



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.

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

- 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

- 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.

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

White Boards: AIR

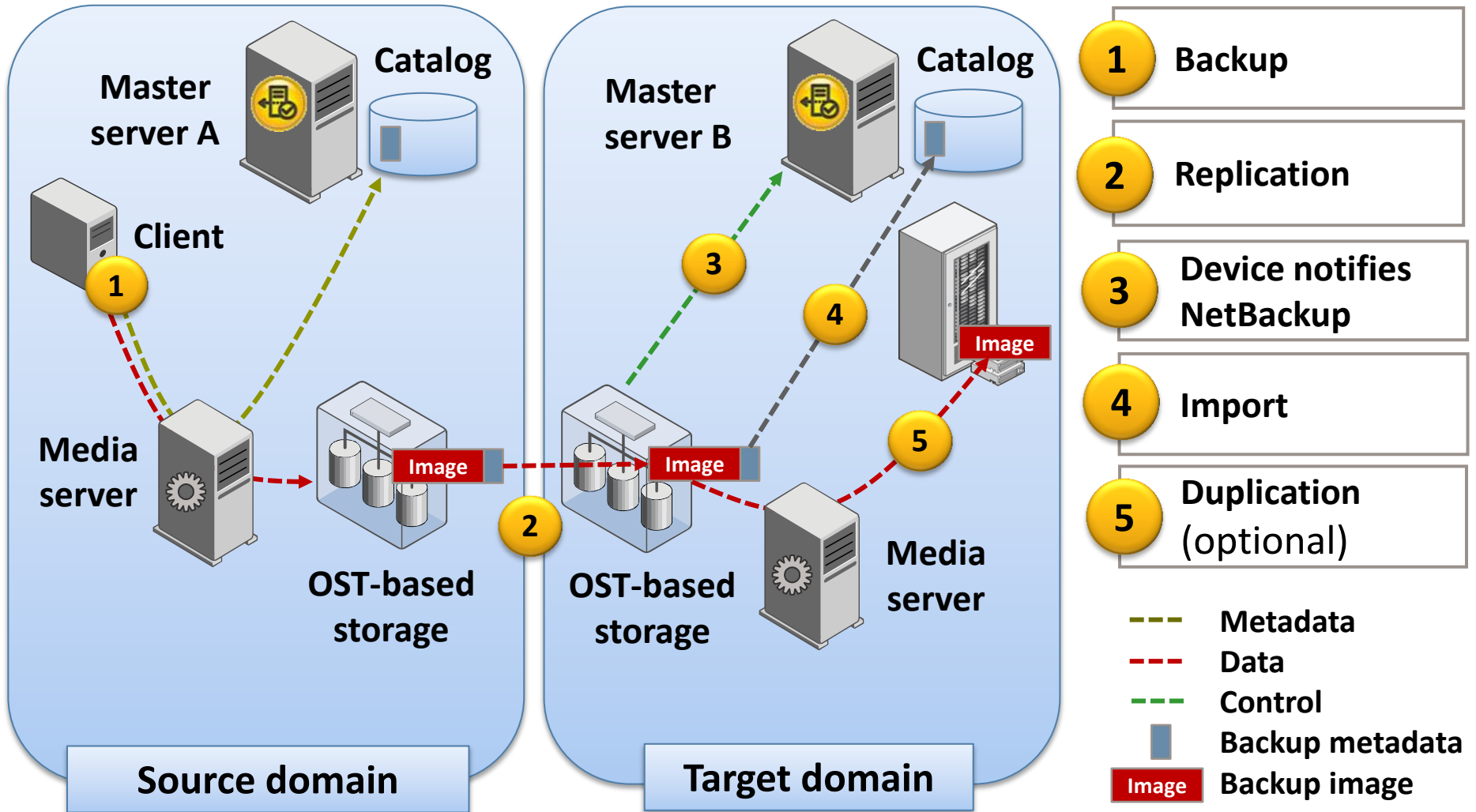
Requirements and pre-requisites

- 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	<ul style="list-style-type: none">• 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. 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

The screenshot shows the Symantec NetBackup Administration Console interface. The main window displays a tree view of the 'srtsf6 (Master Server)' configuration. A red box highlights the 'Storage Servers' folder, and a red arrow points to the 'srtsf6.beisrt.veritas.com' entry. A second window, 'Change Storage Server - srtsf6.beisrt.veritas.com', is open, showing the 'Replication' tab. This window contains a table for 'Replication target in a different NetBackup domain' with columns for 'Target Storage Server Name' and 'Target Storage Server Type'. A third window, 'Add a Replication Target in a Different NetBackup domain', is also open, showing fields for 'Target master server' (srtsf1.beisrt.veritas.com), 'Target storage server type' (PureDisk), 'Target storage server name' (srtsf2.beisrt.veritas.com), 'User name' (root), and 'Password'. A yellow callout bubble with the text 'Add target credentials' points to the 'User name' and 'Password' fields.

Source domain

Example Diagram : AIR

AIR validation at the source disk pool

The screenshot displays the Symantec NetBackup Administration Console interface. On the left, a tree view shows the navigation structure, with 'Disk Pools' highlighted. A red box highlights 'Disk Pools' in the tree, and a red arrow points from it to the '1 Disk Pools (1 selected)' table. The table lists the disk pool 'MDSP_srtsf6' on storage server 'srtsf6.beisrt.veritas.com' with a 'PureDisk' server type. Below the table, a 'Change Disk Pool' dialog box is open, showing the 'Name' as 'MDSP_srtsf6' and the 'Storage servers' as '(PureDisk) srtsf6.beisrt.veritas.com'. The 'Disk volumes' section contains a table with the following data:

Volume Name	Available Space	Raw Size	Replication
PureDiskVolume	24.83 GB	25.81 GB	Source

A red box highlights the 'Source' value in the 'Replication' column. Below this table is a 'Refresh' button. A yellow callout bubble points to the 'Refresh' button with the text: 'The Refresh button is used to obtain current disk pool information.' Another yellow callout bubble points to the 'Source' value with the text: 'Replication: Source'. A blue callout bubble at the bottom left of the screenshot contains the text: 'Source domain'.

Source domain

The Refresh button is used to obtain current disk pool information.

Replication: Source

Example Diagram : AIR

AIR validation at the target disk pool

Replication: Target

Volume Name	Available Space	Raw Size	Replication
PureDiskVolume	24.82 GB	25.81 GB	Target

Refresh

The **Refresh** button is used to obtain current disk pool information.

Target domain

Example Diagram : AIR SLP setup at the source

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

Storage Lifecycle Policy Validation Report

Storage lifecycle policy name: SLP_AIR_srtf6 Data classification: <No data classificati... Priority for secondary operations: 0 (higher number is greater priority)

Operation	Window	Target Master	Storage	Volume Pool	Media Owner	Retention Ty...	Retenti...
Backup	--	--	DSU_srt...	--	--	Expire after ...	--
Replication	Default_24x...	srtf1.beisrt.veritas.com	SLP_AIR_sr...	--	--	Fixed	2 weeks

Source domain

Change Operation Properties

Source storage: ---

Operation: Backup

Destination Storage Attributes

Destination storage: DSU_srtf6

Volume pool: NetBackup

Media owner: Any

Retention

Retention type: Expire after copy

Change Operation Properties

Source storage: DSU_srtf6 (Backup)

Operation: Replication

Destination Storage Attributes

Send the backups to:

All replication target storage servers (across different NetBackup domains) for the source storage server, srtf6.beisrt.veritas.com

A specific Master Server:

Target master server: srtf1.beisrt.veritas.com

Target import SLP: SLP_AIR_srtf1

Retention

Retention type: Fixed

Retention period: 2 weeks

Window close behavior

After the window closes, NetBackup will not start processing images currently being processed will be suspended. Images unable to be suspended will be handled as follows:

Finish processing the active images

Cancel the processing of the active images

When the window reopens, processing will resume for images which were suspended, cancelled, or never started.

Uses source disk pool's storage unit

Can use Target master and Target import SLP

Example Diagram : AIR SLP setup at the target

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

The screenshot displays the Symantec NetBackup console interface for configuring a Storage Lifecycle Policy (SLP). The main window is titled "New Storage Lifecycle Policy" and has two tabs: "Storage Lifecycle Policy" and "Validation Report".

Storage Lifecycle Policy Configuration:

- Storage lifecycle policy name:** SLP_AIR_srtsf1
- Data classification:** <No data classificati...>
- Priority for secondary operations:** 0 (higher number is greater priority)

Operation	Window	Target Master	Storage	Volume Pool	Media Owner	Retention Type	Retention
Import	Default_24x7_Window	--	DSU_srtsf2	--	--	Target Retention	--
Duplication	Default_24x7_Window	--	srtsf2-hcart-robot-tld-0	NetBackup	Any	Fixed	--

Change Operation Dialog (Left):

- Operation:** Import (highlighted with a red box)
- Destination Storage Attributes:** Destination storage: DSU_srtsf2
- Retention type:** Target Retention
- Import:** Override default priority
- Operation Priority:** 0

Change Operation Dialog (Right):

- Operation:** Duplication (highlighted with a red box)
- Destination Storage Attributes:** Destination storage: srtsf2-hcart-robot-tld-0
- Volume pool:** NetBackup
- Media owner:** Any
- Retention:** Retention type: Fixed (highlighted with a red box)

Callouts:

- Retention type:** Points to the "Retention type" dropdown in the left dialog.
- Uses target's storage unit:** Points to the "Destination storage" dropdown in the left dialog.
- Can use Target retention:** Points to the "Retention type" dropdown in the right dialog.
- Target domain:** A blue box pointing to the right dialog.

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-1td-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

Job Details: 4

Job ID: 4

Job Overview

Attempt: 1 Attempt Started: 01/07/2014 17:21:14

Job PID: 23727 Attempt Elapsed: 00:01:13

Storage Unit:

Media Server:

Transport Type:

Status:

```
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
```

Current Kilobyte

Current Files W

Current File:

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

Job Details: 118

Job ID: 118

Job State: Done(Successful)

Job Overview Detailed Status

Attempt: 1

Attempt Started: 01/07/2014 17:27:02

Job PID:

Attempt Elapsed: 00:00:11

Storage Unit:

Attempt Ended: 01/07/2014 17:27:14

Media Server: srtsf2

Second:

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
```

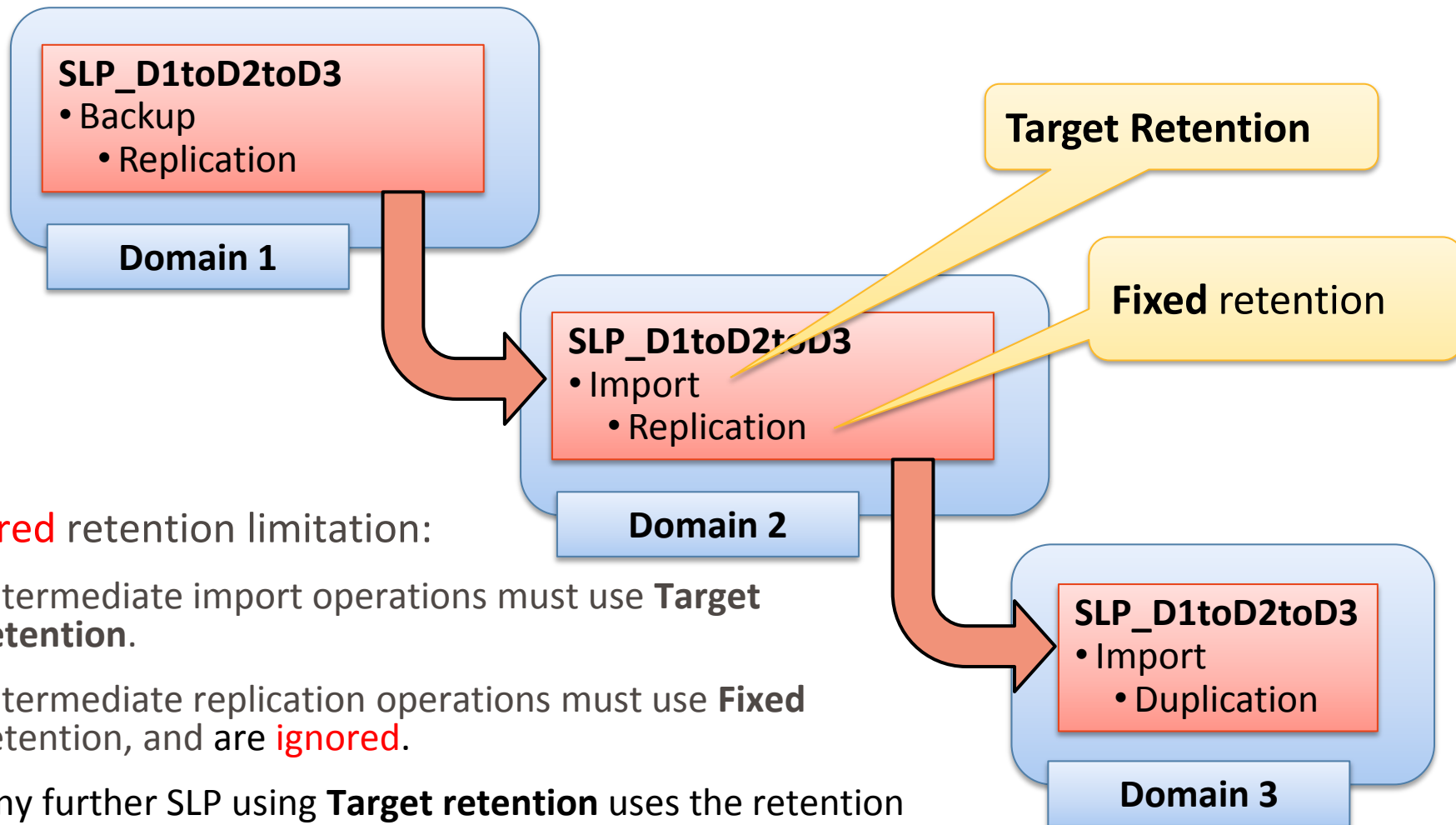
- Symantec recommends using the source domain for restores, if possible.
- The following methods are available for disaster recovery:

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

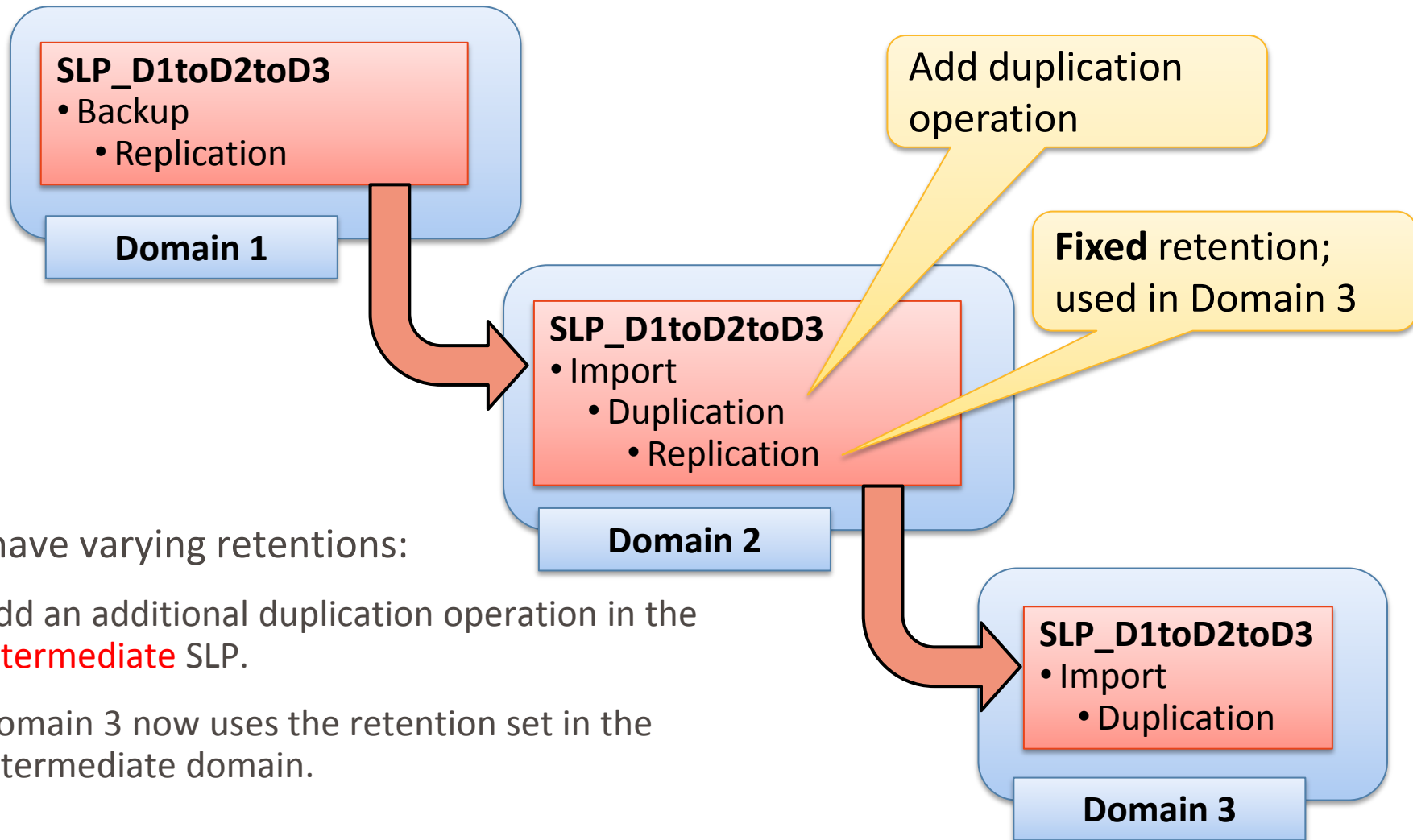


Shared retention limitation:

- 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

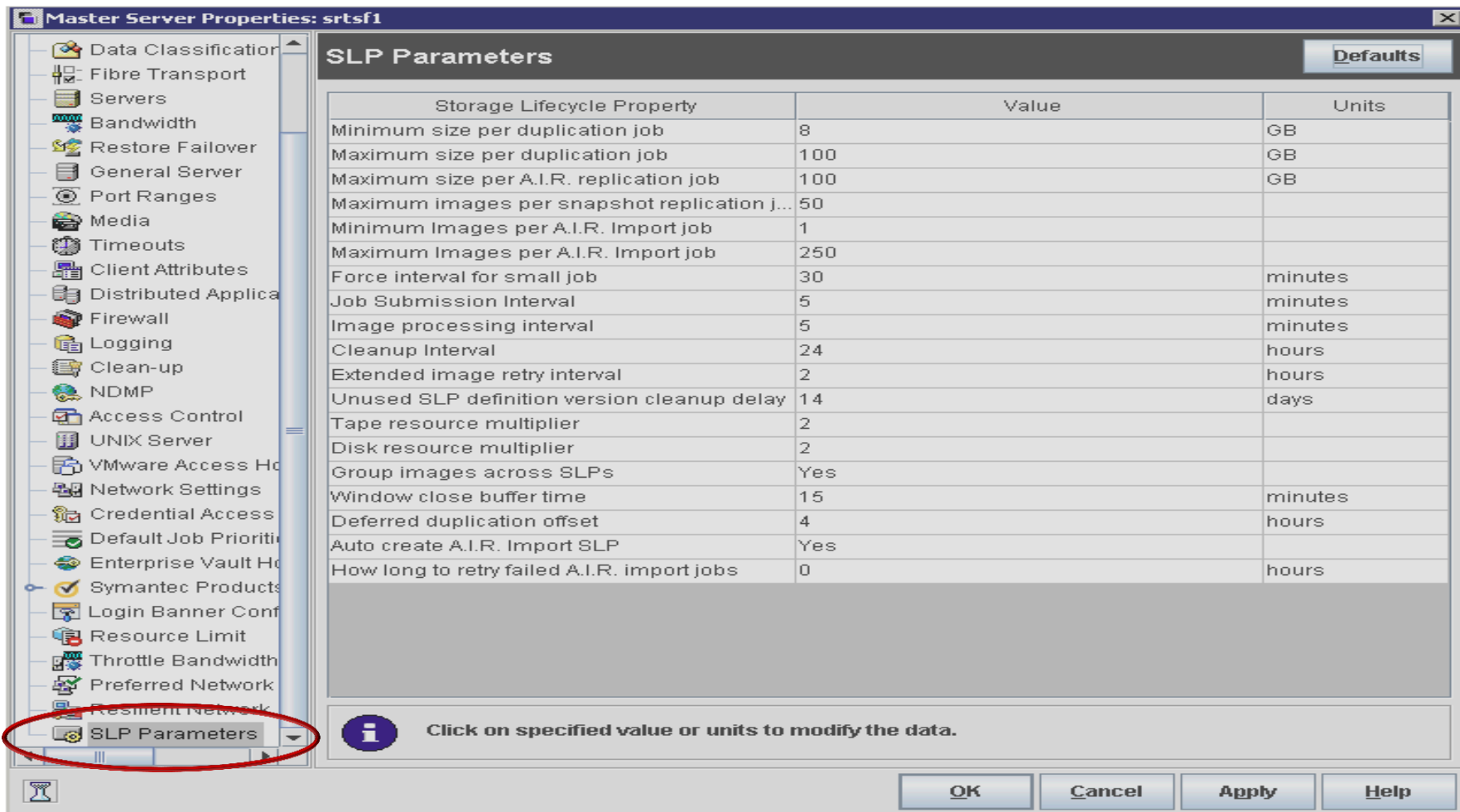


To have varying retentions:

- 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)
 - **Nbemms**: DSM, EMM, REM & DAL(master server)
 - **bpdm** (media server)
 - **nbrmms** (media server)

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



The screenshot shows the 'Master Server Properties: srtsf1' window with the 'SLP Parameters' tab selected. The left-hand navigation pane lists various server properties, with 'SLP Parameters' highlighted and circled in red. The main area displays a table of SLP parameters with their current values and units. A 'Defaults' button is visible in the top right corner of the table area. At the bottom of the window, there is an information icon and a message: 'Click on specified value or units to modify the data.' Standard 'OK', 'Cancel', 'Apply', and 'Help' buttons are located at the bottom right.

Storage Lifecycle Property	Value	Units
Minimum size per duplication job	8	GB
Maximum size per duplication job	100	GB
Maximum size per A.I.R. replication job	100	GB
Maximum images per snapshot replication j...	50	
Minimum Images per A.I.R. Import job	1	
Maximum Images per A.I.R. Import job	250	
Force interval for small job	30	minutes
Job Submission Interval	5	minutes
Image processing interval	5	minutes
Cleanup Interval	24	hours
Extended image retry interval	2	hours
Unused SLP definition version cleanup delay	14	days
Tape resource multiplier	2	
Disk resource multiplier	2	
Group images across SLPs	Yes	
Window close buffer time	15	minutes
Deferred duplication offset	4	hours
Auto create A.I.R. Import SLP	Yes	
How long to retry failed A.I.R. import jobs	0	hours

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

OpsCenter now includes reporting for SLP and Auto Image Replication

Logged in as: [admin] | Customize Tabs ▾ | Tools ▾ | About | Help | Logout

Home | Monitor | Manage | **Reports** | Search & Hold | Settings

Report Templates | My Reports | My Dashboard | Schedules | Manage Folders

Create New Report | Edit Report

Name	Description
⊕ Media Reports	-
⊕ Performance Reports	-
⊕ Policy Reports	-
⊕ Restore	-
⊖ Storage Lifecycle Policy	-
<input type="checkbox"/> SLP Status	This report provides an overall summary of the SLP status and allows you to monitor the SLP progress by master server.
<input type="checkbox"/> SLP Backlog	This report illustrates what the SLP backlog looks like against the image creation volume.

Example Diagram : AIR

SLP Status report



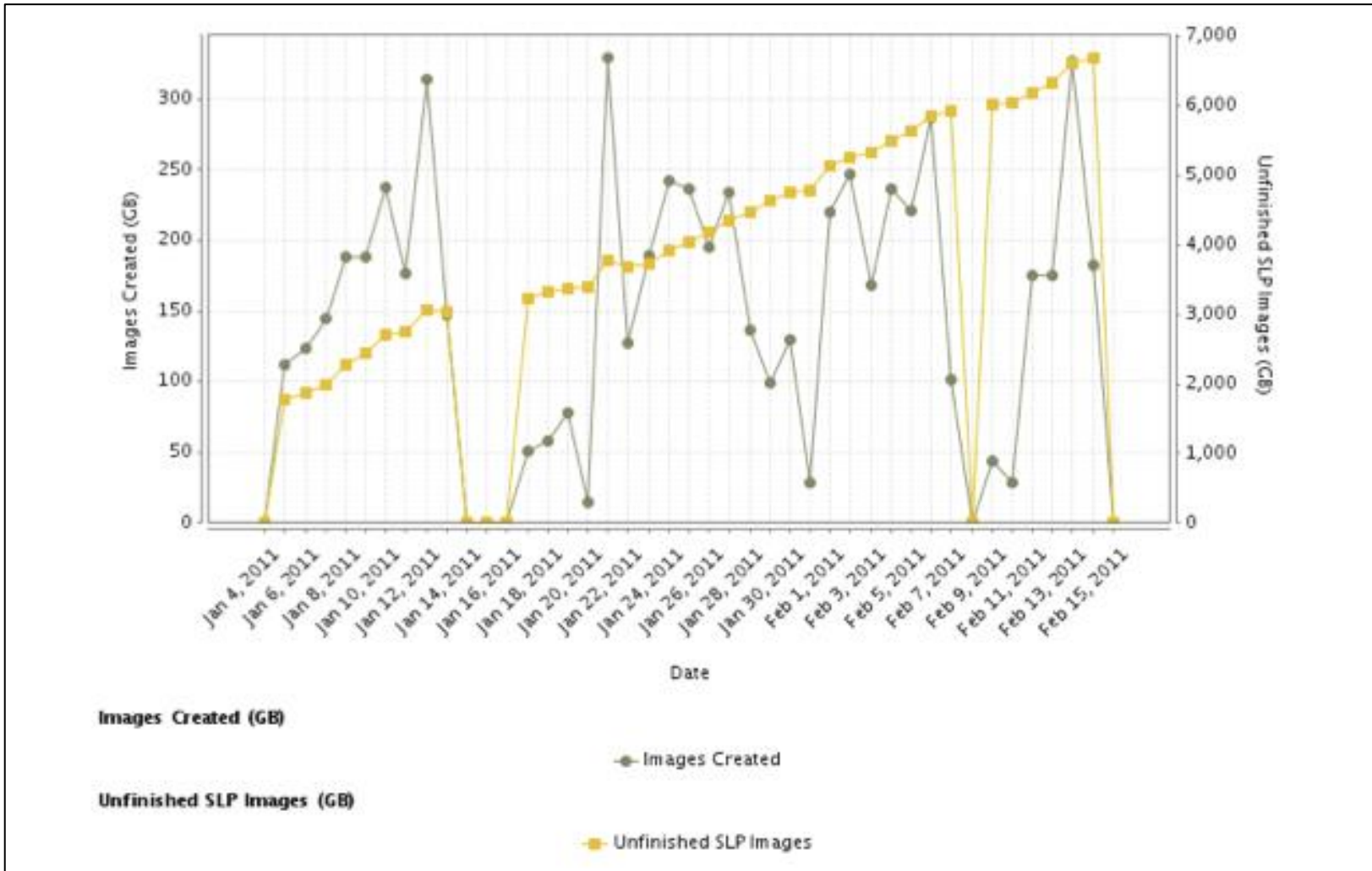
SLP Status											
Master Server (where the SLP lives)	Oldest Unfinished Image	Total Clients	Total Existing Images	Images % SLP Complete	Images SLP Complete	Images Not SLP Complete	Total Expected Copies	% Copy Complete	Copies Completed	Copies Not Complete	Total Expected Size - copies
master1	-	2	631	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 Expected Size - copies
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 Expected Size - copies
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