

Quest® QoreStor™ 7.1.1

Release Notes

February 2022

These release notes are intended to supplement the QoreStor documentation to provide last minute information available for the latest release of the QoreStor software. These release notes contain details about the latest updates and resolutions, known issues, resolutions, and other information.

About this release

QoreStor is a software-defined secondary storage platform based on Quest's proven DR Series 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. (For a complete list of supported backup software, see the *QoreStor Interoperability Guide*). QoreStor achieves these results using patented Rapid Data Access (RDA) technology as well as built-in, variable block-based deduplication and compression.

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 7.1.1.162 is a maintenance release of QoreStor with enhancements and resolved issues. See [New features and enhancements](#) for more information. See [Resolved issues](#) for information on issues resolved in this version.

New features and enhancements

QoreStor 7.1.1 includes the enhancements listed below:

- Addition of SAML 2.0 for support of Multi-Factor Authentication (MFA) and Single Sign-On (SSO)
- Support for RHEL / Oracle Enterprise Linux / CentOS 8.5
- Support for AlmaLinux / Rocky Linux 8.5
- Availability of QoreStor in AWS Marketplace
- Support for Secure Boot environments with Rapid CIFS plug-in

Upgrade notes

This topic contains important information for users who are upgrading from a previous QoreStor release.

- If the existing installation of QoreStor uses the default passwords for the **UI admin** login, **qsservice** user, or **qsadmin** user, then you must update these passwords before upgrading to QoreStor 7.1.1
- In version 7.1.1, auto upgrade is not available from the QoreStor Menu.
- Applicable to environments using NetVault 13.0.3 and QoreStor releases prior to 7.0: For RDA backups to be restored using NV 13.0.3 where the target RDA container is on DR Series system or a QoreStor running a release prior to 7.0, standalone RDA plug-in has to be installed over the NetVault installation. Download and install 4.1.0.501 version of the plug-in. For previous releases of NetVault (prior to 13.0.3), no change is required. For QoreStor release 7.0 or later, no change to NetVault installation is required. Please contact QoreStor Support for further details.
- AWS Lambda and IAM permissions are required for an archive tier. After you complete an upgrade, to update the IAM roles and permissions, see the *Quest QoreStor Release Notes*.
- Existing QoreStor installations can not be upgraded to use Object Direct storage. To use QoreStor in Object Direct mode, you must perform a fresh installation.
- During the upgrade, the QoreStor installation script will verify that the Repository and Metadata filesystems are mounted with the **noatime** and **dirsync** mount options. If not, the installation script will prompt the user to allow the script to make the necessary changes in */etc/fstab* and prompt you to reboot the system and re-run the QoreStor installation process.

i | **NOTE:** The above process does not occur when installing QoreStor in Demo mode.

- To ensure proper authentication of network shares, after upgrading to QoreStor 7.1.1, remove the QoreStor server from the domain and re-add it to the domain.
- The metadata volume storage requirement for Object Direct configuration has been extended to 1.5TB, 8TB, and 18TB for cloud-optimized, standard, and large modes. Although it is not mandatory to extend the metadata volume on existing QoreStor instances before upgrade, Quest recommends you extend the volume when it reaches 90% full.
- QoreStor 7.1.1 contains VTL support for RHEL, CentOS, and Oracle Linux versions 8.3 and above. To enable VTL support, see the *Quest QoreStor Installation Guide*.

When using QoreStor with VTL, if want to upgrade the operating system, upgrade QoreStor before you upgrade the operating system.

Upgrading QoreStor instances on Microsoft Azure

For QoreStor instances running on Microsoft Azure, perform the actions below before upgrading to 7.1.0.

- At the prompt, run the following commands:

```
curl -o azureclient.rpm https://rhui-1.microsoft.com/pulp/repos/microsoft-azure-rhel7/rhui-azure-rhel7-2.2-74.noarch.rpm

sudo rpm -U azureclient.rpm

sudo yum clean all
```

Upgrading a migrated DR Series appliance to QoreStor 7.1.0.245

If you have previously migrated your DR Series system to a version of QoreStor prior to 6.1.0.814, then you must upgrade your QoreStor software to build 6.1.0.814 **before** upgrading to build 7.1.0.245. The upgrade process in build 6.1.0.814 includes a step that flushes WAM data, and that process must be completed before upgrading to 7.1.1.162.

Upgrading to Rapid CIFS Plug-in 4.0.4 with Secure Connect

Secure Connect is comprised of a set of client and server components that create a resilient and secure communication channel for use by WAN-connected clients. The server components are installed and enabled by default during the installation of the QoreStor server. Starting with the Rapid CIFS plug-in version 4.0.4, the plug-in installer includes the option to install and enable Secure Connect.

i | **IMPORTANT:** Refer to the Known Issues section of this document for Rapid CIFS issues known to be present at the time of release.

If you have WAN-connected Rapid CIFS clients and choose to install Secure Connect, you can do so by following the steps below:

1. On the media server, map a network share to your CIFS-enabled container.
2. Download the plug-in installer from the website, as detailed previously.
3. Open a command prompt with the “Run as Administrator” option selected. To do this using the Windows Start menu, click **Start** → **All Programs** → **Accessories**. Right-click **Command Prompt** and select **Run as Administrator**.
This gives all the required privileges to install/copy the driver files to the Windows drivers folder.
4. Run `QuestRapidCIFS-4.0.4.4001.exe`.
5. When prompted, select **Install a Secure Connection** to install Secure Connect.
Secure Connect ensures backups to QoreStor are completed in spite of slow or unreliable WAN connections. When selecting this option, you will be prompted for additional configuration information required to make Secure Connect function correctly.

6. At the **Configure Secure Connect** page, complete the dialog using the IP or fully qualified domain name (FQDN) of the QoreStor server and appropriate credentials.

The user account used must have the CIFS role assigned.

i **NOTE:** The **Configure Secure Connect** operation is not supported for CIFS containers on DR Series appliances. DR Series appliances do not contain the required Secure Connect server component. This operation is available only for QoreStor instances. For CIFS containers on DR Series appliances, connect using the Rapid CIFS plug-in and the DR Series host name.

i **NOTE:** The value entered in the **Display Name** field must **not** match the hostname of the QoreStor server.

Upgrading to Rapid NFS Plug-in 4.0.3.3

Secure Connect is comprised of a set of client and server components that create a resilient and secure communication channel for use by WAN-connected clients. The server components are installed and enabled by default during the installation of the QoreStor server. Starting with the Rapid NFS plug-in version 4.0.3.3, the plug-in installation script includes the option to install and enable Secure Connect.

i **IMPORTANT:** Refer to the Known Issues section of this document for Rapid NFS issues known to be present at the time of release.

If you have WAN-connected Rapid NFS clients and choose to install Secure Connect, you can do so by following the steps below:

1. Download `QuestRapidNFS-4.0.3317.0-x86_64.bin.gz` from the website.

2. Unzip the package using the following `gunzip` command:

```
gunzip QuestRapidNFS-4.0.3317.0-x86_64.bin.gz
```

3. Change the permission of the binary package to allow it to run:

```
chmod +x QuestRapidNFS-4.0.3317.0-x86_64.bin
```

4. Install the Rapid NFS package. Before installing, remove the stale NFS entry.

```
QuestRapidNFS-4.0.3317.0-x86_64.bin -install
```

5. Load the file system in user space (FUSE) module, if not already loaded:

```
modprobe fuse
```

6. Create a directory on the client. For example:

```
mkdir /mnt/backup
```

7. Mount Rapid NFS as a file system type using the mount command. For example:

```
mount -t rdnfs 10.0.0.1:/containers/backup /mnt/backup
```

To enable Secure Connect, mount Rapid NFS using the **sc** flag, as shown below:

```
mount -t rdnfs 10.0.0.1:/containers/backup /mnt/backup sc,user=backup_
user,password=<backup_user password>
```

If you are using a DMA that supports a marker, set the marker by using **-o** in the mount command. For example, if you wanted to set the CommVault marker (cv):

```
mount -t rdnfs 10.0.0.1:/containers/backup /mnt/backup -o marker=cv
```

i **NOTE:** If you want to do a mount on AIX, you must set the `nfs_use_reserved_ports` and `portcheck` parameters first. The parameters cannot be set to 0. For example: `root@aixhost1 / # nfso -po portcheck=1 root@aixhost1 / # nfso -po nfs_use_reserved_ports=1`

Resolved issues

The following is a list of issues addressed in this release.

Table 1: Resolved issues in build 7.1.1.162

Issue ID	Resolved Issue
QS-5891, QS-6892	For Rapid CIFS with Secure Connect, corrected the issue where the driver was not loading on Windows 2019 VMs where Secure Boot was enabled.
QS-12029	Removed the terminal from the QoreStor UI.
QS-12140	Corrected an issue where NDMP backup over RDA was asserting.
QS-12246	Corrected an issue where QoreStor service with cloud replication configured could crash and enter support mode after unlinking files.
QS-12256	Corrected an issue where QoreStor was unable to export or import tapes to cloud from QoreStor right after a DR with VTL was migrated to QoreStor.
QS-12265	Corrected an issue where Archive Tier Edit page showed Encryption instead of "Change Passphrase."

Known issues

The issues below are known to exist in this release.

Table 2: Known issues in this release

ID	Issue
QS-437 QS-438	When using multiple NetVault Servers to access the same QoreStor Server, use storage group, container, and user names unique to each NetVault server to avoid accidental deletions.
QS-1446	If the QoreStor partition is not set to automount, and the QoreStor server is rebooted, the system appears to be operational but shows 0 physical capacity.
QS-1588	When running Optimized Duplication jobs in Backup Exec, the container quota is not enforced as it is for backup jobs.
QS-1666	When NetVault is installed on a Linux server, the RDA Client version is not displayed correctly. Workaround: To view the build number of the plugin, run the command <pre>strings /usr/netvault/dynlib/librofsoca.so grep "(EAR-4.1.0) Build:"</pre>
QS-1670	For Linux clients, the full version number of RDA plug-ins is not displayed.
QS-1823	In some situations, the deduplication savings for a storage group shows as 100% before a backup has occurred. Once a backup has occurred, the deduplication savings will be displayed accurately.
QS-2242	When installing QoreStor, the filesystem selected for the QoreStor repository should not contain data from other application or users. QoreStor must have exclusive access to the repository filesystem.
QS-2604	If unregistered clients access QoreStor CIFS shares by mounting the share, the /var/log/messages will contain numerous host name/mismatch errors. Workaround: Unregistered clients need to be updated in DNS server manually.
QS-2694	When the system time on the QoreStor server is synchronized with the domain time, this may cause the system time to adjust backwards. If this occurs, system statistics (like read/write throughput statistics) will appear to be hung for an amount of time equal to the time adjustment.
QS-3779	When using Secure Connect with NetVault in a multiple-machine configuration (NetVault server, NetVault client, QoreStor server), Secure Connect can respond to errors only for connections between the NetVault server and QoreStor or the NetVault client and QoreStor. Secure Connect does not address connections between the NetVault server and NetVault client.
QS-4169	When using the Linux exports http_proxy or https_proxy , no_proxy is also required for the watcher service to function correctly. Refer to "Accessing QoreStor" in the <i>QoreStor User Guide</i> .
QS-5072	When authenticated to a domain, connecting to CIFS shares with a localhost account is not successful.
QS-5105	Changes to a Cloud Tier Policy for inclusions or exclusions will not take effect until the QoreStor service has been restarted.

ID	Issue
QS-5438	After performing a DR to QoreStor migration, network settings are reset to default.
QS-5627	The current error output of "rda --limit" without any argument incorrect suggests limits are enforced via Mbps (megabits per second) when the limit is actually in MBps (megabytes per second).
QS-5629	When configuring a custom graph, if you select a period for which there is no data, the graph will be blank and display "No Data Available"
QS-5826	When performing a DR to QoreStor migration, bonding modes and MTU settings are not
QS-6291	<p>When using the latest version of the Rapid CIFS plug-in with Veeam Backup and Recovery, the configurations below are required:</p> <ul style="list-style-type: none"> • For the Backup Repository, change the Gateway Server option to The following server and enter the IP or hostname of the local machine. • For VMware Backup, the Gateway server should be changed from the Automatic selection to the Use the selected backup proxy servers only.
QS-6653	<p>OST MSI plugin reports a new version is already installed when installing an updated driver</p> <p>Workaround: Uninstall the OST driver before installing the newer driver</p>
QS-6782	When installing Rapid CIFS on Windows 2008 R2, the installation deploys driver version 4.0.3207.1 , causing the version displayed by rcifsctl.exe driver -q to be different from the version in the Windows Programs and Features dialog. The functionality of Secure Connect is not changed.
QS-6808	<p>When configuring Backup Exec with CIFS shares using the display name, the steps below must be followed:</p> <ol style="list-style-type: none"> 1. In the command prompt, change directpries to the path C:\Program Files\Quest\Rapid CIFS. 2. Run rdcifsctl.exe sc -d for disable a secure connection. 3. Configure storage in Backup Exec by specifying \\displayname\container as network share. During this configuration all connections from Backup Exec to QoreStor are secured. 4. Run rdcifsctl.exe sc -e to enable a secure connection.
QS-6860	During upgrade, the SMB config file is overwritten. Any manual changes to this file will be lost on upgrade.
QS-8945	<p>When QoreStor is installed on Linux versions 7.3 - 7.7, configuring an archive tier may result in a memory leak. This is due to an issue with the curl package installed on those versions of Linux.</p> <p>Workaround Either upgrade the Linux version on the QoreStor server to 7.8, or update the curl package to curl 7.29.0-57.el7. DR Series systems migrated to QoreStor which are on Oracle Linux 7.3 should update the curl package to 7.29.0-57.el7</p>
QS-9056	<p>On DR Series Systems migrated to QoreStor, the maximum inode limit for an object container is set to 1 million. In some cases, this may result in a "maximum allowable File(s) and Directories limit" error.</p> <p>Workaround: To increase that, the environmental variable MDS_OT_INODES_ALLOWED in <i>/etc/oca/customer.env</i> has to be set to a higher value. Please contact Quest Support for assistance</p>

ID	Issue
	making this change.
QS-9021	<p data-bbox="325 315 1337 371">During object direct installation, if the message "Failed to validate object direct connection string!" may be received if the certificate has been changed or is expired on the QoreStor server.</p> <p data-bbox="325 383 467 405">Workaround</p> <p data-bbox="325 421 804 443">Purge the certificate with the command below</p> <pre data-bbox="325 459 817 481">cloud_tier --purge-ssl-certificate</pre>
QS-9177	<p data-bbox="325 517 1390 595">When configuring the Rapid NFS client with Secure Connect, You may mount the plug-in with either the IP address or the fully qualified domain name (FQDN). If you use the FQDN, you must also add an entry in the <code>/etc/hosts</code> file on the QoreStor system and verify that the hostname is resolvable.</p>
QS-10018	<p data-bbox="325 622 1358 678">When writing to an NFS container on a system with 24GB or less of memory, some customers may receive "out of memory" errors.</p> <p data-bbox="325 694 464 716">Workaround:</p> <p data-bbox="325 732 1070 754">On the QoreStor system, run the command <code>sysctl -a grep tcp_mem</code>.</p> <p data-bbox="325 770 1390 826">This will return your tcp memory consumption, like the example value below. The return indicates your minimum, average, and maximum values.</p> <pre data-bbox="325 842 890 864">net.ipv4.tcp_mem = 285198 380264 570396</pre> <p data-bbox="325 880 1358 936">Using the command below, set the <code>tcp_mem</code> maximum value to the average value (380264, in the example above). Note that your values will be different. The value in the center is the average.</p> <p data-bbox="325 952 927 974">sysctl -w "net.ipv4.tcp_mem=285198 380264 380264"</p>
QS-10042	<p data-bbox="325 1003 1390 1126">When attempting to delete a bucket containing a large amount of data, QoreStor will appear to freeze. This is due to an AWS S3 limitation that requires the objects within a bucket to be deleted before the bucket can be deleted. During the bucket delete operation, the objects are enumerated and deleted one at a time.</p> <p data-bbox="325 1142 475 1164">Workaround:</p> <p data-bbox="325 1180 1273 1202">Before deleting the bucket, delete the objects within the bucket using the AWS S3 console.</p>
QS-10117	<p data-bbox="325 1234 983 1256">System stops while upgrading from the user interface terminal.</p>
QS-10772	<p data-bbox="325 1310 1230 1332">Replication update fails with replication between QoreStor 7.1.1 and the DR appliance.</p> <p data-bbox="325 1348 475 1370">Workaround:</p> <p data-bbox="325 1386 1390 1442">For DR-to-QoreStor replication, update replication by way of the QoreStor user interface or command line interface.</p>
QS-11329	<p data-bbox="325 1473 1358 1496">During replication, crash may occur on a target if the replication source has archive tier configured.</p>
QS-11588	<p data-bbox="325 1552 1390 1574">When there is not enough space under <code>/opt</code> to install or upgrade QoreStor, an error message occurs.</p> <p data-bbox="325 1590 475 1612">Workaround:</p> <p data-bbox="325 1628 711 1650">Free space under the <code>/opt</code> partition.</p>
QS-11613	<p data-bbox="325 1684 1094 1706">During replication, QoreStor is unable to locate a specific blockmap entry.</p> <p data-bbox="325 1722 475 1744">Workaround:</p> <p data-bbox="325 1760 1369 1816">If a replication source already has archive tier replication, do not configure archive tier replication on the replication target.</p>

ID	Issue
QS-11818	<p>New backups jobs fail with Backup Exec 20.x after stubbing the existing data.</p> <p>Workaround:</p> <p>Delete the Changer.cfg meta file in the CIFS container, which triggers the start of a new backup job.</p>
QS-11819	<p>Received the following error: RDA SRVR RDA_OPEN_FILE : failed to add open image to hash map for LSU 9 scid 1152921504606847079 (Bad file descriptor).</p>
QS-11851	<p>The directory uploading using AWS CLI to Object Tier may become unresponsive if the directory has large files.</p>
QS-11936	<p>Netvault Backup Jobs may stall if cloud upload on QoreStor is not happening because of cloud provider experiencing high request rate.</p>
QS-11972	<p>Adding replication between DR 4.0.4 and QoreStor 7.1 fails.</p> <p>Workaround:</p> <p>Run the replication commands on QoreStor.</p>
QS-12017	<p>QoreStor cannot add replication in a situation when there are two Secure Connect server processes and one is in unknown state after upgrade.</p> <p>Workaround:</p> <p>Stop the old Secure Connect server in the unknown process.</p>
QS-12113	<p>Alert generated for OFSCK scan is still present after QoreStor becomes operational.</p>
QS-12117	<p>During replication, the error "Failed to set ns txlog csn on scid" occurs.</p> <p>Workaround:</p> <p>You can ignore these messages. Replication eventually succeeds.</p>
QS-12154	<p>QoreStor is not operational after Disaster Recovery from cloud tier.</p>
QS-12228	<p>Storage group encryption once disabled cannot be enabled.</p>
QS-12240	<p>Replication add from migrated QS between RDA containers may fail.</p>
QS-12260	<p>VTL tape export is successful even without cloud replication configured.</p>

Product Licensing

QoreStor offers a backend capacity licensing model to allow for simple integration with other Quest Data Protection products.

- **Standalone license** - QoreStor is licensed by the amount of backend capacity required. Standalone licenses are available as either **perpetual** licenses (with no expiration), or **term** licenses, which expire after a specified period of time.
- **i** | **NOTE:** Term licenses are intended for specific customer use cases, i.e., licensing according to yearly billing cycles. A perpetual license is appropriate for most customers.

QoreStor licenses are additive, meaning that if you purchase a 5TB license now, and a 10TB license in the future, you will have 15TB total capacity.

- **i** | **NOTE:** Licenses for QoreStor are specific to the QoreStor server. When installing a license, the System ID for your QoreStor server is required. You can obtain the System ID with the command **system --show | grep "System ID"**

Evaluating QoreStor

QoreStor offers two methods for evaluation:

- **Default installation** - If no license is installed, QoreStor defaults to a no-cost, 1TB capacity installation supported by the QoreStor Community. This option requires no license and does not expire.
 - If a license is applied to a server running in this mode, the free 1TB is **not** added to the purchased license capacity.
 - When installed in Demo mode, the capacity is limited to 100GB.
- **Full capacity trial** - available on the Quest Software Trial site, which provides a 30-day evaluation license for up to 360TB and access to Quest Support. After the evaluation period has expired, the QoreStor server will operate in Manual Intervention mode until a license is applied. To use QoreStor beyond that time frame, you will need to purchase a perpetual standalone license.
 - If installed in Demo mode, the capacity is limited to 100GB
 - If a longer trial period is required, please contact Quest Sales.

If you have purchased a standalone license, you can install it using the **system --license** command, as described in the *QoreStor Command Line Reference Guide*.

- **i** | **NOTE:** When ordering a license, the System ID for your QoreStor server is required. You can obtain the System ID with the command **system --show | grep "System ID"**

Supported software and hardware

For a complete list of the supported hardware and software for QoreStor, see the *QoreStor Interoperability Guide*. You can download this guide by visiting: <http://support.quest.com/qorestor> and selecting your specific QoreStor version, which opens the product support page to view product documentation for your system.

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 3: 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.

About us

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.

Contacting Quest

For sales or other inquiries, visit 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

Third party components

This product contains the following third-party components. For third-party license information, and copies of third party licenses not reproduced below, go to <https://www.quest.com/legal/license-agreements.aspx>.

Source code for components marked with an asterisk (*) is available at <https://opensource.quest.com/>. For items marked with a ‡, a copy of the license can be found at <https://www.quest.com/legal/license-agreements.aspx>

Component	License	Notes
afero 1.2.1		Copyright ©2015 The Go Authors Copyright ©2015 Steve Francia <spf@spf13.com>
@angular/cdk 7.3.7	MIT N/A	Copyright © 2019 Google LLC.
angular2-jwt 0.2.3‡	MIT 1.0	Copyright (c) 2017 Auth0 Inc.
Angular-jwt 1.0‡	MIT 1.0	Copyright (c) 2017 Auth0 Inc.
AWS CPP SDK 1.0	Apache 2.0	Copyright Notice - AWS CPP SDK 1.0 AWS SDK for C++ Copyright 2015 Amazon.com, Inc. or its affiliates. All Rights Reserved. This product includes software developed by Amazon Technologies, Inc (http://www.amazon.com/) A copy of the license can be found below at Apache 2.0
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Azure Storage Client Library 3.0.0	Apache 2.0	Copyright Notice - Azure Storage Client Library 3.0.0 // ----- // ----- // <copyright file="cloud_block_blob.cpp" company="Microsoft"> // Copyright 2013 Microsoft Corporation // // Licensed under the Apache License, Version 2.0 (the "License"); // you may not use this file except in compliance with the License.

Component	License	Notes
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Boost 1.63 [‡]	Boost 1.0	Copyright (c) 2001-2010 Joel de Guzman Copyright (c) 2010 Eric Niebler Copyright (c) 2015 John Fletcher
bzip2 [‡]	BSD Simple	
C++ REST SDK 1.0 [‡]	MIT 1.0	Copyright (c) Microsoft Corporation
cli v1.20.0 [‡]	MIT 1.0	Copyright (c) 2016 Jeremy Saenz & Contributors
color-convert 1.9.3	MIT Template 2020	Copyright 2011-2016 Heather Arthur and Josh Junon
color-go 1.7.0 [‡]	MIT 1.0	Copyright (c) 2013 Fatih Arslan
core-js 2.5.3 [‡]	MIT	Copyright (c) 2014-2016 Denis Pushkarev
crewjam/saml	BSD 2-Clause Simplified	Copyright (c) 2015, Ross Kinder
Crypto-Go v0.0.0-20181203042331-505ab145d0a9 [‡]	BSD-Crypto-Go 1.0	Copyright (c) 2009 The Go Authors. All rights reserved.
cURL 7.57.0 [‡]	MIT	Copyright (c) 1996 - 2016, Daniel Stenberg, <daniel@haxx.se>, and many contributors, see the THANKS file.
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Version 2.1, February 1999

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