Understanding Servers

IT4GIS
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What is a server?

- Desktop
- Workstation
- Server

Functional Roles

- Data Storage
- Application Host
- GeoProcessing
- Spatial Data Management
- Website Host
- E-mail
Data Storage

- The role of hardware
  - NAS (network attached storage)
  - SAN (storage area network)
  - DAS (direct attached storage)
  - [other]

- Your role
  - Delete unnecessary data
  - Apply best data type (vector attribute tables and raster file formats)

Data Storage: Fault Tolerance

- RAID=Redundant Array of Inexpensive Disks
- Hardware or software implementation
- Level 0,1,5,10
- Minimum four disks on server
- Hard disk types
  - SCSI, IDE, etc.
  - Hot-swappable

Data Storage: The Way Fault Tolerance Works!
Data Storage: RAID and RAIS

- Redundant Array of Inexpensive Disks
- Redundant Array of Inexpensive Servers

Hints and Tips: The 5-nines

- 99.999% of the time...
- Servers are operational and functioning
- How much down-time does this allow?
  - 5 minutes!
  - No longer even a goal!
  - Why?

Application Host

- GIS software-host server (application server)
- GIS software license server
GeoProcessing

- ArcGIS for Server software resides on server with GeoProcessing Services running
- Clients have the desktop or workstation application installed
- Large tasks are processed by the server via web interface
  - Can more fully utilize available processors and RAM

Why are Servers Faster?

- More RAM and more CPU cores (yes)
- But more importantly, a different architecture in RAM and CPU usage and allocation

Spatial Data Management

- SDE=Spatial Database Engine
- Requires DBMS
- ArcSDE
- Spatial library organized with a RDBMS
Web Server

- IIS
  - Overview of structure on host server
  - Client access
    (http://giscenter.isu.edu)
- ArcGIS for Server
  - Serving maps

ArcGIS for Server

Compliments SDE by serving GeoData services

Includes Web Services as the next generation web map server

Provides Geo-processing capabilities even through the Web!

Types of Server Hardware

- Glorified desktops
- Standard Rack-based
- Blade
  - Rack based, but not limited to 42 Units
  - Can contain more than CPUs
- ISU’s Research Data Center (RDC)
Professional Tips

• Data folder for clients
• Data liability policy
• Use of Temp folders
• System Administration:
  – Do not allow write access from remote clients anywhere on your system!
• Security
  – Web access is principal security threat
  – FTP is a primary avenue for intrusion
  – Dynamic IP addressing

Applying Security to Your Server

• Reactive:
  – TCP/IP exclusion
• Proactive
  – Service packs
  – Updating anti-virus dictionaries
  – Disabling and uninstalling FTP
  – Firewalls

Security (cont’d)

• Backup your data
  – Mission critical
  – Critical
  – Non-critical data
Key Concepts

- A server is best defined by its **Functional Role**.
- You should now know several roles for GIS servers.
- Fault tolerance addresses **data integrity** (information assurance).
- Proactive security measure address **data security**.

A Tour of the Server Room
(in under 2 minutes)

Keep the Servers Cool

- Cool aisle and hot aisle approach
- Liquid cooling (INL C3)
  - Better approach but more expensive
  - ROI good on larger data centers (INL C3)
  - ROI poor on smaller data centers (ISU RDC)
Questions...Assignment

Get ready for the 2-minute write