

Quest® QoreStor™ 5.0

# 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.
Additional whitepapers	Instructions and best practices for configuring additional Quest and third-party applications to work with QoreStor.

**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 of four installation modes, each with different hardware requirements and expected performance levels.

- **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.

## Hardware requirements for installation

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.

**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 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>	<ul style="list-style-type: none"> <li>• Minimum of 500GB free space on repository volume.</li> <li>• Minimum of 700GB free space on metadata volume</li> </ul>	Minimum of 500GB free space on repository volume.	Minimum of 500GB free space on repository volume.	Minimum of 50GB free space on repository volume.
<b>Additional storage requirements</b>	<ul style="list-style-type: none"> <li>• Storage back-end should support 100,000 IOPS for sequential writes and 20,000 IOPS with random writes.</li> <li>• 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> </li> <li>• Maximum supported physical capacity is 360TB</li> </ul>	<ul style="list-style-type: none"> <li>• Storage back-end should support 2000 IOPS for sequential writes and 850 IOPS with random writes.</li> <li>• Recommended back-end configuration is RAID 6 with 12 disks.</li> <li>• Maximum supported physical capacity is 150TB</li> </ul>	<ul style="list-style-type: none"> <li>• Storage back-end should support 2000 IOPS for sequential writes and 850 IOPS with random writes.</li> <li>• Recommended back-end configuration is RAID 6 with 6 disks.</li> <li>• Maximum supported physical capacity is 43TB</li> </ul>	When installing in Demo mode, QoreStor does not perform a pre-check for IOPS Maximum supported physical capacity is 100GB

## 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:

- 5233
- 9901
- 9904
- 9911
- 9915
- 9916
- 9920
- 11000
- 10011
- 12000-12127

## 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 6: Operating systems supported for installation**

Operating System	Bit level
CentOS Linux 7.3 or higher	64-bit
RHEL Linux 7.3 or higher	64-bit

# Supported file systems

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

- XFS



# 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)

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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 7: Supported browsers**

Software	Versions
Mozilla Firefox	43 or later
Microsoft Internet Explorer	11.0
Microsoft Edge	38 or later
Google Chrome	48 or later

## Supported clients

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

**Table 8: Supported QoreStor clients**

**Client type**   **Client installation platform**

RDA	<ul style="list-style-type: none"> <li>• Linux <ul style="list-style-type: none"> <li>• RHEL 5</li> <li>• RHEL 6</li> <li>• RHEL 7</li> <li>• CentOS 7</li> <li>• SLES 10</li> <li>• SLES 11</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> </ul> </li> </ul>
OST	<ul style="list-style-type: none"> <li>• Linux <ul style="list-style-type: none"> <li>• RHEL 5</li> <li>• RHEL 6</li> <li>• RHEL 7</li> <li>• CentOS 7</li> <li>• SLES 10</li> <li>• SLES 11</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> </ul> </li> </ul>

## Supported client plug-ins

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

**Table 9: Supported client plug-in versions**

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
Rapid CIFS	4.0.3101.1

# Supported backup software

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

**Table 10: Supported backup applications and protocols**

Data Management Application (DMA)	RDA	OST	NFS	RDNFS	CIFS	RDCIFS
<b>NetVault Backup<sup>1</sup></b>						
v11.4.5	✓					
v12.0	✓					
v12.0.1	✓					
<b>vRanger<sup>1</sup></b>						
v7.6	✓					
v7.6.5	✓					
<b>Backup Exec</b>						
v16		✓				✓
v20		✓				✓
<b>NetBackup</b>						
v8.0		✓				✓
v8.1		✓				✓
<b>CommVault Simpana</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>VEEAM</b>						
9.0					✓	✓
9.5 U3					✓	✓

<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

# NetVault Backup and vRanger Feature Compatibility

The table below provides more detailed information on NetVault Backup and vRanger feature compatibility with QoreStor.

**Table 11: NetVault Backup and vRanger feature compatibility**

<b>Feature</b>	<b>NVBU 11.4.5</b>	<b>NVBU 12.0</b>	<b>NVBU 12.0.1</b>	<b>vRanger 7.6.5</b>
RDA Version	4.03	4.03	4.1	4.03
Secure Connect WAN restartability	No	No	Yes	No
Create storage groups and containers from DMA	Yes <sup>1</sup>	Yes	Yes	No
OpDup DR to QoreStor	Yes	Yes	Yes	Yes
OpDup QoreStor to DR	Yes	Yes	Yes	Yes

<sup>1</sup>NetVault Backup 11.4.5 will recognize QoreStor as a "Quest DR Device".

# QoreStor supported system limits

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

**Table 12: Supported configuration limits**

<b>Feature</b>	<b>System Limit</b>
Maximum containers	64
Maximum storage groups	5
Maximum RDA connections	128
Maximum RDA Open images	96
Maximum RDA clients	128
Maximum OST connections	128
Maximum OST clients	64
Maximum NFS clients	32
Maximum CIFS clients	32
Maximum concurrent replications	32

# 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 13: Reference guidelines**

Reference Guidelines	CPU (cores)	Memory (GB)	NIC Minimum	IO Minimums			Inbound bandwidth Ingest Rate Max <sup>1</sup> @ 90% deduplication rate
				SSD Support	IOPS BW	IO spindles	
Enterprise Plus	32-64	128+	4 x 10GbE	Required	IOPs = 50K+ BW = 800MiB/Sec	RAID 1 or RAID 10 SSD(s) + RAID 6: 48+ Disks	30+ TB/HR
Enterprise	32-64	64-128	2x 10GbE	Optional <sup>2</sup>	IOPs = 2K+ BW = 800MiB/Sec	RAID 6: 24-48 Disks	20 TB/HR
Basic	8-32	32-64	2x 10GbE	Optional <sup>2</sup>	IOPs = 800 BW = 420MiB/Sec	RAID 5: 8-12 Disks RAID 6: 9-12 Disks	10 TB/HR
Starter	4-8	24-32	4+ x 1GbE	NA	IOPs = 450 BW = 200MiB/Sec	RAID 5: 4-8 Disks RAID 6: 6-8 Disks	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 14: Hardware references**

Hardware references	Enterprise Plus	Enterprise	Basic	Starter
	<b>R740-05 – HDD/SSD MetaData</b>	<b>R740-05 – ALL HDD</b>	<b>R730-10 – HDD/SSD MetaData</b>	<b>R730-10 – ALL HDD</b>
<b>Model</b>	Dell EMC OEMR XL R740xd	Dell EMC OEMR XL R740xd	Dell EMC PowerEdge R730xd	Dell EMC PowerEdge R730xd
<b>Drives</b>	2TB 7.2K RPM NLSAS 12Gbps 512n 8TB 7.2K RPM NLSAS 12Gbps 512e	2TB 7.2K RPM NLSAS 12Gbps 512n 8TB 7.2K RPM NLSAS 12Gbps 512e	500GB 7.2K RPM SATA 6Gbps 2.5i n Flex Bay Hard Drive,13G 6TB 7.2K RPM Self-Encrypting N LSAS 6Gbps 3.5in Hot-plug Hard Drive,FIPS140-2,13G 8TB 7.2K RPM Self-Encrypting N LSAS 6Gbps 3.5in Hot-plug Hard Drive,FIPS140-2,13G	500GB 7.2K RPM SATA 6Gbps 2.5i n Flex Bay Hard Drive,13G 6TB 7.2K RPM Self-Encrypting N LSAS 6Gbps 3.5in Hot-plug Hard Drive,FIPS140-2,13G 8TB 7.2K RPM Self-Encrypting N LSAS 6Gbps 3.5in Hot-plug Hard Drive,FIPS140-2,13G
<b>Drive Qty</b>	2 x 2TB 48 x 8TB 4 x 400GB SSD	2 x 2TB INT 48 x 8TB EXT	2 x 500GB 24 x 8TB 24 x 6TB 4 x 960GB SSD	2 x 500GB 24 x 8TB 24 x 6TB
<b>Internal SSD (optional)</b>	4x 400GB SSD SAS Mix Use 12Gbps 512e 2.5in MFC6G Dell 400GB Enterprise SAS 12GBps 2.5" Solid State Drive		4x 960GB SSD SAS Mix Use 12Gbps 512e 2.5in Dell 960Gb SAS 12G MLC SFF Mixed-Use Value Endurance SSD (Toshiba PX04SVB096) R/T-Series Tray - SPN - Gen 13	
<b>CPU</b>	2x Intel Xeon Gold 5118 2.3G, 1 2C/24T, 10.4GT/s 2UPI, 16M Cac he, Turbo, HT (105W) DDR4-2400 , OEM XL	2x Intel Xeon Gold 5118 2.3G, 1 2C/24T, 10.4GT/s 2UPI, 16M Cac he, Turbo, HT (105W) DDR4-2400 , OEM XL	2x Intel Xeon E5-2660 v3 2.6GHz,2 5M Cache,9.60GT/s QPI,Turbo,HT ,10C/20T (105W) Max Mem 2133MHz	2x Intel Xeon E5-2660 v3 2.6GHz,2 5M Cache,9.60GT/s QPI,Turbo,HT ,10C/20T (105W) Max Mem 2133MHz
<b>Memory</b>	208GB	208GB	128GB	128GB



	13 x DUAL IN-LINE MEMORY MODULE, 16GB, 2666, 2RX8, 8G, DDR4, R	13 x DUAL IN-LINE MEMORY MODULE, 16GB, 2666, 2RX8, 8G, DDR4, R	8x 16GB RDIMM, 2400MT/s, Dual Rank, x8 Data Width	8x 16GB RDIMM, 2400MT/s, Dual Rank, x8 Data Width
<b>PERC RAID</b>	1x PERC H740P RAID Controller, 8GB NV Cache, Mini card 1x PERC H840 RAID Adapter for External MD14XX Only, 8GB NV Cache, Full Height	1x PERC H740P RAID Controller, 8GB NV Cache, Mini card 1x PERC H840 RAID Adapter for External MD14XX Only, 8GB NV Cache, Full Height	1x PERC H730P RAID Controller, 2GB NV Cache, Mini card 1x PERC H830 RAID Adapter for External MD14XX Only, 2GB NV Cache, Full Height	1x PERC H730P RAID Controller, 2GB NV Cache, Mini card 1x PERC H830 RAID Adapter for External MD14XX Only, 2GB NV Cache, Full Height
<b>Network</b>	1x QLogic 57800 2x10Gb DA/SFP+ + 2x1Gb BT Network Daughter Card	1x QLogic 57800 2x10Gb DA/SFP+ + 2x1Gb BT Network Daughter Card	1x QLogic 57840S Quad Port 10Gb SFP+ Direct Attach Rack Network Daughter Card	1x QLogic 57840S Quad Port 10Gb SFP+ Direct Attach Rack Network Daughter Card
<b>External Storage</b>	4x1400	4x1400	4x1400	4x1400
<b>HW RAID CONFIG</b> <Level (0-5-6-10)> : <# Groups (GRP)> : <# Spindles per GRP> : <#Channels> :	RAID 10 : 1 : 4 : 1 RAID 6 : 4 : 11+1 : 2	RAID 6 : 4 : 11+1 : 2	RAID 10 : 1 : 4 : 1 RAID 6 : 4 : 11+1 : 2	RAID 6 : 4 : 11+1 : 2
<b>LVM CONFIG</b>	Striped LVM :: 64KB :: 4xStripes	Striped LVM :: 64KB :: 4xStripes	Striped LVM :: 64KB :: 4xStripes	Striped LVM :: 64KB :: 4xStripes
<b>FS CONFIG</b>	XFS	XFS	XFS	XFS
<b>SEQ FIO A + B</b>	IOPS=98.5 K/Sec + 18.2 K/Sec BW=385 MiB/Sec + 71.1 MiB/Sec	IOPS=105 K/Sec BW=412 MiB/Sec	IOPS=50.5 K/Sec + 37.3 K/Sec BW= 197 MiB/Sec + 146 MiB/Sec	IOPS=12.2 K/Sec BW= 48 MiB/Sec
<b>RAND FIO</b>	IOPS=95.7 K/Sec + 39 K/Sec BW=374 MiB/Sec + 152 MiB/Sec	IOPS=91.7K/Sec BW=358 MiB/Sec	IOPS= 12.6 K/Sec + 44.2 K/Sec BW= 49 MiB/Sec + 173 MiB/Sec	IOPS=21 K/Sec BW= 85 MiB/Sec
<b>MAX INGEST @ 0%</b>	Total Connections :: TB/Hr	Total Connections :: TB/Hr	Total Connections :: TB/Hr	Total Connections :: TB/Hr

8 :: 9.48	8 :: 9.00	8 :: 4.37	8 :: 3.85
16 :: 8.58	16 :: 8.52	16 :: 4.13	16 :: 3.91
24 :: 7.32	24 :: 8.00	24 :: 4.11	24 :: 3.82
32 :: 6.98	32 :: 7.02	32 :: 4.09	32 :: 3.76
48 :: 7.00	48 :: 4.31	48 :: 4.01	48 :: 2.84
64 :: 4.71	64 :: 3.25	64 :: 3.92	64 :: 2.94

<b>MAX INGEST @ 90%</b>	Total Connections ::	Total Connections ::	Total Connections ::	Total Connections ::
	TB/Hr	TB/Hr	TB/Hr	TB/Hr
	8 :: 37.34	8 :: 31.41	8 :: 23.56	8 :: 20.83
	16 :: 19.40	16 :: 18.94	16 :: 19.70	16 :: 17.36
	24 :: 16.73	24 :: 16.05	24 :: 17.11	24 :: 14.41
	32 :: 13.77	32 :: 14.53	32 :: 15.83	32 :: 14.26
	48 :: 12.03	48 :: 13.82	48 :: 13.73	48 :: 13.33
64 :: 11.96	64 :: 12.96	64 :: 13.49	64 :: 10.26	

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<sup>1</sup>Performance taken using simulation with RDA Protocol Acceleration

<sup>2</sup>Performance from Using SSDs for MetaData varies depending on the configuration of said SSD resources but in general expect to see 10-20% improvement when using best practices.

## We are more than just a name

We are on a quest to make your information technology work harder for you. That is why we build community-driven software solutions that help you spend less time on IT administration and more time on business innovation. We help you modernize your data center, get you to the cloud quicker and provide the expertise, security and accessibility you need to grow your data-driven business. Combined with Quest's invitation to the global community to be a part of its innovation, and our firm commitment to ensuring customer satisfaction, we continue to deliver solutions that have a real impact on our customers today and leave a legacy we are proud of. We are challenging the status quo by transforming into a new software company. And as your partner, we work tirelessly to make sure your information technology is designed for you and by you. This is our mission, and we are in this together. Welcome to a new Quest. You are invited to Join the Innovation™.

## Our brand, our vision. Together.

Our logo reflects our story: innovation, community and support. An important part of this story begins with the letter Q. It is a perfect circle, representing our commitment to technological precision and strength. The space in the Q itself symbolizes our need to add the missing piece — you — to the community, to the new Quest.

## Contacting Quest

For sales or other inquiries, visit [www.quest.com/contact](http://www.quest.com/contact).

## 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