Choosing the right GIS framework for an informed Enterprise Web GIS Solution
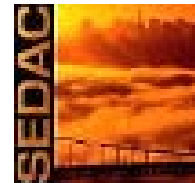
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Web GIS and its importance

•Web GIS is the obvious graduation of GIS on a distributed environment through a simple browser

•Enables organizations to share domain-specific rich and dynamic spatial information over the web

•Web GIS finds applications in a wide-range of internet based applications such as environmental sustainability indicators, global population predictions, water sustainability, hazard vulnerabilities, climate and disaster monitoring, education, banking, armed forces etc.

Few examples of CIESIN Web GIS client applications:

http://sedac.ciesin.columbia.edu/mapviewer
http://beta.www.ciesin.columbia.edu/unep-haiti/haitisite.htm

Enterprise Web GIS framework

•An enterprise Web GIS framework applies a geographic approach for better decision making by comparison of existing spatial data sets with legacy and other existing sources.

•It is thus extremely important to understand the complexity of the Web GIS components and the various interactions and relationships between them when designing an enterprise solution
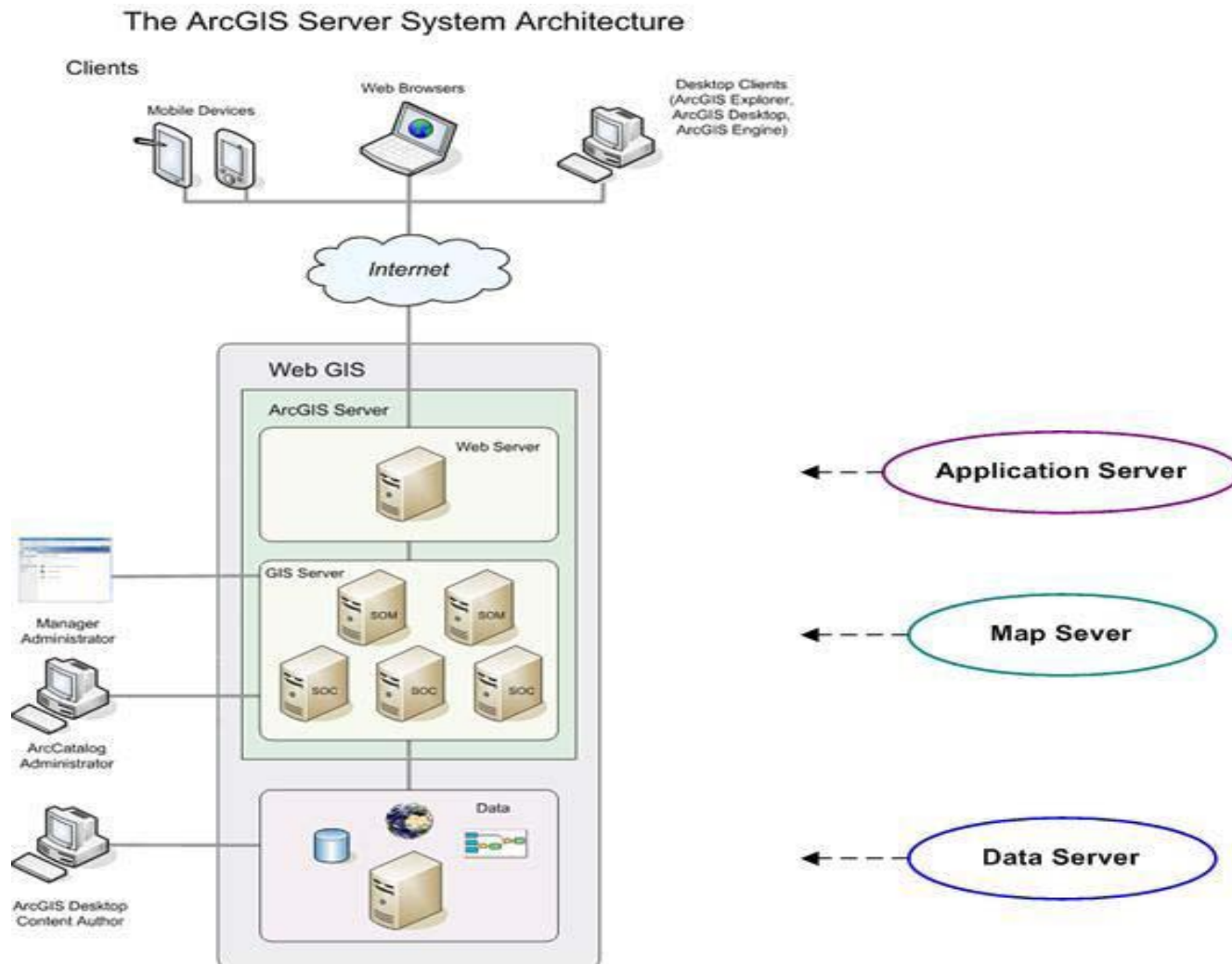
Here below is a broad outline of design considerations:
•Architecture
•System Components
•Factors affecting system components
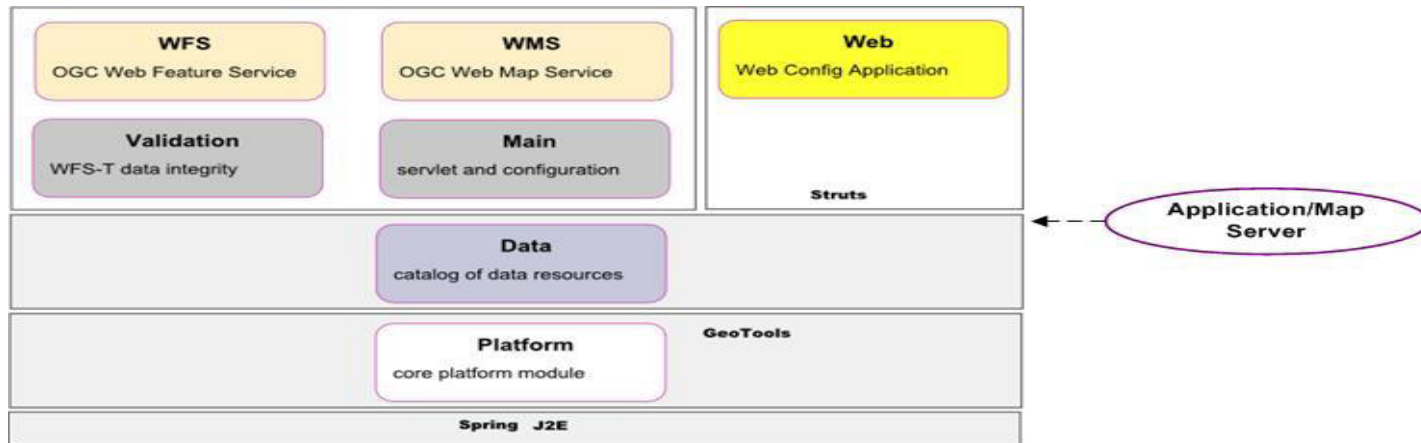•Usability improvement
•Application of system
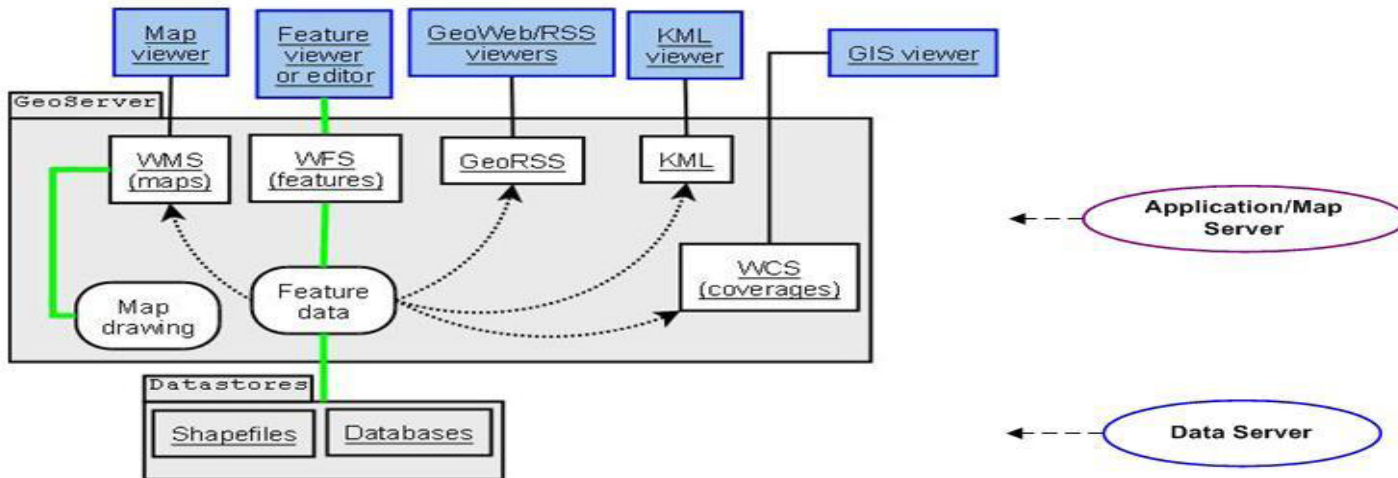
Multi-tier generic Client-server Web GIS Architecture
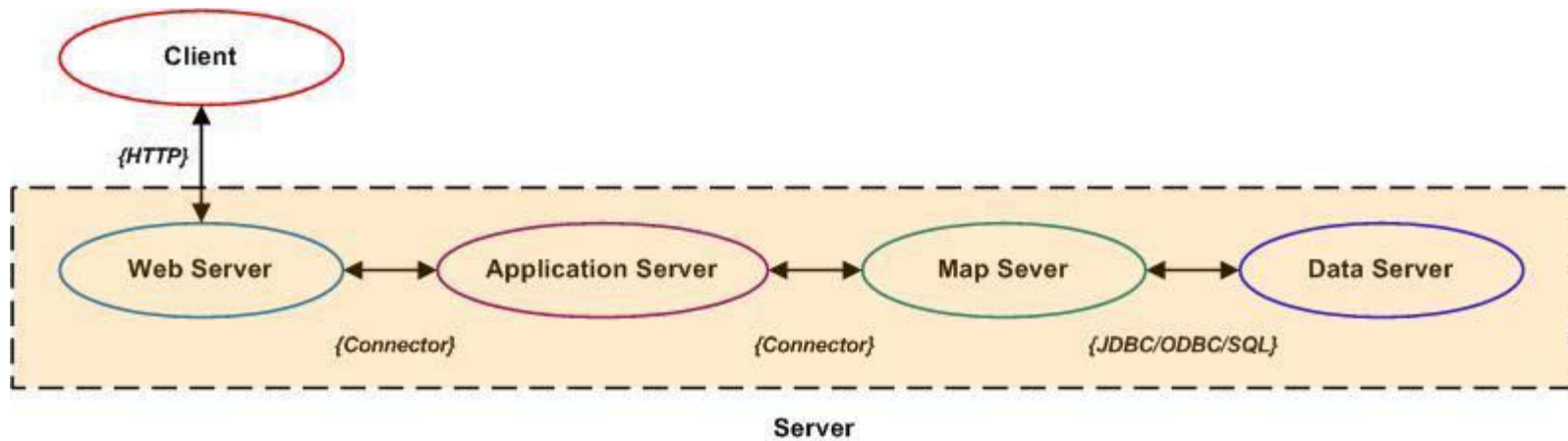
ESRI's ArcGIS Server Architecture

The ArcGIS Server System Architecture
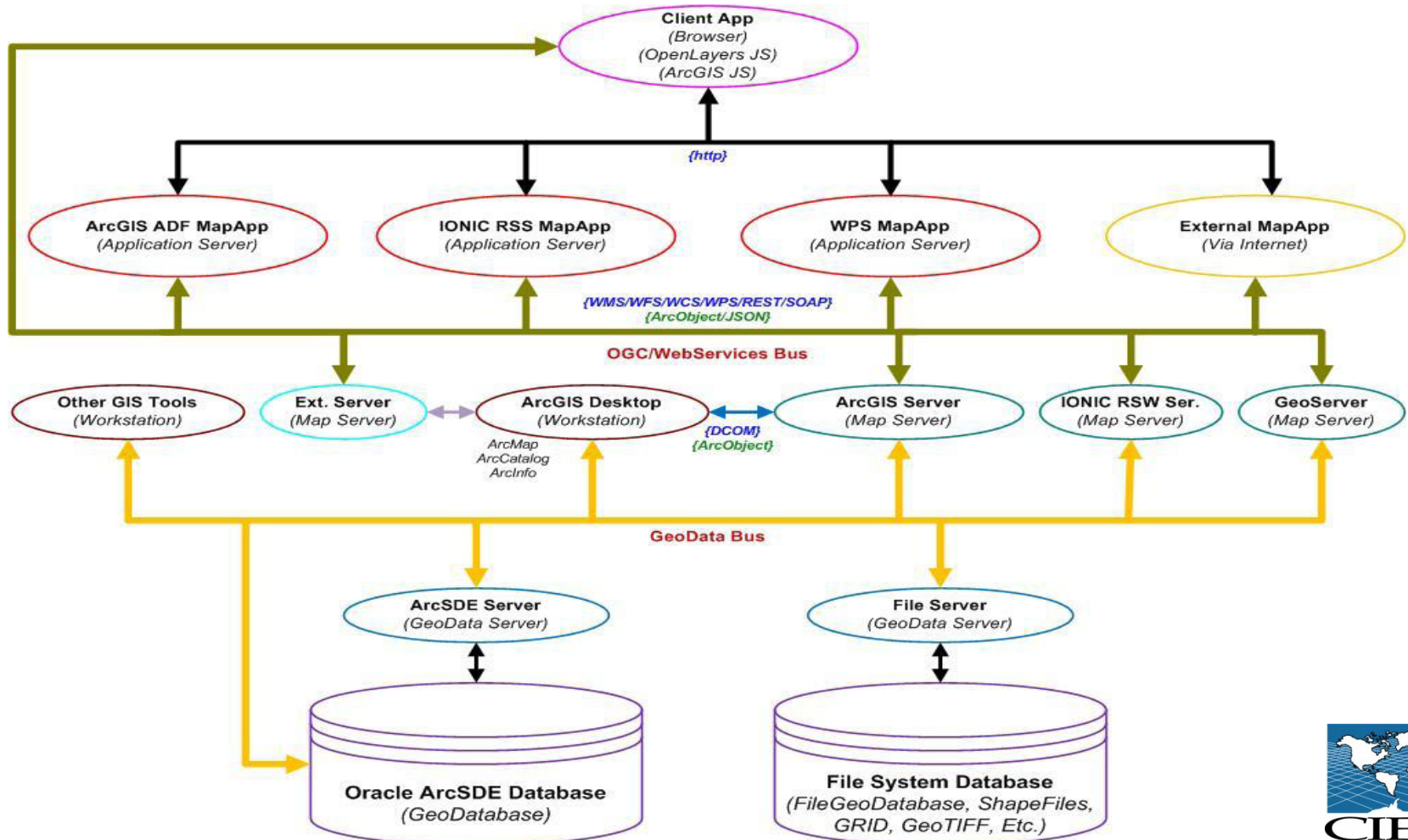
GeoServer Architecture

Various Modules of Geoserver (Application/Map Server)

Geoserver Input and Output Formats

# CIESIN's Enterprise Web GIS Architecture Implementation

Factors affecting Web GIS System Components

Various factors affecting the overall system performance and responsiveness:

- Workflow
- Server performance
- Maintenance and Backward Compatibility
- Scalability
- Interoperability
- Data formats for publishing
- Total Cost of ownership
- Customization
- Network Bandwidth Capabilities

Server Performance:

Response time: Thick v/s Thin Applications
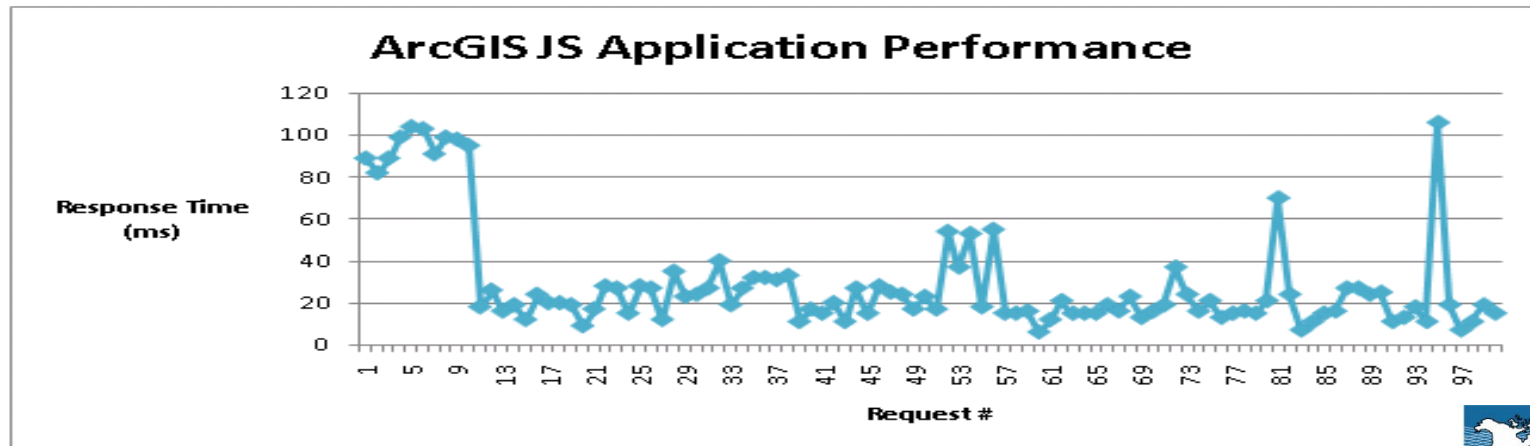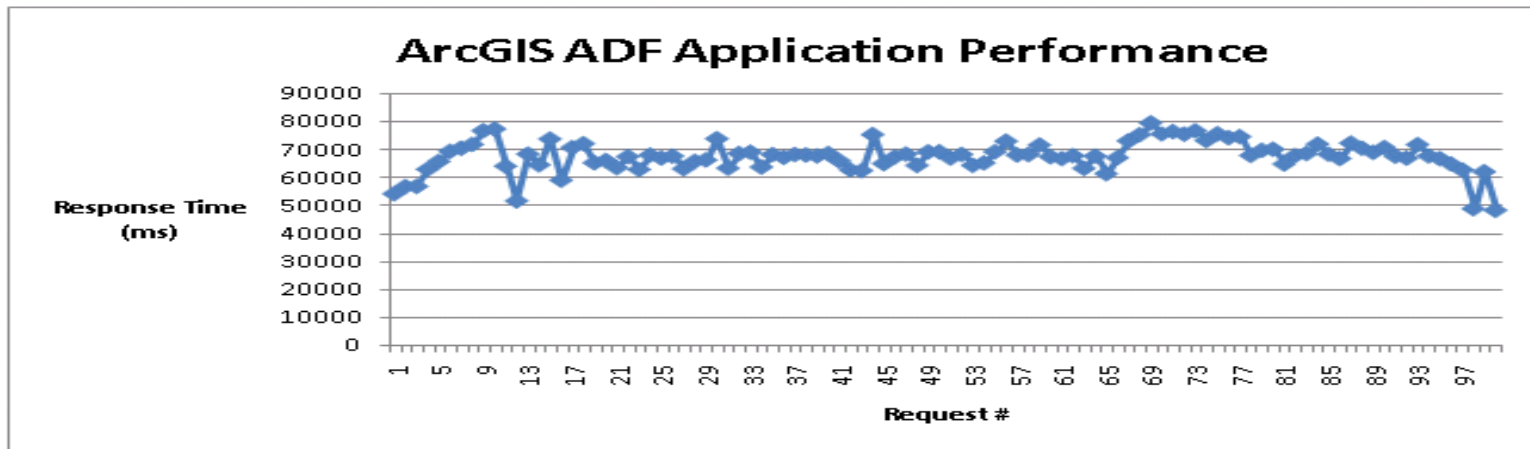
Server Performance:

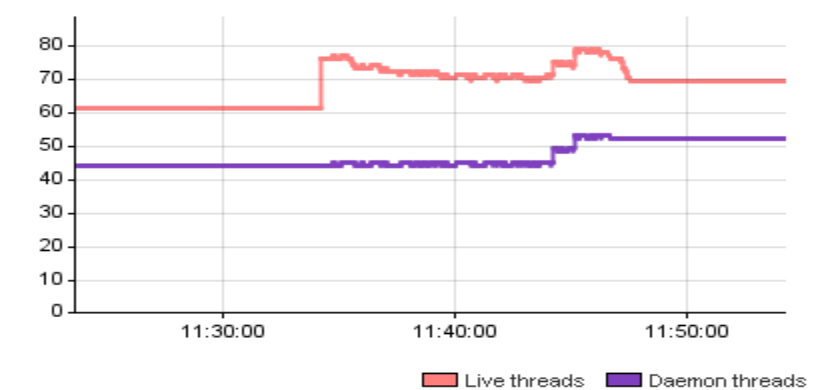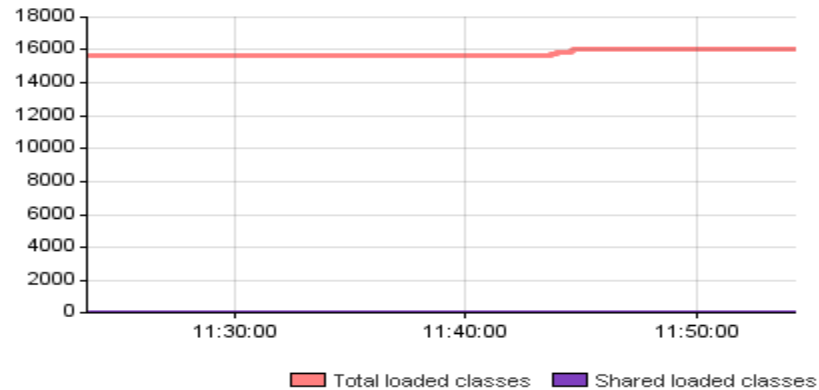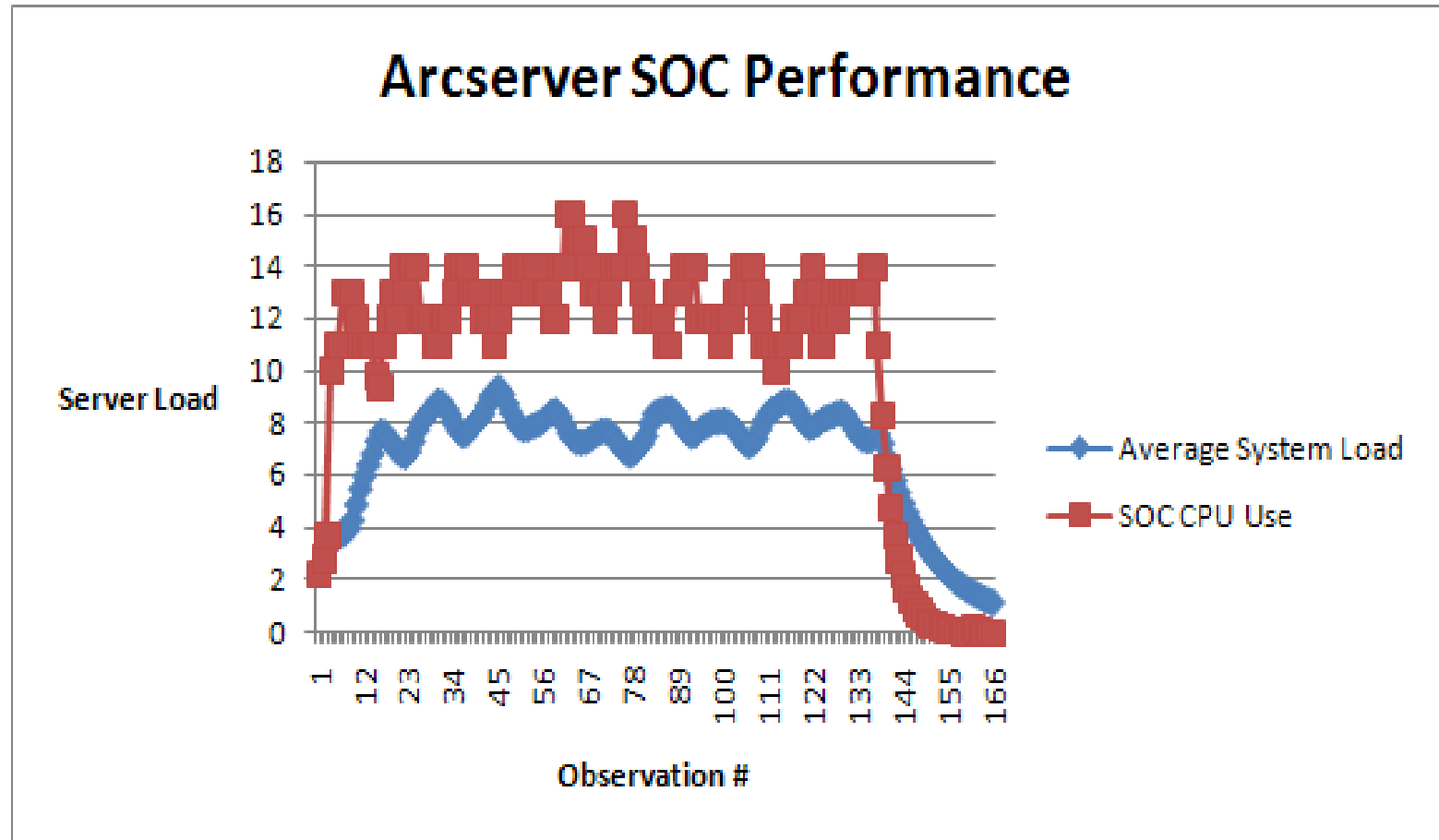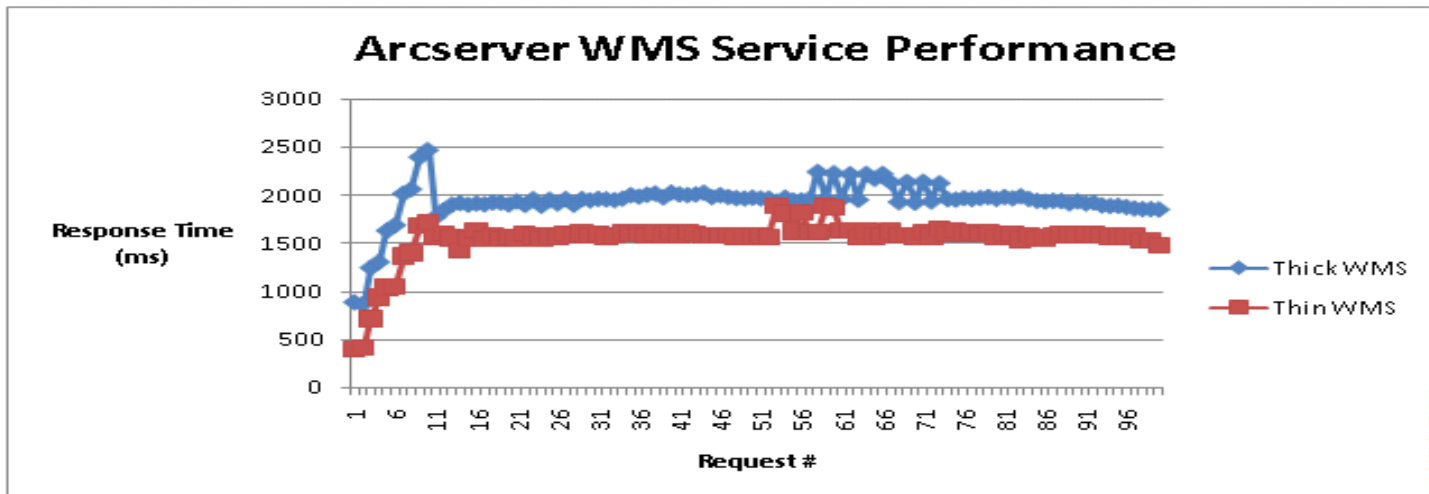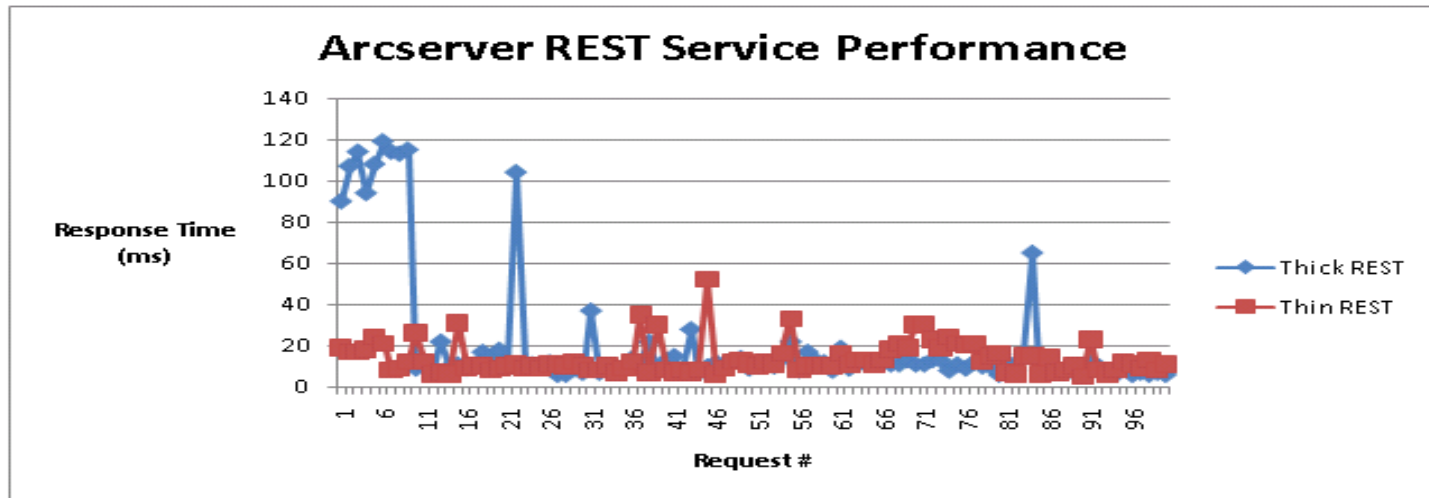Heap Memory Use of ArcGIS ADF Application Server

Server Performance:

ArcGIS Server SOC v/s CPU Load

Server Performance:
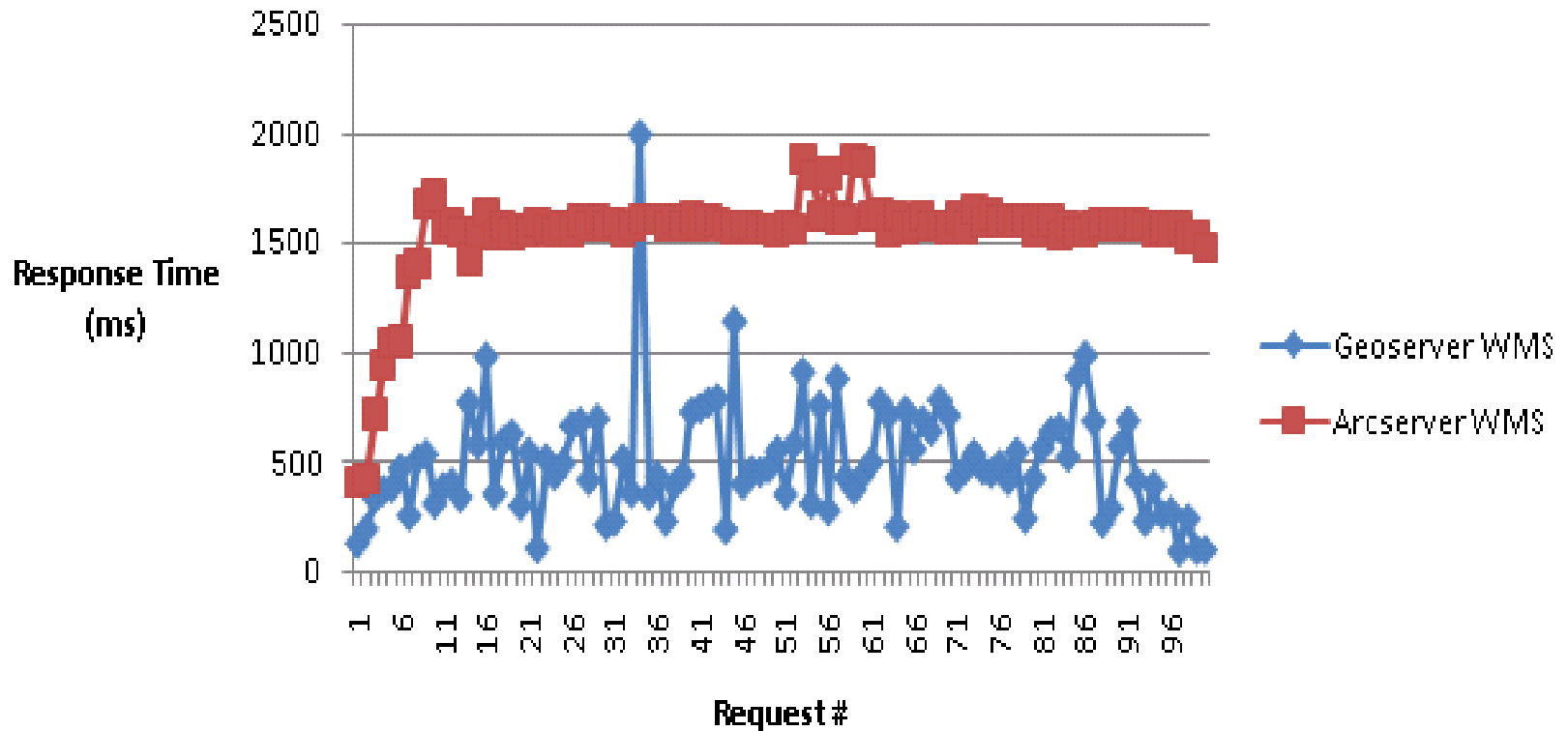
ArcGIS Server Rest v/s WMS service performance

Server Performance:

WMS Service Performance: ArcGIS Server and GeoServer

Interoperability

Service Capabilities	ArcServer 9.3.1	Geoserver 2.0
WCS compliant	Fully compliant to WCS 1.0, 1.1 and 1.1.1	Fully compliant with WCS 1.0 and 1.1
WFS compliant	Fully compliant to WFS 1.0 and 1.1 (transactions)	Fully compliant to WFS 1.0 and 1.1 (transactions and locking)
WMS compliant	Fully compliant to WMS 1.1.1 and 1.3	Fully compliant to WMS 1.1.1
Web map Output	As JPEG, GIF, PNG, PDF, SVG, KML and GeoRSS	As JPEG, GIF, PNG, PDF, SVG, KML and GeoRSS
Projection on demand	Geometry service enables sophisticated projection operations on applications that do not have the ability to perform such operations independently	On the fly reprojection for WMS and WFS from a pool of hundreds of supported EPSG projections stored in a database
SLD compliant	Fully compliant to SLD 1.0	Full SLD support, to support map styles
Filter encoding	Fully compliant to Filter Encoding 1.0 and 1.1	Full Filter support on all data formats in WFS

Data Publishing Formats

Service Data publishing format	ArcServer 9.3.1	Geoserver 2.0
Vector Data	Map document (*.mxd) and Map service definition (*.msd)	Shapefile - ESRI(tm) Shapefiles (*.shp) and directory of spatial files stored as a datastore
Raster Data	Raster dataset (from a geo-databases or file on disk), GeoTiff, BIL or layer file referencing a raster dataset or compiled image service definition (containing one or more raster datasets and defined processes)	ArcGrid (coverage format), GeoTiff (Tagged Image File Format with Geographic information), Gtopo30 (coverage format), ImageMosaic (Image mosaicking plugin), WorldImage (raster file with a spatial data file) and Image pyramids
Spatial database	Database connection file (*.sde), personal and file geo-databases, map document referencing data from a versioned geo-database	PostGIS compliant with OpenGIS Simple Features Interface Standard (SFS), ArcSDE (*.sde), DB2 and Oracle
Processing Tool	Support for geoprocessing map document with a tool layer or toolbox (*.tbx)	Not supported

Factors affecting usability experience of a Web GIS system

Besides the functional components that affect the hardware and software decisions when designing an enterprise Web GIS solution. There are some important factors that affect the usability experience of a system:

- Thinner services with appropriate symbology
- Cached Layers
- Aggregating and Clustering Large Datasets

CONCLUSION

Thanks

Q & A?????