

Understanding Servers

IT4GIS
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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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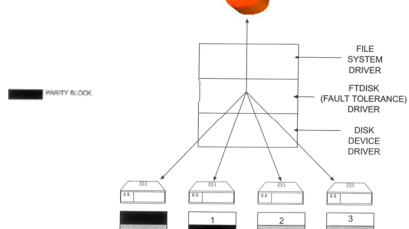
Data Storage: Fault Tolerance

- 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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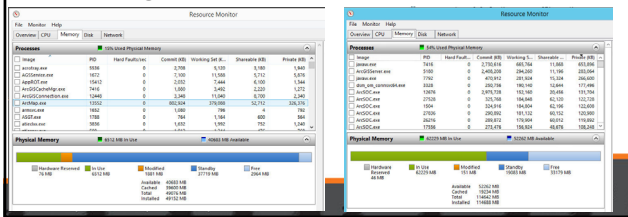
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GeoProcessing

- 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

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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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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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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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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