Red Hat OpenStack Platform 17.1

Service Telemetry Framework 1.5

Installing and deploying Service Telemetry Framework 1.5

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Abstract

Install the core components and deploy Service Telemetry Framework 1.5

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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright's message.

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CHAPTER 1. INTRODUCTION TO SERVICE TELEMETRY FRAMEWORK 1.5

Service Telemetry Framework (STF) collects monitoring data from Red Hat OpenStack Platform (RHOSP) or third-party nodes. You can use STF to perform the following tasks:

- Store or archive the monitoring data for historical information.
- View the monitoring data graphically on the dashboard.
- Use the monitoring data to trigger alerts or warnings.

The monitoring data can be either metric or event:

Metric

A numeric measurement of an application or system.

Event

Irregular and discrete occurrences that happen in a system.

The components of STF use a message bus for data transport. Other modular components that receive and store data are deployed as containers on Red Hat OpenShift Container Platform.

IMPORTANT

STF is compatible with Red Hat OpenShift Container Platform Extended Update Support (EUS) release versions 4.12 and 4.14.

Additional resources

- Red Hat OpenShift Container Platform product documentation
- Service Telemetry Framework Performance and Scaling
- OpenShift Container Platform 4.14 Documentation
- Red Hat OpenShift Container Platform Life Cycle Policy

1.1. SUPPORT FOR SERVICE TELEMETRY FRAMEWORK

Red Hat supports the core Operators and workloads, including AMQ Interconnect, Cluster Observability Operator (Prometheus, Alertmanager), Service Telemetry Operator, and Smart Gateway Operator. Red Hat does not support the community Operators or workload components, inclusive of Elasticsearch, Grafana, and their Operators.

You can deploy Service Telemetry Framework (STF) in fully connected network environments or in Red Hat OpenShift Container Platform-disconnected environments. You cannot deploy STF in network proxy environments.

For more information about STF life cycle and support status, see the Service Telemetry Framework Supported Version Matrix.

1.2. SERVICE TELEMETRY FRAMEWORK ARCHITECTURE

Service Telemetry Framework (STF) uses a client-server architecture, in which Red Hat OpenStack Platform (RHOSP) is the client and Red Hat OpenShift Container Platform is the server.

By default, STF collects, transports, and stores metrics information.

You can collect RHOSP events data, transport it with the message bus, and forward it to a user-provided Elasticsearch from the Smart Gateways, but this option is deprecated.

STF consists of the following components:

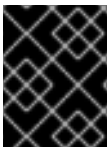
- Data collection
  - collectd: Collects infrastructure metrics and events on RHOSP.
  - Ceilometer: Collects RHOSP metrics and events on RHOSP.
- Transport
  - AMQ Interconnect: An AMQP 1.x compatible messaging bus that provides fast and reliable data transport to transfer the metrics from RHOSP to STF for storage or forwarding.
  - Smart Gateway: A Golang application that takes metrics and events from the AMQP 1.x bus to deliver to Prometheus or an external Elasticsearch.
- Data storage
  - Prometheus: Time-series data storage that stores STF metrics received from the Smart Gateway.
  - Alertmanager: An alerting tool that uses Prometheus alert rules to manage alerts.
- User provided components
  - Grafana: A visualization and analytics application that you can use to query, visualize, and explore data.
  - Elasticsearch: Events data storage that stores RHOSP events received and forwarded by the Smart Gateway.

The following table describes the application of the client and server components:

Table 1.1. Client and server components of STF

Component	Client	Server
An AMQP 1.x compatible messaging bus	yes	yes
Smart Gateway	no	yes
Prometheus	no	yes
Elasticsearch	no	yes
Grafana	no	yes

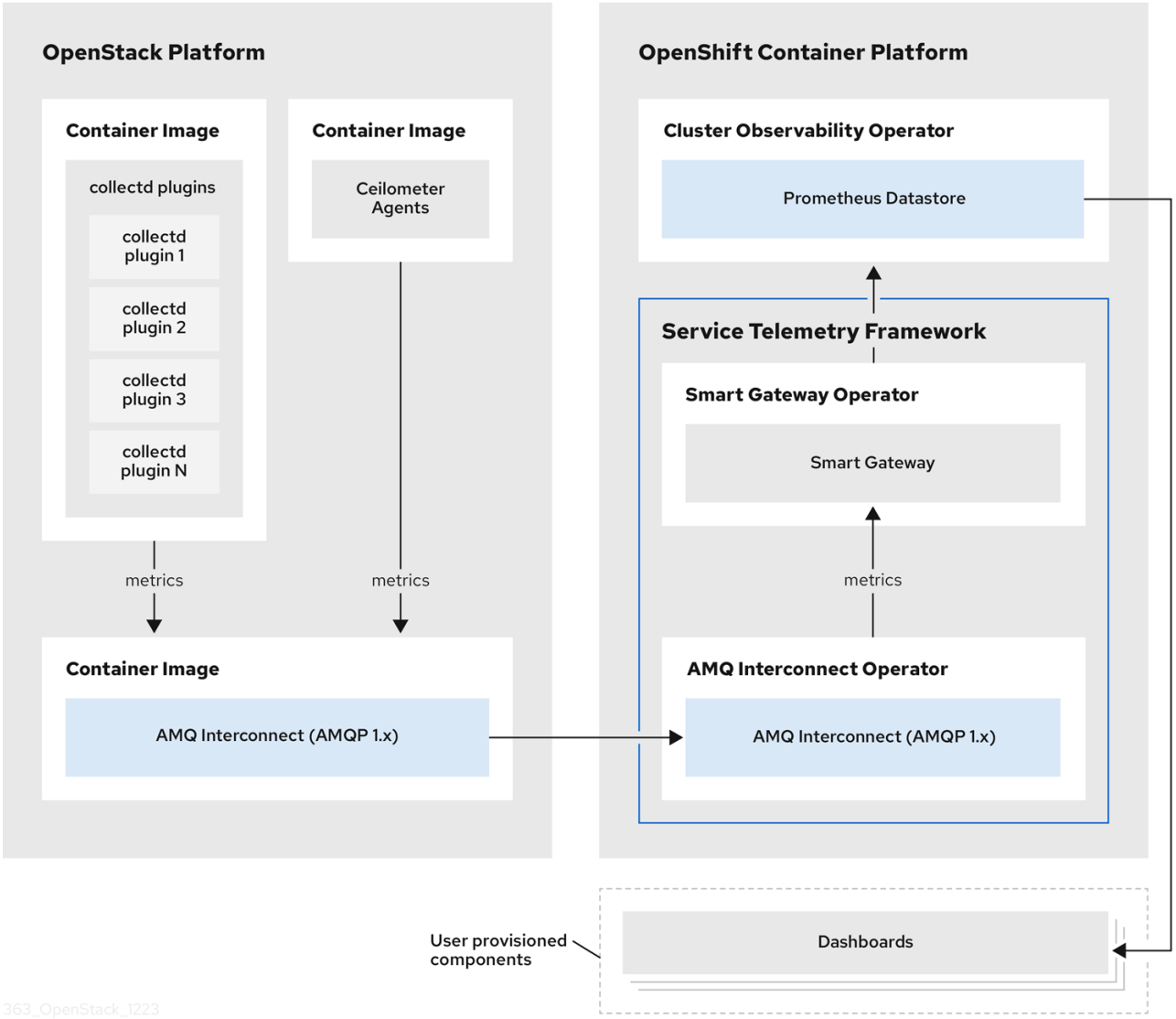
Component	Client	Server
collectd	yes	no
Ceilometer	yes	no



IMPORTANT

To ensure that the monitoring platform can report operational problems with your cloud, do not install STF on the same infrastructure that you are monitoring.

Figure 1.1. Service Telemetry Framework architecture overview



For client side metrics, collectd provides infrastructure metrics without project data, and Ceilometer provides RHOSP platform data based on projects or user workload. Both Ceilometer and collectd deliver data to Prometheus by using the AMQ Interconnect transport, delivering the data through the message bus. On the server side, a Golang application called the Smart Gateway takes the data stream from the bus and exposes it as a local scrape endpoint for Prometheus.

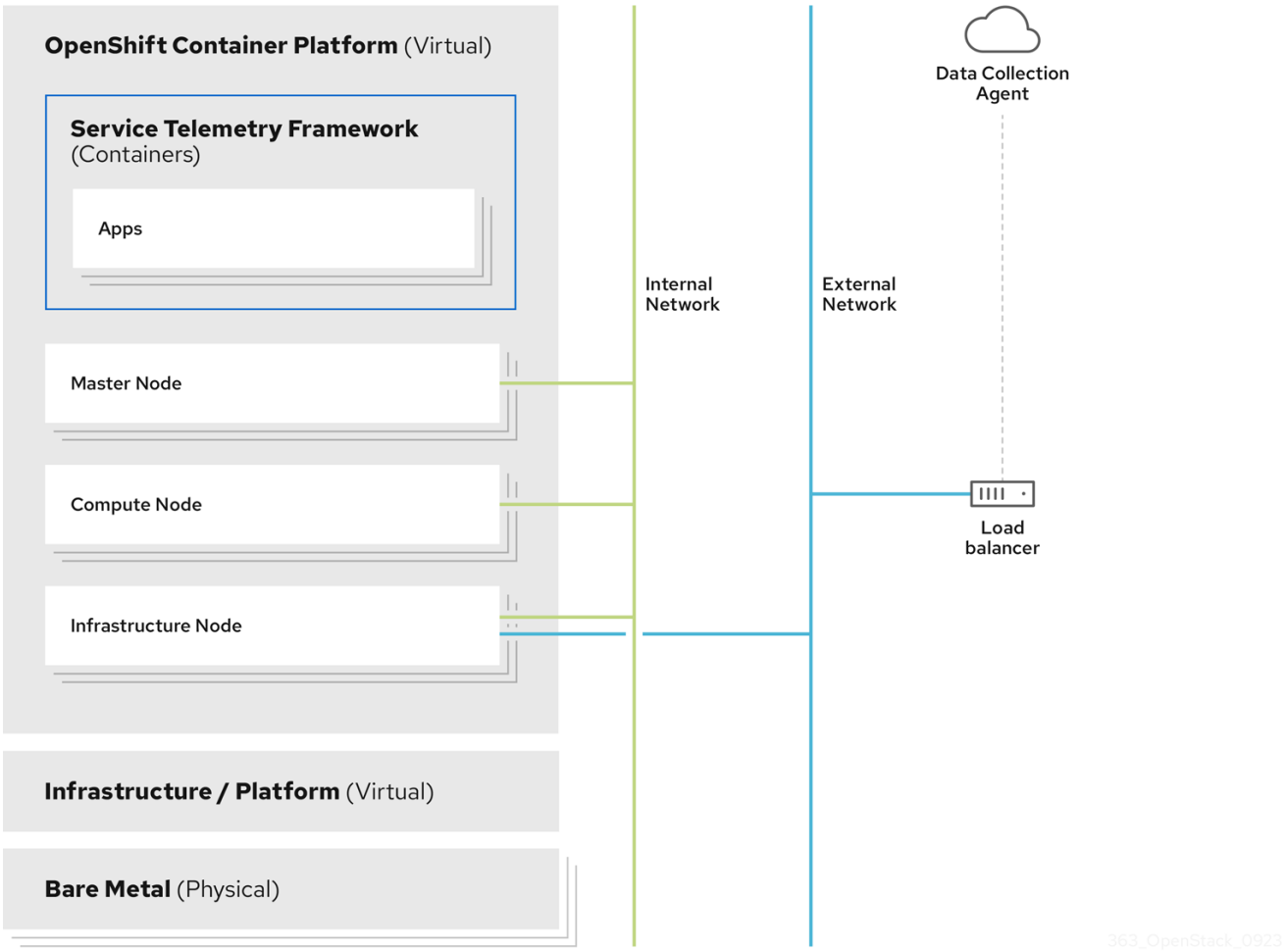
When you collect and store events, collectd and Ceilometer deliver event data to the server side by using the AMQ Interconnect transport. Another Smart Gateway forwards the data to a user-provided Elasticsearch datastore.

Server-side STF monitoring infrastructure consists of the following layers:

- Service Telemetry Framework 1.5
- Red Hat OpenShift Container Platform Extended Update Support (EUS) releases 4.12 and 4.14
- Infrastructure platform

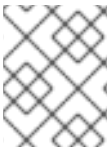
For more information about the Red Hat OpenShift Container Platform EUS releases, see Red Hat OpenShift Container Platform Life Cycle Policy.

Figure 1.2. Server-side STF monitoring infrastructure



1.2.1. STF Architecture Changes

In releases of STF prior to 1.5.3, the Service Telemetry Operator requested instances of Elasticsearch from the Elastic Cloud on Kubernetes (ECK) Operator. STF now uses a forwarding model, where events are forwarded from a Smart Gateway instance to a user-provided instance of Elasticsearch.



NOTE

The management of an Elasticsearch instances by Service Telemetry Operator is deprecated.

In new **ServiceTelemetry** deployments, the **observabilityStrategy** parameter has a value of **use_redhat**, that does not request Elasticsearch instances from ECK. Deployments of **ServiceTelemetry** with STF version 1.5.2 or older and were updated to 1.5.3 will have the **observabilityStrategy** parameter set to **use_community**, which matches the previous architecture.

If a user previously deployed an Elasticsearch instance with STF, the Service Telemetry Operator updates the **ServiceTelemetry** custom resource object to have the **observabilityStrategy** parameter set to **use_community**, and functions similar to previous releases. For more information about observability strategies, see Section 2.1, "Observability Strategy in Service Telemetry Framework" .

It is recommended that users of STF migrate to the **use_redhat** observability strategy. For more information about migration to the **use_redhat** observability strategy, see the Red Hat Knowledge Base article Migrating Service Telemetry Framework to fully supported operators .

1.3. INSTALLATION SIZE OF RED HAT OPENSHIFT CONTAINER PLATFORM

The size of your Red Hat OpenShift Container Platform installation depends on the following factors:

- The infrastructure that you select.
- The number of nodes that you want to monitor.
- The number of metrics that you want to collect.
- The resolution of metrics.
- The length of time that you want to store the data.

Installation of Service Telemetry Framework (STF) depends on an existing Red Hat OpenShift Container Platform environment.

For more information about minimum resources requirements when you install Red Hat OpenShift Container Platform on baremetal, see Minimum resource requirements in the *Installing a cluster on bare metal* guide. For installation requirements of the various public and private cloud platforms that you can install, see the corresponding installation documentation for your cloud platform of choice.

CHAPTER 2. PREPARING YOUR RED HAT OPENSHIFT CONTAINER PLATFORM ENVIRONMENT FOR SERVICE TELEMETRY FRAMEWORK

To prepare your Red Hat OpenShift Container Platform environment for Service Telemetry Framework (STF), you must plan for persistent storage, adequate resources, event storage, and network considerations:

- Ensure that you have persistent storage available in your Red Hat OpenShift Container Platform cluster for a production-grade deployment. For more information, see Section 2.2, "Persistent volumes".
- Ensure that enough resources are available to run the Operators and the application containers. For more information, see Section 2.3, "Resource allocation".

2.1. OBSERVABILITY STRATEGY IN SERVICE TELEMETRY FRAMEWORK

Service Telemetry Framework (STF) does not include event storage backends or dashboarding tools. STF can optionally create datasource configurations for Grafana using the community operator to provide a dashboarding interface.

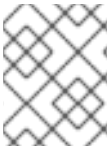
Instead of having Service Telemetry Operator create custom resource requests, you can use your own deployments of these applications or other compatible applications, and scrape the metrics Smart Gateways for delivery to your own Prometheus-compatible system for telemetry storage. If you set the **observabilityStrategy** to **none**, then storage backends will not be deployed so persistent storage will not be required by STF.

Use the observabilityStrategy property on the STF object to specify which type of observability components will be deployed.

The following values are available:

value	meaning
use_redhat	Red Hat supported components are requested by STF. This includes Prometheus and Alertmanager from the Cluster Observability Operator, but no resource requests to Elastic Cloud on Kubernetes (ECK) Operator. If enabled, resources are also requested from the Grafana Operator (community component).
use_hybrid	In addition to the Red Hat supported components, Elasticsearch and Grafana resources are also requested (if specified in the ServiceTelemetry object)

value	meaning
use_community	The community version of Prometheus Operator is used instead of Cluster Observability Operator. Elasticsearch and Grafana resources are also requested (if specified in the ServiceTelemetry object)
none	No storage or alerting components are deployed



NOTE

Newly deployed STF environments as of 1.5.3 default to **use_redhat**. Existing STF deployments created before 1.5.3 default to **use_community**.

To migrate an existing STF deployment to **use_redhat**, see the Red Hat Knowledge Base article Migrating Service Telemetry Framework to fully supported operators .

2.2. PERSISTENT VOLUMES

Service Telemetry Framework (STF) uses persistent storage in Red Hat OpenShift Container Platform to request persistent volumes so that Prometheus can store metrics.

When you enable persistent storage through the Service Telemetry Operator, the Persistent Volume Claims (PVC) requested in an STF deployment results in an access mode of RWO (ReadWriteOnce). If your environment contains pre-provisioned persistent volumes, ensure that volumes of RWO are available in the Red Hat OpenShift Container Platform default configured **storageClass**.

Additional resources

- For more information about configuring persistent storage for Red Hat OpenShift Container Platform, see Understanding persistent storage.
- For more information about recommended configurable storage technology in Red Hat OpenShift Container Platform, see Recommended configurable storage technology .
- For more information about configuring persistent storage for Prometheus in STF, see the section called “Configuring persistent storage for Prometheus”.

2.3. RESOURCE ALLOCATION

To enable the scheduling of pods within the Red Hat OpenShift Container Platform infrastructure, you need resources for the components that are running. If you do not allocate enough resources, pods remain in a **Pending** state because they cannot be scheduled.

The amount of resources that you require to run Service Telemetry Framework (STF) depends on your environment and the number of nodes and clouds that you want to monitor.

Additional resources

- For recommendations about sizing for metrics collection, see the Red Hat Knowledge Base article Service Telemetry Framework Performance and Scaling.

2.4. NETWORK CONSIDERATIONS FOR SERVICE TELEMETRY FRAMEWORK

You can deploy Service Telemetry Framework (STF) in fully connected network environments or in Red Hat OpenShift Container Platform-disconnected environments. You cannot deploy STF in network proxy environments.

2.5. DEPLOYING STF ON RED HAT OPENSHIFT CONTAINER PLATFORM-DISCONNECTED ENVIRONMENTS

Since Service Telemetry Framework (STF) version 1.5.4, you can deploy STF in Red Hat OpenShift Container Platform-disconnected environments.

Prerequisites

- Red Hat OpenShift Container Platform Extended Update Support (EUS) version 4.12 or 4.14 deployed in a restricted network.
- A mirror registry so that the Red Hat OpenShift Container Platform cluster can access the required images. For more information about mirror registries, see Disconnected installation mirroring in the Red Hat OpenShift Container Platform *Installing* guide.
- All the STF dependencies are available in the Red Hat OpenShift Container Platform cluster mirror registry.

Adding STF dependencies to the mirror registry

You can use the **oc-mirror** plugin to fetch the STF dependencies and add them to the Red Hat OpenShift Container Platform cluster mirror registry. For more information about installing the **oc-mirror** plugin, see Mirroring images for a disconnected installation using the oc-mirror plugin in the Red Hat OpenShift Container Platform *Installing* guide.

Procedure

1. Create an **imagesetconfig.yaml** file in your local working directory:

   imagesetconfig.yaml

```
apiVersion: mirror.openshift.io/v1alpha2
kind: ImageSetConfiguration
storageConfig:
  local:
    path: ./
mirror:
  operators:
  - catalog: registry.redhat.io/redhat/redhat-operator-index:v4.14
    packages:
      - name: service-telemetry-operator
        channels:
          - name: stable-1.5
      - name: openshift-cert-manager-operator
        channels:
          - name: stable-v1
```

```
- name: amq7-interconnect-operator
  channels:
    - name: 1.10.x
- name: smart-gateway-operator
  channels:
    - name: stable-1.5
- name: cluster-observability-operator
  channels:
    - name: development
```

2. (Optional) If your mirror registry is not reachable, you can save the manifests and images that you fetched with **oc-mirror** and physically transfer them to the mirror registry and Red Hat OpenShift Container Platform cluster. Otherwise you can run **oc-mirror** and point to the mirror registry.
   You can use the **oc-mirror** plugin differently, depending on your environment, such as:

   - mirroring between mirrors.
   - mirror from mirror to disk.
   - mirror from disk to mirror.
     For more information about different **oc-mirror** scenarios, see Mirroring an image set in a fully disconnected environment in the Red Hat OpenShift Container Platform *Installing* guide.

3. Push the STF operators and their dependencies from the mirror registry and generate the manifest for the Red Hat OpenShift Container Platform cluster.

```
$ oc-mirror --config imagesetconfig.yaml <mirror_registry_location>
```

   - Replace <mirror_registry_location> with the filepath to the mirror registry that you want to use.

4. Locate the generated manifests and apply them to the target Red Hat OpenShift Container Platform cluster. For more information, see Configuring your cluster to use the resources generated by oc-mirror in the Red Hat OpenShift Container Platform *Installing* guide.

NOTE

The manifests that you generate with **oc-mirror** produce catalogs with the full index name, such as **redhat-operator-index** instead of **redhat-operators** for **CatalogSource**. Ensure that you use the correct index name for the STF subscriptions. For more information, see Section 3.1, "Deploying Service Telemetry Framework to the Red Hat OpenShift Container Platform environment". For more information about customizing Operators with oc mirror, see the Red Hat Knowledgebase solution How to customize the catalog name and tags of Operators mirrored to the mirror registry using the oc mirror plugin.

Verification

- Check that the catalog sources are applied. You can return the entries for new catalogs that reference the STF operators and their dependencies:

```
$ oc get catalogsources
```

- You have deployed STF in a disconnected Red Hat OpenShift Container Platform cluster and therefore cannot access external networks.

CHAPTER 3. INSTALLING THE CORE COMPONENTS OF SERVICE TELEMETRY FRAMEWORK

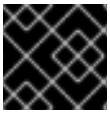
You can use Operators to load the Service Telemetry Framework (STF) components and objects. Operators manage each of the following STF core components:

- Certificate Management
- AMQ Interconnect
- Smart Gateways
- Prometheus and Alertmanager

Service Telemetry Framework (STF) uses other supporting Operators as part of the deployment. STF can resolve most dependencies automatically, but you need to pre-install some Operators, such as Cluster Observability Operator, which provides an instance of Prometheus and Alertmanager, and cert-manager for Red Hat OpenShift, which provides management of certificates.

Prerequisites

- An Red Hat OpenShift Container Platform Extended Update Support (EUS) release version 4.12 or 4.14 is running.
- You have prepared your Red Hat OpenShift Container Platform environment and ensured that there is persistent storage and enough resources to run the STF components on top of the Red Hat OpenShift Container Platform environment. For more information about STF performance, see the Red Hat Knowledge Base article Service Telemetry Framework Performance and Scaling.
- You have deployed STF in a fully connected or Red Hat OpenShift Container Platform-disconnected environments. STF is unavailable in network proxy environments.



IMPORTANT

STF is compatible with Red Hat OpenShift Container Platform versions 4.12 and 4.14.

Additional resources

- For more information about Operators, see the *Understanding Operators* guide.
- For more information about Operator catalogs, see *Red Hat-provided Operator catalogs* .
- For more information about the cert-manager Operator for Red Hat, see *cert-manager Operator for Red Hat OpenShift overview*.
- For more information about Cluster Observability Operator, see *Cluster Observability Operator Overview*.
- For more information about OpenShift life cycle policy and Extended Update Support (EUS), see *Red Hat OpenShift Container Platform Life Cycle Policy* .

3.1. DEPLOYING SERVICE TELEMETRY FRAMEWORK TO THE RED HAT OPENSHIFT CONTAINER PLATFORM ENVIRONMENT

Deploy Service Telemetry Framework (STF) to collect and store Red Hat OpenStack Platform (RHOSP) telemetry.

3.1.1. Deploying Cluster Observability Operator

You must install the Cluster Observability Operator (COO) before you create an instance of Service Telemetry Framework (STF) if the **observabilityStrategy** is set to **use_redhat** and the **backends.metrics.prometheus.enabled** is set to **true** in the **ServiceTelemetry** object. For more information about COO, see Cluster Observability Operator overview in the *OpenShift Container Platform Documentation*.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. To store metrics in Prometheus, enable the Cluster Observability Operator by using the **redhat-operators** CatalogSource:

```
$ oc create -f - <<EOF
apiVersion: operators.coreos.com/v1alpha1
kind: Subscription
metadata:
  name: cluster-observability-operator
  namespace: openshift-operators
spec:
  channel: development
  installPlanApproval: Automatic
  name: cluster-observability-operator
  source: redhat-operators
  sourceNamespace: openshift-marketplace
EOF
```

3. Verify that the **ClusterServiceVersion** for Cluster Observability Operator has a status of **Succeeded**:

```
$ oc wait --for jsonpath="{.status.phase}"=Succeeded csv --namespace=openshift-operators
-l operators.coreos.com/cluster-observability-operator.openshift-operators

clusterserviceversion.operators.coreos.com/observability-operator.v0.0.26 condition met
```

3.1.2. Deploying cert-manager for Red Hat OpenShift

The cert-manager for Red Hat OpenShift (cert-manager) Operator must be pre-installed before creating an instance of Service Telemetry Framework (STF). For more information about cert-manager, see cert-manager for Red Hat OpenShift overview .

In previous versions of STF, the only available cert-manager channel was **tech-preview** which is available until Red Hat OpenShift Container Platform v4.12. Installations of cert-manager on versions of Red Hat OpenShift Container Platform v4.14 and later must be installed from the **stable-v1** channel. For new installations of STF it is recommended to install cert-manager from the **stable-v1** channel.

WARNING

Only one deployment of cert-manager can be installed per Red Hat OpenShift Container Platform cluster. Subscribing to cert-manager in more than one project causes the deployments to conflict with each other.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. Verify cert-manager is not already installed on the Red Hat OpenShift Container Platform cluster. If any results are returned, do not install another instance of cert-manager:

```
$ oc get sub --all-namespaces -o json | jq '.items[] | select(.metadata.name | match("cert-manager")) | .metadata.name'
```

3. Create a namespace for the cert-manager Operator:

```
$ oc create -f - <<EOF
apiVersion: project.openshift.io/v1
kind: Project
metadata:
  name: cert-manager-operator
spec:
  finalizers:
  - kubernetes
EOF
```

4. Create an OperatorGroup for the cert-manager Operator:

```
$ oc create -f - <<EOF
apiVersion: operators.coreos.com/v1
kind: OperatorGroup
metadata:
  name: cert-manager-operator
  namespace: cert-manager-operator
spec:
  targetNamespaces:
  - cert-manager-operator
  upgradeStrategy: Default
EOF
```

5. Subscribe to the cert-manager Operator by using the redhat-operators CatalogSource:

```
$ oc create -f - <<EOF
apiVersion: operators.coreos.com/v1alpha1
kind: Subscription
metadata:
  name: openshift-cert-manager-operator
  namespace: cert-manager-operator
```

```
  labels:
    operators.coreos.com/openshift-cert-manager-operator.cert-manager-operator: ""
spec:
  channel: stable-v1
  installPlanApproval: Automatic
  name: openshift-cert-manager-operator
  source: redhat-operators
  sourceNamespace: openshift-marketplace
EOF
```

6. Validate your ClusterServiceVersion. Ensure that cert-manager Operator displays a phase of **Succeeded**:

```
oc wait --for jsonpath="{.status.phase}"=Succeeded csv --namespace=cert-manager-operator --selector=operators.coreos.com/openshift-cert-manager-operator.cert-manager-operator

clusterserviceversion.operators.coreos.com/cert-manager-operator.v1.12.1 condition met
```

3.1.3. Deploying Service Telemetry Operator

Deploy Service Telemetry Operator on Red Hat OpenShift Container Platform to provide the supporting Operators and interface for creating an instance of Service Telemetry Framework (STF) to monitor Red Hat OpenStack Platform (RHOSP) cloud platforms.

Prerequisites

- You have installed Cluster Observability Operator to allow storage of metrics. For more information, see Section 3.1.1, “Deploying Cluster Observability Operator”.
- You have installed cert-manager for Red Hat OpenShift to allow certificate management. For more information, see Section 3.1.2, “Deploying cert-manager for Red Hat OpenShift” .

Procedure

1. Create a namespace to contain the STF components, for example, **service-telemetry**:

```
$ oc new-project service-telemetry
```

2. Create an OperatorGroup in the namespace so that you can schedule the Operator pods:

```
$ oc create -f - <<EOF
apiVersion: operators.coreos.com/v1
kind: OperatorGroup
metadata:
  name: service-telemetry-operator-group
  namespace: service-telemetry
spec:
  targetNamespaces:
  - service-telemetry
EOF
```

For more information, see OperatorGroups.

3. Create the Service Telemetry Operator subscription to manage the STF instances:

```
$ oc create -f - <<EOF
apiVersion: operators.coreos.com/v1alpha1
kind: Subscription
metadata:
  name: service-telemetry-operator
  namespace: service-telemetry
spec:
  channel: stable-1.5
  installPlanApproval: Automatic
  name: service-telemetry-operator
  source: redhat-operators
  sourceNamespace: openshift-marketplace
EOF
```

4. Validate the Service Telemetry Operator and the dependent operators have their phase as Succeeded:

```
$ oc wait --for jsonpath="{.status.phase}"=Succeeded csv --namespace=service-telemetry -l
operators.coreos.com/service-telemetry-operator.service-telemetry ; oc get csv --namespace
service-telemetry

clusterserviceversion.operators.coreos.com/service-telemetry-operator.v1.5.1700688542
condition met

NAME                                         DISPLAY                          VERSION         REPLACES
PHASE
amq7-interconnect-operator.v1.10.17          Red Hat Integration - AMQ Interconnect   1.10.17
amq7-interconnect-operator.v1.10.4   Succeeded
observability-operator.v0.0.26               Cluster Observability Operator           0.1.0
Succeeded
service-telemetry-operator.v1.5.1700688542   Service Telemetry Operator
1.5.1700688542                               Succeeded
smart-gateway-operator.v5.0.1700688539       Smart Gateway Operator
5.0.1700688539                               Succeeded
```

3.2. CREATING A SERVICETELEMETRY OBJECT IN RED HAT OPENSHIFT CONTAINER PLATFORM

Create a **ServiceTelemetry** object in Red Hat OpenShift Container Platform to result in the Service Telemetry Operator creating the supporting components for a Service Telemetry Framework (STF) deployment. For more information, see Section 3.2.1, “Primary parameters of the ServiceTelemetry object”.

Prerequisites

- You have deployed STF and the supporting operators. For more information, see Section 3.1, “Deploying Service Telemetry Framework to the Red Hat OpenShift Container Platform environment”.
- You have installed Cluster Observability Operator to allow storage of metrics. For more information, see Section 3.1.1, “Deploying Cluster Observability Operator”.

- You have installed cert-manager for Red Hat OpenShift to allow certificate management. For more information, see Section 3.1.2, "Deploying cert-manager for Red Hat OpenShift" .

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. To deploy STF that results in the core components for metrics delivery being configured, create a **ServiceTelemetry** object:

```
$ oc apply -f - <<EOF
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  alerting:
    alertmanager:
      storage:
        persistent:
          pvcStorageRequest: 20G
        strategy: persistent
    enabled: true
  backends:
    metrics:
      prometheus:
        enabled: true
        scrapeInterval: 30s
        storage:
          persistent:
            pvcStorageRequest: 20G
          retention: 24h
          strategy: persistent
  clouds:
  - metrics:
      collectors:
      - bridge:
          ringBufferCount: 15000
          ringBufferSize: 16384
          verbose: false
        collectorType: collectd
        debugEnabled: false
        subscriptionAddress: collectd/cloud1-telemetry
      - bridge:
          ringBufferCount: 15000
          ringBufferSize: 16384
          verbose: false
        collectorType: ceilometer
        debugEnabled: false
        subscriptionAddress: anycast/ceilometer/cloud1-metering.sample
      - bridge:
          ringBufferCount: 15000
          ringBufferSize: 65535
          verbose: false
        collectorType: sensubility
```

```
      debugEnabled: false
      subscriptionAddress: sensubility/cloud1-telemetry
  name: cloud1
 observabilityStrategy: use_redhat
 transports:
  qdr:
   auth: basic
   certificates:
    caCertDuration: 70080h
    endpointCertDuration: 70080h
   enabled: true
   web:
    enabled: false
EOF
```

To override these defaults, add the configuration to the **spec** parameter.

3. View the STF deployment logs in the Service Telemetry Operator:

```
$ oc logs --selector name=service-telemetry-operator

...
---------------------------- Ansible Task Status Event StdOut  -----------------

PLAY RECAP *********************************************************************
localhost                  : ok=90   changed=0    unreachable=0    failed=0    skipped=26
rescued=0    ignored=0
```

Verification

- To determine that all workloads are operating correctly, view the pods and the status of each pod.

```
$ oc get pods

NAME                                                READY   STATUS    RESTARTS   AGE
alertmanager-default-0                              3/3     Running   0          123m
default-cloud1-ceil-meter-smartgateway-7dfb95fcb6-bs6jl     3/3     Running   0          122m
default-cloud1-coll-meter-smartgateway-674d88d8fc-858jk     3/3     Running   0          122m
default-cloud1-sens-meter-smartgateway-9b869695d-xcssf      3/3     Running   0          122m
default-interconnect-6cbf65d797-hk7l6               1/1     Running   0          123m
interconnect-operator-7bb99c5ff4-l6xc2              1/1     Running   0          138m
prometheus-default-0                                3/3     Running   0          122m
service-telemetry-operator-7966cf57f-g4tx4          1/1     Running   0          138m
smart-gateway-operator-7d557cb7b7-9ppls             1/1     Running   0          138m
```

3.2.1. Primary parameters of the ServiceTelemetry object

You can set the following primary configuration parameters of the **ServiceTelemetry** object to configure your STF deployment:

- **alerting**
- **backends**

- **clouds**
- **graphing**
- **highAvailability**
- **transports**

The backends parameter

Set the value of the **backends** parameter to allocate the storage back ends for metrics and events, and to enable the Smart Gateways that the **clouds** parameter defines. For more information, see the section called "The clouds parameter".

You can use Prometheus as the metrics storage back end and Elasticsearch as the events storage back end. The Service Telemetry Operator can create custom resource objects that the Prometheus Operator watches to create a Prometheus workload. You need an external deployment of Elasticsearch to store events.

Enabling Prometheus as a storage back end for metrics

To enable Prometheus as a storage back end for metrics, you must configure the **ServiceTelemetry** object.

Procedure

1. Edit the **ServiceTelemetry** object:

```
$ oc edit stf default
```

2. Set the value of the backends.metrics.prometheus.enabled parameter to **true**:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  [...]
  backends:
    metrics:
      prometheus:
        enabled: true
```

Configuring persistent storage for Prometheus

Set the additional parameters in **backends.metrics.prometheus.storage.persistent** to configure persistent storage options for Prometheus, such as storage class and volume size.

Define the back end storage class with the **storageClass** parameter. If you do not set this parameter, the Service Telemetry Operator uses the default storage class for the Red Hat OpenShift Container Platform cluster.

Define the minimum required volume size for the storage request with the **pvcStorageRequest** parameter. By default, Service Telemetry Operator requests a volume size of **20G** (20 Gigabytes).

Procedure

1. List the available storage classes:

```
$ oc get storageclasses
NAME                 PROVISIONER                RECLAIMPOLICY   VOLUMEBINDINGMODE
ALLOWVOLUMEEXPANSION   AGE
csi-manila-ceph      manila.csi.openstack.org   Delete          Immediate           false
20h
standard (default)   kubernetes.io/cinder       Delete          WaitForFirstConsumer   true
20h
standard-csi         cinder.csi.openstack.org   Delete          WaitForFirstConsumer   true
20h
```

2. Edit the **ServiceTelemetry** object:

```
$ oc edit stf default
```

3. Set the value of the **backends.metrics.prometheus.enabled** parameter to **true** and the value of **backends.metrics.prometheus.storage.strategy** to **persistent**:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  [...]
  backends:
    metrics:
      prometheus:
        enabled: true
        storage:
          strategy: persistent
          persistent:
            storageClass: standard-csi
            pvcStorageRequest: 50G
```

Enabling Elasticsearch as a storage back end for events

NOTE

Previous versions of STF managed Elasticsearch objects for the community supported Elastic Cloud on Kubernetes Operator (ECK). Elasticsearch management functionality is deprecated in STF 1.5.3. You can still forward to an existing Elasticsearch instance that you deploy and manage with ECK, but you cannot manage the creation of Elasticsearch objects. When you upgrade your STF deployment, existing Elasticsearch objects and deployments remain, but are no longer managed by STF.

For more information about using Elasticsearch with STF, see the Red Hat Knowledge Base article Using Service Telemetry Framework with Elasticsearch.

To enable events forwarding to Elasticsearch as a storage back end, you must configure the **ServiceTelemetry** object.

Procedure

1. Edit the **ServiceTelemetry** object:

```
$ oc edit stf default
```

2. Set the value of the **backends.events.elasticsearch.enabled** parameter to **true** and configure the **hostUrl** with the relevant Elasticsearch instance:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  [...]
  backends:
    events:
      elasticsearch:
        enabled: true
        forwarding:
          hostUrl: https://external-elastic-http.domain:9200
          tlsServerName: ""
          tlsSecretName: elasticsearch-es-cert
          userSecretName: elasticsearch-es-elastic-user
          useBasicAuth: true
          useTls: true
```

3. Create the secret named in the **userSecretName** parameter to store the basic **auth** credentials

```
$ oc create secret generic elasticsearch-es-elastic-user --from-
literal=elastic='<PASSWORD>'
```

4. Copy the CA certificate into a file named **EXTERNAL-ES-CA.pem**, then create the secret named in the **tlsSecretName** parameter to make it available to STF

```
$ cat EXTERNAL-ES-CA.pem
-----BEGIN CERTIFICATE-----
[...]
-----END CERTIFICATE-----

$ oc create secret generic elasticsearch-es-cert --from-file=ca.crt=EXTERNAL-ES-CA.pem
```

The clouds parameter

Configure the **clouds** parameter to define which Smart Gateway objects deploy and provide the interface for monitored cloud environments to connect to an instance of STF. If a supporting back end is available, metrics and events Smart Gateways for the default cloud configuration are created. By default, the Service Telemetry Operator creates Smart Gateways for **cloud1**.

You can create a list of cloud objects to control which Smart Gateways are created for the defined clouds. Each cloud consists of data types and collectors. Data types are **metrics** or **events**. Each data type consists of a list of collectors, the message bus subscription address, and a parameter to enable debugging. Available collectors for metrics are **collectd**, **ceilometer**, and **sensubility**. Available collectors for events are **collectd** and **ceilometer**. Ensure that the subscription address for each of these collectors is unique for every cloud, data type, and collector combination.

The default **cloud1** configuration is represented by the following **ServiceTelemetry** object, which provides subscriptions and data storage of metrics and events for collectd, Ceilometer, and Sensubility data collectors for a particular cloud instance:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  clouds:
    - name: cloud1
      metrics:
        collectors:
          - collectorType: collectd
            subscriptionAddress: collectd/cloud1-telemetry
          - collectorType: ceilometer
            subscriptionAddress: anycast/ceilometer/cloud1-metering.sample
          - collectorType: sensubility
            subscriptionAddress: sensubility/cloud1-telemetry
            debugEnabled: false
      events:
        collectors:
          - collectorType: collectd
            subscriptionAddress: collectd/cloud1-notify
          - collectorType: ceilometer
            subscriptionAddress: anycast/ceilometer/cloud1-event.sample
```

Each item of the **clouds** parameter represents a cloud instance. A cloud instance consists of three top-level parameters: **name**, **metrics**, and **events**. The **metrics** and **events** parameters represent the corresponding back end for storage of that data type. The **collectors** parameter specifies a list of objects made up of two required parameters, **collectorType** and **subscriptionAddress**, and these represent an instance of the Smart Gateway. The **collectorType** parameter specifies data collected by either collectd, Ceilometer, or Sensubility. The **subscriptionAddress** parameter provides the AMQ Interconnect address to which a Smart Gateway subscribes.

You can use the optional Boolean parameter **debugEnabled** within the **collectors** parameter to enable additional console debugging in the running Smart Gateway pod.

Additional resources

- For more information about deleting default Smart Gateways, see Section 4.3.3, “Deleting the default Smart Gateways”.
- For more information about how to configure multiple clouds, see Section 4.3, “Configuring multiple clouds”.

The alerting parameter

Set the **alerting** parameter to create an Alertmanager instance and a storage back end. By default, **alerting** is enabled. For more information, see Section 6.3, “Alerts in Service Telemetry Framework”.

The graphing parameter

Set the **graphing** parameter to create a Grafana instance. By default, **graphing** is disabled. For more information, see Section 6.1, “Dashboards in Service Telemetry Framework”.

The highAvailability parameter

WARNING

STF high availability (HA) mode is deprecated and is not supported in production environments. Red Hat OpenShift Container Platform is a highly-available platform, and you can cause issues and complicate debugging in STF if you enable HA mode.

Set the **highAvailability** parameter to instantiate multiple copies of STF components to reduce recovery time of components that fail or are rescheduled. By default, **highAvailability** is disabled. For more information, see Section 6.6, “High availability”.

The transports parameter
Set the **transports** parameter to enable the message bus for a STF deployment. The only transport currently supported is AMQ Interconnect. By default, the **qdr** transport is enabled.

3.3. ACCESSING USER INTERFACES FOR STF COMPONENTS

In Red Hat OpenShift Container Platform, applications are exposed to the external network through a route. For more information about routes, see Configuring ingress cluster traffic.

In Service Telemetry Framework (STF), HTTPS routes are exposed for each service that has a web-based interface and protected by Red Hat OpenShift Container Platform role-based access control (RBAC).

You need the following permissions to access the corresponding component UI’s:

```
{"namespace":"service-telemetry", "resource":"grafana", "group":"grafana.integreatly.org",
"verb":"get"}
{"namespace":"service-telemetry", "resource":"prometheus", "group":"monitoring.rhobs", "verb":"get"}
{"namespace":"service-telemetry", "resource":"alertmanager", "group":"monitoring.rhobs",
"verb":"get"}
```

For more information about RBAC, see Using RBAC to define and apply permissions .

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. List the available web UI routes in the **service-telemetry** project:

```
$ oc get routes | grep web
default-alertmanager-proxy   default-alertmanager-proxy-service-telemetry.apps.infra.watch
default-alertmanager-proxy   web     reencrypt/Redirect   None
default-prometheus-proxy     default-prometheus-proxy-service-telemetry.apps.infra.watch
default-prometheus-proxy     web     reencrypt/Redirect   None
```

4. In a web browser, navigate to https://<route_address> to access the web interface for the corresponding service.

3.4. CONFIGURING AN ALTERNATE OBSERVABILITY STRATEGY

To skip the deployment of storage, visualization, and alerting backends, add **observabilityStrategy: none** to the ServiceTelemetry spec. In this mode, you only deploy AMQ Interconnect routers and Smart Gateways, and you must configure an external Prometheus-compatible system to collect metrics from the STF Smart Gateways, and an external Elasticsearch to receive the forwarded events.

Procedure

1. Create a **ServiceTelemetry** object with the property **observabilityStrategy: none** in the **spec** parameter. The manifest shows results in a default deployment of STF that is suitable for receiving telemetry from a single cloud with all metrics collector types.

```
$ oc apply -f - <<EOF
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  observabilityStrategy: none
EOF
```

2. Delete the remaining objects that are managed by community operators

```
$ for o in alertmanagers.monitoring.rhobs/default prometheuses.monitoring.rhobs/default elasticsearch/elasticsearch grafana/default-grafana; do oc delete $o; done
```

3. To verify that all workloads are operating correctly, view the pods and the status of each pod:

```
$ oc get pods
NAME                                                READY   STATUS    RESTARTS   AGE
default-cloud1-ceil-event-smartgateway-6f8547df6c-p2db5   3/3     Running   0          132m
default-cloud1-ceil-meter-smartgateway-59c845d65b-gzhcs   3/3     Running   0          132m
default-cloud1-coll-event-smartgateway-bf859f8d77-tzb66   3/3     Running   0          132m
default-cloud1-coll-meter-smartgateway-75bbd948b9-d5phm   3/3     Running   0          132m
default-cloud1-sens-meter-smartgateway-7fdbb57b6d-dh2g9   3/3     Running   0          132m
default-interconnect-668d5bbcd6-57b2l               1/1     Running   0          132m
interconnect-operator-b8f5bb647-tlp5t               1/1     Running   0          47h
service-telemetry-operator-566b9dd695-wkvjq         1/1     Running   0          156m
smart-gateway-operator-58d77dcf7-6xsq7              1/1     Running   0          47h
```

Additional resources

- For more information about configuring additional clouds or to change the set of supported collectors, see Section 4.3.2, “Deploying Smart Gateways” .
- To migrate an existing STF deployment to **use_redhat**, see the Red Hat Knowledge Base article Migrating Service Telemetry Framework to fully supported operators .

CHAPTER 4. CONFIGURING RED HAT OPENSTACK PLATFORM DIRECTOR FOR SERVICE TELEMETRY FRAMEWORK

To collect metrics, events, or both, and to send them to the Service Telemetry Framework (STF) storage domain, you must configure the Red Hat OpenStack Platform (RHOSP) overcloud to enable data collection and transport.

STF can support both single and multiple clouds. The default configuration in RHOSP and STF set up for a single cloud installation.

- For a single RHOSP overcloud deployment with default configuration, see Section 4.1, "Deploying Red Hat OpenStack Platform overcloud for Service Telemetry Framework using director".
- To plan your RHOSP installation and configuration STF for multiple clouds, see Section 4.3, "Configuring multiple clouds".
- As part of an RHOSP overcloud deployment, you might need to configure additional features in your environment:
  - To disable the data collector services, see Section 4.2, "Disabling Red Hat OpenStack Platform services used with Service Telemetry Framework".

4.1. DEPLOYING RED HAT OPENSTACK PLATFORM OVERCLOUD FOR SERVICE TELEMETRY FRAMEWORK USING DIRECTOR

As part of the Red Hat OpenStack Platform (RHOSP) overcloud deployment using director, you must configure the data collectors and the data transport to Service Telemetry Framework (STF).

Procedure

1. Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration"
2. Retrieving the AMQ Interconnect password
3. Retrieving the AMQ Interconnect route address
4. Creating the base configuration for STF
5. Configuring the STF connection for the overcloud
6. Deploying the overcloud
7. Validating client-side installation

Additional resources

- For more information about deploying an OpenStack cloud using director, see Installing and managing Red Hat OpenStack Platform with director.
- To collect data through AMQ Interconnect, see the amqp1 plug-in.

4.1.1. Getting CA certificate from Service Telemetry Framework for overcloud configuration

To connect your Red Hat OpenStack Platform (RHOSP) overcloud to Service Telemetry Framework (STF), retrieve the CA certificate of AMQ Interconnect that runs within STF and use the certificate in RHOSP configuration.

Procedure

1. View a list of available certificates in STF:

```
$ oc get secrets
```

2. Retrieve and note the content of the **default-interconnect-selfsigned** Secret:

```
$ oc get secret/default-interconnect-selfsigned -o jsonpath='{.data.ca\.crt}' | base64 -d
```

4.1.2. Retrieving the AMQ Interconnect password

When you configure the Red Hat OpenStack Platform (RHOSP) overcloud for Service Telemetry Framework (STF), you must provide the AMQ Interconnect password in the STF connection file.

You can disable basic authentication on the AMQ Interconnect connection by setting the value of the **transports.qdr.auth** parameter of the ServiceTelemetry spec to **none**. The **transports.qdr.auth** parameter is absent in versions of STF before 1.5.3, so the default behavior is that basic authentication is disabled. In a new install of STF 1.5.3 or later, the default value of **transports.qdr.auth** is **basic**, but if you upgraded to STF 1.5.3, the default value of **transports.qdr.auth** is **none**.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. Change to the **service-telemetry** project:

```
$ oc project service-telemetry
```

3. Retrieve the AMQ Interconnect password:

```
$ oc get secret default-interconnect-users -o json | jq -r .data.guest | base64 -d
```

4.1.3. Retrieving the AMQ Interconnect route address

When you configure the Red Hat OpenStack Platform (RHOSP) overcloud for Service Telemetry Framework (STF), you must provide the AMQ Interconnect route address in the STF connection file.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. Change to the **service-telemetry** project:

```
$ oc project service-telemetry
```

3. Retrieve the AMQ Interconnect route address:

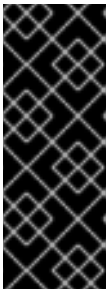
```
$ oc get routes -ogo-template='{{ range .items }}{{printf "%s\n" .spec.host }}{{ end }}' | grep "\-5671"
default-interconnect-5671-service-telemetry.apps.infra.watch
```

4.1.4. Creating the base configuration for STF

To configure the base parameters to provide a compatible data collection and transport for Service Telemetry Framework (STF), you must create a file that defines the default data collection values.

Procedure

1. Log in to the undercloud host as the **stack** user.
2. Create a configuration file called **enable-stf.yaml** in the **/home/stack** directory.



IMPORTANT

Setting **PipelinePublishers** to an empty list results in no metric data passing to RHOSP telemetry components, such as Gnocchi or Panko. If you need to send data to additional pipelines, the Ceilometer polling interval of **30** seconds, that you specify in **ExtraConfig**, might overwhelm the RHOSP telemetry components. You must increase the interval to a larger value, such as **300**, which results in less telemetry resolution in STF.

enable-stf.yaml

```
parameter_defaults:
  # only send to STF, not other publishers
  PipelinePublishers: []

  # manage the polling and pipeline configuration files for Ceilometer agents
  ManagePolling: true
  ManagePipeline: true
  ManageEventPipeline: false

  # enable Ceilometer metrics
  CeilometerQdrPublishMetrics: true

  # enable collection of API status
  CollectdEnableSensubility: true
  CollectdSensubilityTransport: amqp1

  # enable collection of containerized service metrics
  CollectdEnableLibpodstats: true

  # set collectd overrides for higher telemetry resolution and extra plugins
  # to load
  CollectdConnectionType: amqp1
```

```
  CollectdAmqpInterval: 30
  CollectdDefaultPollingInterval: 30
  # to collect information about the virtual memory subsystem of the kernel
  # CollectdExtraPlugins:
  # - vmem

  # set standard prefixes for where metrics are published to QDR
  MetricsQdrAddresses:
  - prefix: 'collectd'
    distribution: multicast
  - prefix: 'anycast/ceilometer'
    distribution: multicast

  ExtraConfig:
    ceilometer::agent::polling::polling_interval: 30
    ceilometer::agent::polling::polling_meters:
    - cpu
    - memory.usage

    # to avoid filling the memory buffers if disconnected from the message bus
    # note: this may need an adjustment if there are many metrics to be sent.
    collectd::plugin::amqp1::send_queue_limit: 5000

    # to receive extra information about virtual memory, you must enable vmem plugin in
CollectdExtraPlugins
    # collectd::plugin::vmem::verbose: true

    # provide name and uuid in addition to hostname for better correlation
    # to ceilometer data
    collectd::plugin::virt::hostname_format: "name uuid hostname"

    # to capture all extra_stats metrics, comment out below config
    collectd::plugin::virt::extra_stats: cpu_util vcpu disk

    # provide the human-friendly name of the virtual instance
    collectd::plugin::virt::plugin_instance_format: metadata

    # set memcached collectd plugin to report its metrics by hostname
    # rather than host IP, ensuring metrics in the dashboard remain uniform
    collectd::plugin::memcached::instances:
      local:
        host: "%{hiera('fqdn_canonical')}"
        port: 11211

    # report root filesystem storage metrics
    collectd::plugin::df::ignoreselected: false
```

4.1.5. Configuring the STF connection for the overcloud

To configure the Service Telemetry Framework (STF) connection, you must create a file that contains the connection configuration of the AMQ Interconnect for the overcloud to the STF deployment. Enable the collection of metrics and storage of the metrics in STF and deploy the overcloud. The default configuration is for a single cloud instance with the default message bus topics. For configuration of multiple cloud deployments, see Section 4.3, “Configuring multiple clouds”.

Prerequisites

- Retrieve the CA certificate from the AMQ Interconnect deployed by STF. For more information, see Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration".
- Retrieve the AMQ Interconnect password. For more information, see Section 4.1.2, "Retrieving the AMQ Interconnect password".
- Retrieve the AMQ Interconnect route address. For more information, see Section 4.1.3, "Retrieving the AMQ Interconnect route address".

Procedure

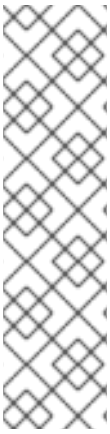
1. Log in to the undercloud host as the **stack** user.
2. Create a configuration file called **stf-connectors.yaml** in the **/home/stack** directory.
3. In the **stf-connectors.yaml** file, configure the **MetricsQdrConnectors** address to connect the AMQ Interconnect on the overcloud to the STF deployment. You configure the topic addresses for Sensubility, Ceilometer, and collectd in this file to match the defaults in STF. For more information about customizing topics and cloud configuration, see Section 4.3, "Configuring multiple clouds".

stf-connectors.yaml

```
resource_registry:
  OS::TripleO::Services::Collectd: /usr/share/openstack-tripleo-heat-
templates/deployment/metrics/collectd-container-puppet.yaml

parameter_defaults:
    ExtraConfig:
      qdr::router_id: "%{::hostname}.cloud1"

    MetricsQdrConnectors:
      - host: default-interconnect-5671-service-telemetry.apps.infra.watch
        port: 443
        role: edge
        verifyHostname: false
        sslProfile: sslProfile
        saslUsername: guest@default-interconnect
        saslPassword: <password_from_stf>

    MetricsQdrSSLProfiles:
      - name: sslProfile
        caCertFileContent: |
          -----BEGIN CERTIFICATE-----
          <snip>
          -----END CERTIFICATE-----

    CeilometerQdrMetricsConfig:
      driver: amqp
      topic: cloud1-metering

    CollectdAmqpInstances:
      cloud1-telemetry:
```

```
        format: JSON
        presettle: false

    CollectdSensubilityResultsChannel: sensubility/cloud1-telemetry
```

- The **qdr::router_id** configuration is to override the default value which uses the fully-qualified domain name (FQDN) of the host. In some cases the FQDN can result in a router ID length of greater than 61 characters which results in failed QDR connections. For deployments with shorter FQDN values this is not necessary.
- The **resource_registry** configuration directly loads the collectd service because you do not include the **collectd-write-qdr.yaml** environment file for multiple cloud deployments.
- Replace the **host** sub-parameter of **MetricsQdrConnectors** with the value that you retrieved in Section 4.1.3, "Retrieving the AMQ Interconnect route address" .
- Replace the **<password_from_stf>** portion of the **saslPassword** sub-parameter of **MetricsQdrConnectors** with the value you retrieved in Section 4.1.2, "Retrieving the AMQ Interconnect password".
- Replace the **caCertFileContent** parameter with the contents retrieved in Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration".
- Set **topic** value of **CeilometerQdrMetricsConfig.topic** to define the topic for Ceilometer metrics. The value is a unique topic identifier for the cloud such as **cloud1-metering**.
- Set **CollectdAmqpInstances** sub-parameter to define the topic for collectd metrics. The section name is a unique topic identifier for the cloud such as **cloud1-telemetry**.
- Set **CollectdSensubilityResultsChannel** to define the topic for collectd-sensubility events. The value is a unique topic identifier for the cloud such as **sensubility/cloud1-telemetry**.



NOTE

When you define the topics for collectd and Ceilometer, the value you provide is transposed into the full topic that the Smart Gateway client uses to listen for messages.

Ceilometer topic values are transposed into the topic address **anycast/ceilometer/<TOPIC>.sample** and collectd topic values are transposed into the topic address **collectd/<TOPIC>**. The value for sensubility is the full topic path and has no transposition from topic value to topic address.

For an example of a cloud configuration in the **ServiceTelemetry** object referring to the full topic address, see the section called "The clouds parameter" .

4.1.6. Deploying the overcloud

Deploy or update the overcloud with the required environment files so that data is collected and transmitted to Service Telemetry Framework (STF).

Procedure

1. Log in to the undercloud host as the **stack** user.
2. Source the **stackrc** undercloud credentials file:

```
$ source ~/stackrc
```

3. Add your data collection and AMQ Interconnect environment files to the stack with your other environment files and deploy the overcloud:

```
(undercloud)$ openstack overcloud deploy --templates \
 -e [your environment files] \
 -e /usr/share/openstack-tripleo-heat-templates/environments/metrics/ceilometer-write-qdr.yaml \
 -e /usr/share/openstack-tripleo-heat-templates/environments/metrics/qdr-edge-only.yaml \
 -e /home/stack/enable-stf.yaml \
 -e /home/stack/stf-connectors.yaml
```

- Include the **ceilometer-write-qdr.yaml** file to ensure that Ceilometer telemetry is sent to STF.
- Include the **qdr-edge-only.yaml** file to ensure that the message bus is enabled and connected to STF message bus routers.
- Include the **enable-stf.yaml** environment file to ensure that the defaults are configured correctly.
- Include the **stf-connectors.yaml** environment file to define the connection to STF.

4.1.7. Validating client-side installation

To validate data collection from the Service Telemetry Framework (STF) storage domain, query the data sources for delivered data. To validate individual nodes in the Red Hat OpenStack Platform (RHOSP) deployment, use SSH to connect to the console.

TIP

Some telemetry data is available only when RHOSP has active workloads.

Procedure

1. Log in to an overcloud node, for example, controller-0.
2. Ensure that the **metrics_qdr** and collection agent containers are running on the node:

```
$ sudo podman container inspect --format '{{.State.Status}}' metrics_qdr collectd ceilometer_agent_notification ceilometer_agent_central
running
running
running
running
```

NOTE

Use this command on compute nodes:

```
$ sudo podman container inspect --format '{{.State.Status}}' metrics_qdr collectd ceilometer_agent_compute
```

3. Return the internal network address on which AMQ Interconnect is running, for example, **172.17.1.44** listening on port **5666**:

```
$ sudo podman exec -it metrics_qdr cat /etc/qpid-dispatch/qdrouterd.conf

listener {
    host: 172.17.1.44
    port: 5666
    authenticatePeer: no
    saslMechanisms: ANONYMOUS
}
```

4. Return a list of connections to the local AMQ Interconnect:

```
$ sudo podman exec -it metrics_qdr qdstat --bus=172.17.1.44:5666 --connections

Connections
  id   host                                                    container
role    dir  security                        authentication  tenant

=========================================================================
=========================================================================
=========================================================================
============================================================
  1    default-interconnect-5671-service-telemetry.apps.infra.watch:443      default-
interconnect-7458fd4d69-bgzfb                                                 edge    out
TLSv1.2(DHE-RSA-AES256-GCM-SHA384)  anonymous-user
  12   172.17.1.44:60290
openstack.org/om/container/controller-0/ceilometer-agent-
notification/25/5c02cee550f143ec9ea030db5cccba14  normal  in   no-security
no-auth
  16   172.17.1.44:36408                                          metrics
normal  in   no-security                    anonymous-user
  899  172.17.1.44:39500                                          10a2e99d-1b8a-4329-b48c-
4335e5f75c84                                                      normal  in   no-security
no-auth
```

There are four connections:

- Outbound connection to STF
- Inbound connection from ceilometer
- Inbound connection from collectd
- Inbound connection from our **qdstat** client

  The outbound STF connection is provided to the **MetricsQdrConnectors** host parameter and is the route for the STF storage domain. The other hosts are internal network addresses of the client connections to this AMQ Interconnect.

5. To ensure that messages are delivered, list the links, and view the **_edge** address in the **deliv** column for delivery of messages:

```
$ sudo podman exec -it metrics_qdr qdstat --bus=172.17.1.44:5666 --links
Router Links
  type      dir  conn id  id    peer  class   addr                phs  cap  pri  undel  unsett  deliv
```

```
presett  psdrop  acc  rej  rel     mod  delay  rate

=============================================================================
=============================================================================
=====
 endpoint  out  1       5         local   _edge                250  0    0     0      2979926  0       0
0    0    2979926 0    0     0
 endpoint  in   1       6                                      250  0    0     0      0        0       0     0   0
0       0    0     0
 endpoint  in   1       7                                      250  0    0     0      0        0       0     0   0
0       0    0     0
 endpoint  out  1       8                                      250  0    0     0      0        0       0     0   0
0       0    0     0
 endpoint  in   1       9                                      250  0    0     0      0        0       0     0   0
0       0    0     0
 endpoint  out  1       10                                     250  0    0     0      911      911     0     0
0    0       0    911    0
 endpoint  in   1       11                                     250  0    0     0      0        911     0     0
0    0       0    0      0
 endpoint  out  12      32        local   temp.lSY6Mcicol4J2Kp      250  0    0     0      0        0
0       0    0    0      0    0     0
 endpoint  in   16      41                                     250  0    0     0      2979924  0       0
0    0    2979924 0    0     0
 endpoint  in   912     1834      mobile  $management         0    250  0    0     0      1        0
0       1    0    0      0    0     0
 endpoint  out  912     1835      local   temp.9Ok2resl9tmt+CT      250  0    0     0      0
0       0      0    0    0      0    0     0
```

6. To list the addresses from RHOSP nodes to STF, connect to Red Hat OpenShift Container Platform to retrieve the AMQ Interconnect pod name and list the connections. List the available AMQ Interconnect pods:

```
$ oc get pods -l application=default-interconnect

NAME                                  READY   STATUS    RESTARTS   AGE
default-interconnect-7458fd4d69-bgzfb   1/1     Running   0          6d21h
```

7. Connect to the pod and list the known connections. In this example, there are three **edge** connections from the RHOSP nodes with connection **id** 22, 23, and 24:

```
$ oc exec -it deploy/default-interconnect -- qdstat --connections

2020-04-21 18:25:47.243852 UTC
default-interconnect-7458fd4d69-bgzfb

Connections
  id  host              container                                          role    dir  security
authentication  tenant  last dlv      uptime

=============================================================================
=============================================================================
=======================================
  5   10.129.0.110:48498  bridge-3f5                                         edge    in   no-security
anonymous-user          000:00:00:02  000:17:36:29
  6   10.129.0.111:43254  rcv[default-cloud1-ceil-meter-smartgateway-58f885c76d-xmxwn]
```

```
edge  in  no-security                anonymous-user        000:00:00:02  000:17:36:20
  7  10.130.0.109:50518  rcv[default-cloud1-coll-event-smartgateway-58fbbd4485-rl9bd]
normal  in  no-security              anonymous-user        -             000:17:36:11
  8  10.130.0.110:33802  rcv[default-cloud1-ceil-event-smartgateway-6cfb65478c-g5q82]
normal  in  no-security              anonymous-user        000:01:26:18  000:17:36:05
  22  10.128.0.1:51948  Router.ceph-0.redhat.local                    edge  in
TLSv1/SSLv3(DHE-RSA-AES256-GCM-SHA384)  anonymous-user        000:00:00:03
000:22:08:43
  23  10.128.0.1:51950  Router.compute-0.redhat.local                 edge  in
TLSv1/SSLv3(DHE-RSA-AES256-GCM-SHA384)  anonymous-user        000:00:00:03
000:22:08:43
  24  10.128.0.1:52082  Router.controller-0.redhat.local              edge  in
TLSv1/SSLv3(DHE-RSA-AES256-GCM-SHA384)  anonymous-user        000:00:00:00
000:22:08:34
  27  127.0.0.1:42202  c2f541c1-4c97-4b37-a189-a396c08fb079                normal  in
no-security                  no-auth              000:00:00:00  000:00:00:00
```

8. To view the number of messages delivered by the network, use each address with the **oc exec** command:

```
$ oc exec -it deploy/default-interconnect -- qdstat --address

2020-04-21 18:20:10.293258 UTC
default-interconnect-7458fd4d69-bgzfb

Router Addresses
  class  addr                    phs  distrib    pri  local  remote  in          out         thru
fallback

========================================================================
=============================================
  mobile  anycast/ceilometer/event.sample     0  balanced  -  1      0       970         970
0     0
  mobile  anycast/ceilometer/metering.sample  0  balanced  -  1      0       2,344,833
2,344,833  0     0
  mobile  collectd/notify                  0  multicast  -  1      0       70          70          0     0
  mobile  collectd/telemetry               0  multicast  -  1      0       216,128,890  216,128,890
0     0
```

4.2. DISABLING RED HAT OPENSTACK PLATFORM SERVICES USED WITH SERVICE TELEMETRY FRAMEWORK

Disable the services used when deploying Red Hat OpenStack Platform (RHOSP) and connecting it to Service Telemetry Framework (STF). There is no removal of logs or generated configuration files as part of the disablement of the services.

Procedure

1. Log in to the undercloud host as the **stack** user.
2. Source the **stackrc** undercloud credentials file:

```
$ source ~/stackrc
```

3. Create the **disable-stf.yaml** environment file:

```
$ cat > ~/disable-stf.yaml <<EOF
---
resource_registry:
  OS::TripleO::Services::CeilometerAgentCentral: OS::Heat::None
  OS::TripleO::Services::CeilometerAgentNotification: OS::Heat::None
  OS::TripleO::Services::CeilometerAgentIpmi: OS::Heat::None
  OS::TripleO::Services::ComputeCeilometerAgent: OS::Heat::None
  OS::TripleO::Services::Redis: OS::Heat::None
  OS::TripleO::Services::Collectd: OS::Heat::None
  OS::TripleO::Services::MetricsQdr: OS::Heat::None
EOF
```

4. Remove the following files from your RHOSP director deployment:

   - **ceilometer-write-qdr.yaml**
   - **qdr-edge-only.yaml**
   - **enable-stf.yaml**
   - **stf-connectors.yaml**

5. Update the RHOSP overcloud. Ensure that you use the **disable-stf.yaml** file early in the list of environment files. By adding **disable-stf.yaml** early in the list, other environment files can override the configuration that would disable the service:

```
(undercloud)$ openstack overcloud deploy --templates \
-e /home/stack/disable-stf.yaml \
-e [your environment files]
```

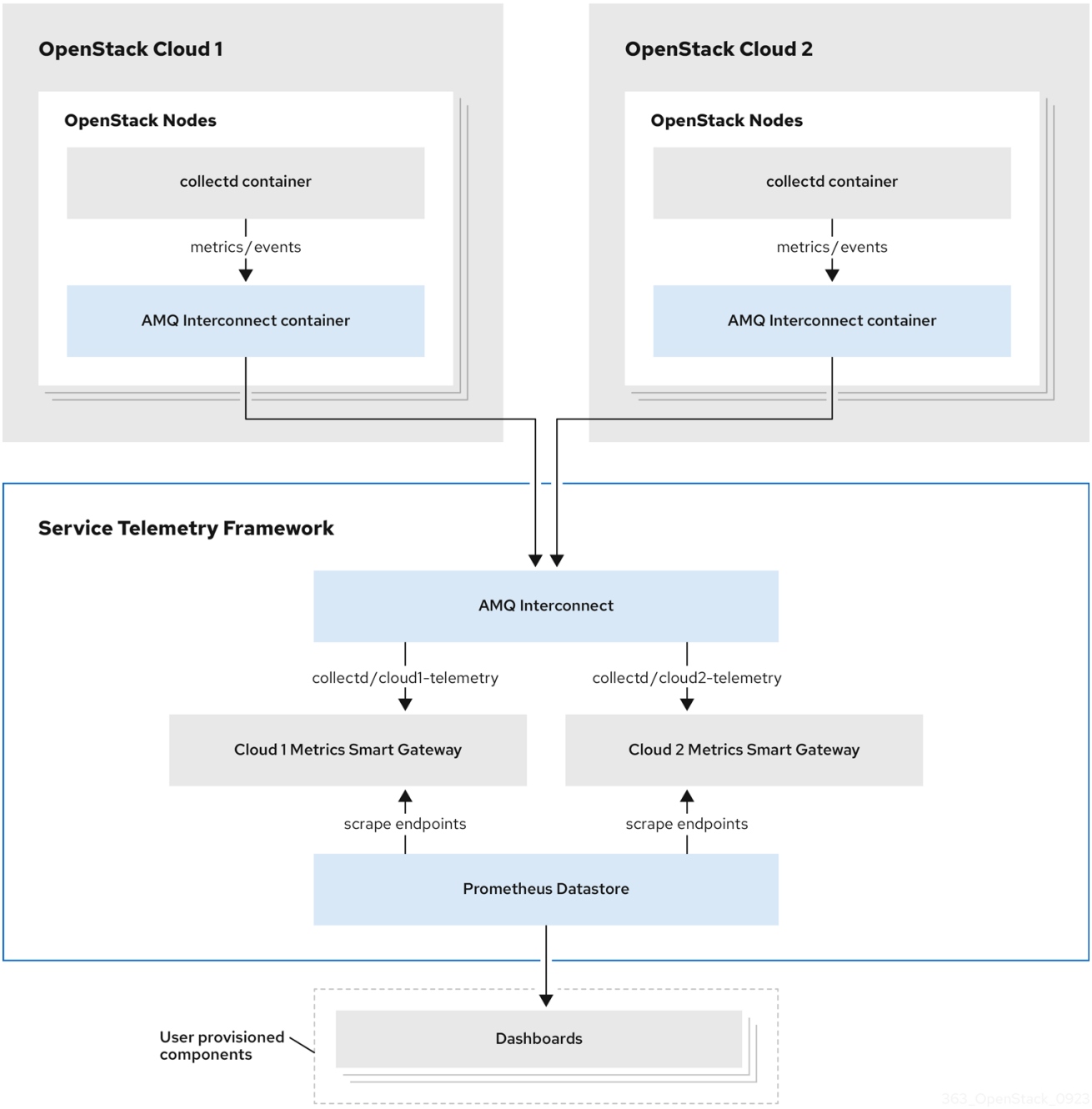
4.3. CONFIGURING MULTIPLE CLOUDS

You can configure multiple Red Hat OpenStack Platform (RHOSP) clouds to target a single instance of Service Telemetry Framework (STF). When you configure multiple clouds, every cloud must send metrics and events on their own unique message bus topic. In the STF deployment, Smart Gateway instances listen on these topics to save information to the common data store. Data that is stored by the Smart Gateway in the data storage domain is filtered by using the metadata that each of Smart Gateways creates.

WARNING

Ensure that you deploy each cloud with a unique cloud domain configuration. For more information about configuring the domain for your cloud deployment, see Section 4.3.4, “Setting a unique cloud domain” .

Figure 4.1. Two RHOSP clouds connect to STF



To configure the RHOSP overcloud for a multiple cloud scenario, complete the following tasks:

1. Plan the AMQP address prefixes that you want to use for each cloud. For more information, see Section 4.3.1, “Planning AMQP address prefixes” .

2. Deploy metrics and events consumer Smart Gateways for each cloud to listen on the corresponding address prefixes. For more information, see Section 4.3.2, “Deploying Smart Gateways”.

3. Configure each cloud with a unique domain name. For more information, see Section 4.3.4, “Setting a unique cloud domain”.

4. Create the base configuration for STF. For more information, see Section 4.1.4, “Creating the base configuration for STF”.

5. Configure each cloud to send its metrics and events to STF on the correct address. For more information, see Section 4.3.5, "Creating the Red Hat OpenStack Platform environment file for multiple clouds".

4.3.1. Planning AMQP address prefixes

By default, Red Hat OpenStack Platform (RHOSP) nodes retrieve data through two data collectors; collectd and Ceilometer. The collectd-sensubility plugin requires a unique address. These components send telemetry data or notifications to the respective AMQP addresses, for example, **collectd/telemetry**. STF Smart Gateways listen on those AMQP addresses for data. To support multiple clouds and to identify which cloud generated the monitoring data, configure each cloud to send data to a unique address. Add a cloud identifier prefix to the second part of the address. The following list shows some example addresses and identifiers:

- **collectd/cloud1-telemetry**
- **collectd/cloud1-notify**
- **sensubility/cloud1-telemetry**
- **anycast/ceilometer/cloud1-metering.sample**
- **anycast/ceilometer/cloud1-event.sample**
- **collectd/cloud2-telemetry**
- **collectd/cloud2-notify**
- **sensubility/cloud2-telemetry**
- **anycast/ceilometer/cloud2-metering.sample**
- **anycast/ceilometer/cloud2-event.sample**
- **collectd/us-east-1-telemetry**
- **collectd/us-west-3-telemetry**

4.3.2. Deploying Smart Gateways

You must deploy a Smart Gateway for each of the data collection types for each cloud; one for collectd metrics, one for collectd events, one for Ceilometer metrics, one for Ceilometer events, and one for collectd-sensubility metrics. Configure each of the Smart Gateways to listen on the AMQP address that you define for the corresponding cloud. To define Smart Gateways, configure the **clouds** parameter in the **ServiceTelemetry** manifest.

When you deploy STF for the first time, Smart Gateway manifests are created that define the initial Smart Gateways for a single cloud. When you deploy Smart Gateways for multiple cloud support, you deploy multiple Smart Gateways for each of the data collection types that handle the metrics and the events data for each cloud. The initial Smart Gateways are defined in **cloud1** with the following subscription addresses:

collector	type	default subscription address
collectd	metrics	collectd/telemetry

collectd	events	collectd/notify
collectd-sensubility	metrics	sensubility/telemetry
Ceilometer	metrics	anycast/ceilometer/metering.sample
Ceilometer	events	anycast/ceilometer/event.sample

Prerequisites

- You have determined your cloud naming scheme. For more information about determining your naming scheme, see Section 4.3.1, “Planning AMQP address prefixes” .
- You have created your list of clouds objects. For more information about creating the content for the **clouds** parameter, see the section called “The clouds parameter” .

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Edit the **default** ServiceTelemetry object and add a **clouds** parameter with your configuration:

WARNING

Long cloud names might exceed the maximum pod name of 63 characters. Ensure that the combination of the **ServiceTelemetry** name **default** and the **clouds.name** does not exceed 19 characters. Cloud names cannot contain any special characters, such as **-**. Limit cloud names to alphanumeric (a-z, 0-9).

Topic addresses have no character limitation and can be different from the **clouds.name** value.

```
$ oc edit stf default
```

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  ...
spec:
  ...
  clouds:
```

```
- name: cloud1
  events:
    collectors:
    - collectorType: collectd
      subscriptionAddress: collectd/cloud1-notify
    - collectorType: ceilometer
      subscriptionAddress: anycast/ceilometer/cloud1-event.sample
  metrics:
    collectors:
    - collectorType: collectd
      subscriptionAddress: collectd/cloud1-telemetry
    - collectorType: sensubility
      subscriptionAddress: sensubility/cloud1-telemetry
    - collectorType: ceilometer
      subscriptionAddress: anycast/ceilometer/cloud1-metering.sample
- name: cloud2
  events:
    ...
```

4. Save the ServiceTelemetry object.

5. Verify that each Smart Gateway is running. This can take several minutes depending on the number of Smart Gateways:

```
$ oc get po -l app=smart-gateway
NAME                                                READY   STATUS    RESTARTS   AGE
default-cloud1-ceil-event-smartgateway-6cfb65478c-g5q82   2/2     Running   0          13h
default-cloud1-ceil-meter-smartgateway-58f885c76d-xmxwn   2/2     Running   0          13h
default-cloud1-coll-event-smartgateway-58fbbd4485-rl9bd   2/2     Running   0          13h
default-cloud1-coll-meter-smartgateway-7c6fc495c4-jn728   2/2     Running   0          13h
default-cloud1-sens-meter-smartgateway-8h4tc445a2-mm683   2/2     Running   0          13h
```

4.3.3. Deleting the default Smart Gateways

After you configure Service Telemetry Framework (STF) for multiple clouds, you can delete the default Smart Gateways if they are no longer in use. The Service Telemetry Operator can remove **SmartGateway** objects that were created but are no longer listed in the ServiceTelemetry **clouds** list of objects. To enable the removal of SmartGateway objects that are not defined by the **clouds** parameter, you must set the **cloudsRemoveOnMissing** parameter to **true** in the **ServiceTelemetry** manifest.

TIP

If you do not want to deploy any Smart Gateways, define an empty clouds list by using the **clouds: []** parameter.

WARNING

The **cloudsRemoveOnMissing** parameter is disabled by default. If you enable the **cloudsRemoveOnMissing** parameter, you remove any manually-created **SmartGateway** objects in the current namespace without any possibility to restore.

Procedure

1. Define your **clouds** parameter with the list of cloud objects that you want the Service Telemetry Operator to manage. For more information, see the section called "The clouds parameter" .
2. Edit the ServiceTelemetry object and add the **cloudsRemoveOnMissing** parameter:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  ...
spec:
  ...
  cloudsRemoveOnMissing: true
  clouds:
    ...
```

3. Save the modifications.
4. Verify that the Operator deleted the Smart Gateways. This can take several minutes while the Operators reconcile the changes:

```
$ oc get smartgateways
```

4.3.4. Setting a unique cloud domain

To ensure that telemetry from different Red Hat OpenStack Platform (RHOSP) clouds to Service Telemetry Framework (STF) can be uniquely identified and do not conflict, configure the **CloudDomain** parameter.

WARNING

Ensure that you do not change host or domain names in an existing deployment. Host and domain name configuration is supported in new cloud deployments only.

Procedure

1. Create a new environment file, for example, **hostnames.yaml**.
2. Set the **CloudDomain** parameter in the environment file, as shown in the following example:

hostnames.yaml

```
parameter_defaults:
    CloudDomain: newyork-west-04
    CephStorageHostnameFormat: 'ceph-%index%'
    ObjectStorageHostnameFormat: 'swift-%index%'
    ComputeHostnameFormat: 'compute-%index%'
```

3. Add the new environment file to your deployment.

Additional resources

- Section 4.3.5, "Creating the Red Hat OpenStack Platform environment file for multiple clouds"
- Core Overcloud Parameters in the *Overcloud Parameters* guide

4.3.5. Creating the Red Hat OpenStack Platform environment file for multiple clouds

To label traffic according to the cloud of origin, you must create a configuration with cloud-specific instance names. Create an **stf-connectors.yaml** file and adjust the values of **CeilometerQdrMetricsConfig** and **CollectdAmqpInstances** to match the AMQP address prefix scheme.

NOTE

If you enabled container health and API status monitoring, you must also modify the **CollectdSensubilityResultsChannel** parameter. For more information, see Section 6.9, "Red Hat OpenStack Platform API status and containerized services health".

Prerequisites

- You have retrieved the CA certificate from the AMQ Interconnect deployed by STF. For more information, see Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration".
- You have created your list of clouds objects. For more information about creating the content for the clouds parameter, see the clouds configuration parameter.
- You have retrieved the AMQ Interconnect route address. For more information, see Section 4.1.3, "Retrieving the AMQ Interconnect route address" .
- You have created the base configuration for STF. For more information, see Section 4.1.4, "Creating the base configuration for STF".
- You have created a unique domain name environment file. For more information, see Section 4.3.4, "Setting a unique cloud domain" .

Procedure

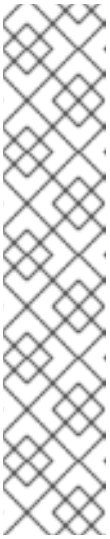
1. Log in to the undercloud host as the **stack** user.
2. Create a configuration file called **stf-connectors.yaml** in the **/home/stack** directory.
3. In the **stf-connectors.yaml** file, configure the **MetricsQdrConnectors** address to connect to the AMQ Interconnect on the overcloud deployment. Configure the **CeilometerQdrMetricsConfig**, **CollectdAmqpInstances**, and **CollectdSensubilityResultsChannel** topic values to match the AMQP address that you want for this cloud deployment.

   stf-connectors.yaml

   ```
   resource_registry:
     OS::TripleO::Services::Collectd: /usr/share/openstack-tripleo-heat-
   templates/deployment/metrics/collectd-container-puppet.yaml
   ```

```
parameter_defaults:
  ExtraConfig:
    qdr::router_id: %{::hostname}.cloud1

  MetricsQdrConnectors:
    - host: default-interconnect-5671-service-telemetry.apps.infra.watch
      port: 443
      role: edge
      verifyHostname: false
      sslProfile: sslProfile

  MetricsQdrSSLProfiles:
    - name: sslProfile
      caCertFileContent: |
        -----BEGIN CERTIFICATE-----
        <snip>
        -----END CERTIFICATE-----

  CeilometerQdrMetricsConfig:
    driver: amqp
    topic: cloud1-metering

  CollectdAmqpInstances:
    cloud1-telemetry:
      format: JSON
      presettle: false

  CollectdSensubilityResultsChannel: sensubility/cloud1-telemetry
```

- The **qdr::router_id** configuration is to override the default value which uses the fully-qualified domain name (FQDN) of the host. In some cases the FQDN can result in a router ID length of greater than 61 characters which results in failed QDR connections. For deployments with shorter FQDN values this is not necessary.
- The **resource_registry** configuration directly loads the collectd service because you do not include the **collectd-write-qdr.yaml** environment file for multiple cloud deployments.
- Replace the **host** parameter with the value that you retrieved in Section 4.1.3, “Retrieving the AMQ Interconnect route address”.
- Replace the **caCertFileContent** parameter with the contents retrieved in Section 4.1.1, “Getting CA certificate from Service Telemetry Framework for overcloud configuration”.
- Replace the **host** sub-parameter of **MetricsQdrConnectors** with the value that you retrieved in Section 4.1.3, “Retrieving the AMQ Interconnect route address” .
- Set **topic** value of **CeilometerQdrMetricsConfig.topic** to define the topic for Ceilometer metrics. The value is a unique topic identifier for the cloud such as **cloud1-metering**.
- Set **CollectdAmqpInstances** sub-parameter to define the topic for collectd metrics. The section name is a unique topic identifier for the cloud such as **cloud1-telemetry**.
- Set **CollectdSensubilityResultsChannel** to define the topic for collectd-sensubility events. The value is a unique topic identifier for the cloud such as **sensubility/cloud1-telemetry**.



NOTE

When you define the topics for collectd and Ceilometer, the value you provide is transposed into the full topic that the Smart Gateway client uses to listen for messages.

Ceilometer topic values are transposed into the topic address **anycast/ceilometer/<TOPIC>.sample** and collectd topic values are transposed into the topic address **collectd/<TOPIC>**. The value for sensubility is the full topic path and has no transposition from topic value to topic address.

For an example of a cloud configuration in the **ServiceTelemetry** object referring to the full topic address, see the section called “The clouds parameter”.

4. Ensure that the naming convention in the **stf-connectors.yaml** file aligns with the **spec.bridge.amqpUrl** field in the Smart Gateway configuration. For example, configure the **CeilometerQdrMetricsConfig.topic** field to a value of **cloud1-metering**.

5. Log in to the undercloud host as the **stack** user.

6. Source the **stackrc** undercloud credentials file:

```
$ source stackrc
```

7. Include the **stf-connectors.yaml** file and unique domain name environment file **hostnames.yaml** in the **openstack overcloud deployment** command, with any other environment files relevant to your environment:

WARNING

If you use the **collectd-write-qdr.yaml** file with a custom **CollectdAmqpInstances** parameter, data publishes to the custom and default topics. In a multiple cloud environment, the configuration of the **resource_registry** parameter in the **stf-connectors.yaml** file loads the collectd service.

```
(undercloud)$ openstack overcloud deploy --templates \
-e [your environment files] \
-e /usr/share/openstack-tripleo-heat-templates/environments/metrics/ceilometer-write-qdr.yaml \
-e /usr/share/openstack-tripleo-heat-templates/environments/metrics/qdr-edge-only.yaml \
-e /home/stack/hostnames.yaml \
-e /home/stack/enable-stf.yaml \
-e /home/stack/stf-connectors.yaml
```

8. Deploy the Red Hat OpenStack Platform overcloud.

Additional resources

- For information about how to validate the deployment, see Section 4.1.7, "Validating client-side installation".

4.3.6. Querying metrics data from multiple clouds

Data stored in Prometheus has a **service** label according to the Smart Gateway it was scraped from. You can use this label to query data from a specific cloud.

To query data from a specific cloud, use a Prometheus *promql* query that matches the associated **service** label; for example: **collectd_uptime{service="default-cloud1-coll-meter"}**.

CHAPTER 5. CONFIGURING RED HAT OPENSTACK PLATFORM DIRECTOR OPERATOR FOR SERVICE TELEMETRY FRAMEWORK

To collect metrics, events, or both, and to send them to the Service Telemetry Framework (STF) storage domain, you must configure the Red Hat OpenStack Platform (RHOSP) overcloud to enable data collection and transport.

STF can support both single and multiple clouds. The default configuration in RHOSP and STF set up for a single cloud installation.

- For a single RHOSP overcloud deployment using director Operator with default configuration, see Section 5.1, "Deploying Red Hat OpenStack Platform overcloud for Service Telemetry Framework using director Operator".

5.1. DEPLOYING RED HAT OPENSTACK PLATFORM OVERCLOUD FOR SERVICE TELEMETRY FRAMEWORK USING DIRECTOR OPERATOR

When you deploy the Red Hat OpenStack Platform (RHOSP) overcloud deployment using director Operator, you must configure the data collectors and the data transport for Service Telemetry Framework (STF).

Prerequisites

- You are familiar with deploying and managing RHOSP with the RHOSP director Operator.

Procedure

1. Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration"
2. Retrieving the AMQ Interconnect route address
3. Creating the base configuration for director Operator for STF
4. Configuring the STF connection for the overcloud
5. Deploying the overcloud for director operator

Additional resources

- For more information about deploying an OpenStack cloud using director Operator, see https://access.redhat.com/documentation/en-us/red_hat_openstack_platform/17.1/html/deploying_an_overcloud_in_a_red_hat_openshift_contai
- To collect data through AMQ Interconnect, see the amqp1 plug-in.

5.1.1. Getting CA certificate from Service Telemetry Framework for overcloud configuration

To connect your Red Hat OpenStack Platform (RHOSP) overcloud to Service Telemetry Framework (STF), retrieve the CA certificate of AMQ Interconnect that runs within STF and use the certificate in RHOSP configuration.

Procedure

1. View a list of available certificates in STF:

```
$ oc get secrets
```

2. Retrieve and note the content of the **default-interconnect-selfsigned** Secret:

```
$ oc get secret/default-interconnect-selfsigned -o jsonpath='{.data.ca\.crt}' | base64 -d
```

5.1.2. Retrieving the AMQ Interconnect route address

When you configure the Red Hat OpenStack Platform (RHOSP) overcloud for Service Telemetry Framework (STF), you must provide the AMQ Interconnect route address in the STF connection file.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. Change to the **service-telemetry** project:

```
$ oc project service-telemetry
```

3. Retrieve the AMQ Interconnect route address:

```
$ oc get routes -ogo-template='{{ range .items }}{{printf "%s\n" .spec.host }}{{ end }}' | grep "\-5671"
default-interconnect-5671-service-telemetry.apps.infra.watch
```

5.1.3. Creating the base configuration for director Operator for STF

Edit the **heat-env-config-deploy** ConfigMap to add the base Service Telemetry Framework (STF) configuration to the overcloud nodes.

Procedure

1. Log in to the Red Hat OpenShift Container Platform environment where RHOSP director Operator is deployed and change to the project that hosts your RHOSP deployment:

```
$ oc project openstack
```

2. Open the **heat-env-config-deploy ConfigMap** CR for editing:

```
$ oc edit heat-env-config-deploy
```

3. Add the **enable-stf.yaml** configuration to the **heat-env-config-deploy** ConfigMap, save your edits and close the file:

enable-stf.yaml

```
apiVersion: v1
```

```
data:
  [...]
  enable-stf.yaml: |
    parameter_defaults:
      # only send to STF, not other publishers
      PipelinePublishers: []

      # manage the polling and pipeline configuration files for Ceilometer agents
      ManagePolling: true
      ManagePipeline: true
      ManageEventPipeline: false

      # enable Ceilometer metrics and events
      CeilometerQdrPublishMetrics: true

      # enable collection of API status
      CollectdEnableSensubility: true
      CollectdSensubilityTransport: amqp1

      # enable collection of containerized service metrics
      CollectdEnableLibpodstats: true

      # set collectd overrides for higher telemetry resolution and extra plugins
      # to load
      CollectdConnectionType: amqp1
      CollectdAmqpInterval: 30
      CollectdDefaultPollingInterval: 30
      # to collect information about the virtual memory subsystem of the kernel
      # CollectdExtraPlugins:
      # - vmem

      # set standard prefixes for where metrics are published to QDR
      MetricsQdrAddresses:
      - prefix: 'collectd'
        distribution: multicast
      - prefix: 'anycast/ceilometer'
        distribution: multicast

      ExtraConfig:
        ceilometer::agent::polling::polling_interval: 30
        ceilometer::agent::polling::polling_meters:
        - cpu
        - memory.usage

        # to avoid filling the memory buffers if disconnected from the message bus
        # note: this may need an adjustment if there are many metrics to be sent.
        collectd::plugin::amqp1::send_queue_limit: 5000

        # to receive extra information about virtual memory, you must enable vmem plugin in
CollectdExtraPlugins
        # collectd::plugin::vmem::verbose: true

        # provide name and uuid in addition to hostname for better correlation
        # to ceilometer data
        collectd::plugin::virt::hostname_format: "name uuid hostname"
```

```
    # to capture all extra_stats metrics, comment out below config
    collectd::plugin::virt::extra_stats: cpu_util vcpu disk

    # provide the human-friendly name of the virtual instance
    collectd::plugin:ConfigMap :virt::plugin_instance_format: metadata

    # set memcached collectd plugin to report its metrics by hostname
    # rather than host IP, ensuring metrics in the dashboard remain uniform
    collectd::plugin::memcached::instances:
      local:
        host: "%{hiera('fqdn_canonical')}"
        port: 11211

    # report root filesystem storage metrics
    collectd::plugin::df::ignoreselected: false
```

Additional resources

- For more information about configuring the **enable-stf.yaml** environment file, see Section 4.1.4, "Creating the base configuration for STF"
- For more information about adding heat templates to a Red Hat OpenStack Platform director Operator deployment, see Adding heat templates and environment files with the director Operator

5.1.4. Configuring the STF connection for director Operator for the overcloud

Edit the **heat-env-config-deploy** ConfigMap to create a connection from Red Hat OpenStack Platform (RHOSP) to Service Telemetry Framework.

Procedure

1. Log in to the Red Hat OpenShift Container Platform environment where RHOSP director Operator is deployed and change to the project that hosts your RHOSP deployment:

```
$ oc project openstack
```

2. Open the **heat-env-config-deploy** ConfigMap for editing:

```
$ oc edit configmap heat-env-config-deploy
```

3. Add your **stf-connectors.yaml** configuration to the **heat-env-config-deploy** ConfigMap, appropriate to your environment, save your edits and close the file:

stf-connectors.yaml

```
apiVersion: v1
data:
  [...]
  stf-connectors.yaml: |
    resource_registry:
      OS::TripleO::Services::Collectd: /usr/share/openstack-tripleo-heat-
templates/deployment/metrics/collectd-container-puppet.yaml
```

```
parameter_defaults:
  MetricsQdrConnectors:
    - host: default-interconnect-5671-service-telemetry.apps.ostest.test.metalkube.org
      port: 443
      role: edge
      verifyHostname: false
      sslProfile: sslProfile
      saslUsername: guest@default-interconnect
      saslPassword: <password_from_stf>

  MetricsQdrSSLProfiles:
    - name: sslProfile

  CeilometerQdrMetricsConfig:
    driver: amqp
    topic: cloud1-metering

  CollectdAmqpInstances:
    cloud1-telemetry:
      format: JSON
      presettle: false

  CollectdSensubilityResultsChannel: sensubility/cloud1-telemetry
```

- The **resource_registry** configuration directly loads the collectd service because you do not include the **collectd-write-qdr.yaml** environment file for multiple cloud deployments.
- Replace the **host** sub-parameter of **MetricsQdrConnectors** with the value that you retrieved in Section 4.1.3, "Retrieving the AMQ Interconnect route address" .
- Replace the **<password_from_stf>** portion of the **saslPassword** sub-parameter of **MetricsQdrConnectors** with the value you retrieved in Section 4.1.2, "Retrieving the AMQ Interconnect password".
- Replace the **caCertFileContent** parameter with the contents retrieved in Section 4.1.1, "Getting CA certificate from Service Telemetry Framework for overcloud configuration".
- Set **topic** value of **CeilometerQdrMetricsConfig.topic** to define the topic for Ceilometer metrics. The value is a unique topic identifier for the cloud such as **cloud1-metering**.
- Set **CollectdAmqpInstances** sub-parameter to define the topic for collectd metrics. The section name is a unique topic identifier for the cloud such as **cloud1-telemetry**.
- Set **CollectdSensubilityResultsChannel** to define the topic for collectd-sensubility events. The value is a unique topic identifier for the cloud such as **sensubility/cloud1-telemetry**.

Additional resources

- For more information about the **stf-connectors.yaml** environment file, see Section 4.1.5, "Configuring the STF connection for the overcloud".
- For more information about adding heat templates to a RHOSP director Operator deployment, see Adding heat templates and environment files with the director Operator

5.1.5. Deploying the overcloud for director Operator

Deploy or update the overcloud with the required environment files so that data is collected and transmitted to Service Telemetry Framework (STF).

Procedure

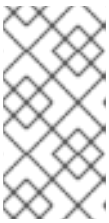
1. Log in to the Red Hat OpenShift Container Platform environment where RHOSP director Operator is deployed and change to the project that hosts your RHOSP deployment:

```
$ oc project openstack
```

2. Open the **OpenStackConfigGenerator** custom resource for editing:

```
$ oc edit OpenStackConfigGenerator
```

3. Add the **metrics/ceilometer-write-qdr.yaml** and **metrics/qdr-edge-only.yaml** environment files as values for the **heatEnvs** parameter. Save your edits, and close the **OpenStackConfigGenerator** custom resource:



NOTE

If you already deployed a Red Hat OpenStack Platform environment using director Operator, you must delete the existing **OpenStackConfigGenerator** and create a new object with the full configuration in order to re-generate the **OpenStackConfigVersion**.

OpenStackConfigGenerator

```
apiVersion: osp-director.openstack.org/v1beta1
kind: OpenStackConfigGenerator
metadata:
  name: default
  namespace: openstack
spec:
  heatEnvConfigMap: heat-env-config-deploy
  heatEnvs:
  - <existing_environment_file_references>
  - metrics/ceilometer-write-qdr.yaml
  - metrics/qdr-edge-only.yaml
```

4. If you already deployed a Red Hat OpenStack Platform environment using director Operator and generated a new **OpenStackConfigVersion**, edit the **OpenStackDeploy** object of your deployment, and set the value of **spec.configVersion** to the new **OpenStackConfigVersion** in order to update the overcloud deployment.

Additional resources

- For more information about getting the latest **OpenStackConfigVersion**, see Obtain the latest OpenStackConfigVersion
- For more information about applying the overcloud configuration with director Operator, see Applying overcloud configuration with the director Operator

CHAPTER 6. USING OPERATIONAL FEATURES OF SERVICE TELEMETRY FRAMEWORK

You can use the following operational features to provide additional functionality to the Service Telemetry Framework (STF):

- Configuring dashboards
- Configuring the metrics retention time period
- Configuring alerts
- Configuring SNMP traps
- Configuring high availability
- Configuring an alternate observability strategy
- Monitoring the resource use of OpenStack services
- Monitoring container health and API status

6.1. DASHBOARDS IN SERVICE TELEMETRY FRAMEWORK

Use the third-party application, Grafana, to visualize system-level metrics that the data collectors collectd and Ceilometer gather for each individual host node.

For more information about configuring data collectors, see Section 4.1, "Deploying Red Hat OpenStack Platform overcloud for Service Telemetry Framework using director".

You can use dashboards to monitor a cloud:

Infrastructure dashboard

Use the infrastructure dashboard to view metrics for a single node at a time. Select a node from the upper left corner of the dashboard.

Cloud view dashboard

Use the cloud view dashboard to view panels to monitor service resource usage, API stats, and cloud events. You must enable API health monitoring and service monitoring to provide the data for this dashboard. API health monitoring is enabled by default in the STF base configuration. For more information, see Section 4.1.4, "Creating the base configuration for STF" .

- For more information about API health monitoring, see Section 6.9, "Red Hat OpenStack Platform API status and containerized services health".
- For more information about RHOSP service monitoring, see Section 6.8, "Resource usage of Red Hat OpenStack Platform services".

Virtual machine view dashboard

Use the virtual machine view dashboard to view panels to monitor virtual machine infrastructure usage. Select a cloud and project from the upper left corner of the dashboard. You must enable event storage if you want to enable the event annotations on this dashboard. For more information, see Section 3.2, "Creating a ServiceTelemetry object in Red Hat OpenShift Container Platform" .

Memcached view dashboard

Use the memcached view dashboard to view panels to monitor connections, availability, system metrics and cache performance. Select a cloud from the upper left corner of the dashboard.

6.1.1. Configuring Grafana to host the dashboard

Grafana is not included in the default Service Telemetry Framework (STF) deployment, so you must deploy the Grafana Operator from community-operators CatalogSource. If you use the Service Telemetry Operator to deploy Grafana, it results in a Grafana instance and the configuration of the default data sources for the local STF deployment.

Procedure

1. Log in to your Red Hat OpenShift Container Platform environment where STF is hosted.
2. Subscribe to the Grafana Operator by using the community-operators CatalogSource:

WARNING

Community Operators are Operators which have not been vetted or verified by Red Hat. Community Operators should be used with caution because their stability is unknown. Red Hat provides no support for community Operators.

Learn more about Red Hat's third party software support policy

```
$ oc apply -f - <<EOF
apiVersion: operators.coreos.com/v1alpha1
kind: Subscription
metadata:
  labels:
    operators.coreos.com/grafana-operator.openshift-operators: ""
  name: grafana-operator
  namespace: openshift-operators
spec:
  channel: v5
  installPlanApproval: Automatic
  name: grafana-operator
  source: community-operators
  sourceNamespace: openshift-marketplace
EOF
```

3. Verify that the Operator launched successfully. In the command output, if the value of the **PHASE** column is **Succeeded**, the Operator launched successfully:

```
$ oc wait --for jsonpath="{.status.phase}"=Succeeded csv --namespace openshift-operators -
l operators.coreos.com/grafana-operator.openshift-operators

clusterserviceversion.operators.coreos.com/grafana-operator.v5.6.0 condition met
```

4. To launch a Grafana instance, create or modify the **ServiceTelemetry** object. Set **graphing.enabled** and **graphing.grafana.ingressEnabled** to **true**. Optionally, set the value of **graphing.grafana.baseImage** to the Grafana workload container image that will be deployed:

```
$ oc edit stf default

apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
...
spec:
  ...
  graphing:
    enabled: true
    grafana:
      ingressEnabled: true
      baseImage: 'registry.redhat.io/rhel8/grafana:9'
```

5. Verify that the Grafana instance deployed:

```
$ oc wait --for jsonpath="{.status.phase}"=Running pod -l app=default-grafana --
timeout=600s

pod/default-grafana-deployment-669968df64-wz5s2 condition met
```

6. Verify that the Grafana data sources installed correctly:

```
$ oc get grafanadatasources.grafana.integreatly.org

NAME                    NO MATCHING INSTANCES   LAST RESYNC   AGE
default-ds-stf-prometheus                       2m35s         2m56s
```

7. Verify that the Grafana route exists:

```
$ oc get route default-grafana-route

NAME                    HOST/PORT                                                PATH   SERVICES
PORT   TERMINATION   WILDCARD
default-grafana-route   default-grafana-route-service-telemetry.apps.infra.watch
default-grafana-service   web     reencrypt     None
```

6.1.2. Enabling dashboards

The Grafana Operator can import and manage dashboards by creating **GrafanaDashboard** objects. Service Telemetry Operator can enable a set of default dashboards that create the **GrafanaDashboard** objects that load dashboards into the Grafana instance.

Set the value of **graphing.grafana.dashboards.enabled** to **true** to load the following dashboards into Grafana :

- Infrastructure dashboard
- Cloud view dashboard
- Virtual machine view dashboard

- Memcached view dashboard

You can use the **GrafanaDashboard** object to create and load additional dashboards into Grafana. For more information about managing dashboards with Grafana Operator, see Dashboards in the *Grafana Operator project documentation*.

Prerequisites

- You enabled graphing in the **ServiceTelemetry** object. For more information about graphing, see Section 6.1.1, "Configuring Grafana to host the dashboard" .

Procedure

1. To enable the managed dashboards, create or modify the **ServiceTelemetry** object. Set **graphing.grafana.dashboards.enabled** to **true**:

```
$ oc edit stf default

apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
...
spec:
  ...
  graphing:
    enabled: true
    grafana:
      dashboards:
        enabled: true
```

2. Verify that the Grafana dashboards are created. The process of Service Telemetry Operator creating the dashboards might take some time.

```
$ oc get grafanadashboards.grafana.integreatly.org

NAME                          NO MATCHING INSTANCES   LAST RESYNC   AGE
memcached-dashboard-1                                 38s           38s
rhos-cloud-dashboard-1                                39s           39s
rhos-dashboard-1                                      39s           39s
virtual-machine-dashboard-1                           37s           37s
```

3. Retrieve the Grafana route address:

```
$ oc get route default-grafana-route -ojsonpath='{.spec.host}'

default-grafana-route-service-telemetry.apps.infra.watch
```

4. In a web browser, navigate to https://*<grafana_route_address>*. Replace *<grafana_route_address>* with the value that you retrieved in the previous step.

5. Log in with OpenShift credentials. For more information about logging in, see Section 3.3, "Accessing user interfaces for STF components".

6. To view the dashboard, click **Dashboards** and **Browse**. The managed dashboards are available in the *service-telemetry* folder.

6.1.3. Connecting an external dashboard system

It is possible to configure third-party visualization tools to connect to the STF Prometheus for metrics retrieval. Access is controlled via an OAuth token, and a ServiceAccount is already created that has (only) the required permissions. A new OAuth token can be generated against this account for the external system to use.

To use the authentication token, the third-party tool must be configured to supply an HTTP Bearer Token Authorization header as described in RFC6750. Consult the documentation of the third-party tool for how to configure this header. For example Configure Prometheus - Custom HTTP Headers in the *Grafana Documentation*.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Create a new token secret for the stf-prometheus-reader service account

```
$ oc create -f - <<EOF
apiVersion: v1
kind: Secret
metadata:
  name: my-prometheus-reader-token
  namespace: service-telemetry
  annotations:
    kubernetes.io/service-account.name: stf-prometheus-reader
type: kubernetes.io/service-account-token
EOF
```

4. Retrieve the token from the secret

```
$ TOKEN=$(oc get secret my-prometheus-reader-token -o template='{{.data.token}}' |
base64 -d)
```

5. Retrieve the Prometheus host name

```
$ PROM_HOST=$(oc get route default-prometheus-proxy -ogo-template='{{ .spec.host }}')
```

6. Test the access token

```
$ curl -k -H "Authorization: Bearer ${TOKEN}" https://${PROM_HOST}/api/v1/query?
query=up

{"status":"success",[...]
```

7. Configure your third-party tool with the PROM_HOST and TOKEN values from above

```
$ echo $PROM_HOST
$ echo $TOKEN
```

8. The token remains valid as long as the secret exists. You can revoke the token by deleting the secret.

```
$ oc delete secret my-prometheus-reader-token
secret "my-prometheus-reader-token" deleted
```

Additional information

For more information about service account token secrets, see Creating a service account token secret in the *OpenShift Container Platform Documentation*.

6.2. METRICS RETENTION TIME PERIOD IN SERVICE TELEMETRY FRAMEWORK

The default retention time for metrics stored in Service Telemetry Framework (STF) is 24 hours, which provides enough data for trends to develop for the purposes of alerting.

For long-term storage, use systems designed for long-term data retention, for example, Thanos.

Additional resources

- To adjust STF for additional metrics retention time, see Section 6.2.1, "Editing the metrics retention time period in Service Telemetry Framework".
- For recommendations about Prometheus data storage and estimating storage space, see https://prometheus.io/docs/prometheus/latest/storage/#operational-aspects
- For more information about Thanos, see https://thanos.io/

6.2.1. Editing the metrics retention time period in Service Telemetry Framework

You can adjust Service Telemetry Framework (STF) for additional metrics retention time.

Procedure

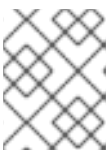
1. Log in to Red Hat OpenShift Container Platform.
2. Change to the service-telemetry namespace:

```
$ oc project service-telemetry
```

3. Edit the ServiceTelemetry object:

```
$ oc edit stf default
```

4. Add **retention: 7d** to the storage section of backends.metrics.prometheus.storage to increase the retention period to seven days:



NOTE

If you set a long retention period, retrieving data from heavily populated Prometheus systems can result in queries returning results slowly.

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  ...
  backends:
    metrics:
      prometheus:
        enabled: true
        storage:
          strategy: persistent
          retention: 7d
    ...
```

5. Save your changes and close the object.
6. Wait for prometheus to restart with the new settings.

```
$ oc get po -l app.kubernetes.io/name=prometheus -w
```

7. Verify the new retention setting by checking the command line arguments used in the pod.

```
$ oc describe po prometheus-default-0 | grep retention.time
      --storage.tsdb.retention.time=24h
```

Additional resources

- For more information about the metrics retention time, see Section 6.2, "Metrics retention time period in Service Telemetry Framework".

6.3. ALERTS IN SERVICE TELEMETRY FRAMEWORK

You create alert rules in Prometheus and alert routes in Alertmanager. Alert rules in Prometheus servers send alerts to an Alertmanager, which manages the alerts. Alertmanager can silence, inhibit, or aggregate alerts, and send notifications by using email, on-call notification systems, or chat platforms.

To create an alert, complete the following tasks:

1. Create an alert rule in Prometheus. For more information, see Section 6.3.1, "Creating an alert rule in Prometheus".
2. Create an alert route in Alertmanager. There are two ways in which you can create an alert route:
   - Creating a standard alert route in Alertmanager .
   - Creating an alert route with templating in Alertmanager .

Additional resources

For more information about alerts or notifications with Prometheus and Alertmanager, see https://prometheus.io/docs/alerting/overview/

To view an example set of alerts that you can use with Service Telemetry Framework (STF), see https://github.com/infrawatch/service-telemetry-operator/tree/master/deploy/alerts

6.3.1. Creating an alert rule in Prometheus

Prometheus evaluates alert rules to trigger notifications. If the rule condition returns an empty result set, the condition is false. Otherwise, the rule is true and it triggers an alert.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Create a **PrometheusRule** object that contains the alert rule. The Prometheus Operator loads the rule into Prometheus:

```
$ oc apply -f - <<EOF
apiVersion: monitoring.rhobs/v1
kind: PrometheusRule
metadata:
  creationTimestamp: null
  labels:
    prometheus: default
    role: alert-rules
  name: prometheus-alarm-rules
  namespace: service-telemetry
spec:
  groups:
    - name: ./openstack.rules
      rules:
        - alert: Collectd metrics receive rate is zero
          expr: rate(sg_total_collectd_msg_received_count[1m]) == 0
EOF
```

To change the rule, edit the value of the **expr** parameter.

4. To verify that the Operator loaded the rules into Prometheus, run the **curl** command against the default-prometheus-proxy route with basic authentication:

```
$ curl -k -H "Authorization: Bearer $(oc create token stf-prometheus-reader)" https://$(oc get route default-prometheus-proxy -ogo-template='{{ .spec.host }}')/api/v1/rules

{"status":"success","data":{"groups":
[{"name":"./openstack.rules","file":"/etc/prometheus/rules/prometheus-default-rulefiles-0/service-telemetry-prometheus-alarm-rules.yaml","rules":
[{"state":"inactive","name":"Collectd metrics receive count is zero","query":"rate(sg_total_collectd_msg_received_count[1m]) == 0","duration":0,"labels":
{},"annotations":{},"alerts":
[],"health":"ok","evaluationTime":0.00034627,"lastEvaluation":"2021-12-07T17:23:22.160448028Z","type":"alerting"}],"interval":30,"evaluationTime":0.000353787,"lastEvaluation":"2021-12-07T17:23:22.160444017Z"}]}}
```

Additional resources

- For more information on alerting, see https://github.com/coreos/prometheus-operator/blob/master/Documentation/user-guides/alerting.md

6.3.2. Configuring custom alerts

You can add custom alerts to the **PrometheusRule** object that you created in Section 6.3.1, "Creating an alert rule in Prometheus".

Procedure

1. Use the **oc edit** command:

```
$ oc edit prometheusrules.monitoring.rhobs prometheus-alarm-rules
```

2. Edit the **PrometheusRules** manifest.
3. Save and close the manifest.

Additional resources

- For more information about how to configure alerting rules, see https://prometheus.io/docs/prometheus/latest/configuration/alerting_rules/.
- For more information about PrometheusRules objects, see https://github.com/coreos/prometheus-operator/blob/master/Documentation/user-guides/alerting.md

6.3.3. Creating a standard alert route in Alertmanager

Use Alertmanager to deliver alerts to an external system, such as email, IRC, or other notification channel. The Prometheus Operator manages the Alertmanager configuration as a Red Hat OpenShift Container Platform secret. By default, Service Telemetry Framework (STF) deploys a basic configuration that results in no receivers:

```
alertmanager.yaml: |-
  global:
    resolve_timeout: 5m
  route:
    group_by: ['job']
    group_wait: 30s
    group_interval: 5m
    repeat_interval: 12h
    receiver: 'null'
  receivers:
  - name: 'null'
```

To deploy a custom Alertmanager route with STF, you must add a **alertmanagerConfigManifest** parameter to the Service Telemetry Operator that results in an updated secret, managed by the Prometheus Operator.

NOTE

If your **alertmanagerConfigManifest** contains a custom template, for example, to construct the title and text of the sent alert, you must deploy the contents of the **alertmanagerConfigManifest** using a base64-encoded configuration. For more information, see Section 6.3.4, "Creating an alert route with templating in Alertmanager" .

Procedure

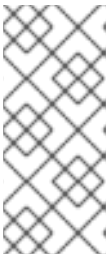
1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Edit the **ServiceTelemetry** object for your STF deployment:

```
$ oc edit stf default
```

4. Add the new parameter **alertmanagerConfigManifest** and the **Secret** object contents to define the **alertmanager.yaml** configuration for Alertmanager:



NOTE

This step loads the default template that the Service Telemetry Operator manages. To verify that the changes are populating correctly, change a value, return the **alertmanager-default** secret, and verify that the new value is loaded into memory. For example, change the value of the parameter **global.resolve_timeout** from **5m** to **10m**.

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  backends:
    metrics:
      prometheus:
        enabled: true
  alertmanagerConfigManifest: |
    apiVersion: v1
    kind: Secret
    metadata:
      name: 'alertmanager-default'
      namespace: 'service-telemetry'
    type: Opaque
    stringData:
      alertmanager.yaml: |-
        global:
          resolve_timeout: 10m
        route:
          group_by: ['job']
          group_wait: 30s
```

```
      group_interval: 5m
      repeat_interval: 12h
      receiver: 'null'
    receivers:
    - name: 'null'
```

5. Verify that the configuration has been applied to the secret:

```
$ oc get secret alertmanager-default -o go-template='{{index .data "alertmanager.yaml" |
base64decode }}'

global:
  resolve_timeout: 10m
route:
  group_by: ['job']
  group_wait: 30s
  group_interval: 5m
  repeat_interval: 12h
  receiver: 'null'
receivers:
- name: 'null'
```

6. Run the **wget** command from the prometheus pod against the **alertmanager-proxy** service to retrieve the status and **configYAML** contents, and verify that the supplied configuration matches the configuration in Alertmanager:

```
$ oc exec -it prometheus-default-0 -c prometheus -- sh -c "wget --header \"Authorization:
Bearer \$(cat /var/run/secrets/kubernetes.io/serviceaccount/token)\" https://default-
alertmanager-proxy:9095/api/v1/status -q -O -"

{"status":"success","data":{"configYAML":"...",...}}
```

7. Verify that the **configYAML** field contains the changes you expect.

Additional resources

- For more information about the Red Hat OpenShift Container Platform secret and the Prometheus operator, see Prometheus user guide on alerting.

6.3.4. Creating an alert route with templating in Alertmanager

Use Alertmanager to deliver alerts to an external system, such as email, IRC, or other notification channel. The Prometheus Operator manages the Alertmanager configuration as a Red Hat OpenShift Container Platform secret. By default, Service Telemetry Framework (STF) deploys a basic configuration that results in no receivers:

```
alertmanager.yaml: |-
  global:
    resolve_timeout: 5m
  route:
    group_by: ['job']
    group_wait: 30s
    group_interval: 5m
    repeat_interval: 12h
```

```
  receiver: 'null'
receivers:
- name: 'null'
```

If the **alertmanagerConfigManifest** parameter contains a custom template, for example, to construct the title and text of the sent alert, you must deploy the contents of the **alertmanagerConfigManifest** by using a base64-encoded configuration.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Create the necessary alertmanager config in a file called alertmanager.yaml, for example:

```
$ cat > alertmanager.yaml <<EOF
global:
  resolve_timeout: 10m
  slack_api_url: <slack_api_url>
receivers:
  - name: slack
    slack_configs:
    - channel: #stf-alerts
      title: |-
        ...
      text: >-
        ...
route:
  group_by: ['job']
  group_wait: 30s
  group_interval: 5m
  repeat_interval: 12h
  receiver: 'slack'
EOF
```

4. Generate the config manifest and add it to the **ServiceTelemetry** object for your STF deployment:

```
$ CONFIG_MANIFEST=$(oc create secret --dry-run=client generic alertmanager-default --
from-file=alertmanager.yaml -o json)
$ oc patch stf default --type=merge -p '{"spec":
{"alertmanagerConfigManifest":'"$CONFIG_MANIFEST"'}}'
```

5. Verify that the configuration has been applied to the secret:

NOTE

There will be a short delay as the operators update each object

```
$ oc get secret alertmanager-default -o go-template='{{index .data "alertmanager.yaml" |
```

```
base64decode }}'

global:
  resolve_timeout: 10m
  slack_api_url: <slack_api_url>
receivers:
  - name: slack
    slack_configs:
    - channel: #stf-alerts
      title: |-
        ...
      text: >-
        ...
route:
  group_by: ['job']
  group_wait: 30s
  group_interval: 5m
  repeat_interval: 12h
  receiver: 'slack'
```

6. Run the **wget** command from the prometheus pod against the **alertmanager-proxy** service to retrieve the status and **configYAML** contents, and verify that the supplied configuration matches the configuration in Alertmanager:

```
$ oc exec -it prometheus-default-0 -c prometheus -- /bin/sh -c "wget --header \"Authorization: Bearer \$(cat /var/run/secrets/kubernetes.io/serviceaccount/token)\" https://default-alertmanager-proxy:9095/api/v1/status -q -O -"

{"status":"success","data":{"configYAML":"...",...}}
```

7. Verify that the **configYAML** field contains the changes you expect.

Additional resources

- For more information about the Red Hat OpenShift Container Platform secret and the Prometheus operator, see Prometheus user guide on alerting.

6.4. SENDING ALERTS AS SNMP TRAPS

To enable SNMP traps, modify the **ServiceTelemetry** object and configure the **snmpTraps** parameters. SNMP traps are sent using version 2c.

6.4.1. Configuration parameters for snmpTraps

The **snmpTraps** parameter contains the following sub-parameters for configuring the alert receiver:

enabled

Set the value of this sub-parameter to true to enable the SNMP trap alert receiver. The default value is false.

target

Target address to send SNMP traps. Value is a string. Default is **192.168.24.254**.

port

Target port to send SNMP traps. Value is an integer. Default is **162**.

community

Target community to send SNMP traps to. Value is a string. Default is **public**.

retries

SNMP trap retry delivery limit. Value is an integer. Default is **5**.

timeout

SNMP trap delivery timeout defined in seconds. Value is an integer. Default is **1**.

alertOidLabel

Label name in the alert that defines the OID value to send the SNMP trap as. Value is a string. Default is **oid**.

trapOidPrefix

SNMP trap OID prefix for variable bindings. Value is a string. Default is **1.3.6.1.4.1.50495.15**.

trapDefaultOid

SNMP trap OID when no alert OID label has been specified with the alert. Value is a string. Default is **1.3.6.1.4.1.50495.15.1.2.1**.

trapDefaultSeverity

SNMP trap severity when no alert severity has been set. Value is a string. Defaults to an empty string.

Configure the **snmpTraps** parameter as part of the **alerting.alertmanager.receivers** definition in the **ServiceTelemetry** object:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  alerting:
    alertmanager:
      receivers:
        snmpTraps:
          alertOidLabel: oid
          community: public
          enabled: true
          port: 162
          retries: 5
          target: 192.168.25.254
          timeout: 1
          trapDefaultOid: 1.3.6.1.4.1.50495.15.1.2.1
          trapDefaultSeverity: ""
          trapOidPrefix: 1.3.6.1.4.1.50495.15
...
```

6.4.2. Overview of the MIB definition

Delivery of SNMP traps uses object identifier (OID) value **1.3.6.1.4.1.50495.15.1.2.1** by default. The management information base (MIB) schema is available at https://github.com/infrawatch/prometheus-webhook-snmp/blob/master/PROMETHEUS-ALERT-CEPH-MIB.txt.

The OID number is comprised of the following component values: * The value **1.3.6.1.4.1** is a global OID defined for private enterprises. * The next identifier **50495** is a private enterprise number assigned by IANA for the Ceph organization. * The other values are child OIDs of the parent.

15
: prometheus objects

15.1
: prometheus alerts

15.1.2
: prometheus alert traps

15.1.2.1
: prometheus alert trap default

The prometheus alert trap default is an object comprised of several other sub-objects to OID **1.3.6.1.4.1.50495.15** which is defined by the **alerting.alertmanager.receivers.snmpTraps.trapOidPrefix** parameter:

<trapOidPrefix>.1.1.1
: alert name

<trapOidPrefix>.1.1.2
: status

<trapOidPrefix>.1.1.3
: severity

<trapOidPrefix>.1.1.4
: instance

<trapOidPrefix>.1.1.5
: job

<trapOidPrefix>.1.1.6
: description

<trapOidPrefix>.1.1.7
: labels

<trapOidPrefix>.1.1.8
: timestamp

<trapOidPrefix>.1.1.9
: rawdata

The following is example output from a simple SNMP trap receiver that outputs the received trap to the console:

```
SNMPv2-MIB::snmpTrapOID.0 = OID: SNMPv2-SMI::enterprises.50495.15.1.2.1
SNMPv2-SMI::enterprises.50495.15.1.1.1 = STRING: "TEST ALERT FROM PROMETHEUS
PLEASE ACKNOWLEDGE"
SNMPv2-SMI::enterprises.50495.15.1.1.2 = STRING: "firing"
SNMPv2-SMI::enterprises.50495.15.1.1.3 = STRING: "warning"
SNMPv2-SMI::enterprises.50495.15.1.1.4 = ""
SNMPv2-SMI::enterprises.50495.15.1.1.5 = ""
SNMPv2-SMI::enterprises.50495.15.1.1.6 = STRING: "TEST ALERT FROM "
SNMPv2-SMI::enterprises.50495.15.1.1.7 = STRING: "{\"cluster\": \"TEST\", \"container\": \"sg-
```

```
core\", \"endpoint\": \"prom-https\", \"prometheus\": \"service-telemetry/default\", \"service\": \"default-cloud1-coll-meter\", \"source\": \"SG\"}"
  SNMPv2-SMI::enterprises.50495.15.1.1.8 = Timeticks: (1676476389) 194 days, 0:52:43.89
  SNMPv2-SMI::enterprises.50495.15.1.1.9 = STRING: "{\"status\": \"firing\", \"labels\": {\"cluster\": \"TEST\", \"container\": \"sg-core\", \"endpoint\": \"prom-https\", \"prometheus\": \"service-telemetry/default\", \"service\": \"default-cloud1-coll-meter\", \"source\": \"SG\"}, \"annotations\": {\"action\": \"TESTING PLEASE ACKNOWLEDGE, NO FURTHER ACTION REQUIRED ONLY A TEST\"}, \"startsAt\": \"2023-02-15T15:53:09.109Z\", \"endsAt\": \"0001-01-01T00:00:00Z\", \"generatorURL\": \"http://prometheus-default-0:9090/graph?g0.expr=sg_total_collectd_msg_received_count+%3E+1&g0.tab=1\", \"fingerprint\": \"feefeb77c577a02f\"}"
```

6.4.3. Configuring SNMP traps

Prerequisites

- Ensure that you know the IP address or hostname of the SNMP trap receiver where you want to send the alerts to.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. To enable SNMP traps, modify the **ServiceTelemetry** object:

```
$ oc edit stf default
```

4. Set the **alerting.alertmanager.receivers.snmpTraps** parameters:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
...
spec:
  ...
  alerting:
    alertmanager:
      receivers:
        snmpTraps:
          enabled: true
          target: 10.10.10.10
```

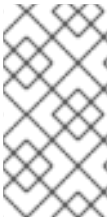
5. Ensure that you set the value of **target** to the IP address or hostname of the SNMP trap receiver.

Additional Information

For more information about available parameters for **snmpTraps**, see Section 6.4.1, “Configuration parameters for snmpTraps”.

6.4.4. Creating alerts for SNMP traps

You can create alerts that are configured for delivery by SNMP traps by adding labels that are parsed by the prometheus-webhook-snmp middleware to define the trap information and delivered object identifiers (OID). Adding the **oid** or **severity** labels is only required if you need to change the default values for a particular alert definition.



NOTE

When you set the oid label, the top-level SNMP trap OID changes, but the sub-OIDs remain defined by the global **trapOidPrefix** value plus the child OID values **.1.1.1** through **.1.1.9**. For more information about the MIB definition, see Section 6.4.2, "Overview of the MIB definition".

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Create a **PrometheusRule** object that contains the alert rule and an **oid** label that contains the SNMP trap OID override value:

```
$ oc apply -f - <<EOF
apiVersion: monitoring.rhobs/v1
kind: PrometheusRule
metadata:
  creationTimestamp: null
  labels:
    prometheus: default
    role: alert-rules
  name: prometheus-alarm-rules-snmp
  namespace: service-telemetry
spec:
  groups:
    - name: ./openstack.rules
      rules:
        - alert: Collectd metrics receive rate is zero
          expr: rate(sg_total_collectd_msg_received_count[1m]) == 0
          labels:
            oid: 1.3.6.1.4.1.50495.15.1.2.1
            severity: critical
EOF
```

Additional information

For more information about configuring alerts, see Section 6.3, "Alerts in Service Telemetry Framework".

6.5. CONFIGURING THE DURATION FOR THE TLS CERTIFICATES

To configure the duration of the TLS certificates that you use for the AMQ Interconnect connection in Service Telemetry Framework (STF), modify the **ServiceTelemetry** object and configure the **certificates** parameter.

6.5.1. Configuration parameters for the TLS certificates

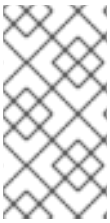
You can configure the duration of the certificate with the following sub-parameters of the **certificates** parameter:

endpointCertDuration

The requested *duration* or lifetime of the endpoint Certificate. Minimum accepted duration is 1 hour. Value must be in units accepted by Go time.ParseDuration https://golang.org/pkg/time/#ParseDuration. The default value is **70080h**.

caCertDuration

The requested *duration* or lifetime of the CA Certificate. Minimum accepted duration is 1 hour. Value must be in units accepted by Go time.ParseDuration https://golang.org/pkg/time/#ParseDuration. Default value is **70080h**.



NOTE

The default duration of certificates is long, because you usually copy a subset of them in the Red Hat OpenStack Platform deployment when the certificates renew. For more information about the QDR CA Certificate renewal process, see Chapter 7, *Renewing the AMQ Interconnect certificate*.

You can configure the **certificates** parameter for QDR that is part of the **transports.qdr** definition in the **ServiceTelemetry** object:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
...
  transports:
    ...
    qdr:
      enabled: true
      certificates:
        endpointCertDuration: 70080h
        caCertDuration: 70080h
...
```

6.5.2. Configuring TLS certificates duration

To configure the duration of the TLS certificates to use with Service Telemetry Framework (STF), modify the **ServiceTelemetry** object and configure the **certificates** parameter.

Prerequisites

- You didn't deploy an instance of Service Telemetry Operator already.

NOTE

When you create the **ServiceTelemetry** object, the required certificates and their secrets for STF are also created. For more information about how to modify the certificates and the secrets, see: Chapter 7, *Renewing the AMQ Interconnect certificate*. The following procedure is valid for new STF deployments.

Procedure

1. To edit the duration of the TLS certificate, you can set the QDR **caCertDuration**, for example **87600h** for 10 years:

```
$ oc apply -f - <<EOF
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  transport:
    qdr:
      enabled: true
      certificates:
        caCertDuration: 87600h
EOF
```

Verification

1. Verify that the expiry date for the certificate is correct:

```
$ oc get secret  default-interconnect-selfsigned -o jsonpath='{.data.tls\.crt}' | base64 -d  |
openssl x509 -in - -text | grep "Not After"
            Not After : Mar  9 21:00:16 2033 GMT
```

6.6. HIGH AVAILABILITY

WARNING

STF high availability (HA) mode is deprecated and is not supported in production environments. Red Hat OpenShift Container Platform is a highly-available platform, and you can cause issues and complicate debugging in STF if you enable HA mode.

With high availability, Service Telemetry Framework (STF) can rapidly recover from failures in its component services. Although Red Hat OpenShift Container Platform restarts a failed pod if nodes are available to schedule the workload, this recovery process might take more than one minute, during which time events and metrics are lost. A high availability configuration includes multiple copies of STF components, which reduces recovery time to approximately 2 seconds. To protect against failure of an Red Hat OpenShift Container Platform node, deploy STF to an Red Hat OpenShift Container Platform cluster with three or more nodes.

Enabling high availability has the following effects:

- The following components run two pods instead of the default one:
  - AMQ Interconnect
  - Alertmanager
  - Prometheus
  - Events Smart Gateway
  - Metrics Smart Gateway
- Recovery time from a lost pod in any of these services reduces to approximately 2 seconds.

6.6.1. Configuring high availability

To configure Service Telemetry Framework (STF) for high availability, add **highAvailability.enabled: true** to the ServiceTelemetry object in Red Hat OpenShift Container Platform. You can set this parameter at installation time or, if you already deployed STF, complete the following steps:

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Use the oc command to edit the ServiceTelemetry object:

```
$ oc edit stf default
```

4. Add **highAvailability.enabled: true** to the **spec** section:

```
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
...
spec:
  ...
  highAvailability:
    enabled: true
```

5. Save your changes and close the object.

6.7. OBSERVABILITY STRATEGY IN SERVICE TELEMETRY FRAMEWORK

Service Telemetry Framework (STF) does not include event storage backends or dashboarding tools. STF can optionally create datasource configurations for Grafana using the community operator to provide a dashboarding interface.

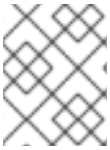
Instead of having Service Telemetry Operator create custom resource requests, you can use your own

deployments of these applications or other compatible applications, and scrape the metrics Smart Gateways for delivery to your own Prometheus-compatible system for telemetry storage. If you set the **observabilityStrategy** to **none**, then storage backends will not be deployed so persistent storage will not be required by STF.

Use the observabilityStrategy property on the STF object to specify which type of observability components will be deployed.

The following values are available:

value	meaning
use_redhat	Red Hat supported components are requested by STF. This includes Prometheus and Alertmanager from the Cluster Observability Operator, but no resource requests to Elastic Cloud on Kubernetes (ECK) Operator. If enabled, resources are also requested from the Grafana Operator (community component).
use_hybrid	In addition to the Red Hat supported components, Elasticsearch and Grafana resources are also requested (if specified in the ServiceTelemetry object)
use_community	The community version of Prometheus Operator is used instead of Cluster Observability Operator. Elasticsearch and Grafana resources are also requested (if specified in the ServiceTelemetry object)
none	No storage or alerting components are deployed



NOTE

Newly deployed STF environments as of 1.5.3 default to **use_redhat**. Existing STF deployments created before 1.5.3 default to **use_community**.

To migrate an existing STF deployment to **use_redhat**, see the Red Hat Knowledge Base article Migrating Service Telemetry Framework to fully supported operators .

6.7.1. Configuring an alternate observability strategy

To skip the deployment of storage, visualization, and alerting backends, add **observabilityStrategy: none** to the ServiceTelemetry spec. In this mode, you only deploy AMQ Interconnect routers and Smart Gateways, and you must configure an external Prometheus-compatible system to collect metrics from the STF Smart Gateways, and an external Elasticsearch to receive the forwarded events.

Procedure

1. Create a **ServiceTelemetry** object with the property **observabilityStrategy: none** in the **spec** parameter. The manifest shows results in a default deployment of STF that is suitable for receiving telemetry from a single cloud with all metrics collector types.

```
$ oc apply -f - <<EOF
apiVersion: infra.watch/v1beta1
kind: ServiceTelemetry
metadata:
  name: default
  namespace: service-telemetry
spec:
  observabilityStrategy: none
EOF
```

2. Delete the remaining objects that are managed by community operators

```
$ for o in alertmanagers.monitoring.rhobs/default prometheuses.monitoring.rhobs/default
elasticsearch/elasticsearch grafana/default-grafana; do oc delete $o; done
```

3. To verify that all workloads are operating correctly, view the pods and the status of each pod:

```
$ oc get pods
NAME                                                READY   STATUS    RESTARTS   AGE
default-cloud1-ceil-event-smartgateway-6f8547df6c-p2db5   3/3     Running   0          132m
default-cloud1-ceil-meter-smartgateway-59c845d65b-gzhcs   3/3     Running   0          132m
default-cloud1-coll-event-smartgateway-bf859f8d77-tzb66   3/3     Running   0          132m
default-cloud1-coll-meter-smartgateway-75bbd948b9-d5phm   3/3     Running   0          132m
default-cloud1-sens-meter-smartgateway-7fdbb57b6d-dh2g9   3/3     Running   0          132m
default-interconnect-668d5bbcd6-57b2l               1/1     Running   0          132m
interconnect-operator-b8f5bb647-tlp5t               1/1     Running   0          47h
service-telemetry-operator-566b9dd695-wkvjq         1/1     Running   0          156m
smart-gateway-operator-58d77dcf7-6xsq7              1/1     Running   0          47h
```

Additional resources

- For more information about configuring additional clouds or to change the set of supported collectors, see Section 4.3.2, “Deploying Smart Gateways” .
- To migrate an existing STF deployment to **use_redhat**, see the Red Hat Knowledge Base article Migrating Service Telemetry Framework to fully supported operators .

6.8. RESOURCE USAGE OF RED HAT OPENSTACK PLATFORM SERVICES

You can monitor the resource usage of the Red Hat OpenStack Platform (RHOSP) services, such as the APIs and other infrastructure processes, to identify bottlenecks in the overcloud by showing services that run out of compute power. Resource usage monitoring is enabled by default.

Additional resources

- To disable resource usage monitoring, see Section 6.8.1, “Disabling resource usage monitoring of Red Hat OpenStack Platform services”.

6.8.1. Disabling resource usage monitoring of Red Hat OpenStack Platform services

To disable the monitoring of RHOSP containerized service resource usage, you must set the **CollectdEnableLibpodstats** parameter to **false**.

Prerequisites

- You have created the **stf-connectors.yaml** file. For more information, see Section 4.1, "Deploying Red Hat OpenStack Platform overcloud for Service Telemetry Framework using director".
- You are using the most current version of Red Hat OpenStack Platform (RHOSP) 17.1.

Procedure

1. Open the **stf-connectors.yaml** file and add the **CollectdEnableLibpodstats** parameter to override the setting in **enable-stf.yaml**. Ensure that **stf-connectors.yaml** is called from the **openstack overcloud deploy** command after **enable-stf.yaml**:

```
CollectdEnableLibpodstats: false
```

2. Continue with the overcloud deployment procedure. For more information, see Section 4.1.6, "Deploying the overcloud".

6.9. RED HAT OPENSTACK PLATFORM API STATUS AND CONTAINERIZED SERVICES HEALTH

You can use the OCI (Open Container Initiative) standard to assess the container health status of each Red Hat OpenStack Platform (RHOSP) service by periodically running a health check script. Most RHOSP services implement a health check that logs issues and returns a binary status. For the RHOSP APIs, the health checks query the root endpoint and determine the health based on the response time.

Monitoring of RHOSP container health and API status is enabled by default.

Additional resources

- To disable RHOSP container health and API status monitoring, see Section 6.9.1, "Disabling container health and API status monitoring".

6.9.1. Disabling container health and API status monitoring

To disable RHOSP containerized service health and API status monitoring, you must set the **CollectdEnableSensubility** parameter to **false**.

Prerequisites

- You have created the **stf-connectors.yaml** file in your templates directory. For more information, see Section 4.1, "Deploying Red Hat OpenStack Platform overcloud for Service Telemetry Framework using director".
- You are using the most current version of Red Hat OpenStack Platform (RHOSP) 17.1.

Procedure

1. Open the **stf-connectors.yaml** and add the **CollectdEnableSensubility** parameter to override the setting in **enable-stf.yaml**. Ensure that **stf-connectors.yaml** is called from the **openstack overcloud deploy** command after **enable-stf.yaml**:

```
CollectdEnableSensubility: false
```

2. Continue with the overcloud deployment procedure. For more information, see Section 4.1.6, “Deploying the overcloud”.

Additional resources

- For more information about multiple cloud addresses, see Section 4.3, “Configuring multiple clouds”.

CHAPTER 7. RENEWING THE AMQ INTERCONNECT CERTIFICATE

Periodically, you must renew the CA certificate that secures the AMQ Interconnect connection between Red Hat OpenStack Platform (RHOSP) and Service Telemetry Framework (STF) when the certificate expires. The renewal is handled automatically by the cert-manager component in Red Hat OpenShift Container Platform, but you must manually copy the renewed certificate to your RHOSP nodes.

7.1. CHECKING FOR AN EXPIRED AMQ INTERCONNECT CA CERTIFICATE

When the CA certificate expires, the AMQ Interconnect connections remain up, but cannot reconnect if they are interrupted. Eventually, some or all of the connections from your Red Hat OpenStack Platform (RHOSP) dispatch routers fail, showing errors on both sides, and the expiry or **Not After** field in your CA certificate is in the past.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Verify that some or all dispatch router connections have failed:

```
$ oc exec -it deploy/default-interconnect -- qdstat --connections | grep Router | wc
      0       0       0
```

4. Check for this error in the Red Hat OpenShift Container Platform-hosted AMQ Interconnect logs:

```
$ oc logs -l application=default-interconnect | tail
[...]
2022-11-10 20:51:22.863466 +0000 SERVER (info) [C261] Connection from
10.10.10.10:34570 (to 0.0.0.0:5671) failed: amqp:connection:framing-error SSL Failure:
error:140940E5:SSL routines:ssl3_read_bytes:ssl handshake failure
```

5. Log into your RHOSP undercloud.
6. Check for this error in the RHOSP-hosted AMQ Interconnect logs of a node with a failed connection:

```
$ ssh controller-0.ctlplane -- sudo tail /var/log/containers/metrics_qdr/metrics_qdr.log
[...]
2022-11-10 20:50:44.311646 +0000 SERVER (info) [C137] Connection to default-
interconnect-5671-service-telemetry.apps.mycluster.com:443 failed:
amqp:connection:framing-error SSL Failure: error:0A000086:SSL routines::certificate verify
failed
```

7. Confirm that the CA certificate has expired by examining the file on an RHOSP node:

```
$ ssh controller-0.ctlplane -- cat /var/lib/config-data/puppet-generated/metrics_qdr/etc/pki/tls/certs/CA_sslProfile.pem | openssl x509 -text | grep "Not After"
        Not After : Nov 10 20:31:16 2022 GMT

$ date
Mon Nov 14 11:10:40 EST 2022
```

7.2. UPDATING THE AMQ INTERCONNECT CA CERTIFICATE

To update the AMQ Interconnect certificate, you must export it from Red Hat OpenShift Container Platform and copy it to your Red Hat OpenStack Platform (RHOSP) nodes.

Procedure

1. Log in to Red Hat OpenShift Container Platform.
2. Change to the **service-telemetry** namespace:

```
$ oc project service-telemetry
```

3. Export the CA certificate to **STFCA.pem**:

```
$ oc get secret/default-interconnect-selfsigned -o jsonpath='{.data.ca\.crt}' | base64 -d > STFCA.pem
```

4. Copy **STFCA.pem** to your RHOSP undercloud.
5. Log into your RHOSP undercloud.
6. Edit the **stf-connectors.yaml** file to contain the new caCertFileContent. For more information, see Section 4.1.5, “Configuring the STF connection for the overcloud” .
7. Copy the **STFCA.pem** file to each RHOSP overcloud node:

```
[stack@undercloud-0 ~]$ ansible -i overcloud-deploy/overcloud/tripleo-ansible-inventory.yaml allovercloud -b -m copy -a "src=STFCA.pem dest=/var/lib/config-data/puppet-generated/metrics_qdr/etc/pki/tls/certs/CA_sslProfile.pem"
```

8. Restart the metrics_qdr container on each RHOSP overcloud node:

```
[stack@undercloud-0 ~]$ ansible -i overcloud-deploy/overcloud/tripleo-ansible-inventory.yaml allovercloud -m shell -a "sudo podman restart metrics_qdr"
```

NOTE

You do not need to deploy the overcloud after you copy the **STFCA.pem** file and restart the **metrics_qdr** container. You edit the **stf-connectors.yaml** file so that future deployments do not overwrite the new CA certificate.

CHAPTER 8. REMOVING SERVICE TELEMETRY FRAMEWORK FROM THE RED HAT OPENSHIFT CONTAINER PLATFORM ENVIRONMENT

Remove Service Telemetry Framework (STF) from an Red Hat OpenShift Container Platform environment if you no longer require the STF functionality.

To remove STF from the Red Hat OpenShift Container Platform environment, you must perform the following tasks:

1. Delete the namespace.
2. Remove the cert-manager Operator.
3. Remove the Cluster Observability Operator.

8.1. DELETING THE NAMESPACE

To remove the operational resources for STF from Red Hat OpenShift Container Platform, delete the namespace.

Procedure

1. Run the **oc delete** command:

```
$ oc delete project service-telemetry
```

2. Verify that the resources have been deleted from the namespace:

```
$ oc get all
No resources found.
```

8.2. REMOVING THE CERT-MANAGER OPERATOR FOR RED HAT OPENSHIFT

If you are not using the cert-manager Operator for Red Hat OpenShift for any other applications, delete the Subscription, ClusterServiceVersion, and CustomResourceDefinitions.

For more information about removing the cert-manager for Red Hat OpenShift Operator, see Removing cert-manager Operator for Red Hat OpenShift in the *OpenShift Container Platform Documentation*.

Additional resources

- Deleting Operators from a cluster .

8.3. REMOVING THE CLUSTER OBSERVABILITY OPERATOR

If you are not using the Cluster Observability Operator for any other applications, delete the Subscription, ClusterServiceVersion, and CustomResourceDefinitions.

For more information about removing the Cluster Observability Operator, see Uninstalling the Cluster Observability Operator using the web console in the *OpenShift Container Platform Documentation*.

Additional resources

- Deleting Operators from a cluster .