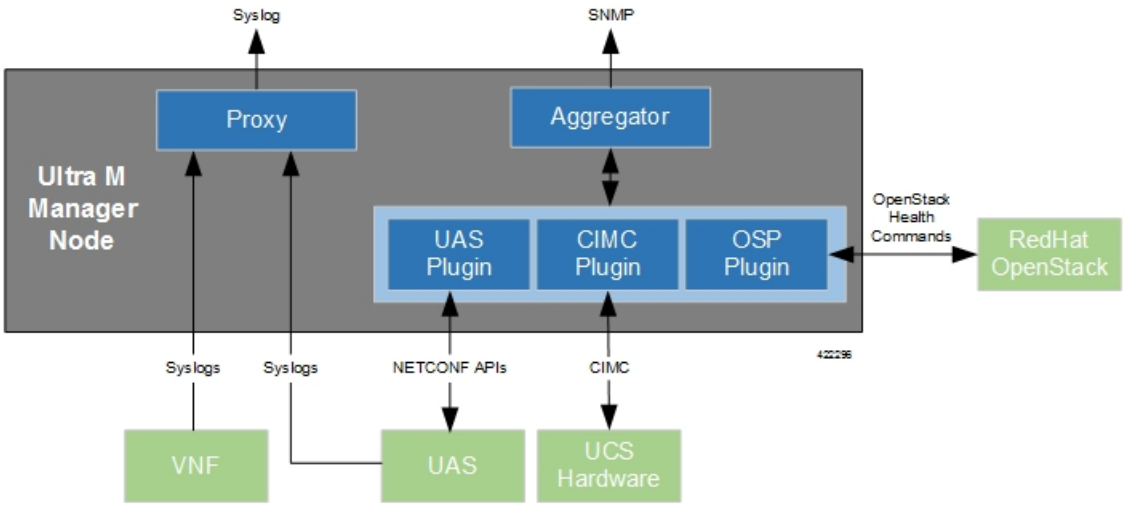
Event and Syslog Management Within the Ultra M Solution

Hyper-Converged Ultra M solution models support a centralized monitor and management function. This function provides a central aggregation point for events (faults and alarms) and a proxy point for syslogs generated by the different components within the solution as identified in Table 1: Component Event Sources, on page 6. This monitor and management function runs on the Ultra M Manager Node.

Figure 1: Ultra M Manager Node Event and Syslog Functions



The software to enable this functionality is distributed as a both a stand-alone RPM and as part of the Ultra Services Platform (USP) release ISO as described in Install the Ultra M Manager RPM, on page 12. Once installed, additional configuration is required based on the desired functionality as described in the following sections:

- Syslog Proxy, page 2
- Event Aggregation , page 5
- Install the Ultra M Manager RPM, page 12
- Restarting the Health Monitor Service, page 13

• Uninstalling the Ultra M Manager, page 15

Syslog Proxy

The Ultra M Manager Node can be configured as a proxy server for syslogs received from UCS servers and/or OpenStack. As a proxy, the Ultra M Manager Node acts a single logging collection point for syslog messages from these components and relays them to a remote collection server.

NOTES:

- This functionality is currently supported only with Ultra M deployments based on OSP 10 and that leverage the Hyper-Converged architecture.

  .

- You must configure a remote collection server to receive and filter log files sent by the Ultra M Manager Node.
- Though you can configure syslogging at any severity level your deployment scenario requires, it is recommended that you only configure syslog levels with severity levels 0 (emergency) through 4 (warning).

Once the Ultra M Manager RPM is installed, a script provided with this release allows you to quickly enable syslog on the nodes and set the Ultra M Manager as the proxy. Leveraging inputs from a YAML-based configuration file, the script:

- Inspects the nodes within the Undercloud and Overcloud
- Logs on to each node
- Enables syslogging at the specified level or both the UCS hardware and for OpenStack
- Sets the Ultra M Manager Node's address as the syslog proxy

Note The use of this script assumes that all of the nodes use the same login credentials.

To enable this functionality:

1. Install the Ultra M Manager bundle RPM using the instructions in Install the Ultra M Manager RPM, on page 12.

Note This step is not needed if the Ultra M Manager bundle was previously installed.

2. Become the root user.

   sudo -i

3. Verify that there are no previously existing configuration files for logging information messages in /etc/rsyslog.d.

   a. Navigate to */etc/rsyslog.d*.

   cd /etc/rsyslog.d
   ls -al

Example output:

```
total 24
drwxr-xr-x.   2 root root  4096 Sep  3 23:17 .
drwxr-xr-x. 152 root root 12288 Sep  3 23:05 ..
-rw-r--r--.   1 root root    49 Apr 21 00:03 listen.conf
-rw-r--r--.   1 root root   280 Jan 12  2017 openstack-swift.conf
```

b Check the *listen.conf* file.

cat listen.conf
Example output:

```
$SystemLogSocketName /run/systemd/journal/syslog
```

c Check the configuration of the *openstack-swift.conf*.

cat openstack-swift.conf
Example configuration:

```
# LOCAL0 is the upstream default and LOCAL2 is what Swift gets in
# RHOS and RDO if installed with Packstack (also, in docs).
# The breakout action prevents logging into /var/log/messages, bz#997983.
local0.*;local2.* /var/log/swift/swift.log
& stop
```

4 Enable syslogging to the external server by configuring the */etc/rsyslog.conf* file.

vi /etc/rsyslog.conf

a Enable TCP/UDP reception.

```
# provides UDP syslog reception
$ModLoad imudp
$UDPServerRun 514

# provides TCP syslog reception
$ModLoad imtcp
$InputTCPServerRun 514
```

b Disable logging for private authentication messages.

```
# Don't log private authentication messages!
#*.info;mail.none;authpriv.none;cron.none                /var/log/messages
```

c Configure the desired log severity levels.

```
# log 0-4 severity logs to external server 172.21.201.53
*.4,3,2,1,0    @<external_syslog_server_ipv4_address>:514
```

This enables the collection and reporting of logs with severity levels 0 (emergency) through 4 (warning).

Caution Though it is possible to configure the system to locally store syslogs on the Ultra M Manager, it is highly recommended that you avoid doing so to avoid the risk of data loss and to preserve disk space.

5 Restart the syslog server.

service rsyslog restart

6 Navigate to */etc*.

cd /etc

7 Create and edit the *syslogs.yaml* file based your VIM Orchestrator and VIM configuration. A sample of this configuration file is provided in Example ultram_cfg.yaml File.

Note The *ultram_cfg.yaml* file pertains to both the syslog proxy and event aggregation functionality. Some parts of this file's configuration overlap and may have been configured in relation to the other function.

vi ultram_cfg.yaml

a *Optional*. Configure your Undercloud settings if they are not already configured.

```
under-cloud:
  OS_AUTH_URL: <auth_url>
  OS_USERNAME: admin
  OS_TENANT_NAME: <tenant_name>
  OS_PASSWORD: <admin_user_password>
  ssh-key: /opt/cisco/heat_admin_ssh_key
```

b *Optional.* Configure your Overcloud settings if they are not already configured.

```
over-cloud:
  enabled: true
  environment:
    OS_AUTH_URL: <auth_url>
    OS_TENANT_NAME: <tenant_name>
    OS_USERNAME: <user_name>
    OS_PASSWORD: <user_password>
    OS_ENDPOINT_TYPE: publicURL
    OS_IDENTITY_API_VERSION: 2
    OS_REGION_NAME: regionOne
```

c Specify the IP address of the Ultra M Manager Node to be the proxy server.

```
<-- SNIP -->
rsyslog:
  level: 4,3,2,1,0
  proxy-rsyslog: <ultram_manager_address>
```

Note

- You can modify the syslog levels to report according to your requirements using the **level** parameter as shown above.
- <*ultram_manager_address*> is the internal IP address of the Ultra M Manager Node reachable by OpenStack and the UCS servers.
- If you are copying the above information from an older configuration, make sure the **proxy-rsyslog** IP address does not contain a port number.

d *Optional*. Configure the CIMC login information for each of the nodes on which syslogging is to be enabled.

```
ucs-cluster:
  enabled: true
  user: <username>
  password: <password>
```

Note The use of this script assumes that all of the nodes use the same login credentials.

8 Navigate to */opt/cisco/usp/ultram-health*.

cd /opt/cisco/usp/ultram-health

9 *Optional*. Disable rsyslog if it was previously configured on the UCS servers.

./ultram_syslogs.py --cfg /etc/ultram_cfg.yaml –u -d

10 Execute the *ultram_syslogs.py* script to load the configuration on the various nodes.

./ultram_syslogs.py --cfg /etc/ultram_cfg.yaml -o –u

Note Additional command line options for the *ultram_syslogs.py* script can be seen by entering **ultram_syslogs.py –help** at the command prompt. An example of the output of this command is below:

```
usage: ultram_syslogs.py [-h] -c CFG [-d] [-u] [-o]

optional arguments:
  -h, --help            show this help message and exit
  -c CFG, --cfg CFG     Configuration file
  -d, --disable-syslog  Disable Syslog
  -u, --ucs             Apply syslog configuration on UCS servers
  -o, --openstack       Apply syslog configuration on OpenStack
```

Example output:

```
2017-09-13 15:24:23,305 - Configuring Syslog server 192.200.0.1:514 on UCS cluster
2017-09-13 15:24:23,305 - Get information about all the nodes from under-cloud
2017-09-13 15:24:37,178 - Enabling syslog configuration on 192.100.3.5
2017-09-13 15:24:54,686 - Connected.
2017-09-13 15:25:00,546 - syslog configuration success.
2017-09-13 15:25:00,547 - Enabling syslog configuration on 192.100.3.6
2017-09-13 15:25:19,003 - Connected.
2017-09-13 15:25:24,808 - syslog configuration success.
<---SNIP--->

<---SNIP--->
2017-09-13 15:46:08,715 - Enabling syslog configuration on vnf1-osd-compute-1
[192.200.0.104]
2017-09-13 15:46:08,817 - Connected
2017-09-13 15:46:09,046 - - /etc/rsyslog.conf
2017-09-13 15:46:09,047 -  Enabling syslog ...
2017-09-13 15:46:09,130 -  Restarting rsyslog
2017-09-13 15:46:09,237 -  Restarted
2017-09-13 15:46:09,321 - - /etc/nova/nova.conf
2017-09-13 15:46:09,321 -  Enabling syslog ...
2017-09-13 15:46:09,487 -  Restarting Services 'openstack-nova-compute.service'
```

11 Ensure that client log messages are being received by the server and are uniquely identifiable.

NOTES:

- If necessary, configure a unique tag and hostname as part of the syslog configuration/template for each client.
- Syslogs are very specific in terms of the file permissions and ownership. If need be, manually configure permissions for the log file on the client using the following command:

  chmod +r *<URL>/<log_filename>*

Event Aggregation

The Ultra M Manager Node can be configured to aggregate events received from different Ultra M components as identified in Table 1: Component Event Sources, on page 6.

Note This functionality is currently supported only with Ultra M deployments based on OSP 10 and that leverage the Hyper-Converged architecture.

Table 1: Component Event Sources

Solution Component	Event Source Type	Details
UCS server hardware	CIMC	Reports on events collected from UCS C-series hardware via CIMC-based subscription. These events are monitored in real-time.
VIM (Overcloud)	OpenStack service health	Reports on OpenStack service fault events pertaining to: • Failures (stopped, restarted) • High availability • Ceph / storage • Neutron / compute host and network agent • Nova scheduler (VIM instances) By default, these events are collected during a 900 second polling interval as specified within the *ultram_cfg.yaml* file. **Note** In order to ensure optimal performance, it is strongly recommended that you do not change the default polling-interval.
UAS (AutoVNF, UEM, and ESC)	UAS cluster/USP management component events	Reports on UAS service fault events pertaining to: • Service failure (stopped, restarted) • High availability • AutoVNF • UEM • ESC (VNFM) By default, these events are collected during a 900 second polling interval as specified within the *ultram_cfg.yaml* file. **Note** In order to ensure optimal performance, it is strongly recommended that you do not change the default polling-interval.

Events received from the solution components, regardless of the source type, are mapped against the Ultra M SNMP MIB (CISCO-ULTRAM-MIB.my, refer to Ultra M MIB). The event data is parsed and categorized against the following conventions:

- **Fault code:** Identifies the area in which the fault occurred for the given component. Refer to the "CFaultCode" convention within the Ultra M MIB for more information.
- **Severity:** The severity level associated with the fault. Refer to the "CFaultSeverity" convention within the Ultra M MIB for more information. Since the Ultra M Manager Node aggregates events from different components within the solution, the severities supported within the Ultra M Manager Node MIB map to those for the specific components. Refer to Ultra M Component Event Severity and Fault Code Mappings for details.
- **Domain:** The component in which the fault occurred (e.g. UCS hardware, VIM, UEM, etc.). Refer to the "CFaultDomain" convention within the Ultra M MIB for more information.

UAS and OpenStack events are monitored at the configured polling interval as described in Table 2: SNMP Fault Entry Table Element Descriptions, on page 9. At the polling interval, the Ultra M Manager Node:

1. Collects data from UAS and OpenStack.
2. Generates/updates .log and .report files and an SNMP-based fault table with this information. It also includes related data about the fault such as the specific source, creation time, and description.
3. Processes any events that occurred:
   a. If an error or fault event is identified, then a .error file is created and an SNMP trap is sent.
   b. If the event received is a clear condition, then an informational SNMP trap is sent to "clear" an active fault.
   c. If no event occurred, then no further action is taken beyond Step 2.

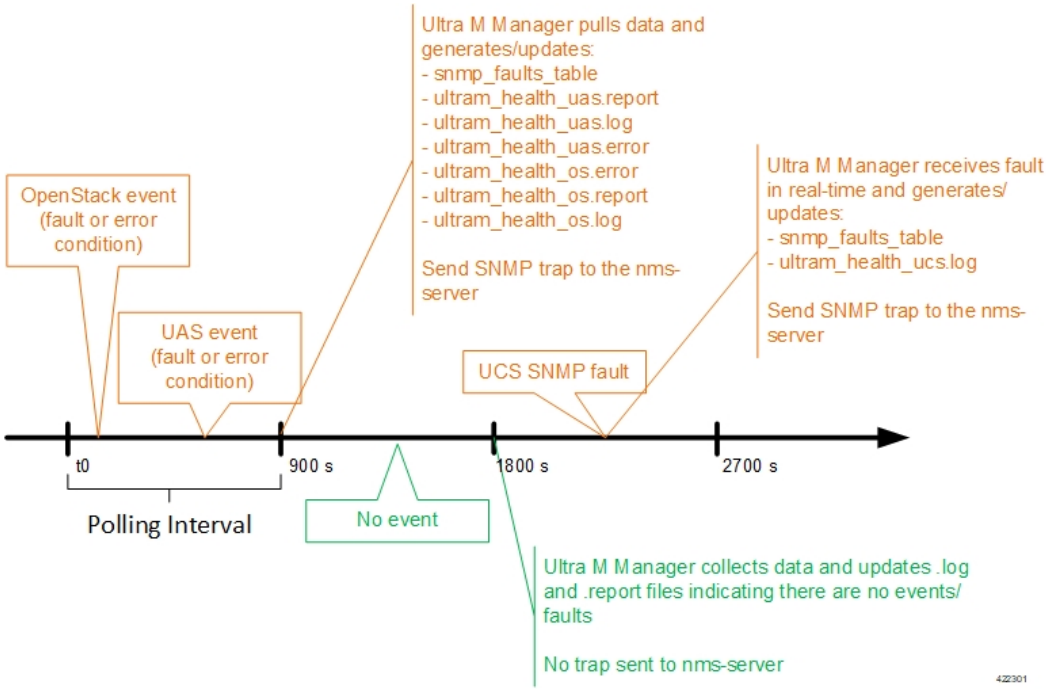
UCS events are monitored and acted upon in real-time. When events occur, the Ultra M Manager generates a .log file and the SNMP fault table.

Active faults are reported "only" once and not on every polling interval. As a result, there is only one trap as long as this fault is active. Once the fault is "cleared", an informational trap is sent.

Note UCS events are considered to be the "same" if a previously received fault has the same distinguished name (DN), severity, and lastTransition time. UCS events are considered as "new" only if any of these elements change.

These processes are illustrated in Figure 2: Ultra M Manager Node Event Aggregation Operation, on page 8. Refer to About Ultra M Manager Log Files for more information.

Figure 2: Ultra M Manager Node Event Aggregation Operation

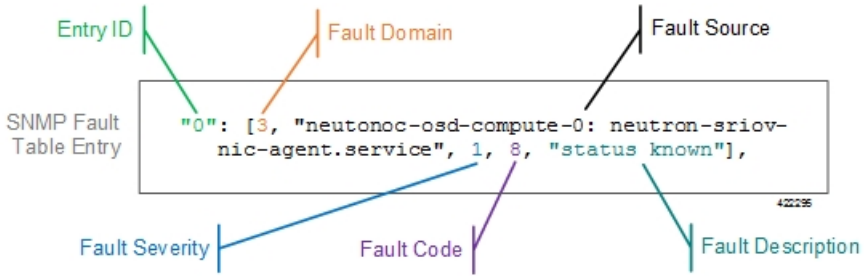


An example of the snmp_faults_table file is shown below and the entry syntax is described in Figure 3: SNMP Fault Table Entry Description, on page 8:

```
"0": [3 "neutonoc-osd-compute-0: neutron-sriov-nic-agent.service" 1 8 "status known"] "1":
 [3 "neutonoc-osd-compute-0: ntpd" 1 8 "Service is not active state: inactive"] "2": [3
"neutonoc-osd-compute-1: neutron-sriov-nic-agent.service" 1 8 "status known"] "3": [3
"neutonoc-osd-compute-1: ntpd" 1 8 "Service is not active state: inactive"] "4": [3
"neutonoc-osd-compute-2: neutron-sriov-nic-agent.service" 1 8 "status known"] "5": [3
"neutonoc-osd-compute-2: ntpd" 1 8 "Service is not active state: inactive"]
```

Refer to About Ultra M Manager Log Files for more information.

Figure 3: SNMP Fault Table Entry Description



Each element in the SNMP Fault Table Entry corresponds to an object defined in the Ultra M SNMP MIB as described in Table 2: SNMP Fault Entry Table Element Descriptions, on page 9. (Refer also to Ultra M MIB.)

Table 2: SNMP Fault Entry Table Element Descriptions

SNMP Fault Table Entry Element	MIB Object	Additional Details
Entry ID	cultramFaultIndex	A unique identifier for the entry
Fault Domain	cultramFaultDomain	The component area in which the fault occurred. The following domains are supported in this release: • **hardware(1) :** Harware including UCS servers • **vim(3) :** OpenStack VIM manager • **uas(4) :** Ultra Automation Services Modules
Fault Source	cultramFaultSource	Information identifying the specific component within the Fault Domain that generated the event. The format of the information is different based on the Fault Domain. Refer to Table 3: cultramFaultSource Format Values, on page 11 for details.
Fault Severity	cultramFaultSeverity	The severity associated with the fault as one of the following: • **emergency(1) :** System level FAULT impacting multiple VNFs/Services • **critical(2) :** Critical Fault specific to VNF/Service • **major(3) :** component level failure within VNF/service. • **alert(4) :** warning condition for a service/VNF, may eventually impact service. • **informational(5) :** informational only, does not impact service Refer to Ultra M Component Event Severity and Fault Code Mappings for details on how these severities map to events generated by the various Ultra M components.

SNMP Fault Table Entry Element	MIB Object	Additional Details
Fault Code	cultramFaultCode	A unique ID representing the type of fault as. The following codes are supported: • **other(1) :** Other events • **networkConnectivity(2) :** Network Connectivity Failure Events • **resourceUsage(3) :** Resource Usage Exhausted Event • **resourceThreshold(4) :** Resource Threshold crossing alarms • **hardwareFailure(5) :** Hardware Failure Events • **securityViolation(6) :** Security Alerts • **configuration(7) :** Config Error Events • **serviceFailure(8) :** Process/Service failures Refer to Ultra M Component Event Severity and Fault Code Mappings for details on how these fault codes map to events generated by the various Ultra M components.
Fault Description	cultramFaultDescription	A message containing details about the fault.

Table 3: cultramFaultSource Format Values

FaultDomain	Format Value of cultramFaultSource
Hardware (UCS Servers)	**Node:** *<UCS-SERVER-IP-ADDRESS>*, **affectedDN:** *<FAULT-OBJECT-DISTINGUSIHED-NAME>* Where: *<UCS-SERVER-IP-ADDRESS> :* The management IP address of the UCS server that generated the fault. *<FAULT-OBJECT-DISTINGUSIHED-NAME> :* The distinguished name of the affected UCS object.
UAS	**Node:** *<UAS-MANAGEMENT-IP>* Where: *<UAS-MANAGEMENT-IP> :* The management IP address for the UAS instance.
VIM (OpenStack)	*<OS-HOSTNAME>*: *<SERVICE-NAME>* Where: *<OS-HOSTNAME>* : The OpenStack node hostname that generated the fault. *<SERVICE-NAME>* : Then name of the OpenStack service that generated the fault.

Fault and alarm collection and aggregation functionality within the Hyper-Converged Ultra M solution is configured and enabled through the *ultram_cfg.yaml* file. (An example of this file is located in Example ultram_cfg.yaml File.) Parameters in this file dictate feature operation and enable SNMP on the UCS servers and event collection from the other Ultra M solution components.

To enable this functionality on the Ultra M solution:

1 Install the Ultra M Manager bundle RPM using the instructions in Install the Ultra M Manager RPM, on page 12.

Note This step is not needed if the Ultra M Manager bundle was previously installed.

2 Become the root user.

sudo -i

3 Navigate to /etc.

cd /etc

4 Edit the *ultram_cfg.yaml* file based on your deployment scenario.

Note The *ultram_cfg.yaml* file pertains to both the syslog proxy and event aggregation functionality. Some parts of this file's configuration overlap and may have been configured in relation to the other function.

5 Navigate to */opt/cisco/usp/ultram-health*.

cd /opt/cisco/usp/ultram-health

6 Start the Ultra M Manager Service, on page 14.

Note Subsequent configuration changes require you restart the health monitor service. Refer to Restarting the Health Monitor Service, on page 13 for details.

7 Verify the configuration by checking the *ultram_health.log* file.

cat /var/log/cisco/ultram_health.log

Install the Ultra M Manager RPM

The Ultra M Manager functionality described in this chapter is enabled through software distributed both as part of the USP ISO and as a separate RPM bundle.

Ensure that you have access to either of these RPM bundles prior to proceeding with the instructions below.

To access the Ultra M Manager RPM packaged within the USP ISO, onboard the ISO and navigate to the *ultram_health* directory. Refer to the *USP Deployment Automation Guide* for instructions on onbarding the USP ISO.

1 *Optional*. Remove any previously installed versions of the Ultra M Manager per the instructions in Uninstalling the Ultra M Manager, on page 15.

2 Log on to the Ultra M Manager Node.

3 Become the root user.

sudo -i

4 Copy the "ultram-manager" RPM file to the Ultra M Manager Node.

5 Navigate to the directory in which you copied the file.

6 Install the ultram-manager bundle RPM that was distributed with the ISO.

yum install -y ultram-manager-<*version*>**.x86_64.rpm**
A message similar to the following is displayed upon completion:

```
Installed:
  ultram-health.x86_64 0:5.1.6-2


Complete!
```

7 Verify that log rotation is enabled in support of the syslog proxy functionality by checking the *logrotate* file.

cd /etc/cron.daily
ls -al
Example output:

```
total 28
drwxr-xr-x.   2 root root  4096 Sep 10 18:15 .
drwxr-xr-x. 128 root root 12288 Sep 11 18:12 ..
-rwx------.  1 root root  219 Jan 24  2017 logrotate
-rwxr-xr-x.   1 root root   618 Mar 17  2014 man-db.cron
-rwx------.   1 root root   256 Jun 21 16:57 rhsmd
```

cat /etc/cron.daily/logrotate

Example output:

```
#!/bin/sh

/usr/sbin/logrotate -s /var/lib/logrotate/logrotate.status /etc/logrotate.conf
EXITVALUE=$?
if [ $EXITVALUE != 0 ]; then
    /usr/bin/logger -t logrotate "ALERT exited abnormally with [$EXITVALUE]"
fi
exit 0
```

8 Create and configure the *ultram_health* file.

cd /etc/logrotate.d
vi ultram_health

```
/var/log/cisco/ultram-health/* {
    size 50M
    rotate 30
    missingok
    notifempty
    compress
    }
```

9 Proceed to either Syslog Proxy, on page 2 or Event Aggregation , on page 5 to configure the desired functionality.

Restarting the Health Monitor Service

In the event of configuration change or a server reboot, the Ultra M Manager service must be restarted.

To restart the Ultra M Manager service:

1 Check the Ultra M Manager Service Status, on page 13.

2 Stop the Ultra M Manager Service, on page 14.

3 Start the Ultra M Manager Service, on page 14.

4 Check the Ultra M Manager Service Status, on page 13.

Check the Ultra M Manager Service Status

It may be necessary to check the status of the Ultra M Manager service.

Note These instructions assume that you are already logged into the Ultra M Manager Node as the *root* user.

To check the Ultra M Manager status:

1 Check the service status.

service ultram_health.service status
Example Output – Inactive Service:

```
Redirecting to /bin/systemctl status ultram_health.service
 ultram_health.service - Cisco UltraM Health monitoring Service
   Loaded: loaded (/etc/systemd/system/ultram_health.service; enabled; vendor preset:
disabled)
   Active: inactive (dead)
```

Example Output – Active Service:

```
Redirecting to /bin/systemctl status ultram_health.service
 ultram_health.service - Cisco UltraM Health monitoring Service
   Loaded: loaded (/etc/systemd/system/ultram_health.service; enabled; vendor preset:
disabled)
   Active: active (running) since Sun 2017-09-10 22:20:20 EDT; 5s ago
 Main PID: 16982 (start_ultram_he)
   CGroup: /system.slice/ultram_health.service
           ├─16982 /bin/sh /usr/local/sbin/start_ultram_health
           ├─16983 python /opt/cisco/usp/ultram-health/ultram_health.py
/etc/ultram_cfg.yaml
           ├─16991 python /opt/cisco/usp/ultram-health/ultram_health.py
/etc/ultram_cfg.yaml
           └─17052 /usr/bin/python /bin/ironic node-show
19844e8d-2def-4be4-b2cf-937f34ebd117

Sep 10 22:20:20 ospd-tb1.mitg-bxb300.cisco.com systemd[1]: Started Cisco UltraM Health
monitoring Service.
Sep 10 22:20:20 ospd-tb1.mitg-bxb300.cisco.com systemd[1]: Starting Cisco UltraM Health
 monitoring Service...
Sep 10 22:20:20 ospd-tb1.mitg-bxb300.cisco.com start_ultram_health[16982]: 2017-09-10
22:20:20,411 - UCS Health Check started
```

2 Check the status of the mongo process.

ps -ef | grep mongo
Example output:

```
mongodb   3769     1  0 Aug23 ?       00:43:30 /usr/bin/mongod --quiet -f /etc/mongod.conf
 run
```

Stop the Ultra M Manager Service

It may be necessary to stop the Ultra M Manager service under certain circumstances.

Note These instructions assume that you are already logged into the Ultra M Manager Node as the root user.

To stop the Ultra M Manager service, enter the following command from the */opt/cisco/usp/ultram-health* directory:

./service ultram_health.service stop

Start the Ultra M Manager Service

It is necessary to start/restart the Ultra M Manager service in order to execute configuration changes and or after a reboot of the Ultra M Manager Node.

Note These instructions assume that you are already logged into the Ultra M Manager Node as the root user.

To start the Ultra M Manager service, enter the following command from the */opt/cisco/usp/ultram-health* directory:

./service ultram_health.service start

Uninstalling the Ultra M Manager

If you have previously installed the Ultra M Manager, you must uninstall it before installing newer releases.

To uninstall the Ultra M Manager:

1. Log on the Ultra M Manager Node.
2. Become the root user.

   sudo -i
3. Make a backup copy of the existing configuring file (e.g. /etc/ultram_cfg.yaml).
4. Check the installed version.

   yum list installed | grep ultra
   Example output:

```
ultram-manager.x86_64          5.1.3-1             installed
```

5. Uninstall the previous version.

   yum erase ultram-manager
   Example output:

```
Loaded plugins: enabled_repos_upload, package_upload, product-id, search-disabled-repos,
 subscription-manager, versionlock
Resolving Dependencies
--> Running transaction check
---> Package ultram-manager.x86_64 0:5.1.5-1 will be erased
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================

 Package                     Arch                Version                  Repository
         Size
================================================================================================
Removing:
 ultram-health               x86_64              5.1.5-1                  installed
        148 k

Transaction Summary
================================================================================================
Remove  1 Package

Installed size: 148 k
Is this ok [y/N]:
```

   Enter **y** at the prompt to continue.

   A message similar to the following is displayed upon completion:

```
Removed:
  ultram-health.x86_64 0:5.1.3-1

Complete!
Uploading Enabled Reposistories Report
Loaded plugins: product-id, versionlock
```

6. Proceed to Install the Ultra M Manager RPM, on page 12