July 25, 2012

Project: Configure ArcGIS Server 10 using Microsoft® Server 2008 Failover Cluster

Presented by Philip Dunn, Senior Consultant / Solution Architect
• **Established 1976**
  – 100% employee owned.
  – Presently over 1200 employees.
  – 26 offices in US and overseas.

• **Energy**

• **GIS and Asset Management**
  – Specializing in geospatial technology consulting and solutions in the energy industry.
• Existing Web-based Solution with 100s of customers.
• Multiple Single Points of Failure.
• No Failover Protection.
• Potential Extended Periods of Downtime due to hardware failures.
• Dissatisfied Customers.
Protect

100s of Users

Firewall

ArcGIS Server 9.3.1 SOM/SOC
IIS 6
Multiple Web Applications
Windows Server 2003 32-bit
8 GB RAM / 4 CPU

SQL Server 2008
SQL Server Reporting Services
Windows Server 2003 32-bit
8 GB RAM / 4 CPU
Existing Components

- Single Web Server with ArcGIS Server (SOM/SOC on same server).
- Single SQL Server 2008 server.
- 8 Geodatabases.
- Several business databases.
- Approximately 15 GB of structured data.
- Approximately 1TB of unstructured data.
- 120+ ArcGIS Server map services.
- Custom web map application using ArcGIS Server 10 Silverlight API.
- Other custom web applications.
Project Requirements

- Near instant failover protection.
- Increase solution up-time to 98%.
- Perform OS maintenance without downtime.
- Simple setup, configuration, and management.
- Failover protection for the web servers, ArcGIS Server, SSRS, and SQL Server database servers.
- Minimal additional software licensing costs.
• Constraints
  – Windows Environment (2003 or 2008)
  – SQL Server 2008
  – SQL Server 2008 Reporting Services
  – ArcSDE 9.3 Geodatabase
  – ArcGIS Server 9.3 or 10
  – 2 identical existing VMWare ESX 4.0 servers
  – SAN Storage
Architectural Approach

- **Windows Failover Clustering**
  - Windows Server 2008 R2 x64
  - Active/Passive
  - Components:
    - IIS 7 (web server)
    - ArcGIS Server 10
    - ArcSDE 9.3
    - SQL Server Reporting Services 2008

- **SQL Server Failover Cluster**
  - SQL Server 2008 R2
  - Active/Passive
Architecture

VM Host #1
- SQL Server 2008 Node 1
- SQL Server Reporting Services 2008 Node 1
- ArcGIS Server 10 SOM Node 1 Web Apps
- ArcGIS Server 10 SOC Node 1

VM Host #2
- SQL Server 2008 Node 2
- SQL Server Reporting Services 2008 Node 2
- ArcGIS Server 10 SOM Node 2 Web Apps
- ArcGIS Server 10 SOC Node 2

SAN
- Quorum
- Content
- Geodatabases

• Web Content
• ArcGIS 10 folders (cache, output, index, etc.)
• Unstructured Data (imagery, photos, etc.)
The Execution

1. Setup SQL Server 2008 Cluster
2. Setup ArcSDE Cluster
3. Setup SSRS Cluster
4. Setup ArcGIS Server 10 Cluster
5. Setup ArcGIS Server Map Services
Resources and Timeline

- 1 Web Developer
- 1 ArcGIS Server Developer
- 1 Solution Architect / SQL Server DBA
- Approximately 300 person-hours for initial stand-up of solution.
Successes and Challenges

- **IIS 7**
  - Only Clusters with Scripts (one for each application pool).
  - Shared Configuration.
    - IIS configuration files on shared storage.
  - All content on shared, clustered storage.
    - Web Content (`inetpub` folder).
    - ArcGIS Server folders (cache, index, jobs, output, etc.).

- **ArcGIS Server**
  - Security setup was difficult.
  - SOCs were limited to 1 due to block level storage.

- **ArcSDE**
  - Cluster as *Generic Service* on SQL Server VM nodes.
  - Encountered problems if installed under “Program Files”; had to install it under C:\argsde. (had to submit a support ticket with Esri)

- **SQL Server Reporting Services**
  - SSRS is not “Cluster Aware”.
  - Cluster as a *Generic Service* on dedicated nodes.

- **SQL Server 2008**
  - Easiest task of the implementation.
  - SQL Server 2008 is “Cluster Aware”.
  - All databases on shared, clustered SAN storage. (15K SAS drives, RAID 6)
Results

• Successful Implementation
• Increased Performance
• Currently Operational
• Lessons Learned:
  – Block-level (SAN) storage may not be a good solution for unstructured data. NAS would have been better.
  – Might have explored more failover options with VMWare.
Architecture

100s of Users

VM Host #1
- SQL Server 2008 Node 1
- SQL Server Reporting Services 2008 Node 1
- ArcGIS Server 10 SOM Node 1
- ArcGIS Server 10 SOC Node 1

VM Host #2
- SQL Server 2008 Node 2
- SQL Server Reporting Services 2008 Node 2
- ArcGIS Server 10 SOM Node 2
- ArcGIS Server 10 SOC Node 2

Firewall

Firewall

100s of Users

VM Host #1
- SQL Server 2008 Node 1
- SQL Server Reporting Services 2008 Node 1
- ArcGIS Server 10 SOM Node 1
- ArcGIS Server 10 SOC Node 1

VM Host #2
- SQL Server 2008 Node 2
- SQL Server Reporting Services 2008 Node 2
- ArcGIS Server 10 SOM Node 2
- ArcGIS Server 10 SOC Node 2

Firewall

Firewall

100s of Users

VM Host #1
- SQL Server 2008 Node 1
- SQL Server Reporting Services 2008 Node 1
- ArcGIS Server 10 SOM Node 1
- ArcGIS Server 10 SOC Node 1

VM Host #2
- SQL Server 2008 Node 2
- SQL Server Reporting Services 2008 Node 2
- ArcGIS Server 10 SOM Node 2
- ArcGIS Server 10 SOC Node 2

Firewall

Firewall

100s of Users
Other Options?

- VMWare Failover & Load Balancing Solution
- Hardware Load Balancer
- Linux RedHat Server Failover
- Hosted or Cloud
Resources

- Microsoft Server 2008 Failover Clustering White Paper
- Microsoft SQL Server 2008 Failover Clustering White Paper
- Getting Started with SQL Server 2008 R2 Failover Clustering
- Windows Failover Cluster Step-by-step Guides
- VMWare Load Balancing/Failover Protection
- ArcGIS Server and Virtualization White Paper
Phil Dunn
POWER Engineers
pdunn@powereng.com
Thank You!