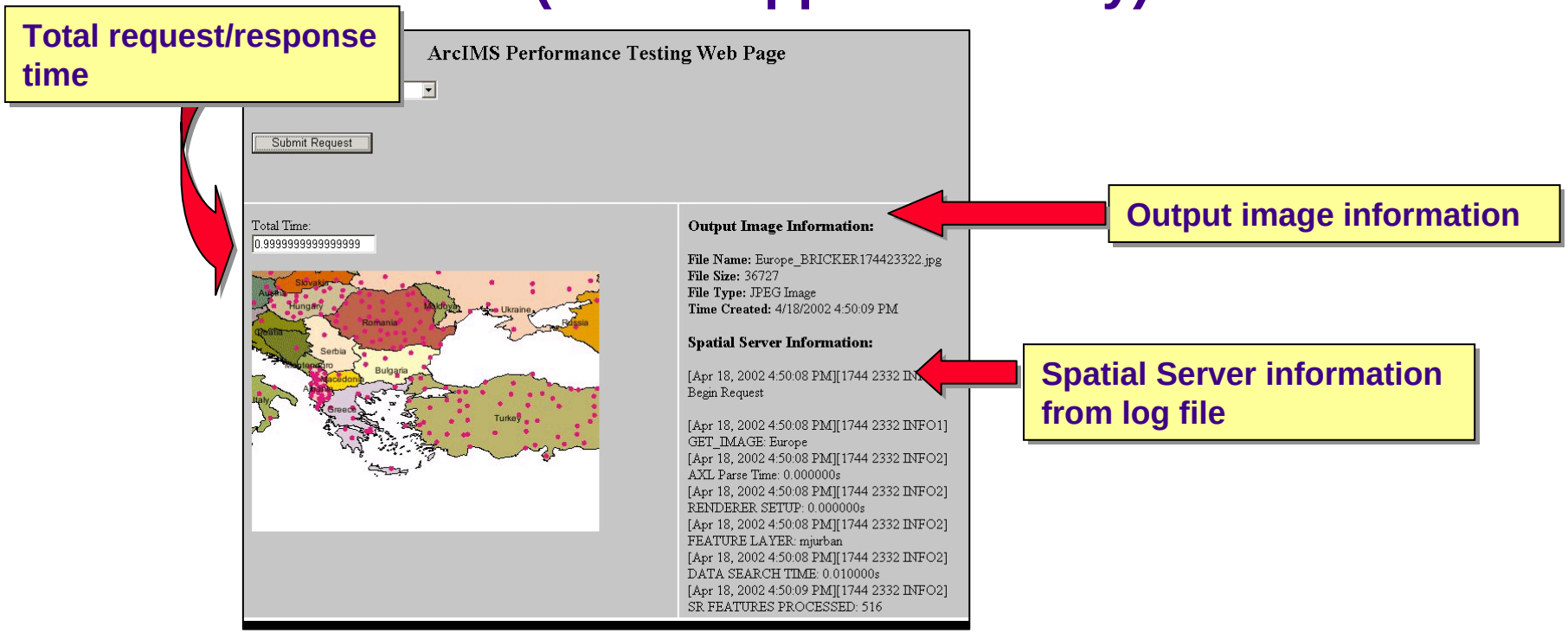
Shield labels



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The Performance Testing example Web page

- Reads Image Virtual Server log file
- Gives information about the output image produced
- Records total time for request/response cycle
- For use in class (not a supported utility)



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Exercise 4 overview

- Enable performance logging
- Use the ArcIMS performance testing Web page
- Edit a map configuration file to increase performance
- Compare the performance of generalized versus ungeneralized data

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Lesson 4 review

- (T/F) It is a good idea to have logging turned on on a production ArcIMS server.
- (T/F) It is possible to exactly predict when a response will be received by an ArcIMS client.
- Name three changes that can be made to a map configuration file to increase ArcIMS performance.

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