ASA r2 for ONTAP power users

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Compare ASA r2 systems to other ONTAP systems

ASA r2 systems offer a unified hardware and software solution for SAN-only environments built on all flash platforms. ASA r2 systems vary from other ONTAP systems (ASA, AFF, and FAS) in the implementation of its storage layer, supported protocols, and ONTAP personality.

On an ASA r2 system, ONTAP software is streamlined to provide support for essential SAN functionality while limiting the visibility and availability of non-SAN related features and functions. For example, System Manager running on an ASA r2 system does not display options to create home directories for NAS clients. This streamlined version of ONTAP is identified as the *ASA r2 personality*. ONTAP running on all other ONTAP systems (ASA, AFF, FAS) is identified as the *unified ONTAP personality*. The differences between ONTAP personalities are referenced in the ONTAP command reference (man pages), REST API specification, and EMS messages where applicable.

You can verify the personality of your ONTAP storage from System Manager or from the ONTAP CLI.

- From the System Manager menu, select **Cluster > Overview**.
- From the CLI, enter: `san config show`

The personality of your ONTAP storage system cannot be changed.

The storage layer for ONTAP systems running the unified ONTAP personality uses aggregates as the base unit of storage. An aggregate owns a specific set of the disks available in a storage system. The aggregate allocates space on the disks it owns to volumes for LUNs and namespaces. A unified ONTAP user can use the command line interface (CLI) to create and modify aggregates, volumes, LUNs and namespaces.

The storage layer in ASA r2 systems uses a storage availability zone instead of aggregates. A storage availability zone is a common pool of storage that has access to all available disks in the storage system. The storage availability zone is visible to both nodes in an ASA r2 HA pair. When a storage unit (based on either a LUN or an NVMe namespace) is created, ONTAP automatically creates a volume containing a storage virtual machine (VM) in the storage availability zone to house the storage unit. Because of this automated and simplified approach to storage management, certain System Manager options, ONTAP commands, and REST API endpoints are not available or have limited usage on an ASA r2 system. For example, because volume creation and management is automated for ASA r2 systems, the **Volumes** menu does not appear in System Manager and the `volume create` command is not supported.

ASA r2 storage compares to other ONTAP storage systems in the following ways:

	ASA r2	ASA	AFF	FAS
ONTAP personality	ASA r2	ASA	Unified	Unified
SAN protocol support	Yes	Yes	Yes	Yes

	ASA r2	ASA	AFF	FAS
NAS protocol support	No	No	Yes	Yes
Storage layer support	Storage availability zone	Aggregates	Aggregates	Aggregates

The following ASA platforms are classified as ASA r2 systems:

- ASA A1K
- ASA A70
- ASA A90

For more information

- Learn more about ONTAP hardware systems.
- See full configuration support and limitations for ASA and ASA r2 systems in NetApp Hardware Universe.
- Learn more about the NetApp ASA.

Summary of ASA r2 system differences

The major differences between ASA r2 systems and FAS, AFF, and ASA systems relevant to the ONTAP command line interface (CLI) and REST API are described below.

Default SVM creation with protocol services

New clusters automatically contain a default data SVM with the SAN protocols enabled. IP data LIFs support iSCSI and NVMe/TCP protocols and use the `default-data-blocks` service policy by default.

Automatic volume creation

Creating a storage unit (LUN or namespace) automatically creates a volume from the storage availability zone. This results in a simplified and common namespace. Deleting a storage unit automatically deletes the associated volume.

Changes to thin and thick provisioning

Storage units for are always thinly provisioned on ASA r2 storage systems. Thick provisioning is not supported.

ONTAP software support and limitations for ASA r2 storage systems

While ASA r2 systems offers a wide range of support for SAN solutions, certain ONTAP software features are not supported.

ASA r2 systems do not support the following:

- iSCSI LIF failover
- FabricPool

- LUN thick provisioning
- MetroCluster
- Object protocols
- ONTAP S3 SnapMirror and S3 APIs
- SnapMirror to Cloud
- SnapMirror to non-ASA r2 systems
- Selective LUN Map (SLM)

ASA r2 systems support the following:

- Snaplock
- Dual-layer encryption

For more information

- See the NetApp Hardware Universe for more information on ASA r2 hardware support and limitations.
- Learn how to lock snapshots on your ASA r2 system.
- Learn how to apply dual-layer encryption to data on your ASA r2 system.

ONTAP CLI support for ASA r2 storage systems

Instead of traditional aggregates, which own a specific set of the disks available in a storage system, ASA r2 systems use a *storage availability zone*. A storage availability zone is a common pool of storage that has access to all available disks in the storage system. The storage availability zone is visible to both nodes in an ASA r2 HA pair. When a storage unit (LUN or NVMe namespace) is created, ONTAP automatically creates a volume containing a storage virtual machine (VM) in the storage availability zone to house the storage unit.

Because of this simplified approach to storage management, `storage aggregate` commands are not supported on ASA r2 systems. Support for certain `lun` and `volume` commands and parameters is also limited.

The following commands and command sets are not supported on ASA on r2:

Unsupported `lun` commands

- `lun copy`
- `lun geometry`
- `lun import`
- `lun mapping add-reportng-nodes`
- `lun mapping-remove-reporting-nodes`
- `lun maxsize`
- `lun move`
- `lun move-in-volume`

  This command is replaced with lun rename/vserver nvme namespace rename.

- `lun transition`

Unsupported `volume` commands and parameters

- `volume autosize`
- `volume create`
- `volume delete`
- `volume expand`
- `volume modify`

  This command is not available when used in conjunction with the following parameters:

  ° `-anti-ransomware-state`

  ° `-autosize`

  ° `-autosize-mode`

  ° `-autosize-shrik-threshold-percent`

  ° `-autosize-reset`

  ° `-group`

  ° `-is-cloud-write-enabled`

  ° `-is-space-enforcement-logical`

  ° `-max-autosize`

  ° `-min-autosize`

  ° `-offline`

  ° `-online`

  ° `-percent-snapshot-space`

  ° `-qos*`

  ° `-size`

  ° `-snapshot-policy`

  ° `-space-guarantee`

  ° `-space-mgmt-try-first`

  ° `-state`

  ° `-tiering-policy`

  ° `-tiering-minimum-cooling-days`

  ° `-user`

  ° `-unix-permisions`

  ° `-vserver-dr-protection`

- `volume make-vsroot`
- `volume mount`

- `volume move`

- `volume offline`

- `volume rehost`

- `volume rename`

- `volume restrict`

- `volume transition-prepare-to-downgrade`

- `volume unmount`

Unsupported `volume clone` **commands**

- `volume clone create`

- `volume clone split`

Unsupported `volume snaplock` **commands**

- `volume snaplock modify`

Unsupported `volume snapshot` **commands**

- `volume snapshot`

- `volume snapshot autodelete modify`

- `volume snapshot policy modify`

Unsupported `volume` command sets

- `volume activity-tracking`
- `volume analytics`
- `volume conversion`
- `volume file`
- `volume flexcache`
- `volume flexgroup`
- `volume inode-upgrade`
- `volume object-store`
- `volume qtree`
- `volume quota`
- `volume reallocation`
- `volume rebalance`
- `volume recovery-queue`
- `volume schedule-style`

Unsupported `storage` commands

- `storage failover show-takeover`
- `storage failover show-giveback`
- `storage aggregate relocation`
- `storage disk assign`
- `storage disk partition`
- `storage disk reassign`

For more information

See the ONTAP command reference for a full list of supported commands

Set up an ONTAP ASA r2 cluster using the CLI

It is recommended that you use System Manager to set up your ONTAP ASA r2 cluster. System Manager offers a quick and easy guided workflow to get your cluster up and running. However, if you are accustomed to working with ONTAP commands, the ONTAP command line interface (CLI) can optionally be used for cluster setup. Cluster set up using the CLI offers no additional options or advantages than cluster set up using System Manager.

During cluster setup, your default data storage virtual machine (VM) is created, an initial storage unit is created, and your data LIFs are automatically discovered. Optionally, you can enable the Domain Name System (DNS) to resolve host names, set your cluster to use the Network Time Protocol (NTS) for time

synchronization, and enable encryption of data at rest.

Before you begin

Gather the following information:

- Cluster management IP address

  The cluster management IP address is a unique IPv4 address for the cluster management interface used by the cluster administrator to access the admin storage VM and manage the cluster. You can obtain this IP address from the administrator responsible for assigning IP addresses in your organization.

- Network subnet mask

  During cluster setup, ONTAP recommends a set of network interfaces appropriate for your configuration. You can adjust the recommendation if necessary.

- Network gateway IP address
- Partner node IP address
- DNS domain names
- DNS name server IP addresses
- NTP server IP addresses
- Data subnet mask

Steps

1. Power on both nodes of the HA pair.

2. Show the nodes discovered on the local network:

   ```
   system node show-discovered -is-in-cluster false
   ```

3. Start the cluster setup wizard:

   ```
   cluster setup
   ```

4. Acknowledge the AutoSupport statement.

5. Enter values for the node management interface port, IP address, netmask and default gateway.

6. Press **Enter** to continue setup using the command line interface; then enter **create** to create a new cluster.

7. Accept the system defaults or enter your own values.

8. After setup on the first node is complete, log into the cluster.

9. Verify that the cluster is active and the first node is healthy:

   ```
   system node show-discovered
   ```

10. Add the second node to the cluster:

```
cluster add-node -cluster-ip <partner_node_ip_address>
```

11. Optionally, synchronize the system time across the cluster

Synchronize without symmetric authentication	```cluster time-service ntp server create -server <server_name>```
Synchronize with symmetric authentication	```cluster time-service ntp server create -server <server_ip_address> -key-id <key_id>```

    a. Verify that the cluster is associated with an NTP server:

```
Cluster time-service ntp show
```

12. Optionally, download and run ActiveIQ Config Advisor to confirm your configuration.

What's next?

You are ready to set up data access from your SAN clients to your system.

REST API support for ASA r2

The ASA r2 REST API is based on the REST API provided with the unified ONTAP personality, with a number of changes adapted to the unique characteristics and capabilities of the ASA r2 personality.

Types of API changes

There are several types of differences between the ASA r2 system REST API and the unified ONTAP REST API available with FAS, AFF, and ASA systems. Understanding the types of changes will help you better utilize the online API reference documentation.

New ASA r2 endpoints not supported in unified ONTAP

Several endpoints have been added to the ASA r2 REST API which are not available with unified ONTAP.

For example, a new block-volume endpoint has been added to the REST API for ASA r2 systems. The block-volume endpoint provides access to both LUN and NVMe namespace objects, enabling an aggregated view of the resources. This is only available through the REST API.

As another example, the **storage-units** endpoints provide an aggregated view of the LUNs and NVMe namespaces. There are several endpoints and they're all based on or derived from `/api/storage/storage-units`. You should also review `/api/storage/luns` and

`/api/storage/namespaces`.

Restrictions on the HTTP methods used for some endpoints

Several endpoints available with ASA r2 have restrictions on which HTTP methods can be used as compared with unified ONTAP. For example, POST and DELETE are not allowed when using the endpoint `/api/protocols/nvme/services` with ASA r2 systems.

Property changes for an endpoint and HTTP method

Some ASA r2 system endpoint and method combinations do not support all the defined properties available in the unified ONTAP personality. For example, when using PATCH with the endpoint `/api/storage/volumes/{uuid}`, several properties are not supported with ASA r2, including:

- `autosize.maximum`
- `autosize.minimum`
- `autosize.mode`

Changes to internal processing

There are several changes to how ASA r2 processes certain REST API requests. For example, a DELETE request with the endpoint `/api/storage/luns/{uuid}` is processed asynchronously.

Enhanced security with OAuth 2.0

OAuth 2.0 is the industry standard authorization framework. It's used to restrict and control access to protected resources based on signed access tokens. You can configure OAuth 2.0 using System Manager to protect ASA r2 system resources.

After OAuth 2.0 is set up with System Manager, access by the REST API clients can be controlled. You need to first obtain an access token from an authorization server. The REST client then passes the token to the ASA r2 cluster as a bearer token using the HTTP authorization request header. See Authentication and authorization using OAuth 2.0 for more information.

Access the ASA r2 API reference documentation through the Swagger UI

You can access the REST API reference documentation through the Swagger UI at your ASA r2 system.

About this task

You should access the ASA r2 reference documentation page for details about the REST API. As part of this, you can search for the string **Platform Specifics** to find details about ASA r2 system support for the API calls and properties.

Before you begin

You must have the following:

- IP address or host name of the ASA r2 system's cluster management LIF
- User name and password for an account with authority to access the REST API

Steps

1. Type the URL in your browser and press **Enter**:

   `https://<ip_address>/docs/api`

2. Sign in using your administrator account.

   The ASA r2 API documentation page is displayed with the API calls organized in major resource categories.

3. To see an example of an API call that's specifically applicable only to ASA r2 systems, scroll down to the **SAN** category and click **GET /storage/storage-units**.