

Understanding Servers

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What is a server?

- Desktop
- Workstation
- Server



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Functional Roles

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

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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 to each attribute (tables) and raster file format/pixel depth)

Grid or GeoTIFF?

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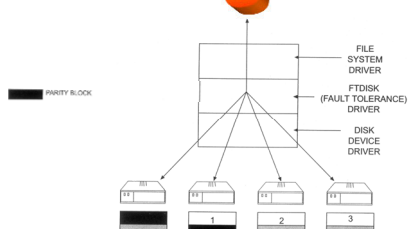
Data Storage: Fault Tolerance

- 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

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Data Storage: The Way Fault Tolerance Works!



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Data Storage: RAID and RAIS

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

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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?

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Application Host

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



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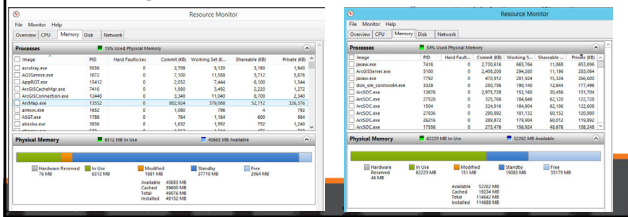
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GeoProcessing

- 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/allocation

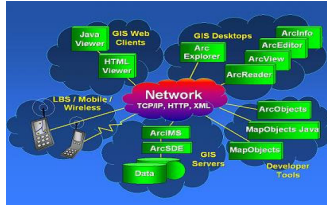


GPU Processing

- Graphical Processing Units
- nVidia leads, but it all started with the demand for smooth video rendering by the gaming industry
- Graphics cards and processing
 - Processing graphics is an intensive Floating-point Operation (FLOP) **that must be done quickly**
 - Geoprocessing can also be an intensive FLOP (but does not need to be done quite so fast)
- In some cases, a server will not be faster if a good graphics card is not available

Spatial Data Management

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



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Web Server

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



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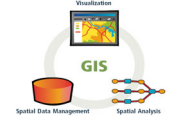
ArcGIS for Server



ArcGIS Server Key Features

ArcGIS Server supports spatial data management, visualization, and spatial analysis on a single Web site.

ArcGIS Server offers Web mapping services that support 2D viewing and online maps, as well as 3D viewing and analysis capabilities. It also supports mobile devices and applications that consume these services with point and click ease.



ArcGIS Server includes built-in workflows and integrates their geospatial management based on the ArcGIS geospatial model. Geospatial services are accessible through a single program, Web for ArcGIS, ArcGIS for Server, and ArcGIS for Desktop.

ArcGIS Server offers server-based analysis and processing. This includes online, batch, 2D, and 3D spatial analysis, including Web, Web, and Web, including publishing and synchronization capabilities.

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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)

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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

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Applying Security to Your Server

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

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Security (cont'd)

- Backup your data
 - Mission critical
 - Critical
 - Non-critical data
- Difference between **Backup** and **Archive**

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



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Keep the Servers Cool

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

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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**.

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Professional Hints and Tips

- Email is not a text SMS...

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Questions...Assignment



Get ready for the 2-minute write

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