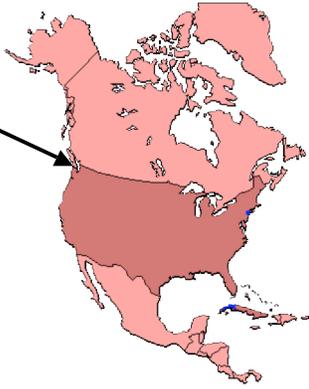


Refractions Research

- Victoria, BC, Canada
- Spatial Systems Consulting
- Open Source Software
- PostGIS
uDig / GeoTools



MUM/EOGEO 2005



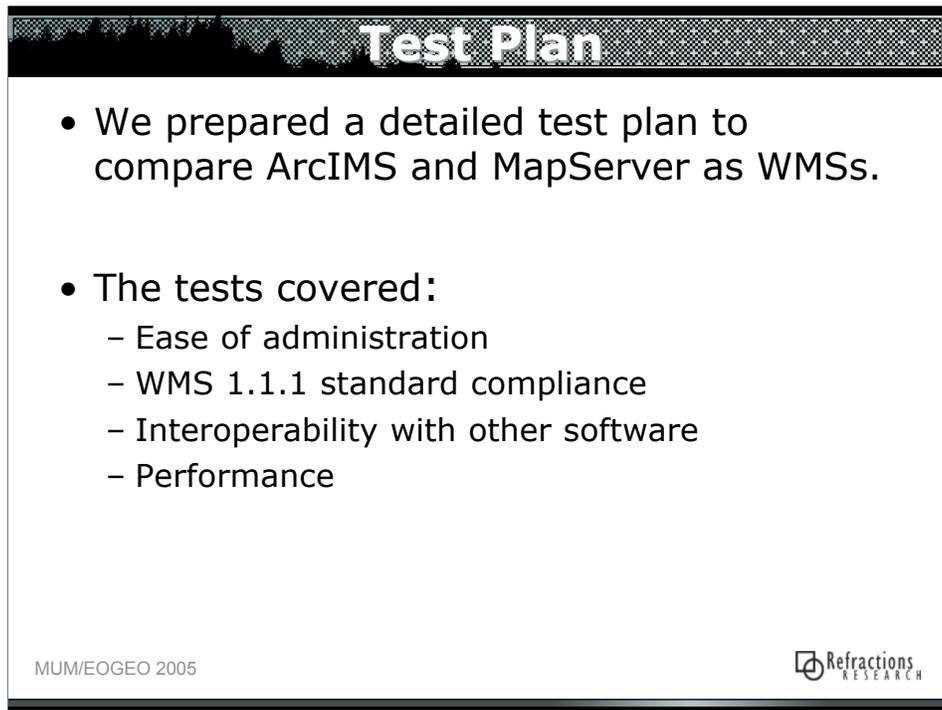
The Client



- BC's Ministry of Sustainable Resource Management (Information Management Branch)
 - Use mostly ESRI products in their mapping infrastructure.
 - Were frustrated with ArcIMS's administrative neediness.
 - Were looking for WMS alternatives to ArcIMS. We suggested MapServer.

MUM/EOGEO 2005



A presentation slide titled "Test Plan" with a decorative header. The slide contains a bulleted list of test objectives and a list of specific tests covered. The footer includes the text "MUM/EOGEO 2005" and the "Refractions RESEARCH" logo.

Test Plan

- We prepared a detailed test plan to compare ArcIMS and MapServer as WMSs.
- The tests covered:
 - Ease of administration
 - WMS 1.1.1 standard compliance
 - Interoperability with other software
 - Performance

MUM/EOGEO 2005 

* Ease of administration

- KEY TEST: time to add and reload services

* Interoperability with other software

- KEY TEST: supports ArcSDE 8.3 and 9.x?

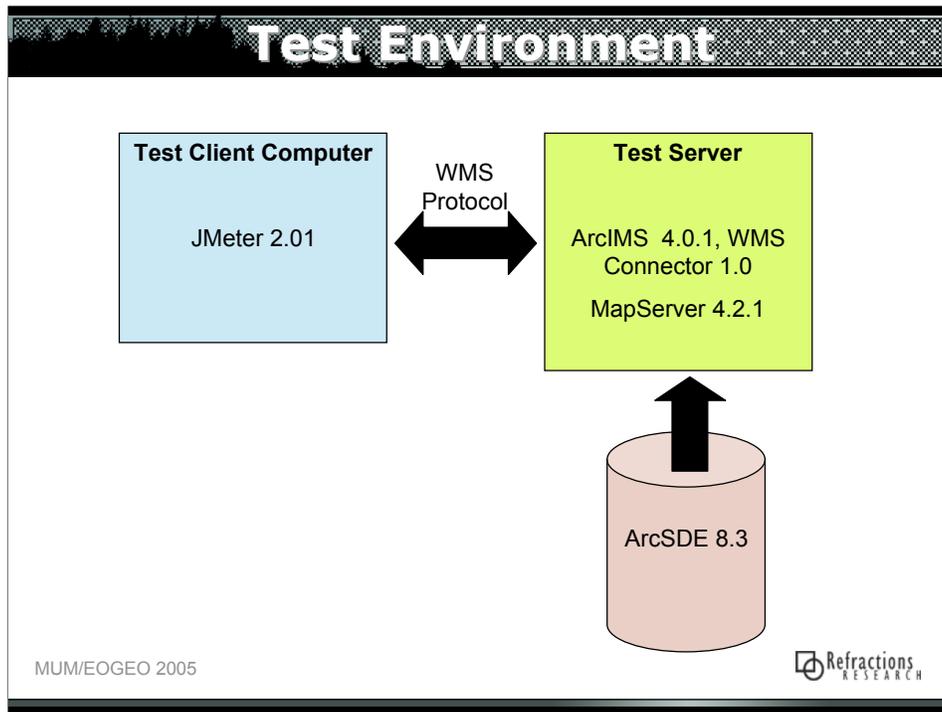
* WMS Standard compliance

- KEY TEST: OGC WMS CITE

* Performance (with ArcSDE)

- KEY TEST: feature density
- KEY TEST: feature complexity
- KEY TEST: image output format
- KEY TEST: concurrency
- KEY TEST: reprojection
- KEY TEST: throughput "under regular operating conditions"

Mapserver versus ArcIMS



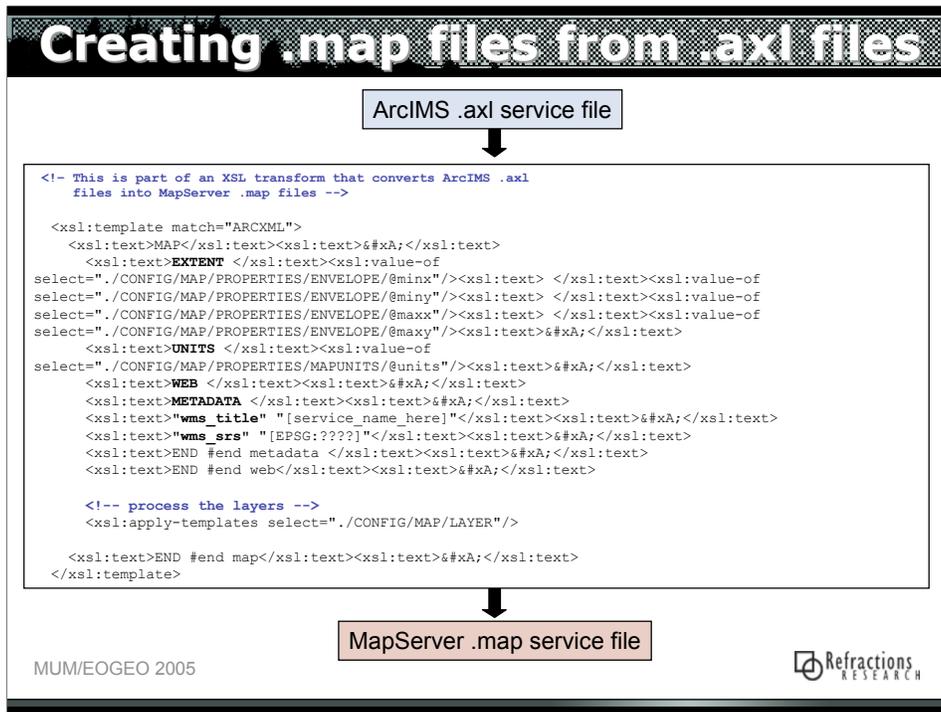
Jmeter is open source software designed to load test functional behavior and measure performance .

Test Preparations

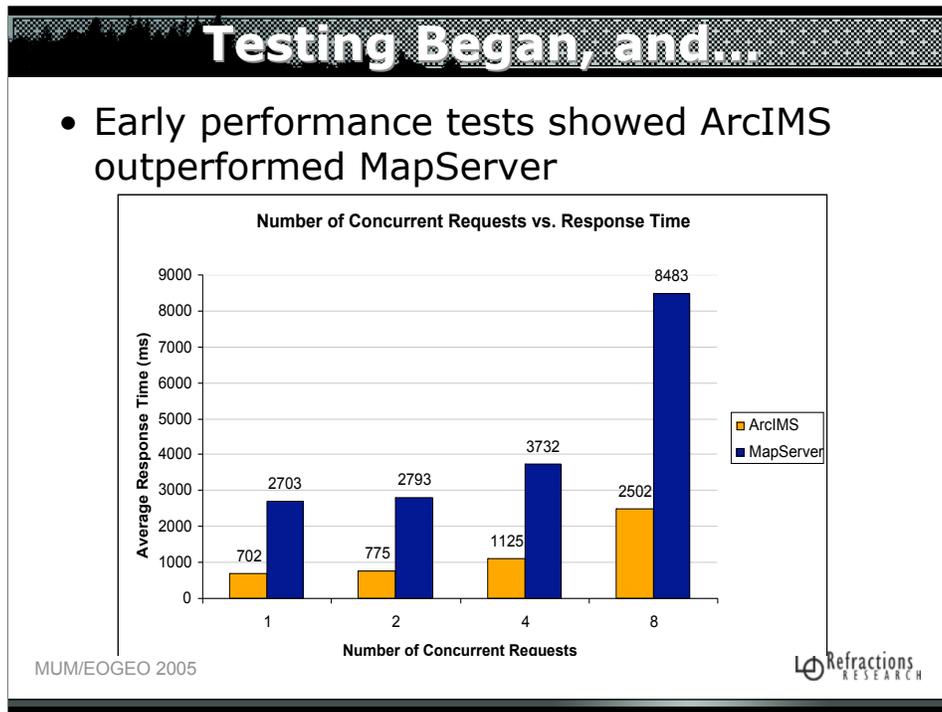
- Created synthetic data to be used for certain performance tests.
- Made a JMeter extension to simulate a diversity of GetMap requests.
- Created ArcIMS AXL files and MapServer map files.

MUM/EOGEO 2005 

- Synthetic data used for feature density and feature complexity test.
- JMeter extension used to generate WMS requests with random bboxes.
- Started with AXL files, and transformed them into .map files



- Our client had an “optimized” .axl file containing their provincial basemap data.
- We used that .axl file to create a .map file from.



- An initial test to convince ourselves that MapServer was comparable to ArcIMS
- We requested the same map each time: 4 layers (including points, lines and polygons)
- Each level of concurrency run for 10 minutes.
- Mention that 1) all graphs have at least 30 samples per point. 2) All tests done against ArcSDE.

MapServer's Bottlenecks

- Profiling revealed two main bottlenecks:
 - 1 to 2 seconds of ArcSDE connection overhead per GetMap request
 - Additional overhead extracting features from ArcSDE



Minimizing the Connection Overhead

- Persistent database connections would nearly eliminate ArcSDE connection overhead.
- **As a CGI program, MapServer had no means to support persistent connections.**
- Added FastCGI support. Thanks Frank!
- Updated the ArcSDE module to utilize persistent connections. Thanks Howard!

MUM/EOGEO 2005



- Frank Warmerdam added FastCGI support to MapServer, and he created a connection pooling API
- Howard Butler updated the ArcSDE module to utilize connection pooling

Using MapServer with FastCGI

1. Compile MapServer with FastCGI support.
2. Configure your web server with a FastCGI module.
3. Update your map files:

```
LAYER
  PROCESSING "CLOSE_CONNECTION=DEFER"
  #all other layer settings here...
END #LAYER
```

* Persistent connections are most useful for data sources with large connection overhead, such as ArcSDE.

Other Enhancements

- Recall, connection overhead was not the only slowdown.
- We also improved the MapServer code which pulled features from ArcSDE.
 - This involved experimenting with ESRI's ArcSDE C API.
 - We discovered which operations were costly, and cut down on their use.

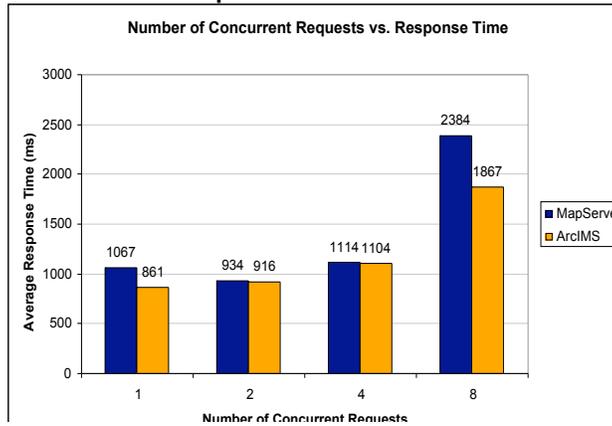
MUM/EOGEO 2005



*Performance is best for the default version of ArcSDE layers.

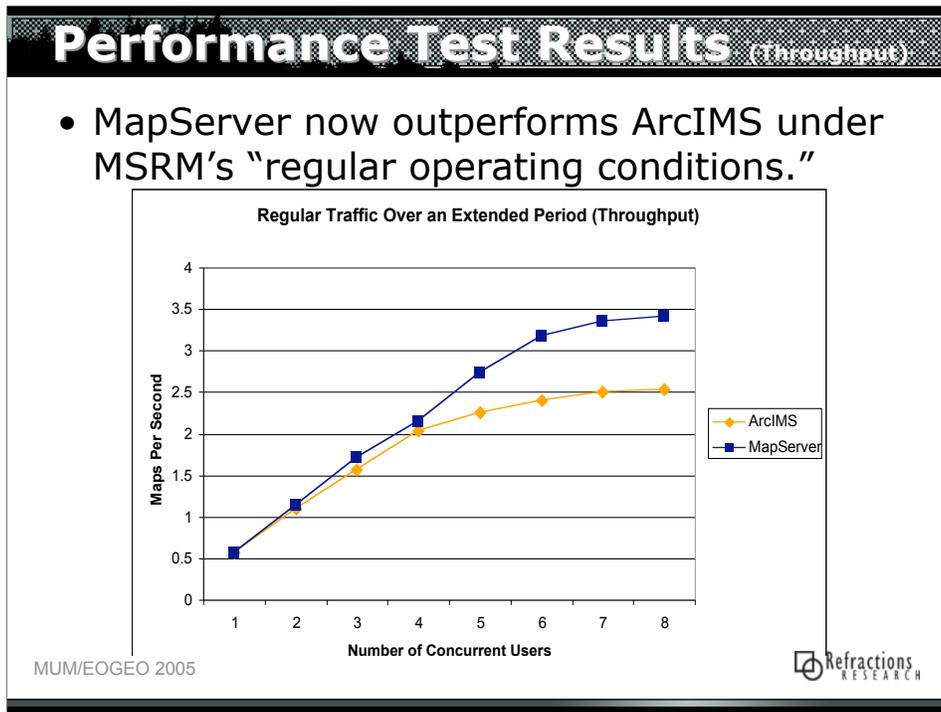
The Same Test Again

- The earlier performance test was run again, this time with FastCGI and the other performance improvements.



MUM/EOGEO 2005

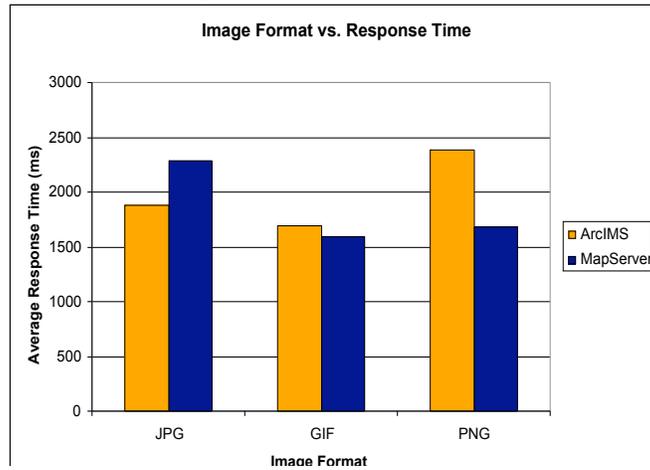
Refractions
RESEARCH



- The higher the better on this graph only
- Difference between concurrency test and this test:
 - This test uses random requests for 10 min.
 - This test doesn't hit the server with a sudden burst of requests. They are ramped up.

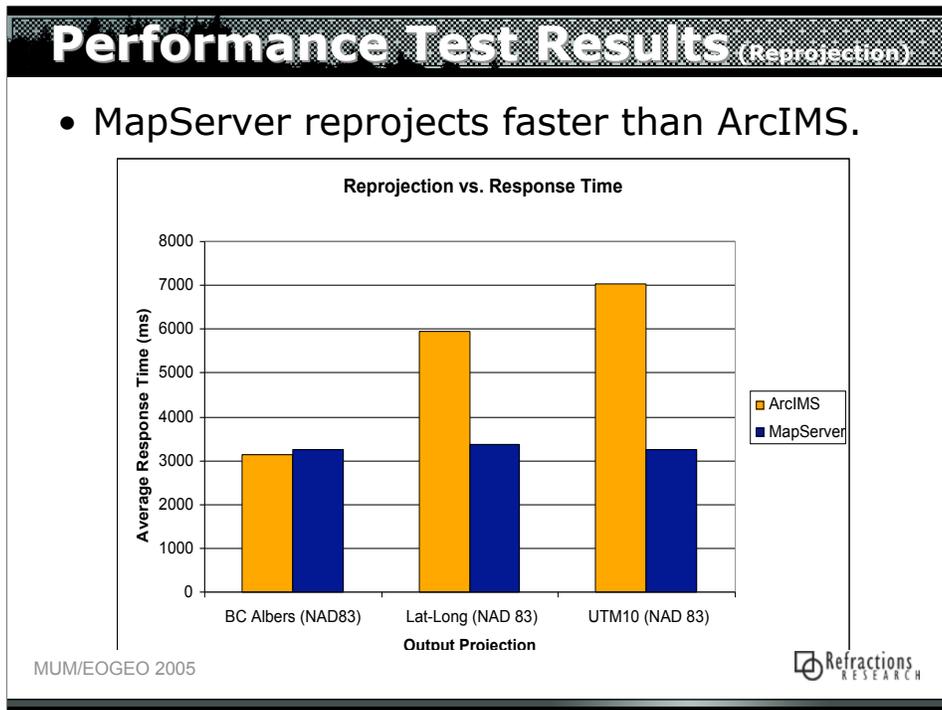
Performance Test Results (Image Format)

- MapServer is slightly faster to return GIF and PNG images. ArcIMS is faster for JPG.



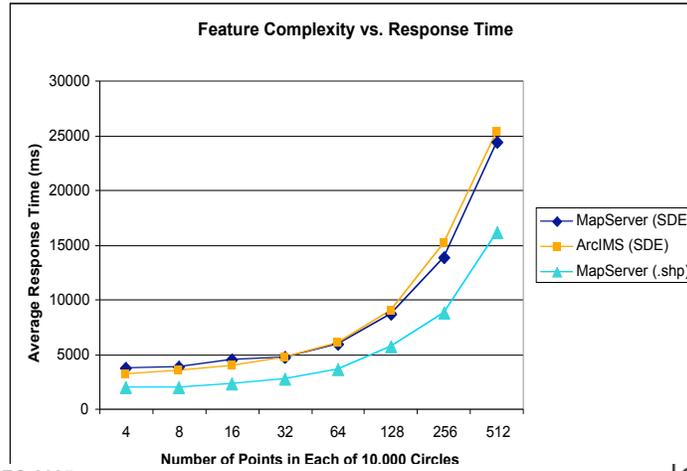
MUM/EOGEO 2005

Refractions
RESEARCH



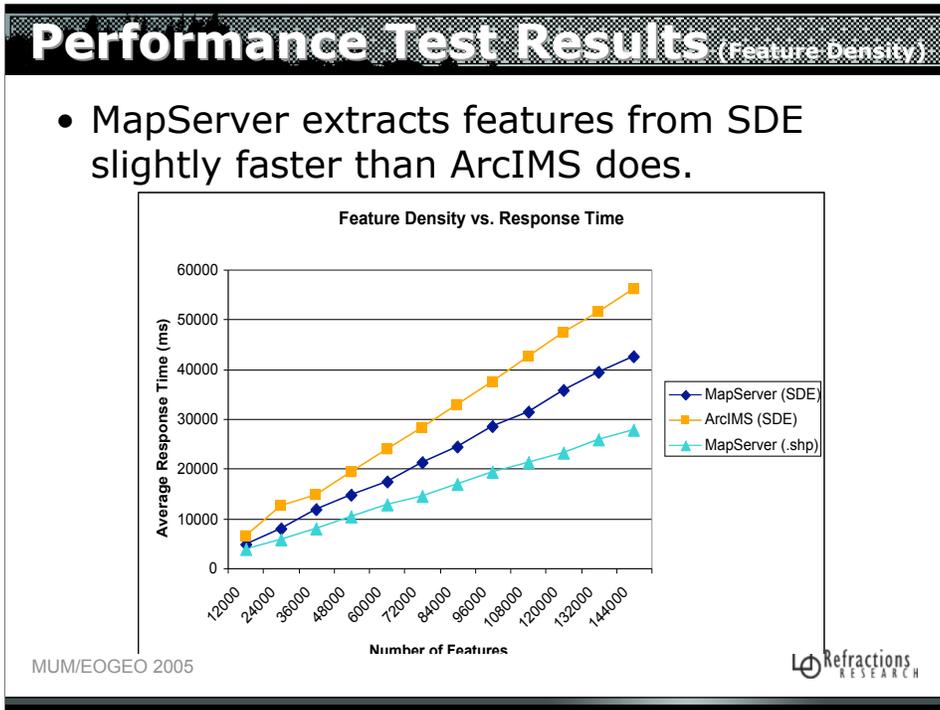
Performance Test Results (Feature Complexity)

- Feature complexity affects both servers almost equally (from ArcSDE).



MUM/EOGEO 2005

Refractions RESEARCH



Actually, this test demonstrates that MapServer (extracts features from SDE) + (draws the map) faster

WMS Standard Compliance



- MapServer passed all 83 WMS CITE tests.
- ArcIMS (w/ WMS connector) passed 71 of 83 WMS CITE tests.

– ArcIMS failed 12 tests because:

- Wrong MIME type for some responses.
- Wrong “exception code” in some exceptions.

MUM/EOGEO 2005 

- MIME type of responses is typically expected to be “application/vnd.ogv.se_xml”

Ease of Administration

- MapServer administration benefits
 - No need to reload services (when service files change)
 - MapServer restarts faster (as fast as the web server)
- ArcIMS administration benefits
 - More granular control over log levels

Interoperability and Support

- Both WMSs support:
 - ArcSDE 8.3 and ArcSDE 9.0
 - Styled Layer Descriptor (SLD)

MUM/EOGEO 2005 

I don't know how fully either server supports SLD, but our testing showed that both support these basic features:

- Selecting and styling based on a attribute value
- Selecting and styling based on spatial location (within a bounding box)

Conclusions

- MapServer is easier to administer than ArcIMS.
- MapServer is more WMS standard compliant than ArcIMS.
- MapServer matches or surpasses ArcIMS in most performance tests.

* (MSRM adopted MapServer for their COINPacific web mapping application)

Questions?

Contact me:

Brock Anderson
banders@refrations.net

Refractions Research
www.refrations.net
(250) 383-3022

MUM/EOGEO 2005 