Taming of the (ArcGIS) Server

Susan Carlson, Julie Kottamala, David Torraca

Loudoun County Office of Mapping and Geographic Information
Overview

Background – How did we get here?

Tuning & Monitoring – What do we do with it?
ArcGIS Desktop Environment
ArcGIS Server Environment
## Scheduled Tasks

<table>
<thead>
<tr>
<th>Scheduled Run Time</th>
<th>Task</th>
<th>Type of Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 AM</td>
<td>deleteOutputPrint</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>1:00 AM</td>
<td>DB2 Backups</td>
<td>SDE</td>
</tr>
<tr>
<td>2:00 AM</td>
<td>Assessor Extract to GISDB</td>
<td>SDE</td>
</tr>
<tr>
<td>2:15 AM</td>
<td>SDE Restart</td>
<td>SDE</td>
</tr>
<tr>
<td>2:30 AM</td>
<td>LR Daily Update Prod2Browse</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>3:05 AM</td>
<td>NonLR Update prod2browse</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>3:30 AM</td>
<td>Address Array JS File</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>3:45 AM</td>
<td>Wellpols_Update to SDE</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>3:50 AM</td>
<td>Update LMIS Parcels FC in 5211</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>4:00 AM</td>
<td>Layer List for AGS</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>4:00 AM</td>
<td>browseBackup _AGTEST,AGSINTRA,AGS fgdb backups</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>4:10 AM</td>
<td>Update to AGTest FileGeoDB (not wed)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>4:30 AM</td>
<td>Add Field Update to FGDB agtest (runs Fri a.m.)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>5:00 AM</td>
<td>Compact FGDB agtest (runs Sunday only)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>5:15 AM</td>
<td>Update to agtest FGDB (W only 6/8/11)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>5:30 AM</td>
<td>Browse Copy FGDB (to AGSIntra &amp; AGS) (not wed)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>5:45 AM</td>
<td>Rebuild Geocode Locators (not wed)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>6:00 AM</td>
<td>Browse Copy FGDB (to AGSIntra &amp; AGS) (W only 6/8/11)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>6:10 AM</td>
<td>Rebuild Geocode Locators (W only 2/9/12)</td>
<td>Weblogis 2.0</td>
</tr>
<tr>
<td>6:15 AM</td>
<td>openRESTServices</td>
<td>AGS</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>Storage Snapshot</td>
<td>SDE</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>crm_DailyUpdate</td>
<td>CRM</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>New_p2p</td>
<td>P2P</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>Addr XY spdd</td>
<td>LandRecords</td>
</tr>
<tr>
<td>5:10 PM</td>
<td>Parc XY spdd</td>
<td>LandRecords</td>
</tr>
<tr>
<td>6:00 PM</td>
<td>Daily Compress</td>
<td>SDE</td>
</tr>
<tr>
<td>7:02 PM</td>
<td>MakeTables_O</td>
<td>CAD</td>
</tr>
<tr>
<td>9:00 PM</td>
<td>Address Master</td>
<td>LandRecords</td>
</tr>
<tr>
<td>10:00 PM</td>
<td>GISFSview update</td>
<td>CAMA</td>
</tr>
<tr>
<td>11:00 PM</td>
<td>Dissolve and Update Subdivisions in 5171</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>11:30 PM</td>
<td>List Layers for prod2browse update</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>11:40 PM</td>
<td>Correct_nonRTextHlc</td>
<td>Prod2Brow</td>
</tr>
<tr>
<td>11:45 PM</td>
<td>Email from Update Network</td>
<td>Cl Network</td>
</tr>
</tbody>
</table>
Applications
Applications
Applications
Applications
Supported Applications
Supported Applications
Supported Applications
Supported Applications
Supported Applications
Supported Applications

http://gep.frec.vt.edu/va_utc.html
Services

ArcGIS Services Directory

Folder: /

Current Version: 10.05

View Footprints In: Google Earth

Folders:
- COL
- CommunityMaps
- FeatureServices
- Geocode
- Geoprocessing
- Imagery
- Mobile
- Network

Services:
- EDMD_View (MapServer)
- Geometry (GeometryServer)
- Parcels4DIT (MapServer)

Supported Interfaces: REST, SOAP, Sitemap, Geo Sitemap

Folder: COL

Current Version: 10.05

View Footprints In: Google Earth

Services:
- COL/BaseLayers_cache (MapServer)
- COL/CountywideSidewalksTrails (MapServer)
- COL/Districts (MapServer)
- COL/EDMDParcels (MapServer)
- COL/ElectionDistricts (MapServer)
- COL/Environmental (MapServer)
- COL/EnvironmentalHealth (MapServer)
- COL/LandRecords (MapServer)
- COL/LMGIS_ParcelsPlane (MapServer)
- COL/LoMap (MapServer)
- COL/LoudounMFGDS (MapServer)
- COL/Planning (MapServer)
- COL/PublicSafety (MapServer)
- COL/Schools (MapServer)
- COL/Surrounding (MapServer)
- COL/Utilities (MapServer)
- COL/Zoning (MapServer)

Supported Interfaces: REST, SOAP, Sitemap, Geo Sitemap

Folder: Imagery

Current Version: 10.05

View Footprints In: Google Earth

Services:
- Imagery/Imagery1853 (MapServer)
- Imagery/Imagery1926 (MapServer)
- Imagery/Imagery1937 (MapServer)
- Imagery/Imagery1957 (MapServer)
- Imagery/Imagery2002 (MapServer)
- Imagery/Imagery2004 (MapServer)
- Imagery/Imagery2005 (MapServer)
- Imagery/Imagery2006 (MapServer)
- Imagery/Imagery2007 (MapServer)
- Imagery/Imagery2008 (MapServer)
- Imagery/Imagery2009 (MapServer)
- Imagery/Imagery2010 (MapServer)
- Imagery/Imagery2011 (MapServer)
- Imagery/Imagery2012 (MapServer)

Supported Interfaces: REST, SOAP, Sitemap, Geo Sitemap
Applications in the works

Mobile Apps:

- Sidewalks and trails
- Emergency Operations Center photo capture
- Intersection proffer management
- Stormwater structures lookup (compact API for Blackberry/mobile)
- Stormwater structures maintenance
- Bus route finding i.e. “where’s the bus now”
- Hunting analysis
- Fire Hydrant mapping
Concerns

- Application Accessibility 24/7
- Human Resources
- System Resources
- Licensing
- Application Creep
- System Growth
- Reporting
Tuning & Monitoring

Tuning – development
- Web Services
- Applications

Monitoring – production
- Web Services
- Applications
- System
Web Service Development

- Data – local FGDB on each server
- Map Documents
  - Authoring specifications (Esri recommendations)
  - Map Service Publishing toolbar
- Caching – base layers, imagery
- Fixes
  - Service settings
    - Recycle hourly – to keep services ‘awake’
    - Min. # instances to 0 – to restart services on Test server
  - Scheduled Task – open REST services and websites
  - Geoprocessing Service – use from internet server only
Application Development: **Firebug & YSlow**

- Runtime errors
- Console logging
- Network usage
- Performance

Free Browser Add-ons for Firefox

## Monitoring

<table>
<thead>
<tr>
<th>Source</th>
<th>Monitoring Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP Requests</td>
<td>Google Analytics, Geocortex Optimizer</td>
</tr>
<tr>
<td>IIS (Web) Log Files</td>
<td>WebLog Expert Lite, Geocortex Optimizer</td>
</tr>
<tr>
<td>Performance Counters (Windows)</td>
<td>Server Manager Diagnostics, Geocortex Optimizer</td>
</tr>
<tr>
<td>ArcGIS Server Log Files</td>
<td>ArcGIS Server Manager / ArcCatalog, Java/Python Custom Script, Service Monitor Esri ArcScript, Geocortex Optimizer</td>
</tr>
<tr>
<td>Probes &amp; Alarms</td>
<td>Geocortex Optimizer</td>
</tr>
</tbody>
</table>
Google Analytics

- Free web statistics – internet only
- Hosted by Google
- Requires:
  - Analytics Account
  - Tracking ID for each site
  - Add tracking code snippet to web page
- Collects:
  - HTTP request of the visitor
  - Browser/system information
  - Can be customized for Event Tracking (tool usage)

http://www.google.com/analytics/
Google Analytics

Visits: for Performance Measures
Google Analytics

Avg. Page Load Time: View potential issues
Google Analytics

Browser Usage: For development and testing
WebLog Expert Lite

- Free web statistics – internet & intranet
- Installed locally
- Reads IIS/Apache logs
- Reports on demand

For Performance Measures

http://www.weblogexpert.com/lite.htm
Monitoring software purchased from Latitude Geographics

- Reporting – web interface or export PDF
  - Tool usage in site
  - Popular Layers
  - Popular Extents
  - Map Service load time
  - System Performance

- Alarms – email alerts
  - Website down
  - Services down
  - Server down

http://www.latitudegeo.com/
http://www.geocortex.com/arcgis-server-software/geocortex-optimizer/
Geocortex Optimizer
Geocortex Optimizer

Reporting: Website Tool Usage – JavaScript code in application

<table>
<thead>
<tr>
<th>Site</th>
<th>Event</th>
<th>Details</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_floodcross</td>
<td>19</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_policyareas</td>
<td>26</td>
</tr>
<tr>
<td>WL_intra</td>
<td>RFA</td>
<td>Zoning</td>
<td>5</td>
</tr>
<tr>
<td>WL_intra</td>
<td>ParcelAdjoiners</td>
<td>pin</td>
<td>35</td>
</tr>
<tr>
<td>WL_intra</td>
<td>ParcelBuffer</td>
<td>click_invalid</td>
<td>1</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_emsarea</td>
<td>2</td>
</tr>
<tr>
<td>WL_intra</td>
<td>ParcelSearch</td>
<td>click</td>
<td>3587</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_quarryod</td>
<td>7</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_tile</td>
<td>39</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_tracts</td>
<td>1</td>
</tr>
<tr>
<td>WL_intra</td>
<td>PinPassURL_Single</td>
<td>app=lmis</td>
<td>1917</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Identify</td>
<td>id_postation</td>
<td>13</td>
</tr>
<tr>
<td>WL_intra</td>
<td>Results_SearchAsmts</td>
<td>PinSingle</td>
<td>2169</td>
</tr>
<tr>
<td>WL_intra</td>
<td>PinPassURL_Single</td>
<td>app=webpods</td>
<td>26</td>
</tr>
</tbody>
</table>
Geocortex Optimizer

Reporting: 20 Most Popular Layers – ArcGIS Server log files

![Table of Popular Layers](image)

The popular layers table shows the 20 most requested layers from map image requests sent to ArcGIS Server. If fewer than 20 layers are displayed in the report, fewer than 20 layers were found in the ArcGIS Server log files.

<table>
<thead>
<tr>
<th>Layer Name</th>
<th>Number of Requests</th>
<th>Total Processing Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Centerline</td>
<td>63362</td>
<td>2388.34</td>
</tr>
<tr>
<td>Parcel Boundaries</td>
<td>63089</td>
<td>3267.24</td>
</tr>
<tr>
<td>Address Points</td>
<td>22788</td>
<td>291.69</td>
</tr>
<tr>
<td>Floodplain</td>
<td>9196</td>
<td>1073.32</td>
</tr>
<tr>
<td>Zoning</td>
<td>9011</td>
<td>718.40</td>
</tr>
<tr>
<td>ZIP Codes: Labels</td>
<td>8552</td>
<td>102.03</td>
</tr>
<tr>
<td>Tile Boundaries: Labels</td>
<td>8522</td>
<td>239.78</td>
</tr>
<tr>
<td>County Boundary</td>
<td>7303</td>
<td>73.31</td>
</tr>
<tr>
<td>Rt 28 Tax District</td>
<td>7271</td>
<td>46.15</td>
</tr>
<tr>
<td>Loudoun Water Fire Hydrants</td>
<td>6145</td>
<td>3058.11</td>
</tr>
<tr>
<td>Rezoning - ZMAP</td>
<td>6032</td>
<td>355.78</td>
</tr>
<tr>
<td>Election Districts 2011</td>
<td>5839</td>
<td>68.54</td>
</tr>
<tr>
<td>Fire Box Areas</td>
<td>5742</td>
<td>211.77</td>
</tr>
<tr>
<td>Ag Districts</td>
<td>4503</td>
<td>342.85</td>
</tr>
</tbody>
</table>
Geocortex Optimizer

Reporting: Layer Processing Time & Most Costly Services

The layer processing time chart identifies the 15 slowest drawing layers (on average) for the specified time period. If fewer than 15 layers appear on the report, that means that fewer than 15 layers in total were requested for the specified time period. Any layers which are dramatically slower than others often have the largest impact on map image performance. The performance of slow layers may be able to be improved by adjusting scale dependencies or symbology.

The map service cost chart shows the 10 most costly services based on the total time required to process all of the requests to each map service during the specified time period. High scores indicate services which are consuming larger amounts of CPU resources.
Geocortex Optimizer

Reporting: Windows Performance Counters
Geocortex Optimizer

Reporting: % Uptime, % Availability – Pings/Probes

Map Service Uptime for All Map Services

The Map Service Uptime report provides an estimate of the uptime percentage and total downtime for map services and image services. This information is retrieved from the data collected from Map Service and Image Service probes. Downtime is calculated based on the number of failed probe attempts for the specified time period. Services without probes will not be listed in the report.

<table>
<thead>
<tr>
<th>Map Service</th>
<th>Total Service Downtime</th>
<th>Percent Uptime</th>
</tr>
</thead>
<tbody>
<tr>
<td>COL/acr on AGSSINTRA</td>
<td>0 hours 9 minutes 60 seconds</td>
<td>99.86%</td>
</tr>
<tr>
<td>Imagery/Imagery2002 on AGS</td>
<td>0 hours 1 minutes 60 seconds</td>
<td>99.97%</td>
</tr>
<tr>
<td>Imagery/Imagery1997 on AGS</td>
<td>0 hours 1 minutes 60 seconds</td>
<td>99.97%</td>
</tr>
</tbody>
</table>

Website Probe Availability

The website probes table shows the average response time plus the percentage of the time each website probe returned a successful response.

<table>
<thead>
<tr>
<th>Probe Name</th>
<th>Percent Available</th>
<th>Average Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebLogis inter</td>
<td>99.989%</td>
<td>5</td>
</tr>
<tr>
<td>WebLogis intra</td>
<td>99.996%</td>
<td>6</td>
</tr>
</tbody>
</table>

Server Uptime Report

The uptime table shows the percentage of time that a server was reachable on the network over a given time period. The data is taken from the Geocortex Optimizer Ping Collector, which issues a small network probe from the source computer to the destination server. The average round trip time for this probe (Ping request and response) is listed with each entry.

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
<th>Percent Available</th>
<th>Average Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GISGEOCORTEX</td>
<td>logis.loudoun.gov</td>
<td>99.98%</td>
<td>0</td>
</tr>
<tr>
<td>GISGEOCORTEX</td>
<td>agsintra.prod.loudoun.local</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>
Geocortex Optimizer

Alarms

- Ping
  - Servers
- Probes
  - Sites
  - Services
- Sends email

Still to do:
Add System Performance alarms
Geocortex Optimizer

Monitoring the Monitor

- Geocortex Agent Service – stopped after MS Updates reboot
  - Set MS Updates to 1x per week (all servers)
  - Scheduled task – starts service if stopped, sends email

- SQL Server – database growth
  - Log file location – double records when moved
  - Delete records – issue with deleting > 1 day
  - Collection intervals – settings to decrease # records

- Alarms
  - Emails during maintenance
  - Probes – max # web sites is 4
Geocortex Optimizer

Using the Monitor

- Daily – Check for email alerts
- Quarterly
  - Review of Monthly Reports
  - Backup/delete records from SQL Server
  - Backup/delete IIS and ArcGIS Server logs
- Constraints
  - No reporting for tools and layers not being accessed
  - Staff time to review reports
Final Thoughts

- Suite of tools help to educate analysts on the use of the applications and lead to better management of the servers
- Alerts and alarms assist in identifying issues with the application components and the servers
- Improves communication with management and users
- Enhances planning for future applications and system growth
Thank you!

susan.carlson@loudoun.gov
julie.kottamala@loudoun.gov
david.torraca@loudoun.gov

www.loudoun.gov/omagi
Phone: 703-771-5778