
hp
invent

data protection for the windows 2000 environment

Sébastien Schikora

Development Partner Manager
HP OpenView Storage

Hewlett-Packard Company
10955 Tantau Ave
Cupertino CA 95014
USA

Phone: +1 408 873 6425
Fax: +1 408 447 8003
E-mail: sebastien_schikora@hp.com

HP OPENVIEW

Works | Right | Now

new challenges in the windows 2000 environment

exchange 2000 data protection considerations

data management with sql2000

enterprise solutions:

san backups

clustering

snap shotbackup

windows 2000 components to be backed up

- Filesystems
- System State
- Windows 2000 System Services

filesystems

Supported filesystems on windows 2000 systems

- FAT16
- FAT32
- NTFS 4.0
- **NTFS 5.0**
- CDFS
- UDF

new features in ntfs 5.0

- Reparse Points
- Directory Junctions
- Volume MountPoints
- Single Instance Storage
- Remote Storage Service
- Encrypted files
- Sparse files
- disk quota
- Posix Hard Links
- LogicalVolume Manager

system state

- Boot Files (ntldr.exe, ntdetect.com, boot.ini)
- Registry
- Com+ database
- Active Directory service
- System Volume Information
- Certificate Server
- Cluster Database

system services and other system components

Components of the system that can not be backed up in a consistent way by a simple data file read and that are not part of Microsoft's definition of system state

- User Profiles
- Event Log
- User disk quota
- DNS Server database
- DHCP
- Removable Storage Manager database
- File Replication Server configuration data
- Terminal Server

recovery options for system services

Explained on the example of Active Directory Service

- **Primary Restore**
  performed when one domain controller has to be rebuilt. Database will be updates from other domain controllers that share the same database.
- **Non-Authoritative Restore**
  performed when a database is damaged. The database will be updated by other domain controllers
- **Authoritative Restore**
  Performed when an Active Directory object has been deleted. DB changes are replicated to the other domain controllers

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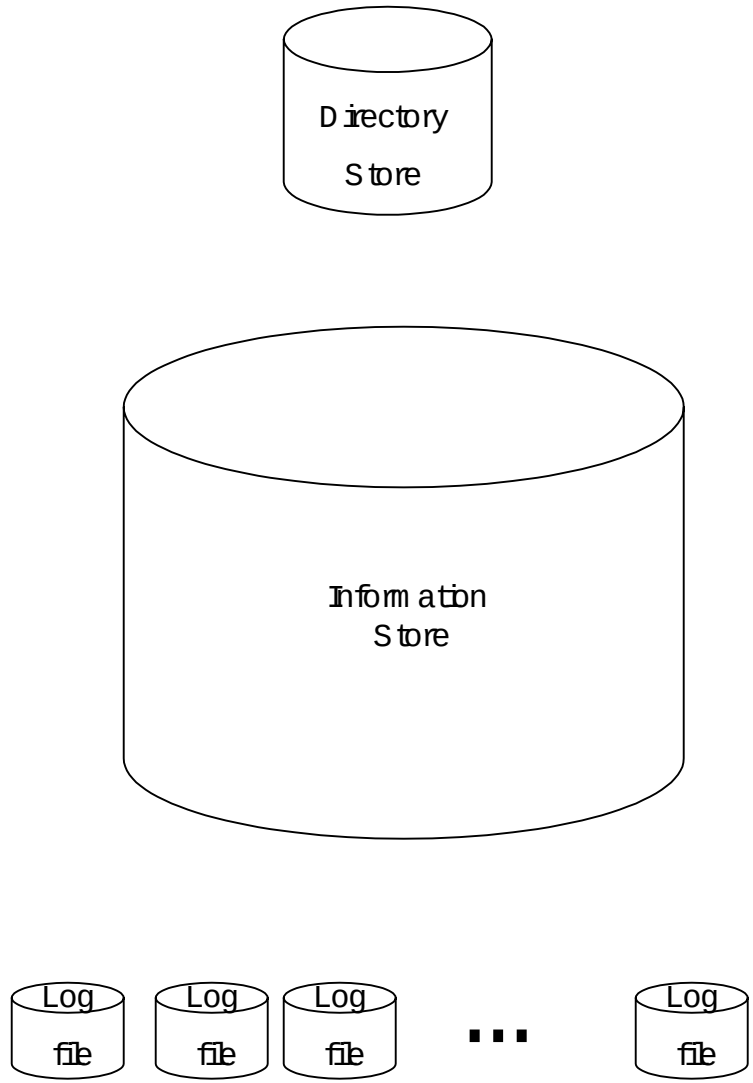
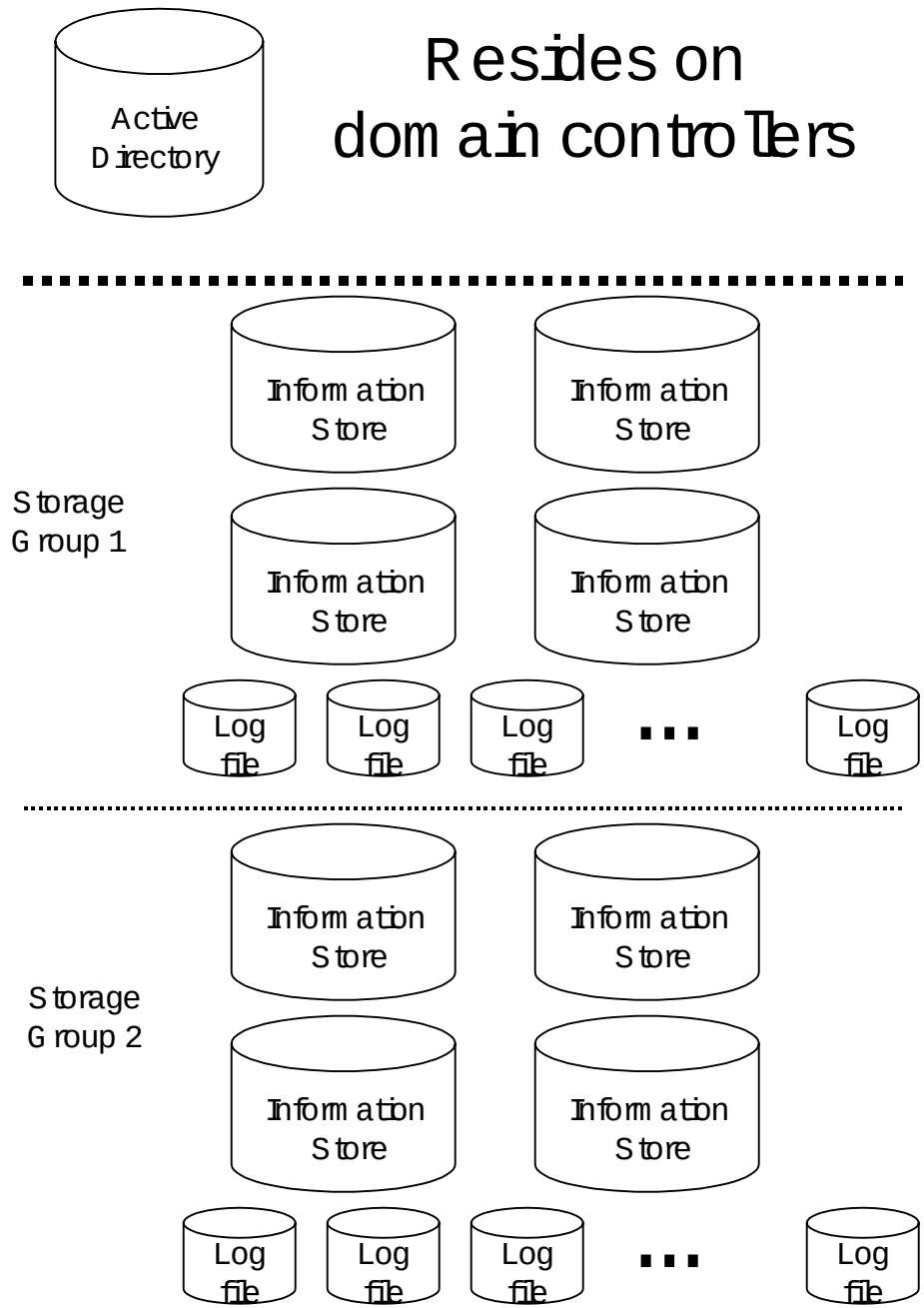
exchange 5.5 storage components

Components of every MS Exchange 5.5 Server
One Information store per server or cluster



exchange 2000 storage components

The directory store now is part of the active directory stored on the domain controllers. Each Exchange 2000 Servers can hold multiple Storage groups, each storage group can hold multiple databases that share one set of log files.



backup/restore apichanges

- Browsing for storage groups and stores
- Multiple storage groups can be backed up in parallel
- Each storage group can run one backup at a time
- No API for directory store, is backed up as part of the Active Directory Service

backup/restore api limitations

Limitations imposed by the API Microsoft provides for backup/recovery of an Exchange Server

- Online backup only
- Backup types:
  - Full
  - Incremental, backs up log files only
- One backup per instance (storage group) at a time (stores within the instance are backed up sequentially)

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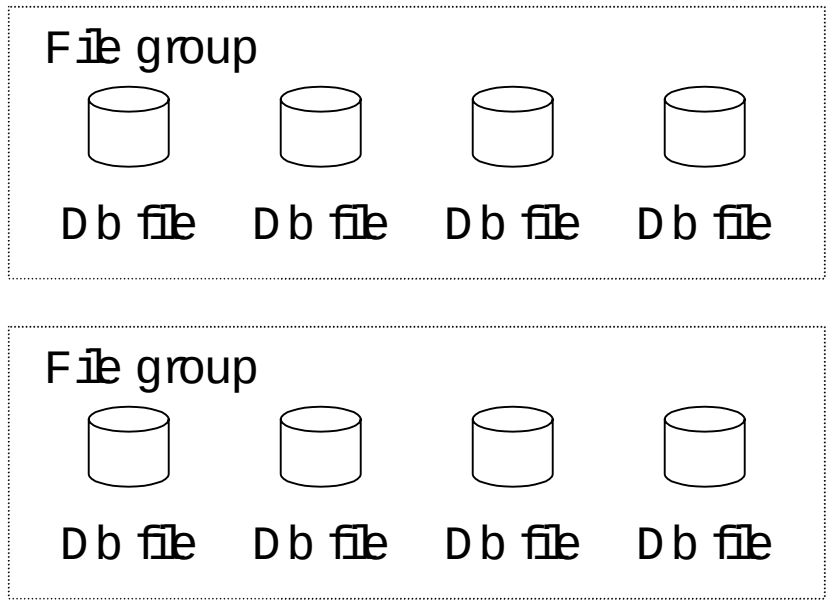
ms sqlserver components

Each SQL Server instance has a master database that holds system and db configurations.

User defined databases consist of data files that can be grouped and a set of log files

MasterDB:
holds system and db configurations

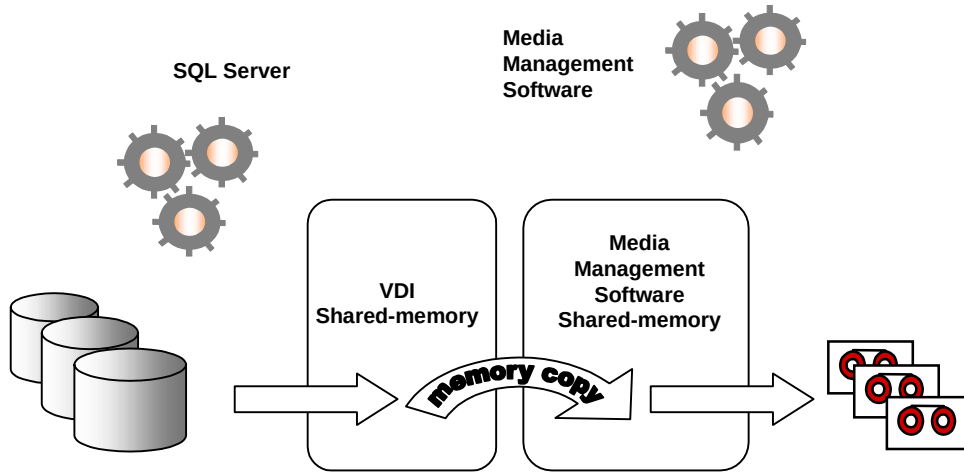
Per user defined DB:



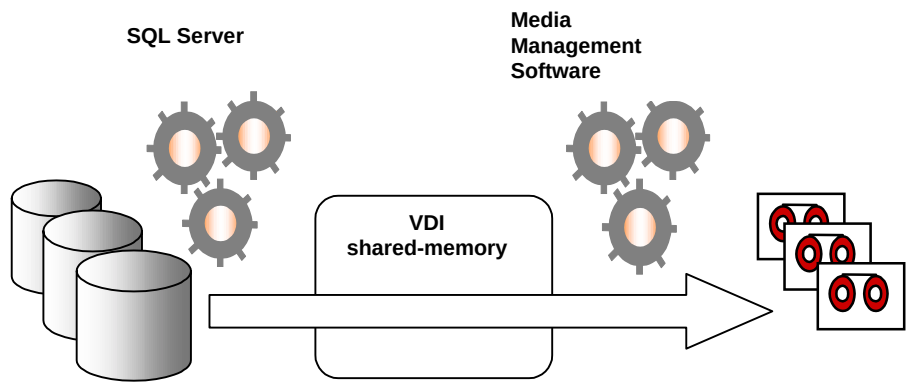
the virtual device interface vdi

In case the tape devices are connected directly to the sqlserver. Only very few backup solutions support the directmode today

traditionalbackup



vdidirectmode backup



backup types

- Full database backup (data files and logs are backed up)
- Differential backup (only changes in the data files are backed up and log files created during backup)
- Transaction log backup (only log files are backed up)

To be able to recover from a disaster make sure to have a current backup of master, distribution and and msdb databases

restore options

Not all backup solutions support all options

- Restore to different server
- By selected backup
- Point in time restore (uses "stop at" option)
- Restore only this backup
- Full restore of database
- Force restore over existing database
- Recovery completion state: operational, non-operational or read-only

disaster recovery

- Install Operating System
- Install SQL Server
- Install Backup software
- Restore master database
  SQL Server has to be in Single-user mode
- Restore all other databases

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scsi limitations

Distance between the machines and storage devices

- max. 25 m

➔ Vaulting is needed to protect data

➔ Servers need to stand close to the SCSI devices

Throughput of SCSI

- 20 MB/s
- 40 MB/s for ultra SCSI

Connectivity for devices

- On the server, limited number of PCI slots

  ➔ Becomes a bottleneck

- Each drive is only connected to one serve

  ➔ Becomes a bottleneck

Network bandwidth used for backup

FiberChannel

Distance between the machines and a fiber device can go up to 2 km (10 km long wave).

Throughput of one fiber connection is 100 MB/s (65 MB/s long distance)

- 5 times of the SCSI performance
- fiberchannel MUX 50 MB/s

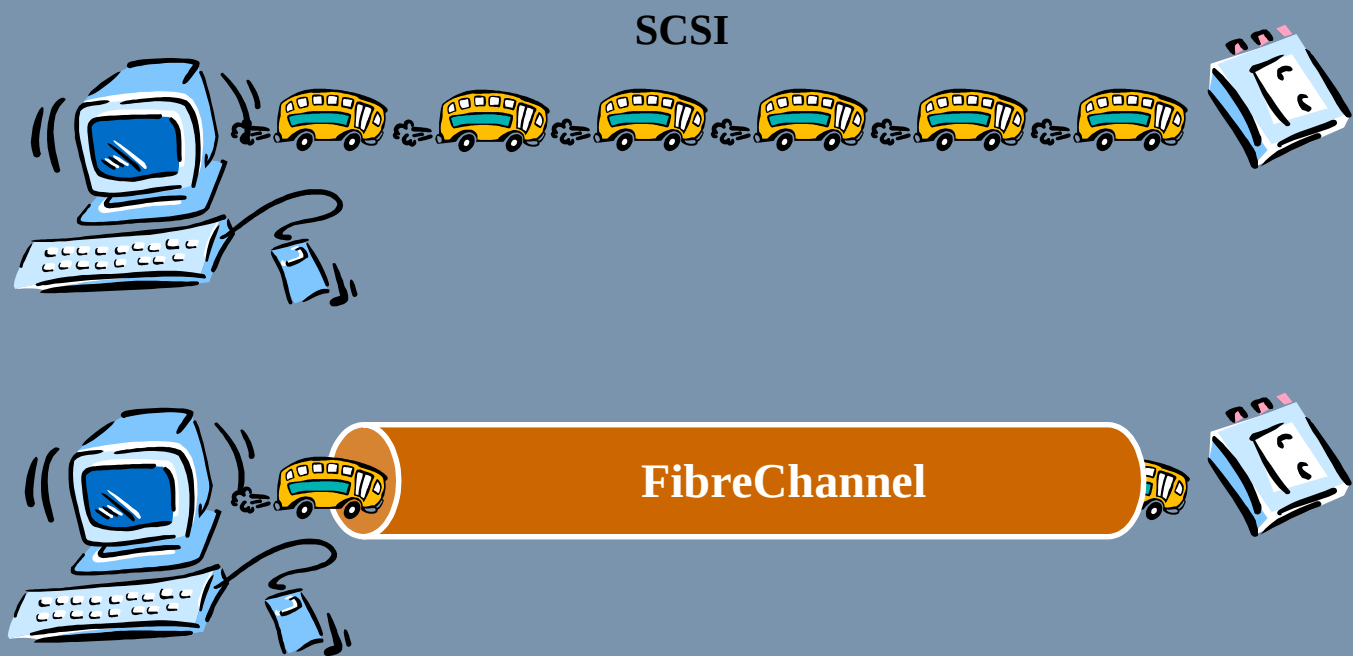
Connectivity for devices can go up to 125 devices with AL, almost unlimited with fabric

- fiberchannel MUX can have 4 SCSI connections

  ➔ with a MUX 4 times as many drives as with SCSI

No **Network** needed for backup

applications still talk scsi



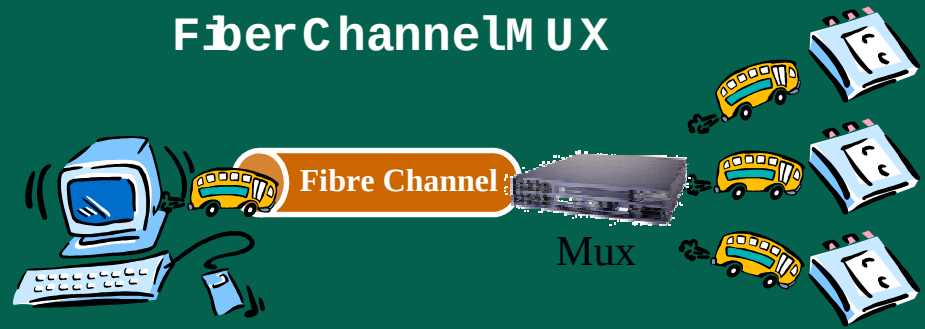
Fibre Channel is the Transport Layer the protocol is still SCSI

Fiber Channel Configurations

Direct Connect

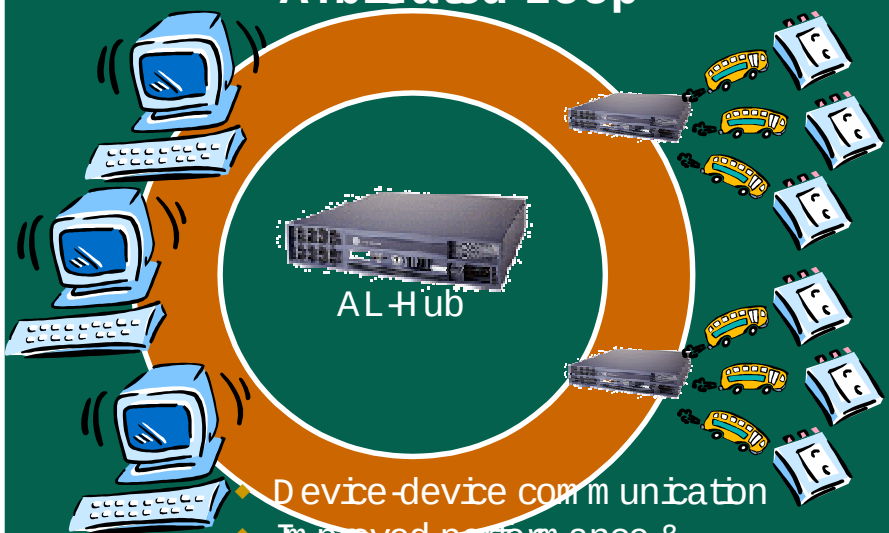
- Improved performance & connectivity
- Increased distance & reliability

Fiber Channel MUX



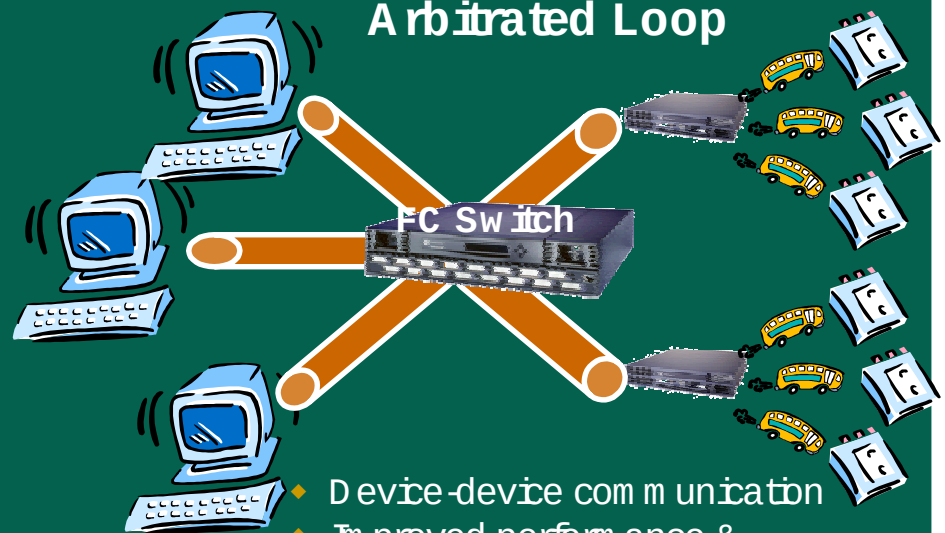
- Improved performance
- Better utilization of resources

Arbitrated Loop



- Device-device communication
- Improved performance & connectivity
- can be redundant (2 loops)

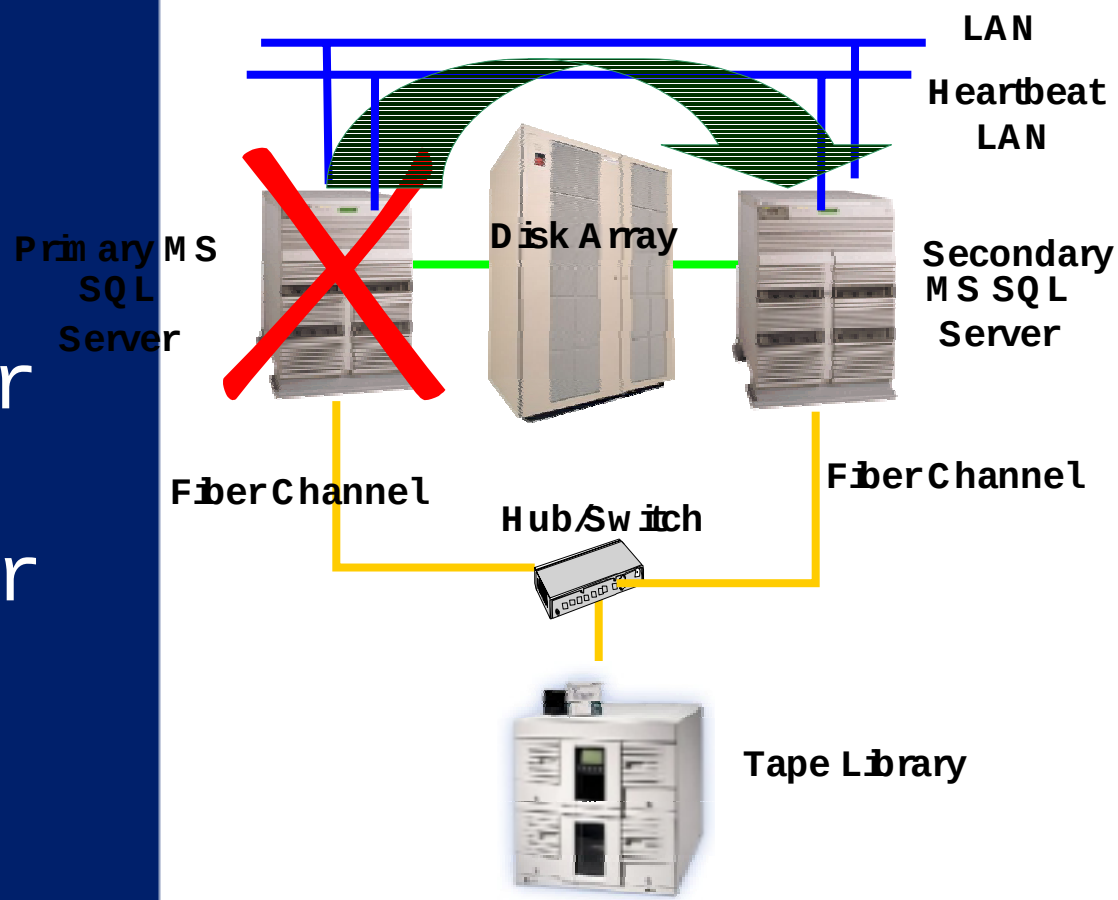
Arbitrated Loop



- Device-device communication
- Improved performance & connectivity highly scalable
- can be redundant

microsoft cluster server advanced server

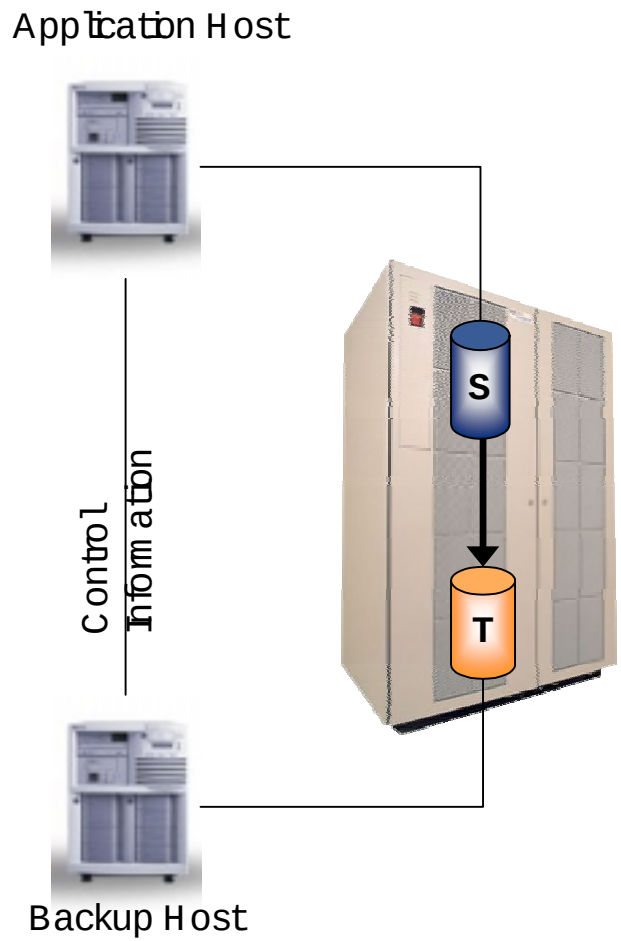
The Advanced Server allows to have 2 nodes in a cluster



microsoft cluster
server
datacenter server

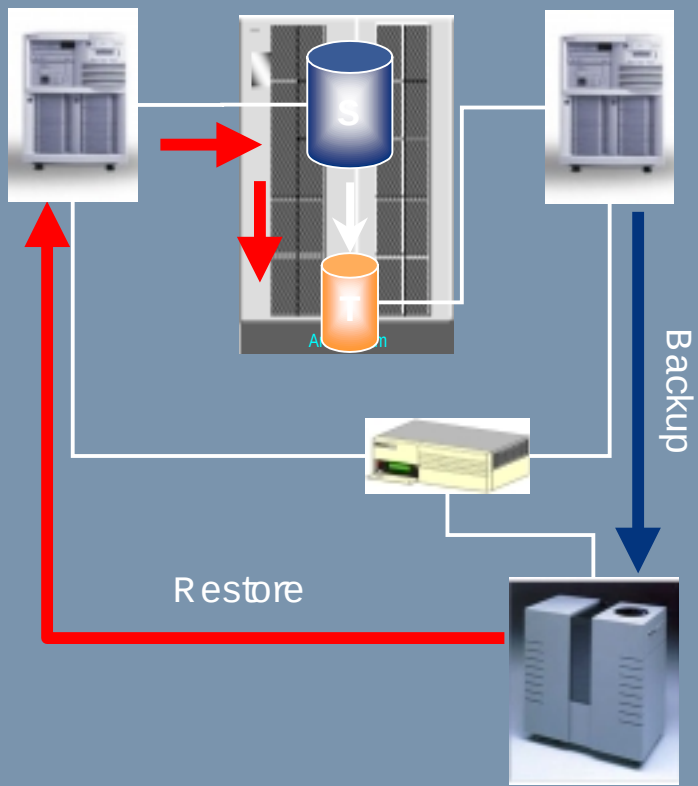
The Datacenter Server allows up to
4 nodes in a cluster

Snap Shot Backup

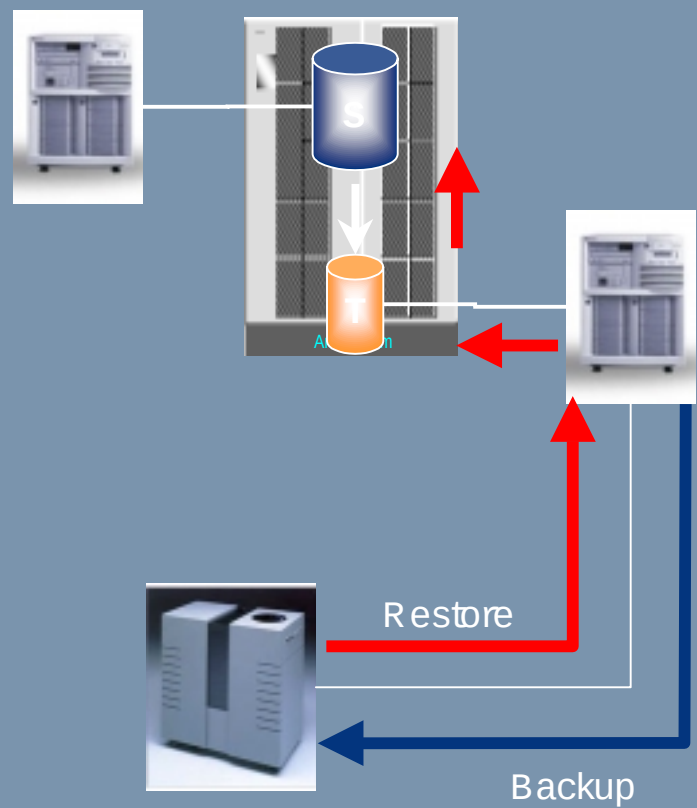


restore possibilities

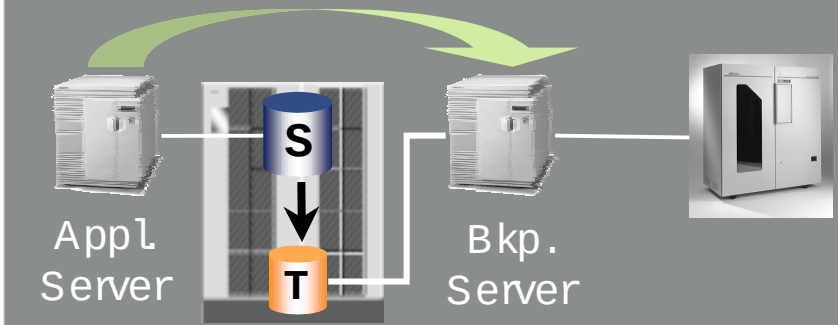
Restore to Application Host

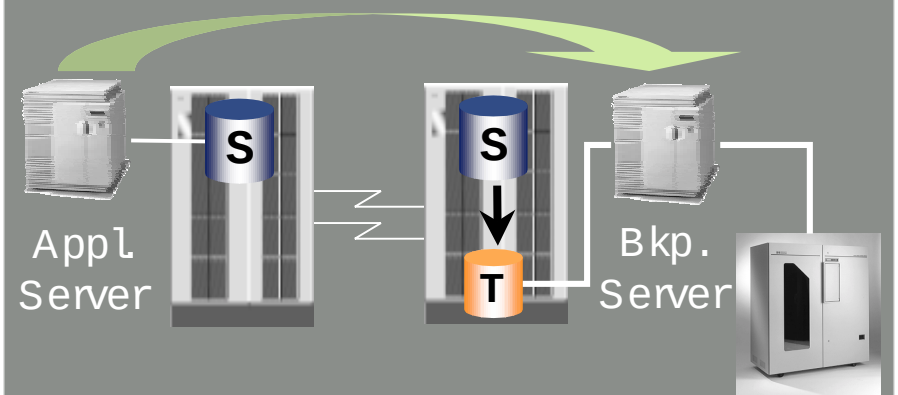


Restore to Backup Host with or without disk resynchronization



backup server as standby server





- **Not** an out of the box supported solution
- Failover script needs modification
  - All backup must be aborted prior to failover
- After failover the backup concept changed
  - The backup specification must be changed
  - Online backup is performed instead of split mirror backup
- **Not** a true online recovery
  - Failover must wait for abort of backup
  - Abort can take several minutes

thank you

For further information:
http://www.openview.hp.com/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