Red Hat OpenStack Platform 16.1

Monitoring Tools Configuration Guide

A guide to OpenStack logging and monitoring tools

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Abstract

This guide provides information on configuring logging and monitoring for a Red Hat OpenStack Platform environment.

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CHAPTER 1. INTRODUCTION

Monitoring tools are an optional suite of tools designed to help operators maintain an OpenStack environment. The tools perform the following functions:

- Centralized logging: Allows you gather logs from all components in the OpenStack environment in one central location. You can identify problems across all nodes and services, and optionally, export the log data to Red Hat for assistance in diagnosing problems.

- Availability monitoring: Allows you to monitor all components in the OpenStack environment and determine if any components are currently experiencing outages or are otherwise not functional. You can also configure the system to alert you when problems are identified.

CHAPTER 2. MONITORING ARCHITECTURE

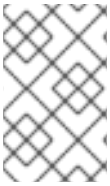
Monitoring tools use a client-server model with the client deployed onto the Red Hat OpenStack Platform overcloud nodes. The Rsyslog service provides client-side centralized logging (CL) and the collectd with enabled sensubility plugin provides client-side availability monitoring (AM).

2.1. CENTRALIZED LOGGING

In your Red Hat OpenStack environment, collecting the logs from all services in one central location simplifies debugging and administration. These logs come from the operating system, such as syslog and audit log files, infrastructure components such as RabbitMQ and MariaDB, and OpenStack services such as Identity, Compute, and others.

The centralized logging toolchain consists of the following components:

- Log Collection Agent (Rsyslog)
- Data Store (Elasticsearch)
- API/Presentation Layer (Kibana)



NOTE

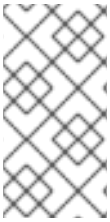
Red Hat OpenStack Platform director does not deploy the server-side components for centralized logging. Red Hat does not support the server-side components, including the Elasticsearch database and Kibana.

2.2. AVAILABILITY MONITORING

With availability monitoring, you have one central place to monitor the high-level functionality of all components across your entire OpenStack environment.

The availability monitoring toolchain consists of several components:

- Monitoring Agent (collectd with enabled sensubility plugin)
- Monitoring Relay/Proxy (RabbitMQ)
- Monitoring Controller/Server (Sensu server)
- API/Presentation Layer (Uchiwa)



NOTE

Red Hat OpenStack Platform director does not deploy the server-side components for availability monitoring. Red Hat does not support the server-side components, including Uchiwa, Sensu Server, the Sensu API plus RabbitMQ, and a Redis instance running on a monitoring node.

The availability monitoring components and their interactions are laid out in the following diagrams:

NOTE

Items shown in blue denote Red Hat-supported components.

Figure 2.1. Availability monitoring architecture at a high level

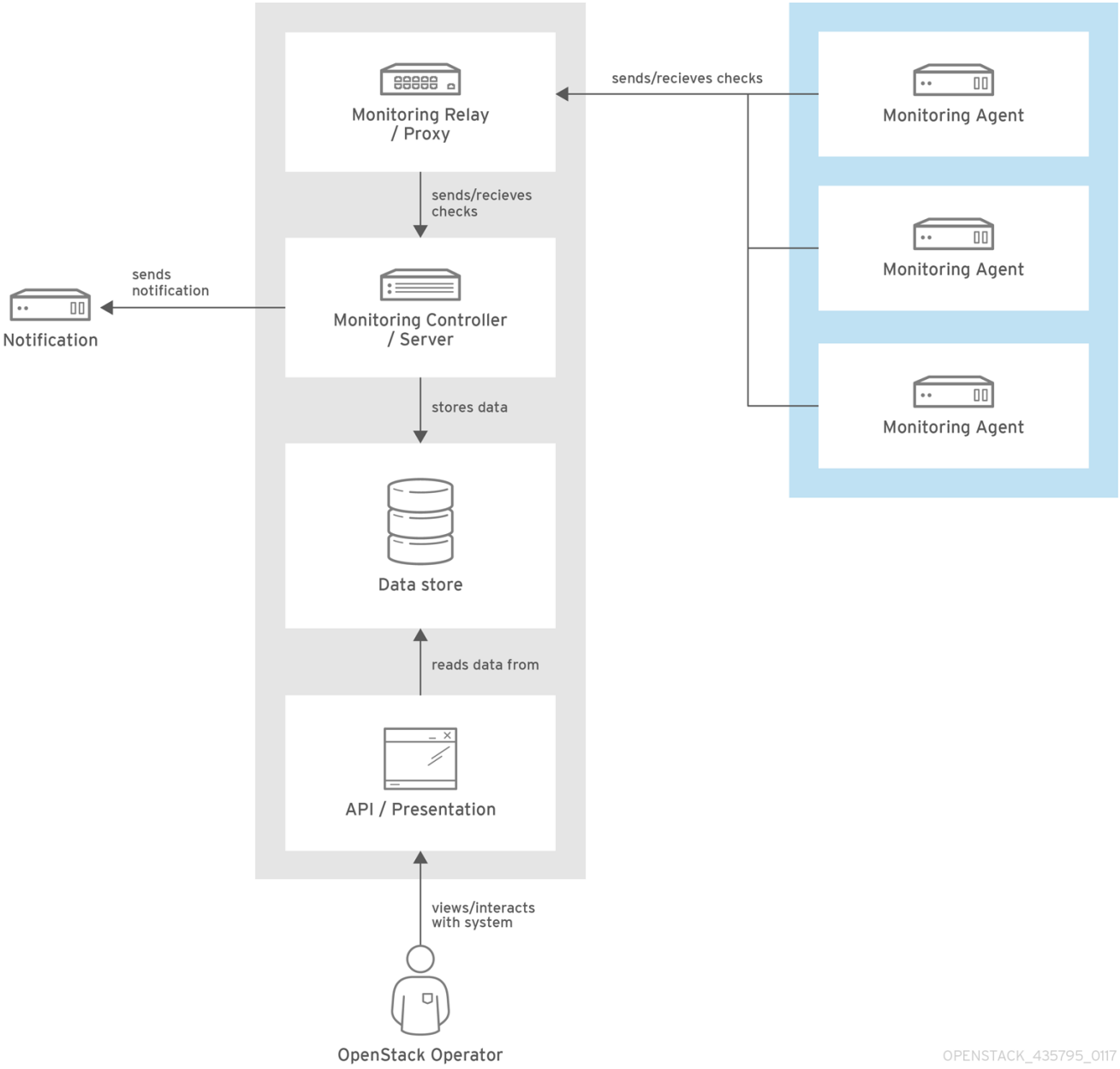


Figure 2.2. Single-node deployment for Red Hat OpenStack Platform

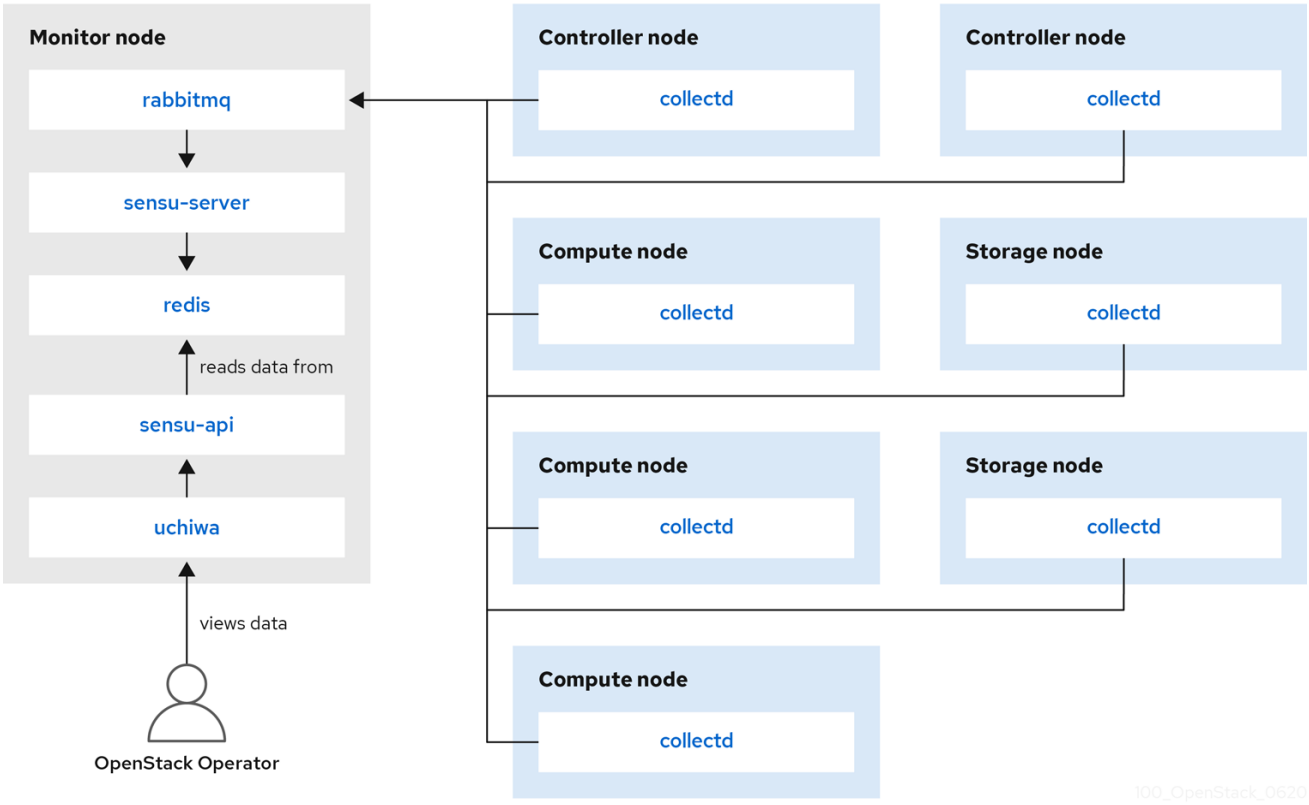
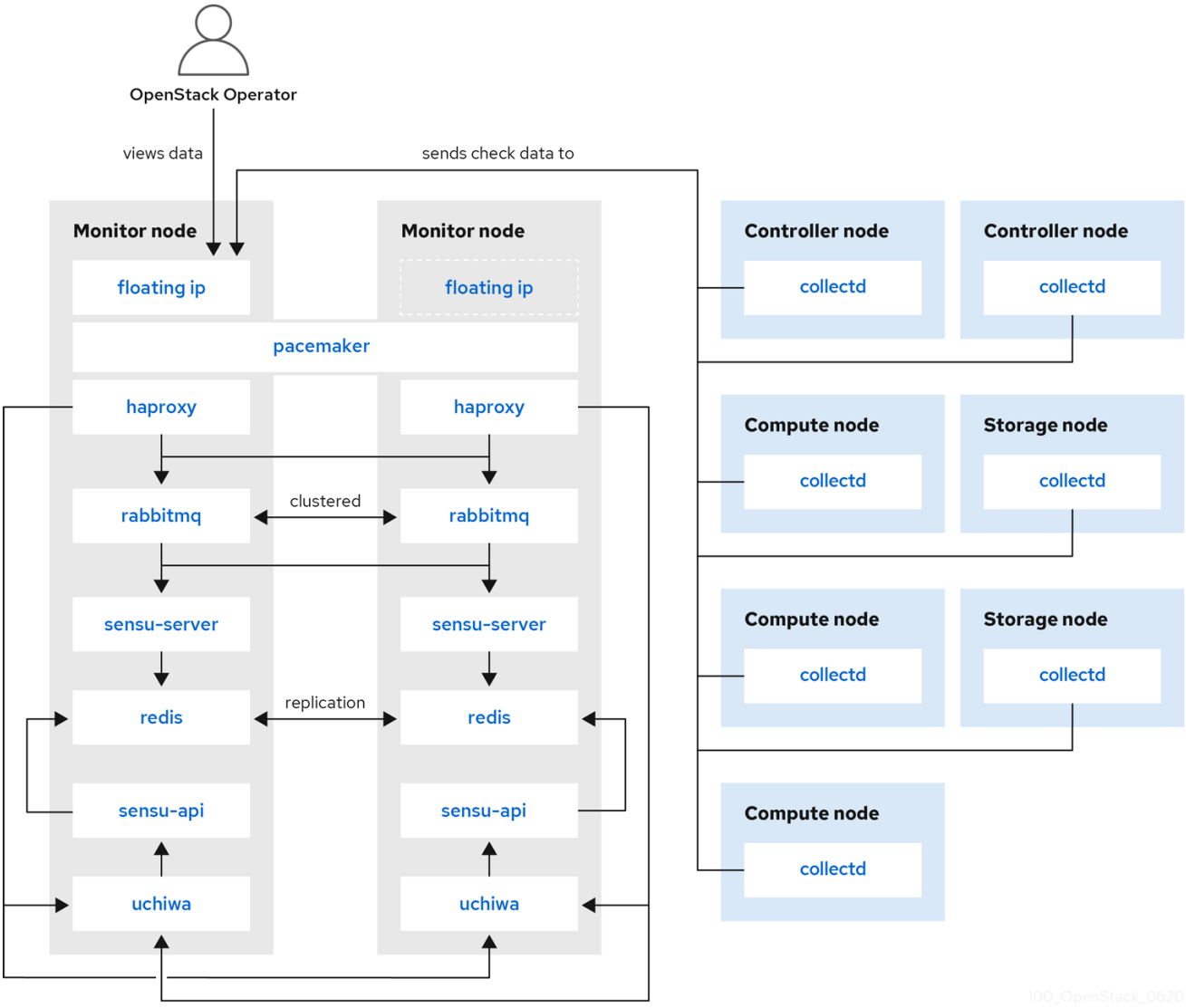


Figure 2.3. HA deployment for Red Hat OpenStack Platform



CHAPTER 3. INSTALLING THE CLIENT-SIDE TOOLS

Before you deploy the overcloud, you need to determine the configuration settings to apply to each client. Copy the example environment files from the heat template collection and modify the files to suit your environment.

3.1. SETTING CENTRALIZED LOGGING CLIENT PARAMETERS

For more information, see Enabling centralized logging during deployment in the *Logging, Monitoring, and Troubleshooting* guide.

3.2. SETTING MONITORING CLIENT PARAMETERS

The monitoring solution collects system information periodically and provides a mechanism to store and monitor the values in a variety of ways using a data collecting agent. Red Hat supports collectd as a collection agent. Collectd-sensubility is an extention of collectd and communicates with Sensu server side through RabbitMQ. You can use Service Telemetry Framework (STF) to store the data, and in turn, monitor systems, find performance bottlenecks, and predict future system load. For more information, see the *Service Telemetry Framework* guide.

To configure collectd and collectd-sensubility, complete the following steps:

1. Create **config.yaml** in your home directory, for example, **/home/templates/custom**, and configure the **MetricsQdrConnectors** parameter to point to STF server side:

```
MetricsQdrConnectors:
  - host: qdr-normal-sa-telemetry.apps.remote.tld
    port: 443
    role: inter-router
    sslProfile: sslProfile
    verifyHostname: false
MetricsQdrSSLProfiles:
  - name: sslProfile
```

2. In the **config.yaml** file, list the plug-ins you want to use under **CollectdExtraPlugins**. You can also provide parameters in the **ExtraConfig** section. By default, collectd comes with the **cpu**, **df**, **disk**, **hugepages**, **interface**, **load**, **memory**, **processes**, **tcpconns**, **unixsock**, and **uptime** plug-ins. You can add additional plug-ins using the **CollectdExtraPlugins** parameter. You can also provide additional configuration information for the **CollectdExtraPlugins** using the **ExtraConfig** option. For example, to enable the **virt** plug-in, and configure the connection string and the hostname format, use the following syntax:

```
parameter_defaults:
  CollectdExtraPlugins:
    - disk
    - df
    - virt

  ExtraConfig:
    collectd::plugin::virt::connection: "qemu:///system"
    collectd::plugin::virt::hostname_format: "hostname uuid"
```

NOTE

Do not remove the **unixsock** plug-in. Removal results in the permanent marking of the collectd container as unhealthy.

For more information about collectd plug-ins, see Section 3.3, “Collectd plug-in configurations” .

3. To enable collectd-sensubility, add the following environment configuration to the **config.yaml** file:

```
parameter_defaults:
  CollectdEnableSensubility: true

  # Use this if there is restricted access for your checks by using the sudo command.
  # The rule will be created in /etc/sudoers.d for sensubility to enable it calling restricted commands via sensubility executor.
  CollectdSensubilityExecSudoRule: "collectd ALL = NOPASSWD: <some command or ALL for all commands>"

  # Connection URL to Sensu server side for reporting check results.
  CollectdSensubilityConnection: "amqp://sensu:sensu@<sensu server side IP>:5672//sensu"

  # Interval in seconds for sending keepalive messages to Sensu server side.
  CollectdSensubilityKeepaliveInterval: 20

  # Path to temporary directory where the check scripts are created.
  CollectdSensubilityTmpDir: /var/tmp/collectd-sensubility-checks

  # Path to shell used for executing check scripts.
  CollectdSensubilityShellPath: /usr/bin/sh

  # To improve check execution rate use this parameter and value to change the number of goroutines spawned for executing check  scripts.
  CollectdSensubilityWorkerCount: 2

  # JSON-formatted definition of standalone checks to be scheduled on client side. If you need to schedule checks
  # on overcloud nodes instead of Sensu server, use this parameter. Configuration is compatible with Sensu check definition.
  # For more information, see https://docs.sensu.io/sensu-core/1.7/reference/checks/#check-definition-specification
  # There are some configuration options which sensubility ignores such as: extension, publish, cron, stdin, hooks.
  CollectdSensubilityChecks:
    example:
      command: "ping -c1 -W1 8.8.8.8"
      interval: 30

  # The following parameters are used to modify standard, standalone checks for monitoring container health on overcloud nodes.
  # Do not modify these parameters.
  # CollectdEnableContainerHealthCheck: true
  # CollectdContainerHealthCheckCommand: <snip>
  # CollectdContainerHealthCheckInterval: 10
  # The Sensu server side event handler to use for events created by the container health check.
```

```
# CollectdContainerHealthCheckHandlers:
#   - handle-container-health-check
# CollectdContainerHealthCheckOccurrences: 3
# CollectdContainerHealthCheckRefresh: 90
```

4. Deploy the overcloud. Include **config.yaml**, **collectd-write-qdr.yaml**, and one of the **qdr-*.yaml** files in your overcloud deploy command:

```
$ openstack overcloud deploy
-e  /home/templates/custom/config.yaml
-e tripleo-heat-templates/environments/metrics/collectd-write-qdr.yaml
-e tripleo-heat-templates/environments/metrics/qdr-form-controller-mesh.yaml
```

5. Optional: To enable overcloud RabbitMQ monitoring, include the **collectd-read-rabbitmq.yaml** file in your overcloud deploy command. For more information about the YAML files, see Section 3.4, "YAML files".

Additional resources

- For more information about collectd plug-ins, see Section 3.3, "Collectd plug-in configurations" .
- For more information about the YAML files, see Section 3.4, "YAML files".

3.3. COLLECTD PLUG-IN CONFIGURATIONS

There are many configuration possibilities of Red Hat OpenStack Platform director. You can configure multiple collectd plug-ins to suit your environment. Each documented plug-in has a description and example configuration. Some plug-ins have a table of metrics that you can query for from Grafana or Prometheus, and a list of options that you can configure, if available.

Additional resources

To view a complete list of collectd plug-in options, see collectd plug-ins in the *Service Telemetry Framework* guide.

3.3.1. amqp1

The amqp1 plug-in writes values to an amqp1 message bus, such as AMQ Interconnect.

Example configuration

```
Parameter_defaults:
  CollectdExtraPlugins:
    - amqp1
  ExtraConfig:
    collectd::plugin::amqp1::send_queue_limit: 50
```

3.3.2. cpu

Use the **cpu** plug-in to monitor the amount of time spent by the CPU in various states, for example, executing user code, executing system code, waiting for IO-operations, and being idle. The **cpu** plug-in does not collect percentages. It collects *jiffies*, the units of scheduling. On many Linux systems, there are approximately 100 jiffies in one second, but this does not mean that you get a percentage value.

Depending on system load, hardware, whether or not the system is virtualized, and other factors, there might be more or less than 100 jiffies in one second. There is no guarantee that all states add up to 100, which is a requirement for percentages.

Table 3.1. cpu metrics

Name	Description	Query
idle	Amount of idle time	collectd_cpu_total{...,type_instance=*idle*}
interrupt	CPU blocked by interrupts	collectd_cpu_total{...,type_instance=*interrupt*}
nice	Amount of time running low priority processes	collectd_cpu_total{...,type_instance=*nice*}
softirq	Amount of cycles spent in servicing interrupt requests	collectd_cpu_total{...,type_instance=*waitirq*}
steal	The percentage of time a virtual CPU waits for a real CPU while the hypervisor is servicing another virtual processor	collectd_cpu_total{...,type_instance=*steal*}
system	Amount spent on system level (kernel)	collectd_cpu_total{...,type_instance=*system*}
user	Jiffies used by user processes	collectd_cpu_total{...,type_instance=*user*}
wait	CPU waiting on outstanding I/O request	collectd_cpu_total{...,type_instance=*wait*}

Options

- collectd::plugin::cpu::reportbystate
- collectd::plugin::cpu::valuespercentage
- collectd::plugin::cpu::reportbycpu
- collectd::plugin::cpu::reportnumcpu
- collectd::plugin::cpu::reportgueststate
- collectd::plugin::cpu::subtractgueststate
- collectd::plugin::cpu::interval

Example configuration

```
parameter_defaults:
  CollectdExtraPlugins:
```

```
    - cpu
  ExtraConfig:
    collectd::plugin::cpu::reportbystate: true
```

Additional resources

For more information about configuring the **cpu** plug-in, see cpu plug-in.

3.3.3. ovs_stats

Use the **ovs_stats** plug-in to collect statistics of OVS connected interfaces. This plug-in uses the OVSDB management protocol (RFC7047) monitor mechanism to get statistics from OVSDB.

Options

- collectd::plugin::ovs_stats::address
- collectd::plugin::ovs_stats::bridges
- collectd::plugin::ovs_stats::port
- collectd::plugin::ovs_stats::socket

Example configuration

```
parameter_defaults:
  CollectdExtraPlugins:
    - ovs_stats
  ExtraConfig:
    collectd::plugin::ovs_stats:
```

Additional resources

- For more information about configuring the **ovs_stats** plug-in, see ovs_stats upstream.

3.3.4. mcelog

Use the **mcelog** plug-in to send notifications and statistics relevant to Machine Check Exceptions when they occur. Configure **mcelog** to run on the platform in daemon mode and ensure that logging capabilities are enabled.

Example configuration

```
parameter_defaults:
  CollectdExtraPlugins: mcelog
  CollectdEnableMcelog: true
```

Additional resources

- For more information about configuring the **mcelog** plug-in, see mcelog upstream.

3.3.5. pcie_errors

Use the **pcie_errors** plug-in to poll PCI config space for baseline and Advanced Error Reporting (AER) errors, and to parse syslog for AER events. Errors are reported through notifications.

Options

- collectd::plugin::pcie_errors::reportbystate
- collectd::plugin::pcie_errors::source
- collectd::plugin::pcie_errors::access
- collectd::plugin::pcie_errors::reportmasked
- collectd::plugin::pcie_errors::persistentnotifications

Example configuration

```
parameter_defaults:
  CollectdExtraPlugins:
    - pcie_errors
```

Additional resources

- For more information about configuring the **pcie_errors** plug-in, see pcie_errors upstream.

3.3.6. write_http

This output plug-in submits values to an HTTP server using POST requests and encoding metrics with JSON or using the PUTVAL command.

Options

- collectd::plugin::write_http::url
- collectd::plugin::write_http::password
- collectd::plugin::write_http::username
- collectd::plugin::write_http::verifypeer
- collectd::plugin::write_http::verifyhost
- collectd::plugin::write_http::cacert
- collectd::plugin::write_http::capath
- collectd::plugin::write_http::clientkey
- collectd::plugin::write_http::clientcert
- collectd::plugin::write_http::clientkeypass
- collectd::plugin::write_http::header
- collectd::plugin::write_http::sslversion

- collectd::plugin::write_http::format
- collectd::plugin::write_http::attribute
- collectd::plugin::write_http::ttl
- collectd::plugin::write_http::prefix
- collectd::plugin::write_http::metrics
- collectd::plugin::write_http::notifications
- collectd::plugin::write_http::storerates
- collectd::plugin::write_http::buffersize
- collectd::plugin::write_http::lowspeedlimit
- collectd::plugin::write_http::timeout
- collectd::plugin::write_http::loghttperror

Example configuration

```
parameter_defaults:
  CollectdExtraPlugins:
    - write_http
  ExtraConfig:
    collectd::plugin::write_http::nodes:
      collectd:
        url: "http://collectd.tld.org/collectd"
        metrics: true
        header: “X-Custom-Header: custom_value"
```

Additional resources

- For more information about configuring the **write_http** plug-in, see write_http upstream.

3.4. YAML FILES

You can include the following YAML files in your **overcloud deploy** command when you configure collectd:

- **collectd-read-rabbitmq.yaml**: Enables and configures **python-collect-rabbitmq** to monitor the overcloud RabbitMQ instance.
- **collectd-write-qdr.yaml**: Enables collectd to send telemetry and notification data through AMQ Interconnect.
- **qdr-edge-only.yaml**: Enables deployment of AMQ Interconnect. Each overcloud node has one local qdrouterd service running and operating in edge mode. For example, sending received data straight to defined **MetricsQdrConnectors**.
- **qdr-form-controller-mesh.yaml**: Enables deployment of AMQ Interconnect. Each overcloud node has one local qdrouterd service forming a mesh topology. For example, AMQ Interconnect routers on controllers operate in interior router mode, with connections to defined

MetricsQdrConnectors, and AMQ Interconnect routers on other node types connect in edge mode to the interior routers running on the controllers.

Additional resources

For more information about configuring collectd, see Section 3.2, “Setting monitoring client parameters”.