



Symantec NetBackup **Blueprints**

Blueprint for NDMP

Symantec Backup and Recovery Technical Services



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Notice



This NetBackup Blueprint presentation includes example diagrams that contain objects that represent applications and platforms from other companies such as Microsoft and VMware. These diagrams may or may not match or resemble actual implementations found in end user environments. Any likeness or similarity to actual end user environments is completely by coincidence.

The goal of the diagrams included in this blueprint presentation is not to recommend specific ways in which to implement applications and platforms from other companies such as Microsoft and VMware; the purpose of these diagrams is to illustrate NetBackup best practices only.

For guidelines and best practices on installing and configuring applications and platforms from other companies, please refer to best practice documentation and other resources provided by those companies.

These **Blueprints** are designed to show customer challenges and how NetBackup solves those.

- Each Blueprint consists of:
 - **Pain Points:** Explain the current challenges a customer faces.
 - **Whiteboards & Example Diagrams:** Describe the implementation of NetBackup solution.
 - **Best Practices:** Present NetBackup best practices to avoid common pitfalls
- Use these **Blueprints** to present the NetBackup best practice implementation example



Pain Points

- High-speed local backup of NDMP hosts
- Shared tape drives with the Shared Storage Option
- Backup of network-attached NDMP hosts to a tape device on another NDMP host
- Backup of a network-attached NDMP host to a tape device on a NetBackup media server
- Direct Access Recovery
- NDMP DirectCopy
- Snapshots of data on NDMP hosts



NetBackup Advantages

- NetBackup for NDMP is an optional NetBackup application. It enables NetBackup to use the Network Data Management Protocol (NDMP) to initiate and control backups and restores of Network Attached Storage (NAS) systems.
- NetBackup for NDMP supports the NDMP protocol versions V2, V3, and V4.
- NetBackup for NDMP supports types of backup:
 - Local backup
 - Three-way backup
 - Remote NDMP backup

- Centralized backup-policy management
- Device and media management
- Shared tape libraries
- Shared tape drives with SSO
- Snapshots of data on NDMP hosts
- NDMP DirectCopy
- NDMP local backup
- Remote NDMP backup
- Three-way backup
- IPv6 support
- Direct Access Recovery (DAR)
- Path-based file history
- NetBackup-clustered environment support
- Enhanced customized scripts
- NDMP multiplexing
- NDMP to disk
- NDMP support for Replication Director
- Support for wildcards in NDMP backup policy selections



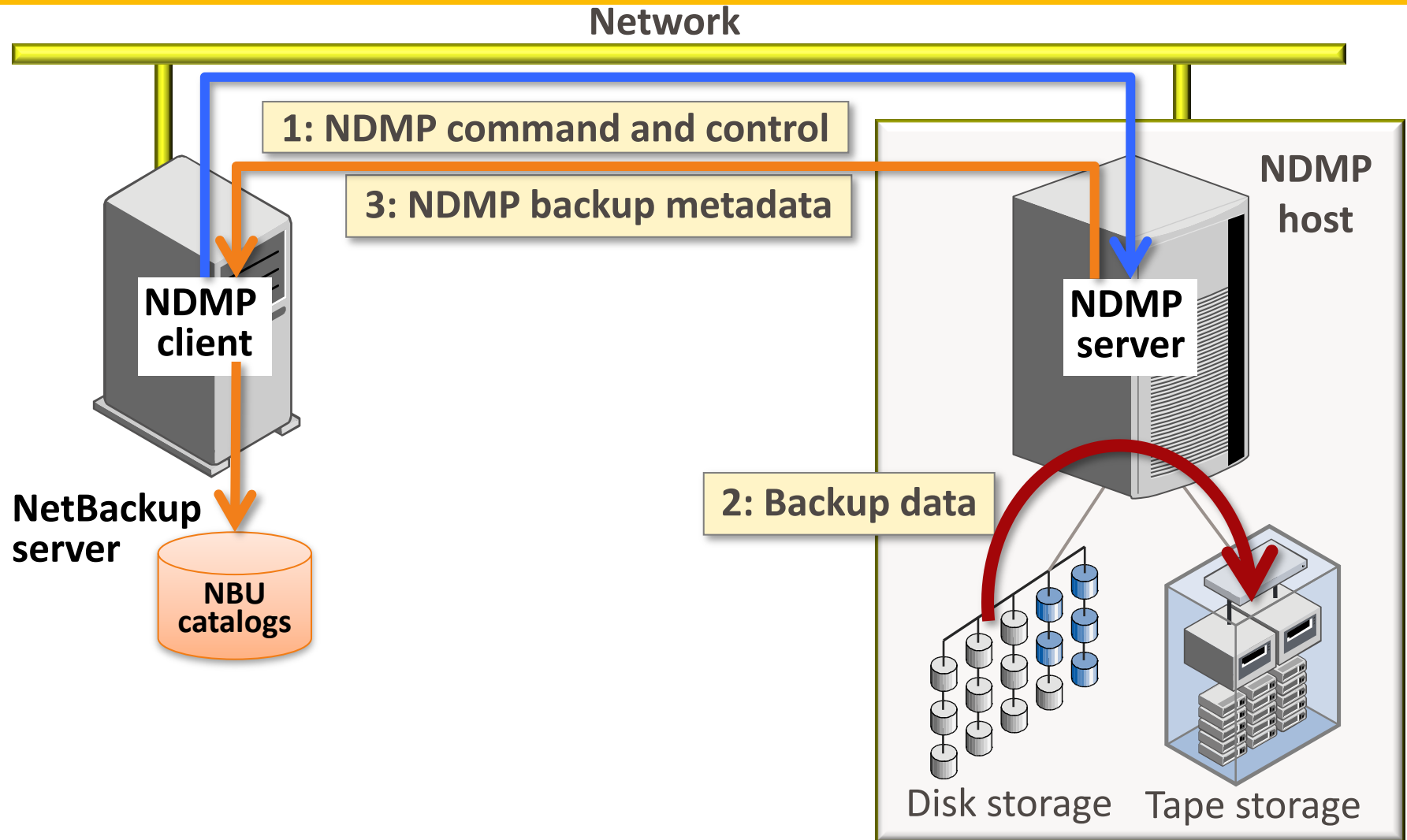
Whiteboards and Diagrams

Term	Description
NDMP	Network Data Management Protocol (NDMP) is an open standard protocol for network-based, enterprise-wide backup of heterogeneous network-attached storage (NAS).
NDMP client	An NDMP client is a Data Management Application (DMA), which controls the backups and restores on an NDMP host. NetBackup for NDMP allows NetBackup acts as an NDMP client.
NDMP host	An NDMP host, also referred to as NDMP server, is a NAS system that serves files to clients using HTTP, FTP, CIFS, or NFS protocols. NDMP hosts act as NetBackup clients.
NetBackup for NDMP server	A NetBackup for NDMP server is a NetBackup master or media server on which NetBackup for NDMP software is installed.
DAR (Direct Access Recovery)	The NDMP host positions the tape to the exact location of the requested file(s), reading only the data that is needed for those files.
NDMP DirectCopy	NetBackup can directly copy NDMP backup images from one NDMP-attached tape drive to another NDMP tape drive that is attached to the same NDMP host.

- Local
High speed local backup of NDMP hosts. Data travels from disk to tape on same NDMP host, or from disk to tape device on SAN. Backup data is NOT sent over local network.
- Three-way
Backup of network-attached NDMP hosts to a tape device on another NDMP host or to advanced tape libraries or VTLs with embedded NDMP server software. Backup data is sent over the local network.
- Remote
Backup of network-attached NDMP hosts to tape or disk storage managed by NetBackup media servers. Backup data is sent over the local network.

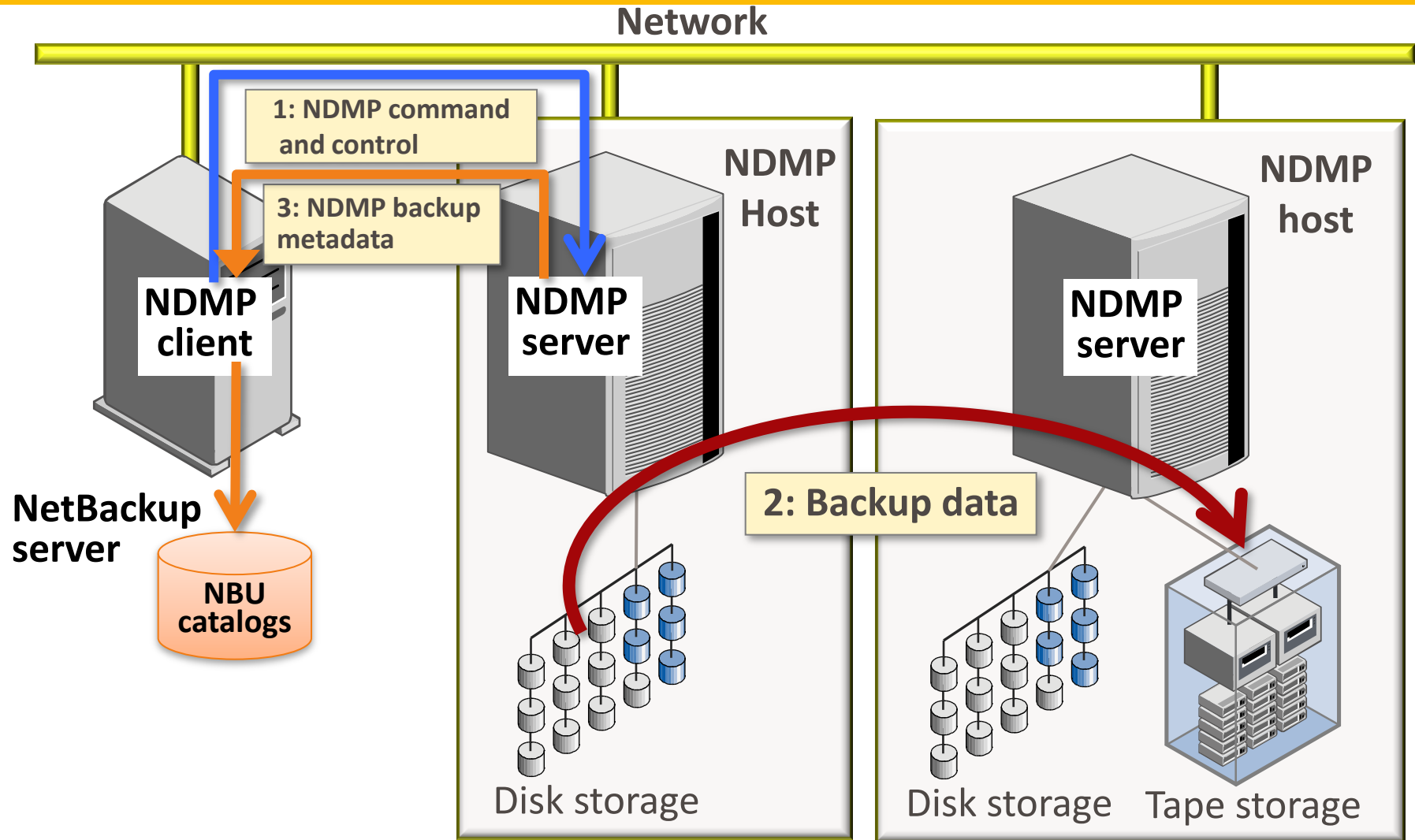
White Boards: NDMP

NetBackup for NDMP local backup workflow



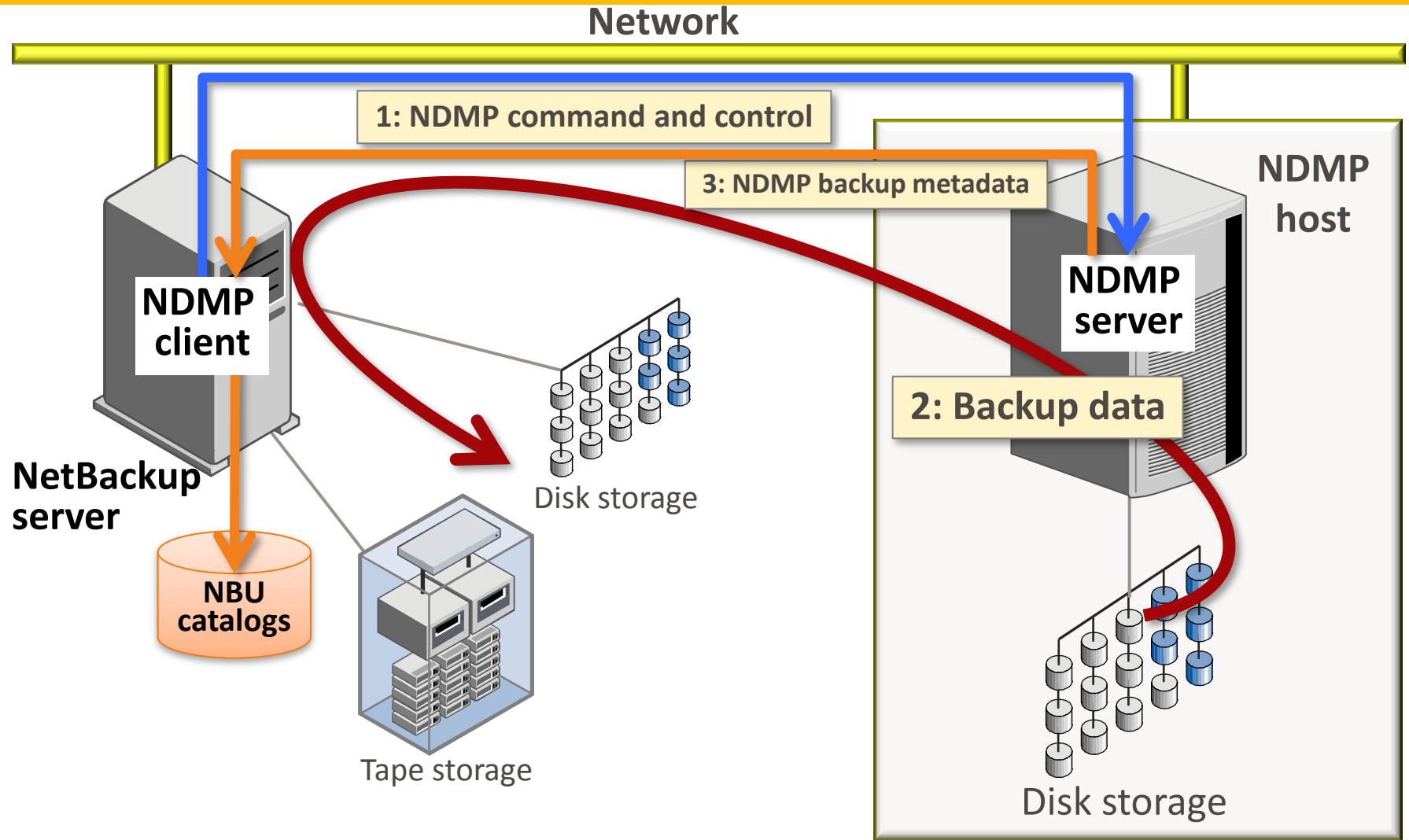
White Boards: NDMP

NetBackup for NDMP three-way backup workflow



White Boards: NDMP

NetBackup for NDMP remote backup workflow

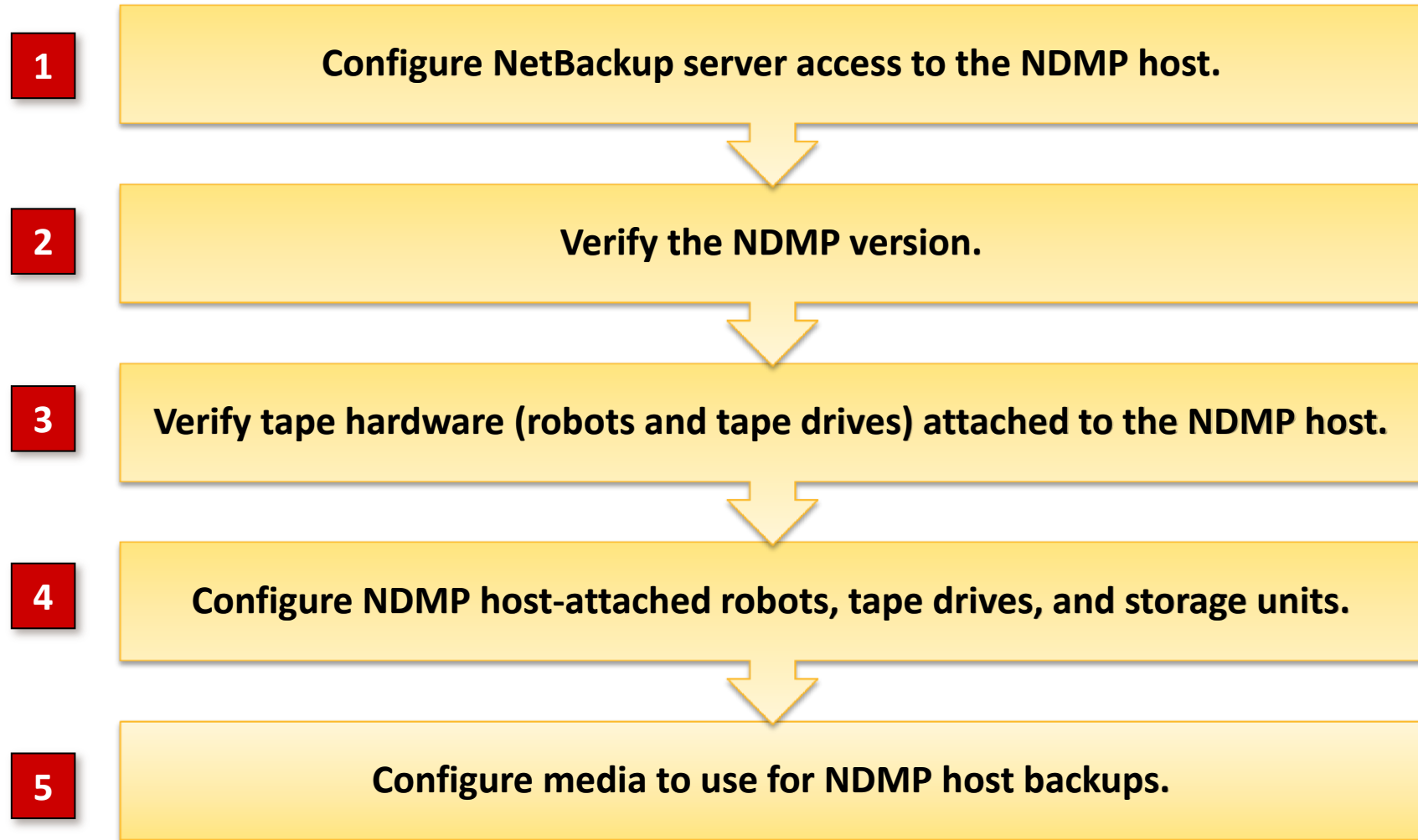


- The NDMP backup level is modeled after UNIX dump levels. The backup level is a number in the range of 0 to 9.
- NetBackup backup types and corresponding NDMP backup levels as below:

NetBackup backup types	NDMP backup levels
NetBackup Full	NDMP level 0
NetBackup Cumulative Incremental	NDMP level 1
NetBackup Differential Incremental	NDMP level (last level + 1, up to 9) never goes higher than 9

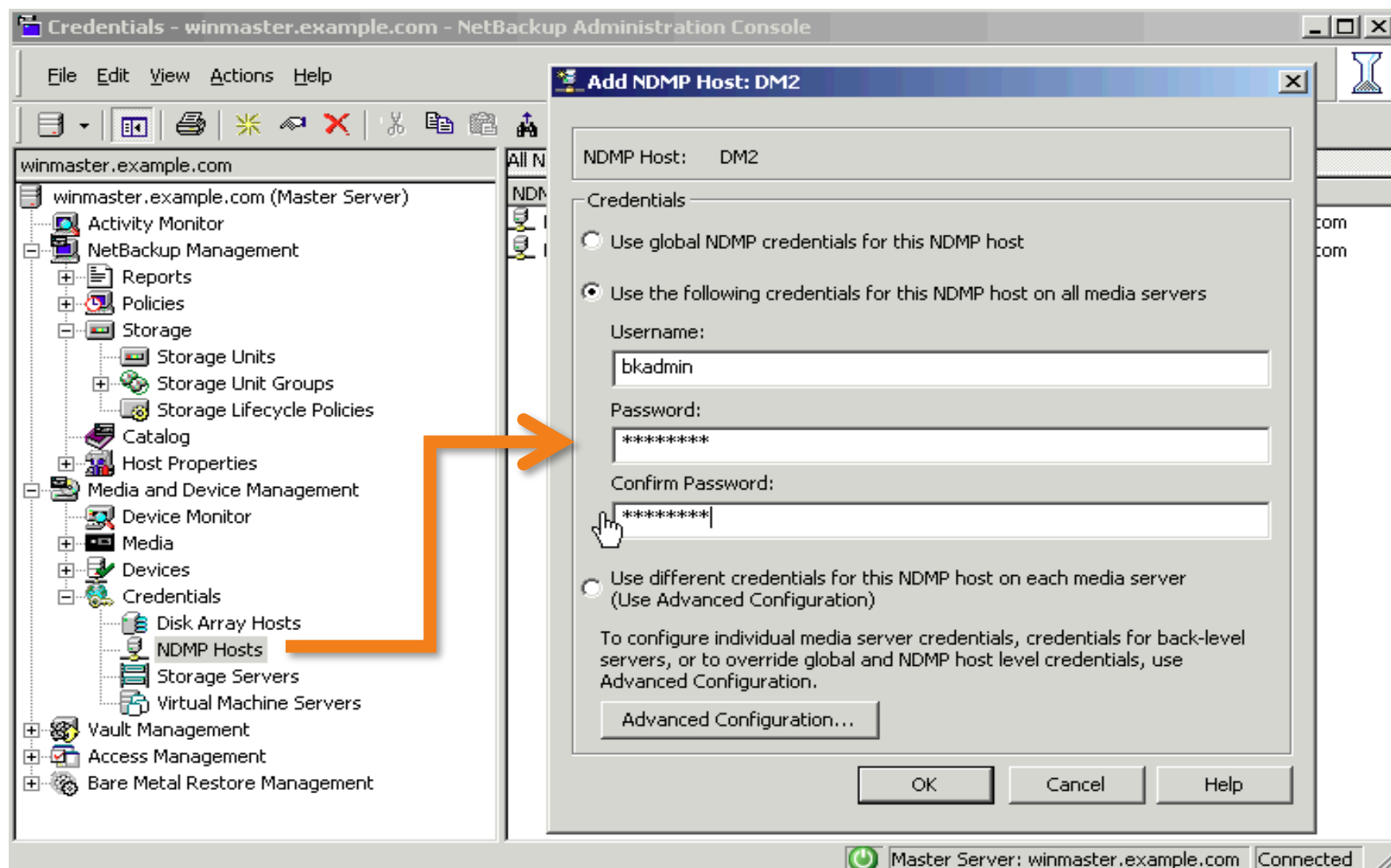
- The NetBackup for NDMP master or media server must run NetBackup 7.0 or later. Wildcard characters in NDMP policy backup selections requires NetBackup 7.6 or later.
- NetBackup for NDMP functionality installs when the NetBackup server software is installed. No separate installation procedure is required.
- There is no NetBackup software on an NDMP host.
- Install the NetBackup for NDMP license on the master server. Require one NetBackup for NDMP license for each NDMP host.
- Additional licenses may be required. For example, Snapshots of data on NDMP hosts requires a NetBackup Snapshot Client license.

Configuring NDMP-attached devices



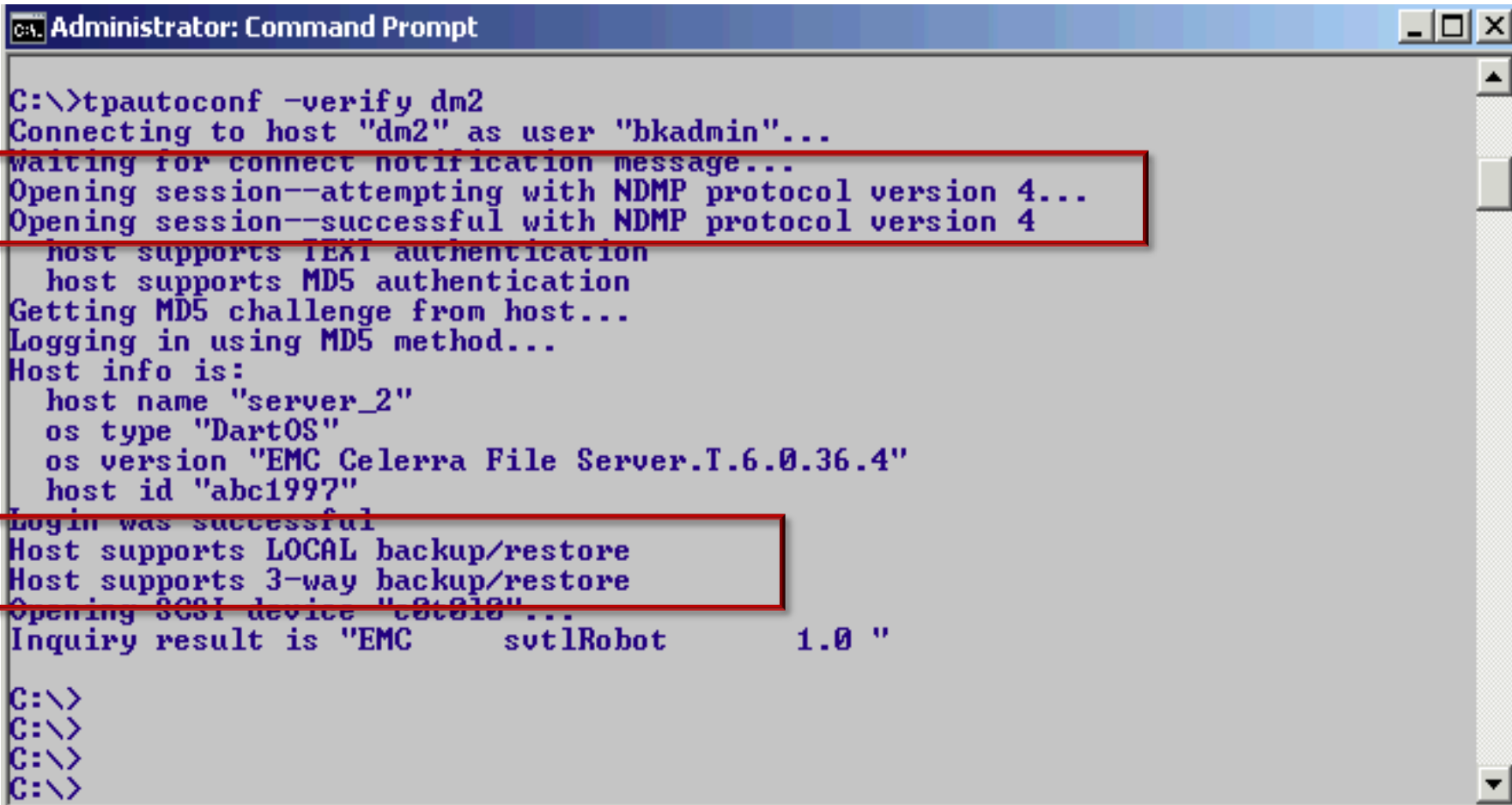
Example Diagram : NDMP

Configuring NetBackup access to the NDMP host



To determine the NDMP version supported by an NDMP host:

```
tpautoconf -verify NDMP_host
```



```
C:\>tpautoconf -verify dm2
Connecting to host "dm2" as user "bkadmin"...
Waiting for connect notification message...
Opening session--attempting with NDMP protocol version 4...
Opening session--successful with NDMP protocol version 4
  host supports TEXT authentication
  host supports MD5 authentication
Getting MD5 challenge from host...
Logging in using MD5 method...
Host info is:
  host name "server_2"
  os type "DartOS"
  os version "EMC Celerra File Server.T.6.0.36.4"
  host id "abc1997"
Login was successful
Host supports LOCAL backup/restore
Host supports 3-way backup/restore
Opening SCSI device "\\.\\"
Inquiry result is "EMC      svtlRobot      1.0 "
```

C:\>
C:\>
C:\>
C:\>

Example Diagram : NDMP

Verifying tape hardware using `tpautoconf`



To verify robots and tape drives that are attached to an NDMP host:

`tpautoconf -probe NDMP_host`

```
C:\>
C:\>tpautoconf -probe DM2
Host "DM2" SCSI device model "svt1Robot":
  Device "c0t0l0" attributes=(0x0)
  SERIAL_NUMBER=ifcvYHP1k5
Host "DM2" tape device model "svt1Drive":
  Device "c0t0l1" attributes=(0x4) RAW
  COMPRESSION=1
  SERIAL_NUMBER=g4vPamg000
Host "DM2" tape device model "svt1Drive":
  Device "c0t0l2" attributes=(0x4) RAW
  COMPRESSION=1
  SERIAL_NUMBER=wATXbmg000
Host "DM2" tape device model "svt1Drive":
  Device "c0t0l3" attributes=(0x4) RAW
  COMPRESSION=1
  SERIAL_NUMBER=M6i6dmg000
Host "DM2" tape device model "svt1Drive":
  Device "c0t0l4" attributes=(0x4) RAW
  COMPRESSION=1
  SERIAL_NUMBER=2DGeemg000
C:\>_
```

Whiteboards: NDMP

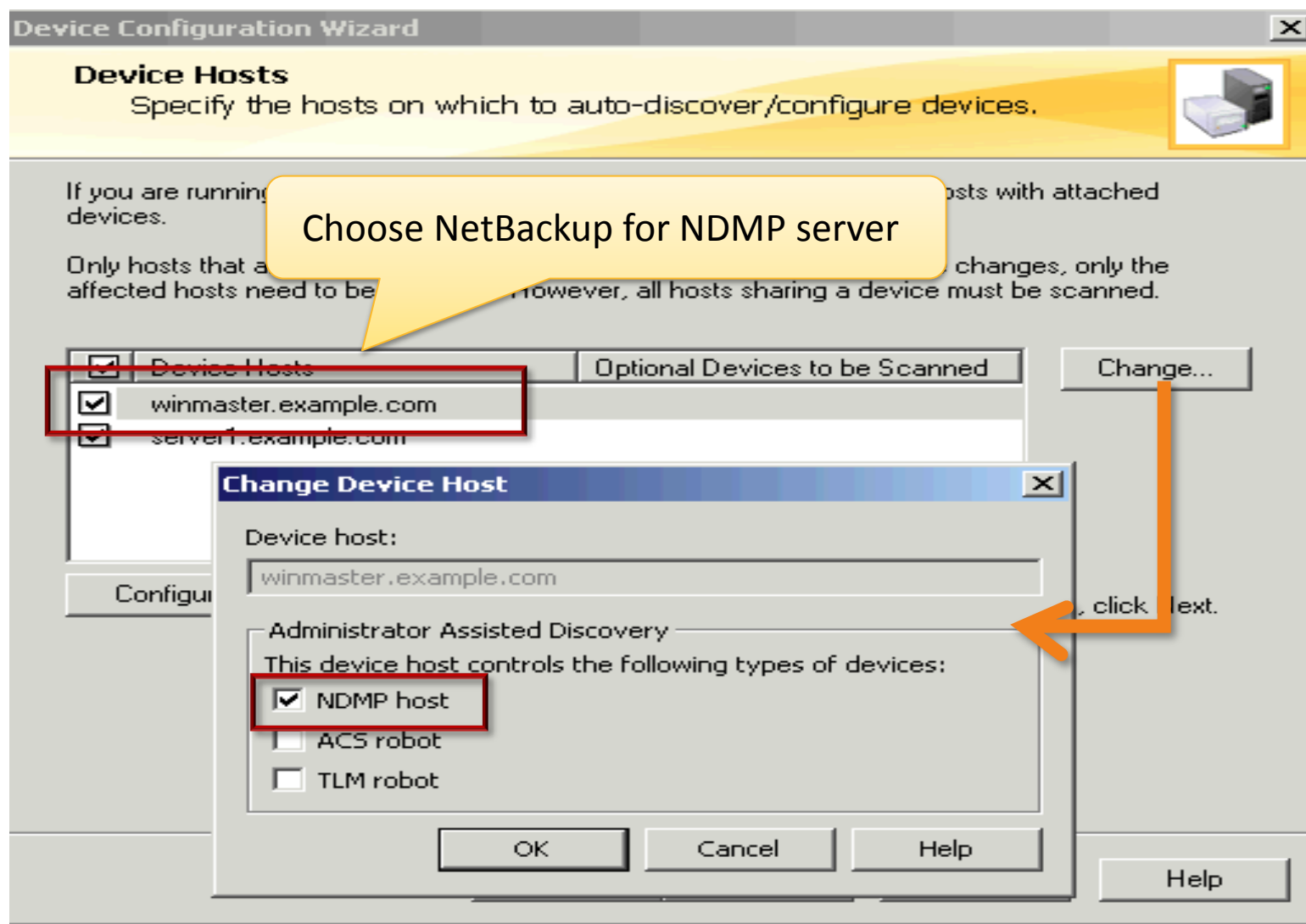
Verifying tape hardware on NDMP hosts



- NDMP host vendors provide various means of verifying that tape hardware is visible to the NDMP host.
- NetApp:
 - To list filer-attached tape drives: **syconfig -t**
 - To list filer-attached media changers (robots): **sysconfig -m**
- EMC Celerra:
 - To list drives and robots:
server_devconfig data_mover_name -list -scsi ch# -nondisks
- Refer to vendor documentation for the NDMP host or NetBackup for NDMP NAS Appliance Information.

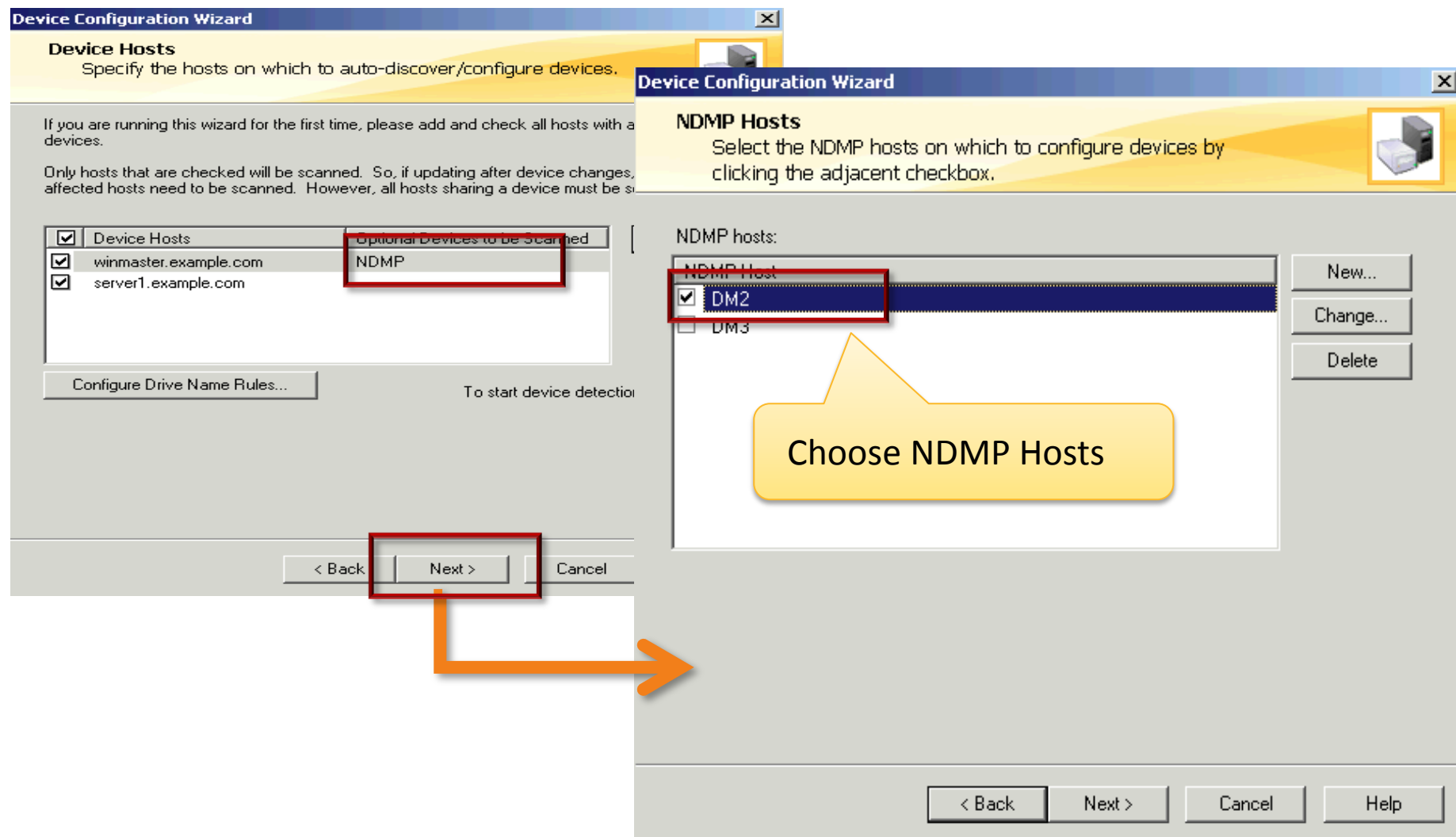
Example Diagram : NDMP

Configure robots and tape drives using the wizard



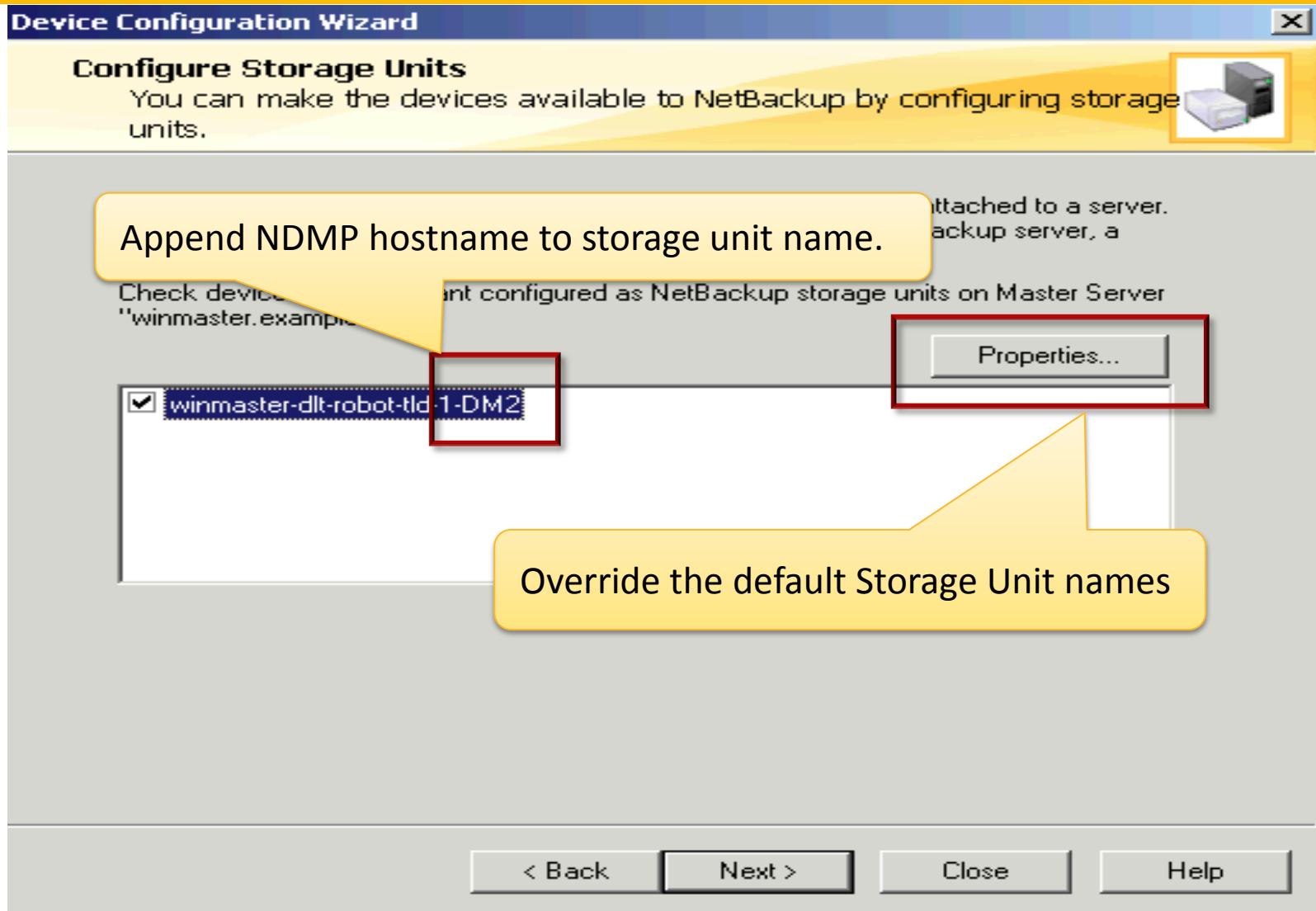
Example Diagram : NDMP

Configure robots and tape drives using the wizard



Example Diagram : NDMP

Configure Storage Units using the wizard



Example Diagram : NDMP

Configure medias using robot inventory

winmaster.example.com - Robot Inventory

Select robot

Device Host:
winmaster.example.com

Robot:
TLD(1) - winmaster.example.com

Inventory operation

☐ Show contents

☐ Compare contents with volume configuration

☒ Update volume configuration

Advanced Options...

☒ Preview changes

Start Stop

Choose NDMP NDMP host-attached robot

Results

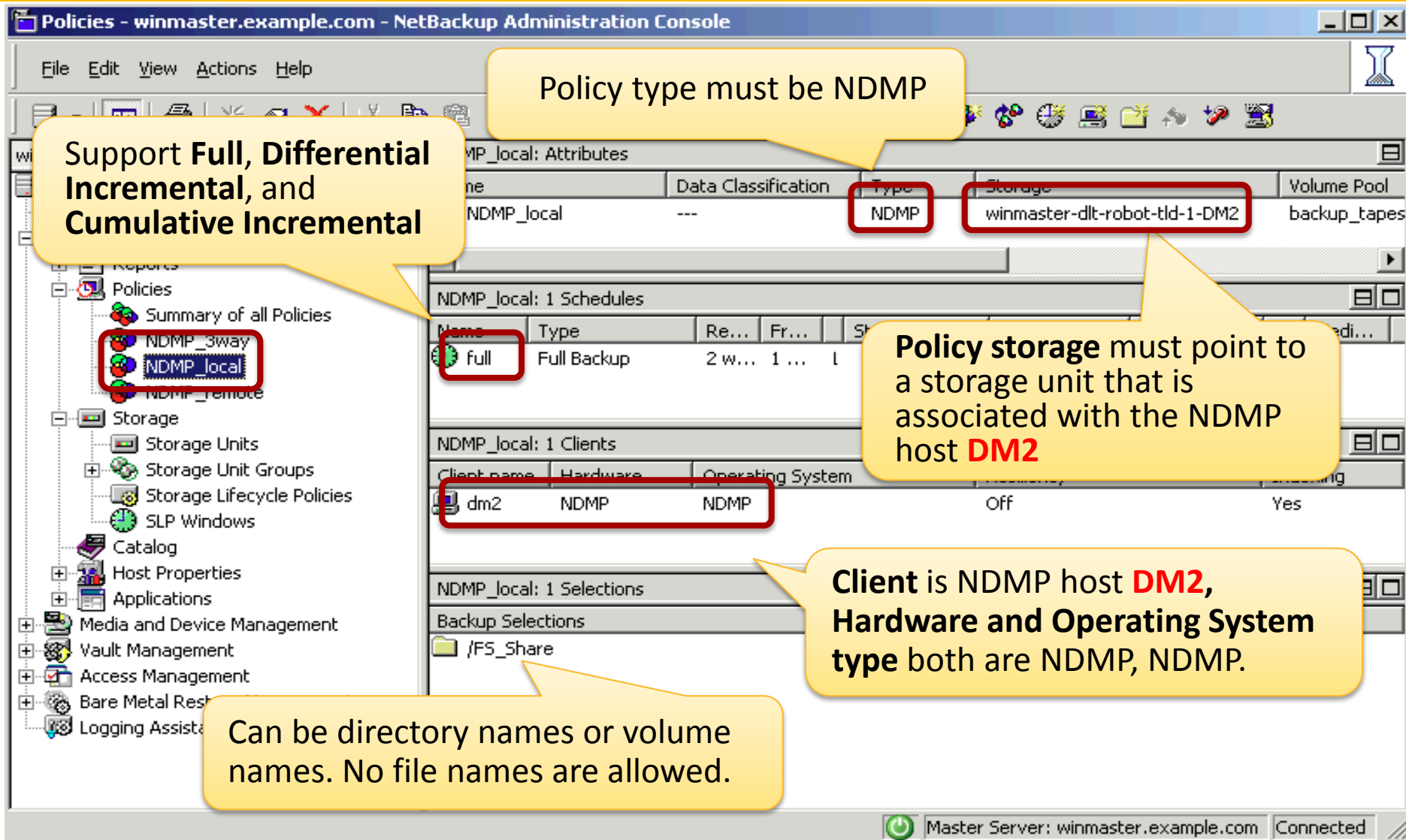
Logically add new media VTL000 (barcode VTL0000) to robot slot 1.
Logically add new media VTL001 (barcode VTL0001) to robot slot 2.
Logically add new media VTL002 (barcode VTL0002) to robot slot 3.
Logically add new media VTL003 (barcode VTL0003) to robot slot 4.
Logically add new media VTL004 (barcode VTL0004) to robot slot 5.
Logically add new media VTL005 (barcode VTL0005) to robot slot 6.
Logically add new media VTL006 (barcode VTL0006) to robot slot 7.
Logically add new media VTL007 (barcode VTL0007) to robot slot 8.
Logically add new media VTL008 (barcode VTL0008) to robot slot 9.
Logically add new media VTL009 (barcode VTL0009) to robot slot 10.
Update volume configuration?

Update volume configuration? Yes No Clear Results

Close Help

Example Diagram : NDMP

Configuring Local NDMP Backups



The screenshot displays the NetBackup Administration Console for 'winmaster.example.com'. The left sidebar shows a tree view with 'Policies' expanded, and 'NDMP_local' selected. The main pane shows the configuration for 'NDMP_local'. Several callouts provide key configuration details:

- Policy type must be NDMP**: Points to the 'Type' field in the 'Attributes' table, which is set to 'NDMP'.
- Support Full, Differential Incremental, and Cumulative Incremental**: Points to the 'Name' field in the 'Schedules' table, which is set to 'Full'.
- Policy storage must point to a storage unit that is associated with the NDMP host DM2**: Points to the 'Storage' field in the 'Attributes' table, which is set to 'winmaster-dlt-robot-tld-1-DM2'.
- Client is NDMP host DM2, Hardware and Operating System type both are NDMP, NDMP.**: Points to the 'Clients' table, which shows a client named 'dm2' with 'NDMP' for both Hardware and Operating System.
- Can be directory names or volume names. No file names are allowed.**: Points to the 'Selections' table, which shows a selection named '/FS_Share'.

Name	Data Classification	Type	Storage	Volume Pool
NDMP_local	---	NDMP	winmaster-dlt-robot-tld-1-DM2	backup_tapes

Name	Type	Re...	Fr...	St...
Full	Full Backup	2 w...	1 ...	l

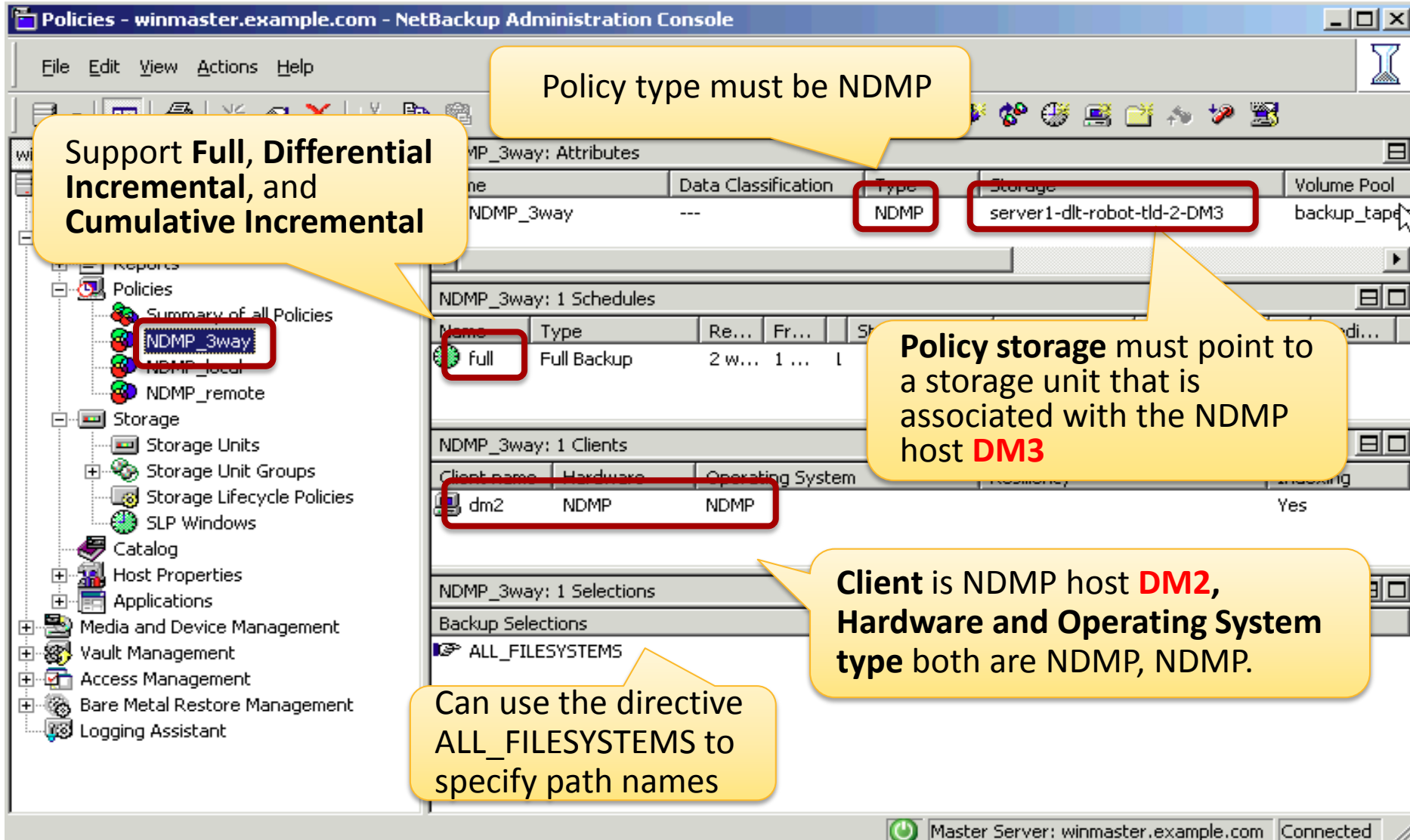
Client name	Hardware	Operating System
dm2	NDMP	NDMP	Off	Yes

Backup Selections
/FS_Share

Master Server: winmaster.example.com Connected

Example Diagram : NDMP

Configuring Three-way NDMP Backups



The screenshot displays the NetBackup Administration Console interface. The left sidebar shows a tree view with 'Policies' expanded, and 'NDMP_3way' selected. The main pane shows the configuration for 'NDMP_3way' across several tabs: Attributes, Schedules, Clients, and Selections. Annotations highlight key configuration details:

- Policy type must be NDMP**: Points to the 'Type' field in the Attributes tab, which is set to 'NDMP'.
- Support Full, Differential Incremental, and Cumulative Incremental**: Points to the 'Name' field in the Schedules tab, which is set to 'Full'.
- Policy storage must point to a storage unit that is associated with the NDMP host DM3**: Points to the 'Storage' field in the Attributes tab, which is set to 'server1-dlt-robot-tld-2-DM3'.
- Client is NDMP host DM2, Hardware and Operating System type both are NDMP, NDMP.**: Points to the 'Client name', 'Hardware', and 'Operating System' fields in the Clients tab, which are all set to 'dm2', 'NDMP', and 'NDMP' respectively.
- Can use the directive ALL_FILESYSTEMS to specify path names**: Points to the 'ALL_FILESYSTEMS' directive in the Selections tab.

The status bar at the bottom indicates 'Master Server: winmaster.example.com' and 'Connected'.

Example Diagram : NDMP

Configuring Remote NDMP Backups

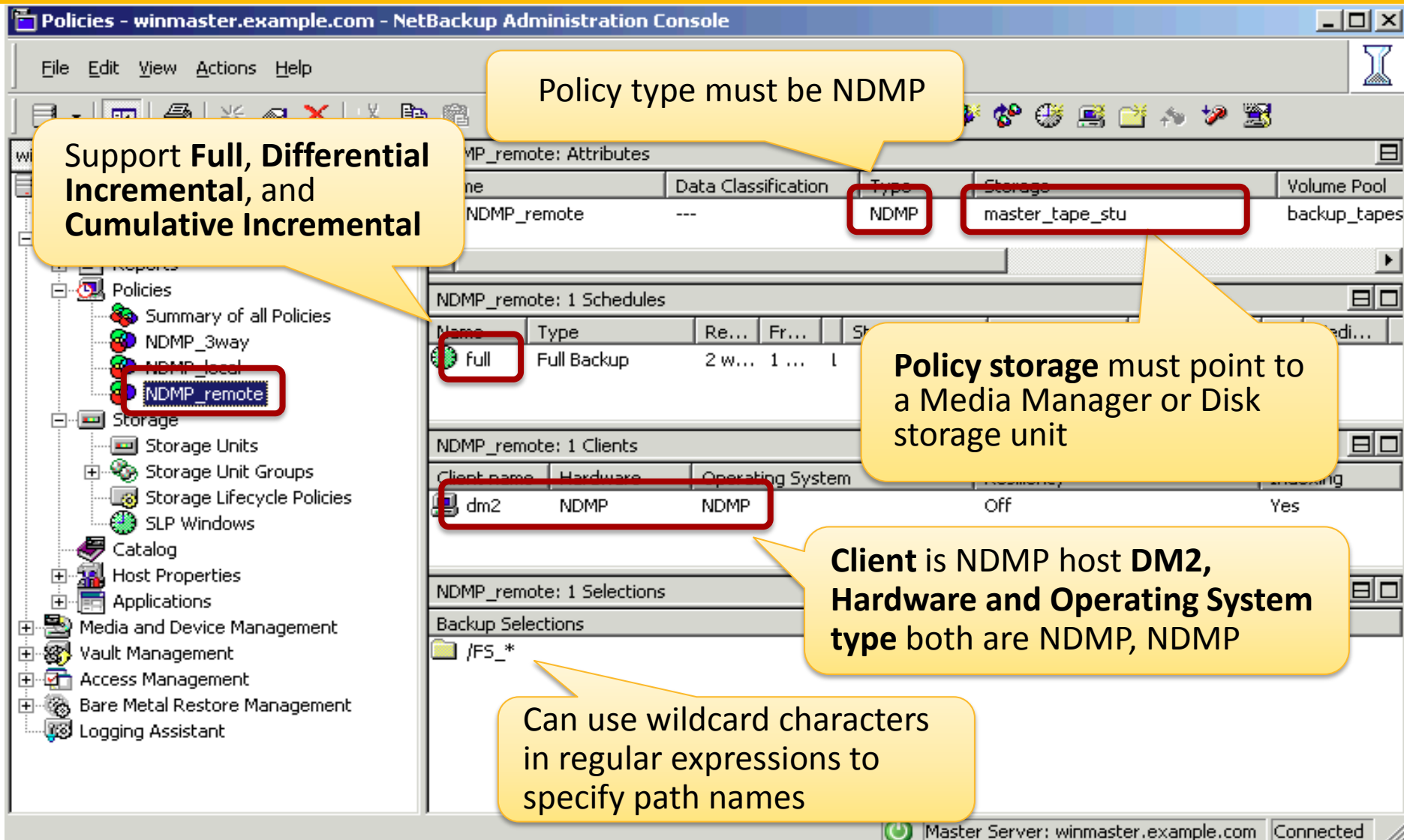
Policy type must be NDMP

Support Full, Differential Incremental, and Cumulative Incremental

Policy storage must point to a Media Manager or Disk storage unit

Client is NDMP host DM2, Hardware and Operating System type both are NDMP, NDMP

Can use wildcard characters in regular expressions to specify path names



Name	Type	Re...	Fr...	St...
Full	Full Backup	2 w...	1 ...	l

Client name	Hardware	Operating System	Res...	Media...
dm2	NDMP	NDMP	Off	Yes

Backup Selections
/FS_*

- Restoring data from NDMP backup has many similarities to restores of other types of backup data.
- Data from local, three-way, and remote NDMP backups can be restored:
 - To its original location on an NDMP host (with the possible exceptions that are host vendor-specific)
 - To an alternate location on the original NDMP host
 - To an alternate NDMP host
- There may be NDMP host vendor-specific issues to consider when performing restores of NDMP data.
 - EMC Celerra does not permit the restore of the root partition to its original location. You must specify a different restore path.
 - Because the format of the backup data written by an NDMP host is not dictated by NDMP, it therefore varies from vendor to vendor. It may not be possible to restore data from a backup performed on one NDMP host to the NDMP host of another vendor.

- DAR is an NDMP feature that enables NetBackup to store the file history and tape offset information for NDMP backup images in the NetBackup's catalogs.
- DAR enables the NDMP host to position the tape to the exact location of the requested files. It reads only the data that is needed for those files rather than the entire image.
- NetBackup uses DAR to restore a directory or individual files from a backup image. DAR can greatly reduce the time it takes to restore files and directories.
- NetBackup has supported DAR since the 4.5 release. To use DAR with NetBackup, the NDMP host must support DAR.
- To use DAR to restore an image, ensure that DAR is enabled at the time the image is created (during the backup). DAR is enabled by default. No configuration is required.
- DAR can be disabled if necessary.

- NDMP DirectCopy is a feature of NDMP that enables an NDMP host, or a supported OST Virtual Tape Library (VTL) that emulates the operation of an NDMP tape server, to duplicate backup image data from one tape volume to another without sending the data across the LAN or through a NetBackup media server.
- NDMP DirectCopy requires the NDMP protocol version V4 or later.
- NDMP DirectCopy is supported in two scenarios:
 - Scenario 1: DirectCopy involving a Virtual Tape Library (VTL) that is capable of emulating an NDMP tape server
 - Scenario 2: DirectCopy involving tape drives of a physical NDMP host
- In both scenarios, initiate the duplication of backup images using:
 - The NetBackup Administration Console
 - The **bpduplicate** command
 - NetBackup Vault
 - Storage Lifecycle Policy

Unless otherwise noted, the logs of interest reside on the media server system that communicates with the NDMP host.

- VxUL debug logs
 - ndmp (OID = 151)
 - ndmpagent (OID = 134)
- Legacy debug logs
 - bpbrm
 - Bptm
 - Bpfis
 - Bpmount
 - Bppfi
 - ndmpagent



Life Preservers

- You cannot back up files where the path name length has more than 1024 characters.
- Do not perform incremental backups of the same NDMP data from two different policies.
- In the backup selections list for an NDMP policy, you can include only directory paths. Individual file names are not allowed.
- Only media manager tape storage units can be used for NDMP multiplexing.
- Create one or more volume pools to house NDMP backups.
- Symantec recommends that you do not nest wildcard expressions.
- Symantec recommends that you do not use a single forward-slash character (/) in an NDMP policy backup selection. Instead, use the ALL_FILESYSTEMS directive:

- NetBackup for NDMP NAS Appliance Information

<http://www.symantec.com/docs/TECH31885>

- NetBackup 7.x hardware compatibility list (HCL)

<http://www.symantec.com/docs/TECH76495>

- NetBackup 7.x operating system compatibility list

<http://www.symantec.com/docs/TECH76648>

- Symantec NetBackup 7.6 for NDMP Administrator's Guide

<http://www.symantec.com/docs/DOC6456>

Thank You!

NetBackup Product Management