Red Hat Virtualization 4.3

Metrics Store Installation Guide

Installing Metrics Store for Red Hat Virtualization
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Abstract

A comprehensive guide to installing and configuring Metrics Store for Red Hat Virtualization. Metrics Store collects logs and metrics for Red Hat Virtualization 4.2 and later.
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Metrics Store collects logs and metrics from Red Hat Virtualization. The data is transferred from Red Hat Virtualization to Red Hat OpenShift where it is stored and aggregated in Elasticsearch and saved in indexes. The data can then be analyzed and visualized in Kibana.

- **Elasticsearch** is a distributed, RESTful search and analytics engine that lets you perform and combine many types of searches.

- **Kibana** is an open source analytics and visualization platform designed to work with Elasticsearch. You can easily perform advanced data analysis and visualize your data in a variety of charts and tables.
CHAPTER 1. WORKFLOW AND ARCHITECTURE

To install Metrics Store, complete the following major tasks:

1. Create the Metrics Store virtual machines.
2. Deploy Metrics Store services on Red Hat OpenShift.
3. Configure networking for Metrics Store virtual machines.
4. Deploy collectd and rsyslog.
5. Verify the Metrics Store installation.

Metrics Store architecture

The Metrics Store architecture is based on the Red Hat OpenShift EFK logging stack, running on Red Hat OpenShift Container Platform 3.11.

Metrics Store uses the following services:

- **collectd** (hosts) collects metrics from hosts, virtual machines, and databases.
- **rsyslog** (hosts) collects metrics, adds log data, enriches the data with metadata, and sends the enriched data to Elasticsearch.
- **Elasticsearch** (Metrics Store virtual machine) stores and indexes the data.
- **Kibana** (Metrics Store virtual machine) analyzes and presents the data as dashboards and charts.

Figure 1.1. Metrics Store architecture
CHAPTER 2. INSTALLING METRICS STORE

Prerequisites

- Computing resources:
  - 4 CPU cores
  - 30 GB RAM
  - 500 GB SSD disk
- For the Metrics Store Installer virtual machine:
  - 4 CPU cores
  - 8 GB RAM

NOTE
The computing resource requirements are for an all-in-one installation, with a single Metrics Store virtual machine. The all-in-one installation can collect data from up to 50 hosts, each running 20 virtual machines.

- Operating system: Red Hat Enterprise Linux 7.7 or later
- Software: Red Hat Virtualization 4.3.5 or later
- Network configuration: see Configuring networking for Metrics Store virtual machines

2.1. CREATING THE METRICS STORE VIRTUAL MACHINES

To create the Metrics Store virtual machines, perform the following tasks:

1. Configure the Metrics Store installation.
2. Create the following Metrics Store virtual machines:
   - The Metrics Store Installer virtual machine - a temporary virtual machine for deploying Red Hat OpenShift and services on the Metrics Store virtual machines.
   - One or more Metrics Store virtual machines.
3. Verify the Metrics Store virtual machines.

2.1.1. Configuring the Metrics Store installation

Procedure

1. Log in to the Manager machine using SSH.
2. Update the packages:
   # yum update
3. Copy `metrics-store-config.yml.example` to create `metrics-store-config.yml`:

   ```
   # cp /etc/ovirt-engine-metrics/metrics-store-config.yml.example /etc/ovirt-engine-metrics/config.yml.d/metrics-store-config.yml
   ```

4. Edit the parameters in `metrics-store-config.yml` to match your installation environment, and save the file. The parameters are documented in the file.

5. To set the logical network that is used for the `metrics-store-installer` and Metrics Store virtual machines, add the following lines to `metrics-store-config.yml`:

   ```
   # ovirt_template_nics - the following are the default values for setting the logical network used by the metrics_store_installer and the Metrics Store virtual machines
   ovirt_template_nics:
   - name: nic1
     profile_name: ovirtmgmt
     interface: virtio
   ```

6. On the Manager machine, copy `/etc/ovirt-engine-metrics/secure_vars.yaml.example` to `/etc/ovirt-engine-metrics/secure_vars.yaml`:

   ```
   # cp /etc/ovirt-engine-metrics/secure_vars.yaml.example /etc/ovirt-engine-metrics/secure_vars.yaml
   ```

7. Edit the parameters in `/etc/ovirt-engine-metrics/secure_vars.yaml` to match the details of your specific environment.

8. Encrypt the `secure_vars.yaml` file:

   ```
   # ansible-vault encrypt /etc/ovirt-engine-metrics/secure_vars.yaml
   ```

2.1.2. Creating Metrics Store virtual machines

**Procedure**

1. Go to the `ovirt-engine-metrics` directory:

   ```
   # cd /usr/share/ovirt-engine-metrics
   ```

2. Run the `ovirt-metrics-store-installation` playbook to create the virtual machines:

   ```
   # ANSIBLE_JINJA2_EXTENSIONS="jinja2.ext.do"
   ./configure_ovirt_machines_for_metrics.sh --playbook=ovirt-metrics-store-installation.yml --ask-vault-pass
   ```

**NOTE**

To enable verbose mode for debugging, add `-vvv` to the end of the command, or add `-v` to enable light verbose mode, or add `-vvvv` to enable connection debugging. For more extensive debugging options, enable debugging through the Ansible playbook as described in Enable debugging via Ansible playbook.
2.1.3. Verifying the creation of the virtual machines

Procedure

1. Log in to the Administration Portal.
2. Click Compute → Virtual Machines to verify that the metrics-store-installer virtual machine and the Metrics Store virtual machines are running.

2.1.4. Changing the default LDAP authentication identity provider (optional)

In the standard Metrics Store installation, the allow_all identity provider is configured by default. You can change this default during installation by configuring the openshift_master_identity_providers parameter in the inventory file integ.ini. You can also configure the session options in the OAuth configuration in the integ.ini inventory file.

Procedure

1. Locate the integ.ini in the root directory of the metrics-store-installer virtual machine.
2. Follow the instructions for updating the identity provider configuration in Configuring identity providers with Ansible.

2.2. CONFIGURING NETWORKING FOR METRICS STORE VIRTUAL MACHINES

2.2.1. Configuring DNS resolution for Metrics Store virtual machines

Procedure

1. In the metrics-store-config.yml DNS zone parameter, public_hosted_zone should be defined as a wildcard DNS record (*.example.com). That wildcard DNS should resolve to the IP address of your master0 virtual machine.
2. Add the hostnames of the Metrics Store virtual machines to your DNS server.

2.2.2. Setting a static MAC address for a Metrics Store virtual machine (optional)

Procedure

1. Log in to the Administration Portal.
2. Click Compute → Virtual Machines and select a Metrics Store virtual machine.
3. In the Network Interfaces tab, select a NIC and click Edit.
4. Select Custom MAC Address, enter the MAC address, and click OK.
5. Reboot the virtual machine.

2.2.3. Configuring firewall ports
The following table describes the firewall settings needed for communication between the ports used by Metrics Store.

<table>
<thead>
<tr>
<th>ID</th>
<th>Port(s)</th>
<th>Protocol</th>
<th>Sources</th>
<th>Destinations</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS1</td>
<td>9200</td>
<td>TCP</td>
<td>RHV Red Hat Virtualization Hosts</td>
<td>Metrics Store VM</td>
<td>Transfer data to ElasticSearch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RHV Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS2</td>
<td>5601</td>
<td>TCP</td>
<td>Kibana user</td>
<td>Metrics Store VM</td>
<td>Give users access to the Kibana web interface.</td>
</tr>
</tbody>
</table>

**NOTE**

Whether a connection is encrypted or not depends on how you deployed the software.

### 2.3. DEPLOYING METRICS STORE SERVICES ON RED HAT OPENSSHIFT

Deploy and verify Red Hat OpenShift, Elasticsearch, Curator (for managing Elasticsearch indices and snapshots), and Kibana on the Metrics Store virtual machines.

**Procedure**

1. Log in to the `metrics-store-installer` virtual machine.

2. Run the `install_okd` playbook to deploy Red Hat OpenShift and Metrics Store services to the Metrics Store virtual machines:

   ```bash
   # ANSIBLE_CONFIG="/usr/share/ansible/openshift-ansible/ansible.cfg" \
   ANSIBLE_ROLES_PATH="/usr/share/ansible/roles/:/usr/share/ansible/openshift-\n   ansible/roles" \
   ansible-playbook -i integ.ini install_okd.yaml -e @vars.yaml -e @secure_vars.yaml --ask-vault-pass
   
   **NOTE**
   
   To enable verbose mode for debugging, add `-vvv` to the end of the command, or add `'-v'` to enable light verbose mode, or add `-vvvv` to enable connection debugging.

3. Verify the deployment by logging in to each Metrics Store virtual machine:
   a. Log in to the `openshift-logging` project:

   ```bash
   # oc project openshift-logging
   
   # oc get pods
   ```
If Elasticsearch is not running, see Troubleshooting related to ElasticSearch in the OpenShift Container Platform 3.11 documentation.

4. Check the Kibana host name and record it so you can access the Kibana console in Chapter 4, Verifying the Metrics Store installation:

```
# oc get routes
```

Cleanup

1. Log in to the Administration Portal.

2. Click Compute → Virtual Machines and delete the metrics-store-installer virtual machine.
CHAPTER 3. DEPLOYING COLLECTD AND RSYSLOG

Deploy **collectd** and **rsyslog** on the hosts to collect logs and metrics.

**NOTE**

You do not need to repeat this procedure for new hosts. The Manager configures the hosts automatically.

**Procedure**

1. Log in to the Manager machine using SSH.

2. Copy `/etc/ovirt-engine-metrics/config.yml.example` to create `/etc/ovirt-engine-metrics/config.yml.d/config.yml`:

   ```
   # cp /etc/ovirt-engine-metrics/config.yml.example /etc/ovirt-engine-metrics/config.yml.d/config.yml
   ```

3. Edit the **ovirt_env_name** and **elasticsearch_host** parameters in **config.yml** and save the file. These parameters are mandatory and are documented in the file.

   **NOTE**

   If you add a Manager or an Elasticsearch installation, copy the Manager’s public key to your Metrics Store virtual machine using the following commands:

   ```
   # mytemp=$(mktemp -d)
   # cp /etc/pki/ovirt-engine/keys/engine_id_rsa $mytemp
   # ssh-keygen -y -f $mytemp/engine_id_rsa > $mytemp/engine_id_rsa.pub
   # ssh-copy-id -i $mytemp/engine_id_rsa.pub root@{elasticsearch_host}
   # rm -rf $mytemp
   ```

4. Deploy **collectd** and **rsyslog** on the hosts:

   ```
   # /usr/share/ovirt-engine-metrics/setup/ansible/configure_ovirt_machines_for_metrics.sh
   ```
Verify the Metrics Store installation using the Kibana console. You can view the collected logs and create data visualizations.

**Procedure**

1. Log in to the Kibana console using the URL ([https://kibana.example.com](https://kibana.example.com)) that you recorded in Section 2.3, "Deploying Metrics Store services on Red Hat OpenShift". Use the default admin user, and the password you defined during the metrics store installation. Optionally, you can access the Red Hat OpenShift Container Platform portal at [https://example.com:8443](https://example.com:8443) (using the same admin user credentials).

2. Select the Discover tab, and check that you can view the `project.ovirt-logs-ovirt_env_name-uuid` index. See the Discover section in the Kibana User Guide for information about working with logs.

3. Select the Visualize tab, where you can create data visualizations for the `project.ovirt-metrics-ovirt_env_name-uuid` and the `project.ovirt-logs-ovirt_env_name-uuid` indexes. The Metrics Store User Guide describes the available parameters. See the Visualize section of the Kibana User Guide for information about visualizing logs and metrics.
APPENDIX A. INSTALLING METRICS STORE WITH SATELLITE

You can use Satellite to install Metrics Store on a disconnected environment.

Prerequisites

- The Satellite server is configured. For more information, seeDisconnected installation using Satellite Docker registry

**NOTE**

If you encounter a missing image or a reference to an online image (depending on which applications you are using), consider updating the references in the deployment or build configuration of the application, or re-tag Docker images as a temporary measure (just to rule out that the image is not reachable).

- The following OpenShift component images are synchronized through Docker on your Satellite server:
  - openshift3/oauth-proxy
  - openshift3/ose-console
  - openshift3/ose-control-plane
  - openshift3/ose-deployer
  - openshift3/ose-docker-registry
  - openshift3/ose-haproxy-router
  - openshift3/ose-logging-auth-proxy
  - openshift3/ose-logging-curator5
  - openshift3/ose-logging-elasticsearch5
  - openshift3/ose-logging-fluentd
  - openshift3/ose-logging-kibana5
  - openshift3/ose-node
  - openshift3/ose-pod
  - openshift3/ose-web-console
  - openshift3/registry-console
  - rhel7/etcd

- Two hosts are created on the Satellite server - one for the Metrics Store Installer virtual machine, and one for the OpenShift virtual machine, as follows:
  1. Create hosts on Satellite - see Creating a Host.
  2. Assign static IP addresses and MAC addresses for the virtual machines. The host for the OpenShift virtual machine should be of the format `master-<suffix>0` to match the OpenShift virtual machine hostname.

- The qcow image is available on the Manager machine.
  1. Go to RHEL product software.
  2. In the Product Software tab, download the Red Hat Enterprise Linux KVM Guest Image to the Manager machine.

Running the Ansible role

   ```bash
   # cp /etc/ovirt-engine-metrics/metrics-store-config-satellite.yml.example /etc/ovirt-engine-metrics/config.yml.d/metrics-store-config.yml
   ```

2. Update the values of `/etc/ovirt-engine-metrics/metrics-store-config.yml` to match the details of your specific environment.

   ```bash
   # vi /etc/ovirt-engine-metrics/config.yml.d/metrics-store-config.yml
   ```

3. On the Manager machine, copy `/etc/ovirt-engine-metrics/secure_vars_satellite.yaml.example` to `/etc/ovirt-engine-metrics/secure_vars.yaml`.

   ```bash
   # cp /etc/ovirt-engine-metrics/secure_vars_satellite.yaml.example /etc/ovirt-engine-metrics/secure_vars.yaml
   ```

4. Update the values of `/etc/ovirt-engine-metrics/secure_vars.yaml` to match the details of your specific environment.

   ```bash
   # vi /etc/ovirt-engine-metrics/secure_vars.yaml
   ```

5. Encrypt the `secure_vars.yaml` file.

   ```bash
   # ansible-vault encrypt /etc/ovirt-engine-metrics/secure_vars.yaml
   ```

6. Go to the ovirt-engine-metrics repo.

   ```bash
   # cd /usr/share/ovirt-engine-metrics
   ```

7. Run the metrics store installation playbook that creates the metrics store installer virtual machine.

   ```bash
   # ANSIBLE_JINJA2_EXTENSIONS="jinja2.ext.do"
   ./configure_ovirt_machines_for_metrics.sh
   --playbook=ovirt-metrics-store-installation.yml --ask-vault-pass -vvv
   ```

8. Log in to the Administration Portal and review the Metrics Store installer virtual machine creation.

9. Log in to the Metrics Store installer virtual machine.

   ```bash
   # ssh root@<metrics-store-installer ip or fqdn>
   ```

10. Run the Ansible playbook that deploys OpenShift on the virtual machines that were created.

    ```bash
    # ANSIBLE_CONFIG="/usr/share/ansible/openshift-ansible/ansible.cfg"
    # ANSIBLE_ROLES_PATH="/usr/share/ansible/roles/:/usr/share/ansible/openshift-ansible/roles"
    ansible-playbook -i integ.ini install_okd.yaml -e @vars.yaml -e @secure_vars.yaml --ask-vault-pass -vvv
    ```

APPENDIX A. INSTALLING METRICS STORE WITH SATELLITE
APPENDIX B. SHARING REPORTS WITH NON-ADMINISTRATORS

Users without administrator privileges can view collected logs and metrics as read-only users. The following example creates a user named \textit{user name} with \textit{view} (read-only) permissions.

Procedure

1. Log in to the Metrics Store virtual machine.

2. Create a new user:

   \begin{verbatim}
   # oc create user \textit{username}
   # oc create identity allow_all: \textit{username}
   # oc create useridentitymapping allow_all: \textit{username} \textit{username}
   \end{verbatim}

3. Log in to the 	extit{openshift-logging} project:

   \begin{verbatim}
   # oc project openshift-logging
   \end{verbatim}

4. Assign a \textit{view} role to the user:

   \begin{verbatim}
   # oc adm policy add-role-to-user view \textit{user name}
   \end{verbatim}

5. Create a password for the user:

   \begin{verbatim}
   # oc login --username=\textit{user name} --password=\textit{password}
   \end{verbatim}
APPENDIX C. REMOVING METRICS STORE

To remove the Metrics Store installation:

1. Stop and disable `collectd` and `rsyslog`:

   ```
   # cd /usr/share/ovirt-engine-metrics/
   # ./configure_ovirt_machines_for_metrics.sh --playbook=cleanup-ovirt-metrics.yml -vvv
   ```

2. Delete the Metrics Store virtual machine.