WHITE PAPER

SEAGATE CLOUD SYSTEMS WHITE PAPER

Integration and Best Practices Guide for Veeam Backup Repository



Technology Alliance Partner Access





CONTENTS

- 3 Introduction
 - 3 Summary
 - 3 Recommended Audience
- **3** Veeam Ready Repository
- 4 Supported Seagate Hardware
- 4 Storage Sizing
 - 4 RPO and RTO
 - 5 The 3-2-1 Rule
 - 5 Sizing the Servers and Storage
- 6 Provisioning Storage on the Array
- 7 Configuring and Presenting Seagate iSCSI Volumes
- 7 Data Protection with RAID and ADAPT
 - 7 Minimum Storage Building Blocks for Veeam
- 8 Creating Disk Groups
 - 9 Using the SMC
 - 11 Using the CLI
- **14** Creating Volumes
 - 14 Using the SMC
 - 16 Using the CLI
- 17 Creating Host Initiators
 - 17 Using the SMC
 - 20 Using the CLI
- 22 Mapping Volumes to Hosts
 - 22 Using the SMC
 - 23 Using the CLI

- 25 Configuring Windows
 - 25 iSCSI
 - 26 MPIO
- **29** Preparing New Volumes for Veeam
- **32** Adding New Storage to the Backup Repository
- **35** Identifying Bottlenecks
 - 35 References

Introduction

Seagate is a worldwide leader in data storage products and Veeam[®] is a leader in backup software and data protection. Seagate and Veeam have teamed up to create world-class data storage solutions for the Veeam Backup Repository.

Summary

This document provides a detailed explanation of how Seagate[®] storage products integrate with Veeam Backup and Replication software. It also provides detailed information about configuration and best practices, as well as guidance on storage sizing.

Recommended Audience

This document is intended for backup and storage administrators, as well as technical sales and support professionals, who are looking to gain a better understanding of the process for integrating Seagate RAID products with the Veeam Backup Repository.

Veeam Ready – Repository

As a Veeam Alliance Partner, Seagate has tested the Exos® X series of iSCSI RAID storage systems for inclusion in the Veeam Ready Program.



Figure1: Veeam Ready Repository

Supported Seagate Hardware

The following Seagate hardware was tested for the Veeam Ready submission:

- Seagate Exos X 2U12 with twelve 12TB HDDs and Exos 3005 controllers
- Configuration: RAID 6 (8+2) with two spares and 128K chunk size

Additionally, all models and configurations of the Exos X Series with specifications equivalent to or greater than what's listed above are included with the qualification. This means the following systems are also supported:

- Exos X 2U12 Enclosure with Exos X 3005/4005/5005 iSCSI RAID Controllers
- Exos X 2U24 Enclosure with Exos X 3005/4005/5005 iSCSI RAID Controllers
- Exos X 5U84 Enclosure with Exos X 4005/5005 iSCSI RAID Controllers Note: Minimum configuration RAID 6 (8+2)

Compatible systems are listed in the Veeam Ready database, which can be accessed directly through this link: **https://www.veeam.com/ready.html**

You can also access information about Seagate Systems directly using this link: https://www.veeam.com/kb3249

Storage Sizing

Before calculating the amount of raw storage required to support a Veeam Backup Repository, it's important to know several key backup software concepts. Further, one must understand how to use the publicly available Veeam sizing tool. Both the type of backup and the frequency of backup jobs, along with the number of clients and data change rate, will have a direct impact on the amount of storage that is ultimately needed.

RPO and RTO

When making decisions about backup frequency and type, backup administrators refer to established requirements known as recovery point objective (RPO) and recovery time objective (RTO). Both the frequency and type will affect the overall storage requirements for backup.

Recovery Point Objective (RPO): A recovery point objective defines the point to which the data must be recovered. Sometimes, this is conceptualized as the amount of acceptable data loss in terms of time; for example, a day, an hour, a minute, or close to none.

Recovery Time Objective (RTO): The recovery time objective defines the maximum amount of time it should take to perform a recovery to the point in time that is defined by the recovery point objective.

The 3-2-1 Rule

The United States Computer Emergency Readiness Team (US-CERT) put forth recommendations that all computer users, whether they're casual home users or professional information security officers, should follow for protecting critical data. This is known as the 3-2-1 rule, and you can learn about it in depth by clicking the following link: https://us-cert.cisa.gov/sites/default/files/publications/ data_backup_options.pdf

As a best practice, Veeam endorses the 3-2-1 rule, which is defined by US-CERT below:

- 3 Keep three copies of any important file: one primary and two backups.
- 2 Keep the files on two different media types to protect against different types of hazards.
- 1 Store one copy off site—i.e., outside your home or business facility.

The important takeaway is to keep multiple copies of data across multiple sites. This will have a direct impact on overall storage sizing.

Sizing the Servers and Storage

The Veeam Backup and Replication software suite includes an array of components, some of which are required and others that are optional. Each of these components will have its own compute system requirements, and many of the components can be run together on a single Windows server. Seagate Exos X storage devices are used directly with the Veeam Backup Repository component as direct-attached iSCSI storage. When sizing the Veeam Backup Repository server, which runs on Windows, sizing the server itself is separate from sizing the physical storage needed for the repository.

Sizing the Backup Repository Server

When sizing the server or servers that will be used to run one or more Veeam Backup Repositories, it's best to follow Veeam's recommendations directly.

Veeam has outlined this information in an online book titled *Veeam Backup & Replication Best Practices*, which can be found here: **https://bp.veeam.com/vbr/**

Click the following link to access the section on *Repository Design*: https://bp.veeam.com/vbr/ VBP/2_Design_Structures/D_Veeam_Components/D_backup_repositories/

Storage Sizing and the Veeam Storage Calculator

Veeam relies on the use of a publicly available online calculator to estimate the amount of storage space that will be required for the backup repository. The backup administrator should work with Veeam to fill out the online form and come up with the projected storage requirements. The resulting storage capacity requirements can then be provided to Seagate for capacity-based system sizing.

You can access the calculator here: http://rps.dewin.me/

Provisioning Storage on the Array

This section describes how to create a disk pool and volume on a Seagate Exos X array and present it to the iSCSI initiator on a Windows host. All steps in this section are carried out on the Exos X storage array, using either the command line interface (CLI) or the Seagate Storage Management Console (SMC). The user account on the array must include a minimum role of Manage to complete the following tasks.

Accessing the CLI

Users can access the CLI on the Exos controller one of two ways: directly via serial cable or over the network by IP address. Each controller in the storage array has the CLI. Before the CLI can be accessed over the network, an IP address must be assigned to each controller, using the serial cable to access the CLI.

 Open a console to the Exos X array via Network: Use HTTPS, HTTP, SSH, or Telnet on a management host that is remotely connected through a LAN to a controller module's network port or

Serial Cable: Use a terminal emulator on a management host that is directly connected to a controller module's serial CLI port

2. Log in at the prompt with an account that was assigned either the Standard or Manage role.

For more detailed information about accessing the CLI and using it to manage the array, please refer to the *Getting Started* section in the *5005/4005/3005 Series CLI Reference Guide:* https://www.seagate.com/files/www-content/support-content/raid-systems/_shared/ documentation/83-00007048-13-01_G265_CLI.pdf

Accessing the SMC

The SMC is a web-based interface that is accessed via IP address. Each controller in the storage array has a web server onboard which can be accessed by logging into the SMC. Before the SMC can be accessed on any controller, an IP address must first be assigned to the controller. This is usually done at the CLI using a serial cable at the time of initial array setup.

To access the SMC on the Exos X array:

- 1. Open a web browser and navigate to: https://<host name or IP address of storage controller>
- 2. Log in at the prompt with an account that was assigned either the Standard or Manage role.

For more detailed information about accessing the SMC and using it to manage the array, please refer to the *Getting Started* section in the Seagate *5005/4005/3005 Series Storage Management Guide:* https://www.seagate.com/files/www-content/support-content/raid-systems/_shared/ documentation/83-00007047-13-01_G265_SMG.pdf

Configuring and Presenting Seagate iSCSI Volumes

This section outlines how to create an iSCSI volume on the Seagate Exos X storage array and then present it to a Veeam Backup Repository server running on Microsoft Windows Server.

Data Protection with RAID and ADAPT

While Veeam and multiple copies of the data help protect against data loss, a level of protection for the backup data itself is still required. This will ultimately span multiple disk drives that make up the Veeam Backup Repository storage target. There are several data protection options available in the Exos X storage controllers, two of which stand out as best options for use with the Veeam Backup Repository. Both RAID 6 and Seagate ADAPT allow for up to a two-disk failure while offering similar levels of performance.

Minimum Storage Building Blocks for Veeam

When planning to use a Seagate Exos X array as a storage target for the Veeam Backup Repository, it's important to consider both performance and data protection. Regardless of which specific Seagate Exos X storage array is used, the minimum storage configuration for Veeam requires 12 disks. A 12-disk configuration was used to meet the requirements of the Veeam Ready Repository program.

There are two minimum configurations that can meet the performance demands of the backup repository server:

- 1. RAID 6 (8+2) with two hot spares 12 disks total in the storage pool
- 2. ADAPT 12 disks total in the storage pool

While any Seagate Exos X array can be used, the 2U12 is an ideal entry-level storage device. The Exos X 2U12 can be expanded with up to three additional Exos E 2U12 enclosures for a total of 48 drives. Similarly, the Exos X 2U24 can be expanded with the addition of three Exos E 2U24 enclosures for a total of 96 drives. And finally, the Exos X 5U84 can be expanded with three additional Exos E 5U84 enclosures for a whopping total of 336 drives.

Creating Disk Groups

The first step in provisioning storage to the Veeam Backup Repository is to create a disk group from a pool of disks on the array. The number of disks and the level of data protection will be defined when the disk group is created. A disk group can be created using the SMC or the CLI.

There are several options available when creating disk groups. In addition to RAID and ADAPT, there are different *linear* and *virtual* storage technologies.

ADAPT and RAID 6

While RAID6 and Seagate ADAPT offer similar levels of data protection, they accomplish this in different ways. RAID 6 is a traditional RAID configuration in which the data is striped across a minimum of two disk drives and two parity drives.

Seagate ADAPT is a RAID-based level of data protection that maximizes flexibility, provides built-in spare capacity, and allows for fast rebuilds, large storage pools, and simplified expansion.

ADAPT disk groups use all available space to maintain fault tolerance, and data is spread evenly across all the disks.

ADAPT offers several advantages over RAID 6, including:

- Significantly faster rebuild times
- The ability to use up to 128 drives compared to RAID 6's limit of 16
- Easier expansions with up to 68 disks at a time versus RAID 6's limit of one to four disks at a time
- Built-in spare capacity that eliminates the need for spare disks

When new data or new disks are added, or the system recognizes that data is not distributed across disks in a balanced way, it will move the data to maintain balance across the disk group.

Because disk space that is dedicated to sparing is spread across all disks in the system, spare capacity for ADAPT disk groups is automatically reserved. In the case of a disk failure, data will be moved to many disks in the disk group, allowing for quick rebuilds and minimal disruption to input/ output (I/O).

About Virtual and Linear Storage

Seagate Exos X arrays use two different storage technologies that share a common user interface. One uses the virtual method while the other uses the linear method.

Virtual storage is a method of mapping logical storage requests to physical storage (i.e., disks). It inserts a layer of virtualization such that logical host I/O requests are mapped onto pages of storage. Each page is then mapped onto physical storage. Within each page, the mapping is linear; but there is no direct relationship between adjacent logical pages and their physical storage.

A page is a range of contiguous logical block addresses (LBA) in a disk group, which is one of up to 16 RAID sets that are grouped into a pool. Thus, a virtual volume as seen by a host represents a portion of storage in a pool. Multiple virtual volumes can be created in a pool, sharing its resources. This allows for a high level of flexibility, as well as the most efficient use of available physical resources.

Some advantages of using virtual storage include:

- Allowing performance to scale as the number of disks in the pool increases
- Virtualizing physical storage, allowing volumes to share available resources in a highly efficient way
- Allowing a volume to be comprised of more than 16 disks

The legacy linear method maps logical host requests directly to physical storage. In some cases, the mapping is one to one, while in most cases the mapping is across groups of physical storage devices—or slices of them. This linear method of mapping is highly efficient. The negative side of linear mapping is a lack of flexibility. This makes it difficult to alter the physical layout after it is established.

Virtual storage provides the foundation for data management features such as thin provisioning, automated tiered storage, read cache, and the quick rebuild feature. More in-depth information on these technologies is available in the *Seagate 5005/4005/3005 Series Storage Management Guide*.

To gain maximum flexibility and ease of expansion, the use of virtual storage is recommended.

Using the SMC

- 1. Open a web browser session to the SMC as described earlier in this section.
- 2. Select the Pools tab, click Action, and then select Add Disk Group.



3. When the *Add Disk Group* wizard appears, select the storage technology *Type* as *Virtual* or *Linear*, and then select the *Data Protection* type. RAID 6 or ADAPT are recommended for use with Veeam.

Veeam recommends setting a chunk or stripe size at the storage level of 128 kilobytes (kB). The chunk size is set automatically, and it's not adjustable when using ADAPT or when using RAID 6 with the *Type* set to *Virtual*. The chunk size can, however, be changed when using RAID 6 with the *Type* set to *Linear*.

In this example, a 12-disk ADAPT disk group is created.

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In this example, a RAID 6 disk group with 10 disks (8+2) is created using the Linear storage *Type*.

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Once *Add* is clicked, it'll take a few minutes to process before there's a confirmation of completion. Once the disk group has been created, it'll be listed on the *Pools* tab of the SMC.

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Please note that once a new disk group has been created, it will take some time for the disk group to initialize. While it will have a health status of Fault Tolerant and On-Line (FTOL), the initialization process will take some time to finish. Peak performance on the array will not be observed until the initialization is complete.

Using the CLI

The CLI command for creating new disk groups is called: add disk-group

To add a new disk group using the CLI, proceed as follows:

- 1. Open a CLI session via serial cable or SSH to one of the Seagate controllers in the Exos X array and log in.
- 2. For example, to create a new disk group using 12 disks and ADAPT for data protection, as in the SMC example above, use the following command:

add disk-group type virtual disks 0.0-11 level adapt pool a

In the following example, the command to display any existing disk groups is used, and then a disk group is created. The command to display existing disk groups is then run a second time.

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To create a new disk group using 10 disks and RAID 6 (8+2) for data protection, as in the SMC example above, use the following command:

add disk-group type linear chunk-size 128k disks 0.0-11 level r6 dg01

In the following example, the command to display any existing disk groups is used, and then a disk group is created. The command to display existing disk groups is then run a second time.

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*** ** * ****	# # ### ##	** * * ***	### ##	
System Version: GT265R009-0 OS Version: GPM265R011-01 MC Version: GXM265R019-01 Serial Number: 00C0FF3B442E 10.239.184.150 login: manag Password: 3835 System Name: Seagate-TME System Location: Fremont, C Version: GT265R009-03 # show disk-groups Name Size Free Pool Tier % Job% Sec Fmt Healt	3 re of Pool Own RA h Reason Ac	ID Disks Status tion	Current Job	2
Success: Command completed # add disk-group type linea Success: Command completed # show disk-groups Mame Size Free Pool Job% Sec Fmt Healt	successfully. (r chunk-size 12 successfully. (Tier % of Pool h Reason Ac	2020-09-21 13:53:3 3k disks 0.0-11 le 2020-09-21 13:53:4 Own RAID Disks tion	20) evel r6 dg01 5) 5 Status Cur	rrent Job
dg01 119.8TB 119.8TB dg01 0% 512e OK	N/A 100	A RAID6 12	FTOL INI	IT
Success: Command completed	successfully. (2020-09-21 13:53:5	59)	~

Please note that once a new disk group has been created, it will take some time for the disk group to initialize. While it will have a health status of Fault Tolerant and On-Line (FTOL), the initialization process will take some time to finish. Peak performance on the array will not be observed until the initialization is complete. Current status can be observed by issuing the command: **show disk-groups**

Creating Volumes

Once a disk group has been created, a volume can then be provisioned from the disk group with the desired size. A volume can be provisioned using the SMC or the CLI.

Using the SMC

- 1. Open a web browser session to the SMC as described earlier in this section.
- 2. Select the Volumes tab, click Action, and then select Create Virtual Volumes.



3. When the *Create Virtual Volumes* wizard appears, enter a *Volume Name* and *Size*, and then click OK.

Create Virtual Volumes New Volumes: 50.0TB Virtual Po 0 volumes, 95.8TB uncommi	A ol: 95.8TB itted, 95.8TB	free		
Volume Name	Size	Number of Volumes	Preference	Pool
Vol0001	50TB		No Affinity 📃 🗖	A
			Add Row R	emove Row
One new volume will be crea	ated in pool A	(50.0TB).		K Cancel

4. The operation will complete and the new volume will be listed.



Using the CLI

The CLI command for creating new disk groups is called: create volume

To create a new volume using the CLI, proceed as follows:

- 1. Open a CLI session via serial cable or SSH to one of the Seagate controllers in the Exos X array and log in.
- 2. To create a 50TB read/write volume named *Vol0001* in pool A, run the following command: create volume vol0001 pool A size 50TB

In the following example, the command to display any existing volumes is used, and then a volume is created. The command to display existing volumes is then run a second time.

```
Putty 10.239.184.150 - Putty
                                                                         ×
                                                             ####
      ##
              ###
                                               ####
###
      ##
              ####
                                   ###
System Version: GT265R009-03
OS Version: GPM265R011-01
MC Version: GXM265R019-01
Serial Number: 00C0FF3B442B
10.239.184.150 login: manage
Password:
3835
System Name: Seagate-TME
System Location: Fremont, CA
Version: GT265R009-03
show volumes
Pool Name Total Size Alloc Size Class Type Large Virtual Extents Health
 Reason Action
Success: Command completed successfully. (2020-09-21 16:15:44)
# create volume vol0001 pool A size 50TB
Success: Command completed successfully. (vol0001) - The volume was created. (20
20-09-21 16:15:52)
show volumes 🧹
             Total Size Alloc Size Class
                                             Type Large Virtual Extents Health
ool Name
 Reason Action
    vol0001 49.9TB
                         0B
                                    Virtual base Disabled
                                                                         OK
Success: Command completed successfully. (2020-09-21 16:15:57)
```

Creating Host Initiators

After new volumes have been created, iSCSI host initiators must be created on the array so the new volume can be mapped to them in the next step. As with the other operations, creating a host initiator can be performed using the SMC or the CLI.

Using the SMC

- 1. Open a web browser session to the SMC as described earlier in this section.
- 2. Select the Hosts tab, click Action, and then select Create Initiator.



3. When the *Create Initiator* wizard appears, enter the iSCSI Qualified Name (IQN) for the initiator, as well as a name.

ifying a WWN or IQN and a	a nickname.
iqn.1991-05.com.microso	oft:tmesrv2
tmesrv2	
Standard 🗸	
	OK Cancel
	cifying a WWN or IQN and a iqn.1991-05.com.microso tmesrv2 Standard V



The initiator name can be found on the Windows Server running the Veeam Backup Repository. Launch the iSCSI application and select the *Configuration* tab. The initiator name will be found there.

argets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
Configu he initia	ation setting	gs here are global a	nd will affect any future	e connectio	ons made with	
Any exis he initia	ating connect ator otherwis	tions may continue se tries to reconnec	to work, but can fail if t t to a target.	he system	restarts or	
When co particula	onnecting to ar connection	a target, advanced n.	d connection features a	low specifi	c control of a	
nitiator	Name:					
gn. 19	91-05.com.n	icrosoft:tmesrv2				
'o modi	fy the initiat	or name, dick Chan	ge.		C <u>h</u> ange	
o set t lick CH/	he initiator C AP.	HAP secret for use	with mutual CHAP,		CHAP	
o set u lick IPs	p the IPsec ec.	tunnel mode addres	sses for the initiator,		ĮPsec	
To gene he syst	rate a repor em, dick Rep	t of all connected to	argets and devices on		<u>R</u> eport	

4. Select the newly created initiator. Then, from the action menu, select Add to Host.



When the Add to Host wizard appears, type in the host name and click OK.

Add to Host	
Add the specified initiators to a host.	
Initiators to Add: tmesrv2	
Host Select: tmesrv2	
	OK Cancel

Using the CLI

The CLI command for creating a new Host is called: create host

To create a new volume using the CLI, proceed as follows:

- 1. Open a CLI session via serial cable or SSH to one of the Seagate controllers in the Exos X array and log in.
- To set an initiator with the IQN, use the following command: set initiator id iqn.1991-05.com.microsoft:tmesrv2 nickname tmesrv2
- 3. To create a host called *tmesrv2* and group it with the new initiator, use the following command:

create host initiators iqn.1991-05.com.microsoft:tmesrv2 tmesrv2

In the following example, the commands to display existing hosts and initiators are used. The commands are then issued to set an initiator and associate it with a host. Then, the commands to display existing initiators and hosts are re-run to confirm the operations.

₽	10.23	9.184	.150 - I	PuTTY											_			\times
* * * * * * * *	* * * *	* * *	# #	***	***	#### ##### #####	#	* * * *	****	# # ##	* * * *	#	* * * * * * * *	*** * ** *** **	** * * *	* * *		^
Syst OS MC Ser: 10.2 Pas:	tem Vers Vers ial 239. swor	Ver ion Num 184 d:	sion: : GPN : GXN ber: .150	GT2 1265R 1265R 1265R 100C0 10gi	65R009 011-01 019-01 FF3B44 n: man	-03 2B age												
383 Syst Ver: # sl Info Suco # sl Nicl	35 tem sion how o: N cess how knam	Name Loc C hos o h c C ini e D	e: Se atior T265F ts osts ommar tiato iscov	were	e-TME emont, 03 found mplete Mappe	CA d succ d Prof	ess	fully Host	. (202 Туре	0-0 ID	9-2:	1 1	7:51:	54)				
 Suce # se Suce (20) # c! Suce 1 1 # s!	cess et i cess 20-0 reat cess 7:52 how	 : C nit : C 9-2 e h : C : 26 ini	ommar iator ommar 1 17: ost i ommar) tiato	nd con id id 52:11 initiand con	mplete iqn.19 mplete 3) ators mplete	d succ 91-05. d succ iqn.19 d succ	ess com ess 91- ess	fully .micr fully 05.co fully	. (202 cosoft: Th m.micr Th	0-0 tme e in oso: e h	- 9-2: srv: nit: ft:1	1 1 2 n iat tme (s)	7:51: ickna or-ni srv2 were	59) me tme ckname tmesrv crea	esrv2 e was v2 ted.	(20	signe 020-0	d. 9–2
Nic II tme: i(knam D srv2 qn.1	e D. N 991	 0 -05.0	com.m	Mappe No icroso	d Prof Stan ft:tme	ıle dar srv	Hos d iSC 2	st Type									
Suco # sl flost	cess how t ID	: C hos	ommar ts (nd coi	mplete	d succ	ess	fully Host	7. (202 Name	0-0	9-2: cove	1 1 ere	7:52: d Map	35) ped P:	rofil	.e)	
iqn	.199 SCSI	1-0	5.con	ı.mic	rosoft	 :tmesr	 v2	tmes	rv2	 No			No	S	tanda	rd	J	
Suco	cess	: C	ommar	nd con	mplete	d succ	ess	fully	. (202	0-0	9-2:	1 1	7:52:	43)				~

Please Note: On a Windows Server, the IQN can be obtained at the Windows Command Prompt using the unqualified command: **iscsicli**



Mapping Volumes to Hosts

With all the prerequisites in place, iSCSI volumes can be mapped to host systems. This is the last step that must be carried out on the storage array. It can be done at the CLI or by using the SMC.

Using the SMC

- 1. Open a web browser session to the SMC as described earlier in this section.
- 2. Select the *Mapping* tab, click *Action*, and then select *Map*.

9 10.239.	184.150 [A] (Seagate-TME	× +								-		×
$\leftrightarrow \rightarrow 0$	C A Not secure	https://10.23	9.184.150					☆	۲	入	* e	
9s و	AGATE 3835 Storage Ma	Syst inagement Vers	em: Seagate-TME ion: GT265R009-03			2020-09-2 18:10:46	User: mana Session: 29	je 56 📢		Sign	Out	2
	Action			MA	PPING							
Home	Map Remove Mappings Remove All Mappings	3lear Filters	Export to CSV	Show 20 🗸 Sho	wing 1 to 0 of 0	entries						
-	View Map Details		* P	Volume	- P	Access	🔑 LUN		P	Ports		P
System												
Pools												
Mapping												

3. When the *Map* wizard appears, click on a host with the IQN in the left pane and click on an available volume. Click *Map* and the mapping will show up in the list below.

	_			_		_		_	_	_
Мар										
		ailable Hosts and Ava	ilable Volumes and click Map.							
Available Host	Groups, Hosts,	, and Initiators			Available Volum	ne Groups a	nd Volumes			
Group 🔺 🎤	Host 🔺 🎤	Nickname 🔺 🎤	ID	1	Group	_^	Name	_^	Туре	~
							vol0001		base	
-	tmesrv2	*								
-	tmesrv2	tmesrv2	iqn. 1991-05.com.microsoft:tmes	irv2						
Show 10 🗸 Sho	wing 1 to 0 of 0									
Action		Host	Volume		Mode		LUN	Ports	\$	_

Once the mapping is done, click OK.

Мар											
			ailable Hosts and Avai								
Available Host	Groups, H	losts,	and Initiators			Available Volun	ne Groups ar	id Volumes			
							Showing 1				
Group 🔺 🎤	Host 🔺	~	Nickname 🔺 🎤	ID	1	Group		Name	_^	Туре	~
								vol0001			
	tmesrv2			iqn.1991-05.com.mic	rosoft:tmesrv2						
Show 10 🗸 Sho											
Action	н	lost		Volume	Mode			LUN	Ports		
		nesrv2		vol0001	read-write	~					
										Арріу	Cancel

When prompted, click Yes to confirm creation of the mapping.

Using the CLI

1. The CLI command for mapping a new volume is called: *map volume*

To map a volume using the CLI, proceed as follows:

- 2. Open a CLI session via serial cable or SSH to one of the Seagate controllers in the Exos X array and log in.
- 3. To map the volume *vol0001* to the initiator named *tmesrv2* over ports *a1* and *b1* on LUN ID 0, use the following command:

map volume ports a1,b1 lun 0 initiator tmesrv2 vol0001

In the following example, several commands are run. The first three commands display lists of existing mappings, initiators, and volumes. Then the *map volume* command is run. And finally, the *show maps* command is run again to confirm the new mapping.

🚰 10.239.184.150 - PuTTY	-		×
A AU USA SAUA AUAN A SAUA A U A SAUA SA SA SA SA SAUA AUAN A SAUA A U SAUA SA A SA SA SAUA AUAN A SAUA AUAN U SAUA SA SA SA SAUA SAUA U SAUA AUA SAUA S			~
System Version: GP265R009-03 OS Version: GFM265R011-01 MC Version: GXM265R019-01 Serial Number: 00C0FF3B442B 10.239.184.150 login: manage Password:			
3835 System Name: Seagate-TME System Location: Fremont, CA Version: GT265R09=03 ≹ show maps ←			
Success: Command completed successfully. (2020-09-21 19:26:12) # show initiators ← Nickname Discovered Mapped Profile Host Type ID			
tmesrv2 No No Standard iSCSI ign.1991-05.com.microsoft:tmesrv2			
Success: Command completed successfully. (2020-09-21 19:26:17) # show volumes Pool Name — Total Size Alloc Size Class — Type Large Virtual Extents Health Reason Action			
A vol0001 49.9TB 0B Virtual base Disabled OK			
Success: Command completed successfully. (2020-09-21 19:26:30) # map volume ports al,bl lun 0 initiator tmesrv2 vol0001 ← Info: Mapping succeeded. Initiator ign.1991-05.com.microsoft:tmesrv2 was mapped for volume vol0001 with LUN 0. (vol0001) Success: Command completed successfully. (vol0001) - Mapping succeeded. Initiator ign.1991-05.com.microsoft:tmesrv2 was mapped for volume vo 0. (2020-09-21 19:26:37) # show maps ←		with L	JUN
Volume View [Serial Number (00c0ff3b442b0000b6d1685f01000000) Name (vol0001)] Mapping: (Forts LUN Access Identifier Nickname Profile 			
1 0 read-write 00c0ff3b442b000054e6685f01010000 tmesrv2.* Standard			
Success: Command completed successfully. (2020-09-21 19:26:44)			~

Configuring Windows

When the storage volumes have been created on the Exos X array and presented to the iSCSI initiator on a Windows host running the Veeam Backup Repository component, additional steps must be taken to prepare the volume so that it can be used as a storage target by the Veeam Backup Repository. This section describes the additional steps required to prepare access to a new volume so it can be used by the Backup Repository as a new backup target.

iSCSI

The Microsoft Windows operating system includes a built-in iSCSI software initiator for block-level storage access over an IP network. While the iSCSI feature is installed by default, the service is not running by default and may need to be started. Depending on the version of Windows, the user will be prompted to start the service automatically when the iSCSI application is launched.

Adding a new iSCSI target to Windows is a simple task. Take the following steps to connect an iSCSI initiator on a Veeam Backup Repository Server to a Seagate Exos X iSCSI target.

- 1. Run the Windows iSCSI Initiator application. It can be found under: *Windows Administrative Tools > iSCSI Initiator*
- 2. Select the *Targets* tab and enter the IP address for one of the ports on the array into the *Target:* field. Click the *Quick Connect* button to add the array port.

arnete	Discourse	Equarita Taranta	Values and Daviese	DADDIE	Carlantia	
Original	Discovery	Pavorite Targets	volumes and Devices	RADIUS	Connguration	
To disc DNS na	cover and lo ame of the t	g on to a target usir arget and then click	ng a basic connection, t Quick Connect.	ype the IP	address or	
Target	: I			Q	uick Connect	
Discove	ered targets					
					Refresh	
Name				Status		
ign.1	992-09.com	seagate:01.array.0	0coff3b2a8c	Connecte	d	
To con dick Co	nect using a onnect.	dvanced options, s	elect a target and then		Cognect	
To con dick Co To con then d	nect using a onnect. npletely disc	advanced options, si onnect a target, sel cct.	elect a target and then ect the target and		Cognect Disconnect	
To con dick Co To con then d For tar select	nect using a onnect. npletely disc lick Disconne rget propert the target a	advanced options, si onnect a target, sel ect. ies, including config ind click Properties.	elect a target and then ect the target and uration of sessions,		Cognect Disconnect Properties	
To con dick Co To con then d For tar select For co the tar	nect using a onnect. npletely disc ick Disconne rget propert the target a nfiguration or rget and the	advanced options, so onnect a target, sel ct. ies, including config ind click Properties. of devices associate in click Devices.	elect a target and then ect the target and uration of sessions, d with a target, select		Cognect Disconnect Properties Degices	
To con dick Co To con then d For tar select For co the tar	inect using a onnect. Inpletely disc lick Disconner rget propert the target a nfiguration of rget and the	advanced options, si onnect a target, sel cst. ese, including config ese, including config ind ick Properties. of devices associate in click Devices.	elect a target and then ect the target and uration of sessions, d with a target, select		Cognect Disconnect Properties Degices	

3. Repeat the previous step for each additional controller port on the array.

MPIO

Multipath I/O (MPIO) is an additional Microsoft software feature that is required for path management when there are multiple network paths to the same storage device. It is not installed by default and must be installed separately as an optional Windows Server feature.

Installing MPIO

The MPIO feature is installed through the Windows Server Manager. To install it, proceed as follows:

- 1. Launch the Server Manager and then select Add Roles and Features from the Manage menu.
- 2. When the *Add Roles* and *Features Wizard* launches, click *Next* and skip through the wizard to the *Select Features* page.
- 3. Scroll down the list until Multipath I/O appears and select it.
- 4. Click *Next* and then *Finish*. Windows will then prompt a reboot for the changes to take effect.

Obtaining the Vendor Name and Product ID for MPIO

To configure MPIO, the *Vendor Name* and *Product ID* must be determined for the hardware being used. There are at least two ways that this information can be obtained. One way is through the Seagate array's CLI and the other is using Windows PowerShell. Launch the Server Manager and then select Add Roles and Features from the Manage menu.

Obtaining the Vendor Name and Product ID via the Seagate CLI

- 1. Open a console session to the management port via serial cable or SSH
- 2. Log in to the session
- 3. Run the command: **show inquiry**

A lot of information will be displayed by the command. The *iSCSI Vendor ID* and the *iSCSI Product ID* are going to be listed near the top. This information will be used in a later step.



Obtaining the Vendor Name and Product ID via Windows PowerShell

- 1. On the Windows Server, open a PowerShell prompt
- 2. Run the command: Get-MPIOAvailableHW

The *VendorID* and *ProductID* will then be displayed.

ator> Get-MPIOAvaila	ableHW			
IsMultipathed	IsSPC3Supported	BusType		
False	True	iSCSI		
	ator> Get-MPIOAvaila IsMultipathed False	ator> Get-MPIOAvailableHW IsMultipathed IsSPC3Supported False True	ator> Get-MPIOAvailableHW IsMultipathed IsSPC3Supported BusType False True iSCSI	ator> Get-MPIOAvailableHW IsMultipathed IsSPC3Supported BusType False True iSCSI



Configuring MPIO

Once the MPIO feature has been installed and the *VendorID* and *ProductID* have been determined, this information must be entered into the MPIO configuration. There are at least two ways to accomplish this.

Using the Windows GUI

- Run the MPIO app by typing MPIO into the Windows Search field before clicking *Enter*. The MPIO app will launch.
- Click Add to add a new MPIO hardware device. When the dialog appears, enter the VendorID and ProductID together as a single string with one space between the word and the number. For example: "SEAGATE 3835"

Add MPIO Support	,
Enter the Vendor and Product	t Ids (as a string of 8 characters followed by
2evice Hardware ID:	
SLAGATE JOJJ	

3. Click *OK* to return to the main menu where the new entry can be verified.

IPIO Propertie	25		>
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration Snapshot
To add suppo Product Ids a Devices can b To remove su then dick Rem	rt for a new device, di s a string of 8 characte e specified using semi- pport for currently MP nove.	ck Add and er ers followed by colon as the c IO'd devices, s	nter the Vendor and y 16 characters. Multiple delimiter. select the devices and
Devices:			
Device Hard	lware Id		
SEAGATE 38	335		
		Add	Remove
		_	

Using the Windows Command Line

- 1. On the Windows Server, open a Windows Command Prompt.
- 2. Run the command: mpclaim -n -i -a ""



- 3. Open a PowerShell prompt.
- 4. To verify the device is multipathed, run the command again: **Get-MPIOAvailableHW**

🔀 Administra	-	×			
PS C:\Users\A	dministrator	> Get-MPIOAvaila	ableHW		^
VendorId Prod	uctId	IsMultipathed	IsSPC3Supported	BusType	
SEAGATE 3835		False	True	iSCSI	
PS C:\Users\A	dministrator	> Get-MPIOAvaila	ableHW		
VendorId Prod	uctId	IsMultipathed	IsSPC3Supported	BusType	
SEAGATE 3835	8	True	True	iSCSI	

Preparing New Volumes for Veeam

Once a volume on the Exos X has been created and mapped to the Veeam Backup Repository server, the raw volume must be brought online and formatted for use by Windows Server.

- 1. Run the Windows Disk Manager Control Panel app by typing *diskmgmt.ms* into the Windows *Search* and then click *Enter* to launch the Windows Disk Manager.
- 2. Newly presented iSCSI volumes may not appear in Disk Manager right away. The disks can be rescanned manually. From the *Action* menu, select *Rescan Disks* and the newly created volumes will appear. If a single volume on the Exos X array is displayed multiple times, this would indicate that there are multiple paths to the volume and MPIO is not configured.

Eile Actio	nagement n <u>V</u> iew <u>H</u> elp							_	×
	Refresh	🔒 🔎 🖾							
/olur	Rescan Disks	Type	File Sv	stem Statu	is 1	Canacity	Free Sn	% Free	
	Create VHD	Basic	NTFS	Healt	thy (B	930.97 GB	835.62 GB	90 %	
Sy:	Attach VHD	Basic	NTFS	Healt	thy (S	549 MB	105 MB	19 %	
	All las <u>k</u> s								
	Help								
Unline	Healthy (Sys	tem, Active, Pr	imary Pi	Healthy (Boot,	, Page File	e, Crash Dump	, Primary Partiti	on)	
	<u> </u>								

3. Once the new iSCSI disk or disks are displayed, right click on the left pane and select *Online* to bring each disk online. Right click the left pane again and select *Initialize* to initialize the new disk.

Help P 2 2 Layout Simple Simple	Type Basic Basic	File System NTFS NTFS	Status Healthy (B Healthy (S	Capacity 930.97 GB 549 MB	Free Sp 835.62 GB	% Free 90 %		
Jayout Simple Simple	Type Basic Basic	File System NTFS NTFS	Status Healthy (B Healthy (S	Capacity 930.97 GB 549 MB	Free Sp 835.62 GB	% Free 90 %		
Layout Simple Simple	Type Basic Basic	File System NTFS NTFS	Status Healthy (B Healthy (S	Capacity 930.97 GB 549 MB	Free Sp 835.62 GB	% Free 90 %		
Simple Simple	Basic Basic	NTFS NTFS	Healthy (B Healthy (S	930.97 GB 549 MB	835.62 GB	90 %		
Simple	Basic	NTFS	Healthy (S	549 MB	10E MAD			
					TUS IVID	19 %		
estam Pacar	rad							
49 MB NTFS ealthy (System	m, Active, Prim	930.97 GB M Healthy (Bo	NTFS pot, Page File, Cr	ash Dump, Prin	nary Partition)			
3969.84 GB nallocated								
	rstem Reserv 19 MB NTFS 2014 (System 1969.84 GB nallocated	stem Reserved 19 MB NTFS aalthy (System, Active, Prim 1969.84 GB aallocated	rstem Reserved 19 MB NTFS Palthy (System, Active, Prim 1969.84 GB Pallocated	rstem Reserved 19 MB NTFS Palthy (System, Active, Prim 1969.84 GB Pallocated	rstem Reserved 19 MB NTFS Palthy (System, Active, Prim 1969.84 GB Pallocated	rstem Reserved 19 MB NTFS Palthy (System, Active, Prim 1969.84 GB Pallocated	stem Reserved (C:) 19 MB NTFS 930.97 GB NTFS Palthy (System, Active, Prim Healthy (Boot, Page File, Crash Dump, Primary Partition) 1969.84 G8 Healthy (Boot, Page File, Crash Dump, Primary Partition)	rstem Reserved 930.97 GB NTFS 99 MB NTFS 930.97 GB NTFS Palthy (System, Active, Prim Healthy (Boot, Page File, Crash Dump, Primary Partition) 1969.84 G8 Healthy (Boot, Page File, Crash Dump, Primary Partition)

Select the GPT partition style for target volumes greater than 2TB

	,
You must initialize a disk before Logical Disk Manager	can access it.
Select disks:	
Disk 1	
Use the following partition style for the selected disks:	
Use the following partition style for the selected disks: ○ MBR (Master Boot Record)	
Use the following partition style for the selected disks: ○ <u>M</u> BR (Master Boot Record)	
Use the following partition style for the selected disks: O <u>M</u> BR (Master Boot Record) @ <u>G</u> PT (GUID Partition Table) Note: The GPT partition style is not recognized by all pr Windows.	evious versions of
Use the following partition style for the selected disks: O <u>M</u> BR (Master Boot Record) @ <u>G</u> PT (GUID Partition Table) Note: The GPT partition style is not recognized by all pr Windows.	evious versions of



4. Once the new iSCSI disk has been brought online and initialized, a new volume must be created. Right click on the unallocated disk space and select *New Simple Volume*. Go through the pages of the *New Simple Volume Wizard* to the *Format Partition* page.

For best results, Veeam recommends using the ReFS file system with the allocation unit size set to 64K. NTFS can also be used.

Format Partition			
To store data on this partition, yo	u must format it first.		
Choose whether you want to for	mat this volume, and if so,	what settings you wan	t to use.
○ <u>D</u> o not format this volume			
Format this volume with the	following settings:		
File system:	ReFS	~	
Allocation unit size:	64K	~	
Volume label:	Seagate Exos X		
☑ Perform a quick format	at		
□ <u>E</u> nable file and folder	compression		

Click *Next* and then *Finish* to complete the operation. Once the disk is formatted, it will be ready to use as a target for the Veeam Backup Repository.

📅 Disk Managemer	ıt					-		×
<u>File</u> <u>Action</u> <u>View</u>	Help							
🗢 🌩 🖬 🖬	T 🗩 🗹 🛙	2						
Volume	Layout	Туре	File System	Status	Capacity	Free Space	% Free	
- (C:)	Simple	Basic	NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)	930.97 GB	835.62 GB	90 %	
- Seagate Exos X (D	:) Simple	Basic	ReFS	Healthy (Primary Partition)	13969.81 GB	13901.99 GB	100 %	
 System Reserved 	Simple	Basic	NTFS	Healthy (System, Active, Primary Partition)	549 MB	105 MB	19 %	
- Disk 0								
Basic	System Reser	ved		(C:)				
Online	549 MB NTES Healthy (Syste	m. Active.	Primary Par	930.97 GB NTES Healthy (Boot, Page File, Crash Dump, Primary Partition)				
= Disk 1								
Basic	Seagate Exos	X (D:)						
Online	Healthy (Prima	ary Partitio	n)					
Unallocated Pr	imary partition							

Adding New Storage to the Backup Repository

Once a new iSCSI disk has been created and exported on the array and then brought into Windows and formatted, it can be configured as a backup target for the Backup Repository. This procedure is performed using the Veeam Backup and Replication management console.

- 1. Launch the Veeam Backup and Replication management console and log in to the Backup Repository server that will be using the newly provisioned iSCSI storage.
- 2. Once the management console has launched, click on *BACKUP INFRASTRUCTURE* in the lower left pane and then click *Backup Repositories*.

REPOSITORY TOOLS	10.239.184.140 - VEEAM BACKUP AND REPLICATION COMMUNITY EDITION - C
Add Edit Repository Repository Manage Repository Tocls	
BACKUP INFRASTRUCTURE	Q. Type in an object name to search for
Backup Proxies	NAME TYPE HOST T PATH CAPACITY FREE USED SPA DESCRIPTI
Backup Repositories Backup Repositories WAN Accelerators Service Providers GManaged Servers Managed Servers Missing Updates (1)	End Default Backup Repository Windows TMESRV2 C:\Backup 931 GB 835.6 GB 0 8 Created by
A HOME	
INVENTORY	
BACKUP INFRASTRUCTURE	
Can TAPE INFRASTRUCTURE	
FILES	
:	< >>
1 REPOSITORY	CONNECTED TO: 10.239.184.140 COMMUNITY EDITION

3. Click on Direct Attached and then, on the next screen, click Microsoft Windows.



4. The *New Backup Repository* wizard will then appear. Choose a name for the new repository and then click *Next*.

New Backup Repository	x
Name Type in a name	and description for this backup repository.
Name	Name:
Name	Seagate Exos X 2U12
Server	Description
Repository	Created by 10.239.184.140\Administrator at 9/17/2020 12:57 PM.
Mount Senier	
WOULD SERVER	
Review	
Apply	
Summary	
	< Previous Next > Einish Cancel

5. Click through to the *Repository* selection and then select the new volume.

闼	New Backup Repository				×	
≣- но	Repository					0
s	Type in path to the	folder where backup file	Select Folder	×		
Add Repository Manage F	Name Server	Location Path to folder:	Folders:		Provine	
DACKOP INI	Repository	- Conscin	Seagate Exos X (D:)		Di Owsen	
Back	Mount Server	Free spa			Populate	USED SPA DESCRIPTI 0 B Created by
Servi-	Apply	Load control Running too ma timeouts. Contro			cause I/O	
 Mana Mi Mi 	Summary	☑ Limit maxim ☐ Limit read a				
🔿 НОМЕ						
물코 INVENT						
🎲 ВАСКИ						
TAPE IN						
FILES		Click Advanced to			dvanced	
					Canad	
_					Cancer	>
1 REPOSITOR	Y		New Folder	OK Cancel	84.140 C	OMMUNITY EDITION

Click through the wizard pages and then click Finish.



6. Once the *New Backup Repository* wizard has completed, verify that the new target is listed. The new Seagate iSCSI volume is now ready for use as a Veeam Backup Repository storage target.

記 REPOSITORY TOOLS 王・HOME BACKUP REPOSITORY		10	.239.184.140	VEEAM BACK	UP AND REPLIC	ATION CON	MMUNITY EDITIO	UN .	× ?
Add Edit Rescan Repository Repository Manage Repository Tools									
BACKUP INFRASTRUCTURE	Q Type in an object name to :	search for		×					
Backup Proxies Backup Repositories Catenal Repositories Sector Providers Service Providers Service Providers Managed Servers Missing Updates (1)	NAME	TYPE Windows Windows	HOST T TMESRV2 TMESRV2	PATH C\Backup D\	CAPACITY 931 GB 13.6 TB	FREE 835.6 GB 13.6 TB	USED SPACE 0 B 0 B	DESCRIPTION Created by Veeam Backup Created by 10.239,184,140,Admini	istrator at 9/17/2020 12-57 PM.
HOME HOME INVENTORY BACKUP INFRASTRUCTURE TAPE INFRASTRUCTURE FILES HISTORY									
2 REPOSITORIES								CONNECTED TO: 10.239.184.140	COMMUNITY EDITION

Identifying Bottlenecks

To ensure all its resources are used efficiently, Veeam Backup and Replication software collects detailed statistics from its backup and recovery operations and uses it to isolate sources of potential bottleneck throughout the data path. Several key areas are monitored as potential sources, including networking and Veeam proxy agents, as well as source and target.

Veeam states in their documentation that the indication of a bottleneck does not necessarily mean there is a problem with the backup infrastructure. Veeam intends to inform the administrator about the weakest component in the data path. However, if it is believed that job performance is low, it may warrant taking some measures to analyze and repair the bottleneck.

If there is a problem with the Seagate Exos array or its configuration, it will show up as a bottleneck with the target (storage). And even when the Exos array is performing at its maximum performance, it may still be indicated as a bottleneck if the backup source is on faster storage and there are no other bottlenecks.

References

Seagate 5005/4005/3005 Series Storage Management Guide https://www.seagate.com/files/www-content/support-content/raid-systems/_shared/ documentation/83-00007047-13-01_G265_SMG.pdf

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Veeam Backup & Replication Best https://bp.veeam.com/vbr/	Practices	
Ready to Learn More?	Visit us at seagate.com	
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