

Megabytes, Gigabytes, Terabytes its all the same to me.

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Megabytes, Gigabytes, Terabytes its all the same to me.

- **Why is it all the same?**
 - Megabytes on the desktop (Cray 1 class)
 - Gigabytes in department servers (Cray YMP class)
 - Terabytes from corporate center resources
 - » Cray T3E and T90 class
 - » Intel TFlops
 - » ASCI Blue Mountain - SGI
 - » ASCI Blue Pacific - IBM
- **Because customers have 'data' that is important to them regardless of the amount.**

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Hierarchical Storage - That's French for never through anything away.

- **Whichever platform data exists on it is vulnerable, transient, a veritable 98 pound weakling.**
 - Head crashes
 - Power spikes
 - Floods
 - “Friendly system administrators”
- **What customers want and need is powerful, indestructible, stronger than dirt DATA that they can rely on for years to come.**

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So what do we do to help these poor unfortunate data addicts?

- **We provide a virtually unlimited data storage space for long term (years or decades) storage of data files.**
- **We provide the capability to make multiple copies of the data available online.**
- **We can provide geographically separate redundant storage locations.**

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So are we Magicians or what?

- **Our current system relies on three software products and on three levels of data storage.**
- **At Sandia National Labs in Albuquerque we employ:**
 - Unitree
 - HPSS
 - Legato
- **Our storage hardware consists of disk and tape devices and offline storage:**
 - StorageTek Silos - 200 MB 4480 cartridges (100x Gigabytes)
 - IBM 3494 Libraries - 10 GB 3590 cartridges (10x Terabytes)

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No magic, just choices.

- **The Computer Services Units at Sandia provide disk backup services to nearly 10,000 desktops.**
- **The Legato system provides backup services to the six HP systems backing up the desktops.**
 - Legato writes to IBM 3590 tapes in a StorageTek silo.
 - Transfer rates are about 8 Megabytes per second.
 - Legato currently uses two 3590 tape drives.
 - Network connections are ATM OC-3 (155Mbits/sec)

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No magic, just choices.

- **Central Scientific Computing uses Unitree on SGI platforms for Unix system backups and hierarchical storage. Previously we used Unitree on Convex and prior to that CFS on IBM equipment. (We still have some of the CFS data!)**
- **Our two Unitree systems hold about 2 Tbytes of data within three StorageTek 4410 Silos.**
 - Unitree stages data to 100 Gbytes of disk
 - Files are migrated to STK 4480 tape via multiple tape drives.
 - Transfer rates to disk are about 4-5 Mbytes/sec.
 - Network connections are FDDI.

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No magic, just choices.

- **Central Scientific Computing uses HPSS on IBM 3494 Tape Libraries with 3590 tape drives.**
- **Our two HPSS systems run on IBM RS/6000 systems running AIX and write to 3590 cartridges via SCSI connections.**
 - HPSS writes data directly to tape.
 - We can stripe up to 6 tape writes simultaneously at 8 Mbytes/sec each.
 - Each library stores 2700 tapes.
 - Network connections are ATM OC-3 (155 Mbits/sec)

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No magic, just choices.

- **We are planning to replace Unitree with HPSS.**
- **We are building a third HPSS system to run with the StorageTek silo. This system is running and supports IBM 3590 tape drives in the STK silo.**
 - **HPSS communicates with the same silo Unitree uses.**
 - **We have two 3590 tape drives available to HPSS.**
 - **The STK Silo (currently a 4410, soon to be a 9410) holds about 6000 tape cartridges.**
 - **Network connections are ATM OC-3 (155 Mbits/sec).**

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