



S3 support in ONTAP 9

ONTAP 9

NetApp
March 21, 2023

Table of Contents

- S3 support in ONTAP 9 1
 - ONTAP S3 architecture and use cases 1
 - ONTAP version support for S3 object storage 2
 - ONTAP S3 supported actions 3
 - ONTAP S3 interoperability 5

S3 support in ONTAP 9

ONTAP S3 architecture and use cases

In ONTAP, the underlying architecture for a bucket is a FlexGroup volume—a single namespace that is made up of multiple constituent member volumes but is managed as a single volume.



Buckets are only limited by the physical maximums of the underlying hardware, architectural maximums could be higher. Buckets can take advantage of FlexGroup elastic sizing to automatically grow a constituent of a FlexGroup volume if it is running out of space. There is a limit of 1000 buckets per FlexGroup volume, or 1/3 of the FlexGroup volume's capacity (to account for data growth in buckets).



No NAS or SAN protocol access is permitted to the FlexGroup volume that contain S3 buckets.

Access to the bucket is provided through authorized users and client applications.



There are three primary use cases for client access to ONTAP S3 services:

- For ONTAP systems using ONTAP S3 as a remote FabricPool capacity (cloud) tier

The S3 server and bucket containing the capacity tier (for *cold* data) is on a different cluster than the performance tier (for *hot* data).

- For ONTAP systems using ONTAP S3 as a local FabricPool tier

The S3 server and bucket containing the capacity tier is on the same cluster, but on a different HA pair, as the performance tier.

- For external S3 client apps

ONTAP S3 serves S3 client apps run on non-NetApp systems.

It is a best practice to provide access to ONTAP S3 buckets using HTTPS. When HTTPS is enabled, security certificates are required for proper integration with SSL/TLS. Client users' access and secret keys are then required to authenticate the user with ONTAP S3 as well as authorizing the users' access permissions for operations within ONTAP S3. The client application should also have access to the root CA certificate (the ONTAP S3 server's signed certificate) to be able to authenticate the server and create a secure connection between client and server.

Users are created within the S3-enabled SVM, and their access permissions can be controlled at the bucket or SVM level; that is, they can be granted access to one or more buckets within the SVM.

HTTPS is enabled by default on ONTAP S3 servers. It is possible to disable HTTPS and enable HTTP for client access, in which case authentication using CA certificates is not required. However, when HTTP is enabled and HTTPS is disabled, all communication with the ONTAP S3 server are sent over the network in clear text.

For additional information, see [Technical Report: S3 in ONTAP Best Practices](#)

Related information

[FlexGroup volumes management](#)

ONTAP version support for S3 object storage

ONTAP supports S3 object storage for on-premises environments beginning with ONTAP 9.8. Cloud Volumes ONTAP supports S3 object storage for cloud environments beginning with ONTAP 9.9.1.

S3 support with Cloud Volumes ONTAP

ONTAP S3 is configured and functions the same in Cloud Volumes ONTAP as in on-premises environments, with one exception:

- Underlying aggregates should be from one node only. Learn more about [bucket creation in CVO environments](#).

Cloud Provider	ONTAP Version
Azure	ONTAP 9.9.1 and later

Cloud Provider	ONTAP Version
AWS	ONTAP 9.11.0 and later
Google Cloud	ONTAP 9.12.1 and later

S3 public preview in ONTAP 9.7

In ONTAP 9.7, S3 object storage was introduced as a public preview. That version was not intended for production environments and will no longer be updated as of ONTAP 9.8. Only ONTAP 9.8 and later releases support S3 object storage in production environments.

S3 buckets created with the 9.7 public preview can be used in ONTAP 9.8 and later, but cannot take advantage of feature enhancements. If you have buckets created with the 9.7 public preview, you should migrate the contents of those buckets to 9.8 buckets for feature support, security, and performance enhancements.

ONTAP S3 supported actions

ONTAP S3 actions are supported by standard S3 REST APIs except as indicated below. For details, see the [Amazon S3 API Reference](#).

Bucket operations

The following operations are supported using ONTAP REST APIs in ONTAP releases where AWS S3 REST API support is not available:

- bucket creation and deletion
- bucket policy creation, modification, and deletion

Bucket operation	ONTAP support beginning with
CreateBucket	ONTAP 9.11.1
DeleteBucket	ONTAP 9.11.1
DeleteBucketPolicy	ONTAP 9.12.1
GetBucketAcl	ONTAP 9.8
GetBucketPolicy	ONTAP 9.12.1
HeadBucket	ONTAP 9.8
ListBuckets	ONTAP 9.8
PutBucket*	ONTAP 9.8 * supported with ONTAP REST APIs only
PutBucketPolicy	ONTAP 9.12.1

Object operations

Beginning with ONTAP 9.9.1, ONTAP S3 supports object metadata and tagging.

- PutObject and CreateMultipartUpload now include key-value pairs using `x-amz-meta-<key>`.

For example: `x-amz-meta-project: ontap_s3`.

- `GetObject`. and `HeadObject` now return user-defined metadata.
- Unlike metadata, tags can be read independently of objects using:
 - `PutObjectTagging`
 - `GetObjectTagging`
 - `DeleteObjectTagging`

Beginning with ONTAP 9.11.1, ONTAP S3 supports object versioning and associated actions with these ONTAP APIs:

- `GetBucketVersioning`
- `ListBucketVersions`
- `PutBucketVersioning`

Object operation	ONTAP support beginning with
<code>AbortMultipartUpload</code>	ONTAP 9.8
<code>CompleteMultipartUpload</code>	ONTAP 9.8
<code>CopyObject</code>	ONTAP 9.12.1
<code>CreateMultipartUpload</code>	ONTAP 9.8
<code>DeleteObject</code>	ONTAP 9.8
<code>DeleteObjects</code>	ONTAP 9.11.1
<code>DeleteObjectTagging</code>	ONTAP 9.9.1
<code>GetBucketVersioning</code>	ONTAP 9.11.1
<code>GetObject</code>	ONTAP 9.8
<code>GetObjectAcl</code>	ONTAP 9.8
<code>GetObjectTagging</code>	ONTAP 9.9.1
<code>HeadObject</code>	ONTAP 9.8
<code>ListMultipartUpload</code>	ONTAP 9.8
<code>ListObjects</code>	ONTAP 9.8
<code>ListObjectsV2</code>	ONTAP 9.8
<code>ListBucketVersions</code>	ONTAP 9.11.1
<code>ListParts</code>	ONTAP 9.8
<code>PutBucketVersioning</code>	ONTAP 9.11.1
<code>PutObject</code>	ONTAP 9.8
<code>PutObjectTagging</code>	ONTAP 9.9.1
<code>UploadPart</code>	ONTAP 9.8
<code>UploadPartCopy</code>	ONTAP 9.12.1

Group policies

These operations are not specific to S3 and are generally associated with Identity and Management (IAM) processes. ONTAP supports these commands but does not use the IAM REST APIs.

- Create Policy
- AttachGroup Policy

User management

These operations are not specific to S3 and are generally associated with IAM processes.

- CreateUser
- DeleteUser
- CreateGroup
- DeleteGroup

ONTAP S3 interoperability

The ONTAP S3 server interacts normally with other ONTAP functionality except as noted in this table.

Feature area	Supported	Not supported
Cloud Volumes ONTAP	<ul style="list-style-type: none">• Azure clients in ONTAP 9.9.1 and later releases• AWS clients in ONTAP 9.11.0 and later releases• Google Cloud clients in ONTAP 9.12.1 and later releases	<ul style="list-style-type: none">• Cloud Volumes ONTAP for any client in ONTAP 9.8 and earlier releases
Data protection	<ul style="list-style-type: none">• Cloud Sync• Object versioning (beginning with ONTAP 9.11.1)• S3 SnapMirror (beginning with ONTAP 9.10.1)• MetroCluster IP configurations (beginning with ONTAP 9.12.1)	<ul style="list-style-type: none">• Erasure coding• Information lifecycle management• NDMP• SMTape• SnapLock• SnapMirror Cloud• SVM disaster recovery• SyncMirror• User-created Snapshot copies• WORM

Feature area	Supported	Not supported
Encryption	<ul style="list-style-type: none"> • NetApp Aggregate Encryption (NAE) • NetApp Volume Encryption (NVE) • NetApp Storage Encryption (NSE) • TLS/SSL 	<ul style="list-style-type: none"> • SLAG
Storage efficiency	<ul style="list-style-type: none"> • Deduplication • Compression • Compaction 	<ul style="list-style-type: none"> • Aggregate-level efficiencies • Volume clone of the FlexGroup volume containing ONTAP S3 buckets
Storage virtualization	-	NetApp FlexArray Virtualization
Quality of service (QoS)	<ul style="list-style-type: none"> • QoS maximums (ceilings) • QoS minimums (floors) 	-
Additional features	<ul style="list-style-type: none"> • Audit S3 events (beginning with ONTAP 9.10.1) 	<ul style="list-style-type: none"> • FlexCache volumes • FPolicy • Qtrees • Quotas

Copyright information

Copyright © 2023 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.