Advanced Backup and Recovery Methods for HP-UX Environments

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Agenda

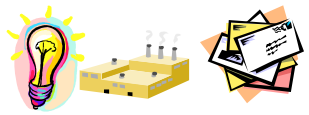
- Data Protection Challenges
- Disk Based Data Protection
- Advanced Backup and Recovery Methods
- Disaster Recovery and Security
- Backup and Recovery Strategies
- Questions and Answers

Data Protection Challenges

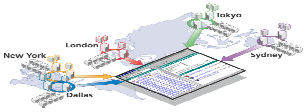
- Slow Data Center Backups
  - *Delayed, Missed, & Infrequently Scheduled Backups*
- Slow Data Center Restores
  - *Restores from Multiple Images*
- Lack of Automation and Administrative Resources
  - *Unprotected Remote Offices*

Comprehensive, Customizable Solutions
VERITAS Desktop to Data Center Protection

Utility Computing — **Command Central Service**



Management / Reporting — **Global Data Manager**

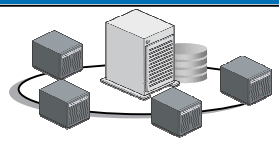


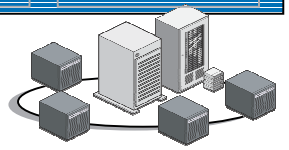
Data Center
NetBackup Enterprise Server

- Disk-Based Protection
- Synthetics Backups
- Advanced Client

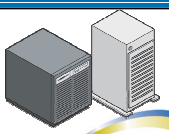
User Level
- Desktop & Laptop Option

Remote Offices
- NetBackup Server
- Backup Exec
- VSR /VVR





Server Recovery
- Bare Metal Restore
- Intelligent DR



HP WORLD 2004
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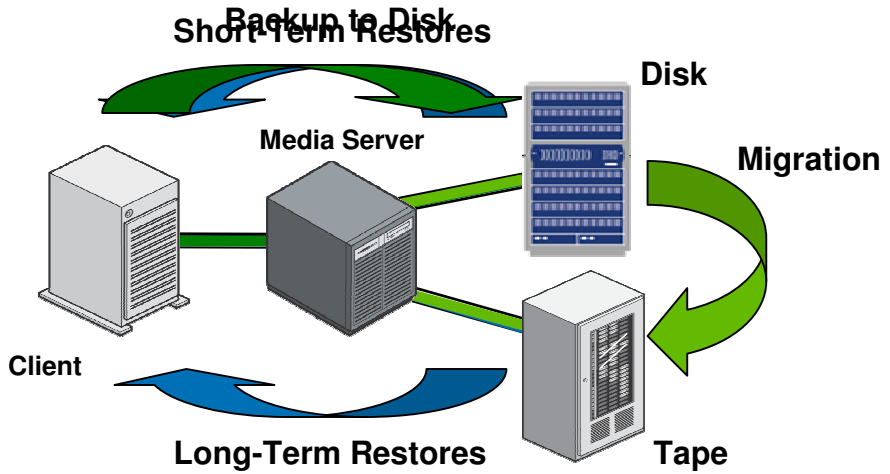
Disk Based Data Protection

Disk-Based Data Protection

Leverage the Best of Both Worlds Disk and Tape
High Performance Backups, Duplication and Short-Term Fast Restores from Disk
Automated Migration to Long-Term Storage

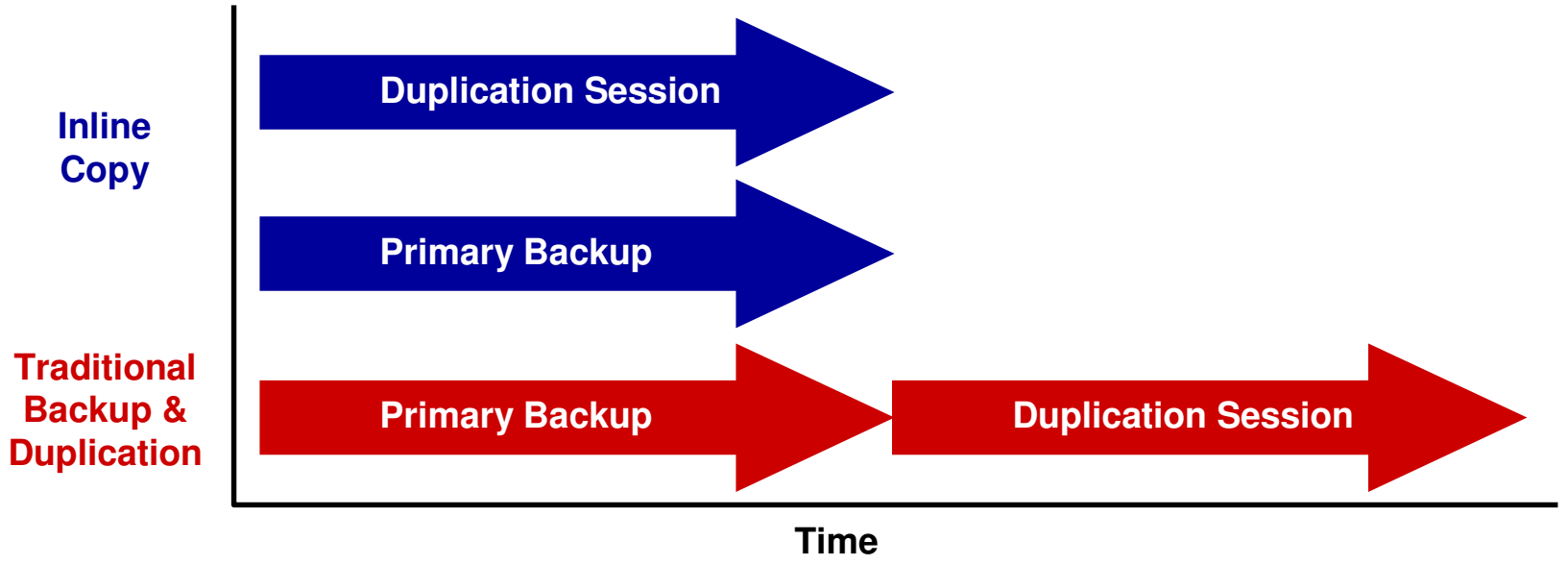
Disk-Based Technologies
- **Backup to Disk**
- **Disk Staging**
- **Instant Recovery**
- **Synthetic Backups**
- **Inline Disk to Disk Copy**



Disk Staging

Backup Flexibility

- Inline Copy
  - Create duplicates to tape or disk concurrently with primary backup

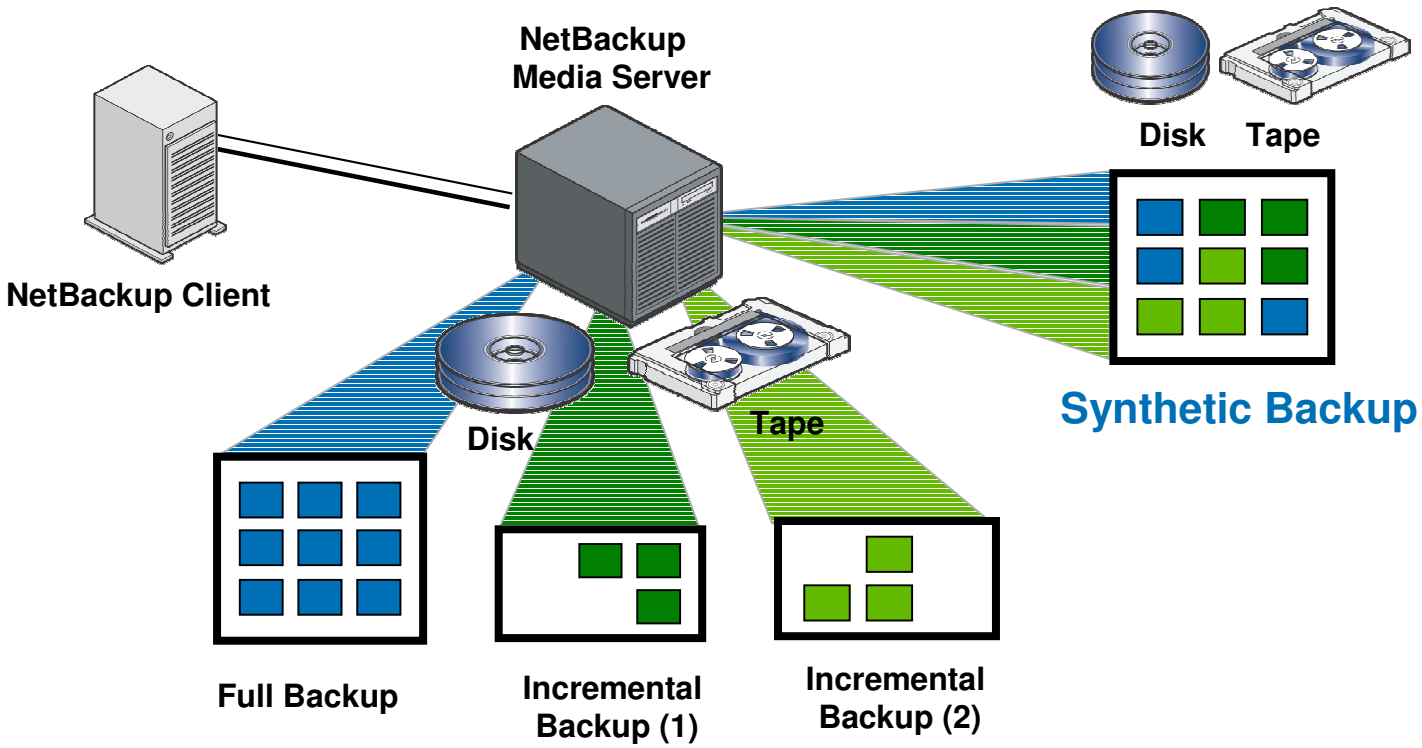


Backup Flexibility

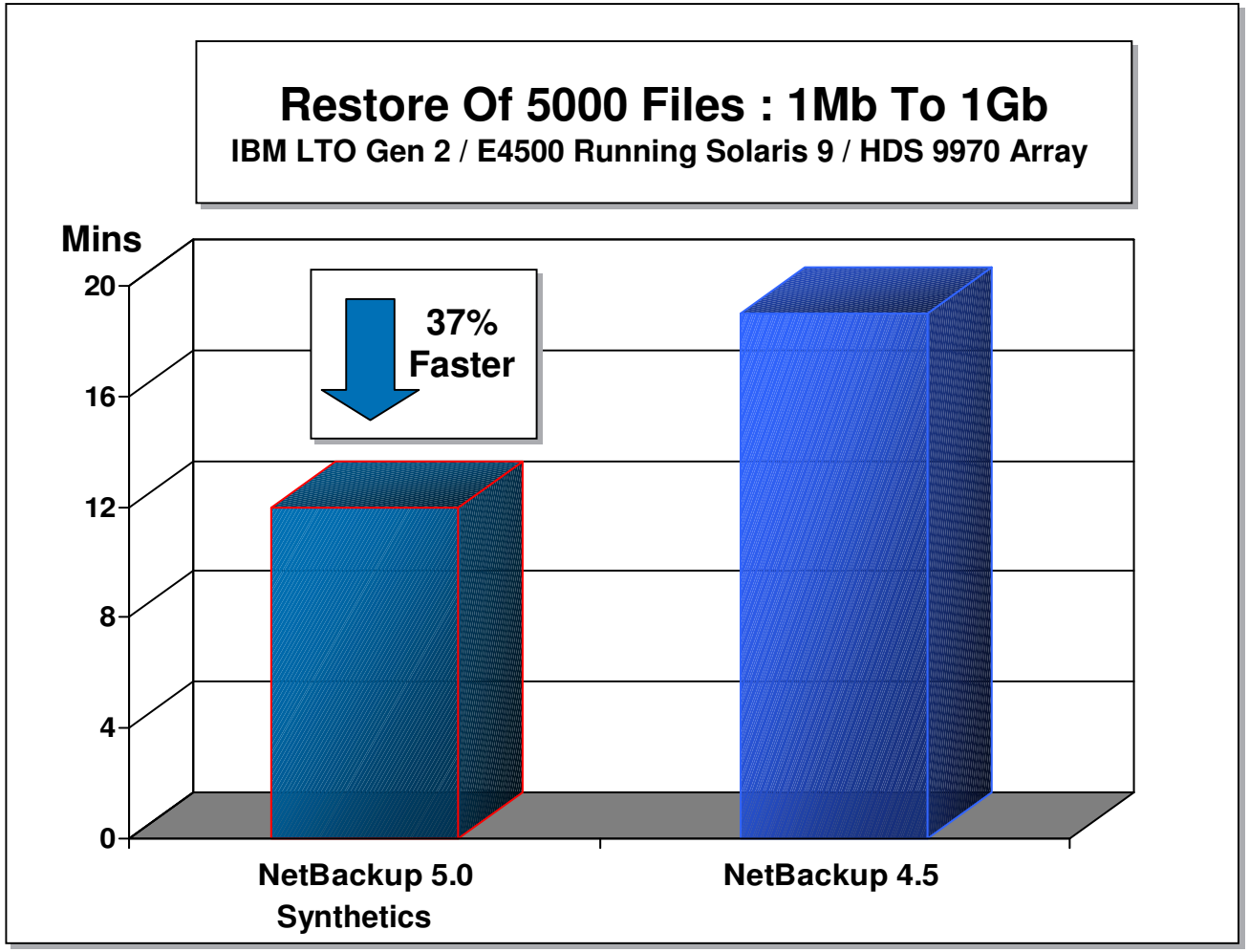
- Synthetic Backups
  - Back up less data
    - Need only perform incremental backups moving forward, after initial full backup
  - Produce a full backup or cumulative incremental, whether client is online or not, without copying data from the client again
    - Less impact to NetBackup client
    - Less impact to network
  - May reduce the amount of tape media needed during backup and restore
    - Backs up a unique file only once
  - May increase restore performance

Synthetic Backups

Improves Restore Performance, Reduces Backup Impact
New Backup Image from Previous Fulls / Incrementals



Synthetic Backups
Restore Performance



Advanced Data Protection

Advanced Data Protection

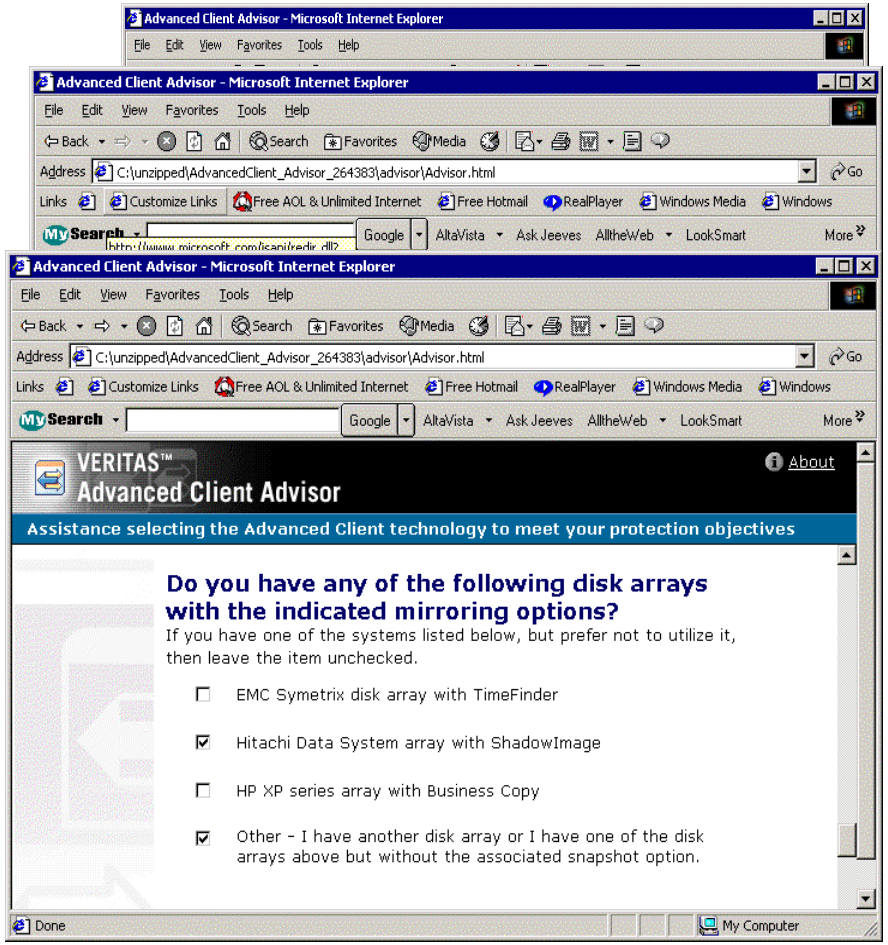
- Why consider advanced methods?
  - Large terabyte databases
  - Reduce the backup window
  - Recovery Point Objectives/Recovery Time Objectives
  - Reduce the impact on application and database servers
  - Reduce the impact on the network

Advanced Client

- High Performance, Low-Impact Data Protection
- Consolidation of Snapshot Technologies Features
  - *FlashBackup*
  - *Off Host (ServerFree)*
  - *Instant Recovery*
  - *Array Integration*
  - *Block-Level Incremental Backups*
- Easy-to-Use Advisor helps Align Data Protection Polices with Business Requirements

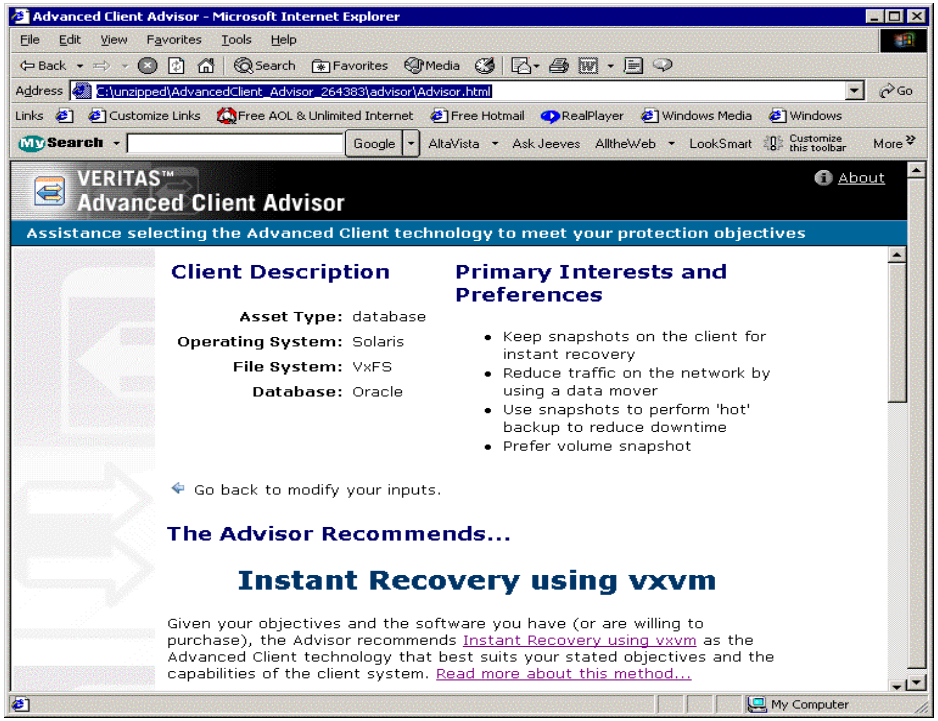
Advanced Client Advisor

- The Advisor asks questions, such as…
  - What is your primary objective?
    - Using snapshots
    - Reducing traffic on the network
    - Utilize special hardware
    - Instant Recovery
  - What is the client like?
    - Operating system
    - File system
    - Type of data, (e.g. Oracle database)
    - How often does data change?
  - Disk Subsystem



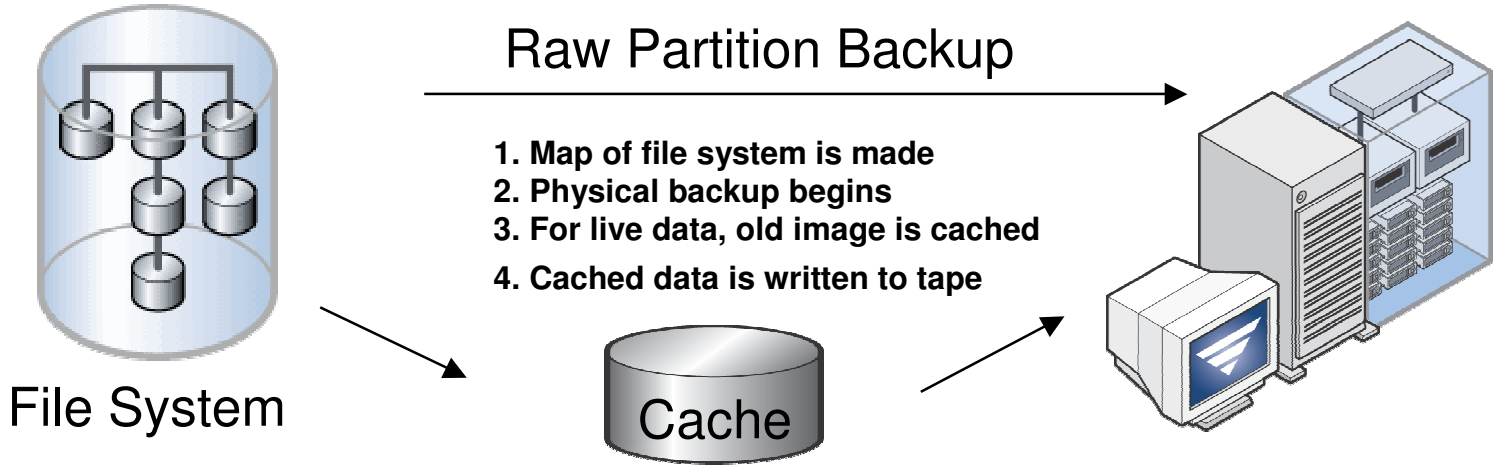
Asks, Analyzes, and Advises

- The Advanced Client Advisor analyzes the input and recommends the solution that best matches goals and resources
  - Description of the Solution
  - Explanation of the advantages and how it fulfills the desired objectives
  - System requirements and limitations

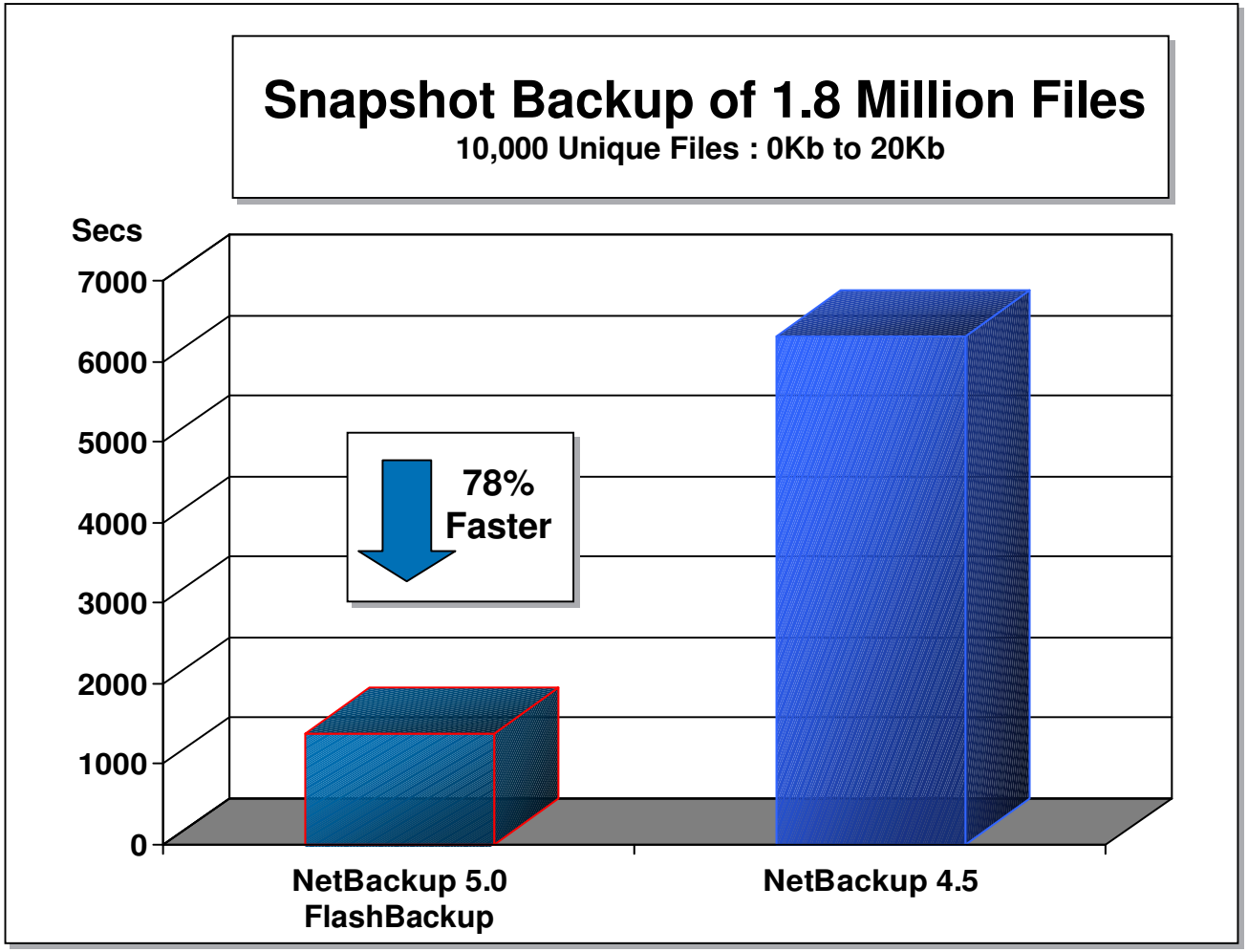


FlashBackup Method

- Physical backup, light backup footprint
  - Ideal for backing up thousands or millions of small files
- More cost effective than hardware-based solutions
- Full or incremental backup of live file system
- Supports NTFS, UFS, Online JFS or VERITAS File System
- Restore individual files or directories, remote/local file system



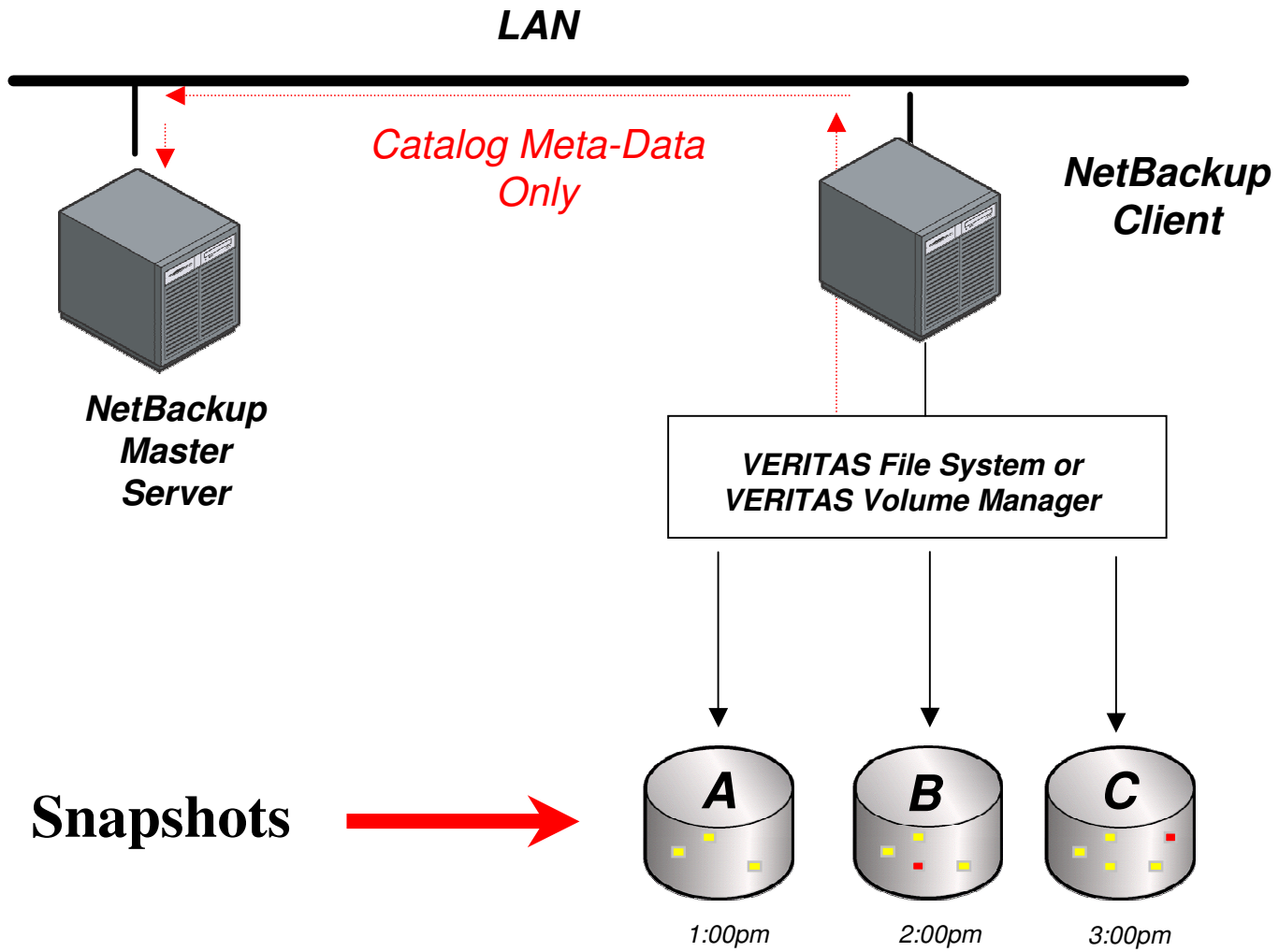
Advanced Client
Backup Performance - FlashBackup



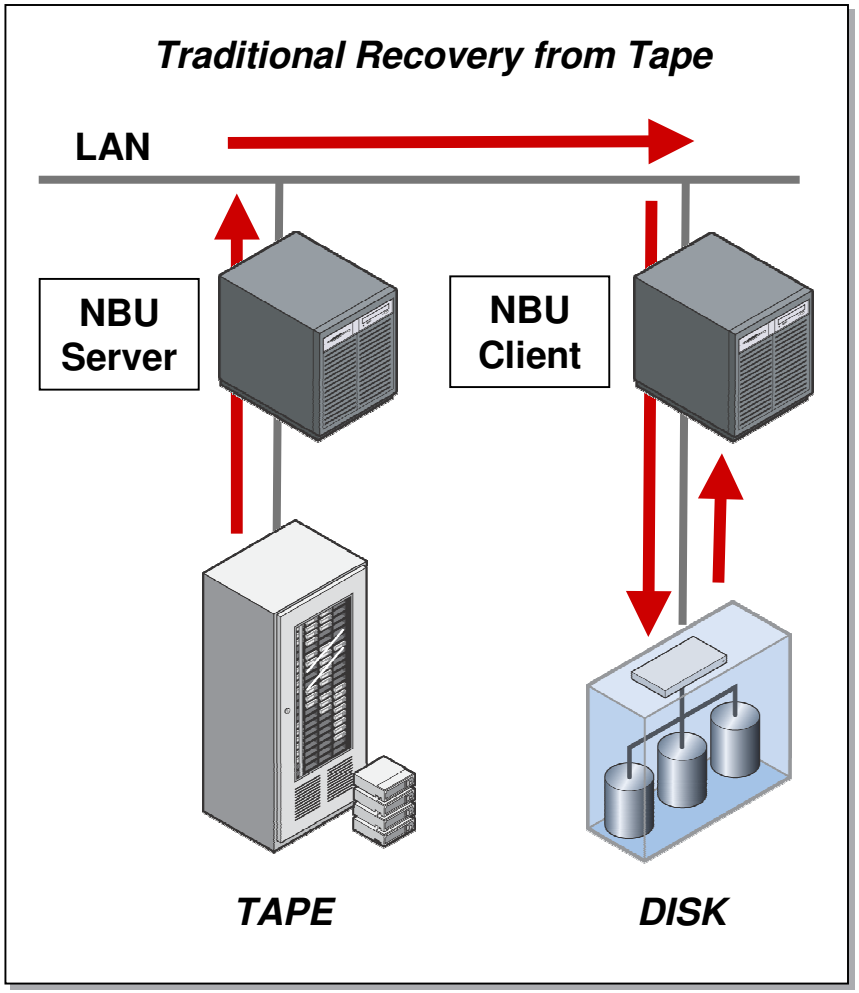
Instant Recovery

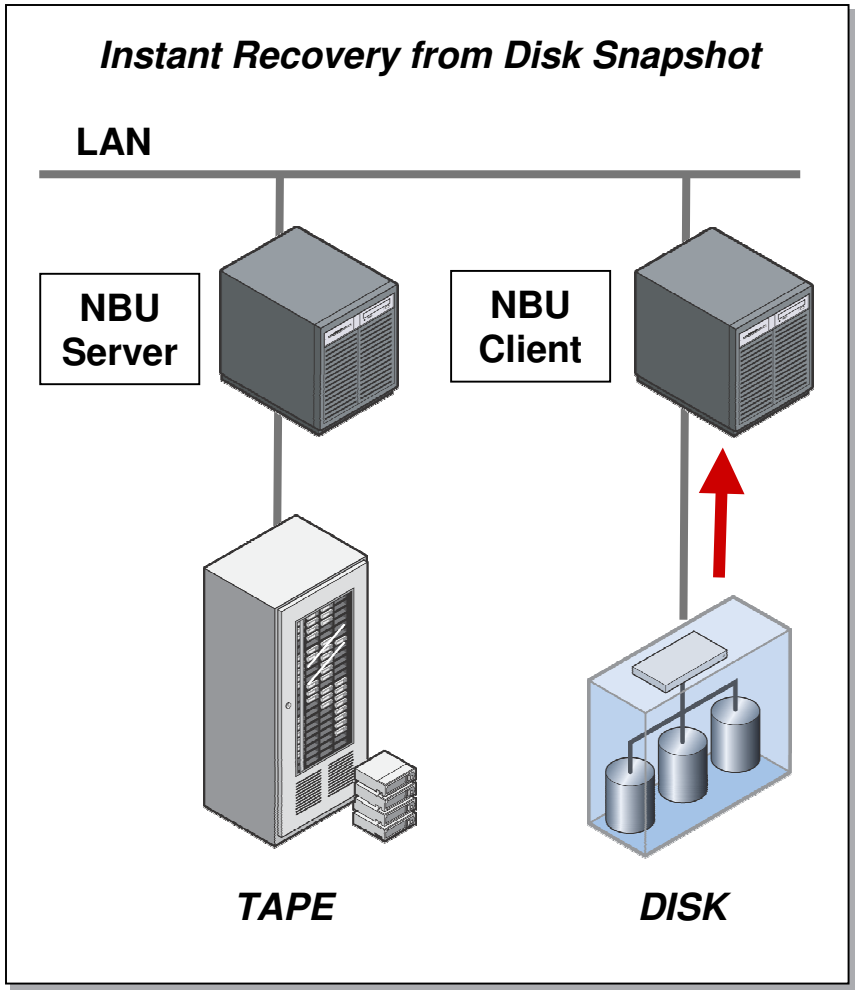
- Instant Recovery method via Disk-Based Snapshots
  - Integration with VERITAS File System and VERITAS Volume Manager
    - Use either storage checkpoints or volume mirrors
  - No data movement to tape or across the network
  - Uses a rotation schedule to manage local and remote (replicated) images

Instant Recovery
Disk-Based Data Protection



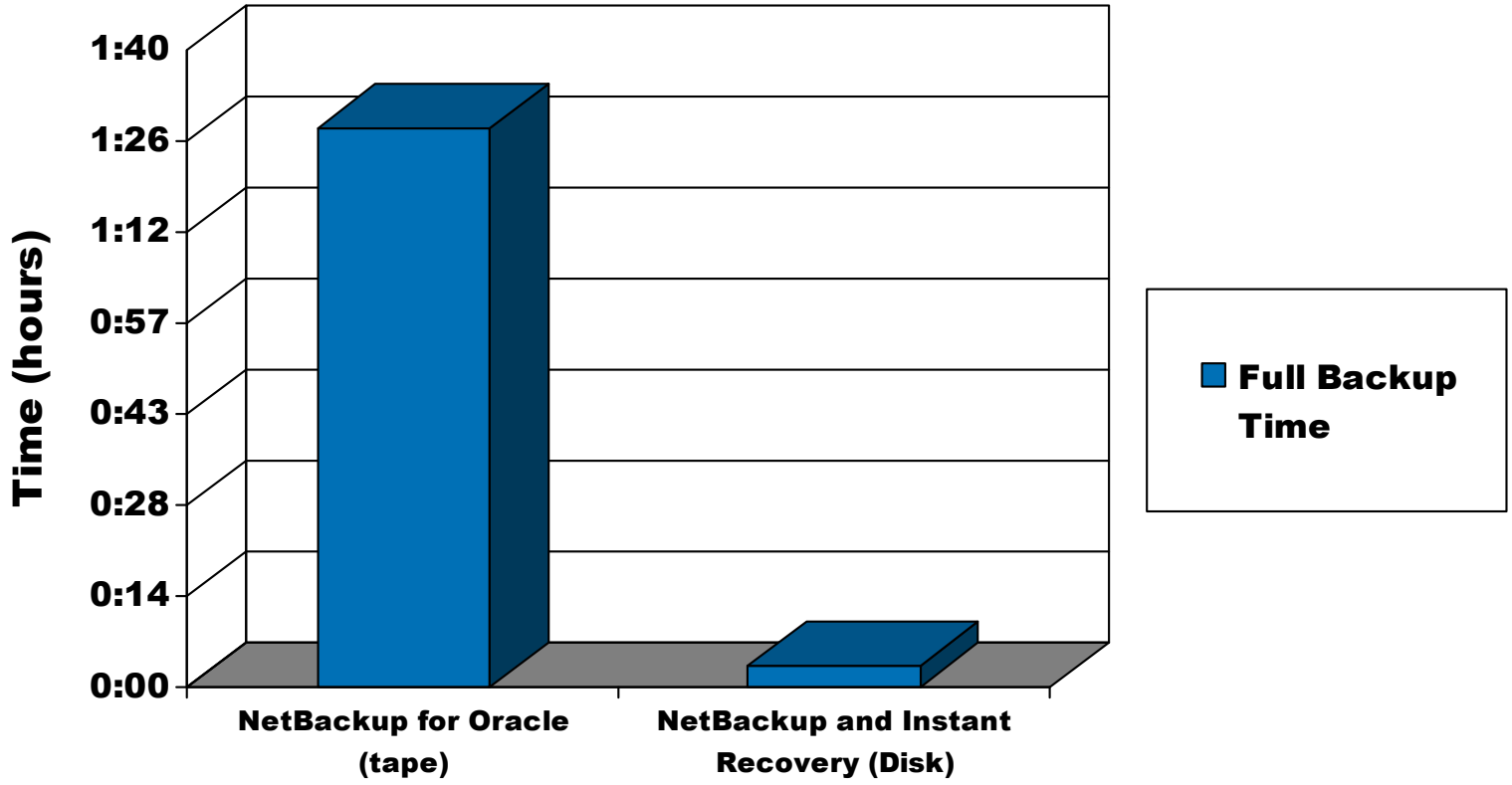
Instant Recovery
Faster Restores with Disk-Based Data Protection





Instant Recovery
Backup Benchmark

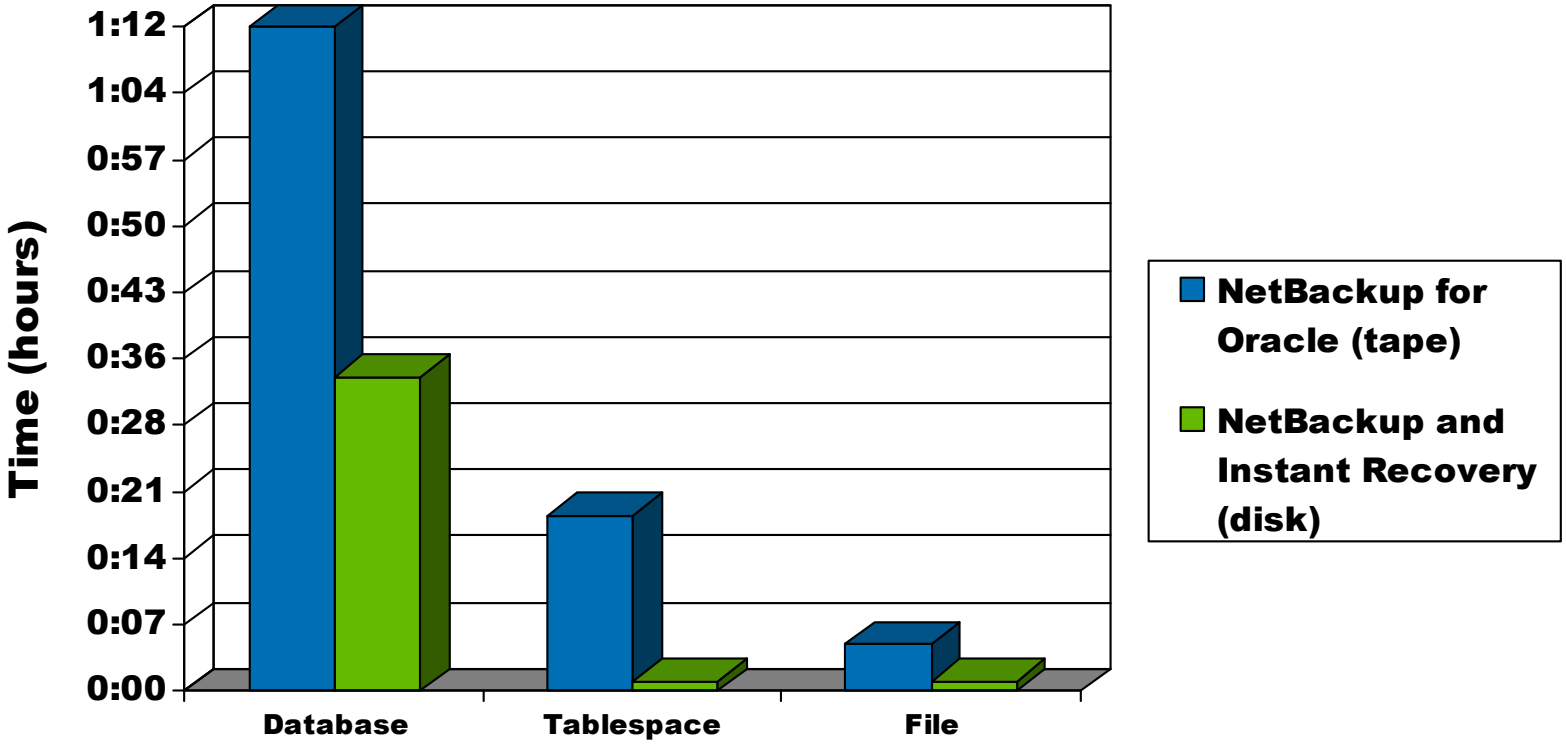
NetBackup and Instant Recovery backups took less than 4% of the time it took to complete a tape based backup



- Size of Oracle database used: 26 GB

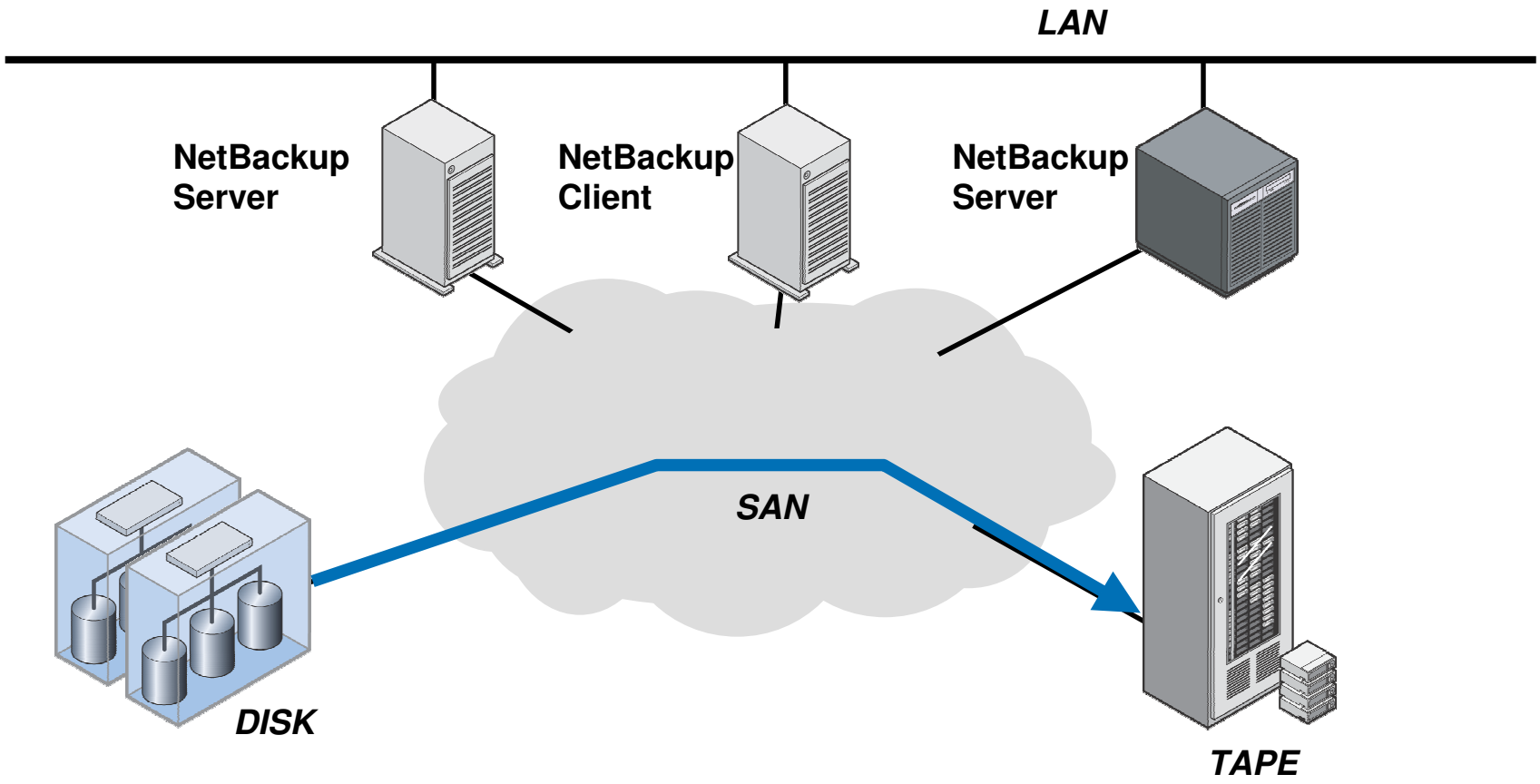
Instant Recovery
Recovery Benchmark

NetBackup and Instant Recovery took far less time than it took for tape based recovery



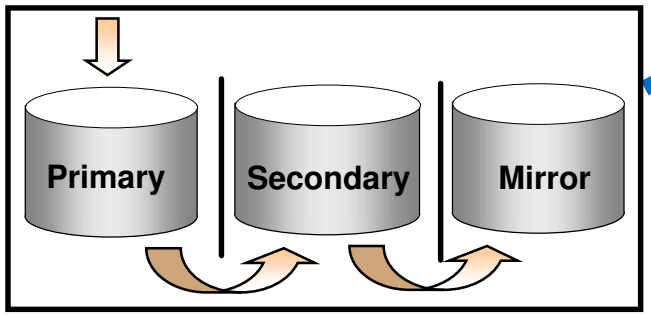
- Size of Oracle database used: 26 GB

Off Host Backup
Reduced Impact Backup

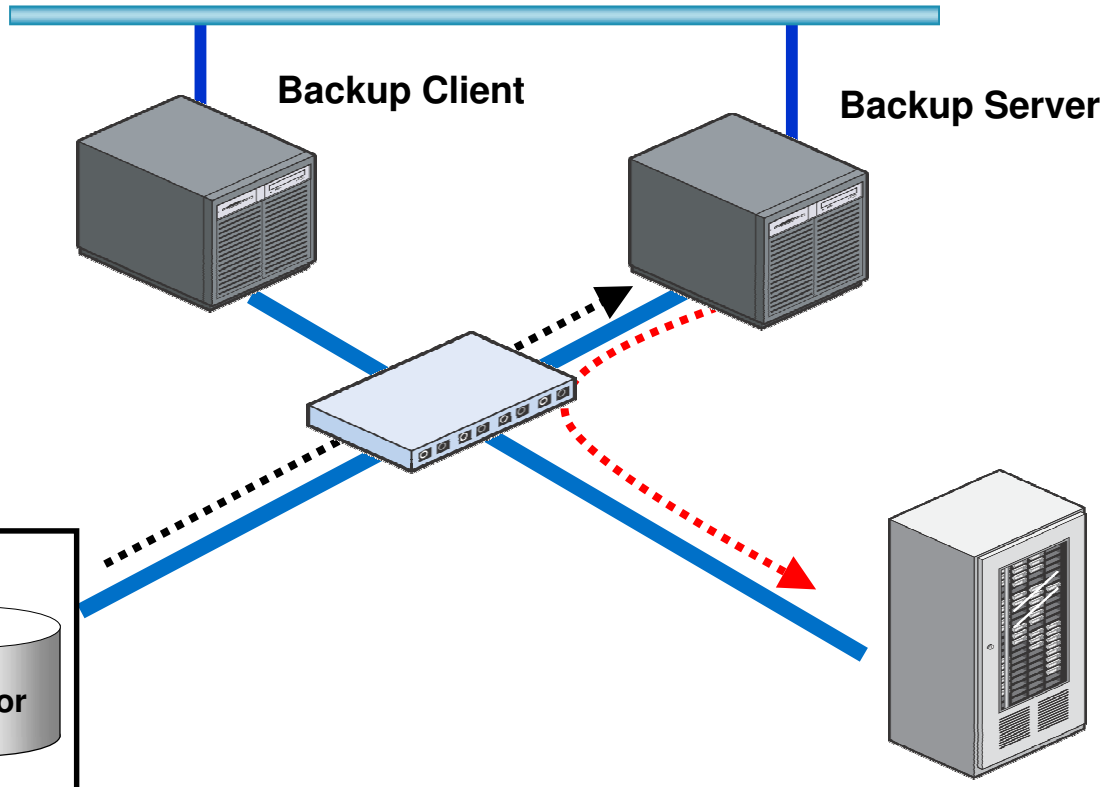


Off Host Backup (Split Mirror)
Reduced Impact Backup

- **Extend and leverage a variety of snapshot methods, including 3rd party hardware-based solutions**
- **Ability to support off-host backup and server-free backup capabilities**
- **The backup client remains online with reduced backup impact**



Disk Array



Tape Library

Block Level Incremental Backup (BLIB) Method

- Backup only the data blocks that have changed
- Uses storage checkpoints
  - VERITAS Storage Foundation for Oracle
- Data is processed from the checkpoints, and not from the filesystem
- RMAN and Proxy Copy
- Minimal Impact on Oracle
  - Removes the backup workload
  - Removes the I/O overhead
- Recover only the data blocks that you need

Disaster Recovery and Security

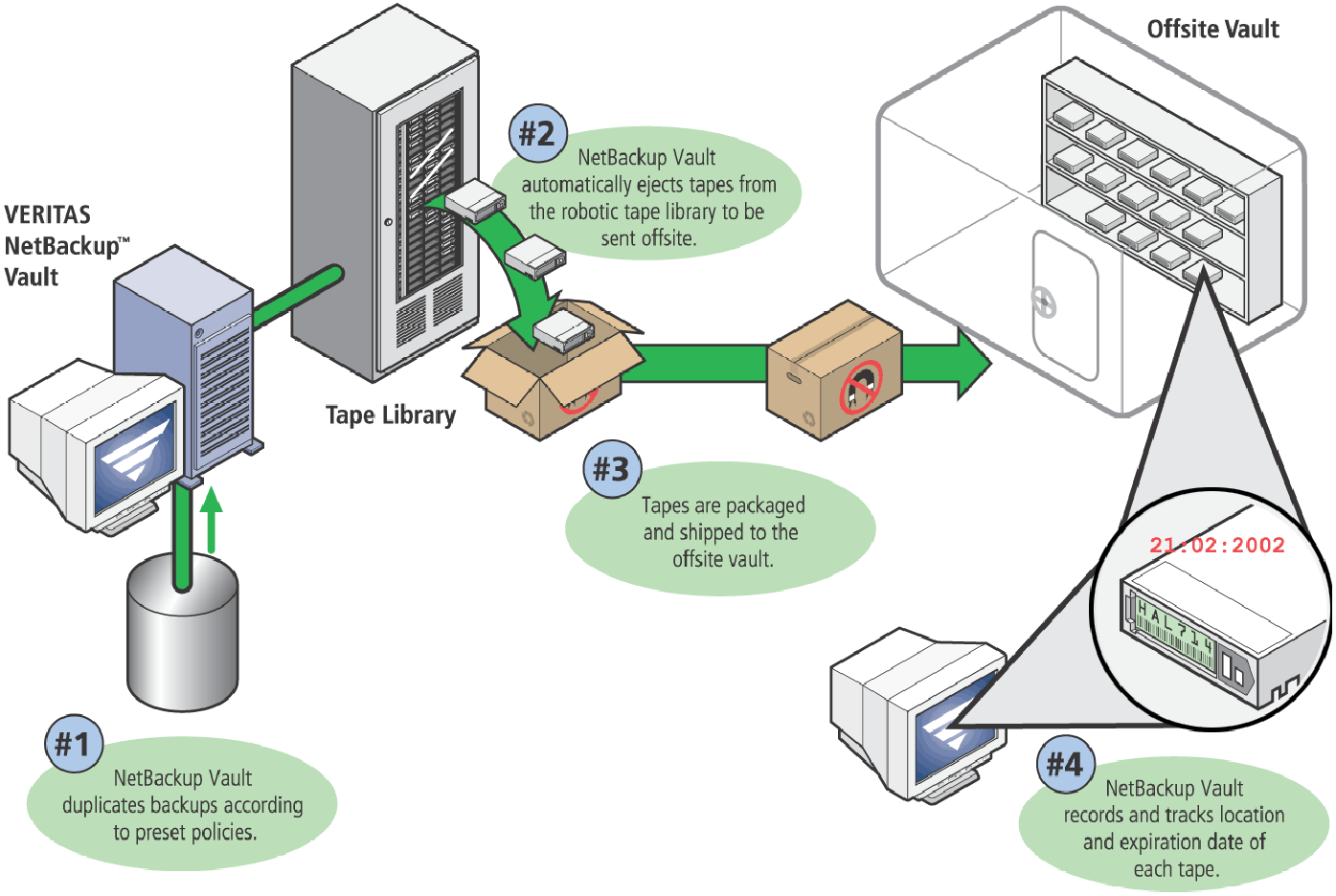
How can I Improve DR efficiency?

- NetBackup Vault
  - "Cradle to Grave" services for tape media management
  - Advanced reporting and automated functionality designed to protect business from local site loss.

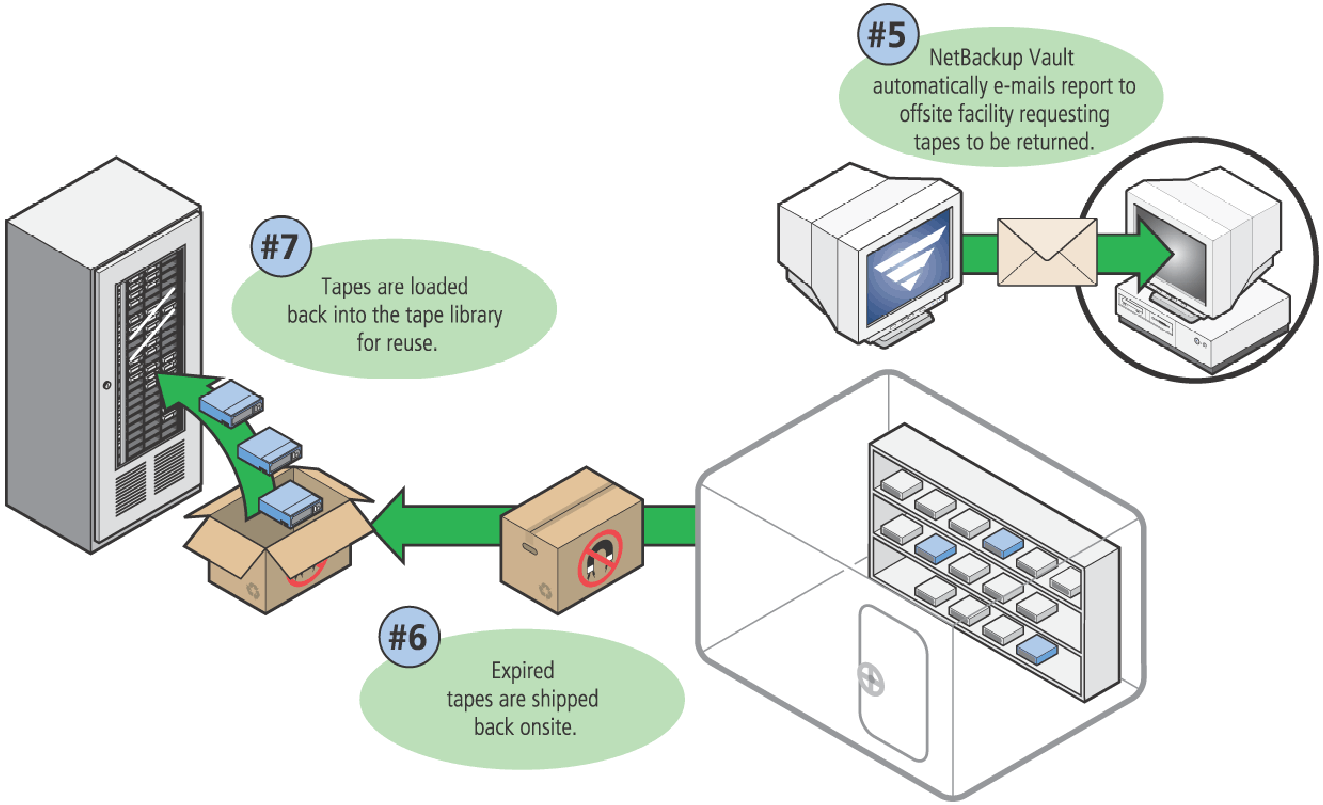
NetBackup Vault

- Vault coordinates tape rotation - the movement of media to and from an offsite facility
  - Reduces risk of error
  - Optimizes the use of vendor offsite vault “slots”
- Vault profiles determine which backups are duplicated or sent offsite, and for how long they are retained
  - Selectable retention for offsite copies

Disaster Recovery and Vault
Sending Tapes To The Vault



Disaster Recovery and Vault
Returning Tapes From The Vault

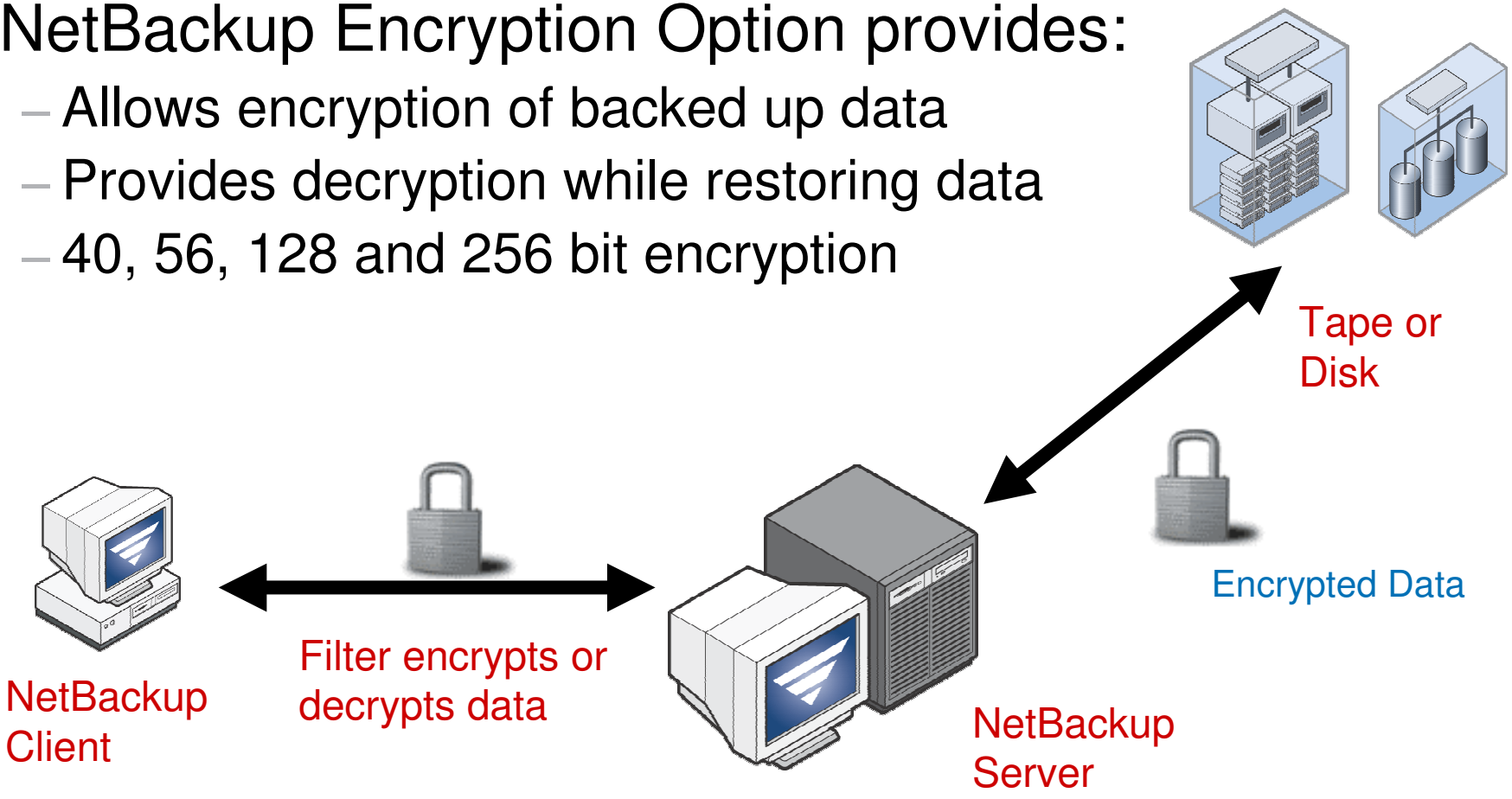


Additional Vault Capabilities

- Reports
  - Distribution, Inventory, Pick List, and Recovery
  - Iron Mountain Electronic Format Report
- Automatic tape ejection
- E-mail notification
- Support for Closed Container vaulting

Data Security Using Encryption

- NetBackup Encryption Option provides:
  - Allows encryption of backed up data
  - Provides decryption while restoring data
  - 40, 56, 128 and 256 bit encryption



Backup and Recovery Strategies

Data Protection
Service Level Oriented

Wks Days Hrs Mins Secs

Secs Mins Hrs Days Wks

Recovery Point | Recovery Time

Protection Methods

Tape Backups | Archiving | Staging | Async Replication | Synchro-nization | Bare Metal Recovery | Search & Retrieve

Vaulting | Disk Backups | Off Host | Sync Replication | Instant Recovery | Disk Restore | Tape Restore

Recovery Methods

VERITAS Technology

Tape Automation | **VM/FS Snapshots & Clones** | **Volume Mirroring & Replication** | **Archive Store** | **Intelligent Arrays & Fabrics**

Data Protection Strategies
Planning

- Cold vs Hot (or mixed?)
  - Does the application or database need to be available at all times?
  - Database Specific: Is there a subset of frequently updated tablespaces that can be backed up separately?
  - What is an acceptable amount of downtime to do a recovery?
  - Example of a mixed backup strategy:
    - Cold database backup once a month
    - Hot database backup once a week
    - Mission critical databases backed up hot nightly
    - Selected highly updated tablespaces backed up hot nightly

Data Protection Strategies
Planning

- Advanced Methods
  - Are you having issues with backup windows that are impacting your application and database servers?
  - Do you need to further reduce recovery time beyond what is possible with traditional data protection methods?
  - Do you need “Instant” data availability?

Data Protection Strategies
Solution

- Create solution that meets your organization's service level requirements (RPO/RTO)
- Plan responses to failure
  - Prioritization of data
    - Which databases and applications are restored first
  - Media failures
  - Non-Media failures
    - User errors
    - Instance failure
- Practice: Test backup and recovery strategy regularly

Conclusions

Ensuring Superior HP-UX Data Protection

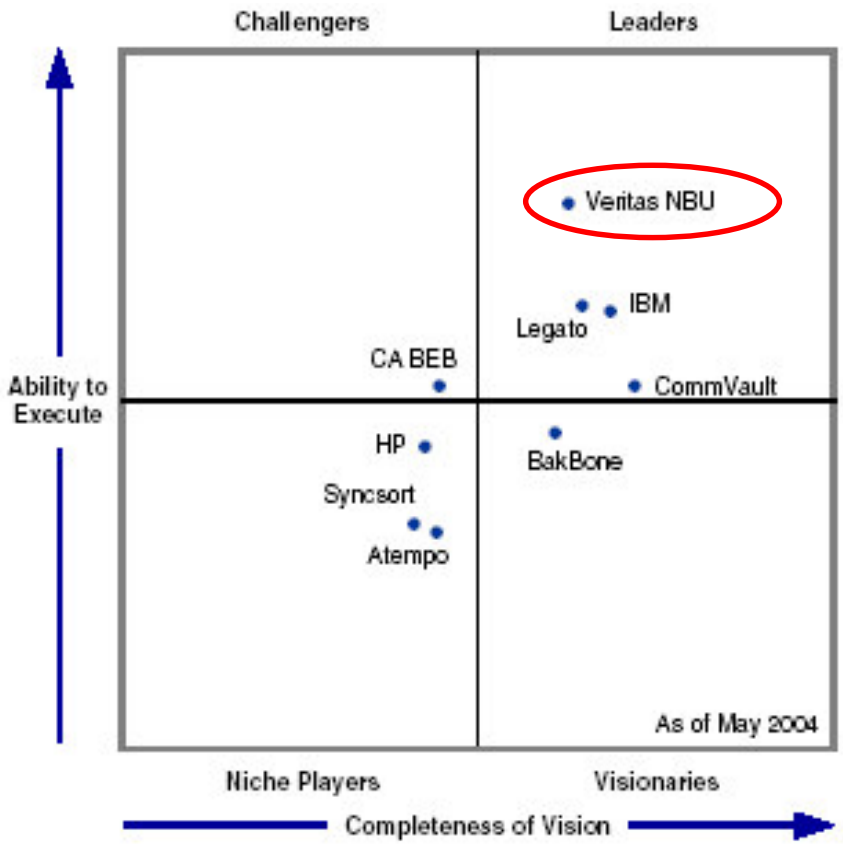
- Improve Backup/Recovery Performance
  - Backup and recovery operations should be non-intrusive
  - Disk based and Instant recovery
- Increase Data Availability
  - Data can always be easily recovered
  - Vaulting is your safety net
- Ease Data Protection Management
  - Automation makes data protection operations invisible
  - Easy management from one console

VERITAS Software

VERITAS Software

- **World's Largest Storage Software Company**
  - $1.77B in Revenues
  - 6,500 Employees
  - 39 Countries
  - 34% Five Year CAGR
- 99% of the Fortune 500 Rely on VERITAS Software

Gartner 2004 Enterprise Backup/Restore Magic Quadrant



Source: Gartner, Magic Quadrant for Enterprise Backup/Restore Vendors 2004, C. DiCenzo and R. Paquet, 6.2.2004

QUESTIONS & ANSWERS

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