



Manage your storage

ASA r2

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Manage your storage

Provision ONTAP SAN storage on the ASA r2 systems

When you provision storage, you enable your SAN hosts to read from and write data to ASA r2 storage systems. To provision storage, you use ONTAP System Manager to create storage units, add host initiators, and map the host to a storage unit. You also need to perform steps on the host to enable read/write operations.

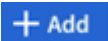
Create storage units

On an ASA r2 system, a storage unit makes storage space available to your SAN hosts for data operations. A storage unit refers to a LUN for SCSI hosts or an NVMe namespace for NVMe hosts. If your cluster is configured to support SCSI hosts, you are prompted to create a LUN. If your cluster is configured to support NVMe hosts, you are prompted to create an NVMe namespace. An ASA r2 storage unit has a maximum capacity of 128TB.

See the [NetApp Hardware Universe](#) for the most current storage limits for ASA r2 systems.

Host initiators are added and mapped to the storage unit as part of the storage unit creation process. You can also [add host initiators](#) and [map](#) them to your storage units after the storage units are created.

Steps

1. In System Manager, select **Storage**; then select  .
2. Enter a name for the new storage unit.
3. Enter the number of units you want to create.



If you create more than one storage unit, each unit is created with the same capacity, host operating system, and host mapping.


4. Enter the storage unit capacity; then select the host operating system.
5. Accept the auto-selected **host mapping** or select a different host group for the storage unit to be mapped to.

Host mapping refers to the host group that the new storage unit will be mapped to. If there is a pre-existing host group for the type of host you selected for your new storage unit, the pre-existing host group is auto-selected for your host mapping. You can accept the host group that is auto-selected for your host mapping or you can select a different host group.

If there is no pre-existing host group for hosts running on the operating system you specified, a new host group is automatically created by ONTAP.

6. If you want to do any of the following, select **More Options** and complete the required steps.

Option	Steps
<p>Change the default Quality of Service (QoS) policy</p> <p>If the default QoS policy has not previously been set on the storage virtual machine (VM) on which the storage unit is being created, this option is not available.</p>	<ol style="list-style-type: none"> a. Under Storage and optimization, next to Quality of service (QoS), select  . b. Select an existing QoS policy.
<p>Create a new QoS policy</p>	<ol style="list-style-type: none"> a. Under Storage and optimization, next to Quality of service (QoS), select  . b. Select Define new policy. c. Enter a name for the new QoS policy. d. Set a QoS limit, a QoS guarantee, or both. <ol style="list-style-type: none"> i. Optionally, under Limit, enter a maximum throughput limit, a maximum IOPS limit, or both. <p>Setting a maximum throughput and IOPS for a storage unit restricts its impact on system resources so that it does not degrade the performance of critical workloads.</p> ii. Optionally, under Guarantee, enter a minimum throughput, a minimum IOPS, or both. <p>Setting a minimum throughput and IOPS for a storage unit guarantees that it meets minimum performance targets regardless of demand by competing workloads.</p> e. Select Add.
<p>Add a new SCSI host</p>	<ol style="list-style-type: none"> a. Under Host information, select SCSI for the connection protocol. b. Select the host operating system. c. Under Host Mapping, select New hosts. d. Select FC or iSCSI. e. Select existing host initiators or select Add initiator to add a new host initiator. <p>An example of a valid FC WWPN is "01:02:03:04:0a:0b:0c:0d". Examples of valid iSCSI initiator names are "iqn.1995-08.com.example:string" and "eui.0123456789abcdef".</p>

Option	Steps
Create a new SCSI host group	<ul style="list-style-type: none"> a. Under Host information, select SCSI for the connection protocol. b. Select the host operating system. c. Under Host Mapping, select New host group. d. Enter a name for the host group; then select the hosts to add to the group.
Add a new NVMe subsystem	<ul style="list-style-type: none"> a. Under Host information, select NVMe for the connection protocol. b. Select the host operating system. c. Under Host Mapping, select New NVMe subsystem. d. Enter a name for the subsystem or accept the default name. e. Enter a name for the initiator. f. If you want to enable in-band authentication or Transport Layer Security (TLS), select ; then select your options. <p data-bbox="669 814 1469 909">In-band authentication allows secure bidirectional and unidirectional authentication between your NVMe hosts and your ASA r2 system.</p> <p data-bbox="669 947 1382 1010">TLS encrypts all data sent over the network between your NVMe/TCP hosts and your ASA r2 system.</p> <ul style="list-style-type: none"> g. Select Add initiator to add more initiators. <p data-bbox="669 1115 1463 1276">The host NQN should be formatted as <nqn.yyyy-mm> followed by a fully qualified domain name. The year should be equal to or later than 1970. The total maximum length should be 223. An example of a valid NVMe initiator is nqn.2014-08.com.example:string</p>

7. Select **Add**.

What's next?

Your storage units are created and mapped to your hosts. You can now [create snapshots](#) to protect the data on your ASA r2 system.

For more information

Learn more about [how ASA r2 systems use storage virtual machines](#).

Add host initiators

You can add new host initiators to your ASA r2 system at any time. Initiators make the hosts eligible to access storage units and perform data operations.

Before you begin

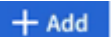
If you want to replicate the host configuration to a destination cluster during the process of adding your host

initiators, your cluster must be in a replication relationship. Optionally, you can [create a replication relationship](#) after your host is added.

Add host initiators for SCSI or NVMe hosts.

SCSI hosts

Steps

1. Select **Host**.
2. Select **SCSI**; then select .
3. Enter the host name, select the host operating system and enter a host description.
4. If you want to replicate the host configuration to a destination cluster, select **Replicate host configuration**; then select the destination cluster.

Your cluster must be in a replication relationship to replicate the host configuration.

5. Add new or existing hosts.

Add new hosts	Add existing hosts
<ol style="list-style-type: none">a. Select New hosts.b. Select FC or iSCSI; then select the host initiators.c. Optionally, select Configure host proximity. Configuring host proximity enables ONTAP to identify the controller nearest to the host for data path optimization and latency reduction. This is only applicable if you have replicated data to a remote location. If you have not set up snapshot replication, you do not need to select this option.d. If you need to add new initiators, select Add initiators.	<ol style="list-style-type: none">a. Select Existing hosts.b. Select the host you want to add.c. Select Add.

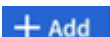
6. Select **Add**.

What's next?

Your SCSI hosts are added to your ASA r2 system and you are ready to map your hosts to your storage units.

NVMe hosts

Steps

1. Select **Host**.
2. Select **NVMe**; then select .
3. Enter a name for the NVMe subsystem, select the host operating system and enter a description.
4. Select **Add initiator**.

What's next?

Your NVMe hosts are added to your ASA r2 system and you are ready to map your hosts to your storage units.

Create host groups

On an ASA r2 system, a *host group* is the mechanism used to give hosts access to storage units. A host group refers to an igroup for SCSI hosts or to an NVMe subsystem for NVMe hosts. A host can only see the storage units that are mapped to the host groups to which it belongs. When a host group is mapped to a storage unit, the hosts that are members of the group, are then able to mount (create directories and file structures on) the storage unit.

Host groups are automatically or manually created when you create your storage units. You can optionally use the following steps to create host groups before or after storage unit creation.

Steps

1. From System Manager, select **Host**.
2. Select the hosts you want to add to the host group.

After you select the first host, the option to add to a host group appears above the list of hosts.

3. Select **Add to host group**.
4. Search for and select the host group to which you want to add the host.


What's next?

You have created a host group and you can now map it to a storage unit.

Map the storage unit to a host

After you have created your ASA r2 storage units and added host initiators, you need to map your hosts to your storage units to begin serving data. Storage units are mapped to hosts as part of the storage unit creation process. You can also map existing storage units to new or existing hosts at any time.

Steps

1. Select **Storage**.
2. Hover over the name of the storage unit you want to map.
3. Select ; then select **Map to hosts**.
4. Select the hosts you want to map to the storage unit; then select **Map**.

What's next?

Your storage unit is mapped to your hosts and you are ready to complete the provisioning process on your hosts.

Complete host-side provisioning

After you have created your storage units, added your host initiators and mapped your storage units, there are steps you must perform on your hosts before they can read and write data on your ASA r2 system.

Steps

1. For FC and FC/NVMe, zone your FC switches by WWPN.

Use one zone per initiator and include all target ports in each zone.

2. Discover the new storage unit.

3. Initialize the storage unit and a create file system.
4. Verify that your host can read and write data on the storage unit.

What's next?

You have completed the provisioning process and are ready to begin serving data. You can now [create snapshots](#) to protect the data on your ASA r2 system.

For more information

For more details about host-side configuration, see the [ONTAP SAN host documentation](#) for your specific host.


Clone data on ASA r2 storage systems

Data cloning creates copies of storage units and consistency groups on your ASA r2 system using ONTAP System Manager that can be used for application development, testing, backups, data migration or other administrative functions.

Clone storage units

When you clone a storage unit, you create a new storage unit on your ASA r2 system that is a point-in-time, writable copy of the storage unit you cloned.

Steps

1. In System Manager, select **Storage**.
2. Hover over the name of the storage unit you want to clone.
3. Select ; then select **Clone**.
4. Accept the default name for the new storage unit that will be created as a clone or enter a new one.
5. Select the host operating system.

A new snapshot is created for the clone by default.

6. If you want to use an existing snapshot, create a new host group, or add a new host, select **More Options**.

Option	Steps
Use an existing snapshot	<ol style="list-style-type: none"> a. Under Snapshot to clone, select Use an existing snapshot. b. Select the snapshot you want to use for the clone.
Create a new host group	<ol style="list-style-type: none"> a. Under Host mapping, select New host group. b. Enter a name for the new host group; then select the host initiators to include in the group.

Option	Steps
Add a new host	<ol style="list-style-type: none"> a. Under Host mapping, select New hosts. b. Enter the a name for the new host; then select FC or iSCSI. c. Select the host initiators from the list of existing initiators or select Add to add new initiators for the host.

7. Select **Clone**.

What's next?

You have created a new storage unit that is identical to the storage unit you cloned. You are now ready to use the new storage unit as needed.

Clone consistency groups

When you clone a consistency group, you create a new consistency group that's identical in structure, storage units, and data to the consistency group you cloned. Use a consistency group clone to perform application testing or to migrate data. Suppose, for example, you need to migrate a production workload out of a consistency group. You can clone the consistency group to create a copy of your production workload to maintain as a backup until the migration is complete.


The clone is created from a snapshot of the consistency group being cloned. The snapshot used for the clone is taken at the point in time that the cloning process is initiated by default. You can modify the default behavior to use a pre-existing snapshot.

Storage unit mappings are copied as part of the cloning process. Snapshot polices are not copied as part of the cloning process.

You can create clones from consistency groups stored locally on your ASA r2 system or from consistency groups that have been replicated to remote locations.

Clone using local snapshot

Steps


1. In System Manager, select **Protection > Consistency groups**.
2. Hover over the consistency group you want to clone.
3. Select , then select **Clone**.
4. Enter a name for consistency group clone or accept the default name.
5. Select the host operating system.
6. If you want to dissociate the clone from the source consistency group and allocate disk space, select **Split clone**.
7. If you want to use an existing snapshot, create a new host group or add a new host for the clone, select **More Options**.

Option	Steps
Use an existing snapshot	<ol style="list-style-type: none">a. Under Snapshot to clone, select Use an existing snapshot.b. Select the snapshot you want to use for the clone.
Create a new host group	<ol style="list-style-type: none">a. Under Host mapping, select New host group.b. Enter a name for the new host group; then select the host initiators to include in the group.
Add a new host	<ol style="list-style-type: none">a. Under Host mapping, select New hosts.b. Enter the name new host name; then select FC or iSCSI.c. Select the host initiators from the list of existing initiators or select Add initiator to add new initiators for the host.

8. Select **Clone**.

Clone using remote snapshot

Steps

1. In System Manager, select **Protection > Replication**.
2. Hover over the **Source** you want to clone.
3. Select , then select **Clone**.
4. Select the source cluster and storage VM; then enter a name for the new consistency group or accept the default name.
5. Select the snapshot to clone; then select **Clone**.

What's next?

You have cloned a consistency group from your remote location. The new consistency group is locally available on your ASA r2 system to use as needed.

What's next?

To protect your data, you should [create snapshots](#) of the cloned consistency group.

Modify storage units on ASA r2 storage systems

To optimize performance on your ASA r2 system, you might need to modify your storage units to increase their capacity, update QoS policies or to change the hosts that are mapped to the units. For example, if a new, critical application workload is added to an existing storage unit, you might need to change the Quality of Service (QoS) policy applied to the storage unit to support the performance level needed for the new application.

Increase capacity

Increase the size of a storage unit before it reaches full capacity to prevent a loss of data access that can occur if the storage unit runs out of writeable space. The capacity of a storage unit can be increased to 128 TB which is the maximum size allowed by ONTAP.

Modify host mappings

Modify the hosts that are mapped to a storage unit to assist in balancing workloads or reconfiguring system resources.

Modify QoS policy

Quality of service (QoS) policies guarantee that the performance of critical workloads is not degraded by competing workloads. You can use QoS policies to set a QoS throughput *limit* and a QoS throughput *guarantee*.


- QoS throughput limit

The QoS throughput *limit* restricts the impact of a workload on system resources by limiting the throughput for the workload to a maximum number of IOPS or MBps, or IOPS and MBps.

- QoS throughput guarantee

The QoS throughput *guarantee* ensures that critical workloads meet minimum throughput targets, regardless of demand by competing workloads, by guaranteeing that the throughput for the critical workload does not fall below a minimum number of IOPS or MBps, or IOPS and MBps.

Steps

1. In System Manager, select **Storage**.
2. Hover over the name of the storage unit you want to edit.
3. Select ; then select **Edit**.
4. Update the storage unit parameters as needed to increase capacity, change the QoS policy, and update the host mapping.

What's next?

If you have increased the size of your storage unit, you must rescan the storage unit on the host for the host to

recognize the change in size.


Delete storage units on ASA r2 storage systems

Delete a storage unit if you no longer need to maintain the data contained in the unit. Deleting storage units that are no longer needed can help you free space needed for other host applications.

Before you begin

If the storage unit you want to delete is in a consistency group that is in replication relationship, you must [remove the storage unit from the consistency group](#) before you delete it.

Steps

1. In System Manager, select **Storage**.
2. Hover over the name of the storage unit you want to delete.
3. Select ; then select **Delete**.
4. Acknowledge that the deletion cannot be undone.
5. Select **Delete**.

What's next?

You can use the space freed from the deleted storage unit to [increase the size](#) of storage units that need additional capacity.

ASA r2 storage limits

For optimal performance, configuration and support, you should be aware of your ASA r2 storage limits.

ASA r2 systems support the following:

Max nodes per cluster	2
Max storage unit size	128 TB

For more information

For a complete list of the most current ASA r2 storage limits, see [NetApp Hardware Universe](#).

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