

EOS Education Project Internet Mapping and Image Service System Configuration

Written By: Chris Munson
EOS Education Project - White Paper #3
munson@eoscenter.com

The EOS Education Project recently completed the purchase, installation, configuration and customization of our Internet Mapping and Image Service. This system consists of a variable number of servers combined with an excellent blend of software from our business partners and custom designed dynamic web applications. This document will serve as an outline of how we constructed this system.

The concept of this system was to spread out the processor intensive activities such as database queries and image processing away from the web server. This frees up the web server to handle requests for information. Additional information will be provided in the Network Configuration section.

Hardware Specifications

The initial service configuration consisted of three (3) servers and a 10/100 Ethernet Hub. The specifications on these servers were as follows:

Server #1 – Webserver (Referred to as *Yoda* from here on)

Pentium III XEON 1000 MHz Processor

512MB RAM

32GB Hard Drive

Windows NT 4.0 SP6a

2 – 3COM 10/100 Network Interface Cards

Server #2 – ArcIMS Spatial Server #1 (Referred to as *Chewbacca*)

2 – Pentium III XEON 1000 Mhz Processors

1GB RAM

2 – 32GB Hard Drives

Windows NT 4.0 SP6a

2 – 3COM 10/100 Network Interface Cards

Server #3 – SQL/Data Server (Referred to as *Vader*)

2 – Pentium III XEON 1000 Mhz Processors

2GB RAM

6 – 76 GB Hard Drives

Uses a RAID 5 Disk Array system where 1 drive is a hot spare.

Windows NT 4.0 Enterprise SP6a

3 – 3COM 10/100 Network Interface Cards

A brief explanation of each server's role in this system is now appropriate. The SQL/Data server (VADER – Server #3) is used for running the DBMS (SQL Server 7) and the Spatial Data Engine (ArcSDE 8.1). This allows us to store various spatial, image and temporal data in one centralized data storehouse for use by the other servers in the system. The ArcIMS Spatial Server (CHEWBACCA – Server #2) handles all of the image/spatial processing. This server performs the following process:

1. The Web Server (YODA – Server #1) sends a request to CHEWBACCA for spatial/image data.
2. CHEWBACCA then requests the spatial/image data from VADER either from ArcSDE/SQL or from a image file stored on VADER's disk array.
3. CHEWBACCA takes the raw information received from VADER, processes it and creates a JPEG image. This JPEG image is sent to YODA, where it is served to the client's web browser as part of the customized web environment.

Network Configuration

In order to make this system both secure and efficient in a shared network environment, it was necessary to isolate the most bandwidth intensive operations from the general enterprise network. In order to accomplish this, we place all servers except the web server "off-network". We simply inserted a generic 10/100 Mbps Ethernet Hub between YODA, CHEWBACCA and VADER. This also enables us to secure the data located on VADER as it is not connected to the Internet in any way. YODA was then connected to the enterprise network and the Internet in order to process requests. Please view Figure 1 below for a visual representation of this physical network configuration.

Physical Configuration

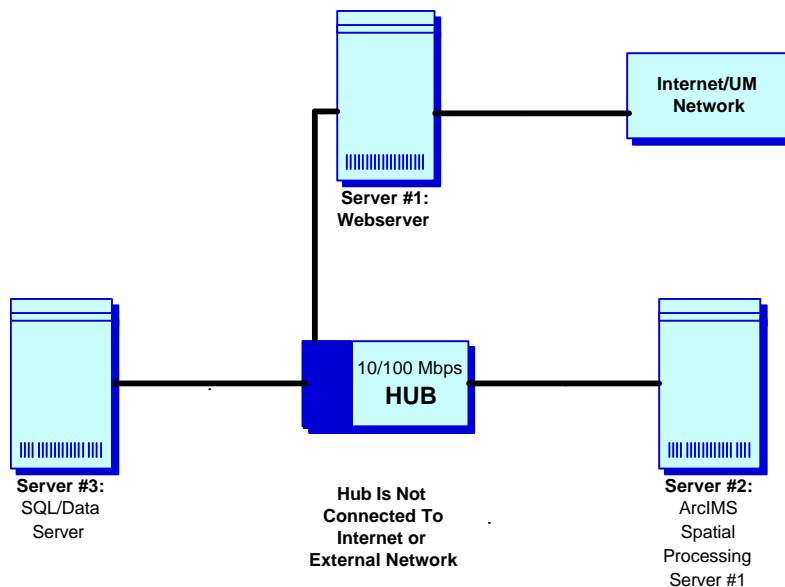


Figure 1

In order to make this function correctly, it was also necessary to install some additional Windows networking features on to YODA. In addition to the IIS Web Server software, it was necessary to install the DNS Server and WINS Server features on to YODA. This allowed us to assign “Private” IP Addresses to VADER, CHEWBACCA and the 2nd Network Interface Card (NIC) of YODA as well as reference each server by its NetBIOS Name (VADER, YODA, CHEWBACCA), which simplified the configuration of the necessary shared drives and shared resources.

Software Configuration

Once the hardware and network settings were configured, it was necessary to install the various software packages from our business partners and to activate the customized web applications we developed. As the installation instructions are well covered in the documentation for these products, I will not cover any of that information in this document. Here is a list of installed software listed by server:

YODA (Webserver)

- Microsoft Windows NT 4.0 SP6a
- Microsoft NT Option Pack 4 (Internet Information Services)
- Servlet Exec 3.0
- Java JRE 1.22
- ESRI ArcIMS 3.1 (Application Server, Tasker, and Monitor Pieces)
- ESRI RouteIMS 2.0
- Lizardtech Content Server 3.0

CHEWBACCA (Spatial Server #1 – Multiple Spatial Servers Possible)

- Microsoft Windows NT 4.0 SP6a
- ESRI ArcIMS 3.1 (ArcIMS Monitor – Configured to Report to YODA)

VADER (SQL/Data Server)

- Windows NT 4.0 Enterprise SP6a
- Microsoft SQL Server 7.0 Enterprise SP3
- ESRI ArcSDE 8.1

Upgrade Plans

We have recently received ArcIMS 3. and have upgraded our systems to to Windows 2000 and take advantage of the 99.999% advertised uptime for Windows 2000 Server products.

Conclusion

This has been a very quick description of a system configuration that took us several days to design and implement. An example of a system using this configuration can be seen at <http://yoda.cec.umn.edu/lc>. If you have any additional questions about how

anything is configured, installed, etc., please feel free to contact me at munson@eoscenter.com and I'll do my best to answer your questions.