Dell PowerMax: Data Protector for z Systems (zDP) Essentials

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White Paper

Abstract

This document describes Data Protector for z Systems (zDP) features and functionality for Dell Technologies PowerMax 8500/2500 storage arrays for mainframe.

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Executive summary

Overview

Much of the focus on data protection in the last twenty years has been on recovery from loss of a data center due to unplanned outages or disasters. The emphasis has been on providing copies of data at alternate sites and on ensuring that data integrity of the copies is preserved. "Availability with data integrity" has been the goal.

In recent years, the focus of business continuity planning has expanded, beyond recovery from unplanned outages, to include a focus on recovery from widespread data corruption. Data corruption risk has taken on new and more dangerous forms beyond simple processing errors that introduce errant data. Data corruption risk now includes the willful hacking and destruction of data. As a result, the responsibility of CIOs has expanded beyond providing for rapid recovery from data center loss to ensuring "rapid recovery from loss of data integrity".

Data Protector for z Systems (zDP) is designed to address the problem of large-scale recovery from logical data corruption. zDP is a Dell Technologies z/OS-based application that uses TimeFinder SnapVX snapshots to enable rapid recovery from logical data corruption. zDP achieves this by providing multiple, frequent, and consistent point-in-time copies of data in an automated fashion across multiple volumes from which an application-level recovery can be conducted. By providing easy access to multiple different point-in-time copies of data (with a granularity of minutes), precise remediation of logical data corruption can be performed using storage or application-based recovery procedures. zDP provides the following benefits:

- Faster recovery times because less data must be processed due to the granularity of the available point in time data copies.

- Cross application data consistency for recovery data.

- Minimal data loss compared to the previous method of restoring data from daily or weekly backups. This is especially important for non-DBMS data, which does not have the granular recovery options provided by log files and image copies associated with database management systems.

- Ability to prevent a rogue employee or employees under duress from destroying zDP Snapsets or altering the operational parameters of zDP by enabling zDP Two Actor Security.

Prior to zDP, the only way to recover from logical data corruption was an offline copy, consisting of either a Business Continuance Volume (BCV), sometimes known as a "gold copy", or a backup made to offline physical or virtual tape. Even in the best data centers practicing the latest data protection procedures, often only one offline copy of the "state of the business" was being made per day. Considering that 288 snapshots can be taken in a 24-hour period (at 5-minute intervals) with zDP as compared to a single BCV or offline tape backup, zDP gives you up to 288x the granularity to recover from a situation that otherwise could have been detrimental or fatal to your business.

zDP enables rapid recovery from cyber-attacks, malware, sabotage, and human error. The key question is, have you done all you can to prepare for data loss, for data held to ransom, or data corruption?

Audience

This white paper is intended for information technology professionals, z/OS systems architects, and IT storage administrators. This white paper assumes you have a basic knowledge of Dell Technologies PowerMax.

Revisions

Date	Description
September 2019	Revision 0.1 which includes content related to OS 5978 SR (Q3 2019) as well as reformatting and attributions of release 0.2.
September 2020	Updates for PowerMaxOS Q3 2020 release
July 2022	Updated version

We value your feedback

Dell Technologies and the authors of this document welcome your feedback on this document. Contact the Dell Technologies team by email.

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Note: For links to other documentation for this topic, see the PowerMax Info Hub.

Introduction

This white paper includes environmental considerations needed to understand and deploy Data Protector for z Systems (zDP). It describes the evolving data protection solutions that provide the building blocks for zDP. This paper discusses zDP both from the mainframe and PowerMax point of view.

zDP provides a granular level of protection for your mainframe assets so that a processing error, malicious intent, or human error may not cause a data center-wide outage or loss of data recovery capabilities. zDP uses the concept of snapshots of Dell PowerMax source volumes that allow applications to restore data at a more granular level. This granularity provides point-in-time recovery for both database and non-database systems.

With point-in-time copies, selectable recovery points, and the ability to automate backup processes, users can elevate their data center and mission critical data management to a level of security never before possible.

Terminology

The following table lists the terminology used in this document.

Table 1.   Terminology

Term	Definition
zDP	Data Protector for z Systems: Dell Technologies software product providing a granular level of backups for data
TimeFinder SnapVX	Backup technology built on Virtual Provisioning enabling customers to take snapshots of Dell Source Volumes on PowerMax Arrays
Local snapshot	Data copy taken at the Source PowerMax Array
Remote snapshot	Data copy taken at the Target/remote PowerMax Array
Versioned Data Group (VDG)	Logical group of source volumes that associates volumes along with settings for creating multiple point-in-time images
Snapshot	Pointer based, point-in-time image of single volume
Snapset	Named point-in-time consistent image of all source volume snapshots in a VDG
Snapset Capture	Continuous automated process of creating snapsets
Target Set	Group of devices which have been defined to zDP as the desired LINK targets to a snapset

What is zDP?

zDP is a mainframe Dell software solution providing continuous data protection for your mainframe data assets. Deployed on TimeFinder SnapVX, Dell's new space efficient volume snap capability, your environment can increase the granularity of application recovery. Increasing granularity involves leveraging zDP's three components; versioned data groups (VDG), snapsets, and Target Sets. To assist customers with zDP, the software includes the ability to manage, operate, and monitor your environment through

JCL, ISPF, and SCF commands. These components working together provide seamless integration for your backups to use and leverage zDP.

TimeFinder SnapVX explained

TimeFinder SnapVX is a Dell Technologies software product that provides space-efficient, volume snap capabilities on the PowerMax storage platform. Built on thin (virtual) provisioning, TimeFinder/SnapVX supports up to 256 'target-less' snapshots on each source volume. The target-less ability provides a reduction in both metadata footprint and capacity consumption while allowing many snaps to be created with minimal impact to application performance. Customers can link one snapshot to multiple target volumes to have multiple copies of data and data versioning when needed. However, customers do not need to link a snapshot to a target volume until users need to use the data from the snapshot in a meaningful way. Because snapshots are a Read-Only structure, the changes made on the source volume will not propagate to the snapshot.

A snapshot can be viewed as a container that saves the pointers of the source volume. When a snapshot is no longer needed, customers can unlink the target volume from the snapshot and terminate the snapshot. This is a fast and efficient way to reclaim any space that a snapshot has (only unique allocations to that snapshot would eventually be freed).

Finally, it is important to differentiate between a snapshot and a snapset. A snapshot represents the pointer based, point-in-time image of one volume. This is what SnapVX primarily does. A snapset is the pointer-based image of a point in time copy of multiple volumes within a single Versioned Data Group (VDG). For example, VDG EMCVDG may have snapshots of volumes AAAAAA, BBBBBB, and CCCCCC. Snapset terminology is unique to zDP.
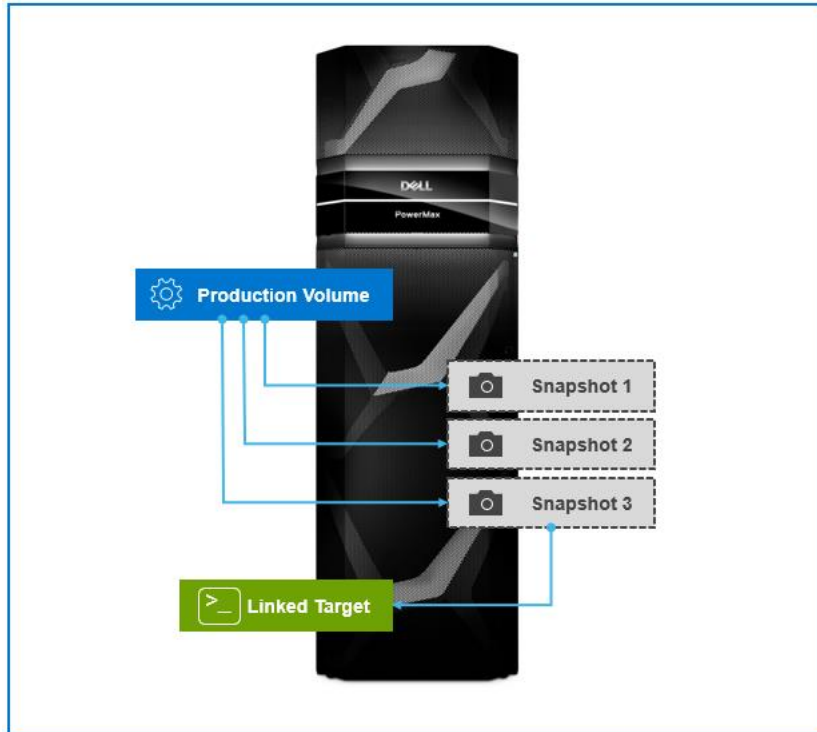

Figure 1.   Snapshots and a linked target

Three snapshots of a production volume were taken. To use the data in the third snapshot, use the LINK command.
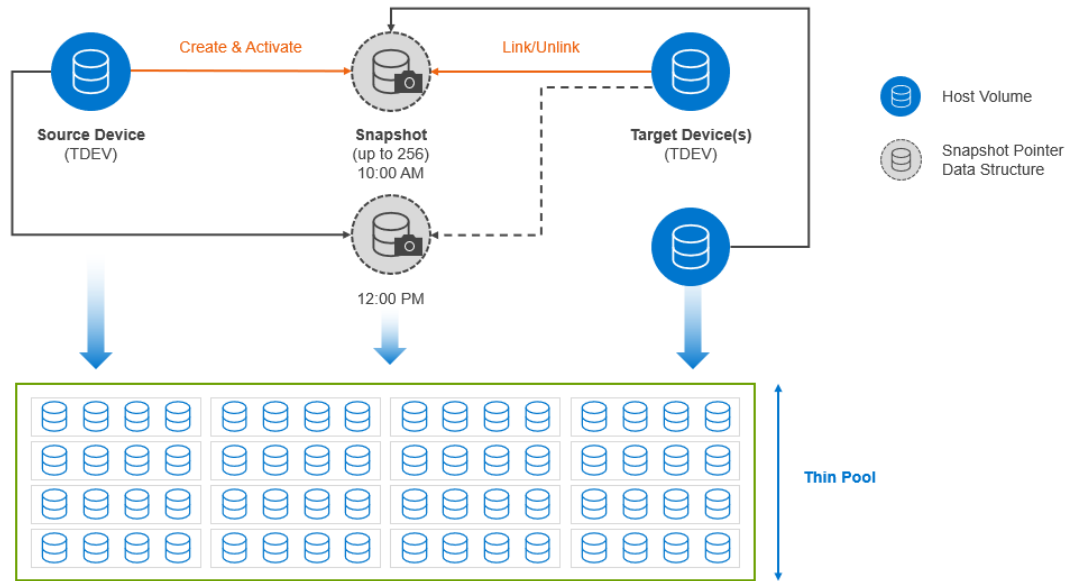
Figure 2.   Relationships between source and target devices to snapshots

This figure shows the relationships between source devices for snapshots and target devices for snapshots. The dotted line indicates the mutually exclusive relationship between snapshots and a single target volume. While not depicted here, it is also possible to cascade copies by taking snapshots from linked targets.

zDP use cases

zDP creates multiple snapsets (a snapset is a dependent write consistent pointer-based construct that provides an immutable point-in-time copy of the data) which can be leveraged in the following ways:

- After taking consistent snapsets of data, users use the data on a rescue system to restore the data to a known point-in-time.

- Create a "golden copy" of the data on the local or remote site with zDP.

- Build a persistent copy of the environment that could be used for disaster recovery testing.

How does zDP work?

zDP runs within the Mainframe Enablers Resource Pak Base in a z/OS environment. The zDP application automates the creation of consistent snapshots on a continuous basis. zDP uses a construct called a 'Versioned Data Group' (VDG) that defines the source volumes used for the point-in-time copies. These source volumes can be referred to by SYMM ID, z/OS device number, SCF Group Name Services (GNS) group name, or volume serial number. When the customer starts the VDG through EMCSCF address space, the source volumes defined in that VDG are used to create "snapsets". When the maximum number of snapsets is reached, zDP terminates the oldest snapset within the VDG (based on MAX_SNAPSETS parameter setting).

To link the entire snapset to a group of target volumes, the user must define a set of target volumes within zDP called the Target Set. Note that a zDP Target Set does not need to be defined for zDP to operate and to take snapsets. However, in order to use the data from a snapset you must link the snapset to the Target Set from within zDP or link individual snapshots from the snapset to target volumes using the EMCSNAP batch utility. Finally, while zDP runs, you can use the zDP Versioned Data Group (VDG) query commands to monitor and report on the zDP application.

zDP implementation

zDP Implementation is a two-stage process, including the planning phase and the implementation phase. The planning phase is done in conjunction with a Dell Technologies representative who has access to tools that can help size the capacity needed for zDP.

The implementation phase includes the following for z/OS:

- A batch interface that allows customers to submit jobs to define and manage zDP

- A zDP run-time environment that executes under your Dell SCF started task that creates and manages snapshots (leveraging SnapVX)

Creating zDP versioned data groups

Before starting zDP users must create the VDG and Target Set while defining the characteristics of the VDG and Target Set. Once the creation and definition of the VDG and Target Set is complete, users can start zDP.

Defining a versioned data group

During the creation of a VDG users provide installation-specific parameters. The VDG and Target Set use a JCL batch job (using the EIPINIT program in your MFE LINKLIB).

Here is sample JCL that users could use to define a VDG.

```
//jjjjjjjj JOB (ZDP),EMC,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID,
//        REGION=0M
/*JOBPARM LINES=999999
//*
//* CREATE AND DEFINE A VDG
//*
//ZDPDEF  EXEC PGM=EIPINIT,REGION=0M
//STEPLIB   DD  DISP=SHR,DSN=your.mfe.linklib
//SYSPRINT  DD  SYSOUT=*
//SCF$PD40  DD  DUMMY    ---> Point to the SCF you are running
//*
//SYSIN    DD  *
GLOBAL MAX_RC(4)
DEFINE VDG VDGNEW,
….. zDP Options here
MODIFY VDG VDGNEW,ADD,
  CCUU(gggg,dddd-dddd)   ---> gggg = Gatekeeper, dddd-dddd =
```

```
devices
//*
```

After receiving the 0000 Return Code, users can now see that VDG is created with the query command.

Defining a target set

In order to use the data from the snapsets within zDP, link the VDG to a Target Set. To define a Target Set in JCL, specify a name for the Target Set and then add the devices that save the data from the snapsets. Here is sample JCL your installation standard to define and add devices to a new Target Set.

```
//JJJJJJJJ JOB (ZDP),EMC,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID,
//        REGION=0M
/*JOBPARM LINES=999999
//*
//*  DEFINE A TGT & ADD DEVICES
//*
//ZDPDEF  EXEC PGM=EIPINIT,REGION=0M
//STEPLIB   DD  DISP=SHR,DSN= your.mfe.linklib
//SYSPRINT  DD  SYSOUT=*
//SYSUDUMP  DD  SYSOUT=*
//SCF$PD40  DD  DUMMY    ---> Point to the SCF you are running
//*
//SYSIN     DD  *
GLOBAL MAX_RC(4)
DEFINE TARGET_SET TGTNEW2
MODIFY TGT TGTNEW2,ADD,
     CCUU(gggg,dddd-dddd)  ---> gggg = Gatekeeper, dddd-dddd =
devices
/*
```

Considerations when building a target set

Note the following when building a target set.

- Target Sets must contain equal or greater number of volumes than the VDG used in the LINK operation.

- Target sets should have equal or larger volume size to the volumes in the VDG. For example, if the VDG has ten 3390 mod 3 CKD volumes, the target set must have at a minimum ten 3390 mod 3 CKD volumes. If users were to have ten 3390 mod 9 CKD volumes in the target set and linked the VDG (with mod 3), the LINK would work but users would need to specify the REFVTOC parameter in the GLOBAL parameters in order to use the remaining space on the volume.

After creating a VDG, zDP provides commands to modify the contents of the VDG so that you can adapt to your ever-growing IT needs. For example, use the MODIFY VDG command to add or remove devices from the group. Authorities for all zDP commands are managed with SAF calls. See *Mainframe Enablers 10.0.0 Installation and Customization Guide* for details on zDP commands which can be restricted.

Starting zDP through mainframe enablers

After users have added and customized the configuration parameters for zDP, zDP should be started from the EMCSCF started task. Use the command "F emcscf,zDP START vdg_name". If the VDG_NAME is found within SCF, the zDP started task creates SNAPSETs in that VDG. There does not need to be a "Target Set" for the SNAPSET to be created. This is based on the 'target-less snapshot' principal underlying SnapVX.

When users start the VDG, the z/OS SYSLOG SCF and EIP messages indicates that the SNAPSET has been created. For example, the VDG called VDGNEW and zDP produced the following messages in SYSLOG. (Also, users can reference a LOGOPT DD statement to see zDP messages.

Snapshot creation message:

```
SCF0740I ZDP START TESTVDG1
SCF0741I ZDP START command accepted
SCF0746I ZDP VDG TESTVDG1 Started
EIP0200I *** EMC zDP – V10.0.0 (000) - Tuesday, July 19, 2022 ***
EIP0250I VDG TESTVDG1,  SMF Recording enabled, Record Id 228,
Tracks
EIP0201I VDG TESTVDG1, Beginning cycle    39, Snapset
TESTVDG1.......170
951304C00039
EIP0217I VDG TESTVDG1,   Devices validated for consistency, via
ECA
EIP0204I VDG TESTVDG1,   SNAPSET TESTVDG1.......170951304C00039
created
EIP0202I VDG TESTVDG1, Completed cycle    39, next cycle scheduled
for
13:14:32
```

When a zDP creates snapsets, it refers to the duration and frequency of the snapset as a cycle. For example, the VDG 'CYCLE_TIME(10,35)' parameter, indicates to zDP to take a snapset of every volume in this VDG every 10 minutes and stop the VDG from taking any more snapsets after 35 cycles. Users can see the first cycle in Figure 3. This is an important concept to understand because when users query the VDG after it has taken 35 cycles, a unique 'SNAPSET_NAME' exist in the output. Each 'SNAPSET_NAME' represents one cycle.

To find out the names of the SNAPSETs for a specific VDG, use the QUERY command. When a VDG takes a SNAPSET, it uses the Enginuity Consistency Assist feature of PowerMaxOS to ensure that the snapset dependent write is consistent.

Linking VDG to target set

After creating a VDG and successfully starting it, and creating snapsets, customers can link a snapset to a Target Set to use the data. First, it is suggested to query the VDG to see what snapsets are available to use. The following is a sample JCL job that queries the status of the snapsets:

```
//jjjjjjjj JOB (ZDP),EMC,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID,
//         REGION=0M
/*JOBPARM LINES=999999
//*
//*  QUERY VDG OPTIONS
//*
//*
//ZDPDEF  EXEC PGM=EIPINIT,REGION=0M
//STEPLIB   DD  DISP=SHR,DSN= your.mfe.linklib
//SYSPRINT  DD  SYSOUT=*
//SYSUDUMP  DD  SYSOUT=*
//SCF$PD40  DD  DUMMY    ---> Point to the SCF you are running
//*
//SYSIN     DD  *
GLOBAL MAX_RC(4)
QUERY VDG VDGNEW,SNAPSET
QUERY VDG VDGNEW,SNAPSET,DETAIL
/*
```

Within the query output look for the 'SNAPSET_NAME' and select the snapset you would like to link to your target devices. Normally users can reference the Create Date to indicate what snapset data they want to access. Note that the 'SNAPSET_NAME' is needed in the LINK command. The following figure provides sample output from a query command that has the VDG SNAPSET_NAME.

SNAPSET_NAME	STATE	CREATE DATE	TIME
JUNIP01........221681545C05500	ACT	06/17/2022	11:42:33

Figure 3.   VDG SNAPSET_NAME query

Using the SNAPSET_NAME, and Target Set (created earlier), users can customize the following JCL to link the snapset to the Target Set, making the data accessible to the target volumes.

```
//JBASTI00 JOB (ZDP),CSEEMC,CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID,
//         REGION=0M
/*JOBPARM LINES=999999
//*
//*  LINK / UNLINK A TARGET_SET
//*
//*
//ZDPDEF  EXEC PGM=EIPINIT,REGION=0M
//STEPLIB   DD  DISP=SHR,DSN=your MFE linklib
//SYSPRINT  DD  SYSOUT=*
//SYSUDUMP  DD  SYSOUT=*
//*SCF$XXXX  DD  DUMMY ---> Point to the SCF you are running
//*
```

```
//SYSIN    DD  *
GLOBAL MAX_RC(4)
LINK   VDG(vdg name from above),SNAPSET(221681545C05500)
TGT(target set from above)
```

zDP with SRDF

The following applies to zDP and SRDF:

- zDP supports snapset creation in locally attached PowerMax arrays, PowerMax via SRDF/S or SRDF/A or PPRC.

- zDP can go up to and not exceed four hops.

- If a z/OS CEC attached to your remote side (R2), you could access the snapsets created using commands that were sent from your R1 environment or create snapsets locally from a zDP environment running on a host attached to the R2 PowerMax. Leverage zDP to execute SnapVX commands utilizing the RMT (remote) keyword across SRDF links. For example:

```
//ZDPDEF  EXEC PGM=EIPINIT,REGION=0M
//STEPLIB   DD  DISP=SHR,DSN=<mfe.linklib>
//SYSPRINT  DD  SYSOUT=*
//SYSUDUMP  DD  SYSOUT=*
//*SCF$PD49 DD DUMMY
//SYSIN    DD  *
GLOBAL MAX_RC(4)
 DELETE VDG ZOS_DBS_DC2,ALLOWNE      ☐ Deletes VDG with
definitions
 DEFINE VDG 'ZOS_DBS_DC2',
    CYCLE_TIME(240,6)
 MODIFY VDG 'ZOS_DBS_DC2',ADD,
    SYMDEV(B10F,
         0000A0-0000A3,000190-000193,000280-000283,000370-
000373),
      RMT(0D)
//
```

zDP enhancements

zDP enhancements: May 2017

Mainframe Enablers enhanced zDP's usability and monitoring capabilities. Some of the new features include:

- The QUERY SNAPSET command with the SNAPSET option provides a new entry in the output called 'RDP Cache Utilization' percentage. This information allows customers to monitor their PowerMax Replication Data Pointers (RDP) usage. In the event a customer's RDP usage exceeds a threshold, customers should work with Dell support to look at reducing the RDP usage.

- Create VDG ISPF panels (via existing zDP ISPF panels) or batch JCL statements add three new parameters on the Versioned Data Group (VDG).

- RDP Cache Util(ww,cc) – 'ww' is a percentage for when warning messages should be sent to z/OS. 'cc' is a percentage when the RDP threshold reaches a critical level and messages will be sent to z/OS.

- SMF rec number – This permits the customer to set a SMF record number for zDP. SMF records are cut for that VDG at the beginning of each cycle. This time is specified in the 'Cycle Time' input parameter

- TRACKS – Provides additional output for your VDG for all total changed and unique tracks within the VDG.

    Note: Understand that turning TRACKS(Y) will create a lot of data for the VDG.

- TERMINATE ALL command available via zDP ISPF panels and batch JCL statements. This command enables customers to terminate multiple zDP snapsets with one statement. The ability to ensure the customer chooses to do this with a confirmation message in the zDP ISPF panels or a WTOR message in SYSLOG (if running in batch mode) is provided.

- If a zDP snapset fails during the ACTIVATE command, zDP automatically cleans up and terminates the snapsets.

zDP enhancements: May 2018

Mainframe Enablers version 8.3 also delivered several enhancements to zDP, expanding management capabilities of existing z/OS structures and security parameters. Enhancements included:

- Secure Snapsets: zDP builds on top of SnapVX secure Snapshot capability. With zDP secure snapsets, customers can set an expiration interval on the zDP Snapset. With the expiration interval set, the snapset will be terminated by Hypermax OS only when the expiration interval expires and cannot be terminated from a host command. This provides increased security to your most critical data that zDP manages. The new parameters to set your snapsets to a secure state are explained in the SnapVX and zDP Product Guide.

- Five Minute Cycle Time: Cycle time enables customers to specify how often zDP should create a snapset. Previous to Mainframe Enablers 8.3, customers set the zDP cycle time to no less than 10 minutes. This enhancement will enable customers to set the cycle time as low as five minutes enabling more granular copies of your data.

- COPY_ONCE VDG Parameter: This parameter will increase space savings for your zDP snapsets because enables customers to identify which data to snapped once and not needed for every snapset iteration.

- The ability to define a VDG and Target group by specifying an SRDF Group: Customers today use SRDF groups when working within PowerMax and VMAX All Flash. This enhancement will enable customers to use existing SRDF Groups to define and manage VDG and Target groups.

zDP has also made significant enhancements to how various commands are processed by the PowerMax and VMAX 950 All Flash Array. The result of these enhancements will improve performance for the QUERY and ACTIVATE commands. For more information about enhancements, refer to latest Product Guide for SnapVX and zDP.

zDP enhancements: September 2019

With the release of PowerMax OS 5978 SR and Mainframe Enablers version 8.4, zDP delivers exciting new enhancements to more efficiently manage your environment.

- An increase in the number of zDP Snapsets for a VDG from 256 to 1024, providing up to a 4x increase in the total number of Snapsets allowed, enabling more point in time copies for increased granularity in RPO.

- Snapset creation on demand. zDP now supports immediate creation of Snapsets of a VDG, which is convenient for taking a snap just prior to a batch or job cycle. Consider a customer's business timing like yearend / quarter close; on demand Snapsets can enhance protection of critical RPOs.

- On demand Snapset creation is even possible with VDG Snapset creation running

- Dynamic modification of Version Data Groups and Target Sets, enabling changes to VDGs without having to stop and start them.

- zDP LINK operations improved performance: With a 5978.* microcode and customers must redefine the VDG with MFE 8.4, will improve performance zDP LINK operations.

zDP Enhancements: September 2020

With the release of Mainframe Enabler version 8.5, Dell Technologies continues to innovate providing new usability and security enhancements for Data Protector for z Systems (zDP).

Security Enhancement

To provide greater protection of your most valued data, Mainframe Enablers (MFE) 8.5 introduces zDP Two Actor Security. When enabled, Two Actor Security requires two people to execute certain zDP commands. This enhancement when implemented could prevent a rogue employee or employee under duress from destroying zDP Snapsets or alter the operational parameters of zDP.

Usability Enhancement

To ensure that customer Volume Data Group (VDG) and Target Set definitions stay defined after an IPL, MFE 8.5 can preserve the definitions via the zDP Definition Persistence feature. When defining your zDP definitions, customers can export the VDG or Target definitions to a Symmetrix File System (SFS) for preservation. After an IPL, the definitions would be loaded back into your SCF address space. If customers have existing definitions created from older MFE software, customers would have to use the export and import functionality while running MFE 8.5 to take advantage of zDP Definition Persistence feature.

While a VDG is taking snapsets, customers can now alter VDG parameters while the VDG is running. (See the Dell TimeFinder SnapVX and zDP 8.4 Product Guide for parameters that can be dynamically modified.)

zDP enhancements: July 2022

Before using zDP in Mainframe Enabler 10.0.0, if this is an existing zDP environment (with a MFE 8.5 or older MFE version), see the MFE 10.0.0 Installation and Customization Guide, Chapter 3 (Upgrading a VDG to Mainframe Enabler 10.0.0). Notable enhancements in zDP with MFE 10.0.0 offer the following enhancements for customers:

- In PowerMaxOS 6079, the Snapset ID has changed slightly to indicate halfseconds.

- zDP in MFE 10.0.0 will allow customers to link to targets sets that are already in a 'LINKED' state.

- Additional security controls when using the FREE command on the UNLINK

- Ability to set a new meta data space utilization parameter to issue warning a error message when percentage of metadata is reached for a VDG

See the MFE 10.0.0 Release notes for a complete list of zDP enhancements with MFE 10.0.0.

Conclusion

zDP, built on TimeFinder SnapVX, provides consistent point in time copies of data that automate and enhance an IT environment's ability to recover from logical errors or pervasive logical corruption, such as ransomware encryption. zDP provides 288 times more recovery capability compared to daily snapshot, clone, or traditional TimeFinder technology. However, zDP does not prevent users from using existing JCL and slowly migrating to SnapVX and zDP.

With zDP, IT infrastructures can experience outstanding data protection. At each release of Mainframe Enablers, zDP continues to add many new usability features to give customers more insight and control of this tremendously powerful Dell Technologies exclusive feature.

References

Dell Technologies documentation

The following Dell Technologies documentation provides other information related to this document. Access to these documents depends on your login credentials. If you do not have access to a document, contact your Dell Technologies representative.

- [PowerMax Info Hub](#)