

Quest® QoreStor™

# Interoperability Guide



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#### Legend

 **CAUTION: A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.**

 **IMPORTANT, NOTE, TIP, MOBILE, or VIDEO:** An information icon indicates supporting information.

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# Introduction

This guide provides information about hardware and software requirements for Quest® QoreStor™ installation, as well as additional third-party software applications supported for use with QoreStor.

## Other information you may need

The following table lists the documentation available for QoreStor. The documents listed in this table are available on the Quest support website by selecting your specific QoreStor version at:

<http://support.quest.com/QoreStor>

**Table 1: QoreStor documentation**

Document	Description
QoreStor Installation Guide	Provides information on installation and operation requirements, supported platforms as well as procedures for installing QoreStor.
QoreStor User Guide	Provides information on configuring and using QoreStor.
QoreStor Release Notes	Provides the latest information about new features and known issues with a specific product release.
QoreStor Command Line Reference Guide	Provides information about managing QoreStor data backup and replication operations using the QoreStor command line interface (CLI).
QoreStor Interoperability Guide	Provides information on supported infrastructure components.
QoreStor Virtual Machine Deployment Guide	Provides information on deploying the QoreStor virtual machine on VMware ESX or Microsoft Hyper-V.
Additional whitepapers	Instructions and best practices for configuring additional Quest and third-party applications to work with QoreStor.

**i** **NOTE:** Check for the latest documentation updates and release notes at <http://support.quest.com/qorestor>. Read the release notes first because they contain the most recently documented information about known issues with a specific product release.

# Information on compatible products

QoreStor offers direct integration with Quest Software's NetVault® Backup and vRanger®, as well as Veritas NetBackup and Backup Exec. For more information on those products refer to the documents below.

**Table 2: Quest NetVault Backup documentation**

Document	Description
NetVault Backup Installation Guide	Provides information about installing and upgrading the NetVault Backup server and client software.
NetVault Backup Administration Guide	Describes how to configure and use NetVault Backup to protect your data. This document also provides information on configuring QoreStor repositories and migrating NetVault SmartDisk data to the new QoreStor repository.
NetVault Backup Release Notes	Provides the latest information about new features and known issues with a specific product release.

**i** **NOTE:** See the complete NetVault Backup documentation at <https://support.quest.com/netvault-backup>.

**Table 3: Quest vRanger documentation**

Document	Description
vRanger Installation/Upgrade Guide	This document provides information on supported platforms, system requirements, and instructions on installing and upgrading vRanger.
vRanger User Guide	This document provides information and procedures on configuring and using vRanger to protect virtual and physical environments.
vRanger Release Notes	This document details the issues resolved in this release, the known issues as of this release, and the third party components in vRanger.

**i** **NOTE:** See the complete vRanger documentation at <https://support.quest.com/vranger>.

**Table 4: Veritas documentation**

Document	Description
Veritas NetBackup	For information on Veritas NetBackup, refer to the <a href="#">NetBackup product documentation</a> .
Veritas Backup Exec	For information on Veritas Backup Exec, refer to the <a href="#">Backup Exec product documentation</a> .

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# Installation Requirements

The information in this section describes the minimum hardware and software requirements for QoreStor installation.

## QoreStor installation modes

QoreStor can be installed in one several installation modes, each with different hardware requirements and expected performance levels. When QoreStor is installed in Object Direct mode, the installation modes available are slightly different and support different capacities.

## Installation modes for standard QoreStor installations

- **Large** - This is the mode of installation that will yield the highest capacity and performance. Large mode supports a back-end capacity of up to 360 TB. It also requires that the data and metadata volumes are on separate RAID sets.
- **Standard** - This is the mode of installation that will suit most environments as it supports a back end capacity of up to 150TB.
- **Cloud Optimized** - This is a smaller footprint installation designed to maximize cost-effectiveness for operation in cloud environments. The data dictionary size is reduced to reflect the lower backend capacity limit of 43TB.
- **Demo** - Demo mode is the least hardware-intensive option used for initial evaluation or lightweight testing. Demo mode can easily be installed on a virtual machine running on most workstations. Demo mode is not suitable for any production application and does not allow any license expansion. Demo mode supports a back end capacity of up to 100GB.

**i** | **NOTE:** When QoreStor is installed in Cloud Optimized or Demo mode, Archive tier is not supported.

**i** | **NOTE:** For information on available virtual machine configurations, refer to the topic "QoreStor VM Specifications" in Chapter 5.

# Installation modes for installing QoreStor in Object Direct Configuration

- **Large** - This is the mode of installation that will yield the highest capacity and performance. Large mode supports a back-end capacity of up to 360 TB. Additionally, 10TB of SSD storage must be configured for QoreStor metadata.
- **Standard** - This is the mode of installation that will suit most environments as it supports a back end capacity of up to 150TB. Additionally, 4TB of SSD storage must be configured for QoreStor metadata.
- **Cloud Optimized** - This is a smaller footprint installation designed to maximize cost-effectiveness for operation in cloud environments. The data dictionary size is reduced to reflect the lower backend capacity limit of 40TB. Additionally, 1TB of additional storage must be configured for QoreStor metadata.

- NOTE:** When QoreStor is installed in Cloud Optimized mode, Archive tier is not supported.
- NOTE:** When QoreStor is installed in an Object Direct configuration, VTL containers are not supported.
- NOTE:** When QoreStor is installed in an Object Direct configuration, the Demo mode is not available.
- NOTE:** When QoreStor is installed in an Object Direct configuration, the minimum required swap space is 16 GB.

## Hardware requirements

The hardware requirements for QoreStor installation differ depending on whether you are installing QoreStor in Object Direct mode or standard mode.

## Hardware requirements for standard installations

QoreStor can be installed in one of four modes: Large, Standard, Cloud Optimized, and Demo. Each installation mode has different minimum installation requirements, as described below. Refer to [QoreStor installation modes](#) for more information on the installation modes.

- NOTE:** The table below lists the minimum hardware requirements for installation. Refer to "QoreStor Sizing Guidelines" in the *QoreStor Interoperability Guide* for information on sizing your QoreStor server.

**Table 5: Hardware requirements for installation**

	Large Mode	Standard Mode	Cloud Optimized Mode	Demo Mode
<b>CPU cores</b>	32	4	4	4
<b>RAM</b>	64 GB	24 GB	14 GB	6 GB



<b>Storage capacity</b>	Minimum of 500GB free space on repository volume. Minimum of 1 TB free space on metadata volume 3.2 TB is recommended	Minimum of 500GB free space on repository volume. Minimum of 600 GB free space on metadata volume. 1.5 TB is recommended	Minimum of 500GB free space on repository volume.	Minimum of 50GB free space on repository volume.
<b>Additional storage requirements</b>	Storage back-end should support: <ul style="list-style-type: none"> <li>• 20,000 IOPS for sequential writes</li> <li>• 20,000 IOPS for Metadata with random writes</li> <li>• 450 IOPS for data volume with random writes.</li> </ul> Recommended back-end configuration is: <ul style="list-style-type: none"> <li>• RAID 6 with 48 to 60 disks for repository</li> <li>• RAID1 or RAID10 with 2 to 4 drives for metadata.</li> </ul> Maximum supported physical capacity is 360TB	Storage back-end should support: <ul style="list-style-type: none"> <li>• 450 IOPS for sequential writes</li> <li>• 450 IOPS with random writes</li> </ul> Recommended back-end configuration is RAID 6 with 12 disks. Maximum supported physical capacity is 150TB	Storage back-end should support: <ul style="list-style-type: none"> <li>• 450 IOPS for sequential writes</li> <li>• 450 IOPS with random writes</li> </ul> Recommended back-end configuration is RAID 6 with 6 disks. Maximum supported physical capacity is 43TB	When installing in Demo mode, QoreStor does not perform a pre-check for IOPS Maximum supported physical capacity is 100GB

## Hardware requirements for installation in Object Direct mode

When installed in an object direct configuration, QoreStor can be installed in one of three modes: Large, Standard, and Cloud Optimized. Each installation mode has different minimum installation requirements, as described below. Refer to [QoreStor installation modes](#) for more information on the installation modes.

**i** **NOTE:** The table below lists the minimum hardware requirements for installation. Refer to "QoreStor Sizing Guidelines" in the *QoreStor Interoperability Guide* for information on sizing your QoreStor server.

**Table 6: Hardware requirements for installation**

	Large Mode	Standard Mode	Cloud Optimized Mode
<b>CPU cores</b>	32	8	4
<b>RAM</b>	64 GB	32 GB	16 GB
<b>Dictionary Size</b>	256 GB	256 GB	64 GB
<b>Storage capacity</b>	Minimum of 10 TB free space on metadata volume	Minimum of 4 TB free space on metadata volume	Minimum of 1 TB free space on metadata volume
<b>Additional storage requirements</b>	Storage back-end should support: <ul style="list-style-type: none"> <li>• 450 IOPS for metadata volume sequential writes</li> <li>• 450 IOPS for metadata volume random writes</li> </ul>	Storage back-end should support: <ul style="list-style-type: none"> <li>• 450 IOPS for metadata volume sequential writes</li> <li>• 450 IOPS for metadata volume random writes</li> </ul>	Storage back-end should support: <ul style="list-style-type: none"> <li>• 450 IOPS for metadata volume sequential writes</li> <li>• 450 IOPS for metadata volume random writes</li> </ul>

## Networking requirements

The following network configurations need to be made in order to successfully install and run QoreStor.

**i** **NOTE:** If you install QoreStor with the **-f** option, or answer **yes** to the prompt regarding firewall changes, the QoreStor installer will ensure these ports are open.

## Port configuration

The ports below need to be available for the QoreStor service:

Component/Function	Ports required
<b>UI / Cloud Tier</b>	<ul style="list-style-type: none"> <li>• 80</li> <li>• 5233</li> </ul>
<b>OST / RDA<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• 9920</li> <li>• 10011</li> <li>• 11000</li> </ul>
<b>NFS<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• 111</li> <li>• 2049</li> </ul>

Component/Function	Ports required
<b>Replication</b>	<ul style="list-style-type: none"> <li>• 9904</li> <li>• 9911</li> <li>• 9915</li> <li>• 9916</li> </ul>
<b>CIFS<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• 138</li> <li>• 139</li> <li>• 445</li> </ul>
<b>Object (S3)</b>	<ul style="list-style-type: none"> <li>• 9000</li> </ul>
<b>NDMP</b>	<ul style="list-style-type: none"> <li>• 10000</li> <li>• 43000-43040</li> </ul>
<b>RDA-NDMP</b>	<ul style="list-style-type: none"> <li>• 12000-12127</li> </ul>
<b>iSCSI</b>	<ul style="list-style-type: none"> <li>• 3260</li> </ul>
<b>Secure Connect<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 9443</li> </ul>

<sup>1</sup> When using Rapid NFS or Rapid CIFS, the ports for both RDA and NFS or RDA and CIFS, respectively, are required. If Secure Connect is used with Rapid CIFS, then the Secure Connect port is also required.

<sup>2</sup> If Secure Connect is used for all RDA and OST clients, then only the Secure Connect port is needed for RDA and OST.

## Verify connectivity

The usage of the QoreStor repository requires stable TCP/IP connectivity between the backup application server and the QoreStor repository server.

**i** | **NOTE:** The QoreStor repository and backup application server need to be on the same local network.

# Supported installation platforms

QoreStor is supported on the following platforms:

**Table 7: Operating systems supported for installation**

Operating System	Bit level
CentOS <sup>1</sup> Linux 7.3 - 7.9, 8.3 <sup>2</sup>	64-bit
RHEL Linux 7.3 - 7.9, 8.3 <sup>2</sup>	64-bit
Oracle <sup>3</sup> Linux 7.3 - 7.9, 8.3 <sup>2</sup>	64-bit

**i** | **NOTE:** CentOS, RHEL, or Oracle Linux<sup>1</sup> version 8.3 is recommended for fresh installations unless VTL is required. If support for VTL is required, CentOS, RHEL, or Oracle Linux<sup>1</sup> version 8.2 is recommended.

**i** **NOTE:** Only CentOS, RHEL, or Oracle Linux<sup>1</sup> versions using the following kernels are supported:

- Linux version 7.x
  - 3.10.0-514
  - 3.10.0-693
  - 3.10.0-862
  - 3.10.0-957
  - 3.10.0-1062
  - 3.10.0-1127
  - 3.10.0-1160
- Linux Version 8.x
  - 4.18.0-193
  - 4.18.240

**i** **IMPORTANT:** Before upgrading the operating system on the QoreStor server, refer to "Upgrading the QoreStor Operating System" in the *QoreStor Installation Guide*.

**i** **IMPORTANT:** The above operating systems should be installed in Minimal or Server mode (without GUI components). Using the Linux GUI will result in poor QoreStor performance.

<sup>1</sup>When installed as a minimal installation, CentOS is missing two required packages: bc, and bzip2. Install these packages before installing QoreStor

<sup>2</sup>For QoreStor installations with VTL, CentOS, RHEL, or Oracle Linux 8.3 is supported when using the 8.2 kernel. When upgrading from 8.2, ensure that the kernel is excluded from the update.

<sup>3</sup>With Oracle Linux, the Red Hat Compatible Kernel (RHCK) must be used. The Oracle Unbreakable Enterprise Kernel is not supported.

## Supported file systems

Only the file system listed below is supported for the QoreStor server.

- XFS
- VxFS (DR migrated machine only)

## Supported file system protocols

QoreStor supports the following file system protocols. The Rapid Data Access (RDA) protocols below provide a logical disk interface that can be used with network storage devices to store data and support data storage operation.

- RDA with NetVault Backup
- RDA with vRanger
- OpenStorage Technology (OST)

- Common Internet File System (CIFS)
- Network File System (NFS)
- Rapid CIFS (RCIFS)
- Rapid NFS (RNFS)
- VTL <sup>1</sup>
  - iSCSI
  - NDMP

1

iSCSI and NDMP are not supported when QoreStor is installed in Demo mode. VTL is not supported when QoreStor is installed in Object Direct mode.

## Other supported protocols

QoreStor supports the following file additional protocols:

- Object (S3 Compatible)

## Supported VTL replication configurations

When configuring replication for VTL containers from DR Series appliances to QoreStor instances, the configurations below are supported:

**Table 8: Supported VTL OEM configurations for replication**

Source (DR Series)	Target (QoreStor)
Dell OEM type	Quest OEM type
Quest OEM type	Quest OEM type

## Supported virtual environments

This section lists the supported virtual environments for the QoreStor virtual machine.

### Supported virtual platforms

**Table 9: Supported virtualization platforms**

Platform	Versions
VMware	<ul style="list-style-type: none"> <li>ESXi 6.0 or later</li> <li>Workstation 15.x and later<sup>1</sup></li> <li>Fusion 11.x and later<sup>1</sup></li> </ul>
Microsoft Hyper-V	<ul style="list-style-type: none"> <li>Hyper-V Server 2016</li> <li>Hyper-V Server 2019</li> <li>Windows 10<sup>2</sup></li> </ul>
Oracle VirtualBox <sup>3</sup>	<ul style="list-style-type: none"> <li>Any version that supports OVF 1.1</li> </ul>

<sup>1</sup>VMware Workstation and Fusion are supported only for demonstration purposes using the demo image.

<sup>2</sup>Windows 10 is supported for hosting only VMs in Demo mode.

<sup>3</sup>

Oracle VirtualBox is supported only for demonstration purposes using the demo image.

## QoreStor VM Specifications

The QoreStor virtual machine templates are available in four configurations as described below:

**Table 10: QoreStor VM Specifications**

	Demo	Tier 1	Tier 2	Tier 3
CPU	4	4	8	32
RAM	6	24	32	64
OS Disk	64 GB (Thin provisioned)	64 GB (Thick provisioned)	64 GB (Thick provisioned)	64 GB (Thick provisioned)
Metadata disk	N/A	470 GB	1.5 TB	3.3 TB
Data Disk	128 GB (Thin provisioned)	1 TiB expandable up to 40 TiB	5 TiB ( 3 individual disks of 1.7 TiB each) expandable up to 150 TiB.	10 TiB (6 individual disks of 1.7 TiB each) expandable up to 360 TiB.
QoreStor Mode (Dictionary type)	Based on Demo installation	Based on Cloud-optimized installation	Based on Standard installation	Based on Large installation
VM OS	Oracle Linux 7.9 - minimal install	Oracle Linux 7.9 - minimal install	Oracle Linux 7.9 - minimal install	Oracle Linux 7.9 - minimal install
NIC	1	1	1	1
Virtual hardware version	10	10	10	10

**Table 11: QoreStor VM Specifications - Object Direct installations**

	Tier 1	Tier 2	Tier 3
CPU	4	8	32
RAM	24	32	64
OS Disk	64 GB (Thick provisioned)	64 GB (Thick provisioned)	64 GB (Thick provisioned)
Metadata disk	1 TB	4 TB	10 TB
QoreStor Mode (Dictionary type)	Based on Cloud-optimized installation	Based on Standard installation	Based on Large installation
VM OS	Oracle Linux 7.9 - minimal install	Oracle Linux 7.9 - minimal install	Oracle Linux 7.9 - minimal install
NIC	1	1	1
Virtual hardware version	10	10	10

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# Supported Software

The applications listed in the sections below are supported for use with QoreStor

## Supported browsers

This section lists the minimum supported web browsers for use with the QoreStor UI.

**Table 12: Supported browsers**

Software	Versions
Mozilla Firefox	67 or later
Microsoft Internet Explorer	11.0 <sup>1</sup>
Google Chrome	75 or later

<sup>1</sup>Internet Explorer 11 is supported only for use with the QoreStor Web Terminal. When IE11 users log in to the QoreStor UI, the Terminal page will be displayed and navigation options will be hidden.

## Supported clients

This section details the operating systems supported for installation of the QoreStor clients.



**Table 13: Supported QoreStor clients**

<b>Client type</b>	<b>Client installation platform</b>
RDA <sup>1</sup>	<ul style="list-style-type: none"><li>• Linux<ul style="list-style-type: none"><li>• CentOS/Oracle Linux /RHEL 5</li><li>• CentOS/Oracle Linux /RHEL 6</li><li>• CentOS/Oracle Linux /RHEL 7</li><li>• CentOS/Oracle Linux /RHEL 8</li><li>• SLES 10</li><li>• SLES 11</li><li>• SLES 12</li><li>• SLES 15</li></ul></li><li>• Unix<ul style="list-style-type: none"><li>• Solaris 10</li><li>• Solaris 11</li><li>• AIX 7.1 and later</li><li>• HPUX 11.31</li></ul></li><li>• Windows<ul style="list-style-type: none"><li>• Windows Server 2008 R2</li><li>• Windows Server 2012 R2</li><li>• Windows Server 2016</li><li>• Windows Server 2019</li></ul></li></ul>
OST <sup>1</sup>	<ul style="list-style-type: none"><li>• Linux<ul style="list-style-type: none"><li>• CentOS/Oracle Linux /RHEL 5</li><li>• CentOS/Oracle Linux /RHEL 6</li><li>• CentOS/Oracle Linux /RHEL 7</li><li>• CentOS/Oracle Linux /RHEL 8</li><li>• SLES 10</li><li>• SLES 11</li><li>• SLES 12</li><li>• SLES 15</li></ul></li><li>• Windows<ul style="list-style-type: none"><li>• Windows Server 2012 R2</li><li>• Windows Server 2016</li><li>• Windows Server 2019</li></ul></li></ul>

**Client type    Client installation platform**

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Rapid CIFS	<ul style="list-style-type: none"><li>• Windows<ul style="list-style-type: none"><li>• Windows Server 2008 R2</li><li>• Windows Server 2012 R2</li><li>• Windows Server 2016<sup>2</sup></li><li>• Windows Server 2019<sup>3</sup></li></ul></li></ul>
Rapid NFS	<ul style="list-style-type: none"><li>• Linux<ul style="list-style-type: none"><li>• CentOS/Oracle Linux /RHEL 6</li><li>• CentOS/Oracle Linux /RHEL 7</li><li>• CentOS/Oracle Linux /RHEL 8.2</li><li>• SLES 11</li><li>• SLES 12</li><li>• SLES 15</li></ul></li></ul>
iSCSI	<ul style="list-style-type: none"><li>• Linux<ul style="list-style-type: none"><li>• CentOS/Oracle Linux /RHEL 6</li><li>• CentOS/Oracle Linux /RHEL 7</li><li>• CentOS 6.6</li></ul></li><li>• Windows<ul style="list-style-type: none"><li>• Windows Server 2008 R2</li><li>• Windows Server 2012 R2</li><li>• Windows Server 2016</li><li>• Windows Server 2019</li></ul></li></ul>
NDMP	<ul style="list-style-type: none"><li>• Dell FluidFS<ul style="list-style-type: none"><li>• v3</li><li>• v4</li><li>• Windows Server 2016</li></ul></li><li>• NetApp<ul style="list-style-type: none"><li>• ONTAP 8.x 7-Mode</li><li>• ONTAP 8.x C-Mode</li><li>• ONTAP 9.x C-Mode</li></ul></li><li>• EMC<ul style="list-style-type: none"><li>• VNX OE 7.x and 8.0.x</li><li>• Isilon OneFS 7.0.x</li><li>• Isilon OneFS 8.0.x</li></ul></li></ul>

## Client type   Client installation platform

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- SUN NAS
  - 2011

<sup>1</sup>To enable secure WAN reconnection functionality, the Secure Connect client must be version 4.1.0.265 and the QoreStor server version must be 5.1.0.xxx.

<sup>2</sup>Rapid CIFS is not supported on Windows Server 2016 with secure boot enabled

<sup>3</sup>SMB 1.0/CIFS File Sharing Support may need to be installed on Server 2019 depending on your QoreStor version.

## Supported client plug-ins

This section lists the client plug-in versions supported by QoreStor.

**Table 14: Supported client plug-in versions (without Secure Connect)**

Client Plug-in	Version(s)
RDA	4.0.3049.0 or greater
OST	4.0.3049.0 or greater
Rapid NFS	4.0.3049.0 or greater
Rapid CIFS	4.0.3101.1 or greater

**Table 15: Supported client plug-in versions ( with Secure Connect)**

Client Plug-in	Version(s)
RDA	4.1.0.265 or greater
OST	4.1.0.265 or greater
Rapid NFS	4.0.3310.0
Rapid CIFS	4.0.3233.1 or greater

## Supported cloud providers

This section lists the cloud providers supported for each of the cloud-focused features in QoreStor.

# Cloud Replication

- Microsoft Azure Blob Storage
- Amazon S3
- Wasabi S3
- IBM S3
- Google S3
- S3 Compatible Storage Providers

# Archive Tier

- Amazon S3 Glacier
- Amazon S3 Glacier Deep Archive

# Object Direct Installations

- **Cloud Deployments**
  - Microsoft Azure Blob with Azure VM from same region
  - Amazon S3 with Amazon EC2 instance from same region
- **On-Premises**
  - S3 Compatible Storage (such as MinIO) with on-Prem Qorestor Server

# Supported backup software

This section lists the supported backup applications and protocols for QoreStor.

**Table 16: Supported backup applications and protocols**

Data Management Application (DMA)	RDA	OST	NFS	RDNFS	CIFS	RDCIFS	Object (S3 Compatible)	NDMP VTL	iSCSI VTL
<b>NetVault Backup<sup>1</sup></b>									
12.x	✓							✓	✓
13.0	✓							✓	✓
13.0.1	✓							✓	✓

**vRanger<sup>1</sup>**

Data Management Application (DMA)	RDA	OST	NFS	RDNFS	CIFS	RDCIFS	Object (S3 Compatible)	NDMP VTL	iSCSI VTL
7.6.5	✓				✓	✓			
7.7	✓				✓	✓			
7.8	✓				✓	✓			
7.8.2	✓				✓	✓			
<b>Backup Exec</b>									
16		✓			✓	✓			✓
20		✓			✓	✓	✓		✓
21		✓			✓	✓	✓		✓
<b>NetBackup</b>									
8.0		✓	✓	✓	✓	✓		✓	✓
8.1		✓	✓	✓	✓	✓		✓	✓
8.1.1		✓	✓	✓	✓	✓		✓	✓
8.1.2		✓	✓	✓	✓	✓		✓	✓
8.2		✓ <sup>2</sup>	✓	✓	✓	✓		✓	✓
<b>CommVault</b>									
10			✓	✓	✓	✓		✓	✓
11			✓	✓	✓	✓	✓	✓	✓
<b>DELL EMC NetWorker</b>									
9.1			✓	✓	✓	✓		✓	✓
<b>Microsoft SQL Server Backup</b>									
2016					✓	✓			
<b>Oracle RMAN</b>									
Oracle Linux 12c			✓	✓					
Oracle 12c for Windows					✓	✓			
<b>CA Arcserve</b>									
v16			✓		✓				
v17.5			✓		✓				
<b>VEEAM</b>									
9.0					✓	✓			

Data Management Application (DMA)	RDA	OST	NFS	RDNFS	CIFS	RDCIFS	Object (S3 Compatible)	NDMP VTL	iSCSI VTL
9.5					✓	✓	✓		✓
<b>HP Data Protector</b>									
9			✓		✓				
10.04			✓		✓				
<b>BridgeHead</b>									
RAPid 20B	✓		✓		✓				
RAPid 21A	✓		✓		✓				
<b>Atempo Time Navigator (TiNa)</b>									
4.3			✓		✓				
4.4			✓		✓				
4.5			✓		✓				
<b>Acronis</b>									
11.5			✓		✓				
<b>OS-provided or third-party utilities</b>									
UNIX dump			✓	✓					

<sup>1</sup>Refer to "NetVault Backup and vRanger Feature Compatibility" in the *QoreStor Interoperability Guide* for more detailed information on NetVault Backup and vRanger Support

<sup>2</sup>AIR support for NetBackup 8.2 requires an update to the mapping file.

## NetVault Backup and vRanger Feature Compatibility

The tables below provide more detailed information on NetVault Backup and vRanger feature compatibility with QoreStor.

**Table 17: NetVault Backup feature compatibility**

Feature	NVBU 12.0.1	NVBU 12.1	NVBU 12.2	NVBU 12.3	NVBU 12.4	NVBU 13
Integrated RDA plug-in version	4.1.0.234	4.1.0.234	4.1.0.237	4.1.0.263	4.1.0.266	4.1.0.328
Compatible RDA plug-in versions	4.1	4.1	4.1	4.1	4.1	4.1
Secure Connect WAN	Yes	Yes	Yes	Yes	Yes	Yes

restart-ability<sup>1</sup>

Create storage groups and containers from DMA	Yes	Yes	Yes	Yes	Yes	Yes
OpDup DR to QoreStor <sup>2</sup>	Yes	Yes	Yes	Yes	Yes	Yes
OpDup QoreStor to DR	Yes	Yes	Yes	Yes	Yes	Yes

**Table 18: vRanger feature compatibility**

Feature	vRanger 7.6.5	vRanger 7.7	vRanger 7.8
Integrated RDA plug-in version	4.03	4.0.3202.1	4.1.0.263
Secure Connect WAN restart-ability <sup>1</sup>	No	No	No
Create storage groups and containers from DMA	No	No	No
OpDup DR to QoreStor <sup>2</sup>	Yes	Yes	Yes
OpDup QoreStor to DR	Yes	Yes (w/ DRv4.0.3203.1b)	Yes (w/ DRv4.0.3203.1b)

<sup>1</sup>To enable secure WAN reconnection functionality, the Secure Connect client must be version 4.1.0.265 and the QoreStor server version must be 5.1.0.xxx.

<sup>2</sup>Requires DR OS 4.0 or later.

# QoreStor supported system limits

This section lists the supported configuration limits for the QoreStor system.

**Table 19: Supported configuration limits**

Feature	Cloud-optimized	Standard	Large
Maximum containers	16	32	64
Maximum VTL containers	1	2	4
Maximum storage groups	5	5	5
Maximum streams	32	64	128
Maximum connections - CIFS/ Rapid CIFS	16	32	128
Maximum connections - NFS/ Rapid NFS	16	32	128
Maximum connections - RDA <sup>1</sup>	32	128	256
Maximum connections - OST	32	128	256
Maximum replications	16	32	64

**Table 20: Supported configuration limits - Object Direct installations**

Feature	Cloud-optimized	Standard	Large
Maximum containers	32	32	64
Maximum storage groups	5	5	5
Maximum streams	32	64	128
Maximum connections	100	100	100

<sup>1</sup>The maximum allowable RDA connections includes the connection to Amazon S3 storage.



# Reference architectures

The information in the sections below is intended to help you properly size your QoreStor server.

## Reference guidelines

The specifications detailed in [Hardware references](#) were constructed with the performance guidelines listed below in mind. Please review the performance guidelines below and select an option suitable for your environment. Use that same reference in the [Hardware references](#) section to identify the representative reference architecture.

**Table 21: Reference guidelines**

Reference Guidelines	CPU (cores)	Memory (GB)	NIC Minimum	IO Minimums			Inbound bandwidth
				SSD Support	IOPS BW	IO spindles	
Extreme	32-64	128+	4 x 10GbE	Required	IOPS = 100K+ BW = 700MiB/Sec	RAID6 48+	Ingest Rate Max @ 90% deduplication rate 30+ TB/HR
Enterprise	32-64	64-128	2x 10GbE	Optional	IOPS = 20K+ BW = 300MiB/Sec	RAID6 24-48	20 TB/HR
Standard	8-32	32-64	2x 10GbE	Optional	IOPS = 10K+ BW = 200MiB/Sec	RAID6 8-12	10 TB/HR
Starter	4-8	24-32	4+ x 1GbE	NA	IOPS = 5K+ BW = 100MiB/Sec	RAID5-6 4-8	5 TB/HR

## Hardware references

The table below provides reference architectures for different levels of performance. Two of the examples below use SSD storage to host the QoreStor metadata, which will improve QoreStor performance.

**Table 22: Hardware references**

Hardware references	Extreme Performance Expandable	Extreme Performance	Enterprise Expandable	Enterprise	Standard	Starter Performance	Starter
<b>OEM Reference</b>	R740PE	R740P	R740HE	R740H	R540H	R340P	R340H
<b>Model</b>	Dell R740XD	Dell R740XD	Dell R740XD	Dell R740XD	Dell R540	Dell R340	Dell R340
<b>QS Installer Mode</b>	Large	Large	Large	Large	Standard	Standard	Standard
<b>Expandable</b>	Yes	No	Yes	No	Yes	No	No
<b>CPU</b>	2x Intel Xeon Gold 5120T 2.2G, 14C/28T, 10.4GT/s 2UPD, 19M Cache, Turbo, HT (105W) DDR4-2400, OEM XL	2x Intel Xeon Gold 5120T 2.2G, 14C/28T, 10.4GT/s 2UPI, 19M Cache, Turbo, HT (105W) DDR4-2400, OEM XL	2x Intel Xeon Gold 5120T 2.2G, 1 14C/28T, 10.4GT/s 2UPI, 16M Cache, Turbo, HT (105W) DDR4-2400, OEM XL	1x Intel Xeon Gold 5120T 2.2G, 14C/28T, 10.4GT/s 2UPI, 19M Cache, Turbo, HT (105W) DDR4-2400, OEM XL	1 x Intel Xeon Gold 6130 2.1G, 16C /32T, 10.4GT/s, 22M Cache, Turbo, HT (125W) DDR4-2666	1 x Intel Xeon E-2186G 3.8GHz, 12M cache, 6C/12T, Turbo (95W)	1 x Intel Xeon E-2186G 3.8GHz, 12M cache, 6C/12T, turbo (95W)
<b>Memory</b>	256GB 8 x DUAL IN-LINE MEMORY MODULE, 32GB, 2666, 2RX8, 8G, DDR4, R	192GB 6 x DUAL IN-LINE MEMORY MODULE, 32GB, 2666, 2RX8, 8G, DDR4, R	192GB 6 x DUAL IN-LINE MEMORY MODULE, 32GB, 2666, 2RX8, 8G, DDR4, R	128GB 8 x DUAL IN-LINE MEMORY MODULE, 16GB, 2666, 2RX8, 8G, DDR4, R	64GB 4 x 16GB RDIMM, 2400MT/s, Dual Rank, x8 Data Width	64GB 4 x 16GB RDIMM, 2400MT/s, Dual Rank, x8 Data Width	32GB 2 x 16GB RDIMM, 2400MT/s, Dual Rank, x8 Data Width
<b>Internal RAID</b>	1 x PERC H740P RAID Controller, 8G B NV Cache, Mini card	1x PERC H740P RAID Controller, 8G B NV Cache, Mini card	1 x PERC H740P RAID Controller, 8G B NV Cache, Mini card	1 x PERC H740P RAID Controller, 8G B NV Cache, Mini card	1 x PERC H740P RAID Controller, LP Adapter	1 x PERC H730P Adapter RAID Controller, 2GB	1 x PERC H730P Adapter RAID Controller, 2GB
<b>External RAID</b>	1 x PERC H840 RAID Adapter for External MD14XX		1 x PERC H840 RAID Adapter for External MD14XX				

	Only, 8GB NV Cache, Full Height		Only, 8GB NV Cache, Full Height (*y)				
<b>Repository Storage Requirements</b>	24 x (*x) TB SSD SAS Mix Use 12Gbps 5 12 2.5in Flex Bay AG Drive, 3 DWPD, 5256 TBW	24 x (*x) TB SSD SAS Mix Use 12Gbps 5 12 2.5in Flex Bay AG Drive, 3 DWPD, 5256 TBW	12 x (*x) TB 7.2K RPM NLSAS 12Gbps 512e 3.5in Hot-plug Hard Drive	12 x (*x) TB 7.2K RPM NLSAS 12Gbps 512e 3.5in Hot-plug Hard Drive	12 x (*x) TB 7.2K RPM NLSAS 12Gbps 512e 3.5in Hot-plug Hard Drive	8 x (*x) TB SSD SATA Read Intensive 6Gbps 512 2.5in Hot- plug AG D rive, 1 DWPD, 3504 TBW	4 x 7.2K RPM NLSAS 12Gbps 512e 3.5in Hot-plug Hard Drive
<b>Metadata Storage Requirements</b>	Included as part of the Repository	Included as part of the Repository	4 x (*x) SSD SAS Mix Use 12Gbps 5 12 2.5in Flex Bay AG Drive, 3 DWPD, 5256 TBW	2 x 1.2TB+ SSD SAS Mix Use 12Gbps 512e	2 x 1.2TB+ SSD SAS Mix Use 12Gbps 512e	Included as part of the Repository	Included as part of the Repository
<b>Operating Environment Storage</b>	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC	BOSS controller card + with 2 M.2 Sticks 240G (RAID 1),FH 2 x SSSDR, 240G, 2N, IT06, M.2, M, 5, EC
<b>Network</b>	1 x Broadcom 57412 Dual Port 10GbE SFP+ & 5720 Dual Port 1GbE BA SE-T rNDC	1 x Broadcom 57412 Dual Port 10GbE SFP+ & 5720 Dual Port 1GbE BA SE-T rNDC	1 x Broadcom 57412 Dual Port 10GbE SFP+ & 5720 Dual Port 1GbE BA SE-T rNDC	1 x Broadcom 57412 Dual Port 10GbE SFP+ & 5720 Dual Port 1GbE BA SE-T rNDC	1 x Broadcom 57416 Dual Port 10 Gb E SFP+ Network LOM Mezz Card	1 x QLogic 57840S Quad Port 10Gb S FP+ Direct Attach Rack Network Daughter Card	1 x QLogic 57840S Quad Port 10Gb S FP+ Direct Attach Rack Network Daughter Card
<b>External Storage</b>	4 x MD1420 (*y)	N/A	3 x MD1400 (*y)	N/A	N/A	N/A	N/A

## Enclosure

<b>HW RAID CONFIG</b>	RAID 6--24-1-1-SSD	RAID 6--24-1-1-SSD	RAID 1-2-1-1-SSD	RAID 1-2-1-1-SSD	RAID 1-2-1-1-SSD	RAID 5-8-2-SSD	RAID 5-4-1-1-HDD
<b>&lt;Level&gt;</b>			RAID 6-12-1-1-HDD	RAID 6-12-1-1-HDD	RAID 6-12-1-1-HDD		
<b>&lt;# of Members&gt;</b>							
<b>&lt;Media Type&gt;</b>							
<b>FS CONFIG</b>	XFS	XFS	XFS	XFS	XFS	XFS	XFS

(X) Refer to the manufacturer's documentation and reference data for the latest options for this configuration item.

(Y) Expansion Chassis Guidelines: Cabling in Unified mode (single path) for daisy chaining of up to eight enclosures for each PERC H830/H840 (four enclosures for each port, single path) Unified mode (recommended redundant path) for daisy chaining up to four enclosures for each PERC H830 (four enclosures connected to both ports using redundant path cabling).

# Cloud deployment reference configurations

The tables below describe reference configurations for deployments to Microsoft Azure. These configurations are based on QoreStor images available in the Azure Marketplace. Configurations are described for 4 installation modes, as described below:

- Tier 0 - Community edition
- Tier 1 - Cloud Optimized
- Tier 2 - Standard
- Tier 3 - Large

## QoreStor Tier 0 configurations

The following VM Size Instance is then recommended and validated for Tier 0, with expected Performance rate between 1 TiB/Hr to 1.5 TiB/Hr. (measured for a 90% dedupe ingest data with RDA/RapidNFS).

**Table 23: Tier 0 configuration**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv3	Standard_D4s_v3	4	16	32	8	6400 / 96	2 / 2000

This will add 6 Standard SSDs or Standard HDD as Data Repository, starting with 256 GB, can be later expanded up to 20 TiB.

- 1 TiB (1.5 TiB raw space) -- No License needed.
- 5 TiB (6 TiB raw space)
- 10 TiB (12 TiB raw space)
- 20 TiB (24 TiB raw space)

Additional VMs Size that are tested and validated for tier 0:

**Table 24: Tier 0 additional configuration**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
Esv3	Standard_E4s_v3 2	4	32	64	8	6400 / 96	2 / 2000

## QoreStor Tier 1 configurations

The following are the recommended VM instances validated for Tier 1 configurations. These configurations have an expected performance rate between 1.5 TiB/Hr and 2.5 TiB/Hr (measured for a 90 % dedupe ingest data).

**Table 25: Tier 1 configurations**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv2 - 11-15	Standard_DS12_v2 3	4	28	56	16	12,800 / 192	4 / 3000

The Pre-configured image is Standard\_D12s\_v2. This will create one Premium SSD of 1024 GB for Metadata and 5 Standard SSDs or Standard HDD of 5 TiB. Storage can be later expanded to 10 TiB, 20 TiB, or 40 TiB

- 5 TiB
- 10 TiB
- 20 TiB
- 40 TiB

Additional VM size tested and validated for Tier 1:

**Table 26: Tier 1 additional configuration**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
Esv3	Standard_E4s_v3	4	32	64	8	6400 / 96	2 / 2000

## QoreStor Tier 2 configurations

The following are the recommended VM instances validated for Tier 2 configurations. These configurations have an expected performance rate between 2 TiB/Hr and 3.5 TiB/Hr (measured for a 90 % dedupe ingest data with RDA/RapidNFS).

**Table 27: Tier 2 configurations**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv3	Standard_D8s_v3	8	32	64	16	12,800 / 192	4 / 4000

The Pre-configured Image is Standard\_D8s\_v3. This will create two Premium SSD of 1TiB for Metadata and 10 Standard SSDs or Standard HDD of 512 GB. Storage can be later expanded to 10 TiB, 20 TiB, 40 TiB , 80 TiB, or 160 TiB.

- 5 TiB
- 10 TiB
- 20 TiB
- 40 TiB
- 80 TiB
- 160 TiB

Additional VMs sizes that can be used for Tier2

**Table 28: Tier 2 configurations**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
ESv3	Standard_E8s_v3 2	8	64	128	16	12,800 / 192	4 / 4000

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv2	Standard_DS4_v2	8	28	56	32	25,000 / 384	8 / 6000

## QoreStor Tier 3 configurations

The following are the recommended VM instances validated for Tier 3 configurations. These configurations have an expected performance rate between 3 TiB/Hr and 5 TiB/Hr (measured for a 90 % dedupe ingest data with RDA/RapidNFS).

**Table 29: Tier 3 configuration**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv3	Standard_D16s_v3	16	64	128	32	25,600 / 384	8 / 8000

The Pre-configured Image is Standard\_D16s\_v3. This will create 3 Premium SSD of 1TiB for Metadata and 20 Standard SSDs of 1024 GB. Storage can be later expanded to 40 TiB, 80 TiB, 160 TiB, or 320 TiB.

- 20 TiB
- 40 TiB
- 80 TiB
- 160 TiB
- 320 TiB

Additional VMs sizes that can be used for Tier 3:

**Table 30: Tier 3 additional configurations**

Series	Size	vCPU	Memory:GiB	Temp Storage (SSD) GiB	Max data disks	Max uncached disk throughput: IOPS / MBps	Max NICs / Expected network bandwidth (Mbps)
DSv2	Standard_DS5_v2	16	56	112	64	51,200 / 768	8 / 12000
DSv2-11-15	Standard_DS13_v2_3	8	56	112	32	25,600 / 384	8 / 6000

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## Technical support resources

Technical support is available to Quest customers with a valid maintenance contract and customers who have trial versions. You can access the Quest Support Portal at <https://support.quest.com>.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request
- View Knowledge Base articles
- Sign up for product notifications
- Download software and technical documentation
- View how-to-videos
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product