



# **Citrix**

## ONTAP SAN Host Utilities

NetApp  
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# Table of Contents

|  |    |
|--|----|
| Citrix .....   | 1  |
| Configure Citrix Xenserver 8.4 for FCP and iSCSI with ONTAP storage .....  | 1  |
| Step 1: Optionally, enable SAN booting .....                               | 1  |
| Step 2: Confirm the multipath configuration for your host .....            | 1  |
| Step 3: Optionally, exclude a device from multipathing .....               | 5  |
| Step 4: Customize multipath parameters for ONTAP LUNs .....                | 5  |
| Step 5: Review the known issues .....                                      | 6  |
| Configure Citrix Hypervisor 8.2 for FCP and iSCSI with ONTAP storage ..... | 6  |
| Step 1: Optionally, enable SAN booting .....                               | 6  |
| Step 2: Confirm the multipath configuration for your host .....            | 7  |
| Step 3: Optionally, exclude a device from multipathing .....               | 10 |
| Step 4: Customize multipath parameters for ONTAP LUNs .....                | 10 |
| Step 5: Review the known issues .....                                      | 11 |

# Citrix

## Configure Citrix Xenserver 8.4 for FCP and iSCSI with ONTAP storage

Configure Citrix Xenserver 8.4 for multipathing and with specific parameters and settings for FCP and iSCSI protocol operations with ONTAP storage.



The Linux Host Utilities software package doesn't support Citrix Xenserver operating systems.

### Step 1: Optionally, enable SAN booting

You can configure your host to use SAN booting to simplify deployment and improve scalability.

#### Before you begin

Use the [Interoperability Matrix Tool](#) to verify that your Linux OS, host bus adapter (HBA), HBA firmware, HBA boot BIOS, and ONTAP version support SAN booting.

#### Steps

1. [Create a SAN boot LUN and map it to the host.](#)
2. Enable SAN booting in the server BIOS for the ports to which the SAN boot LUN is mapped.

For information on how to enable the HBA BIOS, see your vendor-specific documentation.

3. Verify that the configuration was successful by rebooting the host and verifying that the OS is up and running.

### Step 2: Confirm the multipath configuration for your host

You can use multipathing with Citrix Xenserver 8.4 to manage ONTAP LUNs.

To ensure that multipathing is configured correctly for your host, verify that the `/etc/multipath.conf` file is defined and that you have the NetApp recommended settings configured for your ONTAP LUNs.

#### Steps

1. Verify that the `/etc/multipath.conf` file exists. If the file doesn't exist, create an empty, zero-byte file:

```
touch /etc/multipath.conf
```

2. The first time the `multipath.conf` file is created, you might need to enable and start the multipath services to load the recommended settings:

```
systemctl enable multipathd
```

```
systemctl start multipathd
```

3. Each time you boot the host, the empty /etc/multipath.conf zero-byte file automatically loads the NetApp recommended host multipath parameters as the default settings. You shouldn't need to make changes to the /etc/multipath.conf file for your host because the host operating system is compiled with the multipath parameters that recognize and manage ONTAP LUNs correctly.

The following table shows the native Linux OS compiled multipath parameter settings for ONTAP LUNs.

#### Show parameter settings

| Parameter                  | Setting                                 |
|----------------------------|---|
| detect_prio                | yes                                     |
| dev_loss_tmo               | "infinity"                              |
| fallback                   | immediate                               |
| fast_io_fail_tmo           | 5                                       |
| features                   | "3 queue_if_no_path pg_init_retries 50" |
| flush_on_last_del          | "yes"                                   |
| hardware_handler           | "0"                                     |
| no_path_retry              | queue                                   |
| path_checker               | "tur"                                   |
| path_grouping_policy       | "group_by_prio"                         |
| path_selector              | "service-time 0"                        |
| polling_interval           | 5                                       |
| prio                       | "ontap"                                 |
| product                    | LUN                                     |
| retain_attached_hw_handler | yes                                     |
| rr_weight                  | "uniform"                               |
| user_friendly_names        | no                                      |
| vendor                     | NETAPP                                  |

4. Verify the parameter settings and path status for your ONTAP LUNs:

```
/sbin/mpathutil list
```

The default multipath parameters support ASA, AFF, and FAS configurations. In these configurations, a single ONTAP LUN shouldn't require more than four paths. Having more than four paths can cause problems during a storage failure.

The following example outputs show the correct parameter settings and path status for ONTAP LUNs in an ASA, AFF, or FAS configuration.

## ASA configuration

An ASA configuration optimizes all paths to a given LUN, keeping them active. This improves performance by serving I/O operations through all paths at the same time.

### Show example

```
/usr/sbin/mpathutil status
show topology
create: 3600a098038315045572b5930646f4b63 dm-1 NETAPP ,LUN C-
Mode
size=9.0G features='4 queue_if_no_path pg_init_retries 50
retain_attached_hw_handle' hwhandler='1 alua' wp=rw
`-- policy='service-time 0' prio=50 status=active
  |- 15:0:0:0  sdb  8:16    active ready running
  |- 15:0:1:0  sdc  8:32    active ready running
  |- 16:0:0:0  sdcf 69:48   active ready running
  `-- 16:0:1:0  sdcg 69:64  active ready running
```

## AFF or FAS configuration

An AFF or FAS configuration should have two groups of paths with higher and lower priorities. Higher priority Active/Optimized paths are served by the controller where the aggregate is located. Lower priority paths are active but non-optimized because they are served by a different controller. Non-optimized paths are only used when optimized paths aren't available.

The following example displays the output for an ONTAP LUN with two Active/Optimized paths and two Active/Non-Optimized paths:

### Show example

```
/usr/sbin/mpathutil status
show topology
create: 3600a098038315045572b5930646f4b63 dm-1 NETAPP ,LUN C-
Mode
size=9.0G features='4 queue_if_no_path pg_init_retries 50
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`-- policy='service-time 0' prio=50 status=active
  |- 16:0:0:0  sdcf 69:48  active ready running
  `-- 16:0:1:0  sdcg 69:64 active ready running
```

## Step 3: Optionally, exclude a device from multipathing

If required, you can exclude a device from multipathing by adding the WWID for the unwanted device to the "blacklist" stanza for the `multipath.conf` file.

### Steps

1. Determine the WWID:

```
/lib/udev/scsi_id -gud /dev/sda
```

"sda" is the local SCSI disk that you want to add to the blacklist.

An example WWID is 360030057024d0730239134810c0cb833.

2. Add the WWID to the "blacklist" stanza:

```
blacklist {  
    wwid    360030057024d0730239134810c0cb833  
    devnode "^(ram|raw|loop|fd|md|dm-|sr|scd|st)[0-9]*"  
    devnode "^(hd[a-z])"  
    devnode "^(cciss.*)"  
}
```

## Step 4: Customize multipath parameters for ONTAP LUNs

If your host is connected to LUNs from other vendors and any of the multipath parameter settings are overridden, you need to correct them by adding stanzas later in the `multipath.conf` file that apply specifically to ONTAP LUNs. If you don't do this, the ONTAP LUNs might not work as expected.

Check your `/etc/multipath.conf` file, especially in the defaults section, for settings that might be overriding the [default settings for multipath parameters](#).

 You shouldn't override the recommended parameter settings for ONTAP LUNs. These settings are required for optimal performance of your host configuration. Contact NetApp support, your OS vendor, or both for more information.

The following example shows how to correct an overridden default. In this example, the `multipath.conf` file defines values for `path_checker` and `no_path_retry` that aren't compatible with ONTAP LUNs, and you can't remove these parameters because ONTAP storage arrays are still attached to the host. Instead, you correct the values for `path_checker` and `no_path_retry` by adding a device stanza to the `multipath.conf` file that applies specifically to the ONTAP LUNs.

## Show example

```
defaults {
    path_checker      readsector0
    no_path_retry     fail
}

devices {
    device {
        vendor          "NETAPP"
        product         "LUN"
        no_path_retry   queue
        path_checker    tur
    }
}
```

## Step 5: Review the known issues

There are no known issues.

# Configure Citrix Hypervisor 8.2 for FCP and iSCSI with ONTAP storage

Configure Citrix Hypervisor 8.2 for multipathing and with specific parameters and settings for FCP and iSCSI protocol operations with ONTAP storage.



The Linux Host Utilities software package doesn't support Citrix Hypervisor operating systems.

## Step 1: Optionally, enable SAN booting

You can configure your host to use SAN booting to simplify deployment and improve scalability.

### Before you begin

Use the [Interoperability Matrix Tool](#) to verify that your Linux OS, host bus adapter (HBA), HBA firmware, HBA boot BIOS, and ONTAP version support SAN booting.

### Steps

1. [Create a SAN boot LUN and map it to the host.](#)
2. Enable SAN booting in the server BIOS for the ports to which the SAN boot LUN is mapped.

For information on how to enable the HBA BIOS, see your vendor-specific documentation.

3. Verify that the configuration was successful by rebooting the host and verifying that the OS is up and running.

## Step 2: Confirm the multipath configuration for your host

You can use multipathing with Citrix Hypervisor 8.2 to manage ONTAP LUNs.

To ensure that multipathing is configured correctly for your host, verify that the `/etc/multipath.conf` file is defined and that you have the NetApp recommended settings configured for your ONTAP LUNs.

### Steps

1. Verify that the `/etc/multipath.conf` file exists. If the file doesn't exist, create an empty, zero-byte file:

```
touch /etc/multipath.conf
```

2. The first time the `multipath.conf` file is created, you might need to enable and start the multipath services to load the recommended settings:

```
systemctl enable multipathd
```

```
systemctl start multipathd
```

3. Each time you boot the host, the empty `/etc/multipath.conf` zero-byte file automatically loads the NetApp recommended host multipath parameters as the default settings. You shouldn't need to make changes to the `/etc/multipath.conf` file for your host because the host operating system is compiled with the multipath parameters that recognize and manage ONTAP LUNs correctly.

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| flush_on_last_del          | "yes"                                   |
| hardware_handler           | "0"                                     |
| no_path_retry              | queue                                   |
| path_checker               | "tur"                                   |
| path_grouping_policy       | "group_by_prio"                         |
| path_selector              | "service-time 0"                        |
| polling_interval           | 5                                       |
| prio                       | "ontap"                                 |
| product                    | LUN                                     |
| retain_attached_hw_handler | yes                                     |
| rr_weight                  | "uniform"                               |
| user_friendly_names        | no                                      |
| vendor                     | NETAPP                                  |

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    devnode "^\hd[a-z]"  
    devnode "^\cciss.*"  
}
```

## Step 4: Customize multipath parameters for ONTAP LUNs

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```
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    path_checker      readsector0
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}

devices {
    device {
        vendor          "NETAPP"
        product         "LUN"
        no_path_retry   queue
        path_checker    tur
    }
}
```

## Step 5: Review the known issues

There are no known issues.

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