

VMAX³ Local Replication Fundamentals



© Copyright 2015 EMC Corporation. All rights reserved.

Support Contact: [Education Services](#)

Welcome to VMAX³ Local Replication Fundamentals.

Copyright ©2015 EMC Corporation. All Rights Reserved. Published in the USA. EMC believes the information in this publication is accurate as of its publication date. The information is subject to change without notice.

THE INFORMATION IN THIS PUBLICATION IS PROVIDED "AS IS." EMC CORPORATION MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THE INFORMATION IN THIS PUBLICATION, AND SPECIFICALLY DISCLAIMS IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Use, copying, and distribution of any EMC software described in this publication requires an applicable software license. The trademarks, logos, and service marks (collectively "Trademarks") appearing in this publication are the property of EMC Corporation and other parties. Nothing contained in this publication should be construed as granting any license or right to use any Trademark without the prior written permission of the party that owns the Trademark.

EMC, EMC² AccessAnywhere Access Logix, AdvantEdge, AlphaStor, AppSync ApplicationXtender, ArchiveXtender, Atmos, Authentica, Authentic Problems, Automated Resource Manager, AutoStart, AutoSwap, AVALONidm, Avamar, Bus-Tech, Captiva, Catalog Solution, C-Clip, Celerra, Celerra Replicator, Centera, CenterStage, CentraStar, EMC CertTracker, CIO Connect, ClaimPack, ClaimsEditor, Claralert, cLARIiON, ClientPak, CloudArray, Codebook Correlation Technology, Common Information Model, Compuset, Compute Anywhere, Configuration Intelligence, Configuresoft, Connectrix, Constellation Computing, EMC ControlCenter, CopyCross, CopyPoint, CX, DataBridge, Data Protection Suite, Data Protection Advisor, DBClassify, DD Boost, Dantz, DatabaseXtender, Data Domain, Direct Matrix Architecture, DiskXtender, DiskXtender 2000, DLS ECO, Document Sciences, Documentum, DR Anywhere, ECS, elnput, E-Lab, Elastic Cloud Storage, EmailXaminer, EmailXtender, EMC Centera, EMC ControlCenter, EMC LifeLine, EMCTV, Enginuity, EPFM, eRoom, Event Explorer, FAST, FarPoint, FirstPass, FLARE, FormWare, Geosynchrony, Global File Virtualization, Graphic Visualization, Greenplum, HighRoad, HomeBase, Illuminator, InfoArchive, InfoMover, Infoscapes, Infra, InputAccel, InputAcce/ Express, Invista, Ionix, ISIS, Kazeon, EMC LifeLine, Mainframe Appliance for Storage, Mainframe Data Library, Max Retriever, MCx, MediaStor, Metro, MetroPoint, MirrorView, Multi-Band Deduplication, Navisphere, NetStorage, NetWorker, nLayers, EMC OnCourse, OnAlert, OpenScale, Petrocloud, PixTools, Powerlink, PowerPath, PowerSnap, ProSphere, ProtectEverywhere, ProtectPoint, EMC Proven, EMC Proven Professional, QuickScan, RAPIDPath, EMC RecoverPoint, Rainfinity, RepliCare, RepliStor, ResourcePak, Retrospect, RSA, the RSA logo, SafeLine, SAN Advisor, SAN Copy, SAN Manager, ScaleIO Smarts, EMC Snap, SnapImage, SnapSure, SnapView, SourceOne, SRDF, EMC Storage Administrator, StorageScope, SupportMate, SymmAPI, SymmEnabler, Symmetrix, Symmetrix DMX, Symmetrix VMAX, TimeFinder, TwinStrata, UltraFlex, UltraPoint, UltraScale, Unisphere, Universal Data Consistency, Vblock, Velocity, Viewlets, VIPR, Virtual Matrix, Virtual Matrix Architecture, Virtual Provisioning, Virtualize Everything, Compromise Nothing, Virtuent, VMAX, VMAXe, VNX, VNXe, Voyence, VPLEX, VSAM-Assist, VSAM I/O PLUS, VSET, VSPEX, Watch4net, WebXtender, xExpression, xPresso, Xtrem, XtremCache, XtremSF, XtremSW, XtremIO, YottaYotta, Zero-Friction Enterprise Storage.

Revision Date: February 2015

Revision Number: MR-1WP-VMAXLRFD

Course Overview

Description

This course provides an introduction to the VMAX³ family local replication offering. It includes an overview of the TimeFinder SnapVX architecture, features, and functionality. This course provides an understanding of TimeFinder SnapVX disaster recovery concepts and terminology.

Audience

This course is for professionals seeking to learn the basics of the VMAX³ local replication product. This includes those that will be positioning, designing, implementing or supporting the product.

Objectives

Upon completion of this course, you should be able to:

- Discuss the VMAX³ TimeFinder SnapVX product
- Identify key use cases of the TimeFinder SnapVX product
- Explain the TimeFinder SnapVX architecture
- Explain the details of TimeFinder SnapVX Snapshots
- Describe the Linking of Point-In-Time copies
- List the TimeFinder SnapVX operations
- Describe management options and capabilities



This course covers an introduction to the VMAX³ family local replication offering. It includes an overview of the TimeFinder SnapVX architecture, features, functionality and terminology.

Module: Introduction to VMAX³ Local Replication

Upon completion of this module, you should be able to:

- Explain the business, industry and technical requirements of local replication
- Describe local replication business benefits
- Define the TimeFinder SnapVX family of products
- Describe the TimeFinder SnapVX Architecture
- Describe local replication operations
- Explain TimeFinder SnapVX Snapshots

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

3

This module focuses on benefits of using local replication capabilities of the VMAX³ TimeFinder SnapVX product.

Local Replication Benefits

- Efficient – low impact Point-in-time copies (snapshots)
- Target less architecture ensures scalability
- Enhances Backup and Recovery
- DSS / DW refresh enablement
- Fanout for efficiency
- No orphaned & lost snapshots



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

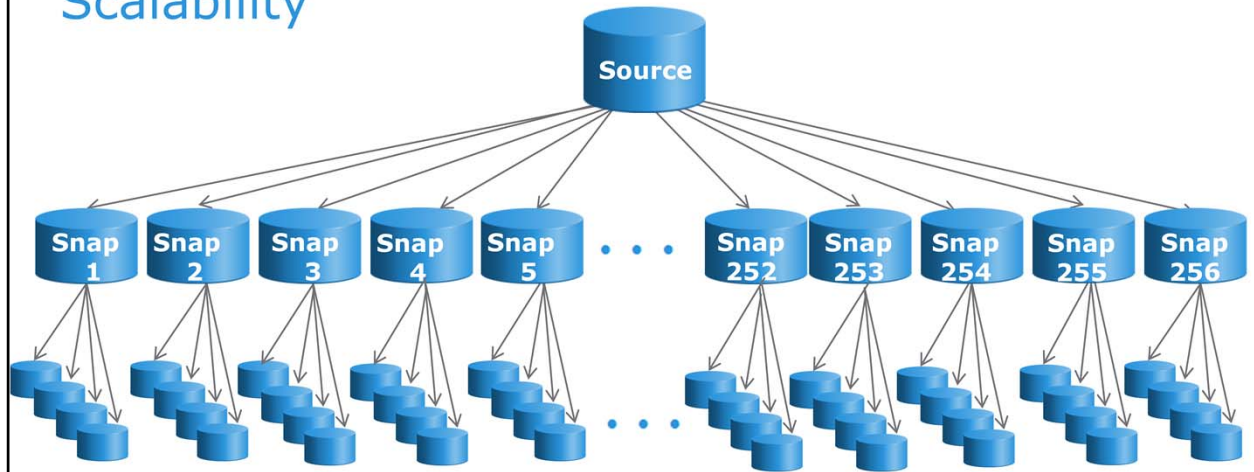
4

TimeFinder SnapVX is a new Local Replication technology introduced with the VMAX³ platform running HYPERMAX OS 5977.

TimeFinder SnapVX allows the user to create target less snapshots. By providing space saving Point-in-time snapshots of source devices without the requirement of pairing a source and target volume, this eliminates the use of a Symmetrix logical volume number and does not use cache.

When used in conjunction with SRDF, ProtectPoint, or Vplex, TimeFinder SnapVX will limit outages and enable fast recovery times.

TimeFinder SnapVX Architecture and Scalability



256 snapshots/source – 1024 linked targets/source

EMC²

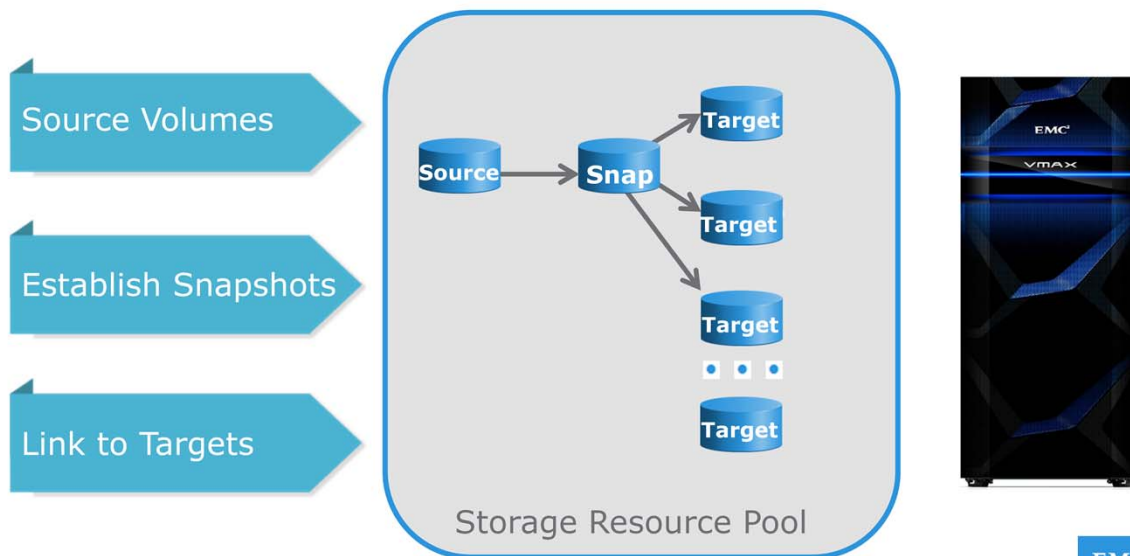
© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

5

With this new architecture, massive scaling is possible. Here is an example that is showing a single source that has 256 linked snapshots. Each snapshot has 4 linked targets. Any variation on this is allowed so long as the maximum of 256 snapshots & 1024 linked targets are observed.

TimeFinder SnapVX Architecture



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

6

Any volume can be the source for a snapshot. Snapshots can be for many purposes; backups, Test and development, fanout, etc.

To access a point-in time-copy, a link must be created from the snapshot to a host mapped target device.

It could also be used as an R1 device in an SRDF pairing, provided it is using Copy mode.

The source and snapshots reside in the same SRP. If the system has more than one SRP it's possible to have a linked target in a different SRP than the source. If this is done the advantage of shared tracks is lost. There is no advantage to having NoCopy linked targets in a separate SRP because writes to a source volume will only create snapshot deltas and will not initiate a copy to the target.

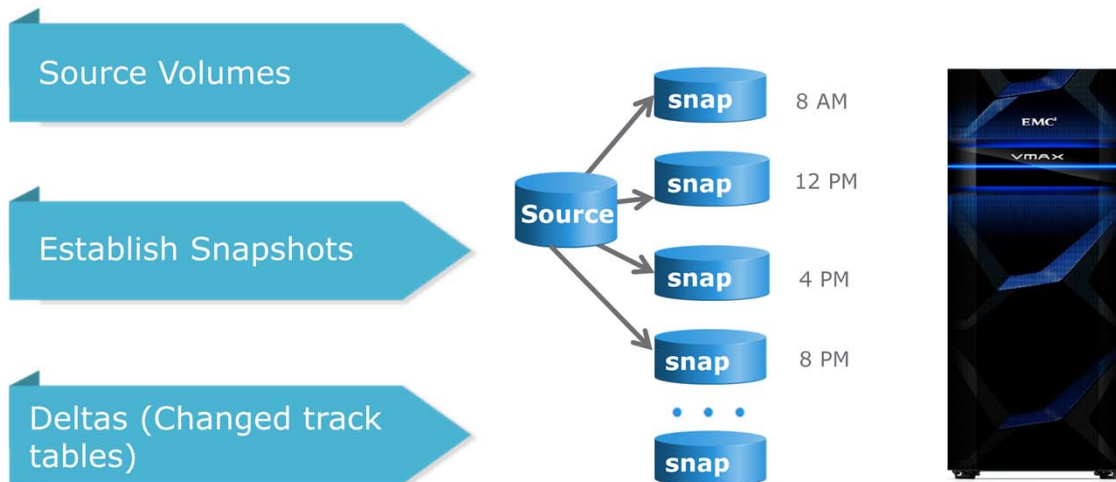
A single snapshot can have both Copy and NoCopy linked targets. All linked targets do not need to be in the same SRP.

The target device must be of equal or greater size than the source device. The target volume can only be linked to one snapshot. When a device is used as a link target all of its previous track allocations are deallocated. Host writes to a linked target device will not change the point-in-time copy, only the linked target device will contain the modified point-in-time copy.

The allocations for tracks for the source and target can have different SLO's and is determined by the storage group that contains them.

Up to 1024 linked targets per source are allowed.

TimeFinder SnapVX Architecture



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

7

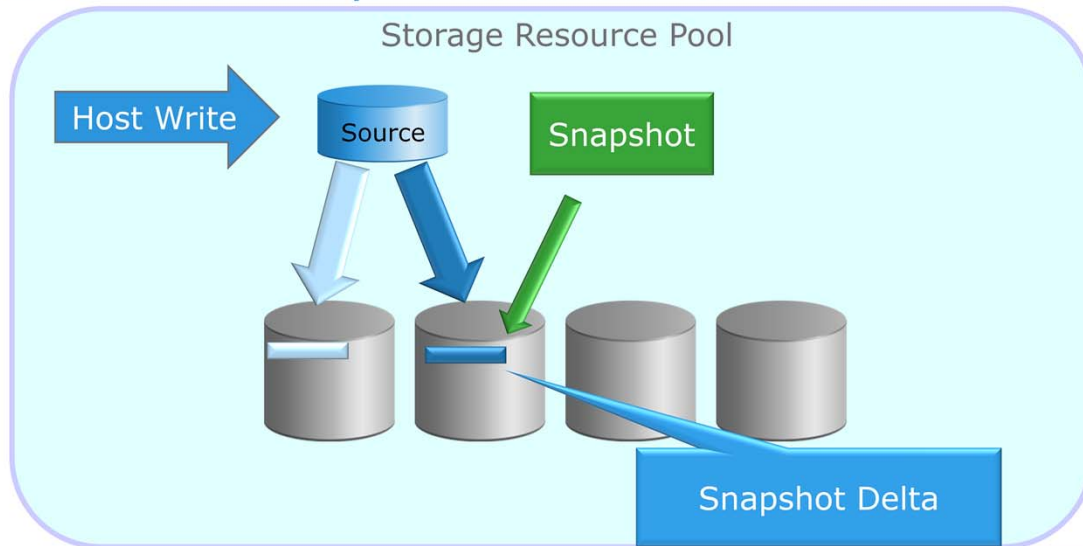
Each source can have up to 256 snapshots. A snapshot of an entire storage group can be taken with a single command.

A snapshot is simply the delta of the source and is a set of changed track tables stored within the source volumes Storage Resource Pool.

A user defined name can be given to the snapshot on creation.

All tracks are shareable between snapshots and the source. Until a track is changed there is no need to copy the track and consume space.

TimeFinder SnapVX Redirect-On-Write



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

8

TimeFinder SnapVX uses a Redirect-on-Write mechanism to preserve a point in time snapshot.

A track that needs to be preserved will not be copied to a new location before a new write is accepted, as is the case with copy-on-write methods.

When a host writes to a track, the allocation comes from the same SRP as the source device.

When a snapshot is taken it points to the location of the data. The snapshot information is contained the SRP.

If the track needs to be updated by a host write, the write will be redirected to a new location. It will not overwrite the original track.

The preserved, point-in-time track becomes a Snapshot Delta, and will remain in its original location to be referenced by the snapshot. Redirect-on-Write will be used whenever possible. But Copy-On-Write may be used in some situations, for example, to prevent the new write from being demoted to a lower tier.

Module Summary

Key points covered in this module:

- Local replication benefits and operations
- TimeFinder SnapVX snapshots
- TimeFinder SnapVX architecture

This module covered the VMAX³ TimeFinder SnapVX benefits, architecture and operations.

Module: TimeFinder SnapVX Features/Capabilities

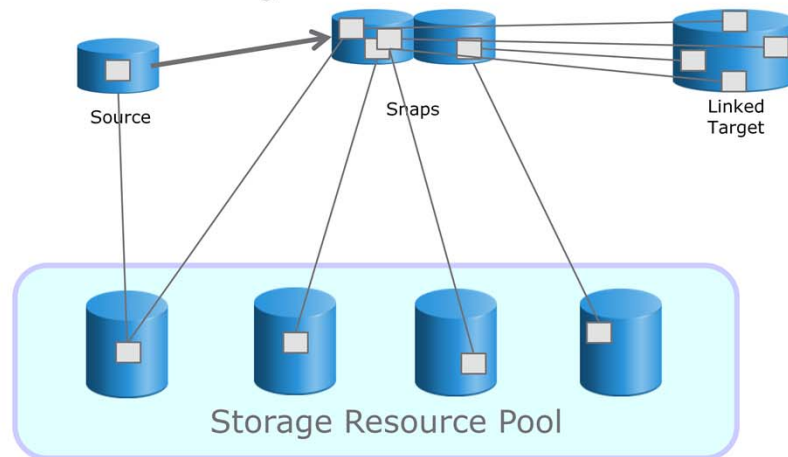
Upon completion of this module, you should be able to:

- Describe the TimeFinder SnapVX Features and Capabilities
- Identify key features in an IT environment

This module focuses on TimeFinder SnapVX features and capabilities and the key features in an IT environment.

TimeFinder SnapVX - Defining Mechanism

- Undefined Linked Target



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

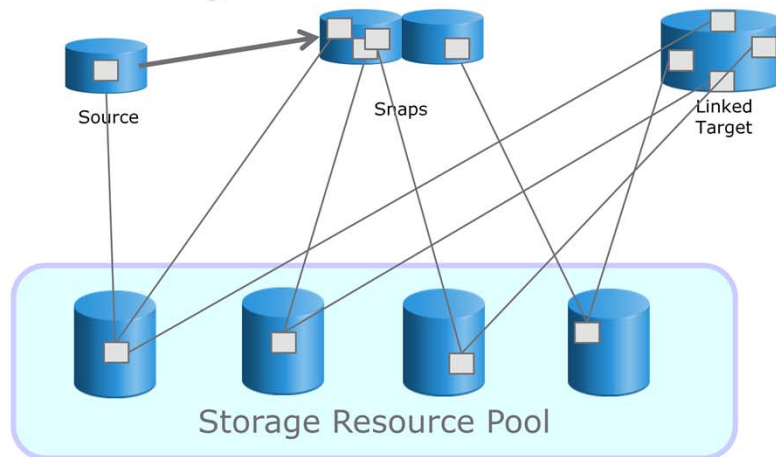
11

Understanding when Targets can be either Defined or Undefined is important to know, as the capability of cascading snapshots is dependent upon this.

- When Undefined - Access from the target is thru the SnapVX snapshot tables to resolve a track location.
The track then becomes defined within the target whenever a background process or host IO accesses the track.

TimeFinder SnapVX - Defining Mechanism

- Defined Linked Target



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

12

When a track is defined - Access is from the target directly to the track in the SRP.

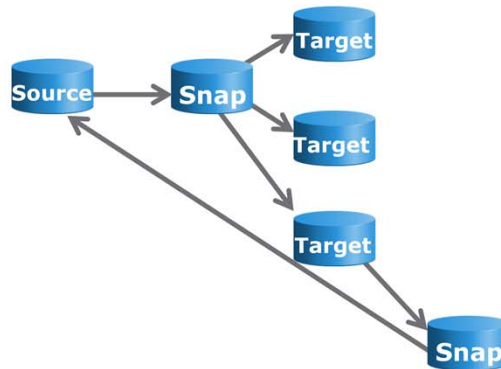
A background process or a host read eventually defines the tracks and updates the target device to point directly to the track location in the source device's SRP. When all tracks in a target are defined the target is fully defined.

A linked target that is fully defined can be the source for further snapshots (cascading).

TimeFinder SnapVX Cascading

Cascading:

- Snapshot of a linked target
- No limit on number of levels
- Unlink Requires
 - Copy mode
 - Fully copied



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

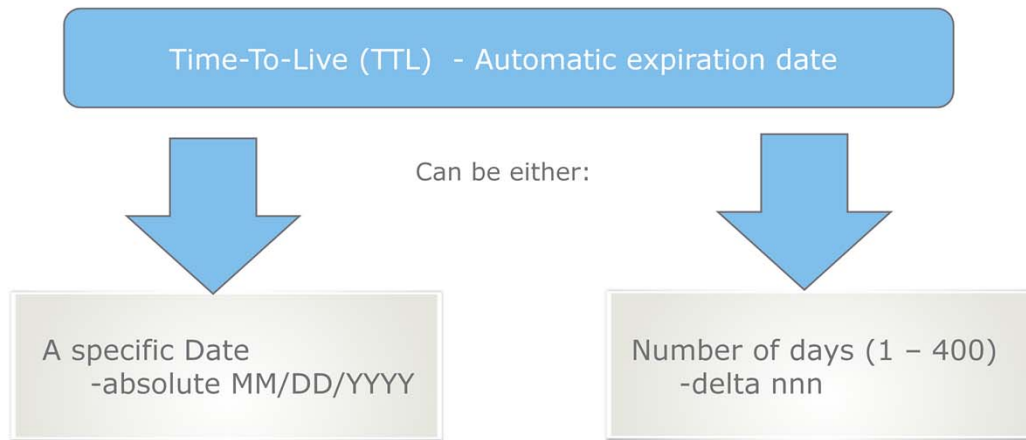
EMC²

13

A snap of a target is allowed once the target has been fully defined. There are no limits on how many levels of cascading occur.

An example usage of this might be if you wanted to restore a linked target to its source. The restore of a snapshot is only for snapshots. The work around is to create a snap of the target and link the snapshot to the source, as its target.

TimeFinder SnapVX Time-To-Live



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

14

Automatic termination of a snapshot is accomplished with the Time To Live, or TTL, feature.

The snapshot will be terminated by the Hypermax OS upon reaching the expiration date.

The TTL can be set for a specific date or for a number of days which will be converted to the correct date.

The number of days can be from 1 to 400.

This is very useful in scripting where a rolling snapshot might be taken and then automatically removed after its time of usefulness has passed.

In addition to setting during creation the TTL can be changed for existing snapshots also.

TimeFinder SnapVX Generations

Generation
number

- Starts from 0
- Consecutively numbered (renumbered for deletions)
- Newest gen is always 0

EMC²

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

15

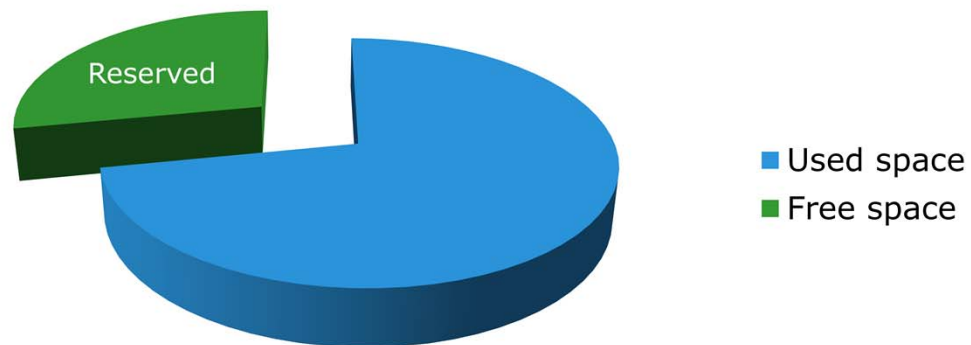
Numbers are incremented or decremented automatically when a new snapshot is taken or a snapshot is removed.

The newest snapshot is always generation 0. Existing snapshots get renumbered.

You can reference a snapshot by both name and a specific generation. If you don't specify a generation it defaults to 0.

VMAX³ SRP reserved capacity

Storage Resource Pool



Note: `symcfg list -v -srp`

EMC²

© Copyright 2015 EMC Corporation. All rights reserved.

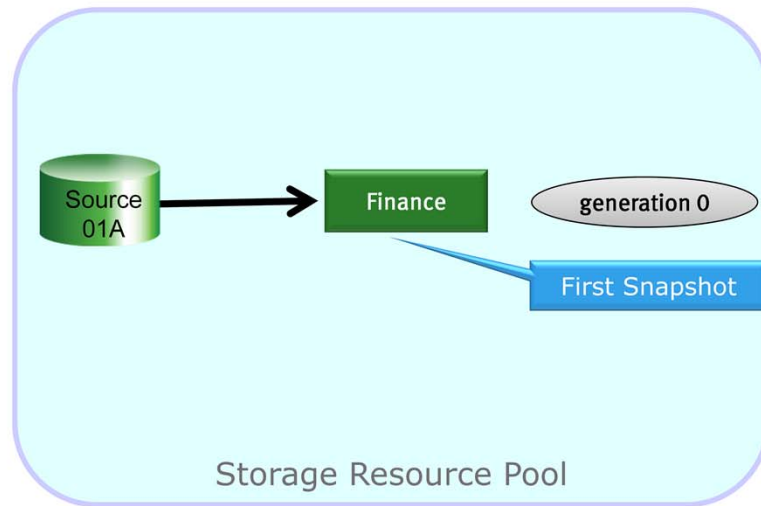
VMAX³ Local Replication Fundamentals

16

The reserved capacity percentage prevents consumption of the SRP by non-host writes, such as a snapshot.

The settable percentage is 1 to 80 percent. If the threshold is hit TimeFinder SnapVX and SRDF will both fail to create new deltas. At that point only host writes will be able to write into the SRP. Use the `symcfg list` command to view the current settings.

Creating the First Snapshot



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

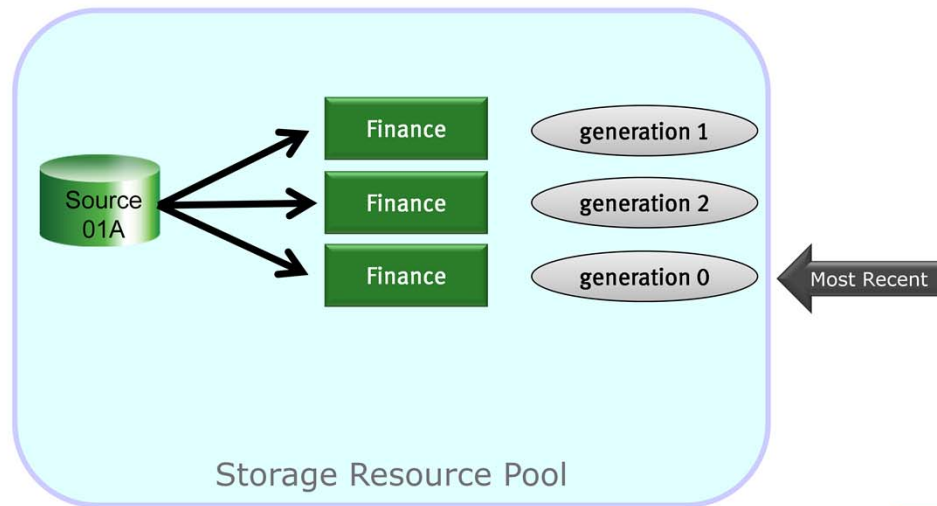
17

The `symsnapvx establish` command creates and activates a SnapVX snapshot. In this example a snapshot named `Finance` is created using the `establish` command. The `name` option must be used when using the `establish` command. The snapshot is automatically assigned a system created generation number of zero.

While creating the snapshot you can also set the expiration date or alternatively you can also change or set the date later on.

Each snapshot also has a system generated date & time stamp.

Creating TimeFinder SnapVX Snapshots



© Copyright 2015 EMC Corporation. All rights reserved.

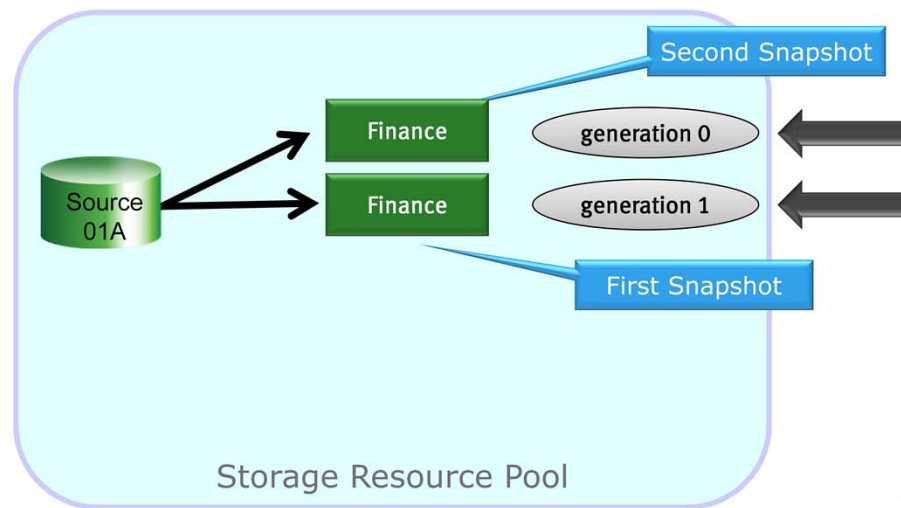
VMAX³ Local Replication Fundamentals

EMC²

18

Multiple snapshots on the same source device with the same user supplied names can be created. Multiple snapshots with the same name become generations. The snapshots will be assigned a system created generation number. The most recent snapshot is assigned generation zero. All others snapshots are incremented by one. By default all snapshots will be consistent.

Creating the Next Snapshot



© Copyright 2015 EMC Corporation. All rights reserved.

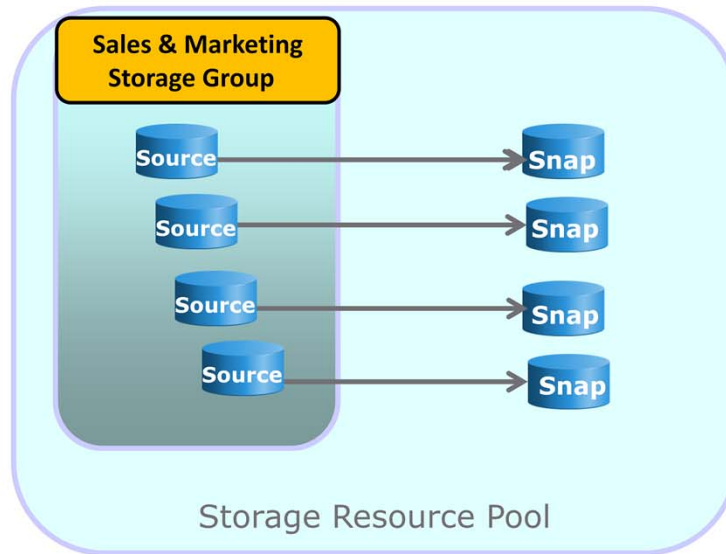
VMAX³ Local Replication Fundamentals

EMC²

19

When a second snapshot on the same source device with the same name, Finance, is created the newest snapshot is automatically assigned generation zero and the previous generation, generation zero, is incremented by 1.

TimeFinder SnapVX Storage Group snapshot



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

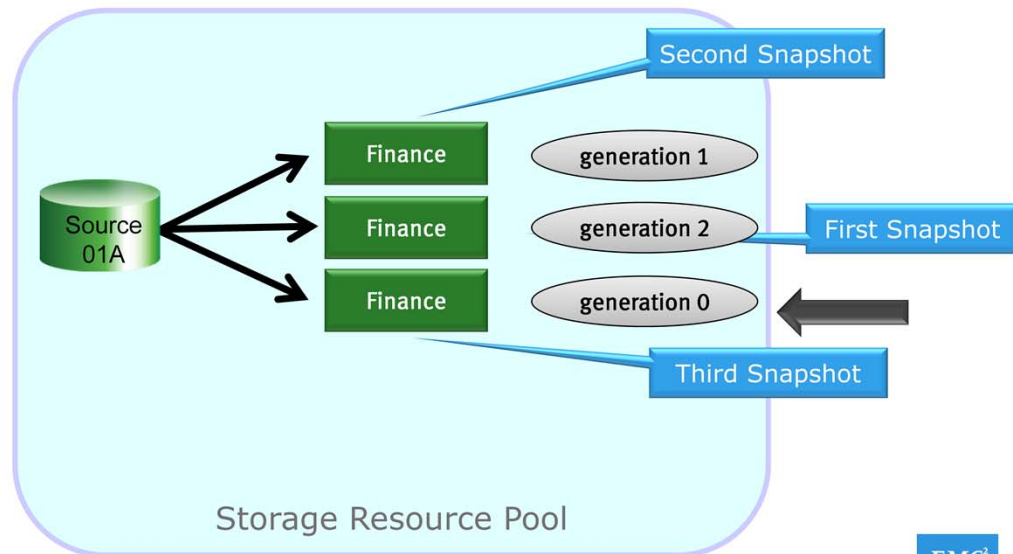
20

Using the `-sg` option with the `symsnapvx` command allows you to create a snapshot of an entire storage group. In this example we have created a snapshot of the sales and marketing storage group. Each of the volumes in the group gets its own snapshot at the same point-in-time.

Any child storage groups of the storage group against which you snap will also create snaps for the child storage groups.

Note: If using Unisphere to manage SnapVX snapshots you must use storage groups only.

Creating Multiple Snapshots



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

21

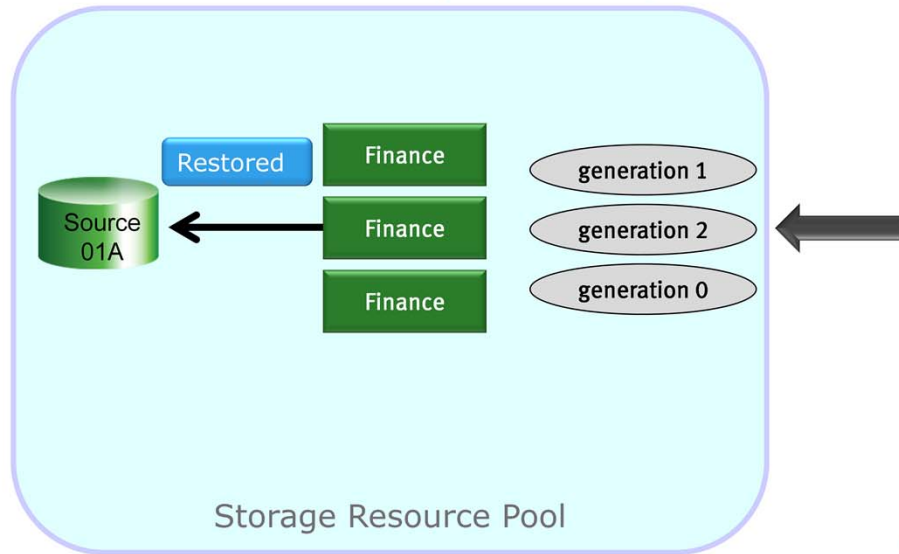
A third snapshot on the same source device with the same name, Finance, is created.

The new snapshot is automatically assigned generation 0 and the previous generations are all incremented by 1.

As snapshots are established and terminated, the generation numbers will be reassigned such that there will be no gaps in the generation numbers.

The names of the snapshots do not have to be the same. The name of the snapshot identifies the snapshot. The generation numbers distinguish each snapshot, with the same name, from one another. The snapshots are also given a system generated time stamp.

Restore TimeFinder SnapVX Snapshot



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

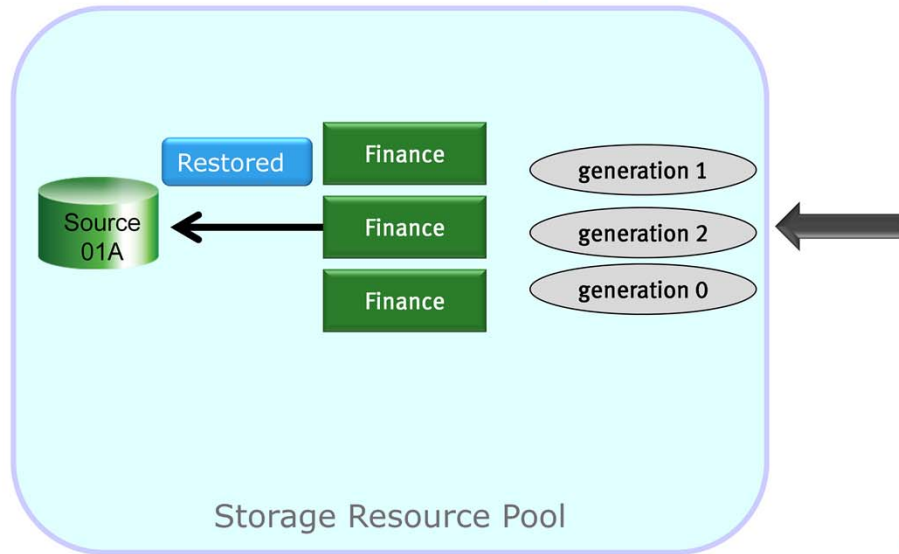
22

SnapVX allows restoring a snapshot's point-in-time data back to the original source device. SnapVX restore operations are inherently differential. This means only the tracks that have changed need to be copied back to the source device.

To restore generation 2 of the Finance snapshot the restore command can be executed specifying the generation number.

Generation 2 of the Finance snapshot will be restored. If a generation number is omitted in the command it defaults to generation 0.

Terminating A Restored Snapshot



© Copyright 2015 EMC Corporation. All rights reserved.

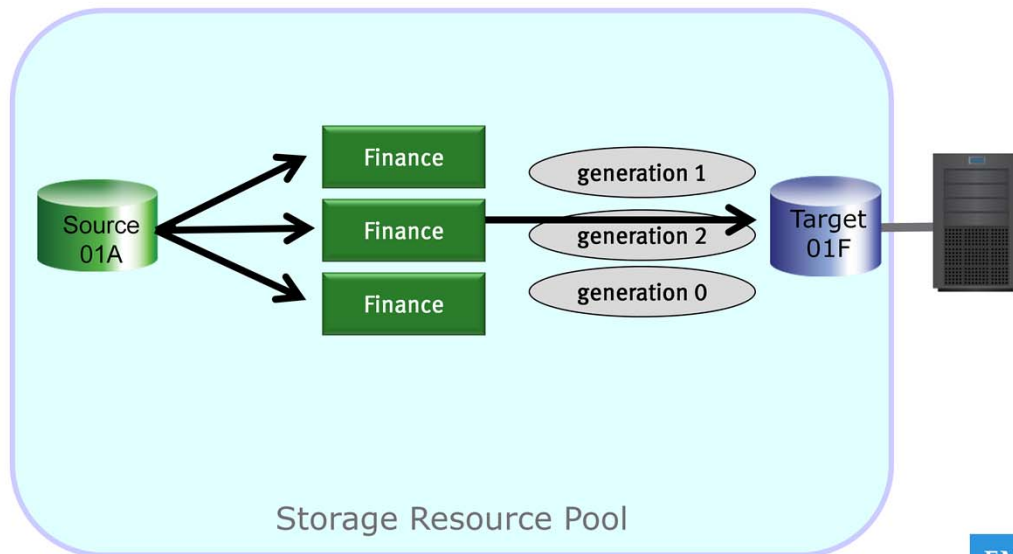
VMAX³ Local Replication Fundamentals

EMC²

23

Before terminating a snapshot that has been restored the restore must be terminated first. To terminate the restore of generation 2 of the Finance snapshot the terminate -restored command can be executed. After the restore has been terminated then the snapshot can be terminated. More detail on terminating a snapshot will follow in upcoming slides.

TimeFinder SnapVX Link



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

24

To access a point-in time-copy, a link must be created from the snapshot to a host mapped target device. You can create links in Copy mode for a permanent copy on the target device, or in NoCopy mode, the default, for temporary use. Copy mode links create full-volume copies of the data by copying it to the target device's SRP. This provides clone like copies of data. NoCopy mode links are space-saving snapshots that only consume space for the changed data that is stored in the source device's SRP.

NoCopy mode links will not retain point-in-time data once they are unlinked. If you do not specify Copy mode when you link the snapshot, a NoCopy link is created. The target device must be of equal or greater size than the source device. The target volume can only be linked to one snapshot. When a device is used as a link target all of its previous track allocations are deallocated. Devices with persistent allocations cannot be used as link targets. Host writes to a linked target device will not change the point-in-time copy, so only the linked target device will contain a modified point-in-time copy.

TimeFinder SnapVX Target linking modes

Copy

- Practical for permanent usage
- Creates a full volume copy
- Similar to the previous VMAX clone

NoCopy

- Default mode
- Best practice for temporary use
- Space savings – no duplicated tracks

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

25

You can create links in Copy mode for a permanent copy on the target device, or in NoCopy mode, the default, for temporary use.

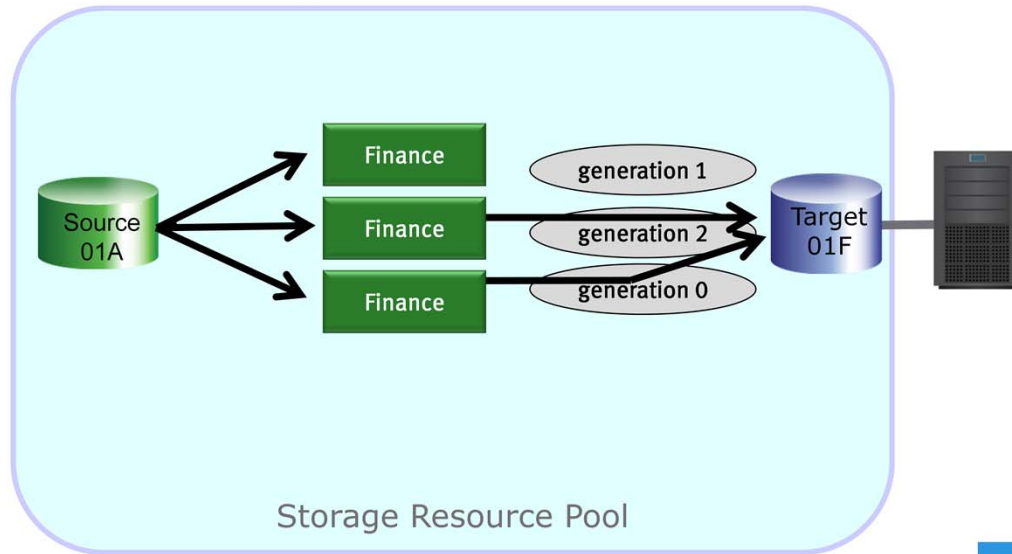
No matter which link mode is selected, the target can still be host visible immediately.

NoCopy is the default and saves space and overhead. Only changed data will take space when using the nocopy mode.

Using the Copy option will make a full volume copy and is similar in concept to the older VMAX clone command.

NoCopy mode links will not retain point-in-time data once they are unlinked.

TimeFinder SnapVX Relink



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

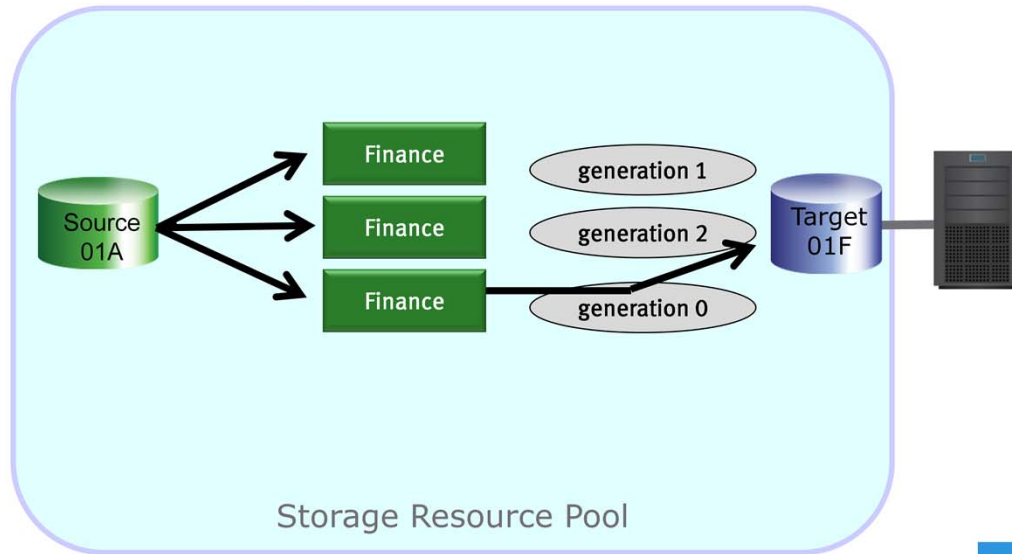
EMC²

26

SnapVX can automatically unlink an existing link and relink it to a different Point-in-Time snapshot by using the relink command.

The relink command can only be used if a link already exists and the relink must be between the same source and target devices. If the relink is in Copy mode, the copy will be differential between the original linked snapshot and the newly linked snapshot. The relink command can also be used to relink to the same snapshot. This has the effect of refreshing the point-in-time copy on the link target if the linked copy has been modified by host writes.

TimeFinder SnapVX Unlink



© Copyright 2015 EMC Corporation. All rights reserved.

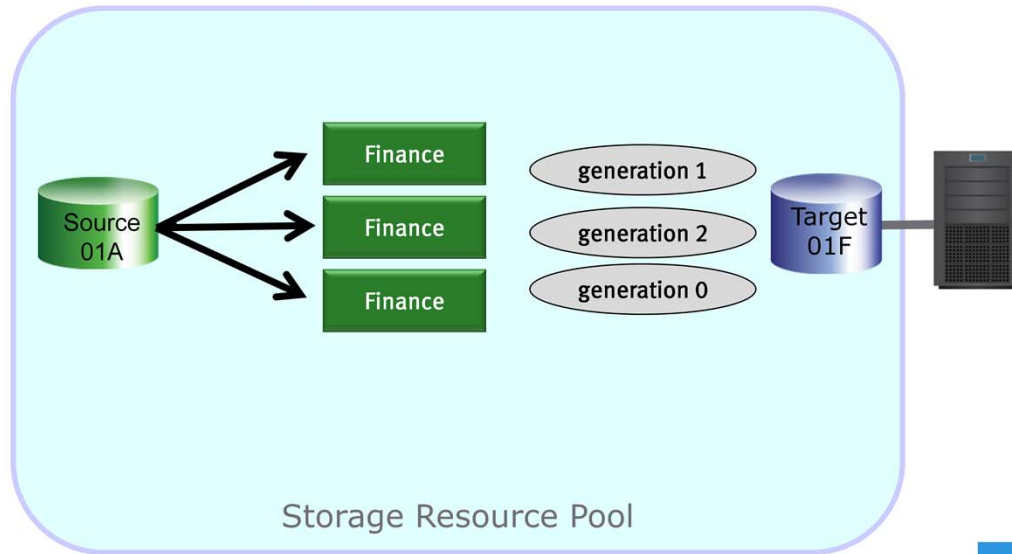
VMAX³ Local Replication Fundamentals

EMC²

27

Unlink is used to disassociate the target from the snapshot.

TimeFinder SnapVX Terminate



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

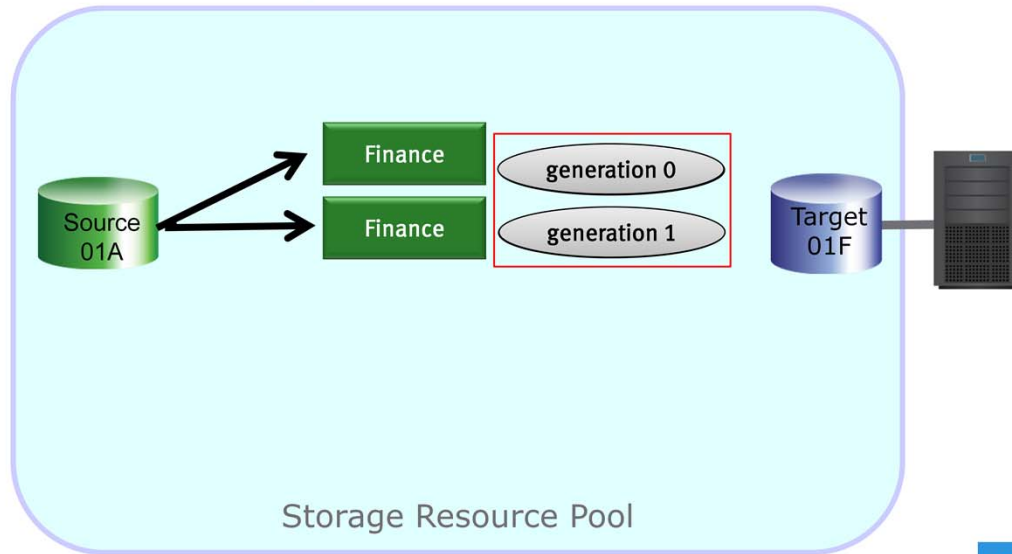
EMC²

28

Terminating a snapshot removes the snapshot from the system. You cannot terminate a snapshot if it has any links.

In order to terminate a snapshot the terminate command is used. In our example generation zero is being terminated. If there are multiple generation then each generation must be explicitly terminated.

TimeFinder SnapVX Terminate



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

29

Notice that the generation numbers have changed. Generation 2 is now 1 and generation 1 is now zero.

TimeFinder SnapVX Legacy Support

Legacy Modes are supported via emulation mode

- Mirrors
- Clones
- VP Snap

Snap mode is not supported on VMAX³

SnapVX and emulation modes cannot be used on the same source volume

EMC²

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

30

TimeFinder SnapVX uses an emulation mode to support legacy TimeFinder modes such as: Mirrors, Clones, and VP Snaps. Investments in scripting and programming using the legacy modes are preserved. Users are encouraged to convert to the SnapVX command syntax as its architecture is much more efficient.

SnapVX and emulation modes can not be used on the same source volume.

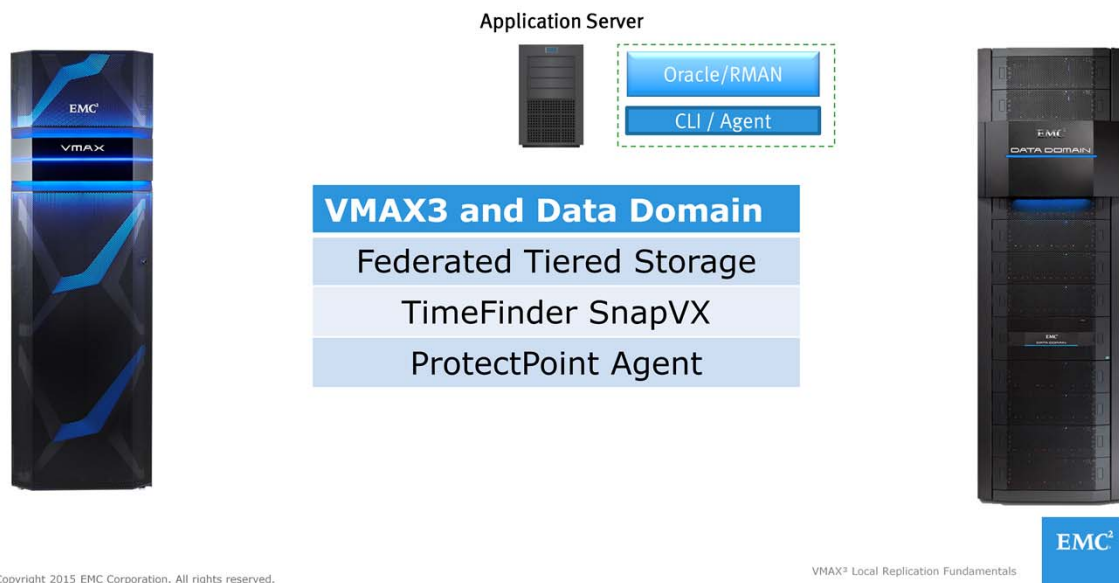
If a Clone emulation is used the underlying SnapVX command will be with a `-copy` argument which is covered later in the course.

When a target device is linked to a snapshot in copy mode it creates a full volume copy.

Due to the fact that all devices are thin in the VMAX³, Snap mode is no longer supported. Any legacy scripts that use the `symsnap` command will fail.

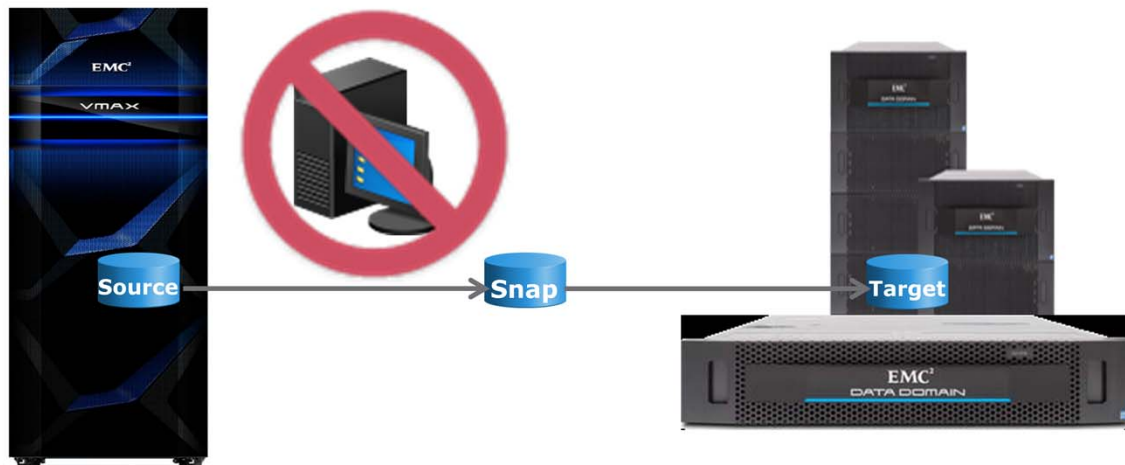
Note: the `-sg` option, for storage groups, is not supported with the emulation modes.

VMAX³ TimeFinder SnapVX and ProtectPoint



ProtectPoint is supported with VMAX³ running HYPERMAX OS 5977 Q4 2014 and Solutions Enabler 8.0.1. ProtectPoint uses TimeFinder SnapVX technology to perform backup and restore operation from Data Domain vDisks. ProtectPoint uses an Application/Recovery Server to execute SnapVX backup and recovery scripted operations. The setup to prepare the VMAX³ for ProtectPoint is done at the factory. The DX ports and the external Disk Group are also configured at the factory. There is no upgrade path to existing VMAX³ arrays. The volumes on the DD side that will be used for backup and restore operation must match the size of the volumes on the VMAX³ side.

VMAX³ TimeFinder SnapVX and ProtectPoint



© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

32

ProtectPoint and FTS provides backup and restore capability controlled by the end user that does not impact host or production applications. ProtectPoint uses EMC's Data Domain vDisks as the targets (via FTS) for the snapshots. The target volume must be linked in copy mode.

Some of ProtectPoint's biggest benefits are:

- elimination of backup impact on applications and hosts
- Faster backup and recovery and
- reduction of complexity, costs, and excess infrastructures

Module Summary

Key points covered in this module:

- TimeFinder SnapVX Features and Capabilities
- Usage of the key features in an IT environment

This module covered the TimeFinder SnapVX features and capabilities, as well as the key features in an IT environment.

Module: Local Replication Management Software

Upon completion of this module, you should be able to:

- Describe Local Replication management options

This module focuses on management tools for TimeFinder SnapVX and ProtectPoint.

Local Replication Management Software

The Replication management software:

Solutions Enabler

- consisting of commands that can be invoked on the command line, or within scripts

Unisphere for VMAX

- User-friendly GUI software to manage the VMAX³

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC

35

EMC provides Replication software to manage the TimeFinder SnapVX environment.

The EMC® Solutions Enabler provides a Command Line Interface (SYMCLI) to manage replication operations from the Command Line, or within scripts.

These commands can be used to monitor device configuration and status, and perform control operations on the replication features.

Alternatively Unisphere for VMAX, a GUI, can also be used.

Minimum versions are:

- Solutions Enabler - 8.0.1 and above
- Unisphere for VMAX - 8.0.1.4 and above

VMAX³ TimeFinder SnapVX Management symsnapvx list

```
C:\>symsnapvx -sid 83 -sg snapvx list -detail
```

```
Storage Group (SG) Name : snapvx
SG's Symmetrix ID      : 000196700483 (Microcode Version: 5977)
```

Sym Dev	Snapshot Name	Gen	Flgs FLRG	Snapshot Timestamp	Total Deltas (Tracks)	Non-Shared (Tracks)	Expiration Date
00049	backup2	0		wed Jan 21 11:14:29 2015	6183	6183	NA
	backup	0		wed Jan 21 11:09:07 2015	16395	16393	Mon Jan 26 11:09:07 2015
	backup	1		wed Jan 21 11:04:01 2015	16395	4365	NA
	backup	2	.X..	wed Jan 21 11:03:47 2015	16395	4366	NA
					55368	31307	

Flgs:

```
(F)ailed : X = Failed, . = No Failure
(L)ink   : X = Link Exists, . = No Link Exists
(R)estore : X = Restore Active, . = No Restore Active
(G)CM    : X = GCM, . = Non-GCM
```

EMC²

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

36

This is an example of the solutions enabler symsnapvx list –detail report of the “snapvx” storage group.

This first two snapshots are both for the same source, device 49, however the first two snapshot names are unique

so they are treated individually and are both generation zero.

The snap with the name “backup” – generation 0, was given an expiration, or TTL, and is shown with an expiration date.

There are 3 snapshots named “backup”. We see generations 0, 1 and 2. Gen 0 is always the most recent snap. The generation numbers are not static and will always be consecutive with the newest being 0.

Snapshot “backup” – generation 2 has been linked to a target.

The non shared tracks count indicates the number of tracks that are unique to this snapshot. If you terminate the snapshot this is the amount of space that would be freed and returned to use in the SRP.

Unisphere for VMAX

The screenshot displays the EMC Unisphere for VMAX V8.0.1.4 interface. The top navigation bar includes 'Storage', 'Hosts', 'Data Protection', 'Performance', 'Databases', and 'System'. The 'Data Protection' menu is open, showing options: 'Protection Dashboard', 'TimeFinder', 'SRDF', 'Replication Groups and Pools', and 'Open Replicator'. The 'TimeFinder' option is highlighted. The main dashboard area shows a 'SUMMARY' section with 'Remote Arrays: 0' and a 'Technologies' list including 'TimeFinder/SnapVX', 'TimeFinder/Clone', 'TimeFinder/Mirror', 'SRDF', and 'ProtectPoint'. Below this is an 'APPLICATION PROTECTION' table with columns for 'State', 'Storage Group', and 'Replication Management Group'. The table shows a single entry with a green checkmark in the 'State' column, 'snapvx' in the 'Storage Group' column, and 'backup (3)' in the 'Replication Management Group' column. The bottom of the slide contains the copyright notice '© Copyright 2015 EMC Corporation. All rights reserved.', the text 'VMAX³ Local Replication Fundamentals', the EMC logo, and the page number '37'.

State	1 ▲ Storage Group	2 ▲ Replication Management Group
✓	snapvx	backup (3)

The Data Protection Dashboard displays the various protection in effect for the applicable Storage Groups. From the Data Protection drop down select TimeFinder. This will take you to the TimeFinder page shown in the next slide.

Unisphere for VMAX (Contd.)

EMC Unisphere for VMAX V8.0.1.4

000196700483 > Data Protection > TimeFinder

TimeFinder/SnapVX
TimeFinder Snap VX views and management. Includes session controls, details and modes.

000196700483 > Data Protection > TimeFinder > TimeFinder/SnapVX

Storage Group	Capacity (GB)	Snapshots	Last Creation Time
snapvx	2	4	Jan 21, 2015 11:08:18 AM
▼ w2k8r2-88-72_parent	12.04	4	Jan 21, 2015 11:08:18 AM
w2k8r2-88-72_prod	12.01	4	Jan 21, 2015 11:08:18 AM

Create Snapshot Link Restore View Storage Group View Snapshots >>

© Copyright 2015 EMC Corporation. All rights reserved. VMAX³ Local Replication Fundamentals 38

Select TimeFinder/SnapVX. This will list all Storage Groups that have at least one Snapshot associated with them. Select the Storage Group on which you want to perform any of the available operations such as Create Snapshot, Link, Restore, View Storage Group, View Snapshots and more.

DD Enterprise Manager Status

The screenshot displays the EMC Data Domain System Manager interface. The top navigation bar includes tabs for Summary, Alerts, Active Users, and Stats. The Alerts section shows a table with columns for Count, Type, and Most recent Alerts. The File System section shows a status bar with 'Status: Running' and '0.0x' usage. The Services section shows a list of services like Replication, VTL, CIFS, NFS, and DD Boost. A help window is open over the Alerts section, titled 'EMC Data Domain System Manager Help'.

Count	Type	Most recent Alerts
0	Hardware	No Alerts
0	Replication	No Alerts
0	File System	No Alerts
1	Others	Error communicating with mail server.

File System: Status: Running 0.0x
Used: 0.7 (Total: 21418.2 GiB)
Data Written (Last 24 hrs): Pre-Compression: 0.0 GiB, Post-Compression: 0.0 GiB

Services: Replication (Enabled), VTL (Enabled), CIFS (Disabled), NFS (Enabled), DD Boost (Disabled)

With the Data Domain Enterprise Manager, you can manage one or more Data Domain systems. You can monitor and add systems from the Enterprise Manager.

A Data Domain system should be added to, and managed by, only one Enterprise Manager.

You can access the Enterprise Manager from many browsers:

- Microsoft Internet Explorer™
- Google Chrome™
- Mozilla Firefox™

The Summary screen presents a status overview of, and cumulative information for, all managed systems in the DD Network devices list and summarizes key operating information. The System Status, Space Usage, and Systems panes provide key factors to help you recognize problems immediately and to allow you to drill down to the system exhibiting the problem.

Module Summary

Key points covered in this module:

- Local Replication management options

This module covered some of the management and monitoring products for TimeFinder SnapVX and ProtectPoint.

Course Summary

Key points covered in this course:

- Business Benefits of Local Replication
- TimeFinder SnapVX Architecture
- Linking of TimeFinder SnapVX Snapshots
- Local Replication TimeFinder SnapVX commands

© Copyright 2015 EMC Corporation. All rights reserved.

VMAX³ Local Replication Fundamentals

EMC²

41

This course covered the VMAX³ TimeFinder SnapVX product, its benefits, architecture and capabilities; also covered were the management tools.

This concludes the training.