Storage Decisions

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Keys to optimizing your backup environment: Legato NetWorker

Natalie Mead
Storage Consultant
GlassHouse Technologies
nmead@glasshouse.com

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Introduction

- **Audience Profile**
- **Storage Management Interdependence**
- **Backup Pain Points**
- **Common Root Causes of NetWorker Issues**
- **Case Study**
- **Performance Architecture**
  - NetWorker Server, Tape/San/Disk Technology, Network, Clients
- **Best Practices**

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Audience Response

- **Are you a NetWorker 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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Backup Pain Points

- **RELIABILITY**
- **Drowning in database and e-mail data**
- **Limited budgets and staff**
- **Shrinking backup windows**
- **Increasingly complex environments**
- **Reactive mode operations**
- **Regulatory requirements**
- **Long-term retention requirements: ARCHIVING**

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Common Root Causes of NetWorker Issues

- Data Zone design
- Poor resource planning
- Network architecture
- Client-side issues (file systems, OS, network, antivirus, etc.)
- Inadequate data retention
- Lacking Operations structure (e.g., too much firefighting)
- Disconnects between growth and storage management

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Case Study – Biotech Company A

- NetWorker Server 6.1.1 (Solaris 2.6 -Two Storage Nodes)
- One NetWorker Administrator, Two Junior Operators
- 100 Mb Switched Environment
- Clients were a mix of Windows, Solaris and HP-UX
  - Some Oracle, SQL and Exchange
  - Many larger systems with more than 1,000,000 files
- NetWorker Resources were using default parameters (Client Parallelism and Target Sessions for example)
- One pool (Default) -- No common retention policies
- Upper-level management requirements for compliance
- Projected 20 to 40% growth in the next year

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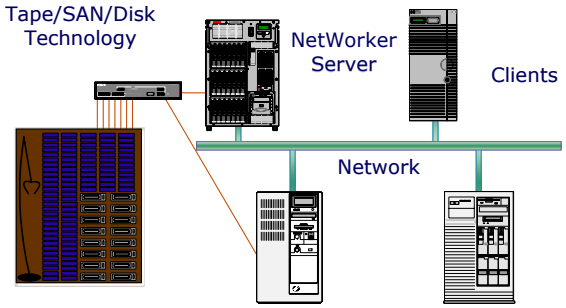
Performance Tuning Architecture



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Server Environment Considerations

- Upgrade to current NetWorker Software revisions
- Replace system hardware
  - separate partition for nsrdb
  - Memory
  - OS
- Tune parameters
  - Server and Client Parallelism
  - Storage Nodes
  - Target Sessions
  - Groups
  - Schedules

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Server Environment Considerations, II

- Implement SAN/disk backup technology
- Network connectivity upgrade

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Case Study – Biotech Company A

- **Server and Storage Nodes moved to version 7**
- **Upgraded NetWorker Server hardware**
- **Tuned NetWorker Resources**
  - Server and Client Parallelism increased (use the guideline ~ SP= # of Devices X TS)
  - Distributed clients across storage nodes
  - Consolidated groups
  - Staggered full backups

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Case Study – Biotech Company A, II

- **Larger client incorporated DDS and raw backup**
- **NetWorker Server and Storage Nodes (non-dedicated) swapped NIC to Gig-E**
- **Implemented Adv File Devices (staging configuration)**

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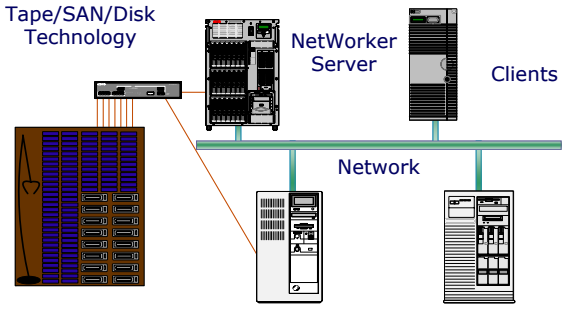
Performance Architecture



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Tape/SAN/Disk Technology

- SAN Architecture: Dedicated if possible
- Disk vs. Tape
- Library Scaling
- Hardware vs. Software Compression
- Dynamic Drive Sharing
  - Immediate save and recover
- Number of Tape Drives based on drive type
  - Linear vs. variable speed
- Number of Drives per HBA

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Case Study: Biotech Customer A

- **Implemented dedicated SAN for tape.**
- **Staged incremental and log files to advanced file type devices.**
- **Moved from DLT7000 media to LTO (to support growth).**
  - Prior to purchasing new media, ¼ of the tape drives became read only to prevent shoe-shining.
  - Used DLT7000 media for cloning once new library was implemented.

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Case Study: Biotech Customer A (II)

- **Any system larger than 100 GB**
  - Dedicated Storage Node
- **Zoned 2 tape drives to each DSN for load balancing.**
- **Separated Pools by data type and retention policy.**

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Advanced File Type Devices for Backup

- **Possible Options**
  - Disk is used as a staging area for later migration to tape.
    - Retention Policies become extremely important.
  - Nightly backup window is reduced in some cases.
  - Requires a relatively large disk capacity
  - Tape still required for restore and offsite locations
  - Restore improvement due to reduced multiplexing (similar to cloning by save set)

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Staging to Advanced File Type Devices

- **Full backups to tape: Weekly or monthly**
- **Incremental/differential to disk**
- **Stage logs and incremental DB data to disk to be moved later to tape (during non-backup window hours)**
- **Save set consolidation with staging devices to create a "synthetic full".**
- **Improves backup and recovery performance**
- **Allows simultaneous read/write operations**

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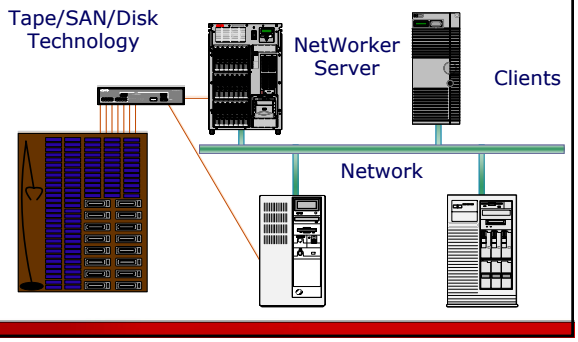
Performance Architecture



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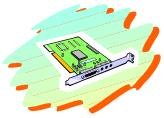
Network



- **Network Configuration**
  - Dedicated Backup LAN
- **Architecture**
  - 100 Mb switched at a minimum – Full duplex on the switch and on each host (Windows-specific)
  - Gig E is preferable
- **Host name resolution**
  - Short name, long name, reverse lookup
  - DNS/hosts files ***need*** to be properly configured
- **Client backup failures are usually network related.**

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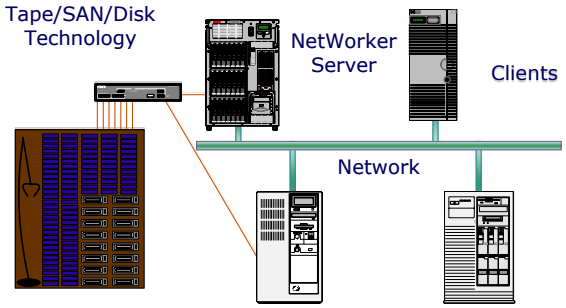
Performance Architecture



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NetWorker Clients

- **Client Software Version**
- **NetWorker Modules**
- **Application workload**
- **OS / File System Type**
- **Application Variables**
  - Backup window
  - Save set sizes
  - Client load
  - Number Mount points/file systems
- **When to promote to a storage node or use raw backup (snap image)?**

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Case Study: Biotech Customer A

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- **Upgraded dedicated & non-dedicated storage nodes to 7.**
- **Larger clients not on SAN implemented Gig-E NICs.**
- **RMAN and other Modules previously in use.**
  - For RMAN, dedicated more channels to each script to improve performance
  - Recommended HSM for mail data compliance and to reduce the size of the mail servers
- **Client Parallelism increased or *decreased* to reflect file systems and mount points**
- **Clients were *evenly* distributed to all non- dedicate storage nodes**
- **Recommended SnapImage to all clients with millions of files.**

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Best Practices Checklist

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- Is backup centrally managed?
- Do you have *written* SLAs for backup/recovery? Are metrics maintained to demonstrate SLA compliance?
- Is backup integrated into the planning and provisioning process for new apps/servers?
- Do you have *written* SOPs for backup/recovery?
- Do backups regularly complete within the backup window?
- Are redundant copies of backup data maintained?
- Is cost accounting in place for the backup environment?
- Are emerging technologies incorporated into the backup environment?

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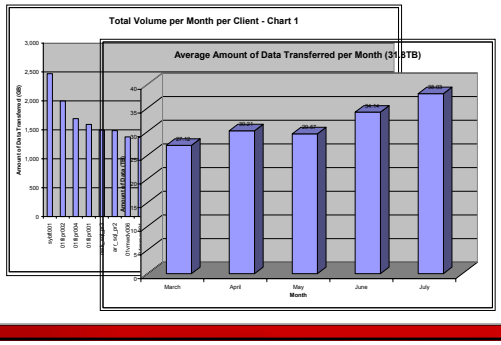
Glasshouse Sample Metrics



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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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Thank you. Questions?

- ***See me at Ask the Expert in the Exhibit Hall:***
  Tuesday 5:00-6:00