



**FOSS4G 2010**

# Performance and statistical analysis of WMS servers

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**[www.sourcepole.com](http://www.sourcepole.com)**



**SOURCEPOLE**  
Linux & Open Source Solutions



# About Sourcepole

- › **GIS-Knoppix: first GIS live-CD**
- › **QGIS**
  - › Core development & PSC membership
  - › QGIS Mapserver
- › **OGR / GDAL**
  - › Interlis driver
  - › schema support for PostGIS driver
- › **Ruby on Rails**
  - › MapLayers plugin
  - › Mapfish server plugin



- › **Running FOSS4G WMS benchmark**
  - › PostGIS / UMN Mapserver
- › **Performance-Tuning / Caching**
- › **WMS checks & statistics**
  - › WMS versions
  - › Products



# FOSS4G WMS benchmark 2009

## › Test data:

Typ	Shape file	Number of Records	SRID	Source
Point	gnis_names09	103,000	EPSG:4326	GNIS database
Multilinestring	edges_merge	> 5 Mio.	EPSG:4326	TIGER 2008
Multipolygon	areawater_merge	380,000	EPSG:4326	TIGER 2008
Raster	Bluemarble TNG, 86400 x 43200 pixels, 7 overviews (TIF, ECW, ...)			

- › Requests from 1, 10, 20 and 40 clients
- › Random extents from CSV file



# Setup 2009 benchmark

- › Instructions for UMN Mapserver on Ubuntu:  
[http://wiki.osgeo.org/wiki/FOSS4G\\_Benchmark](http://wiki.osgeo.org/wiki/FOSS4G_Benchmark)
- › Download data:  
[http://wiki.osgeo.org/wiki/Benchmarking\\_2009#Download](http://wiki.osgeo.org/wiki/Benchmarking_2009#Download)
- › Setup PostGIS-DB:  
`createdb -E latin1 --owner benchmark benchmark`
- › Import:  
`shp2pgsql -I -D GNIS-2009/gnis_names09.shp  
gnis_names09 | psql -q -h localhost -d benchmark`

shp\_areawater\_merge.jmx (/home/pi/devel/gis/foss4g-benchmark/scripts/mapserver/vector/shp\_areawater\_merge.jmx) - Apache JMeter (2.3.4)

File Edit Run Options Help

0 / 0

bluemarble

- 1
  - Loop Controller
    - 1
      - CSV Data Set Config
- 10
  - Loop Controller
    - 10
      - CSV Data Set Config
- 20
  - Loop Controller
    - 20
      - CSV Data Set Config
- 40
  - Loop Controller
    - 40
      - CSV Data Set Config

HTTP Request Defaults

View Results Tree

ContentTypeCheck

Generate Summary Results

Summary Report

WorkBench

### HTTP Request

Name: 10

Comments:

**Web Server**

Server Name or IP:  Port Number:

**Timeouts (milliseconds)**

Connect:  Response:

**HTTP Request**

Protocol (default http):  Method: GET Content encoding:

Path:

Redirect Automatically  Follow Redirects  Use KeepAlive  Use multipart/form-data for HTTP POST

**Send Parameters With the Request:**

Name:	Value	Encode?	Include Eq...
map= /opt/benchmarking/mapserver/shapefile-merged...	\${bbox}	<input type="checkbox"/>	<input checked="" type="checkbox"/>
height	\${height}	<input type="checkbox"/>	<input checked="" type="checkbox"/>
width	\${width}	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Send Files With the Request:**

File Path:	Parameter...	MIME Type:

**Optional Tasks**

Retrieve All Embedded Resources from HTML Files  Use as Monitor  Save response as MD5 hash?

Embedded URLs must match:



# Running benchmark

- › **Single test:**

```
benchmark shp_areawater_merge.jmx
```

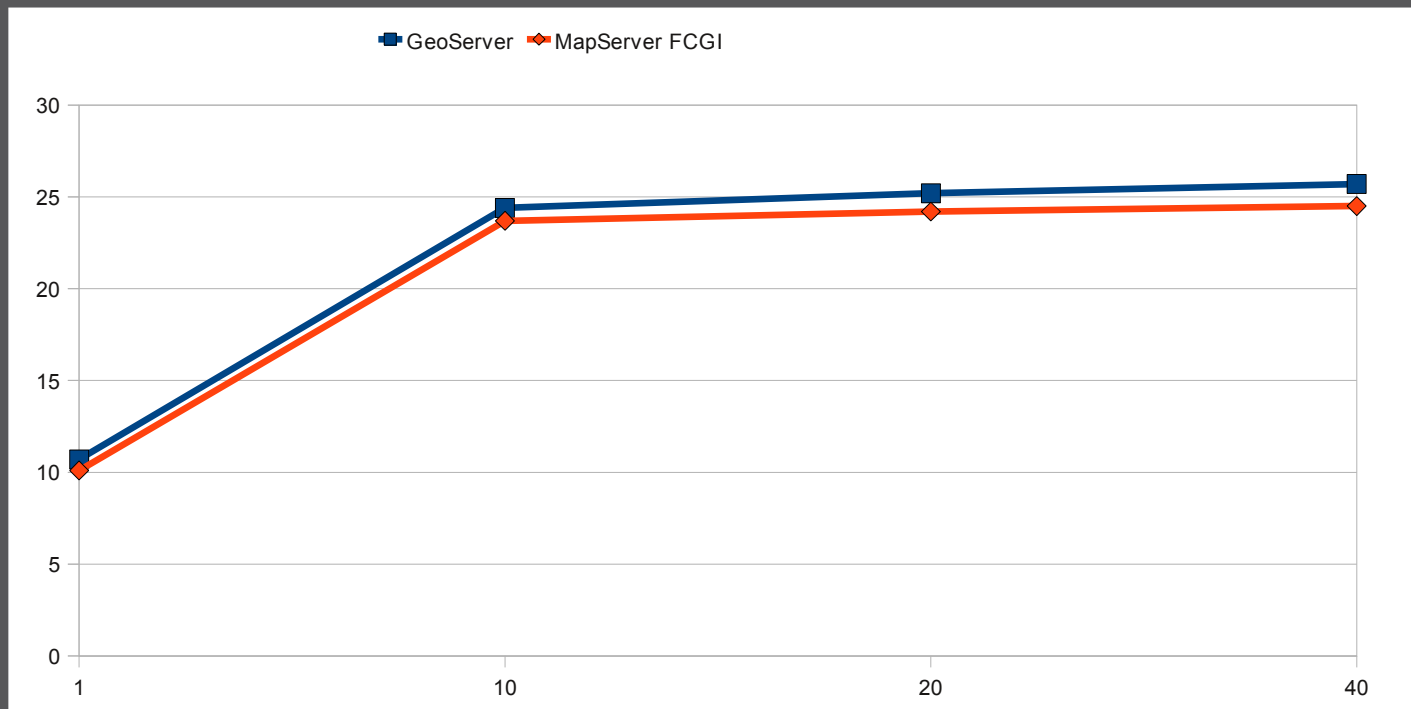
- › **All tests:**

```
mapservconf | tee mapservconf.log
```



# Output

Label	Count	Avg	Min	Max	Errors	Throughput
1	100	63	37	161	0	15.6
10	200	192	39	1303	0	39.7
20	400	297	42	1624	0	52.7
40	800	599	38	4600	0	55.9





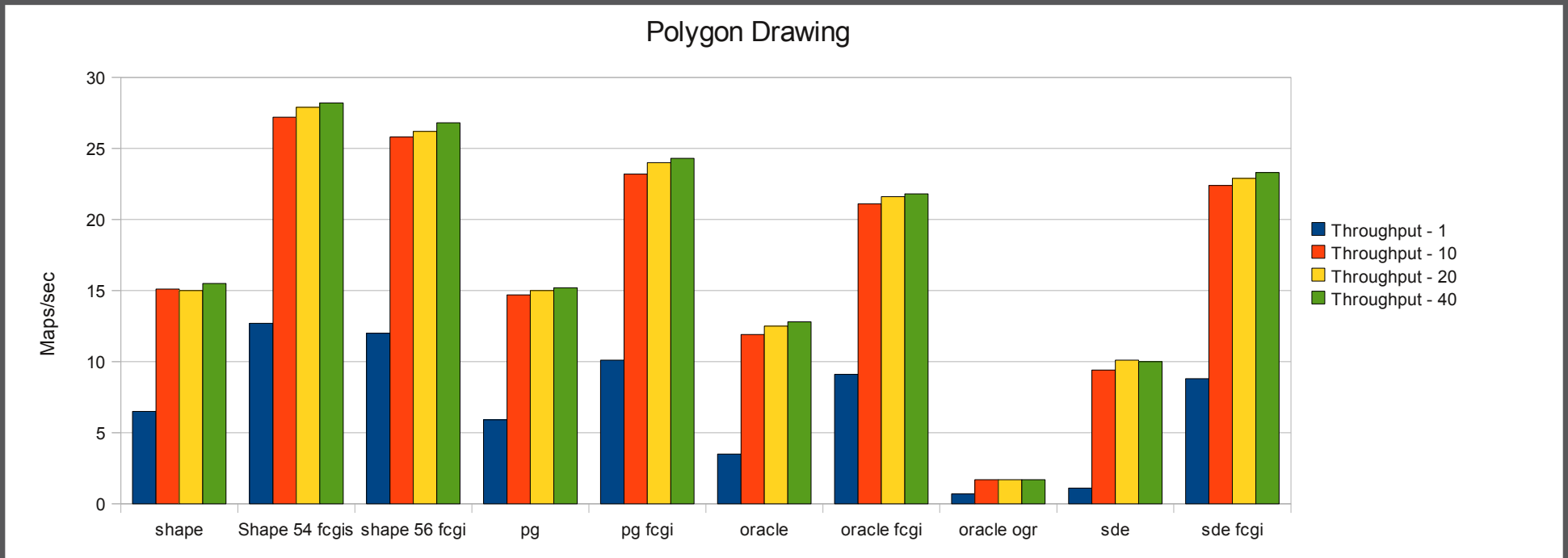


# WMS Performance Shootout

- › **FOSS4G 2009 in Sidney**
- › **UMN Mapserver vs. GeoServer**
- › **Results:**
  - › Very similar performance
  - › Typically 10 to 26 maps/s running 10 threads in parallel
  - › Hardware dated from 2004 (WMS) / 2007 (DB)
- › **FOSS4G 2010 in Barcelona**
  - › New dedicated hardware
  - › Results presented today



# Data source comparison (UMN)





# Performance tuning

- › **File system**
- › **Database setup**
  - › shared\_buffers, work\_mem, checkpoint\_segments, wal\_buffers
  - › pgbench
- › **Spatial queries**
  - › Indexes, generalization
- › **Mapserver**
  - › FCGI, Mapfile, DB connections
- › **Caching, Tiles**
  - › GeoWebCache, tilecache, mod\_cache, varnish



# Benchmark tools

## › Bonnie

```
bonnie++ -f -d ./iobench
```

## › pgbench

```
createdb pgbench
```

## › Setup/Run with 10 clients:

```
pgbench -i pgbench -s 10  
pgbench pgbench -c 10 -t 1000
```

## › Pgbench Select only:

```
pgbench pgbench -S -c 10 -t 1000
```



## › shp2img

```
shp2img -map_debug 2 -m basisinfo-debug.map  
-o map.png
```

```
[Mon Jul 13 17:16:16 2009].485130 msDrawMap(): Layer 2 (Relief), 0.068s  
[Mon Jul 13 17:16:16 2009].588142 msDrawMap(): Layer 23 (Kantonsgrenzen), 0.103s  
[Mon Jul 13 17:16:16 2009].673545 msDrawMap(): Layer 24 (Kantonsnamen), 0.085s  
[Mon Jul 13 17:16:16 2009].806459 msDrawMap(): Layer 25 (Landesgrenzen), 0.133s  
[Mon Jul 13 17:16:16 2009].895594 msDrawMap(): Layer 26 (Landesnamen), 0.089s  
[Mon Jul 13 17:16:16 2009].958645 msDrawMap(): Layer 27 (Seen), 0.063s  
[Mon Jul 13 17:16:17 2009].50348 msDrawMap(): Layer 28 (Flüsse), 0.092s  
[Mon Jul 13 17:16:17 2009].111711 msDrawMap(): Layer 30 (Ortschaften ), 0.061s  
[Mon Jul 13 17:16:17 2009].129694 msDrawMap(): Drawing Label Cache, 0.018s  
[Mon Jul 13 17:16:17 2009].160640 msDrawMap(): Layer 0 (Copyright), 0.031s  
[Mon Jul 13 17:16:17 2009].160659 msDrawMap() total time: 0.746s
```



# WMS conformance checks

- [geopole.org/checks](http://geopole.org/checks)
- Schema validation:
  - Valid: 1194 (30%), Failed: 2770 (70%)

## WMS Check Results

### WMS Capabilities

**Title:** ICEDS (Integrated CEOS European Data Server) WMS

**Url:** <http://iceds.ge.ucl.ac.uk/cgi-bin/icedswms?>

**WMS Version:** 1.1.1

**Layers:** 78

**Formats:** image/png,image/gif,image/jpeg,image/wbmp,image/tiff

**Abstract:** Integrated CEOS European Data Server (ICEDS) Web Map Service, maintained by the Geomatic Engineering Dept at UCL

**Schema Validation:** Failed (1 Errors)

- Error: No declaration for element VendorSpecificCapabilities at :112.



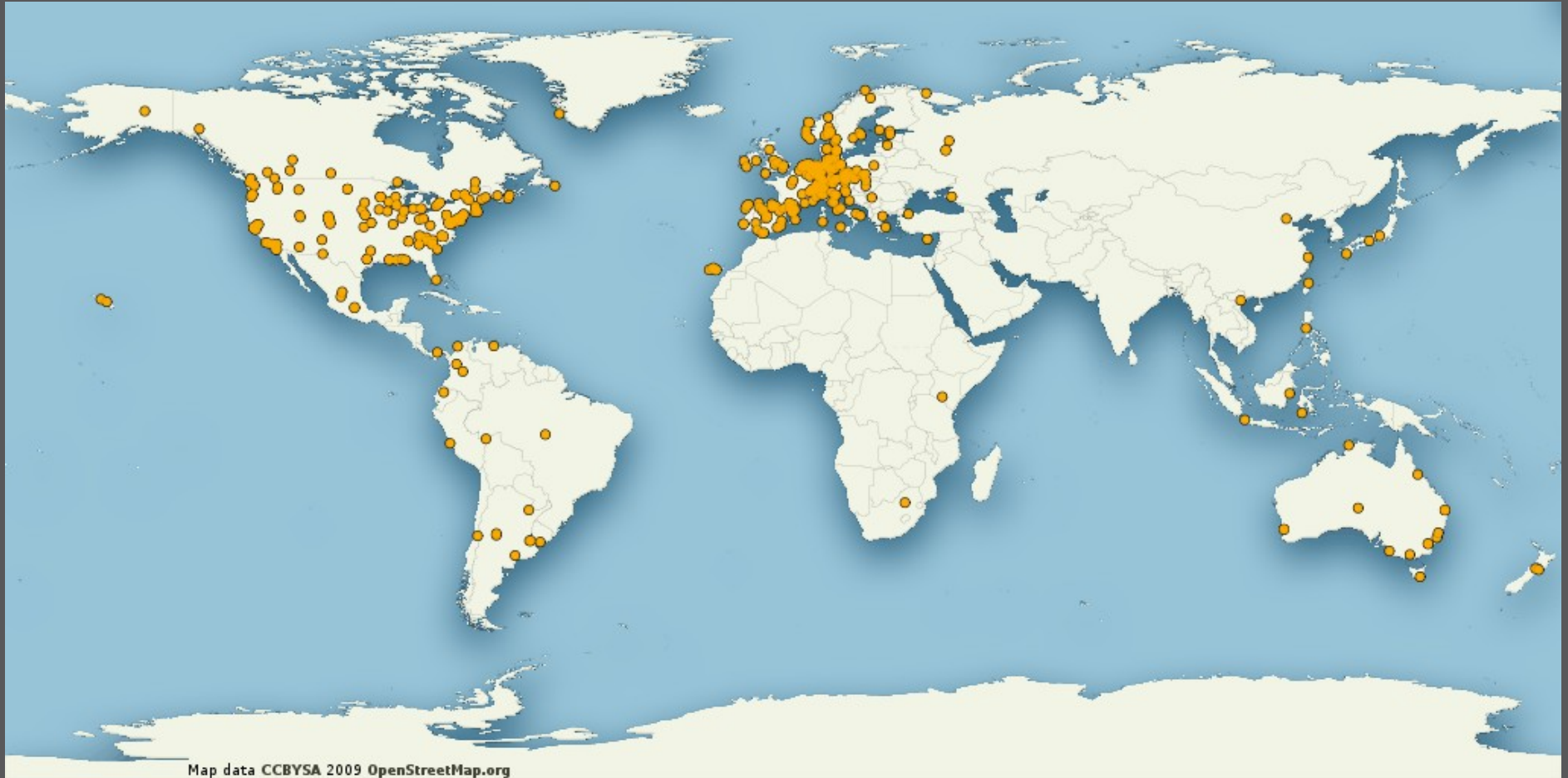
# Public WMS measurements

- **WMS Repository [geopole.org](http://geopole.org)**
- **Tested public WMS servers:**
  - March 2010: 3974
  - Sept. 2010: 4339
- **Locations: IP address**
- **Product statistics**
  - Capabilities comments (UMN Mapserver)
  - Capabilities keywords
  - URL (e.g. `com.esri.wms.Esrimap`)
  - Exceptions



# Server locations

[geopole.org/statistics](https://geopole.org/statistics)

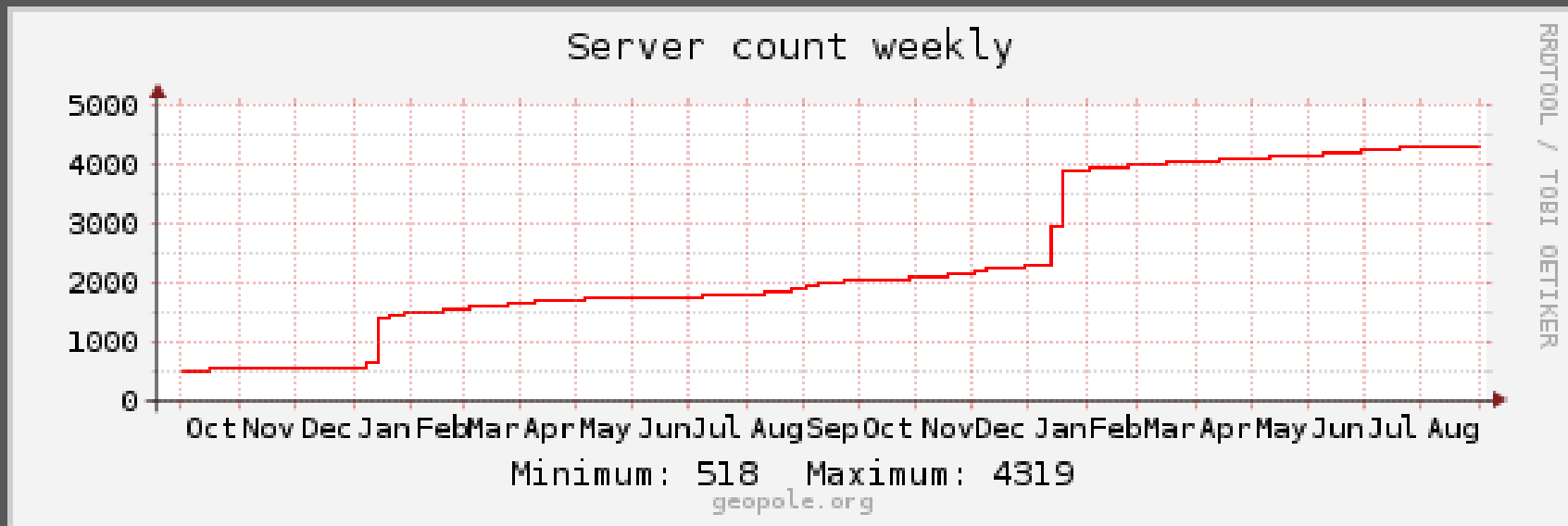






# Public WMS Server count

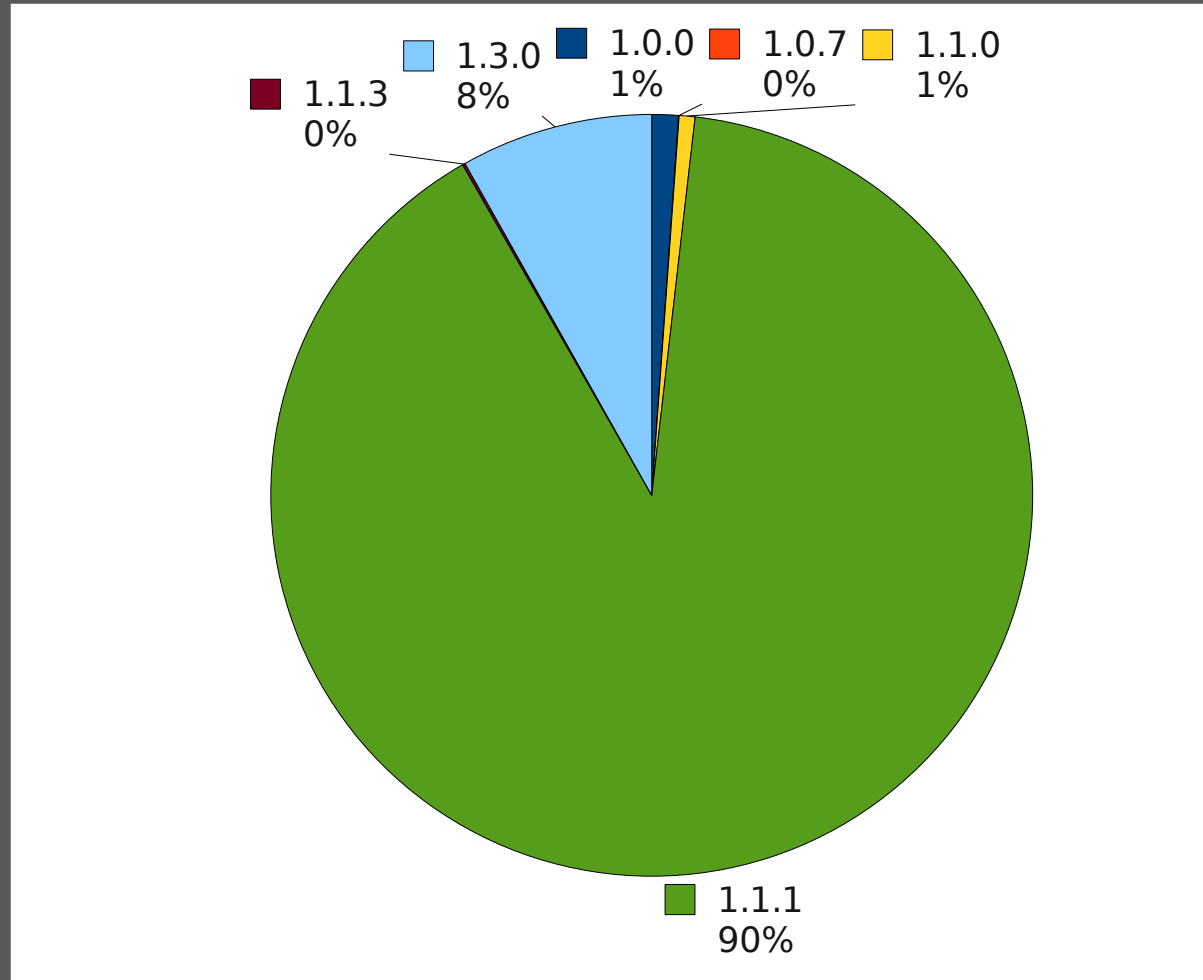
➤ [geopole.org/statistics](http://geopole.org/statistics) (Oct. 2008-Aug. 2010)





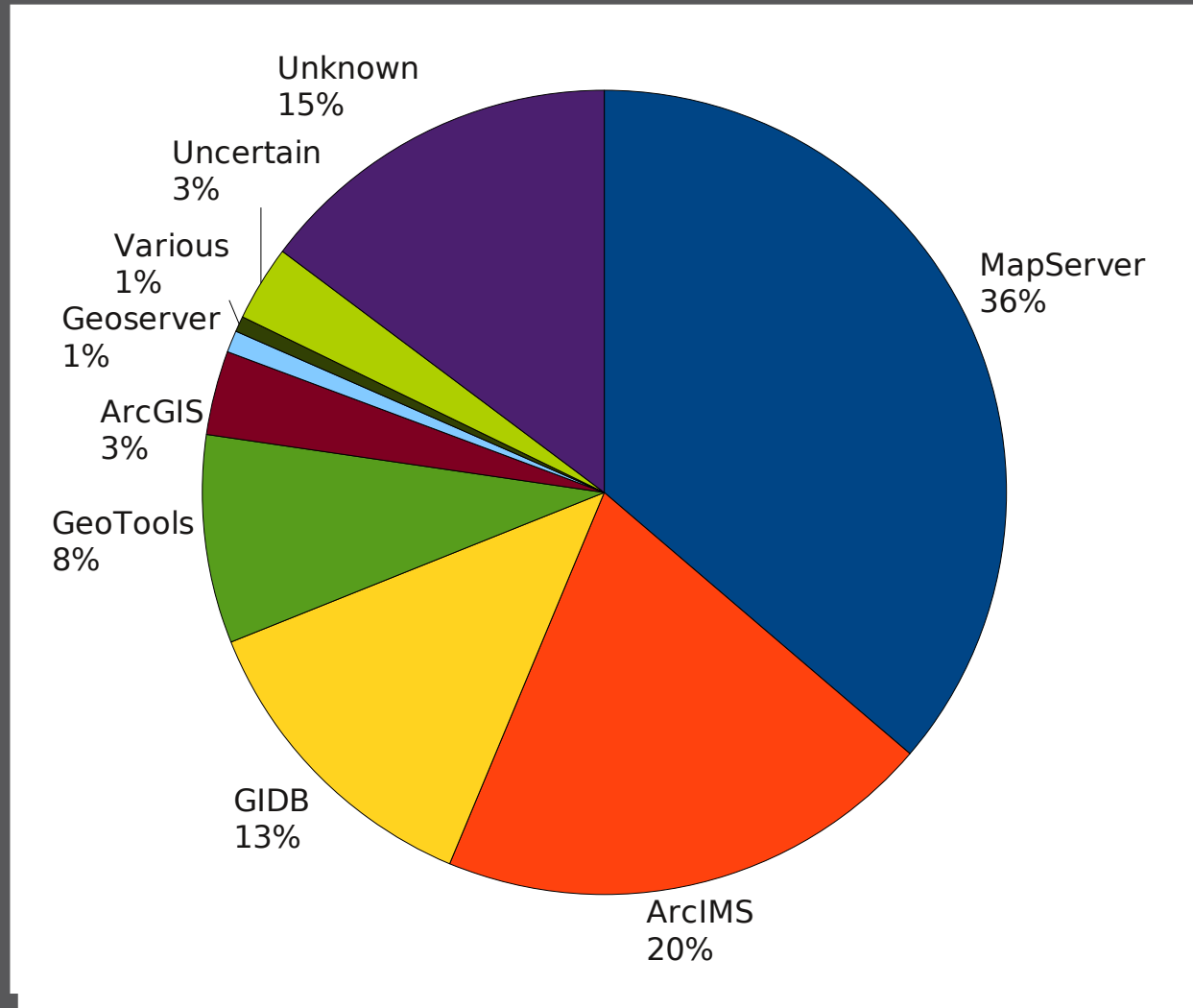
# WMS Statistics

## WMS versions (March):



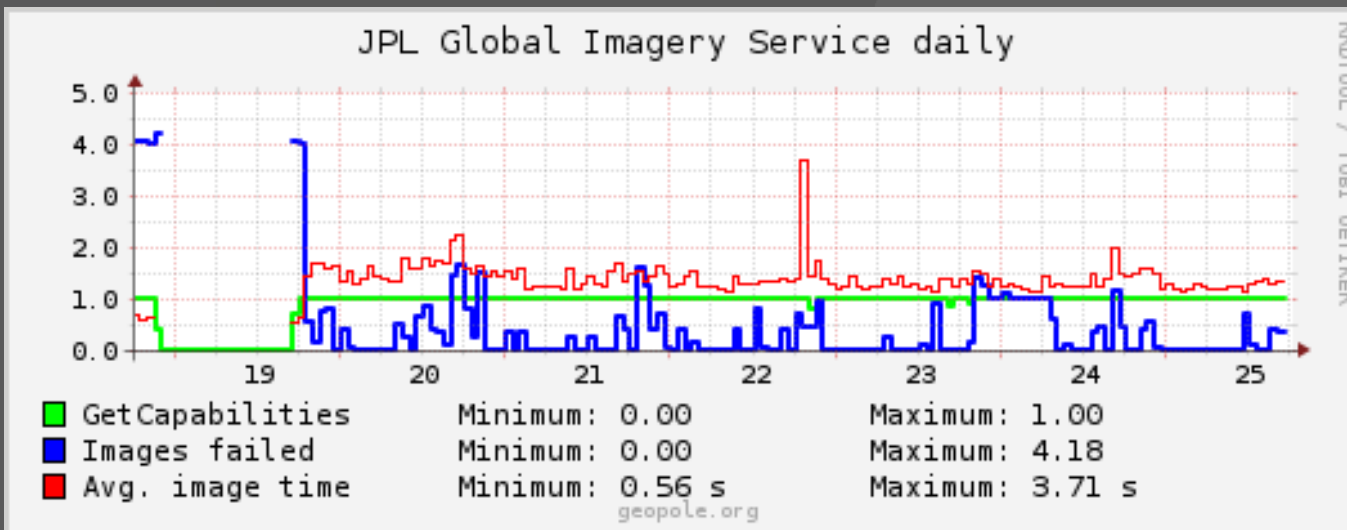
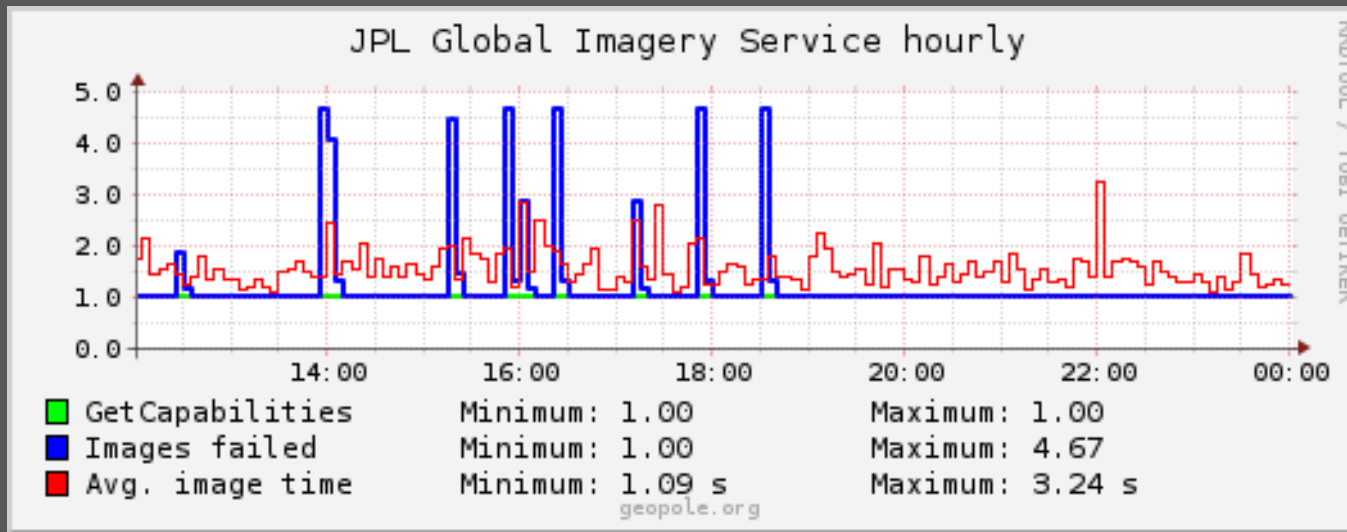


# Product statistics





# Monitoring





# Links

- › [http://wiki.osgeo.org/wiki/FOSS4G\\_Benchmark](http://wiki.osgeo.org/wiki/FOSS4G_Benchmark)
- › <http://geopole.org/statistics>
- › <http://geopole.org/checks>



# Thank you! Questions?



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