



DXi-Series Configuration and Best Practices Guide for Veeam Backup & Replication

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DXi-Series Configuration and Best Practices Guide for Veeam Backup & Replication

This guide seeks to help Quantum customers who own DXi-Series systems (DXi4000-Series, DXi6000-Series, DXi8000-Series, and DXi V-Series), and who also use Veeam Backup & Replication, get the most out of their investment. It is also intended to help Quantum field sales teams by providing guidance to enhance the installation and integration of Veeam Backup & Replication with Quantum DXi-Series systems. This guide includes advice and best practices for using Quantum DXi-Series systems with Veeam Backup & Replication.

How to Use This Guide

This document assumes that the reader has basic expertise with Veeam Backup & Replication, basic networking, SAN, and Hyper-V, and VMware experience. It also assumes that the reader has a Quantum DXi installed in a working Veeam Backup & Replication environment.

This document provides key recommendations and useful information for quickly setting up a DXi system with Veeam Backup & Replication. It then expands on these recommendations and discusses the features and performance tuning considerations relevant to NAS attached storage.

This document is organized by the NAS storage target access methods to be employed with Veeam Backup & Replication. Currently, Veeam does not support VTL, so the DXi will appear as a CIFS or Veeam Linux Repository.

Shortcuts to Quick Start Activities

To go directly to any of the following sections, click that section's name.

- » [**Online Documentation for Your Quantum Products**](#)
- » [**Summary of Performance Tuning Parameters for Veeam Backup & Replication**](#)
- » [**Best Practices Guide for Veeam Linux Repository or CIFS**](#)
- » [**Common Operational Considerations for Veeam Backup & Replication**](#)

Documentation and References

The following is a list of documents, references, and links where you can find additional information regarding specific activities and products. Access to many of the documents below requires a valid serial number or user login. Please have that available when following the hyperlinks to the documents.

Note: After you click some of the links below, you may find multiple versions of a given document. Verify your current software version, then choose the appropriate document for that software version.

Online Documentation for Your Quantum Products

[Quantum service and support for drivers, firmware, software, and all product documentation.](#)

DXi Product Planning Guides

The DXi Product Planning Guides help you configure and use your DXi storage solution correctly from the start. As a best practice, verify that the DXi has been successfully deployed in the infrastructure, using the Quantum site planning documentation:

Note: After clicking the links shown in the lists below, you may need to scroll down to find the linked documents. In some Documentation Centers, you may need to expand the **Previous Documentation** section to find one or more of the documents in these lists.

- [DXi8500 Site Planning Guide](#)
- [DXi6900 Site Planning Guide](#)
- [DXi6800 Site Planning Guide](#)
- [DXi6700 Site Planning Guide](#)
- [DXi4700 Site Planning Guide](#)

DXi User's Guide

Refer to the DXi user's guide for detailed information about all the configurations and functions available on the DXi:

- [DXi8500 User's Guide](#)
- [DXi6900 User's Guide](#)
- [DXi6800 User's Guide](#)
- [DXi6700 User's Guide](#)
- [DXi4700 User's Guide](#)
- [DXi4000 User's Guide](#)
- [DXi V-Series User's Guide](#)

Network Attached Storage

Refer to the following documents for NAS Share setup:

- [DXi8500 User's Guide](#)
- [DXi6900 User's Guide](#)
- [DXi6800 User's Guide](#)
- [DXi6700 User's Guide](#)

- [DXi4700 User's Guide](#)
- [DXi4000 User's Guide](#)
- [DXi V-Series User's Guide](#)

Veeam Installation Guide (DXi)

- [Quantum DXi Veeam Installation Guide..](#)

DXi Replication

Refer to the following documents for DXi-to-DXi Replication setup:

- [DXi8500 User's Guide](#)
- [DXi6900 User's Guide](#)
- [DXi6800 User's Guide](#)
- [DXi6700 User's Guide](#)
- [DXi4700 User's Guide](#)
- [DXi4000 User's Guide](#)
- [DXi V-Series User's Guide](#)

Quantum Knowledge Base

The knowledge base can help you quickly search for Quantum product articles:

- [Quantum Knowledge Base](#)

Veeam Backup & Replication Documentation

These direct documentation links require a Veeam [user account](#). Simply create a user account and remain logged in to use the following links. After a page opens in your browser, you may need to scroll down to find the documents that are linked to in the following list.

- [User Guide for Microsoft Hyper-V](#)
- [Veeam Universal Application Item Recovery User Guide](#)
- [Veeam PowerShell Reference](#)
- [Evaluator's Guide \(VMware VSphere\)](#)
- [Evaluator's Guide \(for Microsoft Hyper-V\)](#)
- [Veeam Knowledge Base](#)

Summary of Performance Tuning Parameters for Veeam Backup & Replication

For backup administrators who are well versed with Veeam Backup & Replication and Quantum DXi systems, the following table offers a summary of suggested parameters/values.

As with any modifications to a system that impact performance and/or tuning, your results may vary and are not guaranteed.

Configuration Recommendations for DXi as a Veeam Linux Repository

The settings shown below are recommended, and present DXi as a Veeam Ready primary backup target.

Component	Parameter or Option	Setting
Repository	Repository Type	Linux Repository
	Align backup file data blocks	Disabled.
	Decompress backup data blocks before storing	Enabled.
	Rotated drives	Disabled.
	Use per-VM backup files	Enabled.
	vPowerNFS	Recommend that vPowerNFS be kept on primary storage.
	Task Limits	The DXi Linux Repository supports the use of Veeam Data Mover Service, which optimizes performance between the DXi and the Veeam proxy server. This optimization uses DXi memory. To avoid oversubscribing memory we recommend that you run no more than 25 concurrent backups across all repositories defined on the DXi. For recovery jobs we recommend that you run no more than 15 concurrent full VM restores concurrently across all repositories.
Proxy	Transport Method	Virtual Appliance or Direct SAN. These two methods allow for the fastest possible data retrieval from the source.
	Maximum Concurrent Tasks	Veeam recommends not to exceed one task per proxy server CPU cores.
Backup Copy job	Healthcheck	Disabled.
	Defragment and Compact full backup file	Disabled.
	Compression Level	If the decompress setting for the Repository is enabled, this value will not result in compressed data being sent to the DXi. As a result, Veeam recommends leaving this as either AUTO or OPTIMAL for the DXi as it will optimize overall processing.
	Inline data deduplication	No. (Veeam recommends disabling this option as this will enable background optimizations for deduplication appliances).
	Encryption	Do not enable Veeam's Encryption feature. Although Veeam Backup & Replication supports encryption, for best performance, use the hardware encryption provided by the DXi appliance.
Backup job	Reverse Incremental	Not recommended.
	Incremental	Enabled.
	Synthetic Full	Enabled. See Backup Stream Considerations for best practices for managing restore points.
	Active Full	Disabled or Enabled – Enabled is recommended if Synthetic Full is not employed.
	Healthcheck	Disabled.

	Defragment and Compact full backup file	Disabled.
	Compression Level	If the decompress setting for the Repository is enabled, this value will not result in compressed data being sent to the DXi. As a result, Veeam recommends leaving this as either AUTO or OPTIMAL for the DXi as it will optimize overall processing.
	Inline data deduplication	Disabled (Veeam recommends disabling this option, because this will enable background optimizations for deduplication appliances).
	Exclude swap file blocks	Enabled.
	Exclude deleted file blocks	Enabled.
	Storage Optimization	Local target or Local+16TB Local+16TB produces a performance gain with synthetic full backups (up to 14%). Local+16TB causes a slightly slower full backup duration, and increased incremental data transferred per backup.
	Encryption	Do not enable Veeam's Encryption feature. Although Veeam Backup & Replication supports encryption, for best performance, use the hardware encryption provided by the DXi appliance.
	Miscellaneous Options	Recommendations
	Veeam Backup Server	Recommendations
	Backup Proxy Server	Recommendations
	Backup Enterprise Manager Server	Recommendations
	Server Name	Use only standard ANSI characters for the computer name of the computer on which you want to install Veeam Backup & Replication.
	Veeam Windows registry modification	When using the Veeam Linux Repository, Quantum recommends increase the call execution timeout. See https://www.veeam.com/kb1176 for more details.

Configuration Recommendations for DXi as a Veeam CIFS (Shared Folder)

The settings shown below are recommended, and present the DXi as a secondary backup target for the Backup Copy Job.

Component	Parameter or Option	Setting
Repository	Repository Type	CIFS (Shared Folder)
	Align backup file data blocks	Disabled.
	Decompress backup data blocks before storing	Recommended to improve Dedupe ratio and backup performance.
	Rotated drives	Disabled; N/A with "Use per-VM backup files".
	Use per-VM backup files	Enabled.
	vPowerNFS	Recommend that vPowerNFS be kept on primary storage.
	Task Limit	This value may need to be adjusted more than once to find the best number of concurrent backups to use for the specific environment. Start low (ie. 5) and increase incrementally to determine when performance starts to fall. There is a direct relation to the proxy maximum concurrent tasks.
Proxy	Transport Method	Virtual Appliance or Direct SAN. These two methods allow for the fastest possible data retrieval from the source.
	Maximum Concurrent Tasks	Veeam recommends that you not exceed one task per proxy server CPU cores.
Backup Copy Job	Healthcheck	Disabled.
	Defragment and Compact full backup file	Disabled.

	Compression Level	If the decompress setting for the Repository is enabled, this value will not result in compressed data being sent to the DXi. As a result, Veeam recommends leaving this as either AUTO or OPTIMAL for the DXi, because it will optimize overall processing.
	Inline data deduplication	No. (Veeam recommends disabling this option, because it will enable background optimizations for deduplication appliances.)
	Encryption	Do not enable Veeam's Encryption feature. Although Veeam Backup & Replication supports encryption, for best performance, use the hardware encryption provided by the DXi appliance.
Backup job	Reverse Incremental	Not recommended.
	Incremental	Enabled.
	Synthetic Full	Not Recommended.
	Active Full	Enabled – Recommended.
	Healthcheck	Disabled.
	Defragment and Compact full backup file	Disabled.
	Compression Level	If the decompress setting for the Repository is enabled, this value will not result in compressed data being sent to the DXi. Veeam recommends leaving this as either AUTO or OPTIMAL for the DXi, because it will optimize overall processing.
	Inline data deduplication	No. (Veeam recommends disabling this option, because it will enable background optimizations for deduplication appliances).
	Exclude swap file blocks	EnabledEnabled
	Exclude deleted file blocks	EnabledEnabled
	Storage Optimization	Local target (16TB+ backup files) – Veeam recommends this setting on all DXi systems to improve overall performance.
	Encryption	Do not enable Veeam's Encryption feature. Although Veeam Backup & Replication supports encryption, for best performance, use the hardware encryption provided by the DXi appliance.
	Miscellaneous Options	Recommendations
	Veeam Backup Server	Recommendations
Backup Proxy Server	Recommendations	
Backup Enterprise Manager Server	Recommendations	
Server Name	Use only standard ANSI characters for the computer name of the computer on which you want to install Veeam Backup & Replication.	

Windows OS Options	Recommendations
<p>Security</p>	<p>Disable SMB Server Signing (Server 2008/2012):</p> <p>SMB Server Signing is disabled by default on the DXi, but must also be disabled on the Veeam server. (This can be changed on the local machine through a Registry setting, but if the server is part of an AD environment, the group policy must be changed to disable SMB Server Signing for the Veeam server for the change to be permanent.)</p> <p>To disable Server Signing on the local server, disable (set to '0') the following Registry values:</p> <ul style="list-style-type: none"> • <i>HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanManServer\Parameters\RequireSecuritySignature</i> • <i>HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanManWorkstation\Parameters\RequireSecuritySignature</i> <p>If the Veeam server is part of an AD environment, the group policy must be changed as well:</p> <ul style="list-style-type: none"> • Open the Group Policy Editor, and right-click-and-edit Default Domain Controller Policy. • Go to Computer Configuration > Policies > Windows Settings > Security Settings > Local Policies > Security Options. • Set "<i>Domain member: Digitally encrypt or sign secure channel data (always)</i>" and "<i>Microsoft network server: Digitally sign communications (always)</i>" to Disabled. <p>For more information, see https://technet.microsoft.com/en-us/library/cc731957.aspx</p>
<p>Communication</p>	<p>SMB Timeouts:</p> <p>In the case of busy systems, some timeout defaults do not allow for enough time to process requests/responses. One such timeout value ("SESTIMEOUT") defines the amount of time the client waits for the server to respond to an outstanding request. Adjusting this value can keep SMB from timing out and requiring multiple retry attempts.</p> <p>To adjust, either modify the existing SessTimeout DWORD or create the DWORD within the following Registry location and set to a 600 value (10 minute timeout):</p> <ul style="list-style-type: none"> • <i>HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanManWorkstation\Parameters</i> <p>For more information, see https://blogs.msdn.microsoft.com/openspecification/2013/03/27/smb-2-x-and-smb-3-0-timeouts-in-windows/</p>

<p>Network</p>	<p>TcpMaxDataRetransmissions</p> <p>Adjusting the following TCP/IP setting by adding a subkey in the registry should reduce the number of timeouts, by allowing more time for the connection to complete. This setting is not present in the registry by default.</p> <ol style="list-style-type: none"> 1. Start the Registry Editor (Regedt32.exe) and go to the following subkey: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters 2. On the Edit menu, click Add Value, then add the following information: Value Name: TcpMaxDataRetransmissions Value Type: REG_DWORD - Number Valid Range: 0 - 0xFFFFFFFF Default Value: 5 Decimal New Value: 10 Decimal 3. Click OK, then quit the Registry Editor. 4. Reboot after registry change has been made. <p>On heavily utilized systems, consider increasing the TCP/IP timeout on Veeam Backup & Replication backup proxy.</p> <p>See the Microsoft Knowledge Base article at: http://support.microsoft.com/kb/q191143/</p> <p>For high TCP loopback latency and UDP latency, applying the following Microsoft Hot Fix may help: http://support.microsoft.com/kb/979612</p>
<p>Server Disk</p>	<p>If I/O performance issues are seen when the Windows disk is under heavy I/O load, consider applying the following Windows Hot Fix: http://support.microsoft.com/kb/982383</p>

Network Switch Settings	Recommendations										
<p>Cisco Nexus 7k-Series</p>	<p>Disable Priority Flow Control for the DXi-connected ports:</p> <p>Procedure:</p> <table border="1" data-bbox="696 1707 1507 1881"> <thead> <tr> <th></th> <th>Command or Action</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>Step 1</td> <td>switch# configure terminal</td> <td>Enters global configuration mode.</td> </tr> <tr> <td>Step 2</td> <td>switch(config)# interface ethernet [slot/port-number]</td> <td>Enters interface mode on the interface specified.</td> </tr> </tbody> </table>			Command or Action	Purpose	Step 1	switch# configure terminal	Enters global configuration mode.	Step 2	switch(config)# interface ethernet [slot/port-number]	Enters interface mode on the interface specified.
	Command or Action	Purpose									
Step 1	switch# configure terminal	Enters global configuration mode.									
Step 2	switch(config)# interface ethernet [slot/port-number]	Enters interface mode on the interface specified.									

	Step 3	switch(config-if)# priority-flow-control mode off	Sets the PFC to the auto, off, or on mode. By default, PFC mode is set to auto on all ports.
	Step 4	switch(config-if)# show interface priority-flow-control	(Optional) Displays the status of PFC on all interfaces.
For more information, see: http://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus7000/sw/qos/config/cisco_nexus7000_qos_config_guide_8x/configuring_priority_flow_control.html			

Consult any of the following resources on the **Help** menu if you have questions or difficulties:

- See the [Veeam Backup & Replication User Guide](#) for comprehensive information about Veeam Backup & Replication.
- See the Veeam Backup & Replication for searchable, topic-based documentation.
- See the Veeam Backup & Replication built-in help for access to offline searchable documentation.

Configuring Veeam Backup & Replication with the DXi-Series

Configuring Veeam Backup & Replication with DXi NAS

A Network Attached Storage (NAS) unit is essentially a self-contained computer connected to an Ethernet network, with the sole purpose of supplying data storage services to other devices on the network. Several DXi models can present themselves as a NAS or Veeam Linux Repository appliance for backup purposes. Before you can use a DXi system as a NAS or Veeam Linux Repository appliance, you must first configure a NAS or Veeam Linux Repository share on the DXi.

Important Note: The DXi is **NOT** a Network Attached Storage device to be used to store customer data. The DXi only emulates a NAS device for the sole purpose of being a Backup-to-Disk target for backup applications such as Veeam. Do **NOT** use the DXi NAS share as “Drag-and-Drop” file storage.

A DXi system can serve as a NAS backup system where the following protocols are supported:

CIFS Protocol -The CIFS (Common Internet File System) protocol defines a standard for remote file access using many computers at a time. This protocol allows users with different platforms to share files without installing additional software. This protocol is used with Windows networks.

NFS Protocol - The NFS (Network File System) protocol was originally designed by Sun Microsystems and allows all network users to access shared files stored on computers of different types. NFS provides access to shared files through an interface called the *Virtual File System* (VFS), which runs on top of TCP/IP. Users can manipulate shared files as if they were stored locally on the user's own hard disk.

With NFS, computers connected to a network operate as clients while accessing remote files, and as servers when providing remote users access to local shared files. This DXi NAS presentation is used with UNIX/Linux networks, and is used for the Veeam Linux Repository initial share creation. However, the Veeam Data Mover is employed to transfer data, rather than NFS.

NAS or Linux Repository Device Path Considerations

Network segmentation is the process of splitting a single network into several sub-networks or segments. The advantages of a segmented network are improved performance and security. Performance is improved because there are fewer hosts on the segmented network, which in turn minimizes local traffic. Security is improved because the data traffic is contained on this segment and is not visible to the outside network.

Note: If you are using network segmentation and Automated Deployment Services (ADS), you must use the data segment IP information for ADS management, **NOT** the management segment. ADS uses the Server Message Block (SMB) data protocol to manage the NAS shares on your system, which requires that the management traffic use the data segment.

DXi systems allow you to configure your network for separate segment types. The three primary segments are defined by the type of network traffic that can be used on that segment. The three types of network traffic are:

- **Replication traffic** - This segment is used exclusively for replication data movement.
- **Management traffic** - This segment is used exclusively for DXi remote management (Web page access).
- **Data traffic** - This segment is used exclusively for NAS data movement.

Each network segment has its own network interface (IP address, network mask, and default gateway). In this way, the segment is separated from other network segment traffic.

Note on Bonding:

When Bonding, whether or not Round Robin or LACP is used, the ports on the Ethernet switch that the DXi are connected to must be in a matching group type as the Bond group on the DXi.

The DXi also supports Mode 1 Bonding (active/backup), which does not require any special switch configuration. With a Mode 1 bond, only one interface in the bond is active. If that interface loses connectivity, the MAC address is moved to another interface in the bond, which then becomes active. Typically this is used when connections to the DXi are routed through two completely separate switches for redundancy / failover.

Veeam Backup & Replication seamlessly integrates with a DXi-Series disk backup system using the NAS (CIFS or NFS) interface. Once installed and configured, Veeam can manage backups through the DXi and take advantage of the system's capabilities, such as data deduplication and replication.

Installing and configuring the DXi and Veeam for NAS operation consists of the following major steps, which are discussed below:

1. Configure the DXi for NAS or Veeam Linux Repository
2. Configure the Veeam Backup & Replication NAS or Veeam Linux Repository

[Configure the DXi for NAS or Veeam Linux Repository](#)

The DXi system allows you to configure it to present its storage capacity as NAS shares that are compatible with Veeam Backup & Replication. You can create NAS shares for use with Windows or UNIX networks. You can also join the DXi to a Windows domain or workgroup and manage users.

In the DXi Remote Management Console (the GUI) the **Configuration** page allows you to configure many of the features of the DXi, including storage presentation. A NAS license must be installed on the DXi before you configure NAS shares. To enable the Veeam Linux Repository; you will need to install a Veeam Application Environment License. See the [Quantum DXi Veeam Installation Guide](#) for more detail.

Configuring the DXi for NAS lets you choose which network protocol will be used as the transport method to the DXi. CIFS (Windows) and NFS (UNIX/Linux) are available on the **NAS > Summary** tab. After NAS Shares have been configured on the DXi, Veeam Backup & Replication can be configured to use these shares as storage resources.

[Configure DXi as a Veeam Linux Repository](#)

Refer to the [Quantum DXi Veeam Installation Guide](#) for details.

[Configure Veeam Backup & Replication for NAS or Veeam Linux Repository](#)

Refer to the "Veeam Backup & Replication" section of the [Veeam Help Center \(Technical Documentation\) website](#) for current configuration and related details.

Best Practices Guide for Veeam Linux Repository or CIFS

Number of Shares Considerations

Quantum DXi systems support both CIFS (Windows-based) and NFS shares. Each system can support multiple NAS shares, with a maximum of 128 shares. It is recommended that users create only the required number of shares for each backup proxy.

When using CIFS shares on DXi systems, it is recommended that you create at least one share for each backup proxy to use. Backup proxies should not share the CIFS shares during normal backup operations.

When using a Veeam Linux repository, in order to limit concurrent tasks, Quantum suggests that you create no more than 25 Linux repositories on a single DXi.

Network CIFS Share Access Control Considerations

In Windows Active Directory environments, the share acts as the target for Veeam Backup & Replication. The share is not intended as primary storage or drag-and-drop storage. A best practice is to create a new account and workgroup, as opposed to joining the domain, to limit access and prevent accidental file deletion by another user. It is recommended that you **DO NOT** reconfigure or delete NAS shares while data is being written. There is no mechanism to detect the I/O and provide a warning to the user.

Network Considerations

Some network considerations include:

- Use a dedicated network for backup data, or use QoS features that guarantee network bandwidth. Another option would be to use virtual networks (VLANs) to segregate backup from production network traffic.
- Configure network interface cards (NICs) in the server and clients, and set routers to full duplex.
- Cabling:
 - Use only CAT5e or CAT6 cables (1Gb/s rated cables).
 - Use only OM3 or OM4 (Aqua) Fibre Optic cables (10Gb/s rated FC).
- If you are using a DNS server, verify that the DNS server configuration settings are correct by using **nslookup** on the host name, as well as the IP address.
- It is also a good idea to add the HOSTNAME and IP Address to the host file.
- Use multiple DXi ports when connecting to the network. The more DXi Ports used, the better the performance capability will be across the ports.
- Install and configure multiple network ports on the Backup Proxy servers. Dedicate multiple ports for the transfer of data to the DXi.
- For redundancy, connect at least two DXi ports to an Ethernet switch.
- Leverage the DXi system's ability to set up multiple networks. The DXi network configuration allows for integration into nearly any networked environment.
- Set each switch port used by the DXi to auto-negotiate/auto-sensing. The DXi network interface cards are preset to auto/auto and cannot be changed.

- When using network transport mode, ensure that the ESX management port is on a VMKernel that is attached to the 10gbe vSwitch.
- Change the virtual NIC from E1000E to VMNEXT3 to improve performance.

Additional Best Practice Considerations

Several operational considerations are common to the two access methods (CIFS and NFS). See the [Common Operational Considerations for Veeam Backup & Replication](#) section below for more information on deduplication, encryption, compression, backup streams, and replication.

A performance increase between releases has been observed. Be sure to have the latest patch installed for Veeam software.

When using a DXi for a backup repository, consider the following:

- Multiple concurrent small backup jobs aggregate for faster overall performance than one large backup.
- Select WAN for storage optimization if running remote backup.
- Quantum recommends that you use Veeam advanced deployments and distributed deployments.
- Use parallel processing (a Veeam global option). This will increase backup performance, at the cost of reduced restore performance.
- The DXi Linux Repository supports the use of the Veeam Data Mover Service, which optimizes performance between the DXi and the Veeam proxy server. This optimization uses DXi memory. To avoid oversubscribing memory, we recommend that you run no more than 25 concurrent backups across all repositories defined on the DXi. For recovery jobs, we recommend that you run no more than 15 concurrent full VM restores concurrently across all repositories.

Common Operational Considerations for Veeam Backup & Replication

Deduplication Data Considerations

Deduplication results can be negatively impacted by compression, encryption, software deduplication, and multiplexing. These functions all change the data stream in a way that obscures patterns in the data content. They will reduce the performance and deduplication from any downstream appliance, including DXi systems. To obtain effective deduplication rates, you should **NOT** encrypt, deduplicate, or compress your backup data before sending it to a DXi appliance.

Good Candidates for Data Deduplication

Data deduplication can work well with virtual machines, large databases, unstructured data such as Microsoft Office documents (PowerPoint presentations, Word documents, and Excel spreadsheets), SQL, Oracle, and Exchange databases, and source code.

Not So Good Candidates for Data Deduplication

Data deduplication does **NOT** work well with encrypted data, in-line compressed data, SQL with LiteSpeed (in-line compression), Oracle with multi-channel RMAN (in-line multiplex), Exchange 2010, and compressed or uncompressed music files or movies/videos.

For long-term archiving, it is recommended to vault the data to a physical tape device.

Replication Considerations

For first-time replication setups, when the DXi share is first created, it is highly recommended to manually initiate a replication while that share is empty. This facilitates the first replication following the first backup to that share/partition.

- The replication is only available to NAS shares with deduplication enabled.
- The DXi supports 256-bit AES encryption for replication.
- Data is only encrypted while in transit between the replication source and replication target.
- Data is unencrypted upon arrival at the replication target.
- Encryption may affect replication performance. You should disable encryption if your WAN is already secured.

For more information, please refer to [DXi User Guide](#).

Oversubscription of Space on the DXi

Deduplication will reduce the amount of space used on the physical system by virtual tapes. Users are advised to monitor for Low Space conditions on the DXi and free up virtual media before reaching this threshold. A best practice would be to trigger the Space Reclamation process *before* the DXi reaches approximately 80 percent full.

The **Disk Usage** overview on the **Home** page of the DXi Management GUI displays the following information about disk usage on the system (Note: values are displayed as an amount and as a percentage of the total capacity in the system):

- **Disk Capacity** - The total usable disk capacity of the DXi.
- **Available Disk Space** - The disk space available for data storage (free space).

- **I/O Write Low Threshold state (Yellow)** - Free disk space is equal to or less than 500GB + [10GB * (Total system capacity in TB)].
- **Stop Write state (Red)** - Free disk space is equal to or less than 250GB.
- **Stop I/O state (Red)** - Free disk space is equal to or less than 10GB.

Note: For optimal system performance, Quantum recommends keeping the amount of Available Disk Space (free space) at 20% or more.

Note: When disk capacity is low, target replication to the system is paused. In addition, space reclamation is automatically started to free up disk space.

Space Reclamation

When data is deduplicated it is stored in the block pool—a pool of all unique data blocks that were captured during the data deduplication cycle. When subsequent backup jobs occur, the data deduplication engine searches for new data entering the DXi and uses a variable length compression algorithm to compare new data to existing data in the block pool. Unique blocks are added to the block pool, and known blocks are indexed.

The space reclamation function searches the blockpool for data blocks that are not referenced by any pointers (that is, the files associated with these blocks have been expired and removed). When such a data block is identified, it is removed to make the space reusable.

For correct system operation, space reclamation must be run at regular intervals (at least once a week). Quantum recommends creating a schedule to automatically run space reclamation

It may be beneficial to schedule space reclamation for a time when other operations are not normally being carried out. Therefore it is important to know when to schedule the space reclamation process. As a best practice, Quantum recommends that the process starts at least two hours after your backup job has completed, on a daily basis. It is far more efficient to process a day's worth of new data than a week's worth.

Refer to the [DXi User Guide](#) for configuration details.

Backup Stream Considerations

Note: Click the following links to view the following topics in the Veeam Help Center.

- Limit the number of [Concurrent](#) backups, and the data ingestion rate, to help control the load on the repository and prevent possible timeouts.
- Use [Advanced Deployment](#) and [Distributed Deployment](#) to greatly relieve the load on the Veeam Backup Server.
- Use [Resource Scheduling](#) to automatically select and use optimal resources for configured jobs.
- Set up multiple networks where possible, so that each Veeam proxy will have its own data path to the DXi.
- When you are using the Veeam Linux Repository, 25 concurrent backup streams and 15 restore streams should be the maximum. Although it is possible to exceed these stream counts at times, the amount of DXi memory consumed by the Veeam data mover is dynamic and fluctuates. If the aggregate memory consumption exceeds 30GB jobs may fail.

DXi Backup I/O Guidance

The **Reverse Incremental Backup** first runs a full backup on the VM, after which all subsequent backups are incremental. This method allows you to perform a forever-incremental backup strategy. During a Reverse Incremental Backup, Veeam injects changes into the **.vbk** file and then rebuilds it to the most recent state of the VM. This will cause simultaneous read and write operation on the DXi.

These simultaneous operations can negatively impact performance, causing an I/O performance bottleneck on the DXi. To avoid this situation, if you are using a CIFS NAS repository, consider running a standard incremental backup and then using the Active Full Backup method, to prevent I/O bottlenecks within the storage device. Multiple Full Backups will not consume as much space on DXi storage, because all similar blocks will be deduplicated by the DXi. If you are using the Veeam Linux Repository, consider running standard incremental backups followed by a periodic synthetic full backup.

The **Synthetic Full Backup** is a method that synthesizes a backup from the first Full Backup and subsequent Incremental Backups. The underlying difference between an Active Full Backup and a Synthetic Full Backup is how the VM data is retrieved. With a Synthetic Full Backup, Veeam will not retrieve the VM data from the source, but will synthesize a full backup from the DXi Linux repository. This should only be attempted when the Linux Repository is employed on the DXi. The network overhead of transferring the data to the Veeam Backup and Replication server to synthesize is not necessary in this case, and the operation takes place entirely on the DXi. For this reason, this method is a good candidate for environments that have limited network bandwidth. It is not advisable to perform synthetic full backups when a CIFS Shared Folder repository is employed.

Instant VM Recovery allows you to immediately restore a VM back into production from the DXi storage repository. This allows you to minimize recovery time, and minimizes disruption from production downtime. Booting virtual machines from the DXi repository is similar in performance to the Reverse Incremental and Synthetic Full Backup methods. However, this restore method could negatively impact performance, causing an I/O bottleneck at the DXi. This should only be attempted when you are employing a Linux Repository on the DXi.

The DXi works well with the Instant VM Recovery method, although it is not designed as primary storage. Thus, Instant VM Recovery should be viewed only as a temporary solution, until primary storage is available. It's advisable to only start as many instant recovery sessions as necessary, because each session consumes memory on the DXi while active. Memory consumption varies, depending on what type of activity is present on the hosted virtual machine. It's also advisable to redirect written blocks to a local high speed datastore to take advantage of caching. We also suggest that you migrate instant recovered virtual machines to permanent storage after instant recovery is complete.

Sample Backup Workflow

When using the Linux Repository, consider using the following backup workflow:

- Active Full Backup (initial)
- Daily Forward Incremental Backup
- Weekly Synthetic Full Backup
- Monthly Active-full Backup

Try to limit restore points to from 7 to 14 (Veeam default). In addition, no more than 30 restore points should be retained before a synthetic or full backup is performed.

Helpful Resources

The following is a list of documents, references, and links where you can find additional information regarding specific activities and products.

Veeam Online Resources:

- [Veeam Backup & Replication Documentation](#)
- [Veeam Help Center \(Technical Documentation\) -- Online Help Center](#)
- [Veeam Customer Support Portal](#)
- [Veeam Community Forums](#)
- [Veeam Online University](#)
- [Veeam Resource Library](#)
- [Veeam FAQs](#)

VMware Web Site

<http://www.vmware.com/>

Microsoft Web Site

<http://www.microsoft.com/en-us/default.aspx>

Quantum Web Site

<http://www.quantum.com>

StorageCare Guardian Web Site

<http://www.quantum.com/ServiceandSupport/Services/GuardianInformation/index.aspx>

StorageCare Vision Web Site

<http://www.quantum.com/products/Software/quantumvision/Index.aspx>

Contacting Quantum

More information about Quantum products is available on the Service and Support website at <http://www.quantum.com/serviceandsupport/get-help/index.aspx>. The Service and Support Website contains a collection of information, including answers to frequently asked questions (FAQs). You can also access software, firmware, and drivers through this site.

For further assistance, or if training is desired, contact the Quantum Customer Support Center:

Region	Support Contact
North America	1-800-284-5101 (toll free) +1-720-249-5700
EMEA	+800-7826-8888 (toll free) +49 6131 324 185
Asia Pacific	+800-7826-8887 (toll free) +603-7953-3010

For worldwide support:

<http://www.quantum.com/serviceandsupport/get-help/index.aspx#contact-support>