



ArcGIS Server Implementation HIGHS and lows

GIS-T

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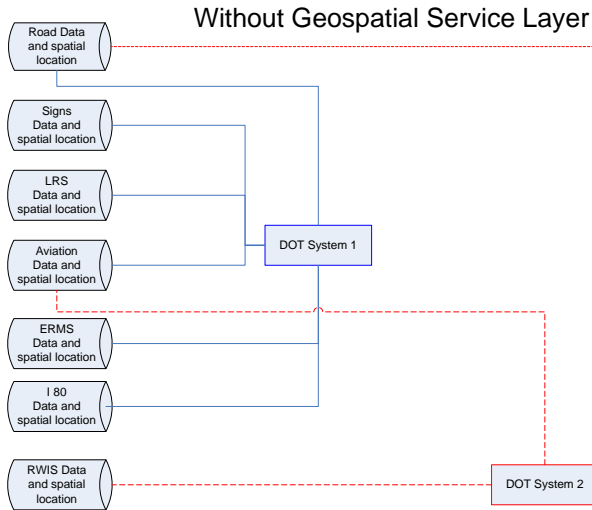
Agenda

- The Problem
- Timeline
- Future
- Discussion/Questions

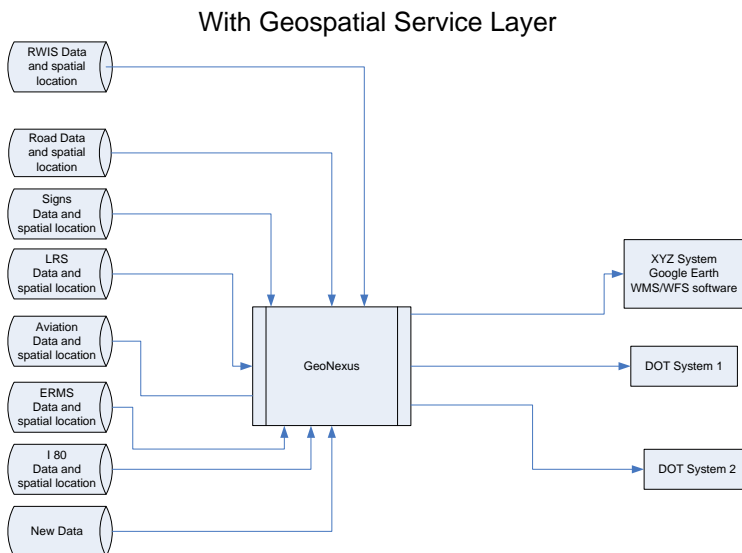
The Problem - 2006

- How does Iowa DOT integrate geospatial data, geospatial processes and geospatial systems to benefit the maximum number of people?
- Is transportation information shared and integrated in a common way?
- How can this be accomplished in a database central software neutral format?

Geospatial Services



Many user & system connections,
duplicated and one off

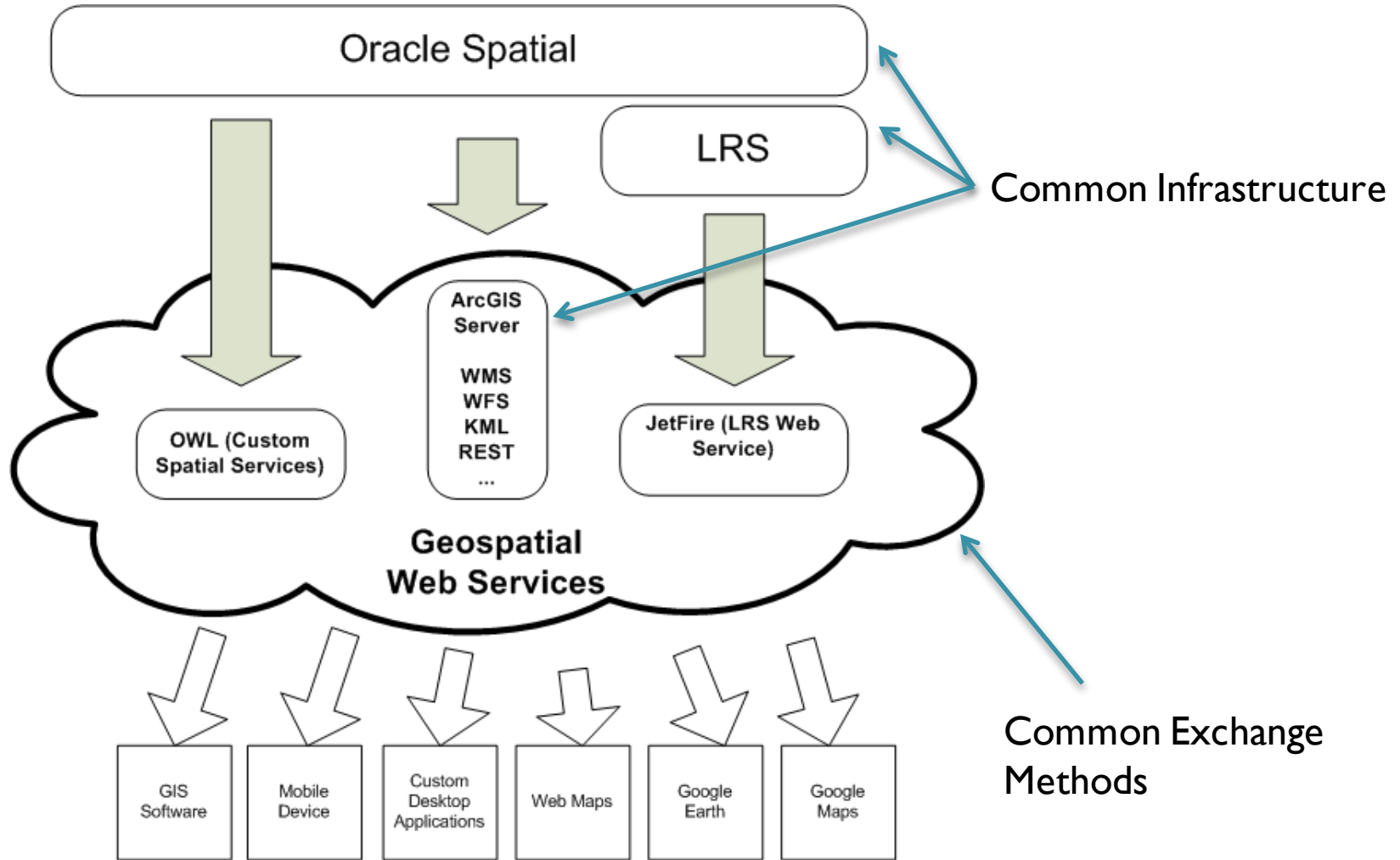


One common connection
Via many connection formats

The Solution - 2006

- Common IT infrastructure and technology
 - Standardized database platform
 - System design that takes into account other data
 - Common storage of geometry or location
 - Geospatial service oriented architecture (GSOA)
- Common exchange methods
 - Web services
 - WMS, WFS, WCS
 - Maps, graphs, PDF
 - Location Referencing Methods (LRM)
 - Geometry
 - Direct Connections

2006 Road Map



ArcGIS Server Implementations

2006 Start
looking at
mapping Services

September 2009
Version 1A of
ArcGIS Server
Distributed SOC

January 2011
Version 2 of
ArcGIS Server
Arkansas Effect

January 2009
Version 1 of
ArcGIS Server

Fall 2011 Version
3 of ArcGIS
Server



2006

- Started looking at ways to tie data together
- Casual GIS staff want web maps and not desktop software complexity
- Started looking at WMS, WFS
 - Minnesota Map Server
 - Oracle web map
 - Geoserver
 - GeoMedia Web Map

2008

- Spent two years looking at geospatial web services.
 - Became clear that more systems would benefit from web based services.
 - Looked at multiple software packages AGAIN
 - Minnesota Map server
 - Oracle Map server
 - ESRI ArcGIS Server
 - GeoMedia Web Map
- Decided on ArcGIS Server
- Implementation Fall 2008
 - Decided on ArcGIS Server for DOT geospatial services engine
 - Worked with Oracle Spatial (for the most part)
 - Provided WMS, WFS, WCS, REST, SOAP, KML, Image services
 - Implemented version 1 January 2009

GeoNexus Services - Version 1

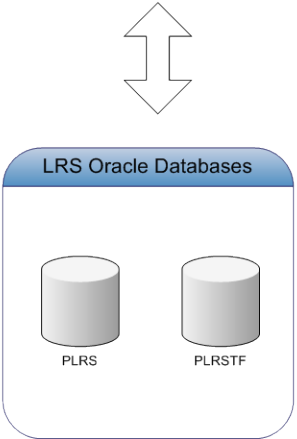
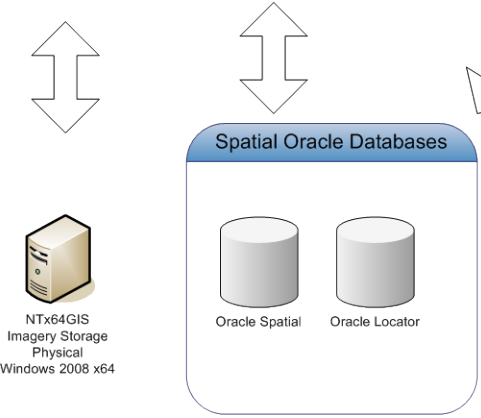
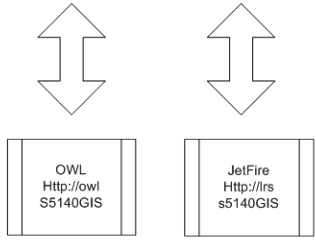
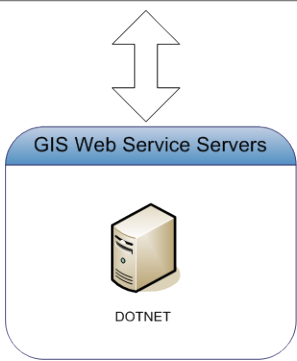
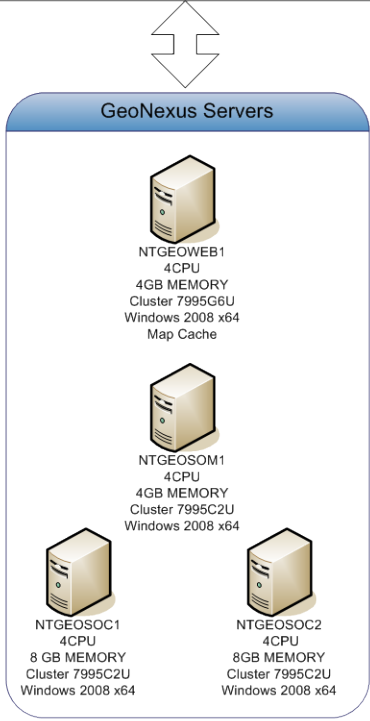
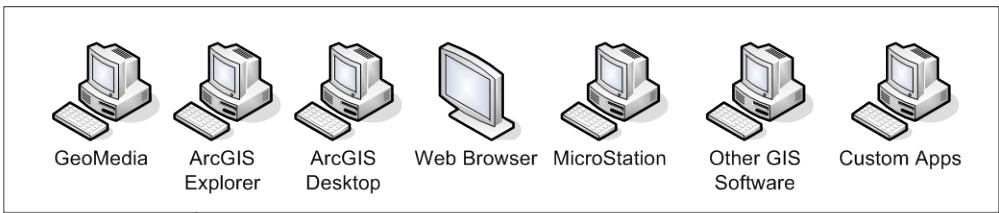
- Single server
 - 64bit, 4 Core, VM Server
- Decided not to publish from Oracle because of SDE learning curve
- Published MXD files
- Dedicated staff position to administer
- No redundancy

Lessons Learned Version 1

- Pro
 - Easy to set up
 - No load balancer
 - ESRI install process automates install
- Con
 - Lower performance
 - No redundancy

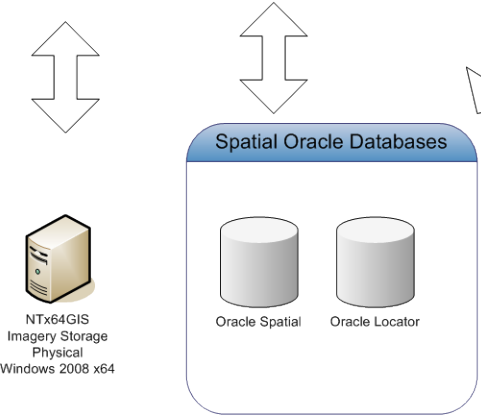
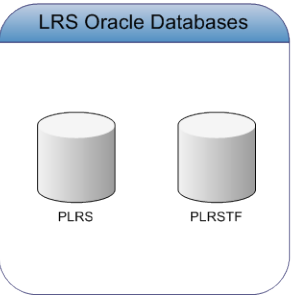
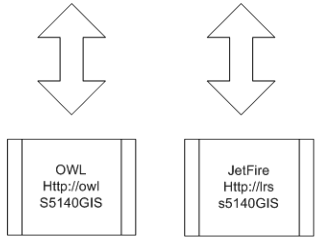
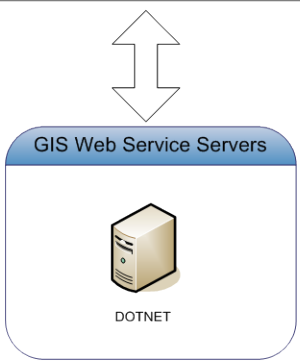
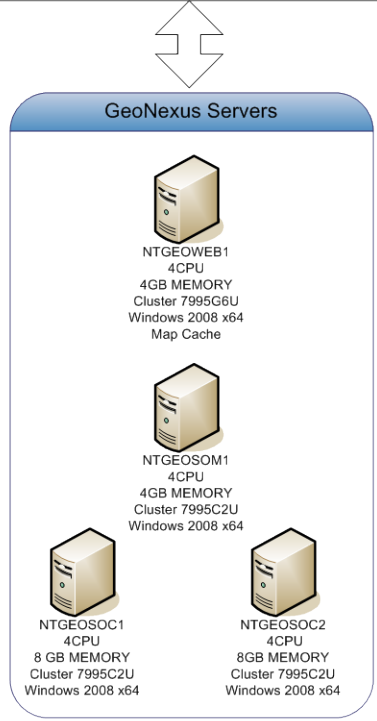
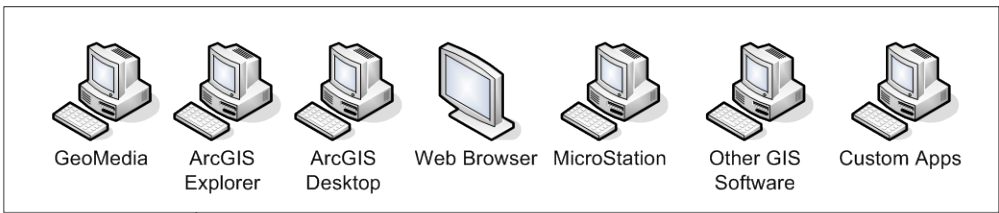
GeoNexus Services – Version 1A

- 4 server production
 - Web, SOM and 2 SOC machines
 - 64 bit VM
- 3 server test
 - Web, SOM and SOC machine
 - 64 bit VM
- Office GIS coordinators starting to expose and use services
- Imager server installed



GeoNexus Services – Version 1A

- Slow and inconsistent response times
 - Unsure why
 - Too many data hops for data access
- Gave redundancy if a SOC failed but not if the SOM or Web Server failed
- Needed a load balancer
 - Web and SOM could become overloaded
- Adding another SOM or web added cost
- Data stored on web server
 - Big mistake



PROD v1 - Retired

Lessons Learned Version 1A

- Pro
 - Better performance because of two SOCS
 - Split web and SOM reduces server load (related to single server)
 - Redundancy of SOCs
 - ESRI favored architecture
 - Best performance per license
 - Scalability
- Con
 - Found performance issues from hops from data on web tier
 - Expense in expansion and redundancy required more servers and licensing

2009 - 2010

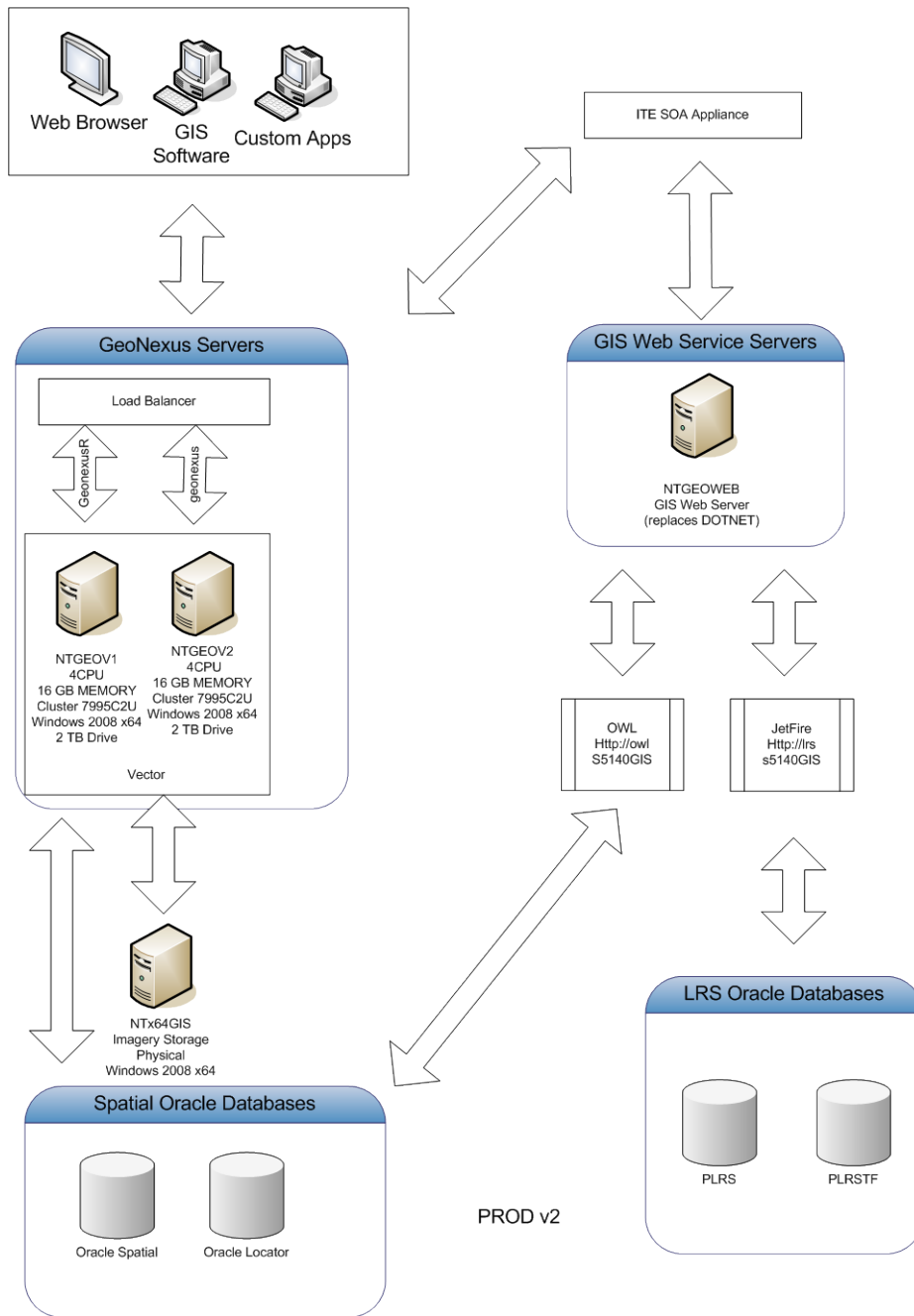
- Ran with version 1A architecture.
- Data from oracle was faster than MSD and MDX files stored on LAN
 - Might have been related to data hops
- Started looking at architecture options again

2010

- Spring talked with Arkansas and North Carolina DOT
- Conference call with Arkansas
 - All on one box
 - Use a load balancer
 - Keep it simple, getting fast response time
- Iowa DOT Created new VM Servers and tested new architecture

GeoNexus Services – Version 2

- January 2011 rolled to new “Arkansas” architecture
- Getting fast and consistent response times
- Take server offline by changing header file load balancer points to
- Automatic fail over from load balancer

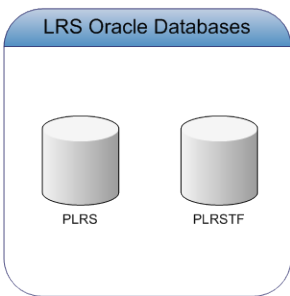
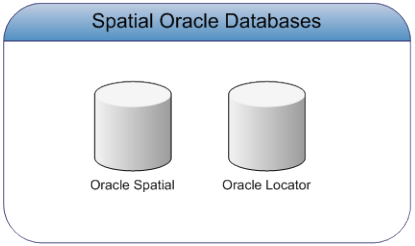
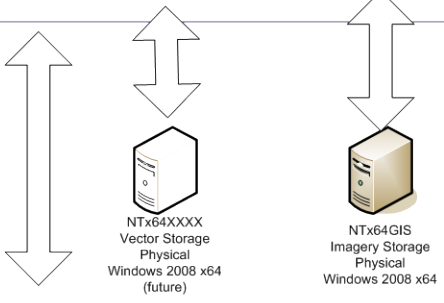
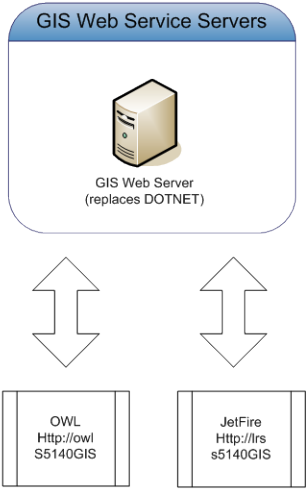
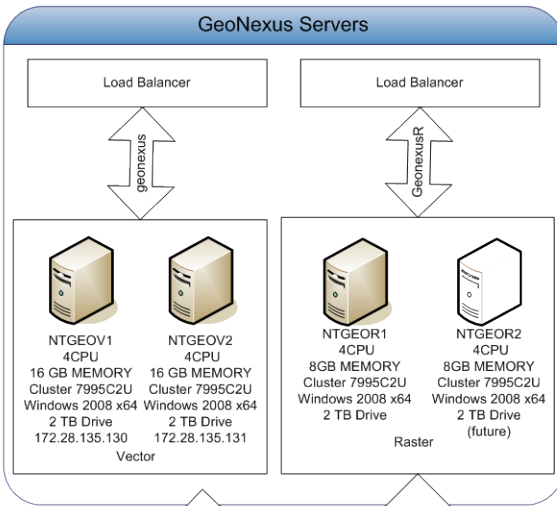
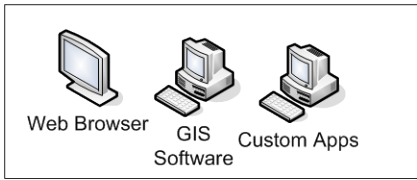


Lessons Learned Version 2

- Pro
 - Load balancer provides redundancy
 - Individual set up goes back to ease of version 1
 - Performance gain from better hardware and fewer network hops
 - Move to ArcGIS 10
 - Expansion is easy. Add cores or machines under load balancer
- Con
 - Duplicate data on each SOC
 - Difficulties making sure servers are identical
 - Have not perfected VM replication
 - Rely on scripts of manually copy data
 - In theory less performance per SOC

GeoNexus Services - Version 3

- Add Second load balancer and server
 - FME
 - Raster
- Add geocortex essentials tier
- Hope to deploy Fall early winter 2011



PROD v3 Proposed



Questions