EMC² NetWorker

Veselin Petrunov

12/17/2013

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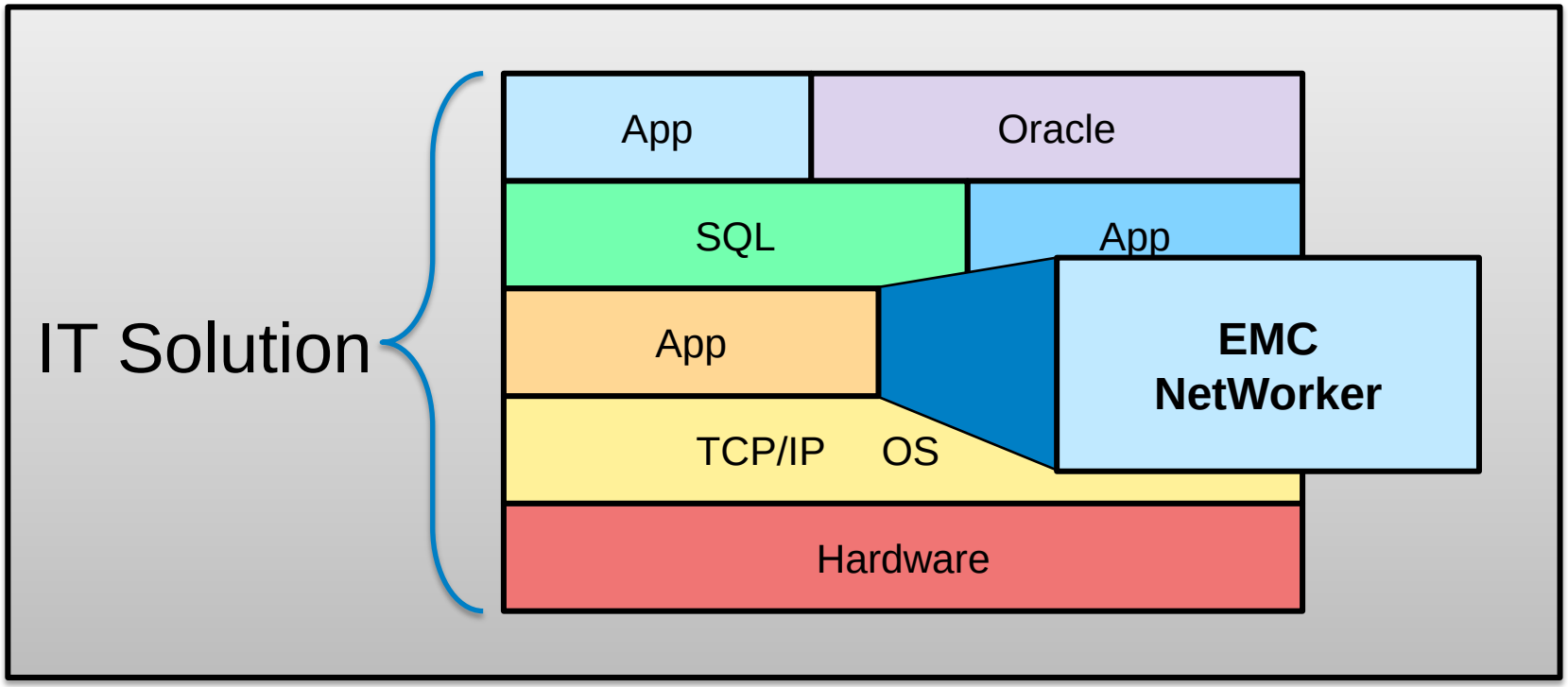
The NetWorker Solution



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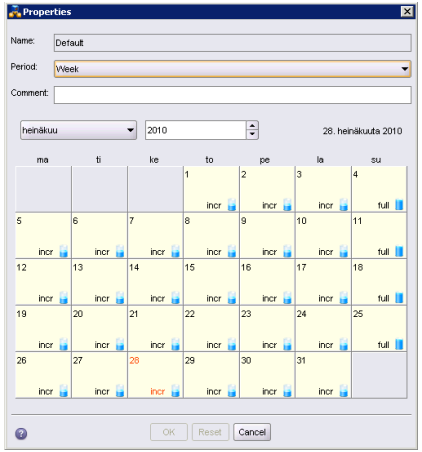
NetWorker Backup Terms

NetWorker server

Backup device

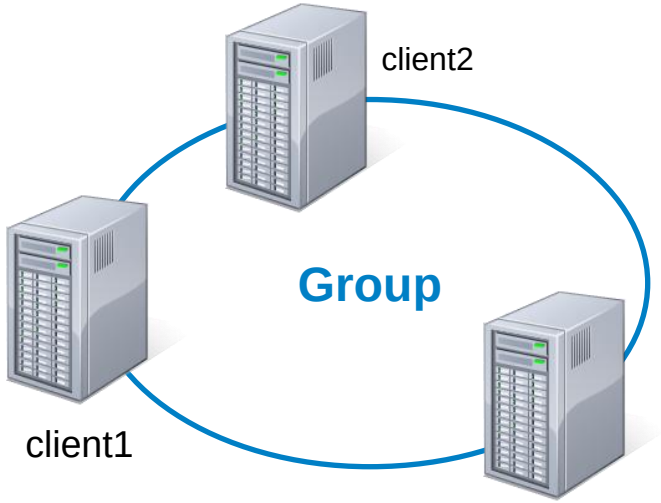


Schedule

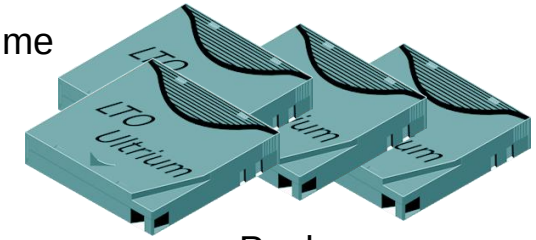
Is a NetWorker resource that **specifies the level** of client backup to perform on any given day. It does NOT specify the time to perform a backup – it is given by the group resource.

Resources

client



Volume



Pool

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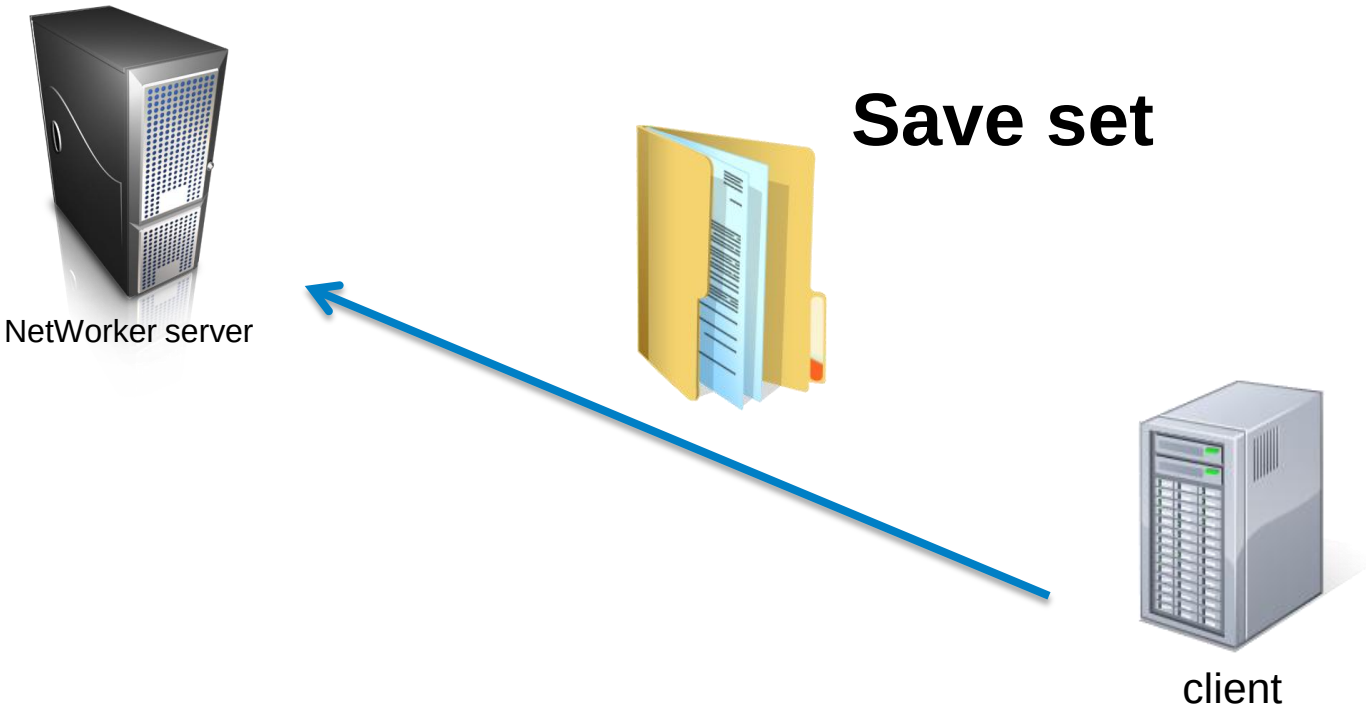
NetWorker Backup Terms



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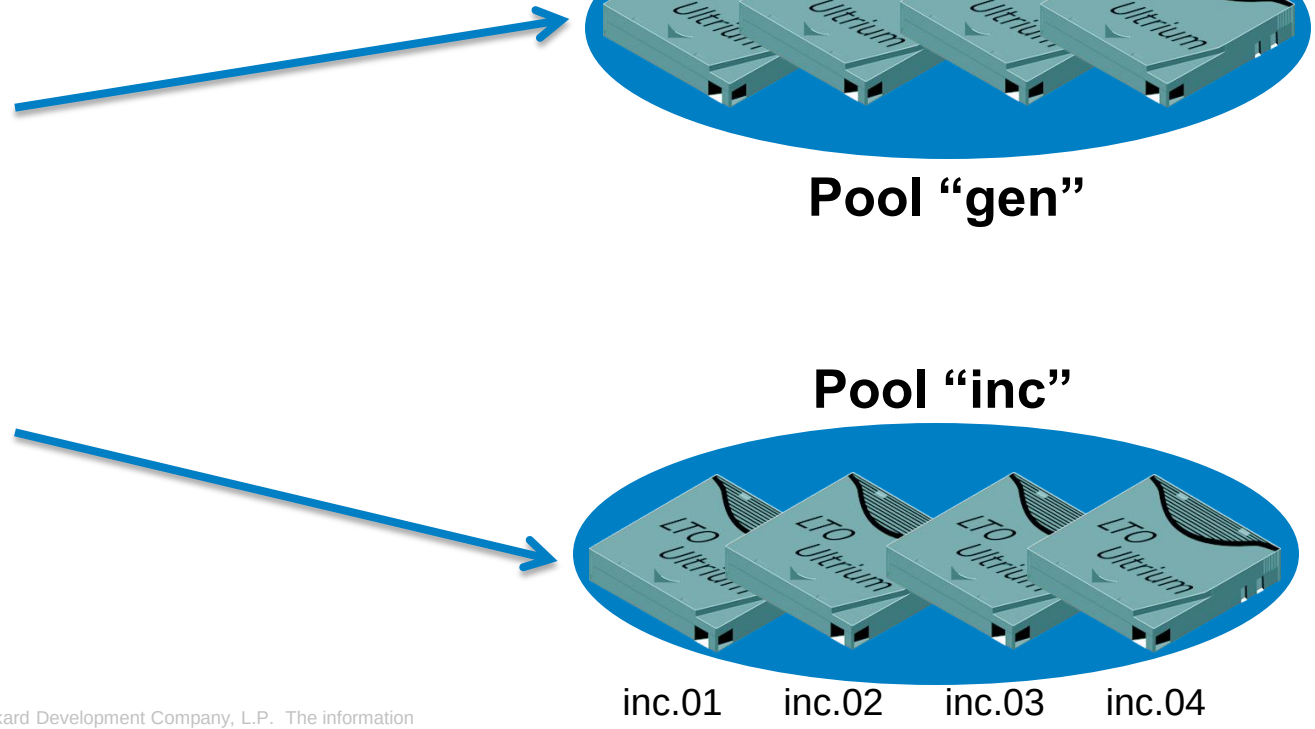
NetWorker Backup Terms

Save sets



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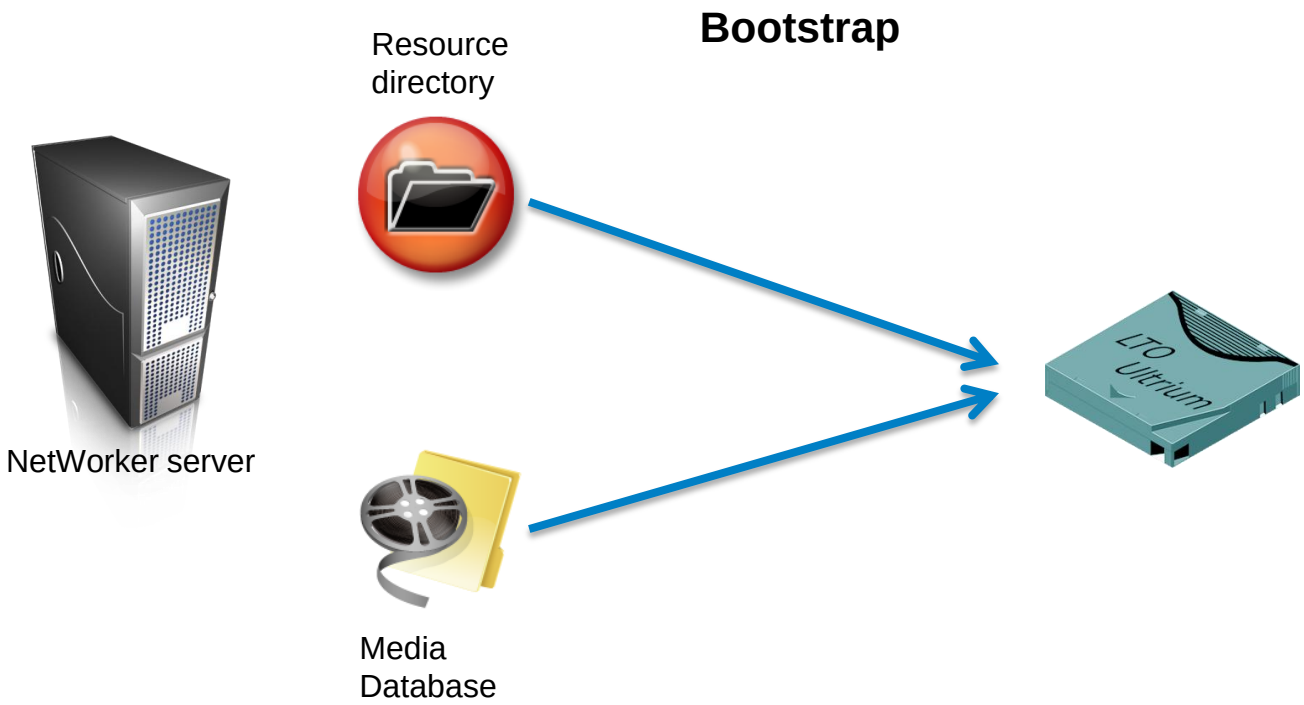
NetWorker Backup Terms



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NetWorker Data Zone

NetWorker server

Client
File
Indexes

Resource
directory

Media
Database

Roles:
- server
- storage node
- client

NetWorker
storage node

Roles:
- storage node
- client

Roles:
- Client

NetWorker Client

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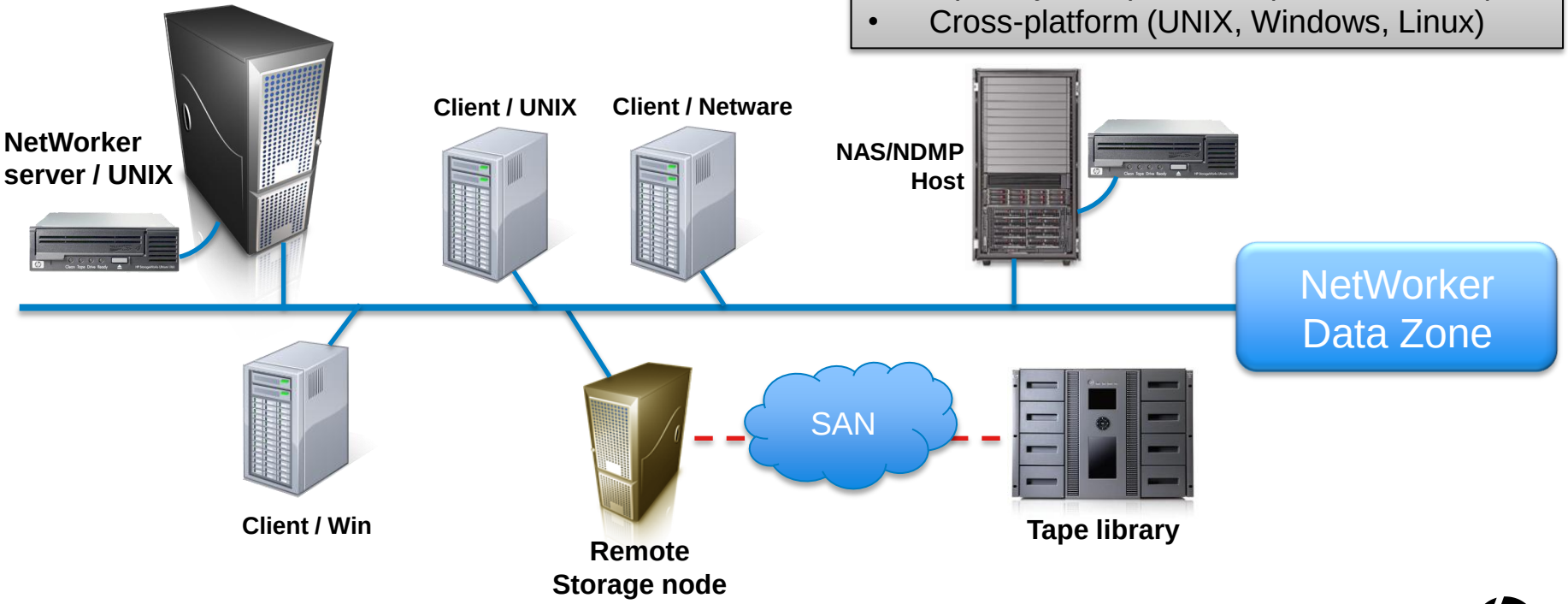
Network-based Backup Protection

- LAN, WAN and SAN
- Open-system protocols (TCP/IP, NDMP)
- Cross-platform (UNIX, Windows, Linux)



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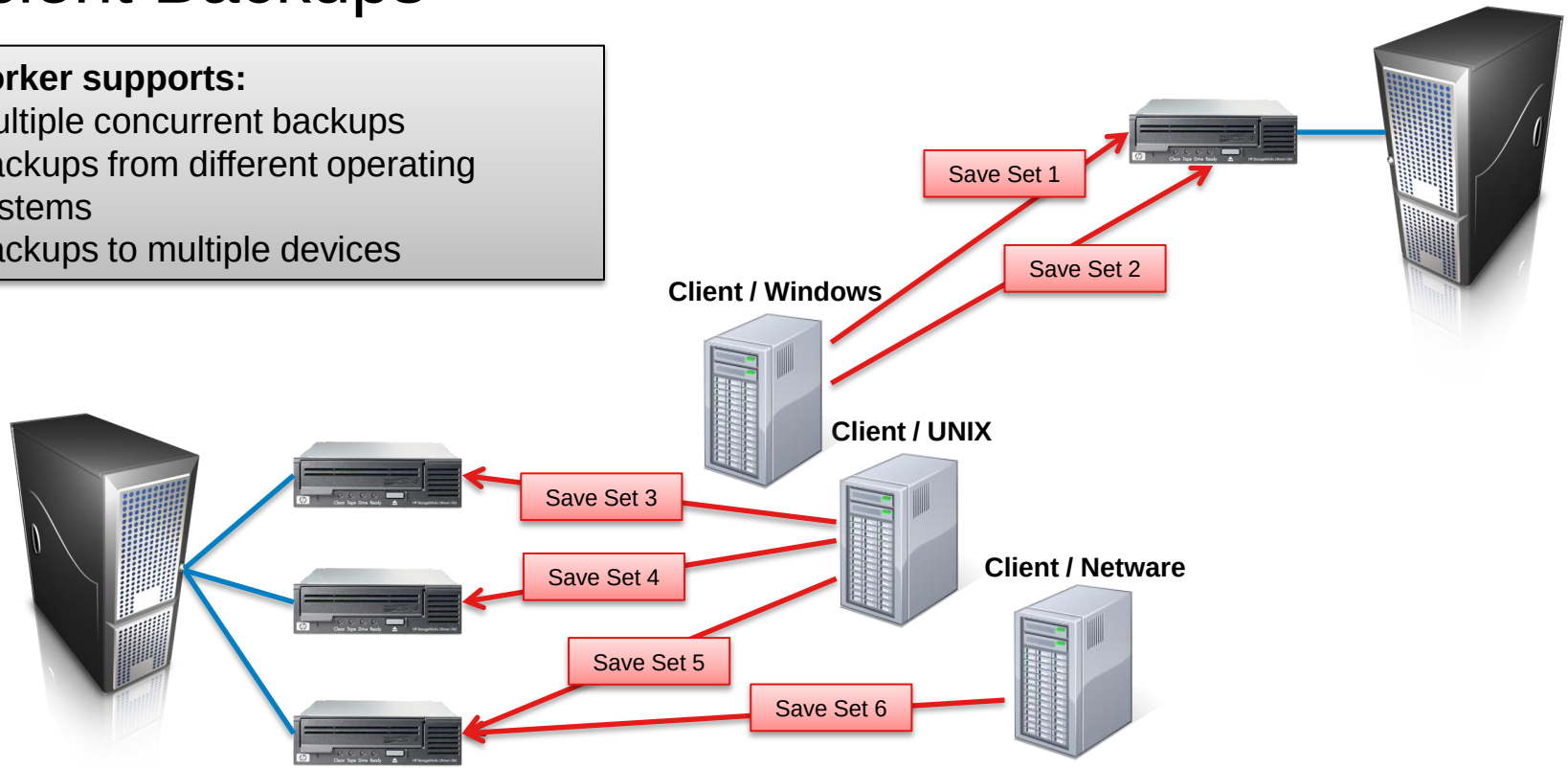
Efficient Backups

NetWorker supports:

- Multiple concurrent backups
- Backups from different operating systems
- Backups to multiple devices



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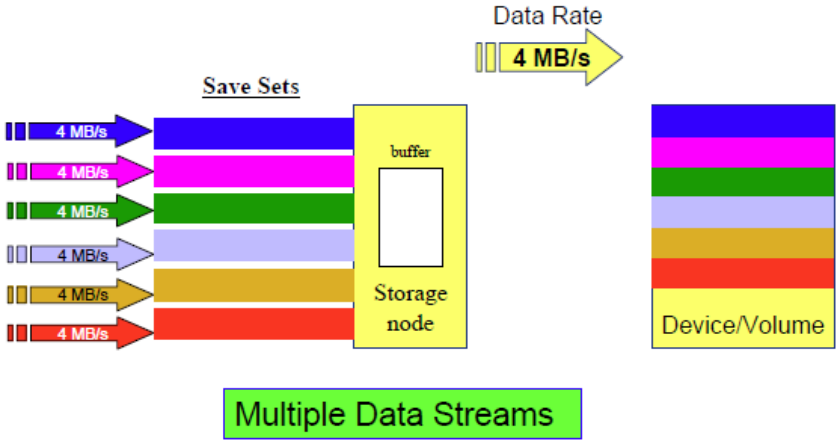
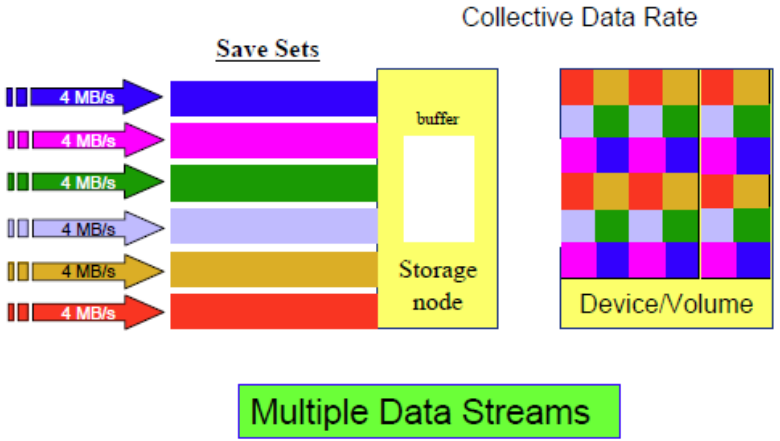
Backup with and without Multiplexing and OTF

Backups Without Multiplexing



Without multiplexing, only one stream is written onto a device at a time

NetWorker Uses Multiplexing



NetWorker Uses Open Tape Format - or **OTF**, is a data format that allows multiplexed, heterogeneous data to reside on the same tape.

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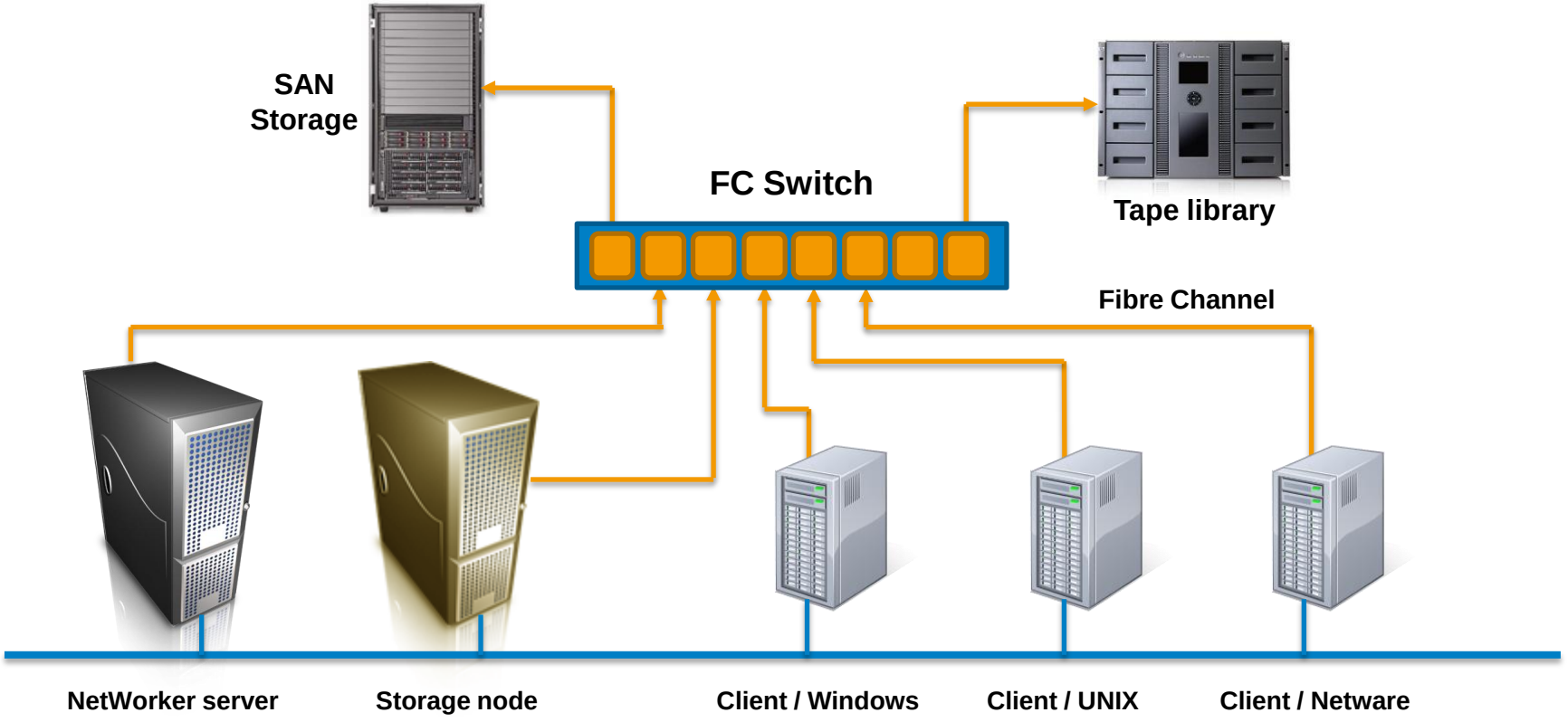
NetWorker in a SAN Environment



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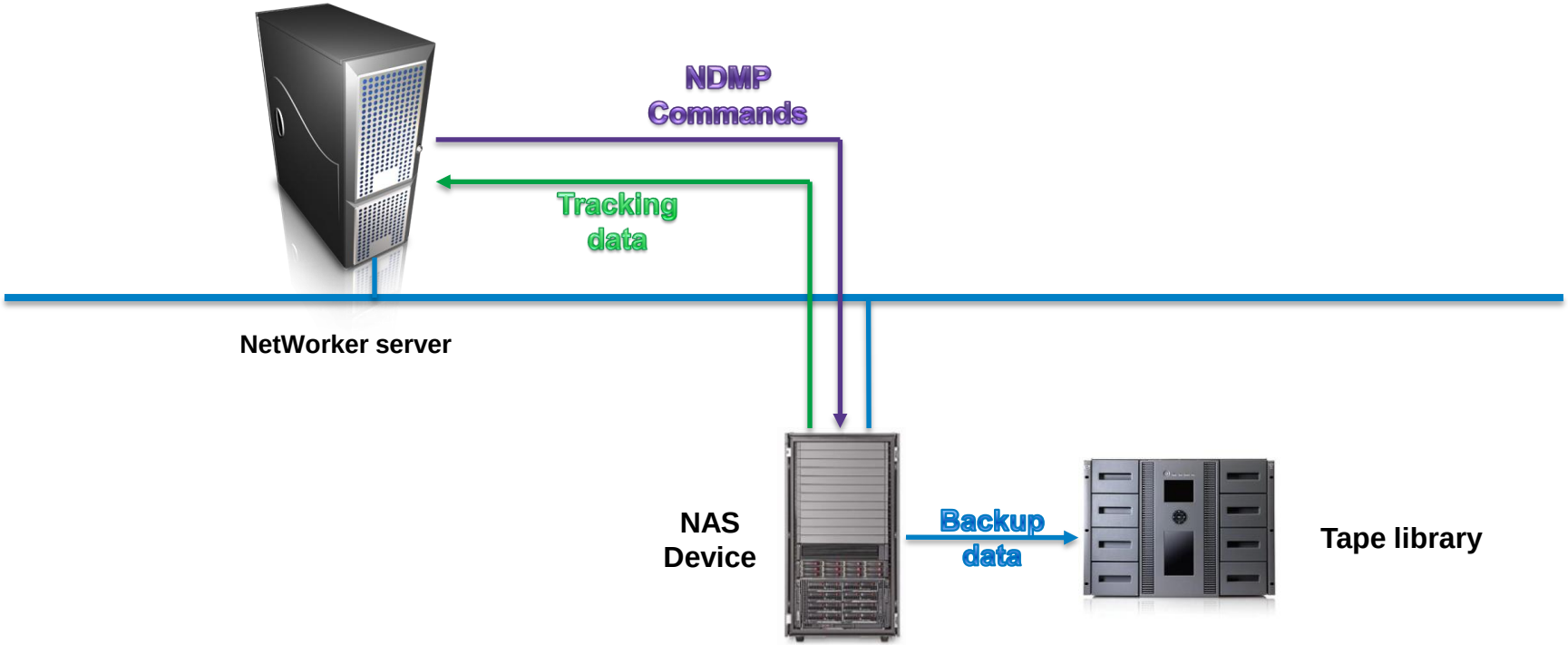
NetWorker and NDMP



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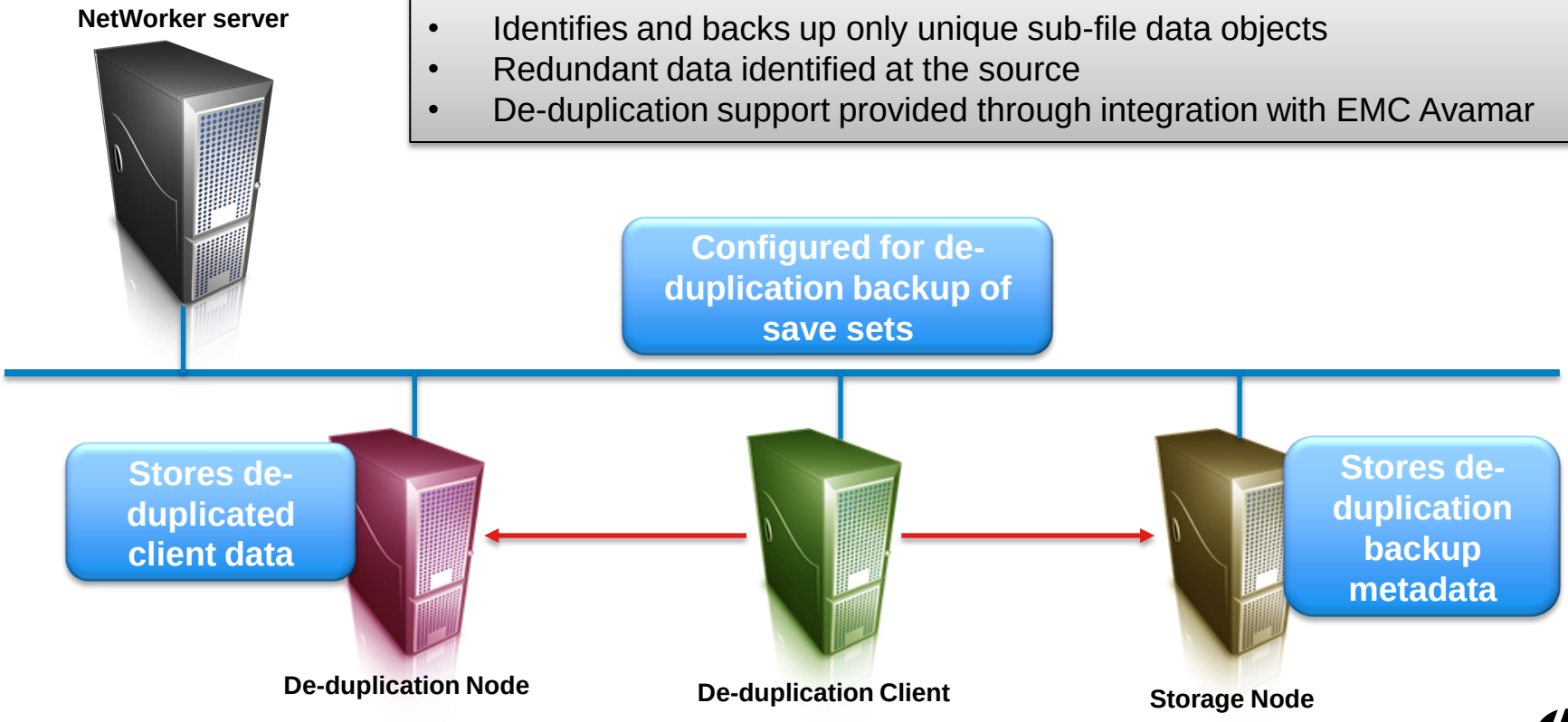
NetWorker with De-duplication

- Identifies and backs up only unique sub-file data objects
- Redundant data identified at the source
- De-duplication support provided through integration with EMC Avamar



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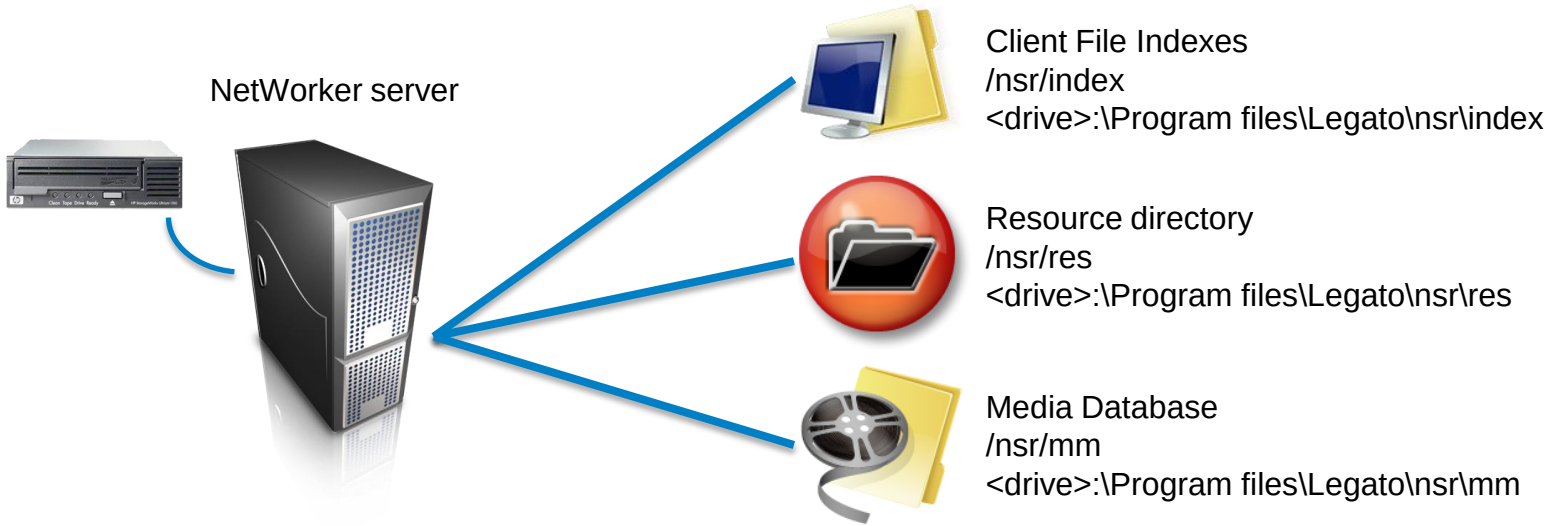
NetWorker Control Data



Resource Directory: This directory (the resource database) contains the resource files.
Media Database: This database is used to track all volumes used by NetWorker and all save sets written to those volumes.
Client File Indexes (CFI): These databases track each file (pathname) backed up by clients, allowing users to browse their backups for files from a particular point in time. The NetWorker server creates and maintains one CFI per physical client.

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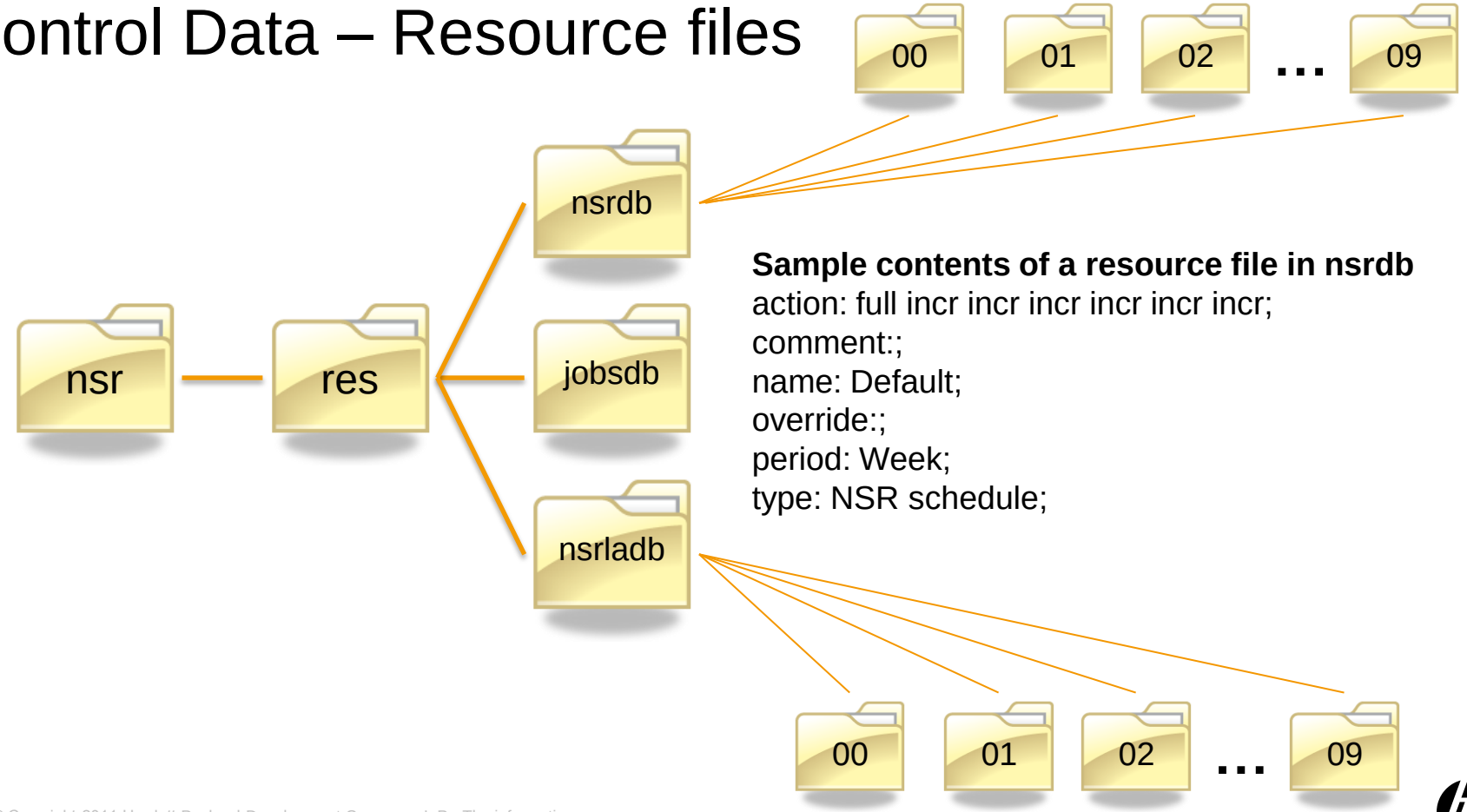
Control Data – Resource files



Sample contents of a resource file in nsrdb

action: full incr incr incr incr incr incr;
comment:;
name: Default;
override:;
period: Week;
type: NSR schedule;

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NetWorker Resources

Resource Type	Function
NSR client	Configure supported clients for backup/recovery.
NSR device	Configure backup devices.
NSR directive	Configure optional directions clients are to follow for backup.
NSR group	Configure start time for scheduled backups. Group clients together.
NSR jukebox	Configure media library/autochanger/jukebox.
NSR label	Configure pool (volume) label templates.
NSR license	Enable (license) a NetWorker product or feature.
NSR notification	Configure actions to be taken when NetWorker events occur.
NSR policy	Configure lengths of time. Used to set aging values for backups and volumes.
NSR pool	Configure characteristics for matching a save set to a set of volumes.
NSR schedule	Set the level (Full, incremental, …) for backups based on day of week or month.
NSR stage	Configure management of save sets stored on file type (disk backup) volumes.
NSR storage node	Configure a remote storage node to be scanned for tape devices.
NSR usergroup	Configure user access privileges.
NSR	Configure the NetWorker server's attributes.

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Control Data – Media Database

volume	client	date	time	size	ssid	fl	lvl	name
leg_win1.001	leg-win1	10/3/2005	3:33:51 AM	227 KB	3795902175	cr	full	bootstrap
leg_win1.001	leg-win1	10/3/2005	3:33:26 AM	59 KB	3863011014	cr	9	index:leg-win1
leg_win1.001	leg-win1	10/3/2005	3:33:23 AM	4 B	3879788227	cb	incr	C:\WINNT\Fonts
leg_win1.001	leg-win1	10/3/2005	3:33:16 AM	4 B	3896565436	cb	incr	C:\WINNT\Cursors
leg_win1.001	leg-win1	10/3/2005	3:33:15 AM	323 KB	3913342651	cr	9	index:leg-sun2
leg_win1.001	leg-sun2	10/3/2005	3:35:57 AM	4 B	3930119860	cb	incr	/usr/bin
leg_win1.001	leg-sun2	10/3/2005	3:35:56 AM	4 B	3946897075	cb	incr	/etc
leg_win1.001	leg-win1	10/2/2005	3:34:01 AM	192 KB	3963587945	cr	full	bootstrap
leg_win1.001	leg-win1	10/2/2005	3:33:37 AM	59 KB	4013919569	cr	full	index:leg-win1
leg_win1.001	leg-win1	10/2/2005	3:33:22 AM	8391 KB	4047473989	cb	full	C:\WINNT\Fonts
leg_win1.001	leg-win1	10/2/2005	3:33:21 AM	389 KB	4064251204	cb	full	C:\WINNT\Cursors
leg_win1.001	leg-win1	10/2/2005	3:33:23 AM	323 KB	4081028419	cr	full	index:leg-sun2
leg_win1.001	leg-sun2	10/2/2005	3:35:55 AM	31 MB	4097805621	cb	full	/usr/bin
leg_win1.001	leg-sun2	10/2/2005	3:35:54 AM	2742 KB	4114582834	cb	full	/etc

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Control Data – Client File Indexes

C:\WINNT\Fonts\8514fix.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\8514oem.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\8514sys.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\app850.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\arial.ttf,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\arialbd.ttf,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\arialbi.ttf,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\ariali.ttf,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\ariblk.ttf,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\cga40850.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\cga40woa.fon,	date=1128238402	Sun Oct 02	03:33:22	2005
C:\WINNT\Fonts\cga80850.fon,	date=1128238402	Sun Oct 02	03:33:22	2005

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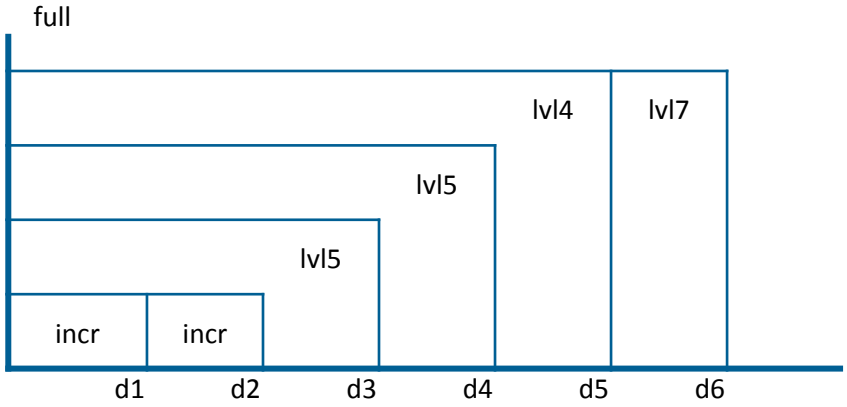
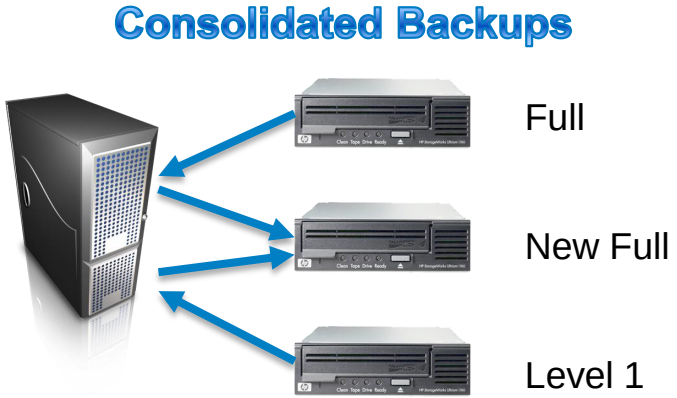
NetWorker Backup Levels

Level	Description
Full	Back up all files regardless of whether they have changed.
Level 1–9 (differential)	Back up all files that have changed since the most recent lower level backup.
Incremental	Back up files that have changed since the last backup, regardless of what level it was.
Skip	Do not perform a backup today.
Consolidated	Perform a level 1 backup and then merge it with the most recent Full backup.





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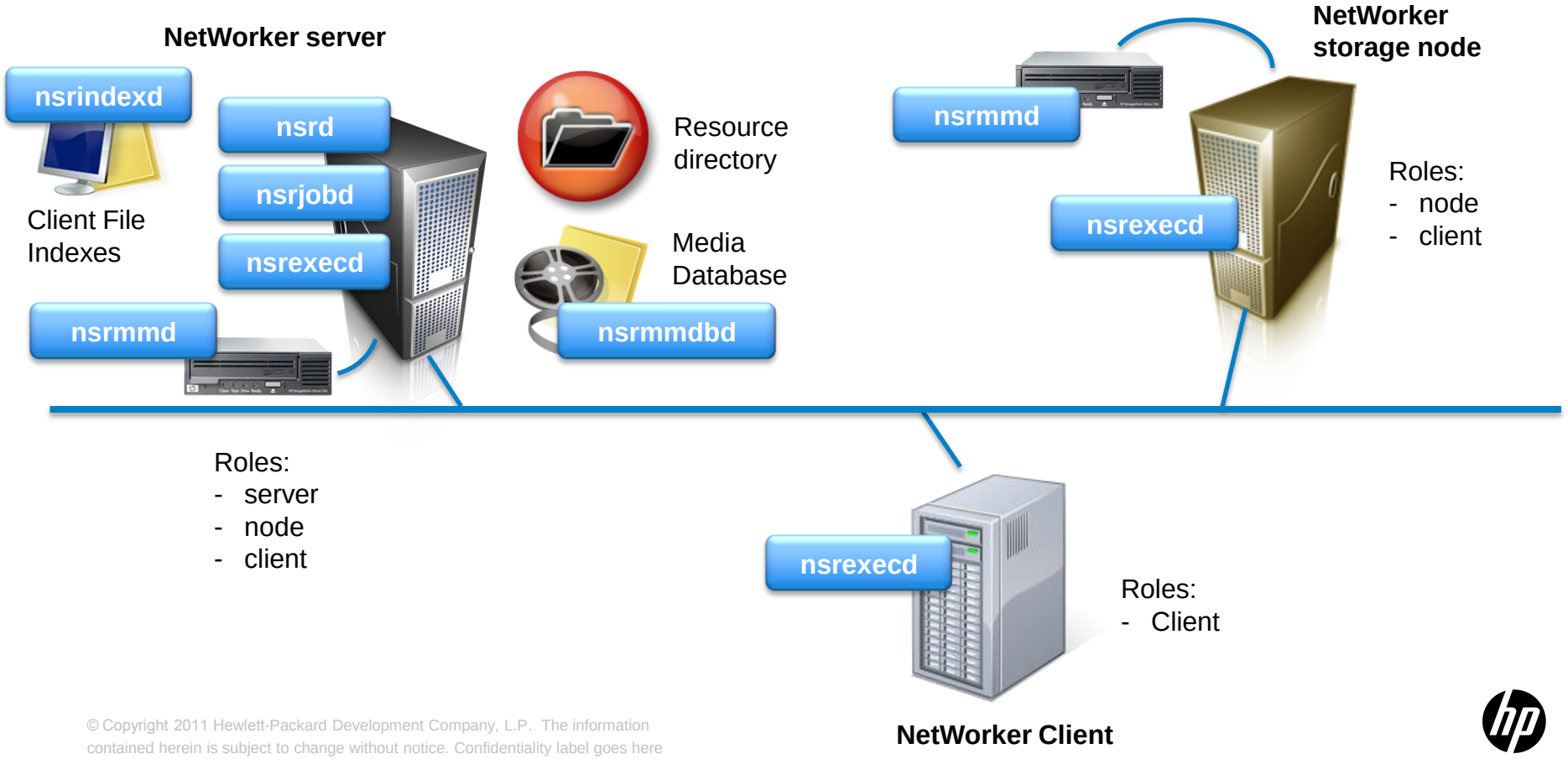
NetWorker Core Daemons



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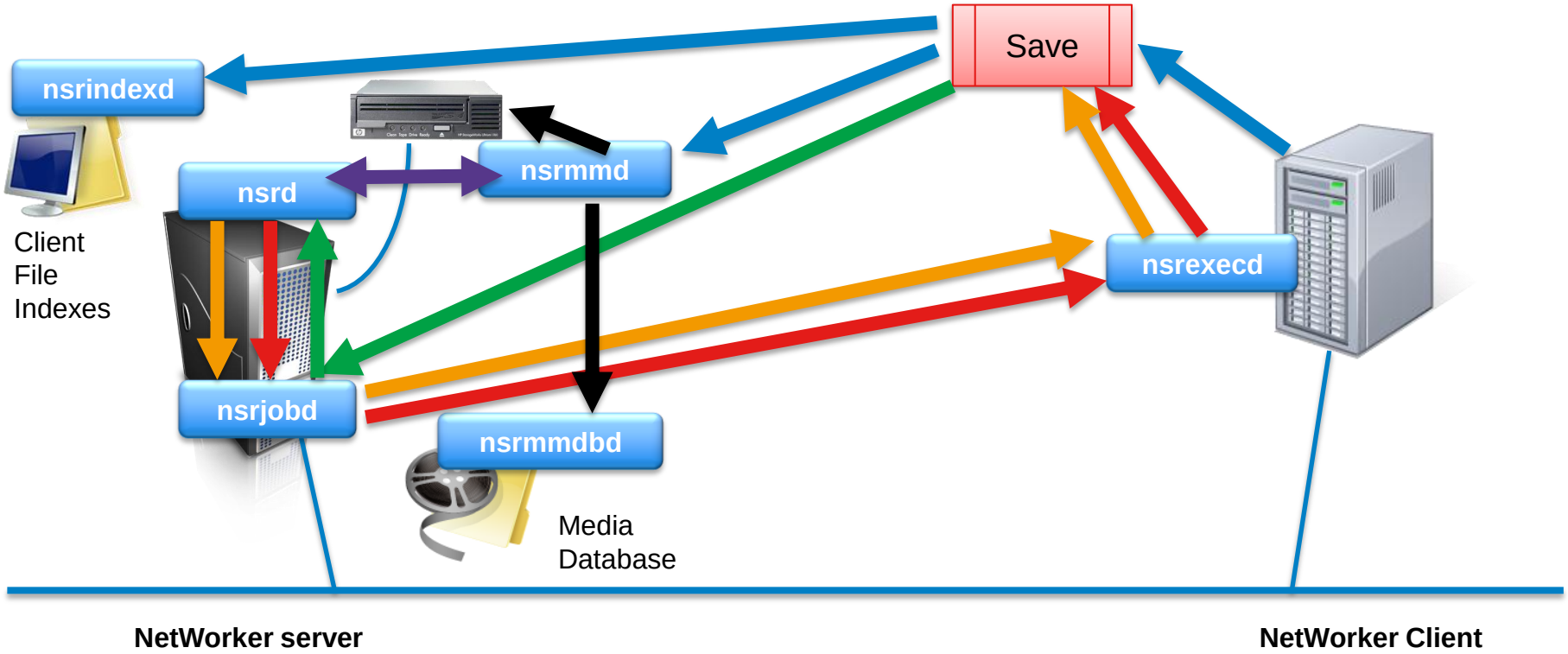
NetWorker Data Zone



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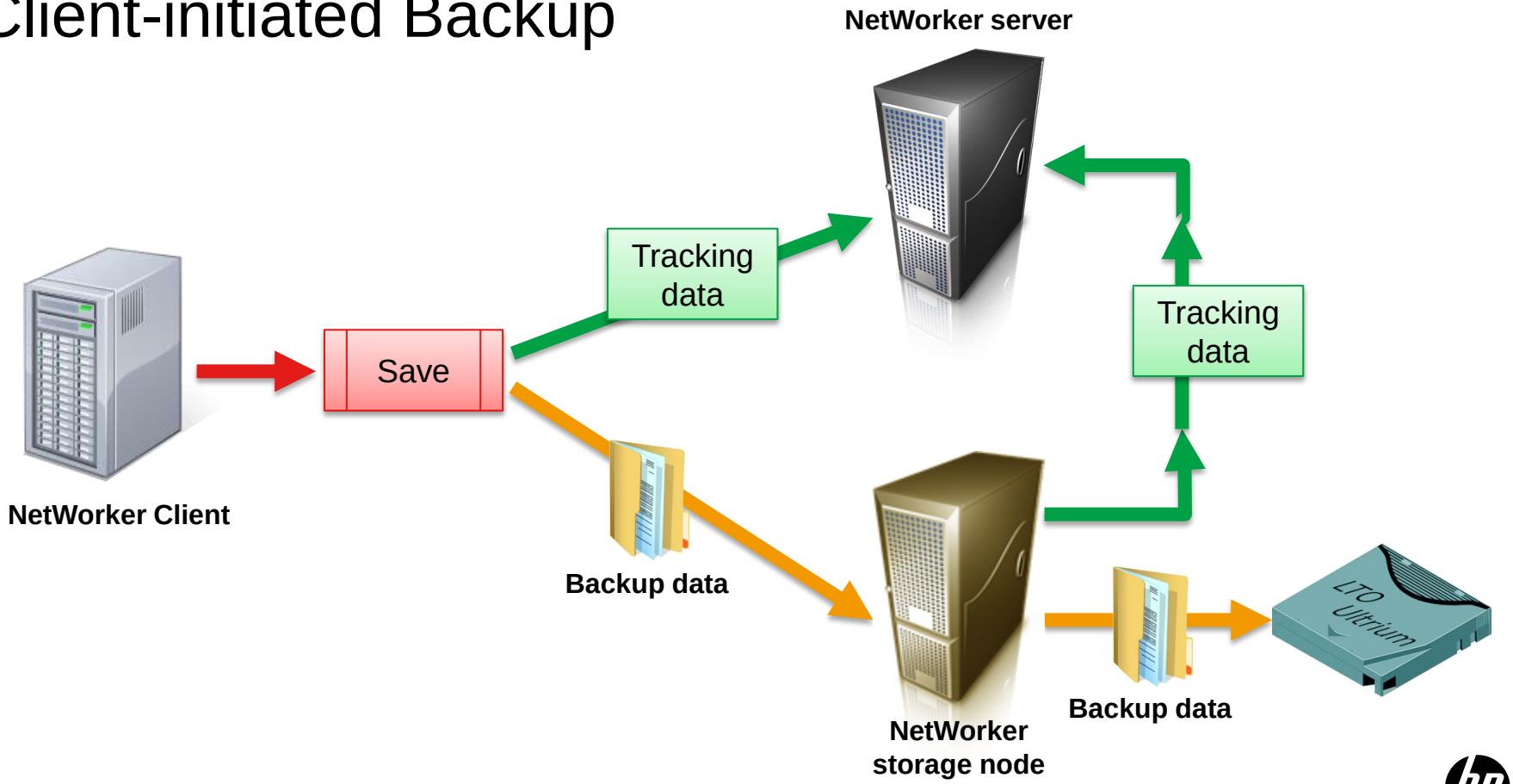
Client-initiated Backup



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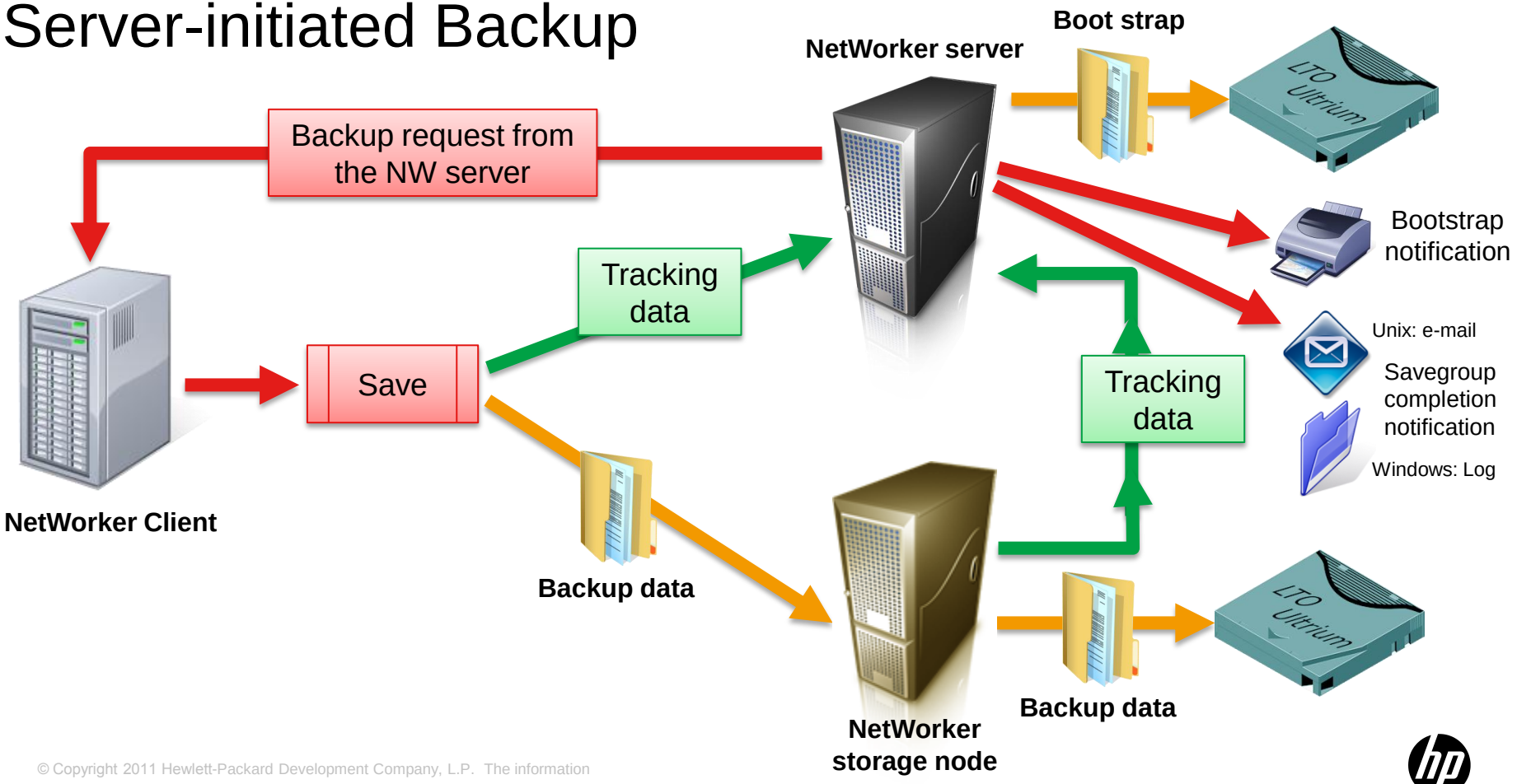
Server-initiated Backup



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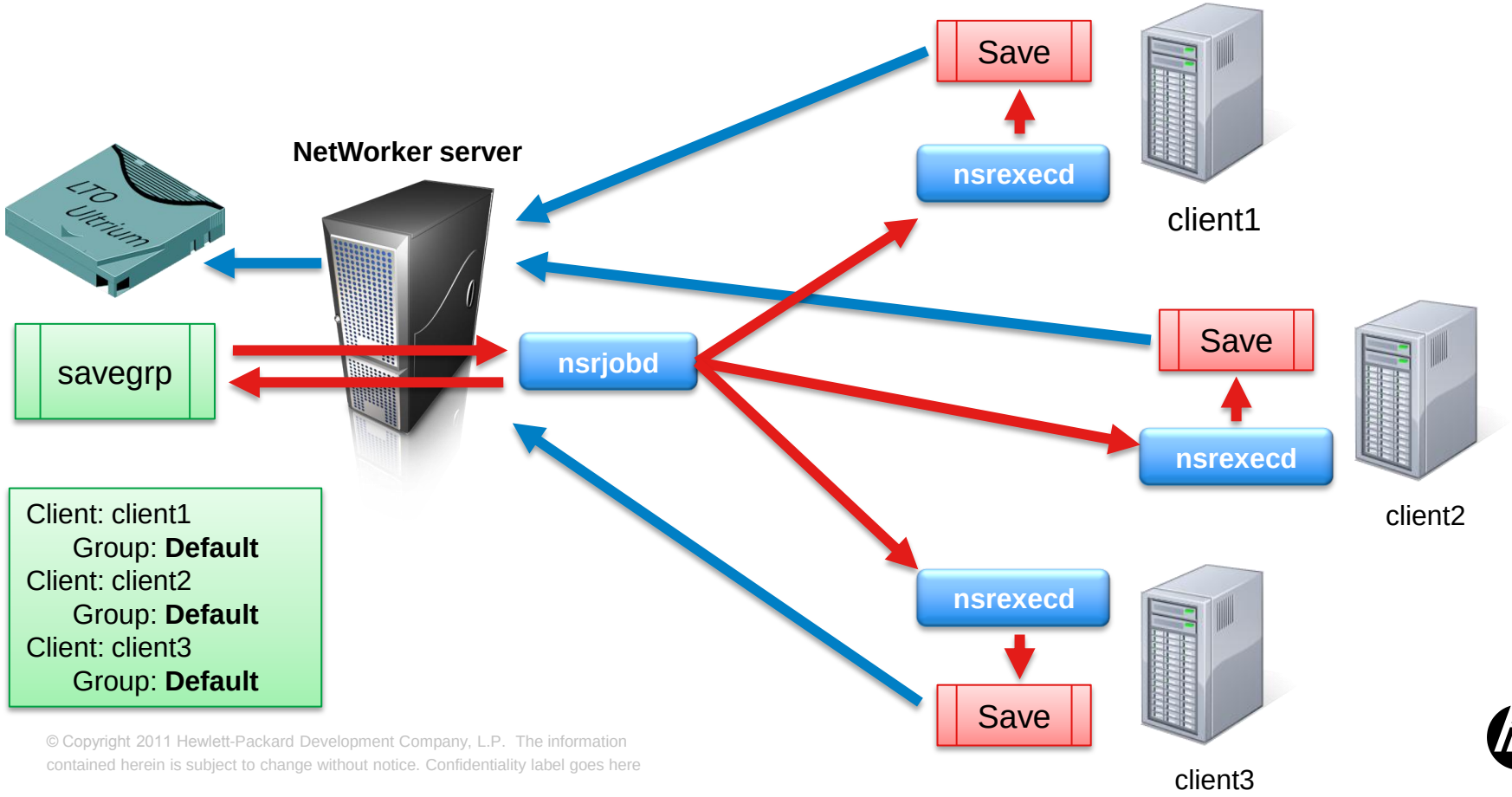
Server-initiated Backup using savegrp



Client: client1
    Group: **Default**
Client: client2
    Group: **Default**
Client: client3
    Group: **Default**

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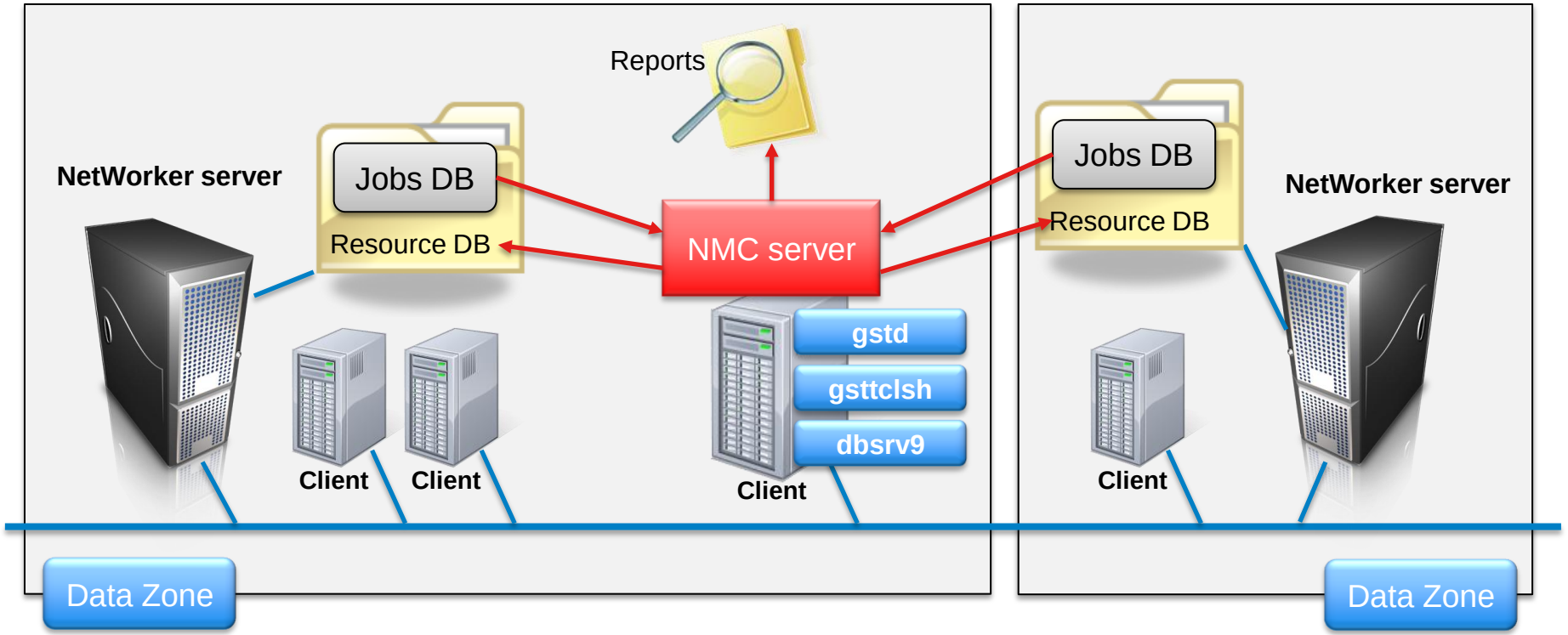
NetWorker Management Console (NMC) Server



Provides a Java interface for configuration and management of NetWorker server(s), Server Node(s), Client (s). Can gather information about backups from multiple data zones. Can generate detailed, customizable reports

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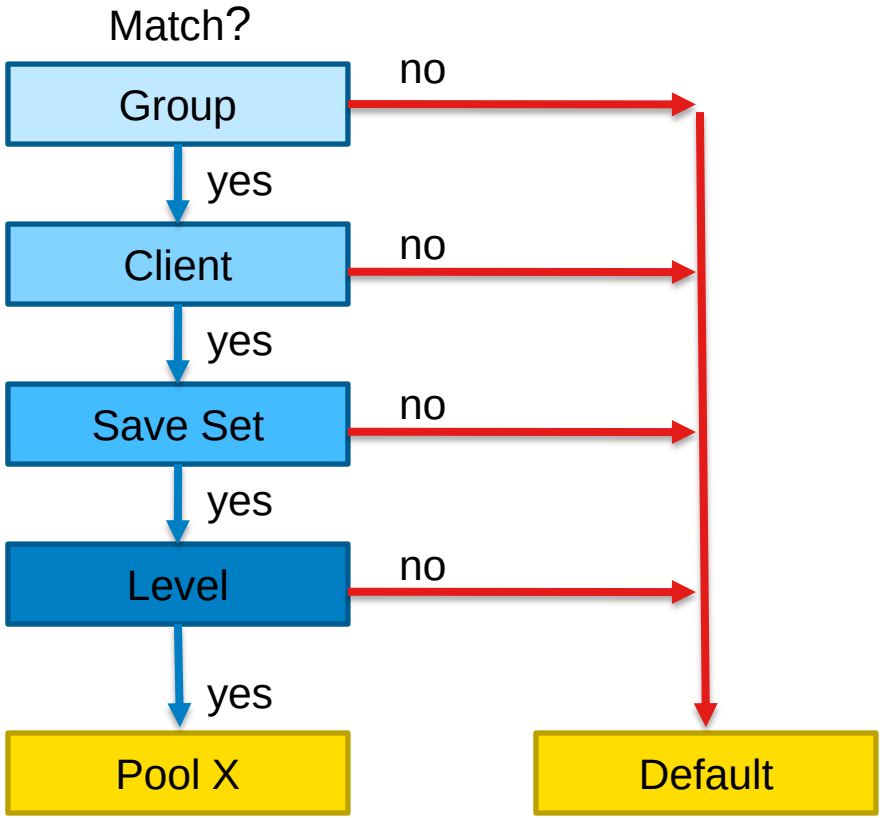
Pool Selection Criteria



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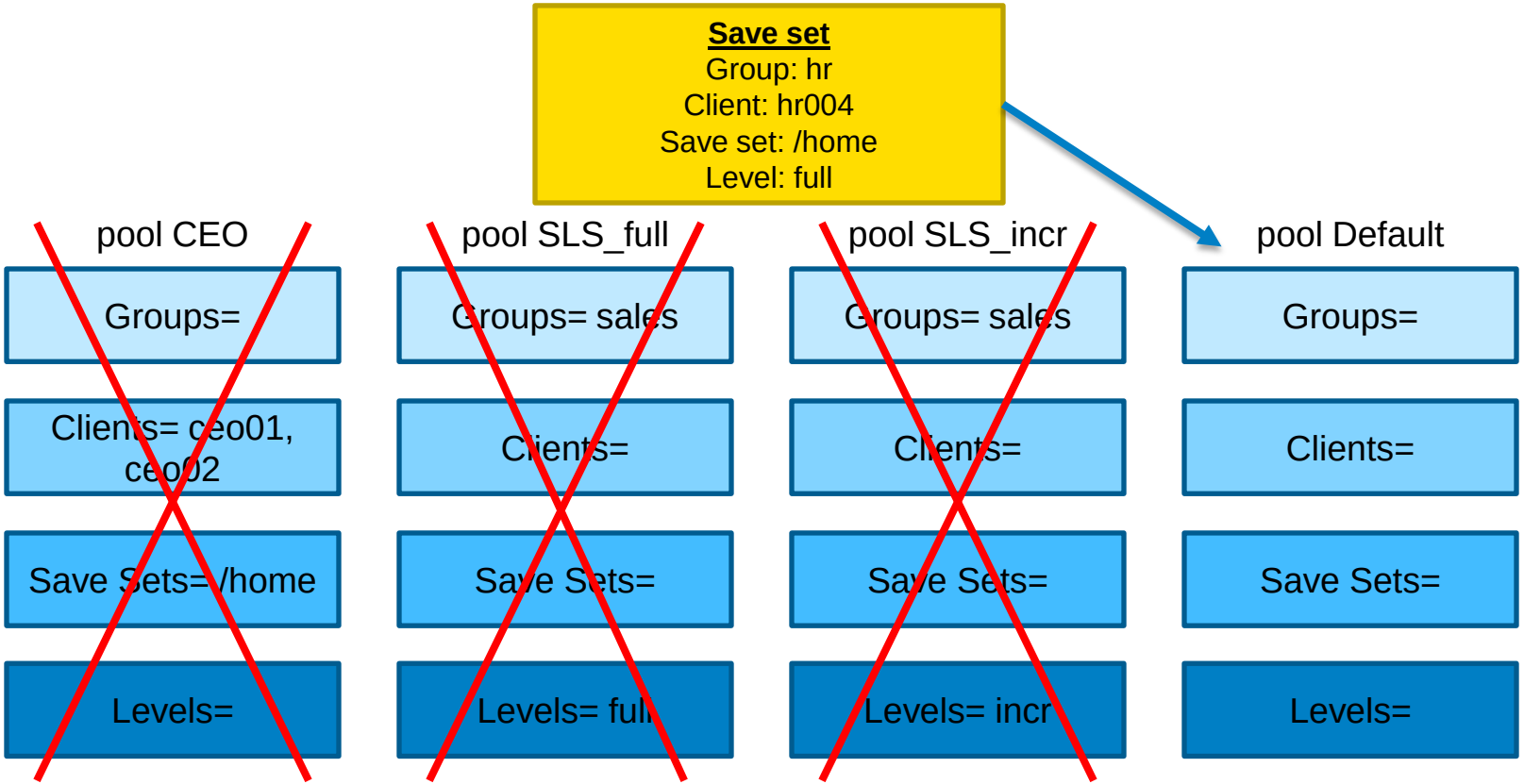
Pool Selection Criteria



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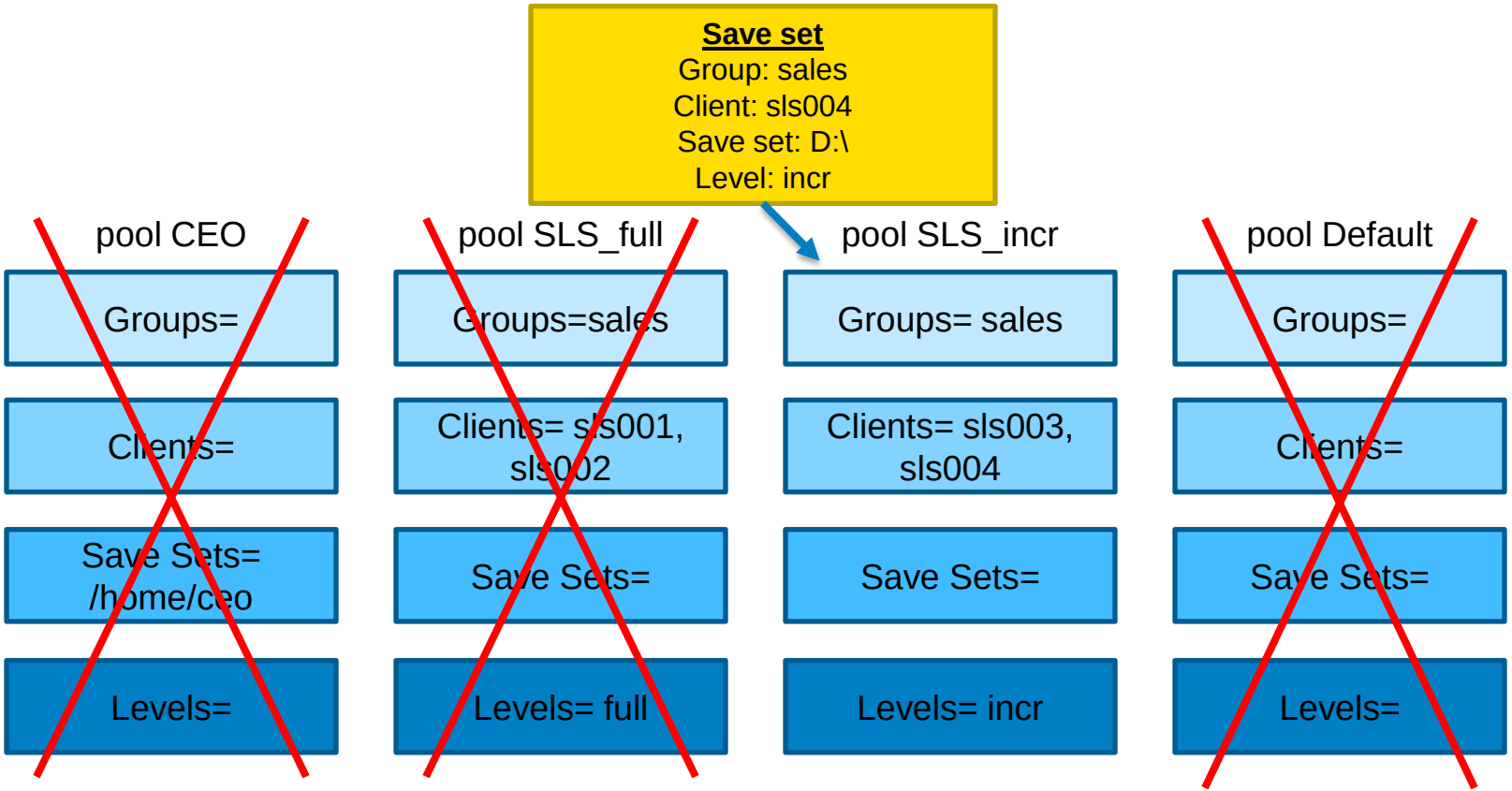
Pool Selection Criteria



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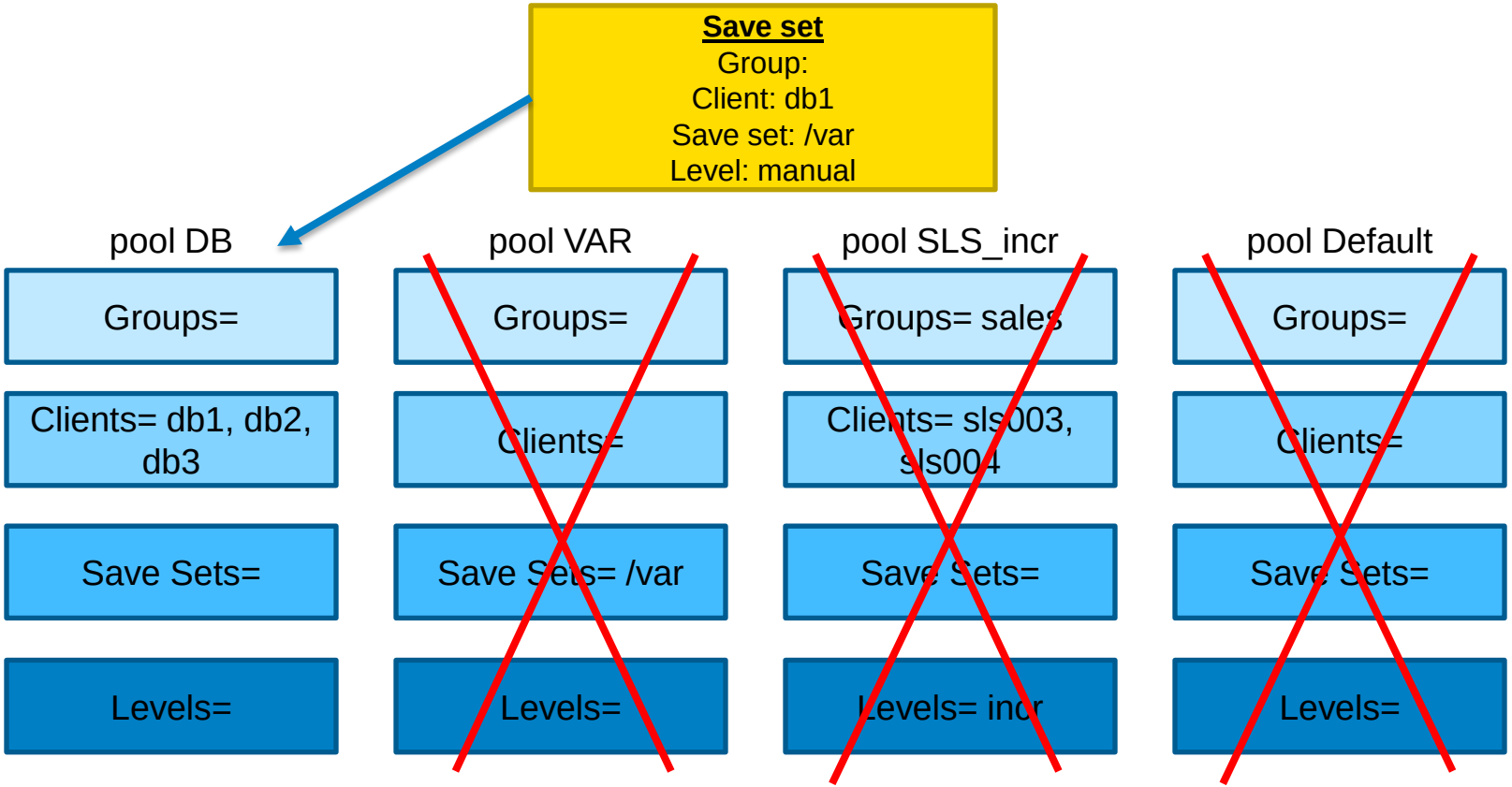
Pool Selection Criteria



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Pool Resource Attributes

Attribute	Function
Pool Type	The pool type (Backup or Backup Clone)
Label Template	The label template to use for the pool.
Groups	Groups allowed to send data to the pool.
Clients	Clients allowed to send data to the pool.
Save sets	Save sets which may be written to the pool.
Levels	Levels of backups which may be written to the pool.
Devices	Devices on which volumes in the pool may be mounted. (By default, no devices are selected. This actually behaves the same as when all devices are selected.) Selecting one or more devices results in the pool always using only those devices.
Max parallelism	Specifies the maximum number of simultaneous save streams that can be sent to a device on which a volume from this pool is mounted.
Auto media verify	Specifies whether to reread data when a device is closed after a save and compare Auto media verify it to the data written to the volume. (disabled by default)
Recycle to other pools	Allows recyclable volumes in the pool to be relabeled into a different pool, if necessary. (disabled by default)
Recycle from other pools	Allows recyclable volumes from other pools to be relabeled into this pool, if necessary. (disabled by default)
Store index entries	Specifies whether to generate CFI entries for save sets written to the pool.
Retention policy	A volume normally becomes recyclable when all save sets on the volume are recyclable. This attribute can specify a longer period of time before a volume becomes recyclable.

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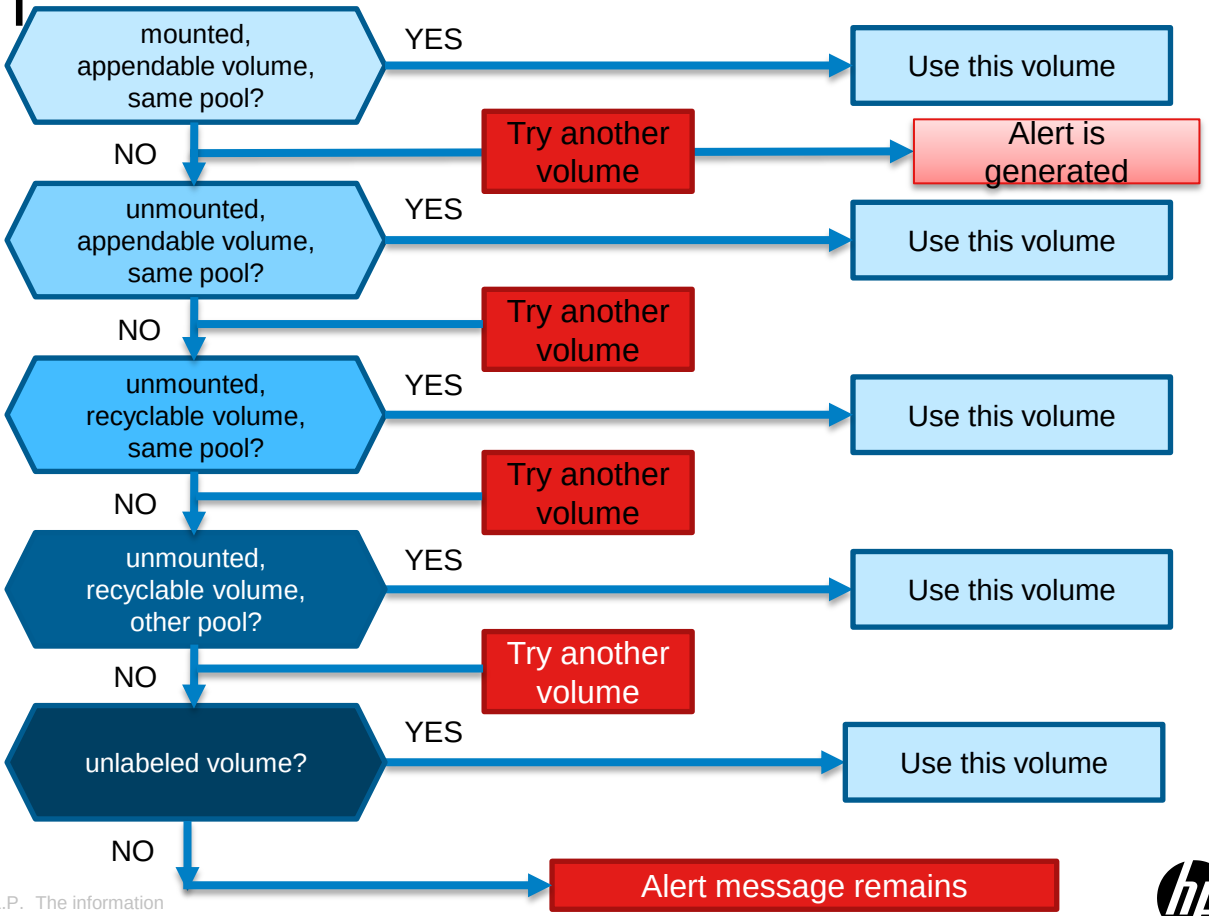
Volume Selection



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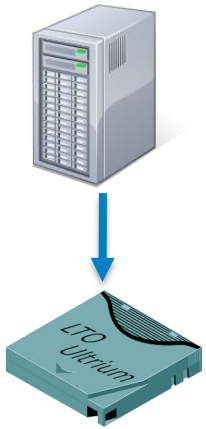
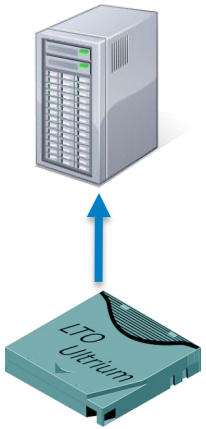
Client Roles in a Recovery

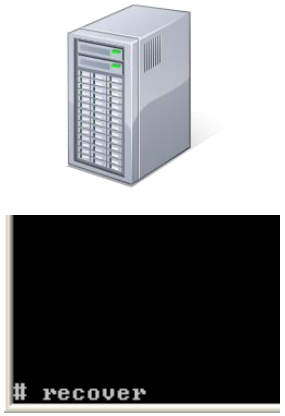
Source Client



Destination Client



Administering Client



Client Role	Description
Source client	This is the NetWorker client from which the data being recovered was originally backed up.
Destination client	This is the NetWorker client to which data is being recovered. If different from the source client, it must be listed in the source client's Remote access list.
Administering client	This is the NetWorker client from which the recovery is being performed. If different from the source client, it must be listed in the source client's Remote access list.

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Recovery Types

Type of Recovery	Performed By	Performed on which host	Save Set Status	Databases Used	Method of Recovery
Browsable	Any user	Any client	Browsable	CFI & MediaDB	nwrecover (UNIX) NetWorker User (Windows) recover CLI
Save Set	System Administrator	Any client	Browsable Recoverable Recyclable	MediaDB	nwrecover (UNIX) NetWorker User (Windows) recover CLI
Directed	(Windows - NetWorker Administrator) (UNIX – root only)	Any client except destination client	Browsable	CFI & MediaDB	NetWorker User (Windows) recover CLI (Windows & UNIX)
NW Server (Disaster)	System Administrator	NetWorker server	N/A	N/A	mmrecov (bootstrap) nsrck –L7 (CFI)

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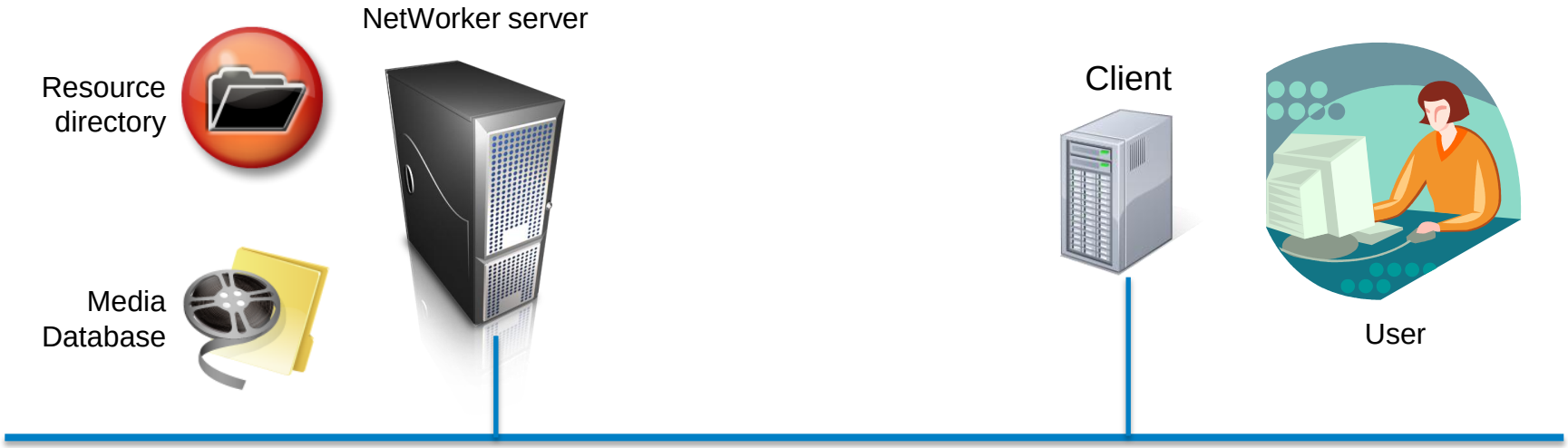
Browsable Recovery



- User selects the set of files and directories to be recovered
- Operating system permissions are adhered to
- “Point-in-time” recovery is performed
- Useful when many files have been deleted or renamed since full backup

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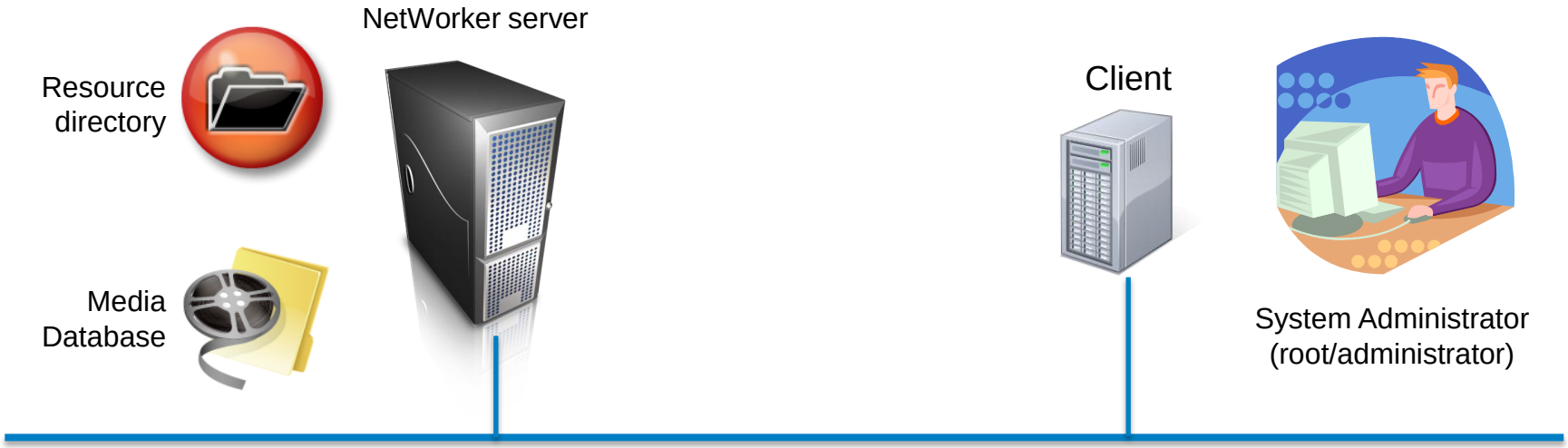
Save Set Recovery



- Useful for recovering non-browsable save sets
- By default, an entire save set is recovered. However, you can recover individual files and directories.
- May be faster than a browsable recovery

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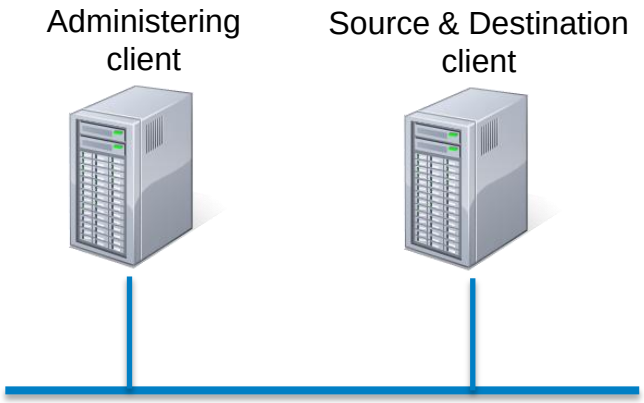
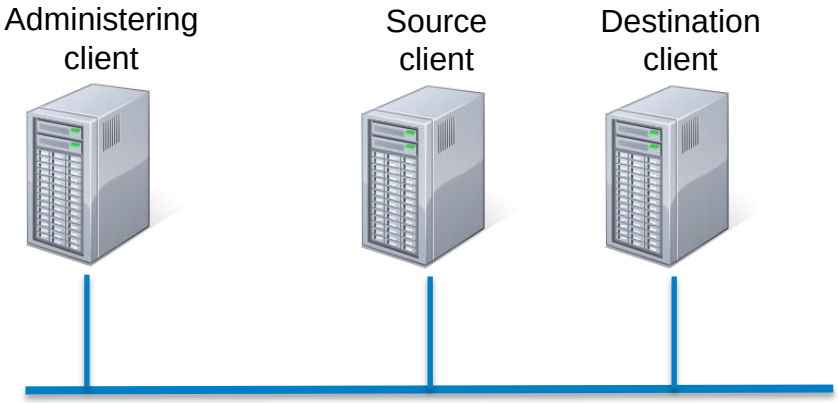
Save Set Recovery





A directed recovery is useful when:

- You are not able to log in to the destination client
- You want to perform all recoveries from a single NetWorker client

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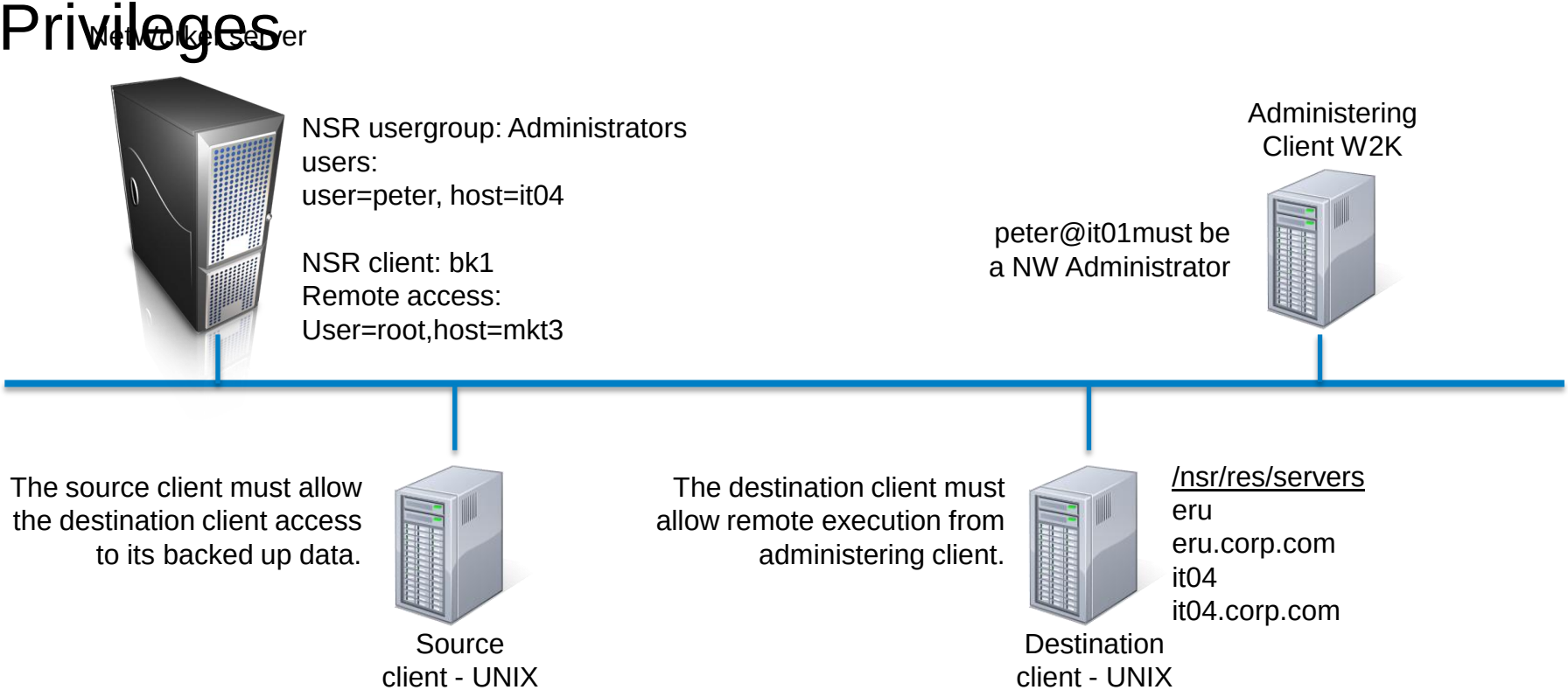
Directed Recovery – Required Privileges



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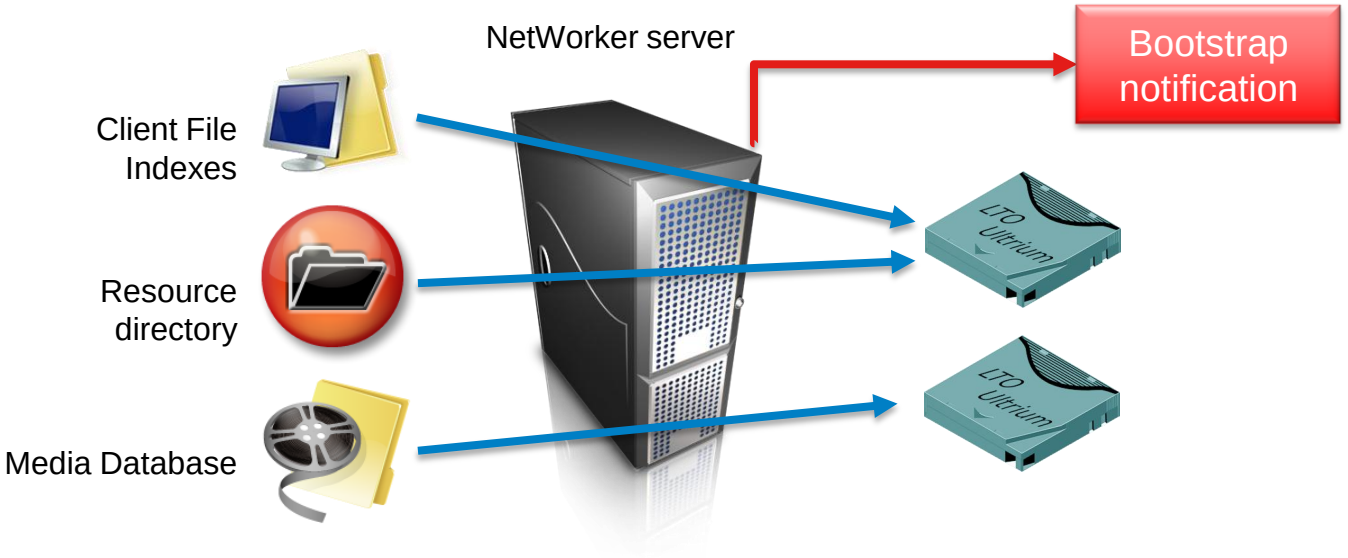
Disaster Recovery – rebuild NetWorker server



Prerequisites for Recovering a NetWorker Server

- ✓ A bootstrap save set must have been backed up
- ✓ The bootstrap report should be available
- ✓ Client file index save sets should have been backed up

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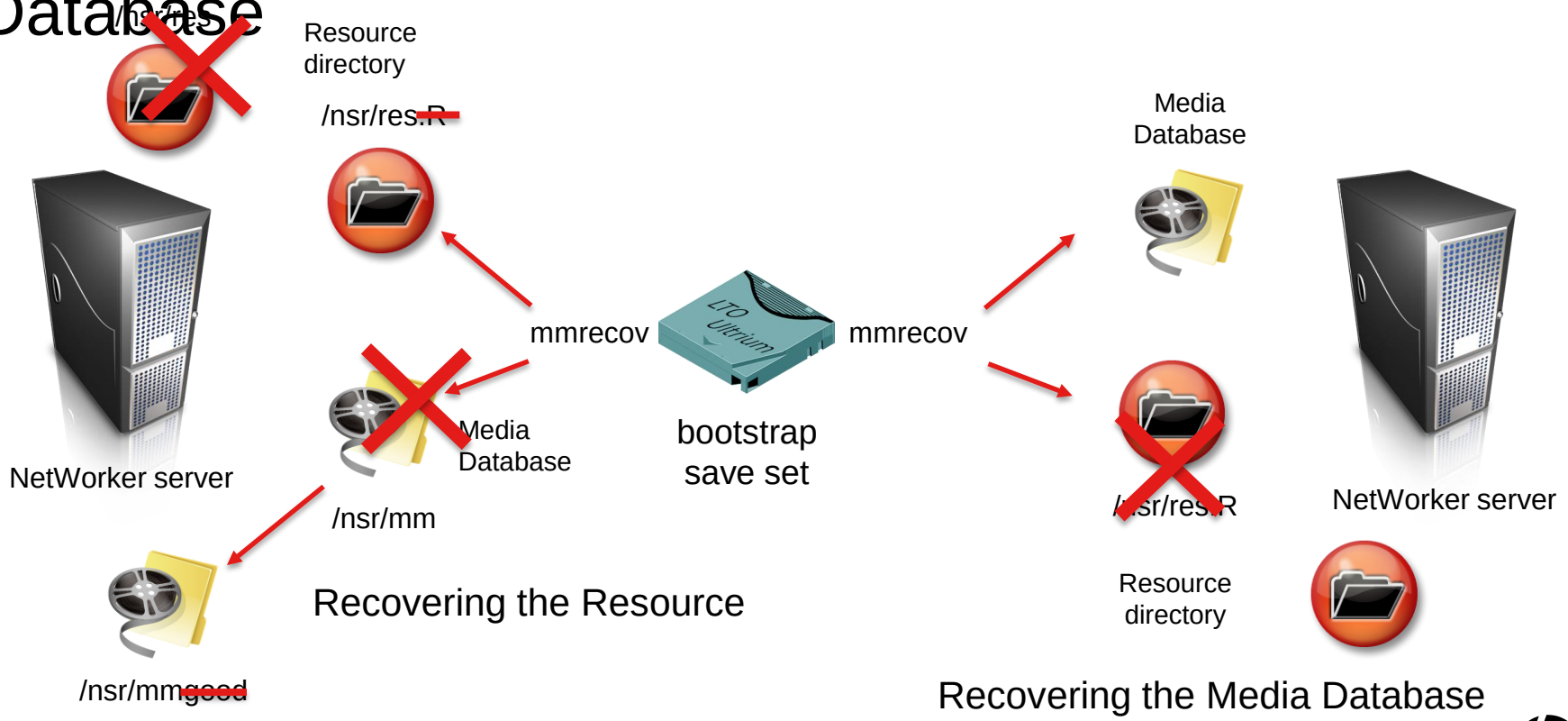
Recovering the Resource Files & Media Database



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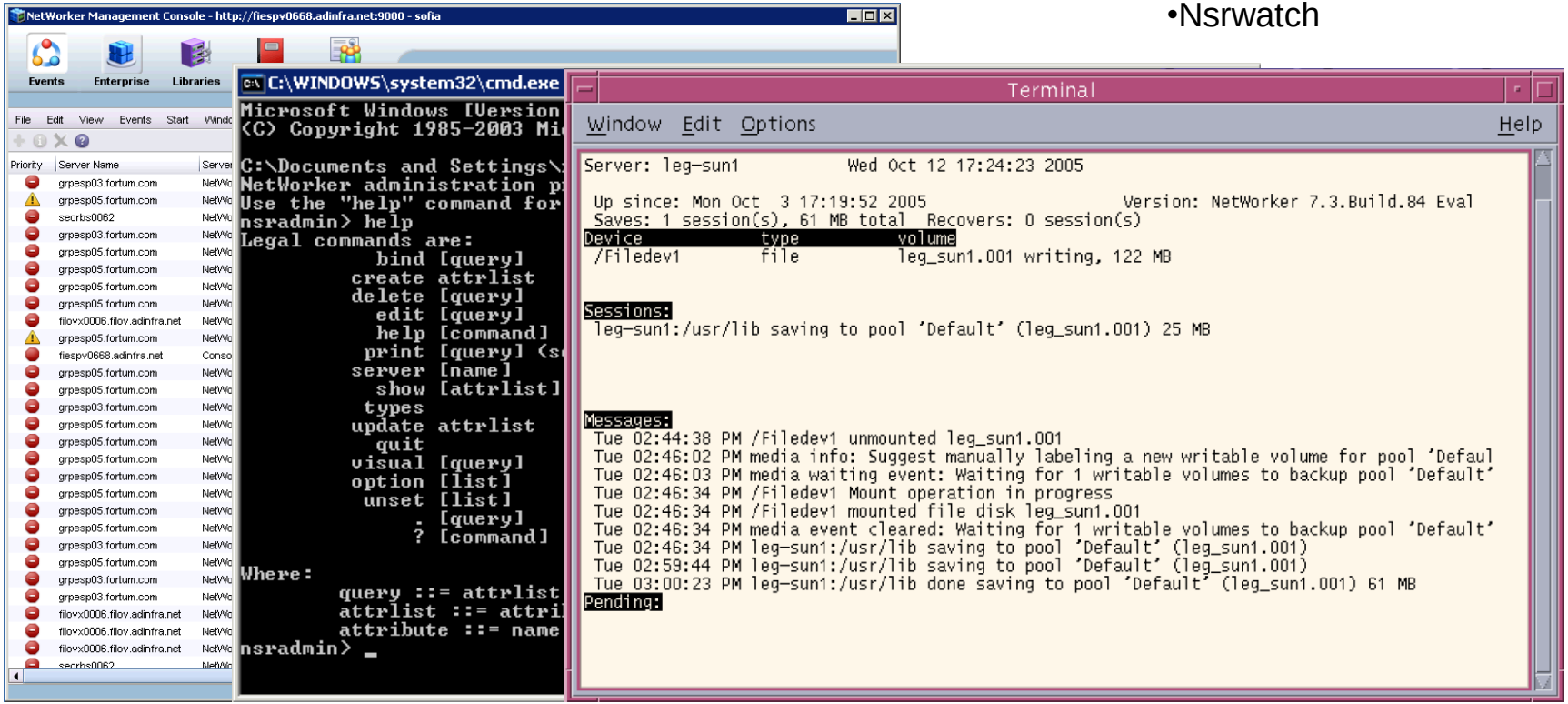
NetWorker Interfaces

- NW Management Console
- Nsradmin
- Nsrwatch



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Q & A

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Thank you

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