



Protect your data

Amazon FSx for NetApp ONTAP

NetApp
September 02, 2024

Table of Contents

- Protect your data 1
 - Data protection overview 1
 - Manage snapshots 3
 - Manage backups to object storage 6
 - Manage replication 7

Protect your data

Data protection overview

FSx for ONTAP supports snapshots to create read-only, point-in-time images of a volume, volume backups to create offline backups with long retention of your volumes, and volume replication to create asynchronous mirrors of your volume in different regions.

Types of data protection

Data protection for your workloads helps ensure that you can recover from any data loss at any time. Learn about the types of data protection before you select the features you'll use.

Snapshots

A snapshot creates a read-only, point-in-time image of a volume within the source volume as a snapshot copy. You can use the snapshot copy to recover individual files, or to restore the entire contents of a volume. Snapshots are the basis of all the backup methods. The snapshot copy that is created on your volume is used to keep the replicated volume and backup file synchronized with changes made to the source volume.

Backups

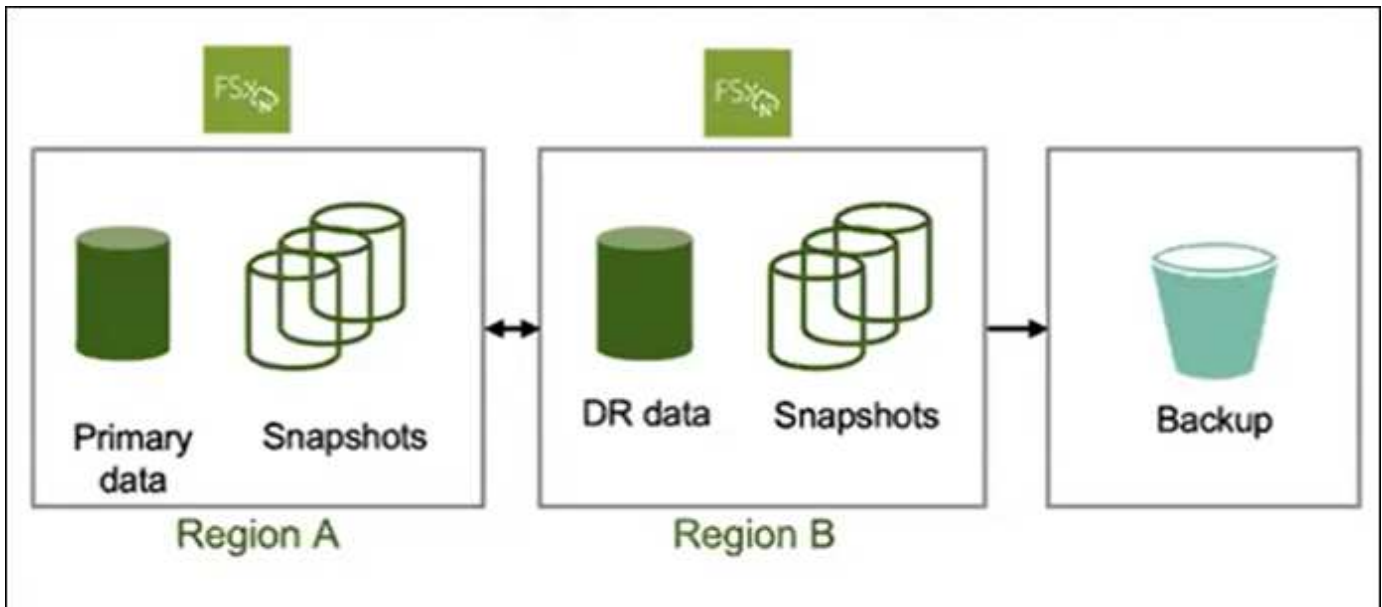
You can create backups of your data to the cloud for protection and for long-term retention purposes. If necessary, you can restore a volume, folder, or individual files from the backup to the same, or different, working file system.

Replication

Replication creates a secondary copy of your data on another FSx for ONTAP file system and continually updates the secondary data. Your data is kept current and remains available whenever you need it, such as for disaster recovery.

You can choose to create both replicated volumes on another FSx for ONTAP file system and backup files in the cloud. Or you can choose just to create replicated volumes or backup files - it's your choice.

The following diagram shows a visual representation of data protection for FSx for ONTAP storage using snapshots, replication across regions, and backup to object storage.



Best practices for protecting your workload data

FSx for ONTAP offers multiple data protection options which can be combined to achieve your selected recovery point and time objectives. For the best possible protection, we recommend that you use both volume snapshots and volume backups.

A recovery point objective (RPO) describes how recent the latest copy of your data is guaranteed to be, which depends on how frequently the copies are made. A recovery time objective (RTO) defines how long it takes to restore your data.

Protect your workload data with snapshots

Snapshots are virtual point-in-time versions of a volume that are taken on a scheduled basis. You can access snapshots using standard file system commands. Snapshots provide an RPO of as little as one hour. RTO depends on the amount of data to restore and is primarily limited by the volume throughput limit. Snapshots also allow users to restore specific files and directories, which decreases RTO even further. Snapshots only consume additional volume space for changes made to the volume.

Protect your workload data with backups

Volume backups provide independent point-in-time copies of your volume. They can be used to store old backups and provide the necessary second copy of your data. Daily, weekly, and monthly backup schedules allow for RPOs starting at one day. Volume backups can only be restored as a whole. Creating a volume from a backup (RTO) can take hours to many days, depending on the size of the backup.

Protect your workload data with volume replication

Volume replication creates a copy of the latest data of a volume including all its snapshots in a different region. If you cannot afford multi-hour RTOs of a full volume restore operation from a volume backup, consider performing a volume replication. While volume replication makes sure recent data is available in a different region for you to use, you need to adjust your clients to use the volume in the other region.

Recommendations for protecting your workload data

Consider the following recommendations for protecting your workload data.

- Use volume backups in conjunction with snapshots: using the two features together ensures that you're able to restore your files from snapshots and perform full restores in case of volume loss using backups.
- Define a volume backup policy: make sure that the backup policy satisfies your company requirements for backup age and frequency. We recommend keeping a minimum of two daily backups for each volume.
- Define a snapshot schedule: older snapshots are less likely to be used to restore data. We recommend that you define a snapshot schedule that takes into consideration the diminishing returns of keeping older snapshots against the cost for additional snapshot capacity.

Manage snapshots

Create a manual snapshot of an FSx for ONTAP volume

Create a manual snapshot of an FSx for ONTAP volume. Snapshots are point-in-time versions of your volume's content.

Snapshots are resources of volumes and are instant captures of your data that consume space only for modified data. Because data changes over time, snapshots usually consume more space as they get older.

FSx for ONTAP volumes use just-in-time copy-on-write so that any unmodified files in snapshots don't consume any of the volume's capacity.



Snapshots aren't copies of your data. If you want to make copies of your data, consider using the FSx for ONTAP backups or volume replication features.

Before you begin

You must [associate a link](#) to create a snapshot. If you don't have an existing link, [create a link](#). To associate a link in the file system, click **Associate link** under **Account name**. Once the link associates, return to this operation.

Steps

1. Log in to the [Workload Factory console](#)
2. In **Storage**, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. From the **Volumes** tab, select the three dots menu for the volume to protect.
6. Select **Data protection actions**, **Snapshots**, then **Create volume from a snapshot**.
7. In the Create volume from a snapshot dialog, in the **Snapshot name** field, enter a snapshot name.
8. Click **Create**.

Create a snapshot policy for FSx for ONTAP volumes

Create a custom snapshot policy for FSx for ONTAP volumes. A snapshot policy defines

how the system creates snapshots for a volume.

About this task

You can create a custom snapshot policy that differs from the three built-in snapshot policies for FSx for ONTAP:

- `default`
- `default-1weekly`
- `none`

By default, every volume is associated with the file system's `default` snapshot policy. We recommend using this policy for most workloads.

Customizing a policy lets you specify when to create snapshots, how many copies to retain, and how to name them.

Before you begin

- Consider the following about snapshot capacity before you use snapshots:
 - For most datasets, an additional capacity of 20% is enough to keep snapshots for up to four weeks. As data gets older, its use for restorations becomes less likely.
 - Overwriting all the data in a snapshot consumes significant volume capacity, which factors into provisioning volume capacity.
- To create a custom snapshot policy, you must [associate a link](#). If you don't have an existing link, [create a link](#). To associate a link in the file system, click **Associate link** under **Account name**. Once the link associates, return to this operation.

Steps

1. Log in to the [Workload Factory console](#)
2. In **Storage**, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. From the **Volumes** tab, select the three dots menu for the volume to protect with scheduled snapshots.
6. Select **Data protection actions**, **Snapshots**, then **Manage snapshot policies**.
7. On the Snapshot policy management page, select **Create a new snapshot policy**.
8. In the **Snapshot policy name** field, enter a name for the snapshot policy.
9. Optional: in the **Description** field, enter a description for the snapshot policy.
10. Under **Schedule**, select when to create snapshots. For example, every minute or hourly.

You can select more than one frequency.

11. Under **Number of copies**, enter the number of copies to retain.

The maximum number of copies is 1,023.

12. Optional: Under **Naming convention**, enter a **Prefix** for the policy.

13. **Retention label** is automatically populated.

This label refers to the SnapMirror, or replication label, used to select only specified snapshots for replication from the source to the target file system.

14. Click **Apply**.

Restore a volume from a snapshot

Restore an FSx for ONTAP volume from a snapshot when the volume contains deleted or corrupted files.

About this task

This operation restores data from a snapshot to a new volume.

Before you begin

You can only restore a volume from a snapshot if you have an existing snapshot copy of the volume.

Make sure you have enough capacity to complete this operation.

Steps

1. Log in to the [Workload Factory console](#)
2. In **Storage**, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. From the **Volumes** tab, select the three dots menu for the volume to restore from a snapshot.
6. Select **Data protection actions, Snapshots**, then **Restore volume from a snapshot**.
7. In the Restore volume from a snapshot dialog, in the **Snapshot name** field, select the snapshot to restore from the dropdown menu.
8. In the **Restored volume name** field, enter a unique name for the volume to restore.
9. Click **Restore**.

Create a new FSx for ONTAP volume from a snapshot

Create a new FSx for ONTAP volume from a snapshot to enable point-in-time recovery.

About this task

A snapshot is a read-only image of an FSx for ONTAP volume taken at a point in time. The creation of a new volume from a snapshot makes a copy of an entire volume within a few seconds independent of volume size. The newly created copy represents a new volume.

Before you begin

Consider the following limitations before you create a volume from a snapshot:

- Changes to permission models: If you use this operation to switch the network-attached storage (NAS) protocol type, it might also switch the permission model that the security style provides. You might experience file access permission issues, which you can only fix manually with administrator access using the NAS client tools for permissions setting.

- Increased volume consumption: After you create a volume from a snapshot, you have two independent volumes, and both consume capacity from the host file system.

Steps

1. Log in to the [Workload Factory console](#)
2. In Storage, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume snapshot and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. In the Volumes tab, click the three dots menu for the volume that has the snapshot you want to create a volume of.
6. Select **Data protection actions, Snapshots**, and then **Create a volume from a snapshot**.
7. In the Create volume from a snapshot dialog, enter the snapshot name.
8. Click **Create**.

Manage backups to object storage

Create a manual backup of a volume

Create a manual backup of a volume outside regularly scheduled backups.

About this task

FSx for ONTAP backups are per volume, so each backup contains only the data in a particular volume.

FSx for ONTAP backups are incremental which means that only the data on the volume that has changed after your most recent backup is saved. This minimizes the time required to create the backup and the storage required for the backup, which saves on storage costs by not duplicating data.

Before you begin

To take backups of your volumes, both your volume and your file system must have enough available SSD storage capacity to store the backup snapshot. When taking a backup snapshot, the additional storage capacity consumed by the snapshot cannot cause the volume to exceed 98% SSD storage utilization. If this happens, the backup will fail.

Steps

1. Log in to the [Workload Factory console](#)
2. In Storage, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. From the **Volumes** tab, click the three dots menu for the volume to back up.
6. Select **Data protection actions, FSx for ONTAP backup**, and then **Manual backup**.
7. In the Manual backup dialog, enter a name for the backup.
8. Click **Back up**.

Restore a volume from a backup

Restore a volume from a backup to any FSx for ONTAP file system in your AWS account.

Steps

1. Log in to the [Workload Factory console](#)
2. In Storage, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system with the volume and then select **Manage**.
4. In the file system overview, select the **Volumes** tab.
5. From the **Volumes** tab, click the three dots menu for the volume to restore from a backup.
6. Select **Data protection actions, FSx for ONTAP backup**, and then **Restore from a backup**.
7. In the Restore from a backup dialog, provide the following:
 - a. **Target file system**: Select the target file system from the dropdown menu.
 - b. **Target storage VM**: Select the target storage VM from the dropdown menu.
 - c. **Backup name**: Select the backup name from the dropdown menu.
 - d. **Restored volume name**: Enter the restored volume name.
8. Click **Restore**.

Manage replication

Create a replication relationship

Create a replication relationship for an FSx for ONTAP file system to avoid data loss in case of an unforeseen disaster.

About this task

Replication is an added layer of data protection which is essential in case the region where your data resides experiences a disaster. Data loss can be avoided if you use cross-region replication.

This operation creates a replication relationship for one or all source volumes in an FSx for ONTAP file system.

Replicated volumes in the target file system follow the naming format: {OriginalVolumeName}_copy.

Before you begin

Make sure you meet the following prerequisites before you begin.

- You must have two available file systems in your storage inventory to create a replication relationship.
- The two file systems you use for the replication relationship must have an associated link. If the file systems don't have existing links, [first create a link](#). To [associate a link](#) in the file systems, click **Associate link** under **Account name**. Once the link associates in both file systems, return to this operation.

Complete the following steps to replicate a single volume or replicate all volumes in a file system.

Replicate a single volume

Steps

1. Log in to the [Workload Factory console](#)
2. In Storage, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, select the three dots menu of the file system that contains the volume to replicate and then select **Manage**.
4. From the Volumes tab, select the three dots menu of the volume to replicate.
5. Select **Data protection actions** then **Replicate volume data**.
6. On the Create replication page, under Replication target, provide the following:
 - a. **FSx for ONTAP file system**: Select credentials, region, and FSx for ONTAP file system name for the target FSx for ONTAP file system.
 - b. **Storage VM name**: Select the storage VM from the dropdown menu.
 - c. **Volume name**: The target volume name is generated automatically with the following format `{OriginalVolumeName}_copy`. You can use the auto-generated volume name or enter another volume name.
 - d. **Tiering policy**: Select the tiering policy for the data stored in the target volume.

Auto is the default tiering policy when creating a volume using the Workload Factory FSx for ONTAP user interface. For more information about volume tiering policies, refer to [Volume storage capacity](#) in AWS FSx for NetApp ONTAP documentation.

- e. **Max transfer rate**: Select **Limited** and enter the max transfer limit in MB/s. Alternatively, select **Unlimited**.

Without a limit, network and application performance may decline. Alternatively, we recommend an unlimited transfer rate for FSx for ONTAP file systems for critical workloads, for example, those that are used primarily for disaster recovery.

7. Under Replication settings, provide the following:
 - a. **Replication interval**: Select the frequency that snapshots are transferred from the source volume to the target volume.
 - b. **Long-term retention**: Optionally, enable snapshots for long-term retention.

If you enable long-term retention, then select an existing policy or create a new policy to define the snapshots to replicate and the number to retain.

- i. For **Choose an existing policy**, select an existing policy from the dropdown menu.
- ii. For **Create a new policy**, provide the following:
 - A. **Policy name**: Enter a policy name.
 - B. **Snapshot policies**: In the table, select the snapshot policy frequency and the number of copies to retain. You can select more than one snapshot policy.

8. Click **Create**.

Replicate all volumes in a file system

Steps

1. Log in to the [Workload Factory console](#)

2. In Storage, select **Go to storage inventory**.
3. In the FSx for ONTAP tab, click the three dots menu of the file system with the volumes and then select **Manage**.
4. From the file system overview, select **Create replication**.
5. On the Create replication page, under Replication target, provide the following:
 - a. **FSx for ONTAP file system**: Select credentials, region, and FSx for ONTAP file system name for the target FSx for ONTAP file system.
 - b. **Storage VM name**: Select the storage VM from the dropdown menu.
 - c. **Volume name**: The target volume name is generated automatically with the following format {OriginalVolumeName}_copy.
 - d. **Tiering policy**: Select the tiering policy for the data stored in the target volume.

Auto is the default tiering policy when creating a volume using the Workload Factory FSx for ONTAP user interface. For more information about volume tiering policies, refer to [Volume storage capacity](#) in AWS FSx for NetApp ONTAP documentation.
 - e. **Max transfer rate**: Select **Limited** and enter the max transfer limit in MB/s. Alternatively, select **Unlimited**.

Without a limit, network and application performance may decline. Alternatively, we recommend an unlimited transfer rate for FSx for ONTAP file systems for critical workloads, for example, those that are used primarily for disaster recovery.
6. Under Replication settings, provide the following:
 - a. **Replication interval**: Select the frequency that snapshots are transferred from the source volume to the target volume.
 - b. **Long-term retention**: Optionally, enable snapshots for long-term retention.

If you enable long-term retention, then select an existing policy or create a new policy to define the snapshots to replicate and the number to retain.

 - i. For **Choose an existing policy**, select an existing policy from the dropdown menu.
 - ii. For **Create a new policy**, provide the following:
 - A. **Policy name**: Enter a policy name.
 - B. **Snapshot policies**: In the table, select the snapshot policy frequency and the number of copies to retain. You can select more than one snapshot policy.
7. Click **Create**.

Result

The replication relationship appears in the **Replication relationships** tab.

Initialize a replication relationship

Initialize a replication relationship between source and target volumes.

About this task

Initialization performs a *baseline* transfer: it makes a snapshot of the source volume, then transfers the

snapshot and all the data blocks it references to the target volume.

Before you begin

Consider when you choose to complete this operation. Initialization can be time-consuming. You might want to run the baseline transfer in off-peak hours.

Steps

1. Log in to the [Workload Factory console](#)
2. In Storage, select **Go to storage inventory**.
3. In the **FSx for ONTAP** tab, click the three dots menu of the file system to update and then select **Manage**.
4. From the file system overview, select the **Replication relationships** tab.
5. In the Replication relationships tab, click the three dots menu of the replication relationship to initialize.
6. Select **Initialize**.
7. In the Initialize relationship dialog, click **Initialize**.

Copyright information

Copyright © 2024 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.