Quest® QoreStor™ 7.1

Virtual Machine Deployment Guide

Contents

About the QoreStor Virtual Machine Deployment Guide

The *QoreStor Virtual Machine Deployment Guide* provides instructions for deploying the QoreStor virtual machine images. This guide contains topics that explain how to deploy the QoreStor system in your environment.

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 documentation

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

ℹ **NOTE:** See the complete NetVault 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.

2

Getting started

This chapter provides an introduction to the QoreStor system and describes specifications, usage notes, and other important information that you need before you begin to deploy your system. It includes the following topics:

- **Introducing QoreStor**— provides an introductory description of QoreStor.
- **NIC Drivers and Settings** — provides important information about NIC driver updates for your hypervisor host and NIC settings for the QoreStor virtual machine.

Introducing Quest® QoreStor™

Quest® QoreStor™ is a software-defined secondary storage platform based on Quest's proven DR Appliance's resilient deduplication and replication technologies. With QoreStor, you can break free of backup appliances and accelerate backup performance, reduce storage requirements and costs, and replicate safer and faster to the cloud for data archiving, disaster recovery and business continuity.

QoreStor supports all of the major backup software applications in use today and can lower your backup storage costs to as little as $.16/GB while reducing your total cost of ownership.QoreStor achieves these results using patented Rapid technology as well as built-in, variable block-based deduplication and compression.

Lower costs and maximize the return on your IT investment by leveraging virtually any storage hardware, virtualization platform or cloud provider. QoreStor also supports many backup software solutions — so it's not just for Quest. Simple to deploy and easy to manage, QoreStor enables you to shrink replication time, improve data security and address compliance requirements.

QoreStor helps you to:

- Reduce on-premises and cloud storage costs with industry-leading deduplication and compression.
- Accelerate backup completion with protocol accelerators and dedupe.
- Shrink replication time by transmitting only changed data.
- Improve data security and comply with FIPS 140-2.
- Maximize return on investment for existing data protection technologies.
- Lower total cost of ownership through all-inclusive licensing.

QoreStor includes the following features:

- Hardware and software agnostic platform
- Next-generation storage dedupe engine
- Built-in protocol accelerators
- Support for a wide variety of data backup installations and environments.

QoreStor VM Specifications

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

Table 4: QoreStor VM Specifications

	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	470 GB	1.5 TB	3.3 TB
Data Disk	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 Cloud-optimized installation	Based on Standard installation	Based on Large installation
VM OS	Oracle Linux 8.4 - minimal install	Oracle Linux 8.4 - minimal install	Oracle Linux 8.4 - minimal install
NIC	1	1	1
Virtual hardware version	11	11	11

Table 5: 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	1.5 TB	8 TB	18 TB
QoreStor Mode (Dictionary type)	Based on Cloud-optimized installation	Based on Standard installation	Based on Large installation
VM OS	Oracle Linux 8.4 - minimal install	Oracle Linux 8.4 - minimal install	Oracle Linux 8.4 - minimal install
NIC	1	1	1
Virtual hardware version	11	11	11

NIC drivers and settings

Refer to the following topics for important information about NIC driver updates for your hypervisor host and NIC settings for the QoreStor virtual machine.

Hyervisor host NIC driver updates for VMQ

Before deploying the QoreStor virtual machine, you may need to update certain hypervisor host NIC drivers to support the VMQ feature. Check your Hypervisor host NIC feature list and update the driver to the latest version as needed. For example, you should update the Broadcom NetXtreme I and NetXtreme II Ethernet adapter driver to 17.6.0 (or later) to add VMQ support; otherwise, you might experience performance degradation during normal operations. Refer to the following links for downloading:

- Driver for NetXtreme I and NetXtreme II Ethernet adapter:
  http://www.dell.com/support/home/us/en/19/Drivers/DriversDetails?driverId=CYKKJ&osCode=MWS80&fileId=3197327398&languageCode=EN&categoryId=NI

- Firmware for NetXtreme I and NetXtreme II Ethernet adapter:

  http://www.dell.com/support/home/us/en/19/Drivers/DriversDetails?driverId=P32M4&osCode=MWS80&fileId=3197328666&languageCode=EN&categoryId=NI

Deploying the QoreStor Virtual Machine on VMware ESXi

This topic provides information about deploying the QoreStor on VMware ESXi.

Refer to QoreStor VM Specifications for VMware for information about the different QoreStor VM template configurations available for VMware. For detailed information about supported VMware ESXi versions, platform and license limits, virtual infrastructure and memory requirements, and other information, see the *QoreStor Interoperability Guide*.

The deployment process comprises the following tasks:

1. Deploying the QoreStor via the vSphere Web Client.

   > **i** | **NOTE:** The security policy for vSwitches in VMware environments should be configured to allow MAC Address Changes, this can be achieved by enabling the Allow MAC Address changes and Forged Transmits option in the Layer-2 security policies of the vSphere vSwitches. To edit the Layer 2 security policies of vSphere vSwitches, navigate to Security Policy settings and set the value for the MAC Address Changes and Forged Transmits to Accept. For more information about security, see the vSphere Security documentation.

2. Setting up and configuring your QoreStor system.

Deploying QoreStor using the vSphere Web Client

The following instructions describe the steps for deploying QoreStor on VMware ESXi using the vSphere web client.

1. Acquire the QoreStor installation package and store it on your system or a network location. This package is in **VMware ESXi ova** format.

2. Launch and log on to the vSphere Web Client.

3. Right-click the ESXi host that will host the QoreStor VM, and select **Deploy OVF Template**.

4. In the **Deploy OVF Template** window, select **Local file** and click **Browse** to locate the QoreStor OVA template on your system. Click **Open**.

5. Click **Next** to proceed.

6. On the **Select Name and location** page, enter a **Name** for the virtual machine and select the folder that hosts it, and then click **Next** to proceed.

7. On the **Select a resource** page, select a host, cluster, resource pool, or vApp to run the virtual machine. Click **Next** to proceed.

8. On the **Review details** page, review the template details. Click **Next** to proceed.

9. On the **Accept license agreements** page, review the license agreements and click **Accept**. Click **Next** to proceed.

10. On the **Select Storage** page, select the virtual disk format and the destination datastore, and then click **Next** to proceed. You must choose a data store that meets the storage space requirement (with minimum free space of at least the size the of the QoreStor system).

   > **i** **NOTE:** Quest recommends that you select on of the the virtual disk formats below:
   >
   > - **Thick provision lazy zeroed -** - Allocates all space required for the disk at the time of creation. Residual data on the physical disk space used for the virtual disk is not erased, and must be zeroed out during first write. This is faster to create than an eager zeroed disk, and while there is a slight performance impact during first write operations, that impact does not occur during subsequent writes.
   >
   > - **Thick provision eager zeroed** - Allocates all space required for the disk at the time of creation. Residual data on the physical disk space used for the virtual disk is erased at the time the disk is created. This takes longer to create than a lazy -zeroed disk, but does support clustering features that a lazy-zeroed disk does not.
   >
   > Selecting a Thin provisioned disk will result in disk fragmentation and possible storage over-subscription. For those reasons, thin provisioning is not recommended.

11. On the **Select Networks** page, configure the networks that the deployed template should use. Click **Next** to proceed.

12. On the **Ready to Complete** page, review the configured settings. Click **Finish**.

13. In the Deployment Completed Successfully dialog box, click **Close**.
    The QoreStor VM will boot up. (It takes approximately 3-5 minutes to self-extract the installation package and install all of the components.)

14. When deployed on vSphere 6.5 or later, you must upgrade the VM compatibility using the procedure below:

    - in vSphere, right-click on the deployed QoreStor VM and click **Compatibility > Upgrade Compatibility**.
    - At the Confirm VM Compatibility Upgrade prompt, click Yes.
    - In the **Compatible With** drop-down menu, select **ESXi 6.7 Update 2 and later**.
    - Click **OK**.

15. Ensure that the Guest OS for the QoreStor VM is correctly configured.

    - in vSphere, right-click on the deployed QoreStor VM and click **Edit Settings.**
    - Click the VM Options tab.
    - In the **Guest OS Version** drop-dowm menu, select **Oracle Linux 7 (64-bit)**.

16. Proceed with the initial setup and configuration of QoreStor. Refer to the topic, "Configuring the QoreStor virtual machine," for instructions.

> **i** **NOTE:** If you have deployed QoreStor in an Object Direct configuration, QoreStor will start in Manual Intervention mode. This is expected behavior. Refer to Additional Configuration for Object Direct installations for the steps required to return QoreStor to normal operation.

Deploying QoreStor on Microsoft Hyper-V

The topics in this section provide information about deploying QoreStor on Microsoft Hyper-V.

For detailed information about supported Microsoft Hyper-V versions, platform and license limits, virtual infrastructure and memory requirements, and other information, see the *QoreStor Interoperability Guide*.

Before you begin the deployment process, ensure you have met the prerequisites described in the topic, "Prerequisites for the QoreStor on Microsoft Hyper-V."

The deployment process comprises the following tasks:

1. Deploying QoreStor on one of the following:
   - On a local Hyper-V Host
   - On a remote Hyper-V Host

     > **i** | **NOTE:** As Microsoft only supports OVF format on system center Virtual Machine Manager, using the Power Shell scripts, the QoreStor appliance's deployment for the Hyper-V infrastructure is made easier, and the procedure for creating virtual appliance with required settings is automated.

2. Converting the disk to fixed disk.

3. Setting up and configuring QoreStor.

Prerequisites for deploying QoreStor in Microsoft Hyper-V Server 2016 and Microsoft Hyper-V Server 2019 environments

To deploy QoreStor on Microsoft Hyper-V and to use the QoreStor Hyper-V cmdlets, ensure that the following prerequisites are met. For more information about the available QoreStor Hyper-V cmdlets, see the topic, "Using the Suppported cmdlets for QoreStor for Hyper-V" in this document.

> **i** | **NOTE:** These prerequisites are applicable to Microsoft Hyper-v Server 2016 environments.

1. **Required User Privileges:**
   You must have administrator privileges or you must be a member of the administrator's group

2. Extract the downloaded QoreStor installation package on the Hyper-V host to access its files. It may take couple of seconds for the files to be extracted. Before executing the Hyper-V installation process the following software pre-requisites are required:

   > **i** | **NOTE:** This software is easily accessible from the Pre-Requisites folder. The pre-requisite file names may change due to different QoreStor OS versions release and also other updates may be required.

   - **Installing .NET Framework 4.6**

     > **i** | **NOTE:** For convenience both online and offline version of .NET 4.6 is available along with the .NET security update packages.

Additional prerequisites for deploying QoreStor in Microsoft Hyper- V Server 2016 and Microsoft Hyper-V Server 2019 environments

Installing the Hyper-V Management Tools

This prerequisite is a Windows feature that contains a PowerShell extension to manage Hyper-V servers on Server 2016 systems. Using PowerShell to install this feature, enter the following commands with elevated privileges:

- `Install-WindowsFeature Hyper-V-Tools` – This command enables Windows to administer Hyper-V.

- `Install-WindowsFeature Hyper-V-PowerShell` – This command installs additional PowerShell commands specialized for Hyper-V.

- `Set-ExecutionPolicy AllSigned` – This command allows scripts signed by a trusted publisher to be run on Windows server..

After the pre-requisites are complete, you can deploy QoreStor on the local Hyper-v host. For more information, see the topic "Deploying QoreStor on a Local Hyper-V Host".

Deploying QoreStor on a local Microsoft Hyper-V host

> **i** | **NOTE:** Ensure all the pre-requisites are complete before deploying QoreStor on a local Hyper-V host. For more information, see the topic, "Prerequisites for deploying QoreStor in Microsoft Hyper-V environments."

To deploy the QoreStor VM on a local Hyper-V host:

1. Run the QoreStor command script from the install package. A command line deployment wizard is displayed with the following ACTIONS are displayed:

   ```
   1) Deploy
   2) Start
   3) Stop
   4) Delete
   5) Repair
   ```

2. Type action **1** to **Deploy** and press **<Enter>**.

3. Type the appropriate QoreStor Hyper-V name and press **<Enter>**. The following options to select storage size are displayed:

   ```
   a)  TIER  1
   b)  TIER  2
   c)  TIER  3
   ```

4. Type option **a**, **b**, or **c** as appropriate and press **<Enter>**. The QoreStor Hyper virtual machine code is now deployed and this process will take approximately 2–3 minutes. A message is displayed showing the deployment progress, that is creating of new QoreStor template, processing the QoreStor image, and populating the virtual machine with QoreStor configurations. A message appears when the deployment has completed successfully

5. When prompted to deploy another QoreStor, type **y** for yes or type **n** for no as appropriate and press **<Enter>**. The Local Deployment menu is displayed again.

6. Type option **2** and press **<Enter>** to start the QoreStor virtual machine to self extract the installation packages and install all the QoreStor components.

7. Enter the name of the QoreStor virtual appliance to start.

8. When prompted to start another QoreStor, type **y** for yes or type **n** for no as appropriate and press **<Enter>**. The Local Deployment menu is displayed again.

9. Next launch **Hyper-V Manager**. Navigate to **Start Menu > Administrative Tools > Hyper-V Manager**. The Hyper-V Manager window is displayed.

10. Select the host where QoreStor VM resides.

11. Right-click the QoreStor VM and select Connect to view the installation process Depending on your system resources, it may take 10 - 20 minutes to self extract installation packages and components.

12. After installation, proceed with the initial setup and configuration of QoreStor as described in the topic, "Configuring QoreStor."

Changing the storage paths for Hyper-V deployment

If an alternate storage location is required for the QoreStor virtual appliance due to capacity limitations or for other reasons, the remote Hyper-V host Virtual hard disks and Virtual machine paths must be changed before QoreStor is deployed.

i NOTE: The capacity requirements of QoreStor are beyond 200GB. For example, if a 2TB DR2000v is to be deployed a 2.2TB storage capacity will be required.

To change the storage paths follow these steps:

1. Log on and connect to the remote machine using Remote Desktop Protocol (RDP) using the following
   command: `mstsc /v:<remote server IP address>`
   For example: `mstsc /v:127.0.0.1`

2. Open the file manager and identify the volume that has free capacity for QoreStor deployment.

3. Create a folder in this location.

4. With the storage needs identified, change the Hyper-V virtual machine storage locations. From the local
   machine, navigate to **Start Menu > Administrative Tools > Hyper-V Manager**.

5. Connect to the host where QoreStor will be deployed.

6. Right-click the host, and select **Hyper-V settings**.

7. Change both the Virtual hard disks and Virtual machine path settings to the same new path, and click OK.

The QoreStor machine is ready to be deployed.

Configuring the QoreStor virtual machine

The sections below contain the steps and information required to configure the QoreStor virtual machinefor the first time.

- Initial network configuration
- Using the QoreStor Menu
    - QoreStor Operations
    - QoreStor Maintenance
    - QoreStor Statistics

Initial login and changing your password

After the QoreStor VM deploymentis complete, you will be prompted to log in. When logging in for the first time with the default credentials, you are required to change the password.

1. Log on to the QoreStor virtual machine (VM) consoleusing the default credentials:
   username: **qsservice**
   password: **changeme**

2. You will be prompted to enter the current password. Enter **changeme.**

3. You will be prompted to enter your new password, and then to confirm it.

4. Continue to Initial network configuration.

Initial network configuration

After changing the default password, you will be prompted to provide the initial networking information for your environment.

1. At the **Change Hostname** page, enter a valid hostname or fully qualified domain name (FQDN).

   i **NOTE:** Hostnames must comply with the standards RFC 1123 and RFC 952. Hostnames may only contain the letters a-z, the numbers 0-9, the "-" (hyphen), and the "." period (or dot).

2. At the **Edit Network Connections** page, you will be prompted to edit the network connections. If you are using DHCP, select **No**. If you are using Static IP, select **Yes**.

3. Follow the screen prompts to configure the required network entries and confirm the configuration settings.

4. After the required network settings are configured, QoreStor will run the initial configuration, which may take up to 5-10 minutes to complete.

5. Continue to Using the QoreStor Menu.

Storage resizing

IMPORTANT: Before beginning a storage resize operation, ensure all backup, replication, and cleaner operations are stopped.

The QoreStor VM supports the ability to incorporate additional storage capacity. Adding storage capacity has the following requirements:

- Storage must be added through the virtualization platform before performing any operations on the QoreStor VM.

- Newly added storage must be discovered by QoreStor.

- If your QoreStor license does not currently allow for the newly added storage, the QoreStor licensing must be updated to reflect the additional capacity.

To add storage to QoreStor:

1. Refer to the documentation for your virtualization platform version for instructions on resizing hard disks.

2. For Tier 1 VMs, locate the data disk and expand it to the desired size. Refer to QoreStor VM Specifications for maximum supported storage size.
   OR
   For Tier 2 VMs, locate each of the three data disks and expand each disk equally. Refer to QoreStor VM Specifications for maximum supported storage size.

   IMPORTANT: When the QoreStor VM discovers the newly added free space, the discovered amount will be equal to the smallest available amount. For proper operation, each data disk must be expanded to the same size.

3. After resizing the data disks, poweron the QoreStor VM and access the QoreStor **Administration** menu.

4. Select **Storage resize**. The newly added space will be detected. Select **OK** to allocate the storage.

   NOTE: QoreStor services will be restarted.

5. You will be prompted when the system has fully restarted. Select **Done**.

6. If youre newly configured storage space exceeds your licensed capacity, add a new QoreStor license. Refer to the *QoreStor User Guide* for more information.

Additional configurations

After performing the initial QoreStor configurations, Quest recommends the performing the additional actions below:

- **Update Open VM Tools [VMware deployments only]** - Open VM Tools is an open-source implementation of VMware Tools pre-installed on the QoreStor VM. Open VM Tools provides a suite of utilities that improves the functionality and adminstration of VMware virtual machines. For more information on Open VM Tools, refer to the VMware documentation.

  To update the Open VM Tools, perform one of the actions below:

  - On the QoreStor Administration menu, select **Operating System**. Select **Open-VM-Tools Update**.

  - On the QoreStor menu, select **Service Shell** and enter

    ```
    # sudo yum update open-vm-tools
    ```

Adding a Performance Tier

In situations where certain workloads have requirements for faster recovery, QoreStor allows you to write these workloads to a performance tier to enable faster read back unaffected by activity in other QoreStor Storage Groups. By utilizing a performance tier, you are able to maximize the value of higher-performing storage by ensuring that only the most critical workloads are written to it.

To create a QoreStor performance tier, you must create a physical volume comprised of high-performing storage (such as SSD) and then create a QoreStor storage group mapped to that volume. Containers created on that storage group will write and read from high-performance storage exclusively and will be isolated from read activity on other volumes.

To add a performance tier to a QoreStor VM

1. Using the management client (vSphere Web Client, Hyper-V VM Manager, etc) for your virtualization environment, add a suitable virtual disk file to the QoreStor VM. The new hard disk should be:

   - at least 500GB in size

   - located on high-performing storage, such as SSD

2. Power on the QoreStor VM and access the QoreStor Menu. See Using the QoreStor Menu for reference.

3. On the QoreStor Menu, select **Administration** , then **Storage Device Options**.

4. Select the volume to add to QoreStor and select OK. If there is only one additional volume, it will be selected automatically.

5. Select **Add as Performance Tier**.
   When a performance tier is added, QoreStor will also create the corresponding storage group "PerformanceTier" mapped to the performance tier storage.

6. Once the performance tier is created, you can enable encryption. Refer to **Editing a Performance Tier** in the QoreStor User Guide.

Repairing your virtual machine

The QoreStor virtual machine consists of an operating system (OS) disk and one or more storage disks. If the VM OS becomes corrupted, it may be possible to repair the virtual machine without negative impact to the QoreStor data. Please contact Quest Support for assistance with the VM repair process.

Quest provides software solutions for the rapidly-changing world of enterprise IT. We help simplify the challenges caused by data explosion, cloud expansion, hybrid datacenters, security threats, and regulatory requirements. We are a global provider to 130,000 companies across 100 countries, including 95% of the Fortune 500 and 90% of the Global 1000. Since 1987, we have built a portfolio of solutions that now includes database management, data protection, identity and access management, Microsoft platform management, and unified endpoint management. With Quest, organizations spend less time on IT administration and more time on business innovation. For more information, visit www.quest.com.

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