Symantec NetBackup Blueprints

Blueprint for Auto Image Replication

Symantec Backup and Recovery Technical Services

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.

Symantec NetBackup Blueprints
How to use ?

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

Today's challenges

- Duplication of backup images between NetBackup domains for disaster recovery needs.
- Vault backups offsite without shipping physical tapes.
- Supports *hub and spoke* model datacenters where remote offices send data to a central data center.
- A single production datacenter back up to multiple disaster recovery sites.
- Performing a catalog recovery at a remote site.
- Cross domain restores from one domain to another.

NetBackup Advantages

What is AIR ?

- Auto Image Replication (AIR) enables the replication of backup images from one NetBackup domain to another. This feature is enabled by using Storage Lifecycle Policies, with OpenStorage Technology (OST) based storage.
- Auto Image Replication supports various disaster recovery models, including the ability to create hub and spoke data centers, where remote offices send data to a central location.
- Supported storage includes:
  - NetBackup deduplication: Media Server deduplication Pools (MSDP), PureDisk deduplication Option (PDDO), and NetBackup appliances.
  - Storage vendors that support and are qualified for OST.

- Auto Image Replication was introduced in NetBackup 7.1. In versions prior to NetBackup 7.5, Auto Image Replication was also sometimes referred to as duplication to remote master. Starting with NetBackup 7.5, this is referred to as *replication.*
- In versions prior to NetBackup 7.6, Auto Image Replication supported one-to-one, many-to-one, and one-to-many replication configurations, when one-to-many replication was used, the default behavior was to replicate an image to all of the target storage servers associated with a source storage server.
- In NetBackup 7.6, the Targeted Auto Image Replication features allows selective replication of images from a source disk storage server to specific disk storage servers in individual target domains.

How Auto Image Replication works

1. A *backup* image is created on the source domain.
2. The image is *replicated* to a remote master in the target domain.
   - Optimized duplication is performed using the OpenStorage (OST) API. Only the unique information is sent.
   - It takes advantage of the built-in replication for the underlying storage.
   - The catalog information is sent with the backup image.
3. The image is *imported* in the target domain.

   Regenerating the catalog does not require scanning the entire image, referred to as a fast import.
4. Additional duplications from the target domain (optional)
   - The image can be duplicated locally to disk or tape.
   - The image can be replicated to additional target domains.

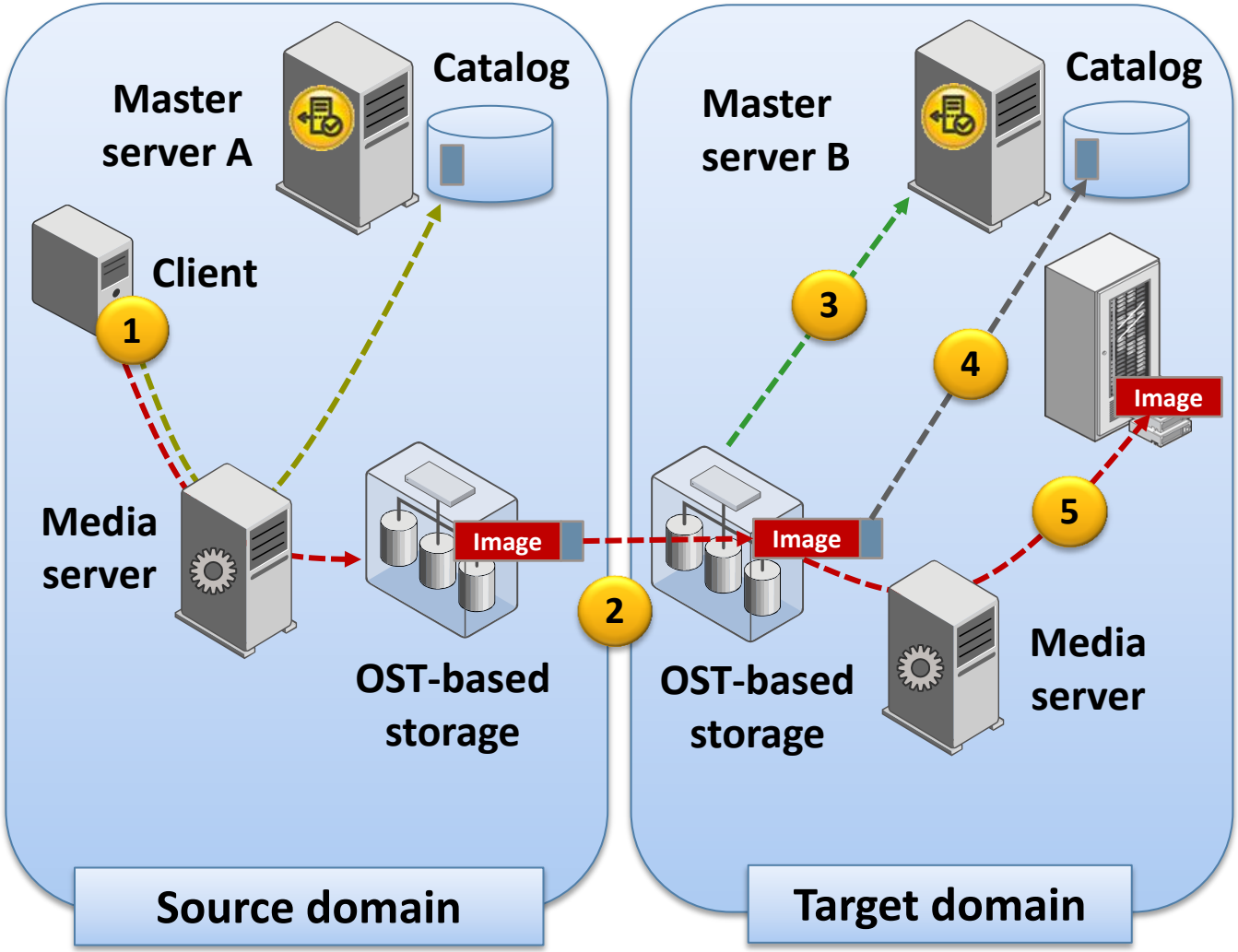
Whiteboards and Diagrams

- Master and media servers require NetBackup 7.1 or later.
- Auto Image Replication minimum version support requirements:

Storage	Minimum versions
NetBackup Media Server Deduplication Pools (MSDP)	NetBackup 7.1
NetBackup PureDisk	Version 6.6.3 (released November 2011)
NetBackup Appliances	• NetBackup 7.1.0.2 on the master server • 52xx series, version N 2.0 (released August 2011) • 50xx series, version D 1.4 (released October 2011)
OpenStorage vendors	Refer to the NetBackup Hardware Compatibility List (HCL)

- The storage across domains must be compatible, already configured, and working.
- The Enterprise Disk Option is required; no separate additional license is required.

White Boards: AIR
Workflow



1. Backup
2. Replication
3. Device notifies NetBackup
4. Import
5. Duplication (optional)

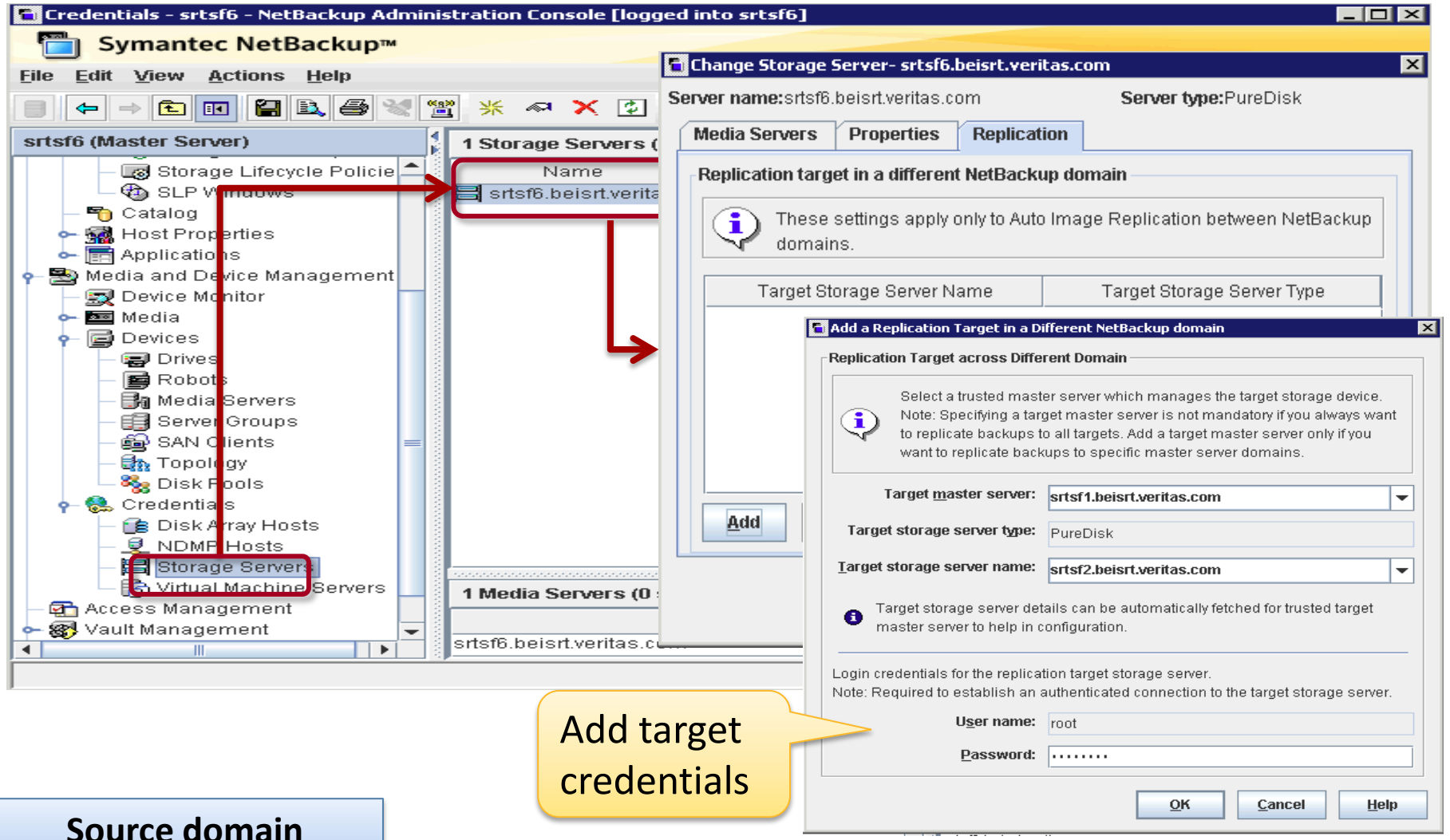
- Metadata
- Data
- Control
- Backup metadata
- Image — Backup image

1. Configure new replication pairs, including source and targets.

Storage	Configuration
MSDP and PDDO	In the source domain, add the storage server name and credentials for the replication target.
OpenStorage vendors	Configure replication pairs following the OST storage device's instructions.

2. Verify the replication parameters in the NetBackup disk pools.
3. Create an SLP in the source domain, including **Backup** and **Replication** operations.
4. Create an SLP in the target domain using the same name and data classification, including an **Import** operation.
5. Create backup policies in the source domain using this SLP.

Example Diagram : AIR
Storage server configuration

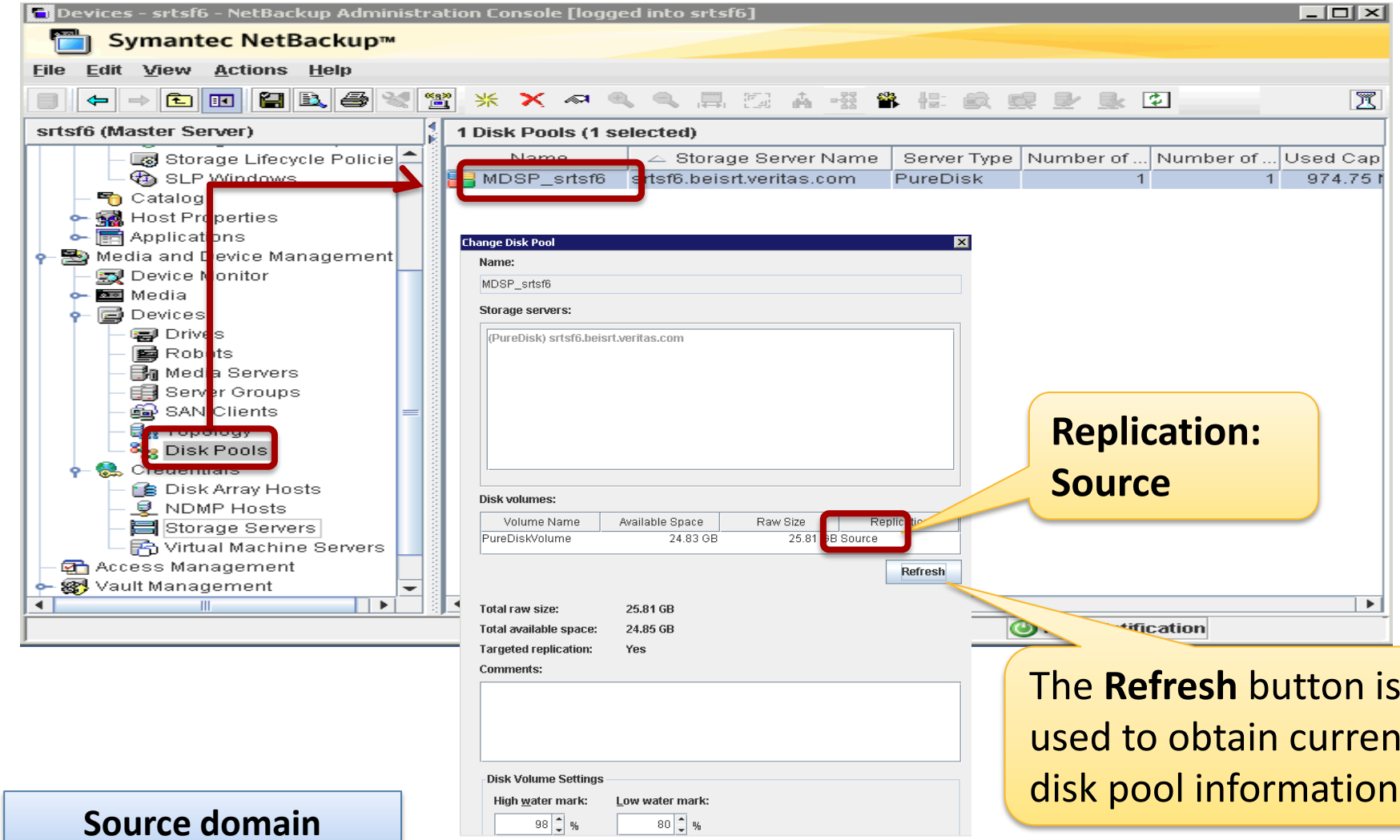


Add target credentials

Source domain

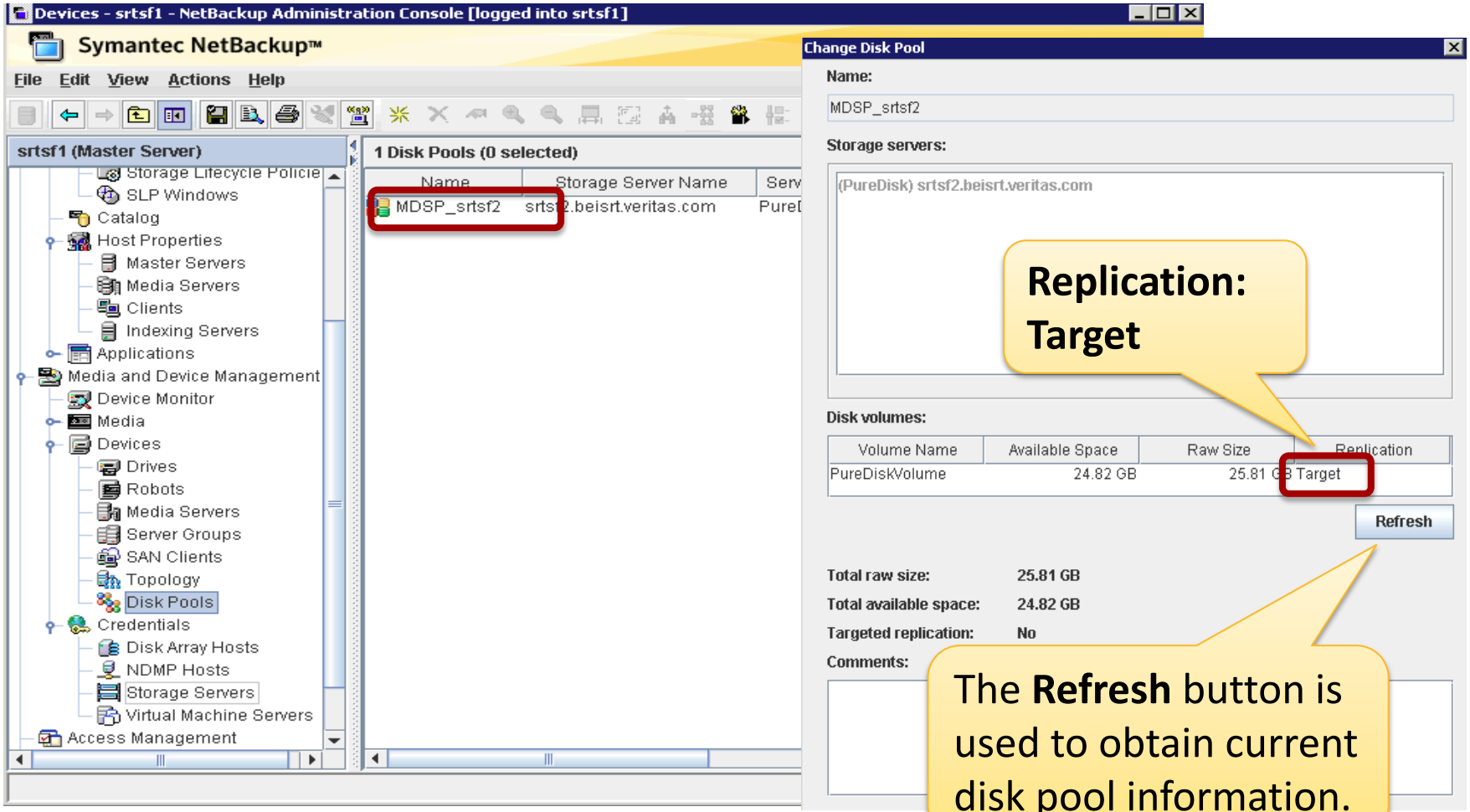
Example Diagram : AIR

AIR validation at the source disk pool



Example Diagram : AIR

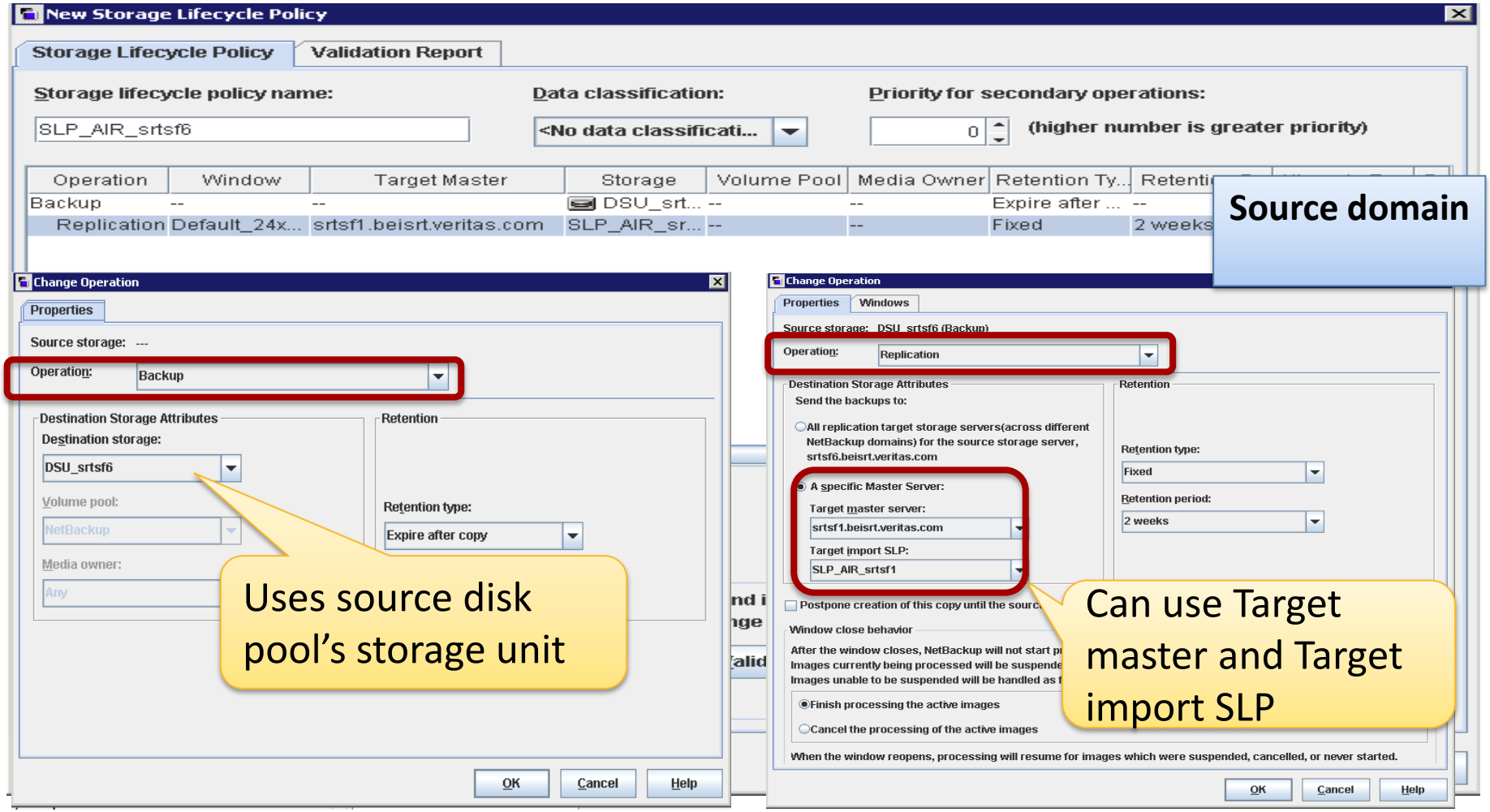
AIR validation at the target disk pool



Target domain

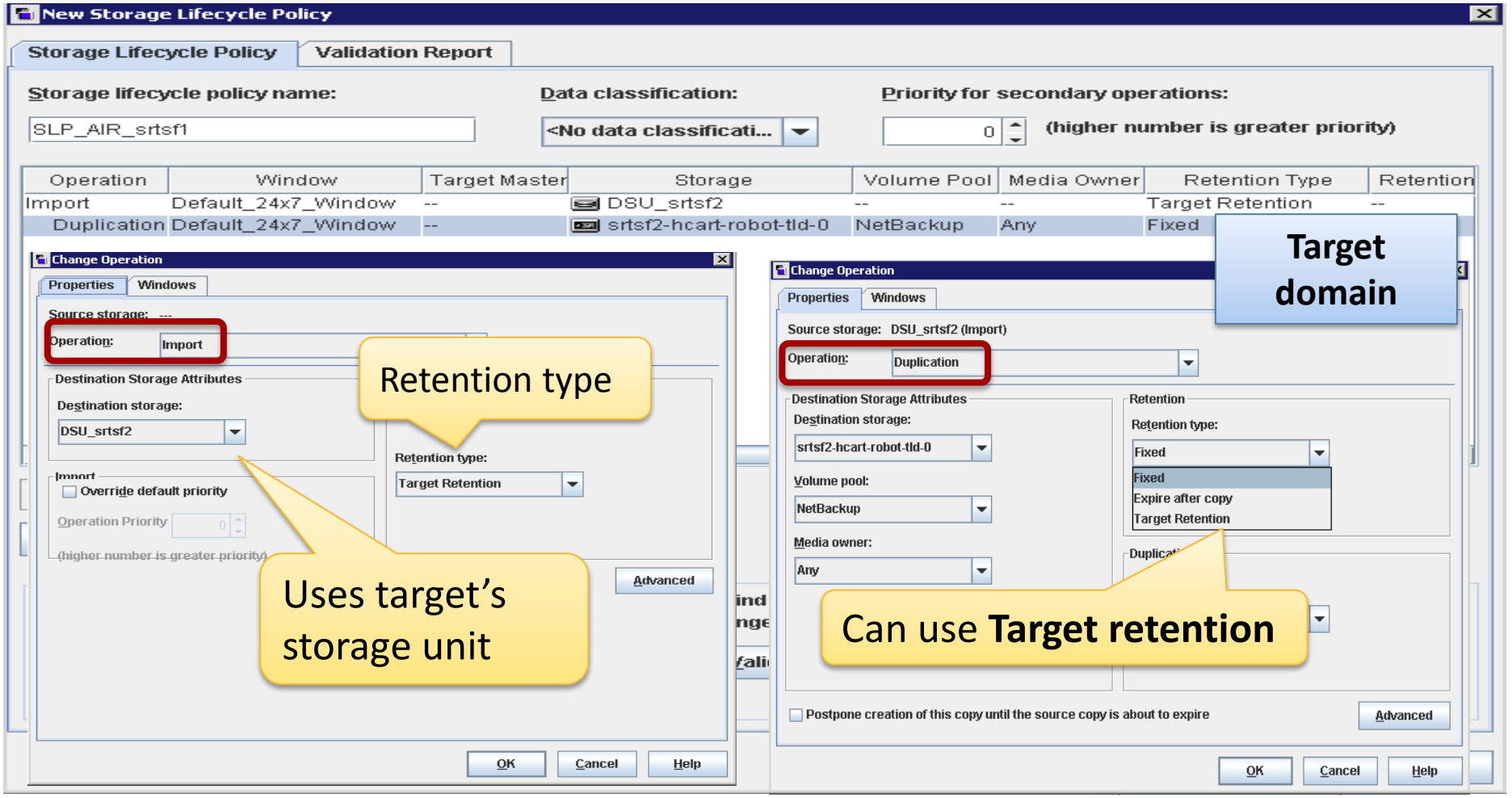
Example Diagram : AIR
SLP setup at the source

Source SLP has a minimum of a **Backup** and **Replication** operation



Example Diagram : AIR
SLP setup at the target

Target SLP has a minimum of a **Import** operation



Whiteboards: AIR
Jobs occurring in the source and target domain

Source domain

Operation	Window	Target Master	Storage	Volume Pool	Media Owner	Retention Ty...	Retention P...
Backup	--	--	DSU_srtsf6	--	--	Expire after ...	--
Replication	Default_24x...	srtsf1.beisrt.veritas.com	SLP_AIR_srtsf1	--	--	Fixed	2 weeks

Step	Job type	Description
1	Backup	The initial backup job is performed by the SLP.
2	Replication	SLP initiates an optimized duplication job between the source and target OST disk pool.

Target domain

Operation	Window	Target Mast...	Storage	Volume Pool	Media Owner	Retention Type	Retention P...
Import	Default_24x7_Window	--	DSU_srtsf2	--	--	Target Retention	--
Duplication	Default_24x7_Window	--	srtsf2-hcart-robot-tld-0	NetBackup	Any	Fixed	2 weeks

Step	Job type	Description
3	Import	Upon completion of the replication job, the OST device triggers the target master server to import the image metadata.
4	Duplication	The standard duplication job runs (Optional).

Whiteboards: AIR
Jobs in the source domain

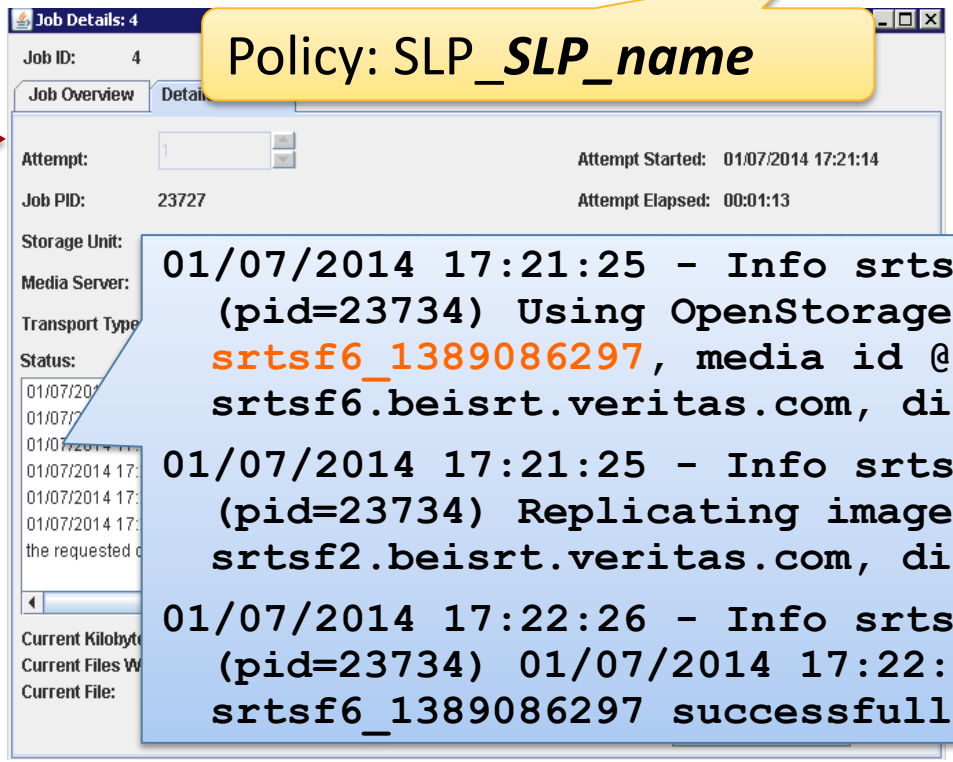
Source domain

3 Jobs (0 Queued 0 Active 0 Waiting for Retry 0 Suspended 0 Incomplete 3 Done - 1 selected)

Job Id	Type	State	State Details	Status	Job Policy	Storage Unit
3	Backup	Done		0	test_AIR	DSU_srtsf6
4	Replication	Done		0	SLP_SLP_AIR_srtsf6	srtsf1.beisrt.veritas.com:SLP_AIR_srtsf1
5	Image Cleanup	Done				

Policy: SLP_***SLP_name***

Target Master: Target SLP



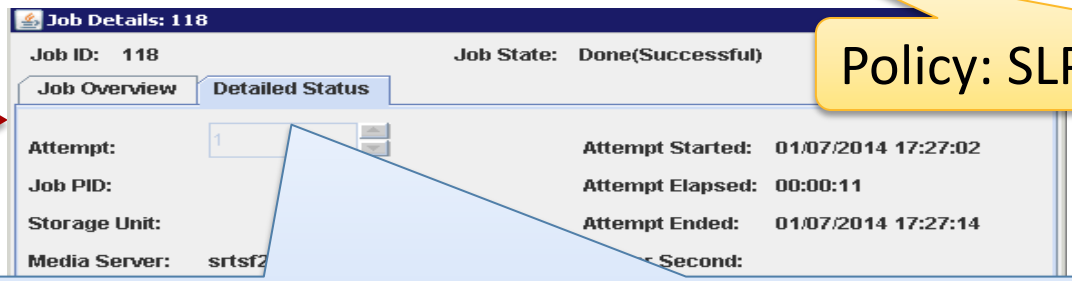

```
01/07/2014 17:21:25 - Info srtsf6.beisrt.veritas.com
  (pid=23734) Using OpenStorage to replicate backup id
  srtsf6_1389086297, media id @aaaab, storage server
  srtsf6.beisrt.veritas.com, disk volume PureDiskVolume
01/07/2014 17:21:25 - Info srtsf6.beisrt.veritas.com
  (pid=23734) Replicating images to target storage server
  srtsf2.beisrt.veritas.com, disk volume PureDiskVolume
01/07/2014 17:22:26 - Info srtsf6.beisrt.veritas.com
  (pid=23734) 01/07/2014 17:22:26 - Replicated backup id
  srtsf6_1389086297 successfully
```

Whiteboards: AIR
Jobs in the target domain

Target domain

2 Jobs (0 Queued 0 Active 0 Waiting for Retry 0 Suspended 0 Incomplete 2 Done - 0 selected)

Job Id	Type	State	State Details	Status	Job Policy	Job Sched...	Client	Media Server
119	Duplication	Done		0	SLP_SLP_AIR_srtsf1	Default_24...	srtsf1.beisr...	srtsf2.beisrt.veritas.com...
118	Import	Done		0	SLP_SLP_AIR_srtsf1	Default_24...		srtsf2.beisrt.veritas.com



Policy: SLP_***SLP_name***

```
01/07/2014 17:27:04 - begin Import
01/07/2014 17:27:13 - Imported backup id srtsf6_1389086297
  successfully
01/07/2014 17:27:13 - end Import; elapsed time 0:00:09
01/07/2014 17:27:19 - Info bpdm (pid=28948) reading backup image
01/07/2014 17:27:24 - Info bpdm (pid=28948) origin master server
  srtsf6.beisrt.veritas.com, backup id srtsf6_1389086297
```

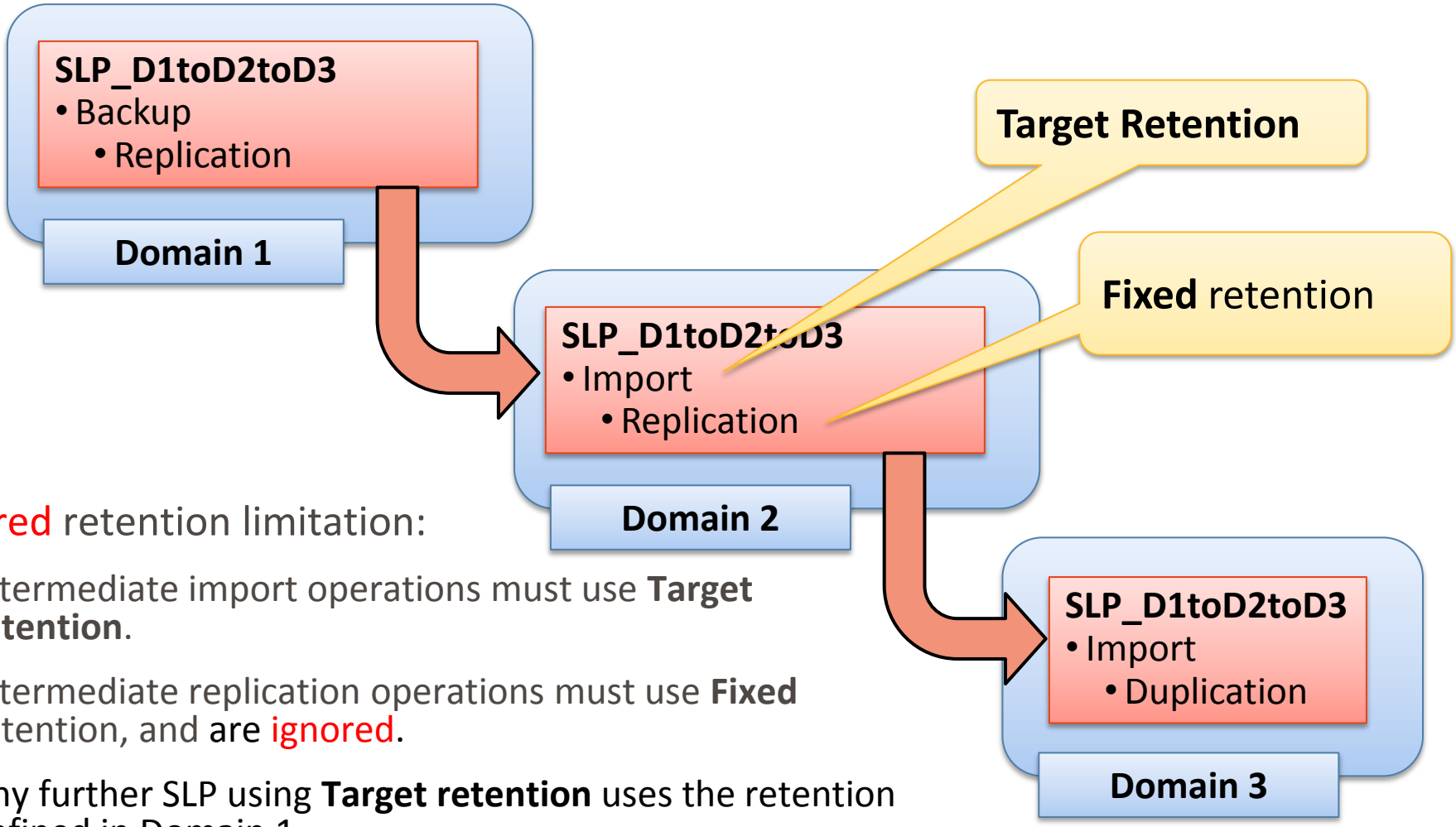
Restoring from a backup at the target domain

- Symantec recommends using the source domain for restores, if possible.
- The following methods are available for disaster recovery:

Client exists?	DR scenario	Description
Yes	Change client domain	Configure the client in the recovery backup domain and restore directly to the client.
No	Create client in recovery domain	Create the client in the recovery domain and restore directly to it. This is the most likely scenario.
No	Alternate client restore	Perform an alternate client restore in the recovery backup domain.

- Recovery steps are otherwise the same as normal restores.
- Restores that use Granular Recovery Technology (GRT) require an application instance in the recovery domain.

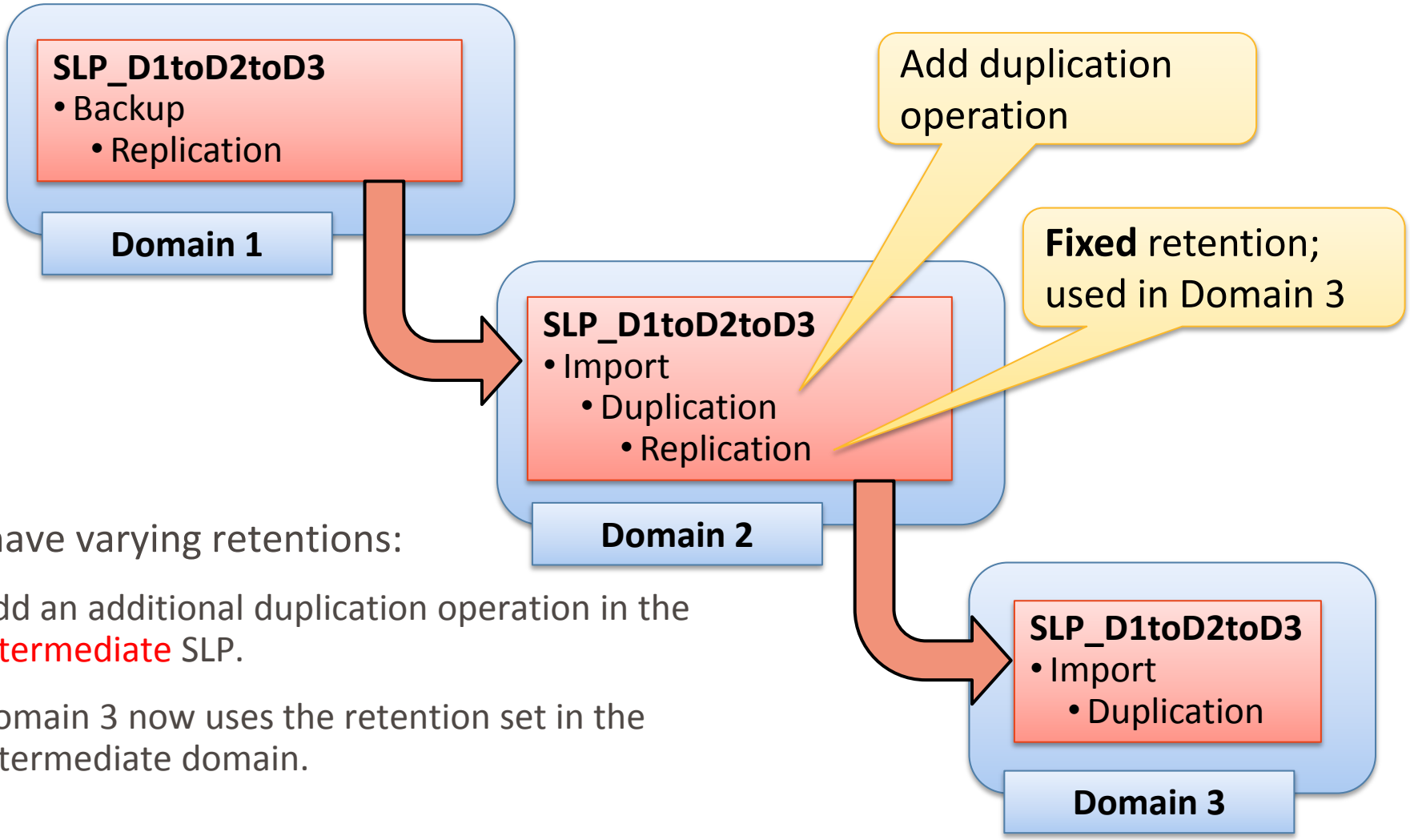
Whiteboards: AIR
Cascading Auto Image Replication



Shared retention limitation:

- Intermediate import operations must use **Target retention**.
- Intermediate replication operations must use **Fixed** retention, and are ignored.
- Any further SLP using **Target retention** uses the retention defined in Domain 1.

Whiteboards: AIR
Cascading AIR with varying retentions



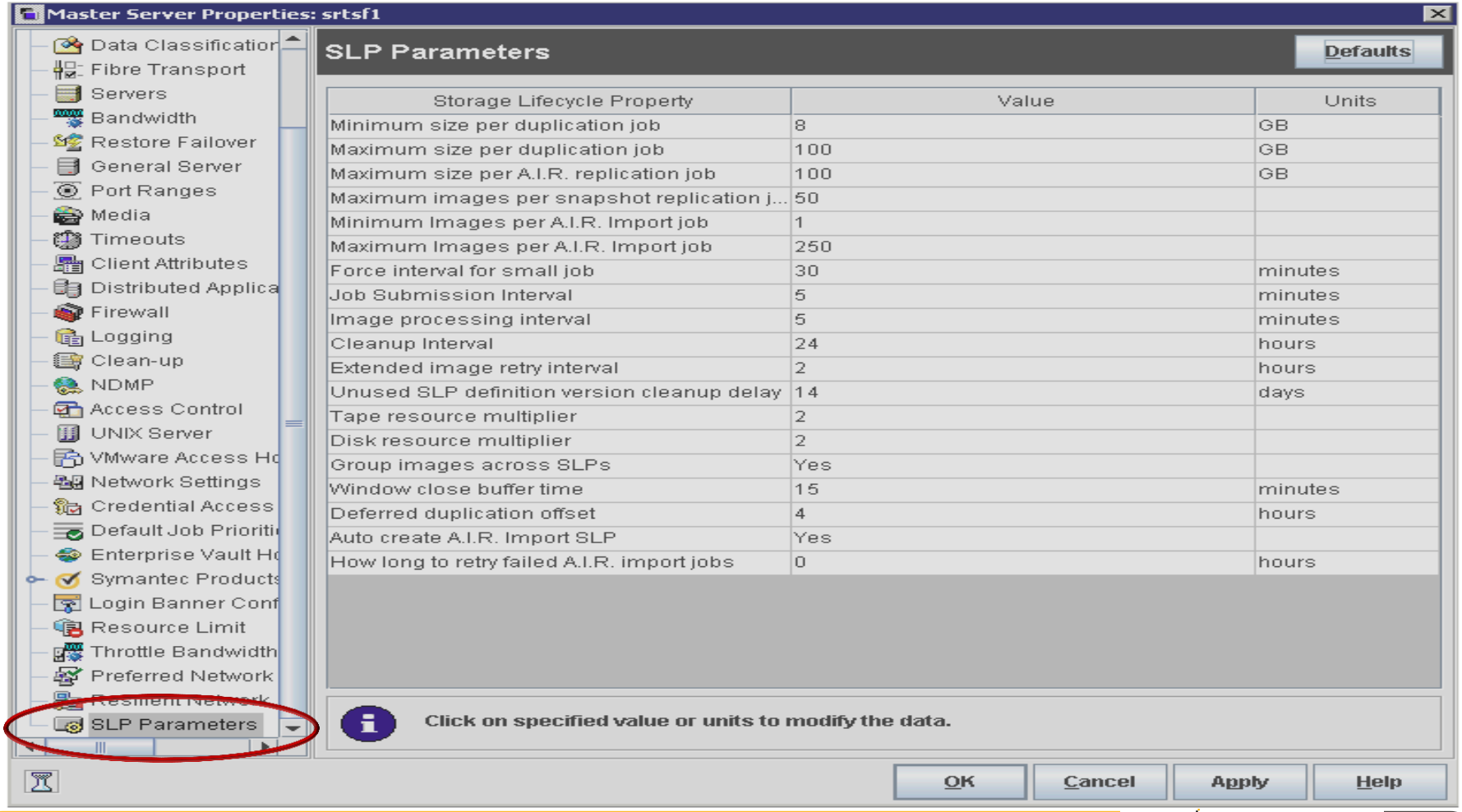
To have varying retentions:

- Add an additional duplication operation in the intermediate SLP.
- Domain 3 now uses the retention set in the intermediate domain.

- Source side
  - **admin** (master server)
  - **nbstserv**: Duplication Manager – OID 226 (master server)
  - **bpdm** (media server)
  - **bptm** (media server)
- Target side
  - **admin** (master server)
  - **nbstserv**: Import Manager – OID 369 (master server)
  - **Nbemm**: DSM, EMM, REM & DAL(master server)
  - **bpdm** (media server)
  - **nbrmms** (media server)

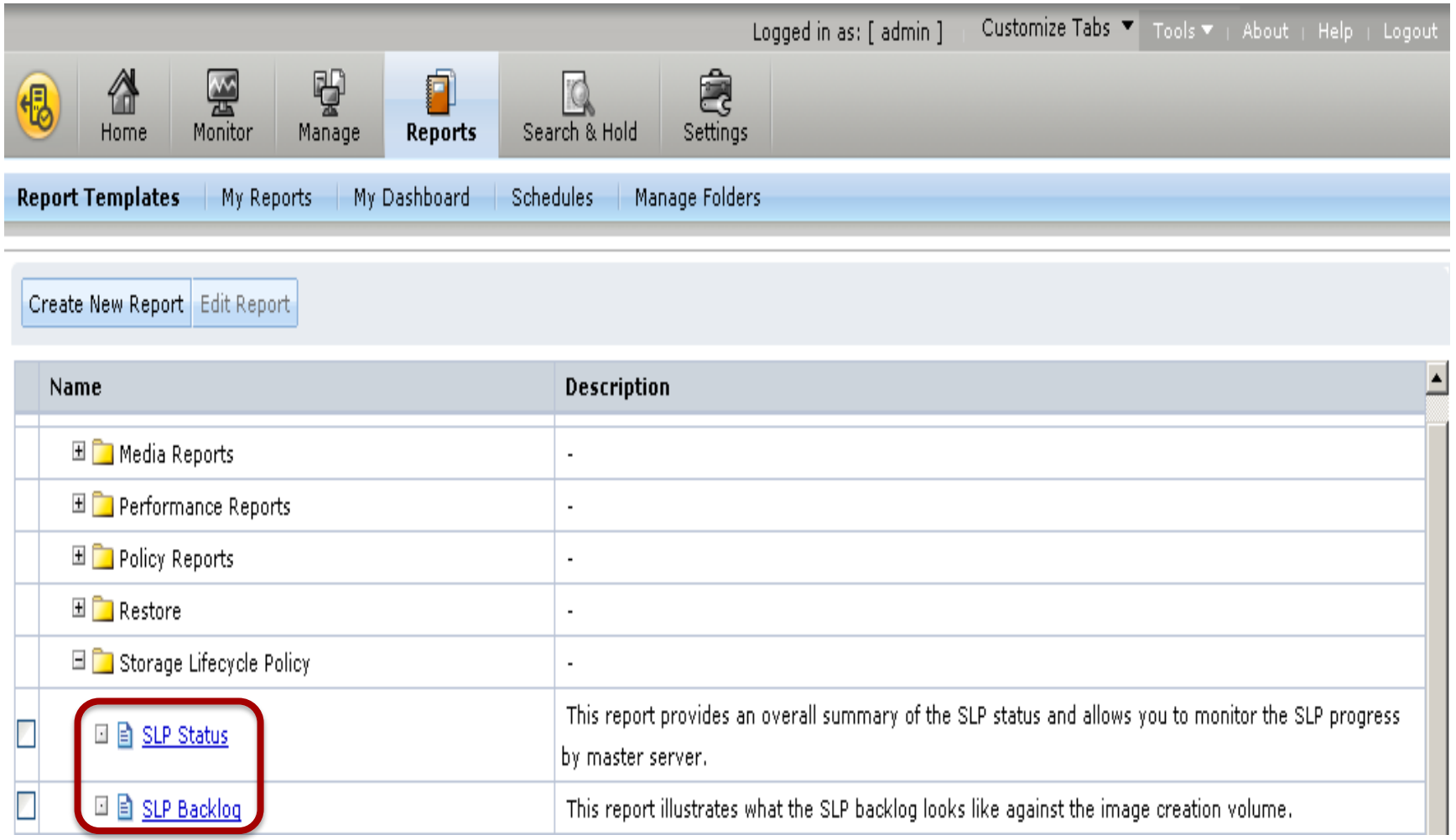
Example Diagram : AIR
SLP Parameters

SLP Parameters properties in the **NetBackup Administration Console** allow administrators to customize how SLP are maintained and how SLP jobs run.

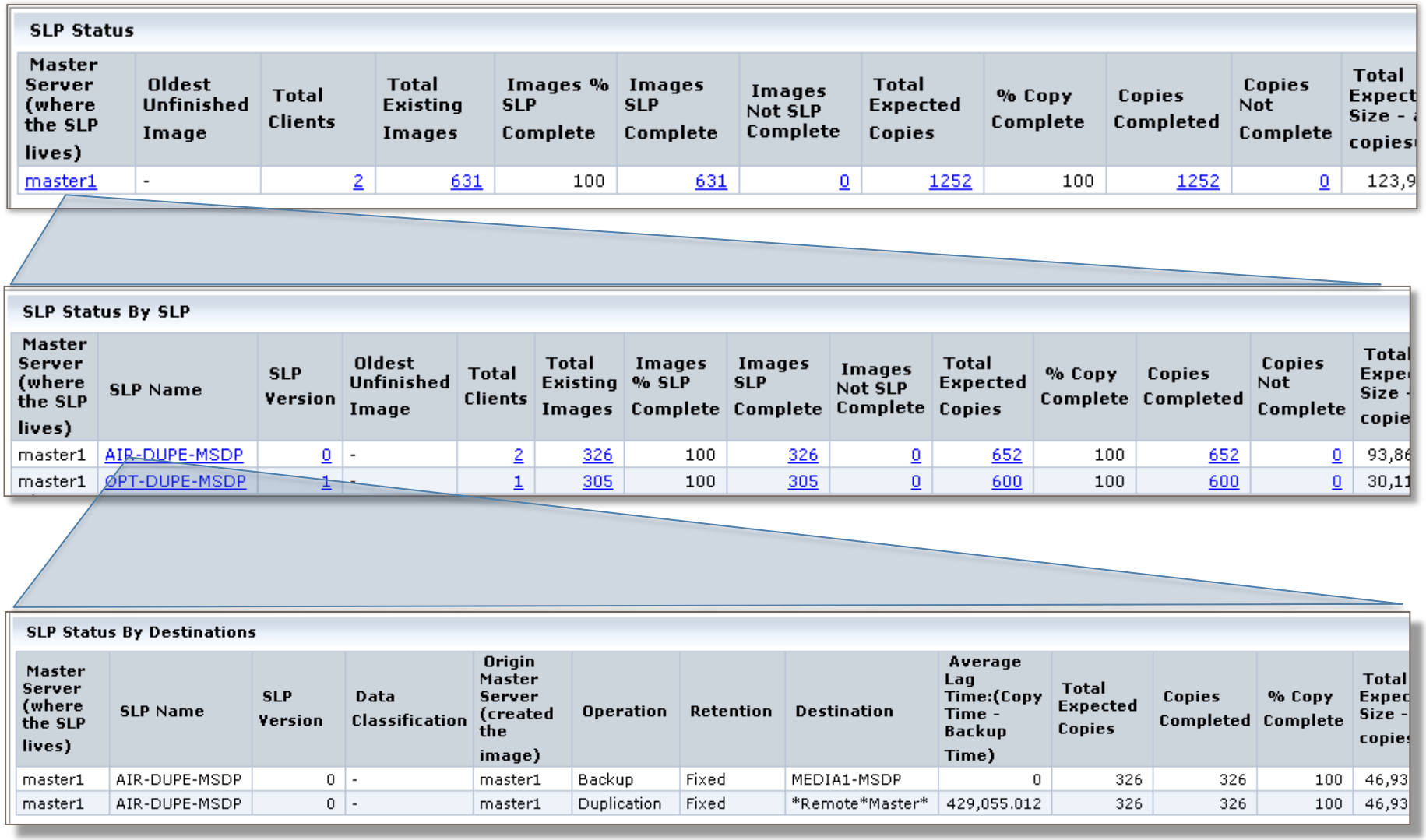


If you want to …	Use this command
Activate or resume suspended SLP operations on an image or image copy	nbstlutil active [-lifecycle name] [-version number] [-destination name] [-backupid value]
Deactivate or suspend pending and future SLP operations on an image or image copy	nbstlutil inactive [-lifecycle name] [-version number] [-destination name] [-backupid value]
Permanently cancel pending duplication operations on an image or image copy	nbstlutil cancel [-lifecycle name] [-version number] [-destination name] [-backupid value]
Repeat an SLP operation on an image or recreate a copy	nbstlutil redo -backupid value -slpindex value

OpsCenter now includes reporting for SLP and Auto Image Replication



Example Diagram : AIR
SLP Status report



SLP Status

Master Server (where the SLP lives)	Oldest Unfinished Image	Total Clients	Total Existing Images	Images % SLP Complete	Images SLP Complete	Images Not SLP Complete	Total Expected Copies	% Copy Complete	Copies Completed	Copies Not Complete	Total Expect Size - copies
master1	-	2	631	100	631	0	1252	100	1252	0	123,9

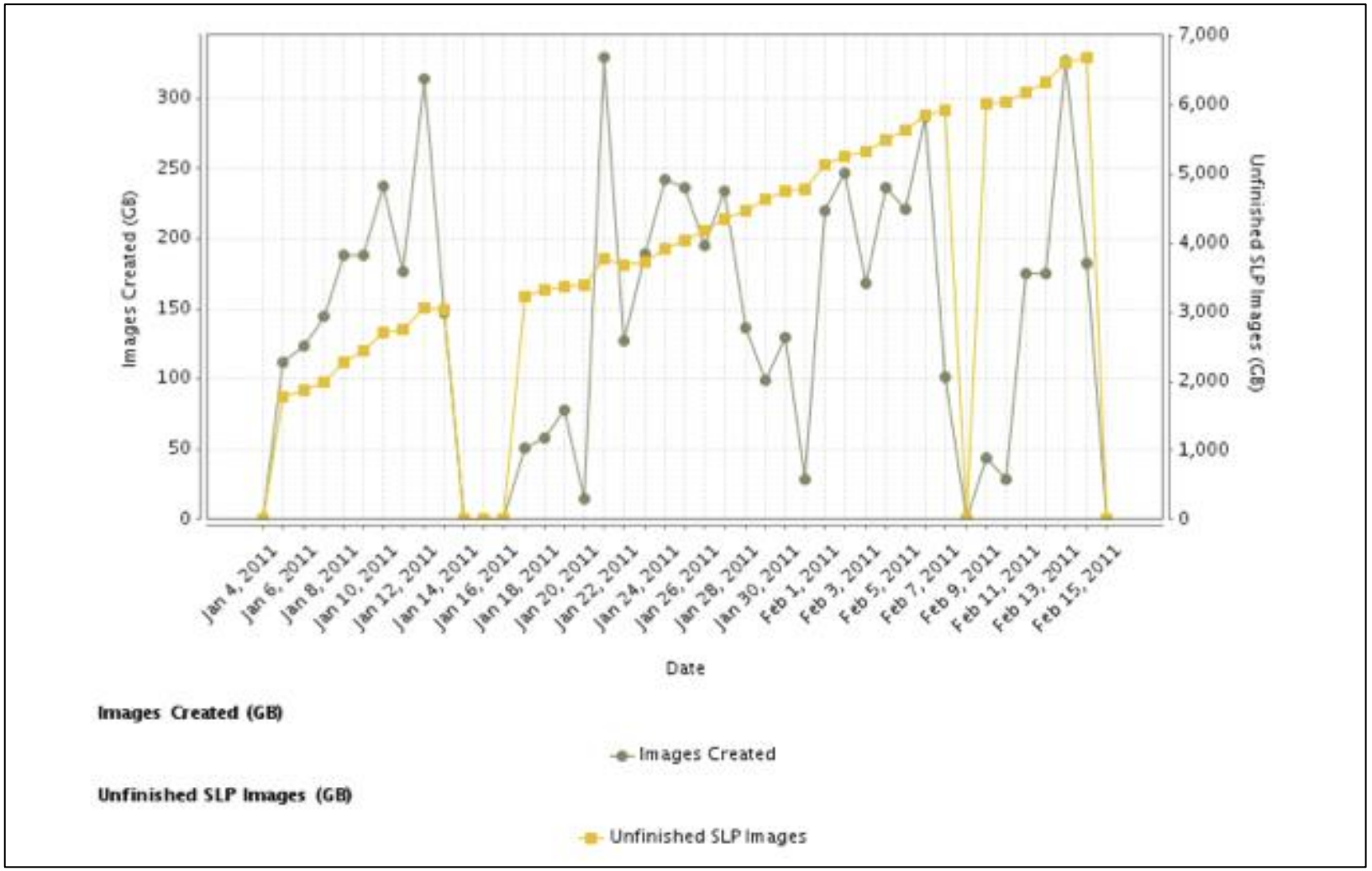
SLP Status By SLP

Master Server (where the SLP lives)	SLP Name	SLP Version	Oldest Unfinished Image	Total Clients	Total Existing Images	Images % SLP Complete	Images SLP Complete	Images Not SLP Complete	Total Expected Copies	% Copy Complete	Copies Completed	Copies Not Complete	Total Expe Size - copie
master1	AIR-DUPE-MSDP	0	-	2	326	100	326	0	652	100	652	0	93,86
master1	OPT-DUPE-MSDP	1	-	1	305	100	305	0	600	100	600	0	30,11

SLP Status By Destinations

Master Server (where the SLP lives)	SLP Name	SLP Version	Data Classification	Origin Master Server (created the image)	Operation	Retention	Destination	Average Lag Time:(Copy Time - Backup Time)	Total Expected Copies	Copies Completed	% Copy Complete	Total Expec Size - copie
master1	AIR-DUPE-MSDP	0	-	master1	Backup	Fixed	MEDIA1-MSDP	0	326	326	100	46,93
master1	AIR-DUPE-MSDP	0	-	master1	Duplication	Fixed	*Remote*Master*	429,055.012	326	326	100	46,93

Example Diagram : AIR
SLP Backlog report



Best Practices

Best Practices: AIR
General best practices for AIR

- At least one storage operation in the target domain's SLP must specify the "Target Retention" to ensure that the backup is retained for the period of time specified by the source SLP.
- When configuring Auto Image Replication it is strongly recommended that you test the configuration using a small test backup before applying the source SLP to production backups.
- Do not use Auto Image Replication to duplicate and replicate all of your data offsite unless you have done a thorough study and upgrade of your storage and network bandwidth requirements in order to support such a load.
- As with SLPs in general, it is essential that you ramp up slowly, starting with only a portion of your backups and slowly adding more.
- Targeted Auto Image Replication feature allows selective replication of images from a source disk storage server to specific disk storage servers in individual target domains without generating unnecessary network traffic.

- Best Practices for using SLP and AIR in NetBackup 7.6

http://www.symantec.com/docs/TECH208536

- NetBackup Administrator's Guide, Volume I

http://www.symantec.com/docs/DOC6452

- NetBackup 7.6 Troubleshooting Guide

http://www.symantec.com/docs/DOC6470

- SLP Parameters

http://www.symantec.com/docs/HOWTO87102

Thank You!

Symantec Backup and Recovery Technical Services