Mediator service for MetroCluster and SnapMirror Business Continuity

ONTAP 9

NetApp
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Mediator service for MetroCluster and SnapMirror Business Continuity

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.

About this task

• 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.

<table>
<thead>
<tr>
<th>Mediator version</th>
<th>Supported Linux versions</th>
</tr>
</thead>
</table>
| 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

Upgrade the host operating system and then the Mediator

The following table provides the upgrade guidelines if you are upgrading from RHEL/CentOS 7.6 to a later RHEL/CentOS release in addition upgrading the Mediator version.

<table>
<thead>
<tr>
<th>Target Linux version</th>
<th>Target Mediator version</th>
<th>Upgrade notes</th>
</tr>
</thead>
</table>

1
<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1.2     | The upgrade must be performed in the following order:  
|         | a. Upgrade the operating system from RHEL/CentOS version.  
|         | b. Reboot the host to apply the kernel module changes.  
|         | c. Upgrade the Mediator from the immediately prior version to the current version.  |
| 1.3     | a. Upgrade the operating system from RHEL/CentOS version.  
|         | b. Reboot the host to apply the kernel module changes.  
|         | c. Upgrade the Mediator from the immediately prior version to the current version.  |
| 1.4     | a. Upgrade the operating system from RHEL/CentOS version.  
|         | b. Reboot the host to apply the kernel module changes.  
|         | c. Upgrade the Mediator from the immediately prior version to the current version.  |
| 1.5     | a. Upgrade the operating system from RHEL/CentOS version.  
|         | b. Reboot the host to apply the kernel module changes. If you do not reboot the host, an error message appears prompting you to perform a reboot.  
|         | c. Upgrade the Mediator from the immediately prior version to the current version.  |

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".

The following packages are required by the ONTAP Mediator service:

<table>
<thead>
<tr>
<th>All RHEL/CentOS versions</th>
<th>Additional packages for RHEL/CentOS 7.x</th>
<th>Additional packages for RHEL 8.x</th>
</tr>
</thead>
<tbody>
<tr>
<td>• openssl</td>
<td>• policycoreutils-python</td>
<td>• elfutils-libelf-devel</td>
</tr>
<tr>
<td>• openssl-devel</td>
<td>• python36-pip</td>
<td>• policycoreutils-python-utils</td>
</tr>
<tr>
<td>• kernel-devel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• gcc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• libselinux-utils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• make</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• redhat-lsb-core</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• patch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• bzip2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• python36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• python36-devel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• perl-Data-Dumper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• perl-ExtUtils-MakeMaker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• python3-pip</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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, as documented in this procedure.
Enable access to the repositories

<table>
<thead>
<tr>
<th>If your operating system is...</th>
<th>You must provide access to these repositories...</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEL 7.x</td>
<td>rhel-7-server-optional-rpms</td>
</tr>
<tr>
<td>CentOS 7.x</td>
<td>C7.6.1810 - Base repository</td>
</tr>
<tr>
<td>RHEL 8.x</td>
<td>• rhel-8-for-x86_64-baseos-rpms&lt;br&gt;• rhel-8-for-x86_64-appstream-rpms</td>
</tr>
</tbody>
</table>

Enable access to the repositories listed above so Mediator can access the required packages during the installation process. Use the procedure below for your operating system.

- Procedure for RHEL 7.x operating system.
- Procedure for RHEL 8.x operating system.
- Procedure for CentOS 7.x operating system.

**Procedure for RHEL 7.x operating system**

If your operating system is **RHEL 7.x**:

**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.
Procedure for RHEL 8.x operating system

If your operating system is **RHEL 8.x**:  

**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 CentOS 7.x operating system

If your operating system is CentOS 7.x:

The following examples are showing a repository for CentOS 7.6 and may 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.
Download the Mediator installation package

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:

```
[root@scs000099753 ~]# tar xvfz ontap-mediator-1.5.0.tgz
ontap-mediator-1.5.0/
ontap-mediator-1.5.0/ONTAP-Mediator-production.pub
ontap-mediator-1.5.0/tsa-prod-chain-ONTAP-Mediator.pem
ontap-mediator-1.5.0/tsa-prod-ONTAP-Mediator.pem
ontap-mediator-1.5.0/csc-prod-ONTAP-Mediator.pem
ontap-mediator-1.5.0/csc-prod-chain-ONTAP-Mediator.pem
ontap-mediator-1.5.0/ontap-mediator-1.5.0
ontap-mediator-1.5.0/ontap-mediator-1.5.0.sig.tsr
ontap-mediator-1.5.0/ontap-mediator-1.5.0.tsr
ontap-mediator-1.5.0/ontap-mediator-1.5.0.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:

- 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-1.5.0 | The product installation executable for version 1.5.0
- ontap-mediator-1.5.0.sig | The SHA-256 hashed, then RSA-signed using the csc-prod key, signature for the installer
- ontap-mediator-1.5.0.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

   a. Find the OCSP URL used to register the certificate as 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.


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


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-1.5.0.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-1.5.0.sig -in ontap-mediator-1.5.0.sig.tsr -CAfile tsa-prod-chain-ONTAP-Mediator.pem -untrusted tsa-prod-ONTAP-Mediator.pem
openssl ts -verify -data ontap-mediator-1.5.0 -in ontap-mediator-1.5.0.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-1.5.0.sig ontap-mediator-1.5.0
```
Example of Verifying the ONTAP Mediator code signature (console output)

```
[root@scspa2695423001 ontap-mediator-1.5.0]# pwd
/root/ontap-mediator-1.5.0
[root@scspa2695423001 ontap-mediator-1.5.0]# ls -l
total 63660
-r--r--r-- 1 root root 8582 Oct 19 15:02 csc-prod-chain-ONTAP-
Mediator.pem
-r--r--r-- 1 root root 2373 Oct 19 15:02 csc-prod-ONTAP-
Mediator.pem
-r-xr-xr-- 1 root root 65132818 Oct 20 15:17 ontap-mediator-1.5.0
-rw-r--r-- 1 root root 384 Oct 20 15:17 ontap-mediator-
1.5.0.sig
-rw-r--r-- 1 root root 5437 Oct 20 15:17 ontap-mediator-
1.5.0.sig.tsv
-rw-r--r-- 1 root root 5436 Oct 20 15:17 ontap-mediator-1.5.0.tsr
-r--r--r-- 1 root root 625 Oct 19 15:02 ONTAP-Mediator-
production.pub
-r--r--r-- 1 root root 3323 Oct 19 15:02 tsa-prod-chain-ONTAP-
Mediator.pem
-r--r--r-- 1 root root 1740 Oct 19 15:02 tsa-prod-ONTAP-
Mediator.pem
[root@scspa2695423001 ontap-mediator-1.5.0]#
[root@scspa2695423001 ontap-mediator-1.5.0]#/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: Oct 28 05:01:00 2022 GMT
```
Responses:
Certificate ID:
Hash Algorithm: sha1
Issuer Name Hash: 69FA640329AB84E27220FE0927647B8194B91F2A
Issuer Key Hash: CE894F8251AA15A28462CA312361D261FBF8FE78
Serial Number: 511A542B57522AEB7295A640DC6200E5
Cert Status: good
This Update: Oct 28 05:00:00 2022 GMT
Next Update: Nov 4 04:59:59 2022 GMT
Signature Algorithm: sha512WithRSAEncryption
  e7:6c:8c:49:dd:0c:fd:d8:ce:20:08:0d:0f:5a:29:a3:19:03:
  97:3a:0b:0a:8e:a3:9e:e3:f4:ee:0:d6:1a:c9:b5:14:8c:3e:54:
  cl:ab:cf:71:30:1e:14:ba
WARNING: no nonce in response
Response verify OK
csc-prod-ONTAP-Mediator.pem: good
  This Update: Oct 28 05:00:00 2022 GMT
  Next Update: Nov 4 04:59:59 2022 GMT
  + openssl verify -untrusted csc-prod-chain-ONTAP-Mediator.pem -CApath
Install the ONTAP Mediator installation package

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:
    /opt/netapp/lib/ontap_mediator/ontap_mediator/SCST_mod_keys/README.module-signing to sign the SCST kernel module.

  - 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-1.5.0/ontap-mediator-1.5.0 -y

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

<table>
<thead>
<tr>
<th>Package</th>
<th>Architecture</th>
<th>Repository</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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Installing:
- bzip2: 1.0.6-26.el8 (x86_64) size: 60 k, repository: rhel-8-for-x86_64-baseos-rpms
- elfutils-libelf-devel: 0.186-1.el8 (x86_64) size: 60 k, repository: rhel-8-for-x86_64-baseos-rpms
- kernel-devel: 4.18.0-348.el8 (x86_64) size: 20 M, repository: rhel-8-for-x86_64-baseos-rpms
- make: 1:4.2.1-11.el8 (x86_64) size: 498 k, repository: rhel-8-for-x86_64-baseos-rpms
- openssl-devel: 1:1.1.1k-7.el8_6 (x86_64) size: 2.3 M, repository: rhel-8-for-x86_64-baseos-rpms
- patch: 2.7.6-11.el8 (x86_64) size: 138 k, repository: rhel-8-for-x86_64-baseos-rpms
- perl-ExtUtils-MakeMaker: 1:7.34-1.el8 (noarch) size: 301 k, repository: rhel-8-for-x86_64-appstream-rpms
- python36-devel: 3.6.8-38.module+el8.5.0+12207+5c5719bc (x86_64) size: 17 k, repository: rhel-8-for-x86_64-appstream-rpms
- redhat-lsb-core: 4.1-47.el8 (x86_64) size: 17 k, repository: rhel-8-for-x86_64-appstream-rpms
- x86_64-appstream-rpms: 8.5.0-10.1.el8_6 (x86_64) size: 10 M, repository: rhel-8-for-x86_64-appstream-rpms

Upgrading:
- cpp: 4.1-47.el8 (x86_64) size: 17 k, repository: rhel-8-for-x86_64-appstream-rpms
- elfutils-libelf-devel: 0.186-1.el8 (x86_64) size: 60 k, repository: rhel-8-for-x86_64-baseos-rpms
0.186-1.el8
x86_64-baseos-rpms 229 k rhel-8-for-
elutils-libs x86_64
0.186-1.el8
x86_64-baseos-rpms 295 k rhel-8-for-
gcc x86_64
8.5.0-10.1.el8_6
x86_64-appstream-rpms 23 M rhel-8-for-
libgcc x86_64
8.5.0-10.1.el8_6
x86_64-baseos-rpms 80 k rhel-8-for-
libgomp x86_64
8.5.0-10.1.el8_6
x86_64-baseos-rpms 207 k rhel-8-for-
libsemanage x86_64
2.9-8.el8
x86_64-baseos-rpms 168 k rhel-8-for-
mokutil x86_64
1:0.3.0-11.el8_6.1
x86_64-baseos-rpms 46 k rhel-8-for-
openssl x86_64
1:1.1.1k-7.el8_6
x86_64-baseos-rpms 709 k rhel-8-for-
openssl-lib x86_64
1:1.1.1k-7.el8_6
x86_64-baseos-rpms 1.5 M rhel-8-for-
platform-python-pip noarch
9.0.3-22.el8
x86_64-baseos-rpms 1.6 M rhel-8-for-
policycoreutils x86_64
2.9-19.el8
x86_64-baseos-rpms 374 k rhel-8-for-
policycoreutils-python-utils noarch
2.9-19.el8
x86_64-baseos-rpms 253 k rhel-8-for-
python3-libsemanage x86_64
2.9-8.el8
x86_64-baseos-rpms 128 k rhel-8-for-
python3-pip noarch
9.0.3-22.el8
x86_64-appstream-rpms 20 k rhel-8-for-
python3-polycoreutils noarch
2.9-19.el8
x86_64-baseos-rpms 2.2 M rhel-8-for-
python36 x86_64
3.6.8-38.module+el8.5.0+12207+5c5719bc rhel-8-for-
Installing dependencies:

- `annobin` (x86_64, 10.29-3.el8)
- `at` (x86_64, 3.1.20-11.el8)
- `bc` (x86_64, 1.07.1-5.el8)
- `cups-client` (x86_64, 1:2.2.6-38.el8)
- `dwz` (x86_64, 0.12-10.el8)
- `ed` (x86_64, 1.14.2-4.el8)
- `esi-srpm-macros` (noarch, 3-3.el8)
- `esmtp` (x86_64, 1.2-15.el8)
- `ghc-srpm-macros` (noarch, 1.4.2-7.el8)
- `go-srpm-macros` (noarch, 2-17.el8)
- `keyutils-libs-devel` (x86_64, 1.5.10-6.el8)
- `krb5-devel` (x86_64, 1.18.2-14.el8)
- `libcom_err-devel` (x86_64, 1.45.6-2.el8)
- `libesmtp` (x86_64, 1.86.64-baseos-rpms)
- `libkadm5` (x86_64, 1.18.2-14.el8)
- `libksmtp` (x86_64, 1.0.6-18.el8)
- `libkadm5` (x86_64, 1.18.2-14.el8)
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Transaction Summary
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=======================================================================
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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
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
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
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
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    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
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.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

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<tr>
<td>perl-Math-Complex</td>
<td></td>
</tr>
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Complete!
OS package installations finished
+ Installing ONTAP Mediator. (Log: /tmp/ontap_mediator.JixKGP/ontap-mediator-1.5.0/ontap-mediator-1.5.0/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.module-signing
to sign the SCST kernel module. Note that reboot will be
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

Steps

1. Run the following commands to view the status of the ONTAP Mediator services:
   a. Run: `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
```

b. Run: `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

2. Confirm the ports the ONTAP Mediator service is using: 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

Result

The ONTAP Mediator service is now installed and running. Further configuration 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

Manage the ONTAP mediator service

After you have installed ONTAP Mediator service, you may change the user name or password. You may also uninstall the ONTAP Mediator Service.

Change the user name

About these tasks
These task is performed on the Linux host on which the ONTAP Mediator service is installed.
If you are unable to reach this command, you might need to run the command using the full path as shown in the following example:

```
/usr/local/bin/mediator_username
```

**Procedure**

Change the username by choosing one of the following options:

- Run the command `mediator_change_user` and respond to the prompts as shown in the following example:

  ```
  [root@mediator-host ~]# mediator_change_user
  Modify the Mediator API username by entering the following values:
  Mediator API User Name: mediatoradmin
  Password: 
  New Mediator API User Name: mediator
  The account username has been modified successfully.
  [root@mediator-host ~]#
  ```

- Run the following command:

  ```
  MEDIATOR_USERNAME=mediator MEDIATOR_PASSWORD=mediator2
  MEDIATOR_NEW_USERNAME=mediatoradmin mediator_change_user
  ```

  ```
  [root@mediator-host ~]# MEDIATOR_USERNAME=mediator
  MEDIATOR_PASSWORD='mediator2' MEDIATOR_NEW_USERNAME=mediatoradmin
  mediator_change_user
  The account username has been modified successfully.
  [root@mediator-host ~]#
  ```

**Change the password**

**About this task**

This task is performed on the Linux host on which the ONTAP Mediator service is installed.

If you are unable to reach this command, you might need to run the command using the full path as shown in the following example:

```
/usr/local/bin/mediator_change_password
```

**Procedure**

Change the password by choosing one of the following options:

- Run the `mediator_change_password` command and respond to the prompts as shown in the following example:
Change the Mediator API password by entering the following values:

Mediator API User Name: mediatoradmin
Old Password:
New Password:
Confirm Password:
The password has been updated successfully.

Run the following command:

```
MEDIATOR_USERNAME=mediatoradmin MEDIATOR_PASSWORD=mediator1 MEDIATOR_NEW_PASSWORD=mediator2 mediator_change_password
```

The example shows the password is changed from "mediator1" to "mediator2".

Uninstall the ONTAP Mediator service

Before you begin
If necessary, you can remove the ONTAP Mediator service. The Mediator must be disconnected from ONTAP before you remove the Mediator service.

About this task
This task is performed on the Linux host on which the ONTAP Mediator service is installed.

If you are unable to reach this command, you might need to run the command using the full path as shown in the following example:

```
/usr/local/bin/uninstall_ontap_mediator
```

Step
1. Uninstall the ONTAP Mediator service:

```
uninstall_ontap_mediator
```
[root@mediator-host ~]# uninstall_ontap_mediator

ONTAP Mediator: Self Extracting Uninstaller

+ Removing ONTAP Mediator. (Log: /tmp/ontap_mediator.GmRGdA/uninstall_ontap_mediator/remove.log)
+ Remove successful.

[root@mediator-host ~]#