Storage Decisions

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Keys to optimizing your backup environment: Veritas NetBackup

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Introduction

- Audience Profile
- Storage Management Interdependence
- Case Study
- Backup Architecture and Performance
  - Server
  - Tape
  - Network
  - Clients

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Audience Response

- Are you a NetBackup Administrator?
  - Yes
  - No
- How long have you been using the product?
  - 1. 0-6 months
  - 2. 6-12 months
  - 3. 12-24 months
  - 4. More than 2 years

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Case Study – Biotechnology Company

Technical Issues	Business Problems
▪ Backup architecture unable to scale with increasing storage capacities and server growth ▪ Network architecture unable to support throughputs required for backup ▪ Lack of NBU / OS tuning: Implementation did not include optimization ▪ Client-side issues impacting backup success (OS, antivirus, network, applications)	▪ Limited budget and staff ▪ Reliability and performance problems for both hardware and software ▪ Regulatory / data retention requirements ▪ Disconnect between application design and storage management ▪ Shrinking backup windows ▪ Lack of data management policies

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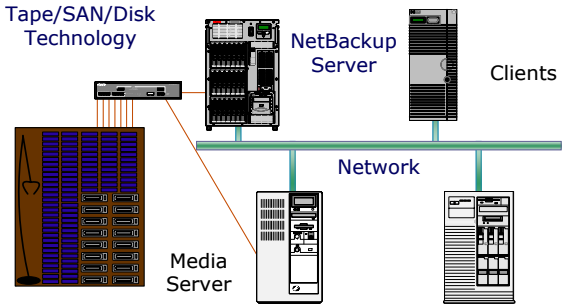
NetBackup Architecture



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Case Study

Technical Issues	Solution
▪ Backup server underpowered for size of environment ▪ Lacking in CPUs, RAM, and Network throughput	▪ Upgraded hardware to HP rp7410 ▪ Master: 4GBs of RAM, 4 CPUs, Gb Ethernet cards
▪ No media servers to balance load	▪ Partitioned server into master and media server ▪ Upgraded hosts with more than 200 GBs into SAN media servers
▪ NetBackup not properly tuned for optimal performance	▪ Modified NetBackup server-side variables to maximize performance

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NetBackup Server Performance

- **Application Performance Tuning**
  - **Backup Schedule Balancing**
  - **Number of Backup Jobs**
    - **Multi-streaming and multiplexing**
  - **Specific Tuning Variables**
    - **NET_BUFFER_SZ**
    - **DISABLE_RESOURCE_BUSY**
    - **CLEAN_IN_BACKGROUND**
    - **Pre-Process Interval**
- **NetBackup Performance Tuning Guide**
  - **UNIX: http://seer.support.veritas.com/docs/240733.htm**
  - **Windows: http://seer.support.veritas.com/docs/248373.htm**

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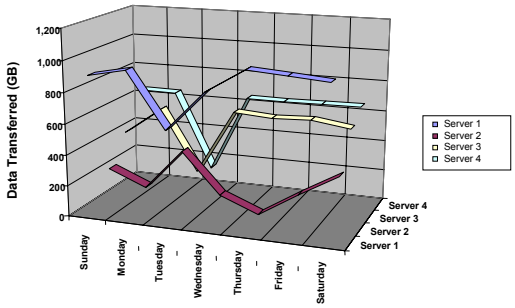
Average Media Server Volume



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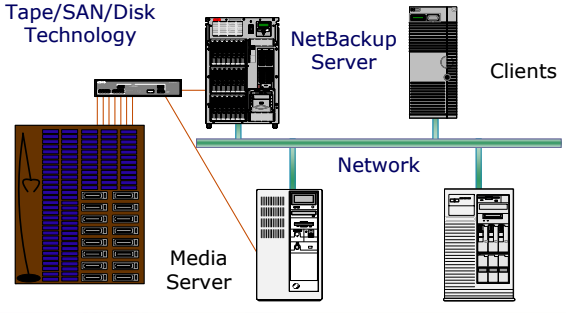
NetBackup Architecture



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Case Study

Technical Issues	Solution
▪ Veritas Shared Storage Option deployed with STK L700 and 20 LTO-1 drives ▪ Frequent drive problems caused multiple backup failures	▪ Modified SSO to limit drive sharing to smaller number of servers ▪ Updated persistent bindings to minimize impact of server reboots and SCSI-locks
▪ Overall Throughput was less than expected	▪ Tape drives were "shoe-shining" due to a lack of data ▪ **Increased the number of multiple streams written to each drive** ▪ **Reduced the number of drives available for backup** ▪ **Modified SIZE_DATA_BUFFERS and NUMBER_DATA_BUFFERS variables on media servers**

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Tape Tuning Strategies

- Storage Unit Fragment Size
  - Rule-of-Thumb = 2GB
- Multiplexing Data
  - Reduces "shoe-shining" effect
  - Too much can negatively impact restore speed.
- In-Line Duplication
  - Requires additional hardware, but enables tapes to be sent offsite quicker
- Software vs. Hardware Compression
  - Best Practice: Utilize hardware compression unless network-constrained.

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Disk-Based Backups with NetBackup v5.0

- **Enhanced functionality of v5.0 makes disk-based backups a viable option.**
- **Disk as a Primary Storage Device**
  - Enterprise-class solutions are limited due to tremendous storage requirements.

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Disk-Based Backups with NetBackup v5.0 (II)

- **Disk as a Staging Device**
  - v5.0 includes Staging functionality.
  - Data is automatically moved based on pre-established policies.
  - Leverages speed of disk for backup, with tape for long-term storage
- **Disk as Hybrid-Solution**
  - Direct some backups to disk, others to tape.
  - Eliminates additional step of staging, but provides advantages of both disk and tape

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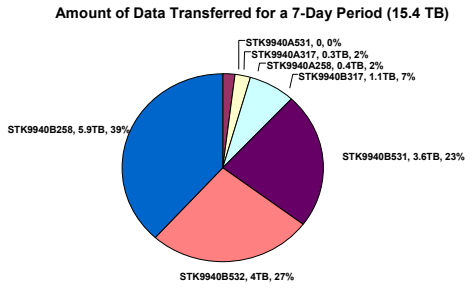
Storage Unit Distribution



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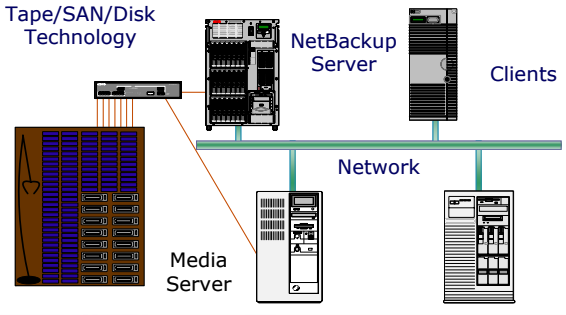
NetBackup Architecture



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Case Study

Technical Issues	Solution
▪ Separate Backup Network was created to reduce impact on corporate network ▪ Clients did not always use backup network for data transfer	▪ Modified "Required Interface" option to bind client backups to appropriate network interface
▪ Intermittent backup failures following host reboots ▪ NICs and Ports set to "auto-negotiate"	▪ Hard-code network settings to 100 Mb, Full-Duplex
▪ Log files indicate that Media servers were "waiting for full buffers" during network backups ▪ Slowed backup performance	▪ Tuned NET_BUFFER_SZ Variable on both media servers and clients

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Network Design

- **Dedicated Private VLAN architectures**
  - Logical network segregation & physical network segregation
  - Use jumbo frames and gigabit VLANs.
    - Improves streaming efficiencies to tape
- **Multiple NICs for client network load balancing**
  - Etherchannel configurations
  - Load balancing for network, switches, server HBAs

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Network Design, II

- **NetBackup Tuning Variable**
  - NET_BUFFER_SZ: Determines size of network communications buffer used to receive data from network
    - If set too small, media servers can't empty buffers fast enough.
    - If set too large, media servers have to wait for data.
    - Client settings should match media servers.

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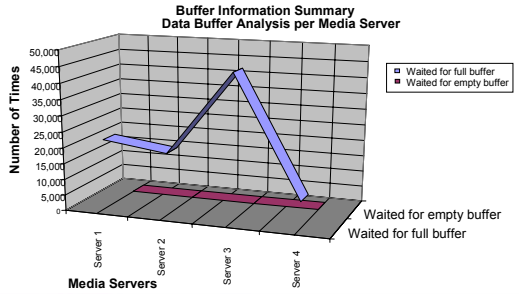
Sample Charts Available From GlassHouse



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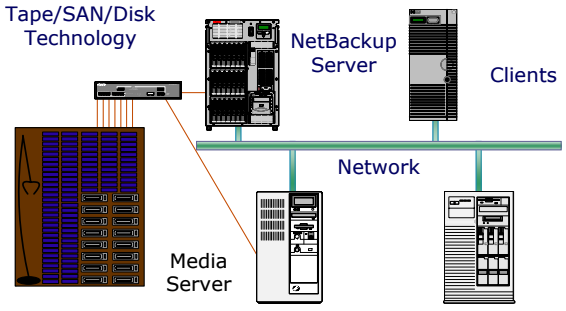
NetBackup Architecture



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Case Study

Technical Issues	Solution
▪ Oracle Agent was implemented for Hot Oracle Database Backups ▪ Backups of some servers ran out-of-window	▪ Implemented Block-Level Incremental backups of Oracle ▪ 30% Faster than standard RMAN backups
▪ Network Appliance Filers backed up via NFS mounts ▪ Full backups took 5 days	▪ Implemented NDMP backups to dedicated tape drives ▪ Testing indicated that 3rd-Party Remote backups were significantly slower
▪ Backups of Netware clients ran out-of-window	▪ Tuned Netware variables per Veritas-recommended settings ▪ Reduced backup times by 33%

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Client Considerations

- **Include/Exclude list size**
  - Maintenance is difficult, but necessary.
  - Exclude Open Files, Temp files, etc.
- **Open File Processing**
- **Block-Level / Flash Backups**
- **Client options settings**
  - Pre-Process Interval (set on master server) - Increasing default interval
- **Number and size of files**
- **Frequency of data change**

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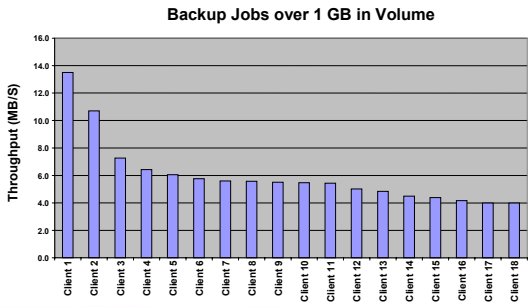
Client Backup Performance



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To receive charts similar to those seen in this presentation specific to your environment go to:

www.glasshouse.com/backup

For a "*cheat sheet*" see the highlighter in your conference bag.

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Questions?

Thank you.

- ***See me at Ask the Expert – Tuesday 5:00-6:00 PM***