Install or upgrade

ONTAP 9

NetApp
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Table of Contents

Install or upgrade

Prepare to install or upgrade the ONTAP Mediator service

To install the ONTAP Mediator service, you must ensure all prerequisites are met, get the installation package and run the installer on the host. This procedure is used for an installation or an upgrade of an existing installation.

- Beginning with ONTAP 9.7, you can use any version of ONTAP Mediator to monitor a MetroCluster IP configuration.
- Beginning with ONTAP 9.8, you can use any version of ONTAP Mediator to monitor an SM-BC relationship.

Before you begin

You must meet the following prerequisites.

ONTAP Mediator version	Supported Linux versions
1.6	• Red Hat Enterprise Linux: 8.4, 8.5, 8.6, 8.7, 9.0, 9.1 • Rocky Linux 8 and 9
1.5	• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3, 8.4, 8.5 • CentOS: 7.6, 7.7, 7.8, 7.9
1.4	• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3, 8.4, 8.5 • CentOS: 7.6, 7.7, 7.8, 7.9
1.3	• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3 • CentOS: 7.6, 7.7, 7.8, 7.9
1.2	• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 8.1 • CentOS: 7.6, 7.7, 7.8

The kernel version must match the operating system version.

- 64-bit physical installation or virtual machine
- 8 GB RAM
- User: Root access

Any library packages except the kernel can safely be updated but might require a reboot to take affect within the ONTAP Mediator application. A service window is recommended when a reboot is required.

If you install the `yum-utils` package, you can use the `needs-restarting` command.

The kernel core can be updated if it is being updated to a version that is still supported by the ONTAP Mediator version matrix. A reboot will be mandatory, so a service window is required.

The SCST kernel module must be uninstalled prior to the reboot, then re-installed after the reboot.

Upgrading to a kernel beyond the supported OS release for the specific ONTAP Mediator release is not support. (This likely indicates that the tested SCST module won't compile).

Upgrade the host operating system and then the ONTAP Mediator

To upgrade the host OS for ONTAP Mediator to a later version, you must first uninstall ONTAP Mediator.

Before you begin

The best practices for installing Red Hat Enterprise Linux or CentOS and the associated repositories on your system are listed below. Systems installed or configured differently might require additional steps.

- You must install Red Hat Enterprise Linux or CentOS according to Red Hat best practices. Due to end-of-life support for CentOS 8.x versions, compatible versions of CentOS 8.x are not recommended.
- While installing the ONTAP Mediator service on Red Hat Enterprise Linux or CentOS, the system must have access to the appropriate repository so that the installation program can access and install all the required software dependencies.
- For the yum installer to find dependent software in the Red Hat Enterprise Linux repositories, you must have registered the system during the Red Hat Enterprise Linux installation or afterwards by using a valid Red Hat subscription.

  See the Red Hat documentation for information about the Red Hat Subscription Manager.

- The following ports must be unused and available for the Mediator:
  - 31784
  - 3260
- If using a third-party firewall: refer to Firewall requirements for ONTAP Mediator
- If the Linux host is in a location without access to the internet, you must ensure that the required packages are available in a local repository.

  If you are using Link Aggregation Control Protocol (LACP) in a Linux environment, you must correctly configure the kernel and make sure the `sysctl net.ipv4.conf.all.arp_ignore` is set to "2".

What you'll need

The following packages are required by the ONTAP Mediator service:

All RHEL/CentOS versions	Additional packages for RHEL 8.x / Rocky Linux 8	Additional packages for RHEL 9.x / Rocky Linux 9

• openssl • openssl-devel • kernel-devel-$ (uname -r) • gcc • make • libselinux-utils • patch • bzip2 • perl-Data-Dumper • perl-ExtUtils-MakeMaker • efibootmgr • mokutil	• python3-pip • elfutils-libelf-devel • policycoreutils-python-utils • redhat-lsb-core • python39 • python39-devel	• python3-pip • elfutils-libelf-devel • policycoreutils-python-utils • python3 • python3-devel

The Mediator installation package is a self-extracting compressed tar file that includes:

- An RPM file containing all dependencies that cannot be obtained from the supported release's repository.
- An install script.

A valid SSL certification is recommended.

About this task

When you upgrade the host OS for ONTAP Mediator to a later major version (for example, from 7.x to 8.x) using the leapp-upgrade tool, you must uninstall ONTAP Mediator because the tool tries to detect new versions of any RPMs that are installed in the repositories that are registered with the system.

Because an .rpm file was installed as part of the ONTAP Mediator installer, it is included in that search. However, because that .rpm file was unpacked as part of the installer and not downloaded from a registered repository, an upgrade cannot be found. In this case, the leapp-upgrade tool uninstalls the package.

In order to preserve the log files, which will be used to triage support cases, you should back up the files prior to doing an OS upgrade and restore them after a reinstall of the ONTAP Mediator package. Because the ONTAP Mediator is being reinstalled, any ONTAP Clusters that are connected to it will need to be reconnected after the new installation.

The following steps should be performed in order. Immediately after you reinstall ONTAP Mediator, you should stop the ontap_mediator service, replace the log files, and restart the service. This will ensure logs will not be lost.

Steps

1. Back up the log files.

```
[rootmediator-host ~]# tar -czf ontap_mediator_file_backup.tgz -C
/opt/netapp/lib/ontap_mediator ./log
./ontap_mediator/server_config/ontap_mediator.user_config.yaml
[rootmediator-host ~]# tar -tf ontap_mediator_file_backup.tgz
./log/
./log/ontap_mediator.log
./log/scstadmin.log
./log/ontap_mediator_stdout.log
./log/ontap_mediator_requests.log
./log/install_20230419134611.log
./log/scst.log
./log/ontap_mediator_syslog.log
./ontap_mediator/server_config/ontap_mediator.user_config.yaml
[rootmediator-host ~]#
```

2. Perform upgrade with leapp-upgrade tool.

```
[rootmediator-host ~]# leapp preupgrade --target 8.4
  ..<snip upgrade checks>..
  ..<fix issues found>..
[rootmediator-host ~]# leapp upgrade --target 8.4
  ..<snip upgrade>..
[rootmediator-host ~]# cat /etc/os-release | head -2
NAME="Red Hat Enterprise Linux"
VERSION="8.4 (Ootpa)"
[rootmediator-host ~]#
```

3. Reinstall ONTAP Mediator.

> Perform the rest of the steps immediately after reinstalling ONTAP Mediator to prevent a loss of log files.

```
[rootmediator-host ~]# ontap-mediator-1.6.0/ontap-mediator-1.6.0

ONTAP Mediator: Self Extracting Installer

  ..<snip installation>..
[rootmediator-host ~]#
```

4. Stop the ontap_mediator service.

```
[rootmediator-host ~]# systemctl stop ontap_mediator
[rootmediator-host ~]#
```

5. Replace the log files.

```
[rootmediator-host ~]# tar -xf ontap_mediator_log_backup.tgz -C
/opt/netapp/lib/ontap_mediator
[rootmediator-host ~]#
```

6. Start the ontap_mediator service.

```
[rootmediator-host ~]# systemctl start ontap_mediator
[rootmediator-host ~]#
```

7. Reconnect all ONTAP clusters to the upgraded ONTAP Mediator

Procedure for MetroCluster over IP

```
siteA::> metrocluster configuration-settings mediator show
Mediator IP     Port    Node                    Configuration
Connection
                                                Status        Status
--------------- ------- ---------------------- -------------
-----------
172.31.40.122
                31784   siteA-node2             true          false
                        siteA-node1             true          false
                        siteB-node2             true          false
                        siteB-node2             true          false
siteA::> metrocluster configuration-settings mediator remove
Removing the mediator and disabling Automatic Unplanned Switchover.
It may take a few minutes to complete.
Please enter the username for the mediator: mediatoradmin
Please enter the password for the mediator:
Confirm the mediator password:
Automatic Unplanned Switchover is disabled for all nodes...
Removing mediator mailboxes...
Successfully removed the mediator.

siteA::> metrocluster configuration-settings mediator add -mediator
-address 172.31.40.122
Adding the mediator and enabling Automatic Unplanned Switchover. It
may take a few minutes to complete.
Please enter the username for the mediator: mediatoradmin
Please enter the password for the mediator:
Confirm the mediator password:
Successfully added the mediator.

siteA::> metrocluster configuration-settings mediator show
Mediator IP     Port    Node                    Configuration
Connection
                                                Status        Status
--------------- ------- ---------------------- -------------
-----------
172.31.40.122
                31784   siteA-node2             true          true
                        siteA-node1             true          true
                        siteB-node2             true          true
                        siteB-node2             true          true
siteA::>
```

Procedure for SnapMirror Business Continuity

For SnapMirror Business Continuity, if you installed your TLS certificate outside of the /opt/netapp directory, then you will not need to reinstall it. If you were using the default generated self-signed certificate or put your custom certificate in the /opt/netapp directory, then you should back it up and restore it.

```
peer1::> snapmirror mediator show
Mediator Address Peer Cluster     Connection Status Quorum Status
---------------- ---------------- ----------------- -------------
172.31.49.237    peer2            unreachable       true

peer1::> snapmirror mediator remove -mediator-address 172.31.49.237
-peer-cluster peer2

Info: [Job 39] 'mediator remove' job queued

peer1::> job show -id 39
                            Owning
Job ID Name                 Vserver    Node           State
------ -------------------- ---------- -------------- ----------
39     mediator remove      peer1      peer1-node1    Success
     Description: Removing entry in mediator

peer1::> security certificate show -common-name ONTAPMediatorCA
Vserver    Serial Number   Certificate Name
Type
---------- --------------- ------------------------------------
------------
peer1
        4A790360081F41145E14C5D7CE721DC6C210007F
                        ONTAPMediatorCA
server-ca
    Certificate Authority: ONTAP Mediator CA
        Expiration Date: Mon Apr 17 10:27:54 2073

peer1::> security certificate delete -common-name ONTAPMediatorCA *
1 entry was deleted.

 peer1::> security certificate install -type server-ca -vserver
peer1

Please enter Certificate: Press <Enter> when done
  ..<snip ONTAP Mediator CA public key>..

You should keep a copy of the CA-signed digital certificate for
future reference.
```

```
The installed certificate's CA and serial number for reference:
CA: ONTAP Mediator CA
serial: 44786524464C5113D5EC966779D3002135EA4254

The certificate's generated name for reference: ONTAPMediatorCA

peer2::> security certificate delete -common-name ONTAPMediatorCA *
1 entry was deleted.

peer2::> security certificate install -type server-ca -vserver peer2

 Please enter Certificate: Press <Enter> when done
..<snip ONTAP Mediator CA public key>..


You should keep a copy of the CA-signed digital certificate for
future reference.

The installed certificate's CA and serial number for reference:
CA: ONTAP Mediator CA
serial: 44786524464C5113D5EC966779D3002135EA4254

The certificate's generated name for reference: ONTAPMediatorCA

peer1::> snapmirror mediator add -mediator-address 172.31.49.237
-peer-cluster peer2 -username mediatoradmin

Notice: Enter the mediator password.

Enter the password:
Enter the password again:

Info: [Job: 43] 'mediator add' job queued

peer1::> job show -id 43
                            Owning
Job ID Name                 Vserver    Node           State
------ -------------------- ---------- -------------- ----------
43     mediator add         peer1      peer1-node2    Success
    Description: Creating a mediator entry

peer1::> snapmirror mediator show
Mediator Address Peer Cluster     Connection Status Quorum Status
---------------- ---------------- ----------------- -------------
172.31.49.237    peer2            connected         true
```

```
peer1::>
```

Enable access to the repositories

You should enable access to repositories so ONTAP Mediator can access the required packages during the installation process

Steps

1. Determine which repositories must be accessed, as shown in the following table:

If your operating system is…	You must provide access to these repositories…
RHEL 7.x	• rhel-7-server-optional-rpms
RHEL 8.x	• rhel-8-for-x86_64-baseos-rpms • rhel-8-for-x86_64-appstream-rpms
RHEL 9.x	• rhel-9-for-x86_64-baseos-rpms • rhel-9-for-x86_64-appstream-rpms
CentOS 7.x	• C7.6.1810 - Base repository
Rocky Linux 8	• appstream • baseos
Rocky Linux 9	• appstream • baseos

2. Use one of the following procedures to enable access to the repositories listed above so ONTAP Mediator can access the required packages during the installation process.

Procedure for RHEL 7.x operating system

Use this procedure if your operating system is **RHEL 7.x** to enable access to repositories:

Steps

1. Subscribe to the required repository:

   ```
   subscription-manager repos --enable rhel-7-server-optional-rpms
   ```

   The following example shows the execution of this command:

   ```
   [root@localhost ~]# subscription-manager repos --enable rhel-7-
   server-optional-rpms
   Repository 'rhel-7-server-optional-rpms' is enabled for this system.
   ```

2. Run the `yum repolist` command.

   The following example shows the execution of this command. The "rhel-7-server-optional-rpms" repository should appear in the list.

   ```
   [root@localhost ~]# yum repolist
   Loaded plugins: product-id, search-disabled-repos, subscription-
   manager
   rhel-7-server-optional-rpms | 3.2 kB  00:00:00
   rhel-7-server-rpms | 3.5 kB  00:00:00
   (1/3): rhel-7-server-optional-rpms/7Server/x86_64/group
   |  26 kB  00:00:00
   (2/3): rhel-7-server-optional-rpms/7Server/x86_64/updateinfo
   | 2.5 MB  00:00:00
   (3/3): rhel-7-server-optional-rpms/7Server/x86_64/primary_db
   | 8.3 MB  00:00:01
   repo id                                    repo name
   status
   rhel-7-server-optional-rpms/7Server/x86_64   Red Hat Enterprise
   Linux 7 Server - Optional (RPMs)   19,447
   rhel-7-server-rpms/7Server/x86_64            Red Hat Enterprise
   Linux 7 Server (RPMs)              26,758
   repolist: 46,205
   [root@localhost ~]#
   ```

Procedure for RHEL 8.x operating system

Use this procedure if your operating system is **RHEL 8.x** to enable access to repositories:

Steps

1. Subscribe to the required repository:

   ```
   subscription-manager repos --enable rhel-8-for-x86_64-baseos-rpms

   subscription-manager repos --enable rhel-8-for-x86_64-appstream-rpms
   ```

   The following example shows the execution of this command:

   ```
   [root@localhost ~]# subscription-manager repos --enable rhel-8-for-
   x86_64-baseos-rpms
   Repository 'rhel-8-for-x86_64-baseos-rpms' is enabled for this
   system.
   [root@localhost ~]# subscription-manager repos --enable rhel-8-for-
   x86_64-appstream-rpms
   Repository 'rhel-8-for-x86_64-appstream-rpms' is enabled for this
   system.
   ```

2. Run the `yum repolist` command.

   The newly subscribed repositories should appear in the list.

Procedure for RHEL 9.x operating system

Use this procedure if your operating system is **RHEL 9.x** to enable access to repositories:

Steps

1. Subscribe to the required repository:

   ```
   subscription-manager repos --enable rhel-9-for-x86_64-baseos-rpms

   subscription-manager repos --enable rhel-9-for-x86_64-appstream-rpms
   ```

   The following example shows the execution of this command:

   ```
   [root@localhost ~]# subscription-manager repos --enable rhel-9-for-
   x86_64-baseos-rpms
   Repository 'rhel-9-for-x86_64-baseos-rpms' is enabled for this
   system.
   [root@localhost ~]# subscription-manager repos --enable rhel-9-for-
   x86_64-appstream-rpms
   Repository 'rhel-9-for-x86_64-appstream-rpms' is enabled for this
   system.
   ```

2. Run the `yum repolist` command.

   The newly subscribed repositories should appear in the list.

Procedure for CentOS 7.x operating system

Use this procedure if your operating system is **CentOS 7.x** to enable access to repositories:

> The following examples are showing a repository for CentOS 7.6 and might not work for other CentOS versions. Use the base repository for your version of CentOS.

Steps

1. Add the C7.6.1810 - Base repository. The C7.6.1810 - Base vault repository contains the "kernel-devel" package needed for ONTAP Mediator.
2. Add the following lines to /etc/yum.repos.d/CentOS-Vault.repo.

```
[C7.6.1810-base]
name=CentOS-7.6.1810 - Base
baseurl=http://vault.centos.org/7.6.1810/os/$basearch/
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
enabled=1
```

3. Run the `yum repolist` command.

   The following example shows the execution of this command. The CentOS-7.6.1810 - Base repository should appear in the list.

```
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: distro.ibiblio.org
 * extras: distro.ibiblio.org
 * updates: ewr.edge.kernel.org
C7.6.1810-base                                | 3.6 kB  00:00:00
(1/2): C7.6.1810-base/x86_64/group_gz         | 166 kB  00:00:00
(2/2): C7.6.1810-base/x86_64/primary_db       | 6.0 MB  00:00:04
repo id                    repo name                status
C7.6.1810-base/x86_64      CentOS-7.6.1810 - Base   10,019
base/7/x86_64              CentOS-7 - Base          10,097
extras/7/x86_64            CentOS-7 - Extras        307
updates/7/x86_64           CentOS-7 - Updates       1,010
repolist: 21,433
[root@localhost ~]#
```

Procedure for Rocky Linux 8 or 9 operating systems

Use this procedure if your operating system is **Rocky Linux 8** or **Rocky Linux 9** to enable access to repositories:

Steps

1. Subscribe to the required repositories:

   ```
   dnf config-manager --set-enabled baseos

   dnf config-manager --set-enabled appstream
   ```

2. Perform a `clean` operation:

   ```
   dnf clean all
   ```

3. Verify the list of repositories:

   ```
   dnf repolist
   ```

Example for Rocky Linux 8

```
[root@localhost ~]# dnf config-manager --set-enabled baseos
[root@localhost ~]# dnf config-manager --set-enabled appstream
[root@localhost ~]# dnf clean all
[root@localhost ~]# dnf repolist
repo id                         repo name
appstream                       Rocky Linux 8 - AppStream
baseos                          Rocky Linux 8 - BaseOS
[root@localhost ~]#
```

Example for Rocky Linux 9

```
[root@localhost ~]# dnf config-manager --set-enabled baseos
[root@localhost ~]# dnf config-manager --set-enabled appstream
[root@localhost ~]# dnf clean all
[root@localhost ~]# dnf repolist
repo id                         repo name
appstream                       Rocky Linux 9 - AppStream
baseos                          Rocky Linux 9 - BaseOS
[root@localhost ~]#
```

Download the Mediator installation package

Download the Mediator installation package as part of the installation process.

Steps

1. Download the Mediator installation package from the ONTAP Mediator page.

   ONTAP Mediator download page

2. Confirm that the Mediator installation package is in the current working directory:

   `ls`

   ```
   [root@mediator-host ~]#ls
   ontap-mediator-1.5.0.tgz
   ```

   For ONTAP Mediator versions 1.4 and earlier, the installer is named `ontap-mediator`.

   If you are at a location without access to the internet, you must ensure that the installer has access to the required packages.

3. If necessary, move the Mediator installation package from the download directory to the installation directory on the Linux Mediator host.
4. Unzip the installer package:

   `tar xvfz ontap-mediator-1.6.0.tgz`

   ```
   [root@scs000099753 ~]# tar xvfz ontap-mediator-1.6.0.tgz
   ontap-mediator-1.6.0/
   ontap-mediator-1.6.0/ONTAP-Mediator-production.pub
   ontap-mediator-1.6.0/tsa-prod-chain-ONTAP-Mediator.pem
   ontap-mediator-1.6.0/tsa-prod-ONTAP-Mediator.pem
   ontap-mediator-1.6.0/csc-prod-ONTAP-Mediator.pem
   ontap-mediator-1.6.0/csc-prod-chain-ONTAP-Mediator.pem
   ontap-mediator-1.6.0/ontap-mediator-1.6.0
   ontap-mediator-1.6.0/ontap-mediator-1.6.0.sig.tsr
   ontap-mediator-1.6.0/ontap-mediator-1.6.0.tsr
   ontap-mediator-1.6.0/ontap-mediator-1.6.0.sig
   ```

Verify the ONTAP Mediator code signature

You should verify the ONTAP Mediator code signature before installing the Mediator installation package.

Before you begin

Before verifying the Mediator code signature, your system must meet the following requirements.

- openssl versions 1.0.2 to 3.0 for basic verification
- openssl version 1.1.0 or later for Time Stamping Authority (TSA) operations
- Public internet access for OCSP verification

The following files are included in the download package:

File	Description
`ONTAP-Mediator-development.pub`	The public key used to verify the signature
`csc-prod-chain-ONTAP-Mediator.pem`	The public certification CA chain of trust
`csc-prod-ONTAP-Mediator.pem`	The certificate used to generate the key
`ontap-mediator-1.6.0`	The product installation executable for version 1.6.0
`ontap-mediator-1.6.0.sig`	The SHA-256 hashed, then RSA-signed using the csc-prod key, signature for the installer
`ontap-mediator-1.6.0.sig.tsr`	The revocation request for use by OCSCP for the installer's signature
`tsa-prod-ONTAP-Mediator.pem`	The public certificate for the TSR
`tsa-prod-chain-ONTAP-Mediator.pem`	The public certificate CA Chain for the TSR

Steps

1. Perform the revocation check on `csc-prod-ONTAP-Mediator.pem` by using Online Certificate Status Protocol (OCSP).
   a. Find the OCSP URL used to register the certificate because developer certificates might not provide a uri.

```
openssl x509 -noout -ocsp_uri -in csc-prod-chain-ONTAP-Mediator.pem
```

   b. Generate an OCSP request for the certificate.

```
openssl ocsp -issuer csc-prod-chain-ONTAP-Mediator.pem -CAfile csc-
prod-chain-ONTAP-Mediator.pem -cert csc-prod-ONTAP-Mediator.pem
-reqout req.der
```

   c. Connect to the OCSP Manager to send the OCSP request:

```
openssl ocsp -issuer csc-prod-chain-ONTAP-Mediator.pem -CAfile csc-
prod-chain-ONTAP-Mediator.pem -cert csc-prod-ONTAP-Mediator.pem  -url
${ocsp_uri} -resp_text -respout resp.der
```

2. Verify the trust chain of the CSC and expiration dates against the local host:

`openssl verify`

> The `openssl` version from the PATH must have a valid `cert.pem` (not self-signed).

```
openssl verify -untrusted csc-prod-chain-ONTAP-Mediator.pem -CApath
${OPENSSLDIR} csc-prod-ONTAP-Mediator.pem  # Failure action: The Code-
Signature-Check certificate has expired or is invalid. Download a newer
version of the ONTAP Mediator.
openssl verify -untrusted tsa-prod-chain-ONTAP-Mediator.pem -CApath
${OPENSSLDIR} tsa-prod-ONTAP-Mediator.pem  # Failure action: The Time-
Stamp certificate has expired or is invalid. Download a newer version of
the ONTAP Mediator.
```

3. Verify the `ontap-mediator-1.5.0.sig.tsr` and `ontap-mediator-1.6.0.tsr` files using the associated certificates:

`openssl ts -verify`

> `.tsr` files contain the time stamp response associated with the installer and the code signature. Processing confirms that the time stamp has a valid signature from TSA and that your input file has not changed. The verification is performed locally on your machine. Independently, there is no need to access TSA servers.

```
openssl ts -verify -data ontap-mediator-1.6.0.sig -in ontap-mediator-
1.6.0.sig.tsr -CAfile tsa-prod-chain-ONTAP-Mediator.pem -untrusted tsa-
prod-ONTAP-Mediator.pem
openssl ts -verify -data ontap-mediator-1.6.0 -in ontap-mediator-
1.6.0.tsr -CAfile tsa-prod-chain-ONTAP-Mediator.pem -untrusted tsa-prod-
ONTAP-Mediator.pem
```

4. Verify signatures against the key:

`openssl -dgst -verify`

```
openssl dgst -sha256 -verify ONTAP-Mediator-production.pub -signature
ontap-mediator-1.6.0.sig ontap-mediator-1.6.0
```

Example of Verifying the ONTAP Mediator code signature (console output)

```
[root@scspa2695423001 ontap-mediator-1.6.0]# pwd
/root/ontap-mediator-1.6.0
[root@scspa2695423001 ontap-mediator-1.6.0]# ls -l
total 63660
-r--r--r-- 1 root root     8582 Feb 19 15:02 csc-prod-chain-ONTAP-
Mediator.pem
-r--r--r-- 1 root root     2373 Feb 19 15:02 csc-prod-ONTAP-
Mediator.pem
-r-xr-xr-- 1 root root 65132818 Feb 20 15:17 ontap-mediator-1.6.0
-rw-r--r-- 1 root root      384 Feb 20 15:17 ontap-mediator-1.6.0.sig
-rw-r--r-- 1 root root     5437 Feb 20 15:17 ontap-mediator-
1.6.0.sig.tsr
-rw-r--r-- 1 root root     5436 Feb 20 15:17 ontap-mediator-1.6.0.tsr
-r--r--r-- 1 root root      625 Feb 19 15:02 ONTAP-Mediator-
production.pub
-r--r--r-- 1 root root     3323 Feb 19 15:02 tsa-prod-chain-ONTAP-
Mediator.pem
-r--r--r-- 1 root root     1740 Feb 19 15:02 tsa-prod-ONTAP-
Mediator.pem
[root@scspa2695423001 ontap-mediator-1.6.0]#
[root@scspa2695423001 ontap-mediator-1.6.0]#
/root/verify_ontap_mediator_signatures.sh
++ openssl version -d
++ cut -d '"' -f2
+ OPENSSLDIR=/etc/pki/tls
+ openssl version
OpenSSL 1.1.1k  FIPS 25 Mar 2021
++ openssl x509 -noout -ocsp_uri -in csc-prod-chain-ONTAP-Mediator.pem
+ ocsp_uri=http://ocsp.entrust.net
+ echo http://ocsp.entrust.net
http://ocsp.entrust.net
+ openssl ocsp -issuer csc-prod-chain-ONTAP-Mediator.pem -CAfile csc-
prod-chain-ONTAP-Mediator.pem -cert csc-prod-ONTAP-Mediator.pem -reqout
req.der
+ openssl ocsp -issuer csc-prod-chain-ONTAP-Mediator.pem -CAfile csc-
prod-chain-ONTAP-Mediator.pem -cert csc-prod-ONTAP-Mediator.pem -url
http://ocsp.entrust.net -resp_text -respout resp.der
OCSP Response Data:
    OCSP Response Status: successful (0x0)
    Response Type: Basic OCSP Response
    Version: 1 (0x0)
    Responder Id: C = US, O = "Entrust, Inc.", CN = Entrust Extended
Validation Code Signing CA - EVCS2
    Produced At: Feb 28 05:01:00 2023 GMT
```

```
    Responses:
    Certificate ID:
      Hash Algorithm: sha1
      Issuer Name Hash: 69FA640329AB84E27220FE0927647B8194B91F2A
      Issuer Key Hash: CE894F8251AA15A28462CA312361D261FBF8FE78
      Serial Number: 511A542B57522AEB7295A640DC6200E5
    Cert Status: good
    This Update: Feb 28 05:00:00 2023 GMT
    Next Update: Mar  4 04:59:59 2023 GMT

    Signature Algorithm: sha512WithRSAEncryption
         3c:1d:49:b0:93:62:37:3e:c7:38:e3:9f:9f:62:82:73:ed:f4:
         ea:00:6b:f1:01:cd:79:57:92:f1:9d:5d:85:9b:60:59:f8:6c:
         e6:f4:50:51:f3:4c:8a:51:dd:50:68:16:8f:20:24:7e:39:b0:
         44:94:8d:b0:61:da:b9:08:36:74:2d:44:55:62:fb:92:be:4a:
         e7:6c:8c:49:dd:0c:fd:d8:ce:20:08:0d:0f:5a:29:a3:19:03:
         9f:d3:df:41:f4:89:0f:73:18:3f:ac:bb:a7:a3:96:7d:c5:70:
         4c:57:cd:17:17:c6:8a:60:d1:37:c9:2d:81:07:2a:d7:a6:02:
         ee:ce:88:16:22:db:e3:43:64:1e:9b:0d:4d:31:66:fa:ab:a5:
         52:99:94:4a:4a:d0:52:c5:34:f5:18:c7:15:5b:ce:74:c2:fc:
         61:ea:55:aa:f1:2f:82:a3:6a:95:8d:7e:2b:38:49:4f:bf:b1:
         68:7b:1b:24:8b:1f:4d:c5:77:f0:71:af:9c:34:c8:7a:82:50:
         09:a2:19:6e:c6:30:4f:da:a2:79:08:f9:d0:ff:85:d9:2a:84:
         cf:0c:aa:75:8f:72:c9:a7:a2:83:e8:8b:cf:ed:0c:69:75:b6:
         2a:7b:6b:58:99:01:d8:34:ad:e1:89:25:27:1b:fa:d9:6d:32:
         97:3a:0b:0a:8e:a3:9e:e3:f4:e0:d6:1a:c9:b5:14:8c:3e:54:
         3b:37:17:1a:93:44:84:8b:4a:87:97:1e:76:43:3e:d3:ec:8b:
         7e:56:4a:3f:01:31:c0:e5:58:fb:50:ce:6f:b1:e7:35:f9:b7:
         a3:ef:6b:3b:21:95:37:a6:5b:8f:f0:15:18:36:65:89:a1:9c:
         9b:69:00:b4:b1:65:6a:bc:11:2d:d4:9b:b4:97:cc:cb:7a:0c:
         16:11:c1:75:58:7e:13:ab:56:3c:3f:93:5b:95:24:c6:54:52:
         1f:86:a9:16:ce:d9:ea:8b:3a:f3:4f:c4:8f:ad:de:e8:3e:3c:
         d2:51:51:ad:33:7f:d8:c5:33:24:26:f1:2d:9d:0e:9f:55:d0:
         68:bf:af:bd:68:4a:40:08:bc:92:a0:62:54:7d:16:7b:36:29:
         15:b1:cd:58:8e:fb:4a:f2:3e:94:8b:fe:56:95:cc:24:32:af:
         5f:71:99:18:ed:0c:64:94:f7:54:48:87:48:d0:6d:b3:42:04:
         96:03:73:a2:8e:8a:6a:b2:af:ee:56:19:a1:c6:35:12:59:ad:
         19:6a:fe:e0:f1:27:cc:96:4e:f0:4f:fb:6a:bd:ce:05:2c:aa:
         79:7c:df:02:5c:ca:53:7d:60:12:88:7c:ce:15:c7:d4:02:27:
         c1:ab:cf:71:30:1e:14:ba
WARNING: no nonce in response
Response verify OK
csc-prod-ONTAP-Mediator.pem: good
        This Update: Feb 28 05:00:00 2023 GMT
        Next Update: Mar  4 04:59:59 2023 GMT
+ openssl verify -untrusted csc-prod-chain-ONTAP-Mediator.pem -CApath
```

```
/etc/pki/tls csc-prod-ONTAP-Mediator.pem
csc-prod-ONTAP-Mediator.pem: OK
+ openssl verify -untrusted tsa-prod-chain-ONTAP-Mediator.pem -CApath
/etc/pki/tls tsa-prod-ONTAP-Mediator.pem
tsa-prod-ONTAP-Mediator.pem: OK
+ openssl ts -verify -data ontap-mediator-1.6.0.sig -in ontap-mediator-
1.6.0.sig.tsr -CAfile tsa-prod-chain-ONTAP-Mediator.pem -untrusted tsa-
prod-ONTAP-Mediator.pem
Using configuration from /etc/pki/tls/openssl.cnf
Verification: OK
+ openssl ts -verify -data ontap-mediator-1.6.0 -in ontap-mediator-
1.6.0.tsr -CAfile tsa-prod-chain-ONTAP-Mediator.pem -untrusted tsa-
prod-ONTAP-Mediator.pem
Using configuration from /etc/pki/tls/openssl.cnf
Verification: OK
+ openssl dgst -sha256 -verify ONTAP-Mediator-production.pub -signature
ontap-mediator-1.6.0.sig ontap-mediator-1.6.0
Verified OK
[root@scspa2695423001 ontap-mediator-1.6.0]#
```

Install the ONTAP Mediator installation package

To install the ONTAP Mediator service, you must get the installation package and run the installer on the host.

About this task

- Beginning with ONTAP Mediator 1.4, the Secure Boot mechanism is enabled on UEFI systems. When Secure Boot is enabled, you must take additional steps to register the security key after installation:
  - Follow instructions in the README file to sign the SCST kernel module.:

    ```
    /opt/netapp/lib/ontap_mediator/ontap_mediator/SCST_mod_keys/README.module-
    signing
    ```

  - Locate the required keys:

    ```
    /opt/netapp/lib/ontap_mediator/ontap_mediator/SCST_mod_keys
    ```

    After installation, the README files and key location are also provided in the system output.

Steps

1. Run the installer and respond to the prompts as required:

   ```
   ./ontap-mediator-1.6.0/ontap-mediator-1.6.0 -y
   ```

```
[root@scs000099753 ~]# ./ontap-mediator-1.5.0/ontap-mediator-1.6.0 -y
```

The installation process proceeds to create the required accounts and install required packages. If you have a previous version of Mediator installed on the host, you will be prompted to confirm that you want to upgrade.

Example of ONTAP Mediator 1.5 installation (console output)

```
[root@scs000099753 ~]# ./ontap-mediator-1.6.0/ontap-mediator-1.6.0 -y
ONTAP Mediator: Self Extracting Installer


+ Extracting the ONTAP Mediator installation/upgrade archive
+ Performing the ONTAP Mediator run-time code signature check
   Using openssl from the path: /usr/bin/openssl configured for
CApath:/etc/pki/tls

+ Unpacking the ONTAP Mediator installer
ONTAP Mediator requires two user accounts. One for the service
(netapp), and one for use by ONTAP to the mediator API (mediatoradmin).
Using default account names: netapp + mediatoradmin

Enter ONTAP Mediator user account (mediatoradmin) password:

Re-Enter ONTAP Mediator user account (mediatoradmin) password:

+ Checking if SELinux is in enforcing mode


+ Checking for default Linux firewall
success
success
success


##################################################################
Preparing for installation of ONTAP Mediator packages.


+ Installing required packages.


Last metadata expiration check: 0:25:24 ago on Fri 21 Oct 2022 04:00:13
PM EDT.
Package openssl-1:1.1.1k-4.el8.x86_64 is already installed.
Package gcc-8.4.1-1.el8.x86_64 is already installed.
Package python36-3.6.8-2.module+el8.1.0+3334+5cb623d7.x86_64 is already
installed.
Package libselinux-utils-2.9-5.el8.x86_64 is already installed.
Package perl-Data-Dumper-2.167-399.el8.x86_64 is already installed.
Package efibootmgr-16-1.el8.x86_64 is already installed.
Package mokutil-1:0.3.0-11.el8.x86_64 is already installed.
```

```
Package python3-pip-9.0.3-19.el8.noarch is already installed.
Package policycoreutils-python-utils-2.9-14.el8.noarch is already
installed.
Dependencies resolved.
================================================================================
================================================================================
 Package                                    Architecture
Version                                                 Repository
Size
================================================================================
================================================================================
Installing:
 bzip2                                      x86_64
1.0.6-26.el8                                            rhel-8-for-
x86_64-baseos-rpms                          60 k
 elfutils-libelf-devel                      x86_64
0.186-1.el8                                             rhel-8-for-
x86_64-baseos-rpms                          60 k
 kernel-devel                               x86_64
4.18.0-348.el8                                          rhel-8-for-
x86_64-baseos-rpms                          20 M
 make                                       x86_64
1:4.2.1-11.el8                                          rhel-8-for-
x86_64-baseos-rpms                         498 k
 openssl-devel                              x86_64
1:1.1.1k-7.el8_6                                        rhel-8-for-
x86_64-baseos-rpms                         2.3 M
 patch                                      x86_64
2.7.6-11.el8                                            rhel-8-for-
x86_64-baseos-rpms                         138 k
 perl-ExtUtils-MakeMaker                    noarch
1:7.34-1.el8                                            rhel-8-for-
x86_64-appstream-rpms                      301 k
 python36-devel                             x86_64
3.6.8-38.module+el8.5.0+12207+5c5719bc                  rhel-8-for-
x86_64-appstream-rpms                       17 k
 redhat-lsb-core                            x86_64
4.1-47.el8                                              rhel-8-for-
x86_64-appstream-rpms                       45 k
Upgrading:
 cpp                                        x86_64
8.5.0-10.1.el8_6                                        rhel-8-for-
x86_64-appstream-rpms                       10 M
 elfutils-libelf                            x86_64
```

```
0.186-1.el8                                                    rhel-8-for-
x86_64-baseos-rpms                        229 k
 elfutils-libs                                 x86_64
0.186-1.el8                                                    rhel-8-for-
x86_64-baseos-rpms                        295 k
 gcc                                           x86_64
8.5.0-10.1.el8_6                                               rhel-8-for-
x86_64-appstream-rpms                      23 M
 libgcc                                        x86_64
8.5.0-10.1.el8_6                                               rhel-8-for-
x86_64-baseos-rpms                         80 k
 libgomp                                       x86_64
8.5.0-10.1.el8_6                                               rhel-8-for-
x86_64-baseos-rpms                        207 k
 libsemanage                                   x86_64
2.9-8.el8                                                      rhel-8-for-
x86_64-baseos-rpms                        168 k
 mokutil                                       x86_64
1:0.3.0-11.el8_6.1                                             rhel-8-for-
x86_64-baseos-rpms                         46 k
 openssl                                       x86_64
1:1.1.1k-7.el8_6                                               rhel-8-for-
x86_64-baseos-rpms                        709 k
 openssl-libs                                  x86_64
1:1.1.1k-7.el8_6                                               rhel-8-for-
x86_64-baseos-rpms                        1.5 M
 platform-python-pip                           noarch
9.0.3-22.el8                                                   rhel-8-for-
x86_64-baseos-rpms                        1.6 M
 policycoreutils                               x86_64
2.9-19.el8                                                     rhel-8-for-
x86_64-baseos-rpms                        374 k
 policycoreutils-python-utils                  noarch
2.9-19.el8                                                     rhel-8-for-
x86_64-baseos-rpms                        253 k
 python3-libsemanage                           x86_64
2.9-8.el8                                                      rhel-8-for-
x86_64-baseos-rpms                        128 k
 python3-pip                                   noarch
9.0.3-22.el8                                                   rhel-8-for-
x86_64-appstream-rpms                      20 k
 python3-policycoreutils                       noarch
2.9-19.el8                                                     rhel-8-for-
x86_64-baseos-rpms                        2.2 M
 python36                                      x86_64
3.6.8-38.module+el8.5.0+12207+5c5719bc                         rhel-8-for-
```

```
x86_64-appstream-rpms                    19 k
Installing dependencies:
 annobin                                 x86_64
10.29-3.el8                                        rhel-8-for-
x86_64-appstream-rpms                   117 k
 at                                      x86_64
3.1.20-11.el8                                      rhel-8-for-
x86_64-baseos-rpms                       81 k
 bc                                      x86_64
1.07.1-5.el8                                       rhel-8-for-
x86_64-baseos-rpms                      129 k
 cups-client                             x86_64
1:2.2.6-38.el8                                     rhel-8-for-
x86_64-appstream-rpms                   169 k
 dwz                                     x86_64
0.12-10.el8                                        rhel-8-for-
x86_64-appstream-rpms                   109 k
 ed                                      x86_64
1.14.2-4.el8                                       rhel-8-for-
x86_64-baseos-rpms                       82 k
 efi-srpm-macros                         noarch
3-3.el8                                            rhel-8-for-
x86_64-appstream-rpms                    22 k
 esmtp                                   x86_64
1.2-15.el8                                         EPEL-8
57 k
 ghc-srpm-macros                         noarch
1.4.2-7.el8                                        rhel-8-for-
x86_64-appstream-rpms                   9.4 k
 go-srpm-macros                          noarch
2-17.el8                                           rhel-8-for-
x86_64-appstream-rpms                    13 k
 keyutils-libs-devel                     x86_64
1.5.10-6.el8                                       rhel-8-for-
x86_64-baseos-rpms                       48 k
 krb5-devel                              x86_64
1.18.2-14.el8                                      rhel-8-for-
x86_64-baseos-rpms                      560 k
 libcom_err-devel                        x86_64
1.45.6-2.el8                                       rhel-8-for-
x86_64-baseos-rpms                       38 k
 libesmtp                                x86_64
1.0.6-18.el8                                       EPEL-8
70 k
 libkadm5                                x86_64
1.18.2-14.el8                                      rhel-8-for-
```

```
x86_64-baseos-rpms                      187 k
 liblockfile                                    x86_64
1.14-1.el8                                              rhel-8-for-
x86_64-appstream-rpms                    32 k
 libselinux-devel                               x86_64
2.9-5.el8                                               rhel-8-for-
x86_64-baseos-rpms                      200 k
 libsepol-devel                                 x86_64
2.9-3.el8                                               rhel-8-for-
x86_64-baseos-rpms                       87 k
 libverto-devel                                 x86_64
0.3.0-5.el8                                             rhel-8-for-
x86_64-baseos-rpms                       18 k
 m4                                             x86_64
1.4.18-7.el8                                            rhel-8-for-
x86_64-baseos-rpms                      223 k
 mailx                                          x86_64
12.5-29.el8                                             rhel-8-for-
x86_64-baseos-rpms                      257 k
 ncurses-compat-libs                            x86_64
6.1-9.20180224.el8                                      rhel-8-for-
x86_64-baseos-rpms                      328 k
 ocaml-srpm-macros                              noarch
5-4.el8                                                 rhel-8-for-
x86_64-appstream-rpms                   9.5 k
 openblas-srpm-macros                           noarch
2-2.el8                                                 rhel-8-for-
x86_64-appstream-rpms                   8.0 k
 pcre2-devel                                    x86_64
10.32-2.el8                                             rhel-8-for-
x86_64-baseos-rpms                      605 k
 pcre2-utf16                                    x86_64
10.32-2.el8                                             rhel-8-for-
x86_64-baseos-rpms                      229 k
 pcre2-utf32                                    x86_64
10.32-2.el8                                             rhel-8-for-
x86_64-baseos-rpms                      220 k
 perl-CPAN-Meta-YAML                            noarch
0.018-397.el8                                           rhel-8-for-
x86_64-appstream-rpms                    34 k
 perl-ExtUtils-Command                          noarch
1:7.34-1.el8                                            rhel-8-for-
x86_64-appstream-rpms                    19 k
 perl-ExtUtils-Install                          noarch
2.14-4.el8                                              rhel-8-for-
x86_64-appstream-rpms                    46 k
```

```
 perl-ExtUtils-Manifest                          noarch
1.70-395.el8                                             rhel-8-for-
x86_64-appstream-rpms                    37 k
 perl-ExtUtils-ParseXS                           noarch
1:3.35-2.el8                                             rhel-8-for-
x86_64-appstream-rpms                    83 k
 perl-JSON-PP                                    noarch
1:2.97.001-3.el8                                         rhel-8-for-
x86_64-appstream-rpms                    68 k
 perl-Math-BigInt                                noarch
1:1.9998.11-7.el8                                        rhel-8-for-
x86_64-baseos-rpms                      196 k
 perl-Math-Complex                               noarch
1.59-421.el8                                             rhel-8-for-
x86_64-baseos-rpms                      109 k
 perl-Test-Harness                               noarch
1:3.42-1.el8                                             rhel-8-for-
x86_64-appstream-rpms                   279 k
 perl-devel                                      x86_64
4:5.26.3-419.el8_4.1                                     rhel-8-for-
x86_64-appstream-rpms                   599 k
 perl-srpm-macros                                noarch
1-25.el8                                                 rhel-8-for-
x86_64-appstream-rpms                    11 k
 perl-version                                    x86_64
6:0.99.24-1.el8                                          rhel-8-for-
x86_64-appstream-rpms                    67 k
 platform-python-devel                           x86_64
3.6.8-41.el8                                             rhel-8-for-
x86_64-appstream-rpms                   249 k
 python-rpm-macros                               noarch
3-41.el8                                                 rhel-8-for-
x86_64-appstream-rpms                    15 k
 python-srpm-macros                              noarch
3-41.el8                                                 rhel-8-for-
x86_64-appstream-rpms                    15 k
 python3-pyparsing                               noarch
2.1.10-7.el8                                             rhel-8-for-
x86_64-baseos-rpms                      142 k
 python3-rpm-generators                          noarch
5-7.el8                                                  rhel-8-for-
x86_64-appstream-rpms                    25 k
 python3-rpm-macros                              noarch
3-41.el8                                                 rhel-8-for-
x86_64-appstream-rpms                    14 k
 qt5-srpm-macros                                 noarch
```

```
5.15.2-1.el8                                                    rhel-8-for-
x86_64-appstream-rpms                    11 k
 redhat-lsb-submod-security                     x86_64
4.1-47.el8                                                      rhel-8-for-
x86_64-appstream-rpms                    22 k
 redhat-rpm-config                              noarch
125-1.el8                                                       rhel-8-for-
x86_64-appstream-rpms                    87 k
 rust-srpm-macros                               noarch
5-2.el8                                                         rhel-8-for-
x86_64-appstream-rpms                   9.3 k
 spax                                           x86_64
1.5.3-13.el8                                                    rhel-8-for-
x86_64-baseos-rpms                      217 k
 systemtap-sdt-devel                            x86_64
4.6-4.el8                                                       rhel-8-for-
x86_64-appstream-rpms                    86 k
 time                                           x86_64
1.9-3.el8                                                       rhel-8-for-
x86_64-baseos-rpms                       54 k
 unzip                                          x86_64
6.0-46.el8                                                      rhel-8-for-
x86_64-baseos-rpms                      196 k
 util-linux-user                                x86_64
2.32.1-28.el8                                                   rhel-8-for-
x86_64-baseos-rpms                      100 k
 zip                                            x86_64
3.0-23.el8                                                      rhel-8-for-
x86_64-baseos-rpms                      270 k
 zlib-devel                                     x86_64
1.2.11-17.el8                                                   rhel-8-for-
x86_64-baseos-rpms                       58 k
Installing weak dependencies:
 perl-CPAN-Meta                                 noarch
2.150010-396.el8                                                rhel-8-for-
x86_64-appstream-rpms                   191 k
 perl-CPAN-Meta-Requirements                    noarch
2.140-396.el8                                                   rhel-8-for-
x86_64-appstream-rpms                    37 k
 perl-Encode-Locale                             noarch
1.05-10.module+el8.3.0+6498+9eecfe51                            rhel-8-for-
x86_64-appstream-rpms                    22 k
 perl-Time-HiRes                                x86_64
4:1.9758-2.el8                                                  rhel-8-for-
x86_64-appstream-rpms                    61 k
```

```
Transaction Summary
================================================================================
================================================================================
=========================================
Install  69 Packages
Upgrade  17 Packages

Total download size: 72 M
Is this ok [y/N]: y
Downloading Packages:
(1/86): perl-ExtUtils-Install-2.14-4.el8.noarch.rpm
735 kB/s |  46 kB     00:00
(2/86): libesmtp-1.0.6-18.el8.x86_64.rpm
1.0 MB/s |  70 kB     00:00
(3/86): esmtp-1.2-15.el8.x86_64.rpm
747 kB/s |  57 kB     00:00
(4/86): rust-srpm-macros-5-2.el8.noarch.rpm
308 kB/s | 9.3 kB     00:00
(5/86): perl-ExtUtils-Manifest-1.70-395.el8.noarch.rpm
781 kB/s |  37 kB     00:00
(6/86): perl-CPAN-Meta-2.150010-396.el8.noarch.rpm
2.7 MB/s | 191 kB     00:00
(7/86): ocaml-srpm-macros-5-4.el8.noarch.rpm
214 kB/s | 9.5 kB     00:00
(8/86): perl-JSON-PP-2.97.001-3.el8.noarch.rpm
1.2 MB/s |  68 kB     00:00
(9/86): perl-ExtUtils-MakeMaker-7.34-1.el8.noarch.rpm
5.8 MB/s | 301 kB     00:00
(10/86): ghc-srpm-macros-1.4.2-7.el8.noarch.rpm
317 kB/s | 9.4 kB     00:00
(11/86): perl-Test-Harness-3.42-1.el8.noarch.rpm
4.5 MB/s | 279 kB     00:00
(12/86): perl-ExtUtils-Command-7.34-1.el8.noarch.rpm
520 kB/s |  19 kB     00:00

...

15 MB/s | 1.5 MB     00:00
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
----------------------------------------
Total
35 MB/s |  72 MB     00:02
Running transaction check
Transaction check succeeded.
Running transaction test
```

```
Transaction test succeeded.
Running transaction
  Preparing        :
1/1
  Running scriptlet: openssl-libs-1:1.1.1k-7.el8_6.x86_64
1/1
  Upgrading        : openssl-libs-1:1.1.1k-7.el8_6.x86_64
1/103
  Running scriptlet: openssl-libs-1:1.1.1k-7.el8_6.x86_64
1/103
  Upgrading        : libgcc-8.5.0-10.1.el8_6.x86_64
2/103
  Running scriptlet: libgcc-8.5.0-10.1.el8_6.x86_64
2/103
  Upgrading        : elfutils-libelf-0.186-1.el8.x86_64
3/103
  Installing       : perl-version-6:0.99.24-1.el8.x86_64
4/103
  Installing       : perl-CPAN-Meta-Requirements-2.140-396.el8.noarch
5/103
  Upgrading        : libsemanage-2.9-8.el8.x86_64
6/103
  Installing       : zlib-devel-1.2.11-17.el8.x86_64
7/103
  Installing       : python-srpm-macros-3-41.el8.noarch
8/103
  Installing       : python-rpm-macros-3-41.el8.noarch
9/103
  Installing       : python3-rpm-macros-3-41.el8.noarch
10/103
  Installing       : perl-Time-HiRes-4:1.9758-2.el8.x86_64
11/103
  Installing       : perl-ExtUtils-ParseXS-1:3.35-2.el8.noarch
12/103
  Installing       : perl-Test-Harness-1:3.42-1.el8.noarch
13/103
  Upgrading        : python3-libsemanage-2.9-8.el8.x86_64
14/103
  Upgrading        : policycoreutils-2.9-19.el8.x86_64
15/103
  Running scriptlet: policycoreutils-2.9-19.el8.x86_64
15/103
  Upgrading        : python3-policycoreutils-2.9-19.el8.noarch
16/103
  Installing       : dwz-0.12-10.el8.x86_64
17/103
```

```
  Installing       : ncurses-compat-libs-6.1-9.20180224.el8.x86_64
18/103
  Installing       : libesmtp-1.0.6-18.el8.x86_64
19/103
  Installing       : mailx-12.5-29.el8.x86_64
20/103
  Installing       : libkadm5-1.18.2-14.el8.x86_64
21/103
  Upgrading        : libgomp-8.5.0-10.1.el8_6.x86_64
22/103
  Running scriptlet: libgomp-8.5.0-10.1.el8_6.x86_64
22/103
  Upgrading        : platform-python-pip-9.0.3-22.el8.noarch
23/103
  Upgrading        : python3-pip-9.0.3-22.el8.noarch
24/103
  Upgrading        : python36-3.6.8-
38.module+el8.5.0+12207+5c5719bc.x86_64
25/103
  Running scriptlet: python36-3.6.8-
38.module+el8.5.0+12207+5c5719bc.x86_64
25/103
  Upgrading        : cpp-8.5.0-10.1.el8_6.x86_64
26/103
  Running scriptlet: cpp-8.5.0-10.1.el8_6.x86_64
26/103
  Upgrading        : gcc-8.5.0-10.1.el8_6.x86_64
27/103
  Running scriptlet: gcc-8.5.0-10.1.el8_6.x86_64
27/103
  Installing       : annobin-10.29-3.el8.x86_64
28/103
  Installing       : unzip-6.0-46.el8.x86_64
29/103
  Installing       : zip-3.0-23.el8.x86_64
30/103
  Installing       : perl-Math-Complex-1.59-421.el8.noarch
31/103
  Installing       : perl-Math-BigInt-1:1.9998.11-7.el8.noarch
32/103
  Installing       : perl-JSON-PP-1:2.97.001-3.el8.noarch
33/103
  Installing       : make-1:4.2.1-11.el8.x86_64
34/103
  Running scriptlet: make-1:4.2.1-11.el8.x86_64
34/103
```

```
  Installing       : libcom_err-devel-1.45.6-2.el8.x86_64
35/103
  Installing       : util-linux-user-2.32.1-28.el8.x86_64
36/103
  Installing       : libsepol-devel-2.9-3.el8.x86_64
37/103
  Installing       : pcre2-utf32-10.32-2.el8.x86_64
38/103
  Installing       : pcre2-utf16-10.32-2.el8.x86_64
39/103
  Installing       : pcre2-devel-10.32-2.el8.x86_64
40/103
  Installing       : libselinux-devel-2.9-5.el8.x86_64
41/103
  Installing       : patch-2.7.6-11.el8.x86_64
42/103
  Installing       : python3-pyparsing-2.1.10-7.el8.noarch
43/103
  Installing       : systemtap-sdt-devel-4.6-4.el8.x86_64
44/103
  Installing       : spax-1.5.3-13.el8.x86_64
45/103
  Running scriptlet: spax-1.5.3-13.el8.x86_64
45/103
  Installing       : m4-1.4.18-7.el8.x86_64
46/103
  Running scriptlet: m4-1.4.18-7.el8.x86_64
46/103
  Installing       : libverto-devel-0.3.0-5.el8.x86_64
47/103
  Installing       : bc-1.07.1-5.el8.x86_64
48/103
  Running scriptlet: bc-1.07.1-5.el8.x86_64
48/103
  Installing       : at-3.1.20-11.el8.x86_64
49/103
  Running scriptlet: at-3.1.20-11.el8.x86_64
49/103
  Installing       : keyutils-libs-devel-1.5.10-6.el8.x86_64
50/103
  Installing       : krb5-devel-1.18.2-14.el8.x86_64
51/103
  Installing       : time-1.9-3.el8.x86_64
52/103
  Running scriptlet: time-1.9-3.el8.x86_64
52/103
```

```
  Upgrading        : policycoreutils-python-utils-2.9-19.el8.noarch
80/103
  Installing       : elfutils-libelf-devel-0.186-1.el8.x86_64
81/103
  Upgrading        : elfutils-libs-0.186-1.el8.x86_64
82/103
  Upgrading        : mokutil-1:0.3.0-11.el8_6.1.x86_64
83/103
  Upgrading        : openssl-1:1.1.1k-7.el8_6.x86_64
84/103
  Installing       : kernel-devel-4.18.0-348.el8.x86_64
85/103
  Running scriptlet: kernel-devel-4.18.0-348.el8.x86_64

  ...

85/103
  Installing       : bzip2-1.0.6-26.el8.x86_64
86/103
  Cleanup          : policycoreutils-python-utils-2.9-14.el8.noarch
87/103
  Cleanup          : python3-policycoreutils-2.9-14.el8.noarch
88/103
  Cleanup          : python36-3.6.8-
2.module+el8.1.0+3334+5cb623d7.x86_64
89/103
  Running scriptlet: python36-3.6.8-
2.module+el8.1.0+3334+5cb623d7.x86_64
89/103
  Cleanup          : elfutils-libs-0.185-1.el8.x86_64
90/103
  Cleanup          : openssl-1:1.1.1k-4.el8.x86_64
91/103
  Cleanup          : python3-libsemanage-2.9-6.el8.x86_64
92/103
  Running scriptlet: gcc-8.4.1-1.el8.x86_64
93/103
  Cleanup          : gcc-8.4.1-1.el8.x86_64
93/103
  Running scriptlet: policycoreutils-2.9-14.el8.x86_64
94/103
  Cleanup          : policycoreutils-2.9-14.el8.x86_64
94/103
  Cleanup          : mokutil-1:0.3.0-11.el8.x86_64
95/103
```

```
  Cleanup          : python3-pip-9.0.3-19.el8.noarch
96/103
  Cleanup          : platform-python-pip-9.0.3-19.el8.noarch
97/103
  Cleanup          : openssl-libs-1:1.1.1k-4.el8.x86_64
98/103
  Running scriptlet: openssl-libs-1:1.1.1k-4.el8.x86_64
98/103
  Cleanup          : libsemanage-2.9-6.el8.x86_64
99/103
  Running scriptlet: cpp-8.4.1-1.el8.x86_64
100/103
  Cleanup          : cpp-8.4.1-1.el8.x86_64
100/103
  Cleanup          : libgcc-8.5.0-3.el8.x86_64
101/103
  Running scriptlet: libgcc-8.5.0-3.el8.x86_64
101/103
  Running scriptlet: libgomp-8.4.1-1.el8.x86_64
102/103
  Cleanup          : libgomp-8.4.1-1.el8.x86_64
102/103
  Running scriptlet: libgomp-8.4.1-1.el8.x86_64
102/103
  Cleanup          : elfutils-libelf-0.185-1.el8.x86_64
103/103
  Running scriptlet: elfutils-libelf-0.185-1.el8.x86_64
103/103
  Verifying        : esmtp-1.2-15.el8.x86_64
1/103
  Verifying        : libesmtp-1.0.6-18.el8.x86_64

  ...

Upgraded:
  cpp-8.5.0-10.1.el8_6.x86_64                              elfutils-
libelf-0.186-1.el8.x86_64     elfutils-libs-0.186-1.el8.x86_64
gcc-8.5.0-10.1.el8_6.x86_64
  libgcc-8.5.0-10.1.el8_6.x86_64                           libgomp-
8.5.0-10.1.el8_6.x86_64        libsemanage-2.9-8.el8.x86_64
mokutil-1:0.3.0-11.el8_6.1.x86_64
  openssl-1:1.1.1k-7.el8_6.x86_64                          openssl-
libs-1:1.1.1k-7.el8_6.x86_64   platform-python-pip-9.0.3-22.el8.noarch
policycoreutils-2.9-19.el8.x86_64
  policycoreutils-python-utils-2.9-19.el8.noarch           python3-
libsemanage-2.9-8.el8.x86_64   python3-pip-9.0.3-22.el8.noarch
```

```
python3-policycoreutils-2.9-19.el8.noarch
  python36-3.6.8-38.module+el8.5.0+12207+5c5719bc.x86_64
Installed:
  annobin-10.29-3.el8.x86_64                                    at-
3.1.20-11.el8.x86_64                          bc-1.07.1-5.el8.x86_64
  bzip2-1.0.6-26.el8.x86_64
cups-client-1:2.2.6-38.el8.x86_64               dwz-0.12-
10.el8.x86_64
  ed-1.14.2-4.el8.x86_64
efi-srpm-macros-3-3.el8.noarch                  elfutils-libelf-
devel-0.186-1.el8.x86_64
  esmtp-1.2-15.el8.x86_64
ghc-srpm-macros-1.4.2-7.el8.noarch              go-srpm-macros-2-
17.el8.noarch
  kernel-devel-4.18.0-348.el8.x86_64
keyutils-libs-devel-1.5.10-6.el8.x86_64         krb5-devel-1.18.2-
14.el8.x86_64
  libcom_err-devel-1.45.6-2.el8.x86_64
libesmtp-1.0.6-18.el8.x86_64                    libkadm5-1.18.2-
14.el8.x86_64
  liblockfile-1.14-1.el8.x86_64
libselinux-devel-2.9-5.el8.x86_64               libsepol-devel-2.9-
3.el8.x86_64
  libverto-devel-0.3.0-5.el8.x86_64                             m4-
1.4.18-7.el8.x86_64                           mailx-12.5-
29.el8.x86_64
  make-1:4.2.1-11.el8.x86_64
ncurses-compat-libs-6.1-9.20180224.el8.x86_64   ocaml-srpm-macros-
5-4.el8.noarch
  openblas-srpm-macros-2-2.el8.noarch
openssl-devel-1:1.1.1k-7.el8_6.x86_64           patch-2.7.6-
11.el8.x86_64
  pcre2-devel-10.32-2.el8.x86_64
pcre2-utf16-10.32-2.el8.x86_64                  pcre2-utf32-10.32-
2.el8.x86_64
  perl-CPAN-Meta-2.150010-396.el8.noarch
perl-CPAN-Meta-Requirements-2.140-396.el8.noarch    perl-CPAN-Meta-
YAML-0.018-397.el8.noarch
  perl-Encode-Locale-1.05-10.module+el8.3.0+6498+9eecfe51.noarch
perl-ExtUtils-Command-1:7.34-1.el8.noarch       perl-ExtUtils-
Install-2.14-4.el8.noarch
  perl-ExtUtils-MakeMaker-1:7.34-1.el8.noarch
perl-ExtUtils-Manifest-1.70-395.el8.noarch      perl-ExtUtils-
ParseXS-1:3.35-2.el8.noarch
  perl-JSON-PP-1:2.97.001-3.el8.noarch
perl-Math-BigInt-1:1.9998.11-7.el8.noarch       perl-Math-Complex-
```

```
1.59-421.el8.noarch
  perl-Test-Harness-1:3.42-1.el8.noarch
perl-Time-HiRes-4:1.9758-2.el8.x86_64              perl-devel-
4:5.26.3-419.el8_4.1.x86_64
  perl-srpm-macros-1-25.el8.noarch
perl-version-6:0.99.24-1.el8.x86_64                platform-python-
devel-3.6.8-41.el8.x86_64
  python-rpm-macros-3-41.el8.noarch
python-srpm-macros-3-41.el8.noarch                 python3-pyparsing-
2.1.10-7.el8.noarch
  python3-rpm-generators-5-7.el8.noarch
python3-rpm-macros-3-41.el8.noarch                 python36-devel-
3.6.8-38.module+el8.5.0+12207+5c5719bc.x86_64
  qt5-srpm-macros-5.15.2-1.el8.noarch
redhat-lsb-core-4.1-47.el8.x86_64                  redhat-lsb-submod-
security-4.1-47.el8.x86_64
  redhat-rpm-config-125-1.el8.noarch
rust-srpm-macros-5-2.el8.noarch                    spax-1.5.3-
13.el8.x86_64
  systemtap-sdt-devel-4.6-4.el8.x86_64
time-1.9-3.el8.x86_64                              unzip-6.0-
46.el8.x86_64
  util-linux-user-2.32.1-28.el8.x86_64
zip-3.0-23.el8.x86_64                              zlib-devel-1.2.11-
17.el8.x86_64

Complete!
OS package installations finished
+ Installing ONTAP Mediator. (Log: /tmp/ontap_mediator.JixKGP/ontap-
mediator-1.6.0/ontap-mediator-1.6.0/install_20221021155929.log)
    This step will take several minutes. Use the log file to view
progress.
    Sudoer config verified
    ONTAP Mediator rsyslog and logging rotation enabled
+ Install successful. (Moving log to
/opt/netapp/lib/ontap_mediator/log/install_20221021155929.log)
+ WARNING: This system supports UEFI
           Secure Boot (SB) is currently disabled on this system.
           If SB is enabled in the future, SCST will not work unless
the following action is taken:
           Using the keys in
/opt/netapp/lib/ontap_mediator/ontap_mediator/SCST_mod_keys follow
           instructions in
/opt/netapp/lib/ontap_mediator/ontap_mediator/SCST_mod_keys/README.modu
le-signing
           to sign the SCST kernel module. Note that reboot will be
```

```
needed.
     SCST will not start automatically when Secure Boot is enabled and
not configured properly.
+ Note: ONTAP Mediator uses a kernel module compiled specifically for
the current
        OS. Using 'yum update' to upgrade the kernel might cause
service interruption.
    For more information, see /opt/netapp/lib/ontap_mediator/README
[root@scs000099753 ~]# cat /etc/redhat-release
Red Hat Enterprise Linux release 8.5 (Ootpa)
[root@scs000099753 ~]#
```

Verify the installation

After the ONTAP Mediator has been installed, you should verify that the ONTAP Mediator services are running.

Steps

1. View the status of the ONTAP Mediator services:
   a. `systemctl status ontap_mediator`

```
[root@scspr1915530002 ~]# systemctl status ontap_mediator

 ontap_mediator.service - ONTAP Mediator
Loaded: loaded (/etc/systemd/system/ontap_mediator.service; enabled;
vendor preset: disabled)
Active: active (running) since Mon 2022-04-18 10:41:49 EDT; 1 weeks 0
days ago
Process: 286710 ExecStop=/bin/kill -s INT $MAINPID (code=exited,
status=0/SUCCESS)
Main PID: 286712 (uwsgi)
Status: "uWSGI is ready"
Tasks: 3 (limit: 49473)
Memory: 139.2M
CGroup: /system.slice/ontap_mediator.service
      ├─286712 /opt/netapp/lib/ontap_mediator/pyenv/bin/uwsgi --ini
/opt/netapp/lib/ontap_mediator/uwsgi/ontap_mediator.ini
      ├─286716 /opt/netapp/lib/ontap_mediator/pyenv/bin/uwsgi --ini
/opt/netapp/lib/ontap_mediator/uwsgi/ontap_mediator.ini
      └─286717 /opt/netapp/lib/ontap_mediator/pyenv/bin/uwsgi --ini
/opt/netapp/lib/ontap_mediator/uwsgi/ontap_mediator.ini

[root@scspr1915530002 ~]#
```

b. `systemctl status mediator-scst`

```
[root@scspr1915530002 ~]# systemctl status mediator-scst
   Loaded: loaded (/etc/systemd/system/mediator-scst.service;
enabled; vendor preset: disabled)
   Active: active (running) since Mon 2022-04-18 10:41:47 EDT; 1
weeks 0 days ago
  Process: 286595 ExecStart=/etc/init.d/scst start (code=exited,
status=0/SUCCESS)
 Main PID: 286662 (iscsi-scstd)
    Tasks: 1 (limit: 49473)
   Memory: 1.2M
   CGroup: /system.slice/mediator-scst.service
           └─286662 /usr/local/sbin/iscsi-scstd

[root@scspr1915530002 ~]#
```

2. Confirm the ports that are used by the ONTAP Mediator service:

`netstat`

```
[root@scspr1905507001 ~]# netstat -anlt | grep -E '3260|31784'

         tcp   0   0 0.0.0.0:31784   0.0.0.0:*      LISTEN

         tcp   0   0 0.0.0.0:3260    0.0.0.0:*      LISTEN

         tcp6  0   0 :::3260         :::*           LISTEN
```

Post-installation configuration

After the ONTAP Mediator service is installed and running, additional configuration tasks must be performed in the ONTAP storage system to use the Mediator features:

- To use the ONTAP Mediator service in a MetroCluster IP configuration, see Configuring the ONTAP Mediator service from a MetroCluster IP configuration.
- To use SnapMirror Business Continuity, see Install ONTAP Mediator Service and confirm the ONTAP cluster configuration.

Configure ONTAP Mediator security policies

The ONTAP Mediator server supports several configurable security settings. The default values for all settings are provide in a low_space_threshold_mib: 10read-only file:

`/opt/netapp/lib/ontap_mediator/server_config/ontap_mediator.user_config.yaml`

All values that are placed in the `ontap_mediator.user_config.yaml` will override the default values and be maintained across all ONTAP Mediator upgrades.

After you modify `ontap_mediator.user_config.yaml`, restart the ONTAP Mediator service:

```
systemctl restart ontap_mediator
```

The following attributes can be configured: NOTE: Other default values in the `ontap_mediator.config.yaml` should not be modified.

- **Settings used to install third-party SSL certificates as replacements for the default self-signed certificates**

```
cert_path:
'/opt/netapp/lib/ontap_mediator/ontap_mediator/server_config/ontap_media
tor_server.crt'
key_path:
'/opt/netapp/lib/ontap_mediator/ontap_mediator/server_config/ontap_media
tor_server.key'
ca_cert_path:
'/opt/netapp/lib/ontap_mediator/ontap_mediator/server_config/ca.crt'
ca_key_path:
'/opt/netapp/lib/ontap_mediator/ontap_mediator/server_config/ca.key'
ca_serial_path:
'/opt/netapp/lib/ontap_mediator/ontap_mediator/server_config/ca.srl'
cert_valid_days: '1095'                  # Used to set the expiration
on client certs to 3 years
x509_passin_pwd: 'pass:ontap'            # passphrase for the signed
client cert
```

- **Settings that provide protections against brute-force password guessing attacks**

  To enable the feature, set a value for the `window_seconds` and the `retry_limit`

  Examples:

  - Provide a 5-minute window for guesses, and then reset the count to zero failures:

    ```
    authentication_lock_window_seconds: 300
    ```

  - Lock the account if five failures occur within the window timeframe:

    ```
    authentication_retry_limit: 5
    ```

  - Reduce the impact of brute-force password guessing attacks by setting a delay that occurs prior to rejecting each attempt, which slows the attacks.

    ```
    authentication_failure_delay_seconds: 5
    ```

```
authentication_failure_delay_seconds: 0   # seconds (float) to delay
failed auth attempts prior to response, 0 = no delay
authentication_lock_window_seconds: null  # seconds (int) since the
oldest failure before resetting the retry counter, null = no window
authentication_retry_limit: null          # number of retries to
allow before locking API access, null = unlimited
```

- **Fields that control the password complexity rules of the ONTAP Mediator API user account**

```
password_min_length: 8

password_max_length: 64

password_uppercase_chars: 0    # min. uppercase characters

password_lowercase_chars: 1    # min. lowercase character

password_special_chars: 1      # min. non-letter, non-digit

password_nonletter_chars: 2    # min. non-letter characters (digits,
specials, anything)
```

- **Setting that controls the required free space on the `/opt/netapp/lib/ontap_mediator` disk.**

  If the space is lower than the set threshold, the service will issue a warning event.

```
low_space_threshold_mib: 10
```

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