Application Operations Management

Best Practices

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Contents

1 Overview

This chapter lists the best practices about Application Operations Management (AOM).

2 Alarm Noise Reduction

This section describes how to set alarm noise reduction. Before sending an alarm notification, AOM processes alarms based on noise reduction rules to prevent alarm storms.

Scenario

When analyzing applications, resources, and businesses, e-commerce O&M personnel find that the number of alarms is too large and there are too many identical alarms. They need to detect faults based on the alarms and monitor applications comprehensively.

Solution

Use AOM to set alarm rules to monitor the usage of resources (such as hosts and components) in the environment in real time. When AOM or an external service is abnormal, an alarm is triggered immediately. AOM also provides the alarm noise reduction function. Before sending an alarm notification, AOM processes alarms based on noise reduction rules. This helps you identify critical problems and avoid alarm storms.

Alarm noise reduction consists of four parts: grouping, deduplication, suppression, and silence.

- You can filter different subnets of alarms and then group them according to certain conditions. Alarms in the same group are aggregated to trigger one notification.
- By using suppression rules, you can suppress or block notifications related to specific alarms. For example, when a major alarm is generated, less severe alarms can be suppressed. Another example, when a node is faulty, all other alarms of the processes or containers on this node can be suppressed.
- You can create a silence rule to shield alarm notifications in a specified period. The rule takes effect immediately after it is created.
- AOM has built-in deduplication rules. The service backend automatically deduplicates alarms. You do not need to manually create rules.

Monitoring ELB metrics at the business layer is used as an example here.

Prerequisite

An alarm action rule has been created.

Step 1: Create a Grouping Rule

When a critical or major alarm is generated, the **Monitor_host** action rule is triggered, and alarms are grouped by alarm source. To create a grouping rule, do as follows:

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane, choose **Alarm Management** > **Alarm Noise Reduction**.

Step 3 On the **Grouping Rules** tab page, click **Create** and set the rule name and grouping condition.

Figure 2-1 Creating a grouping rule

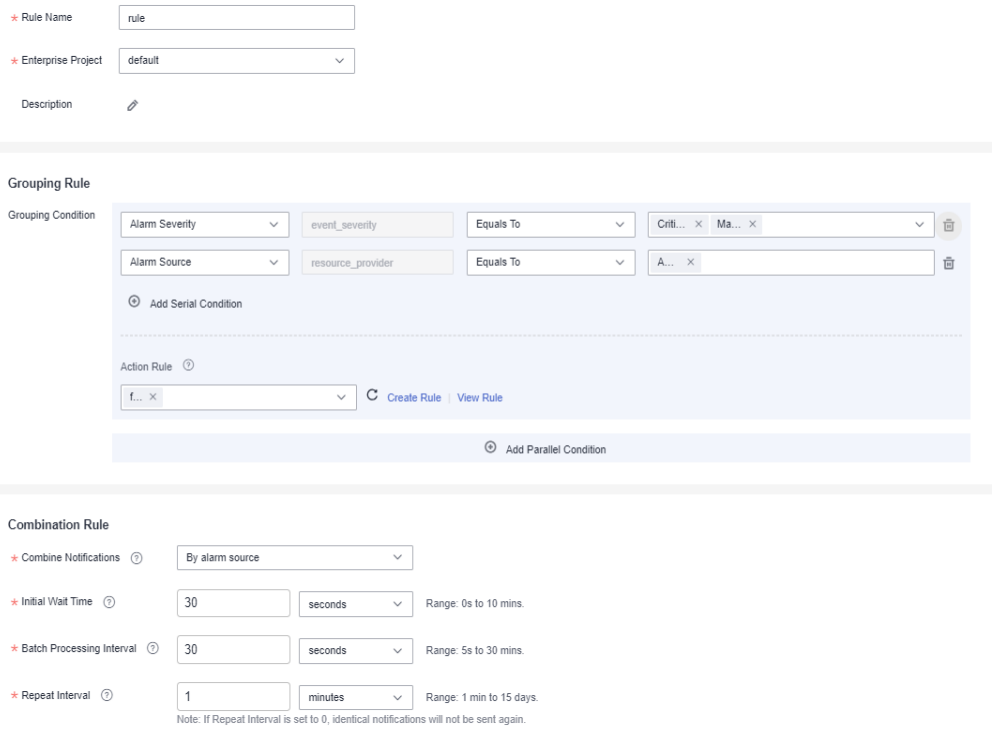


Table 2-1 Alarm combination rule

Combine Notifications	Combines grouped alarms based on specified fields. Alarms in the same group are aggregated for sending one notification. Notifications can be combined: • **By alarm source**: Alarms triggered by the same alarm source are combined into one group for sending notifications. • **By alarm source + severity**: Alarms triggered by the same alarm source and of the same severity are combined into one group for sending notifications. • **By alarm source + all tags**: Alarms triggered by the same alarm source and with the same tag are combined into one group for sending notifications.
Initial Wait Time	Interval for sending an alarm notification after alarms are combined for the first time. It is recommended that the time be set to seconds to prevent alarm storms. Value range: 0s to 10 minutes. Recommended: 15s.
Batch Processing Interval	Waiting time for sending an alarm notification after the combined alarm data changes. It is recommended that the time be set to minutes. If you want to receive alarm notifications as soon as possible, set the time to seconds. The change here refers to a new alarm or an alarm status change. Value range: 5s to 30 minutes. Recommended: 60s.
Repeat Interval	Waiting time for sending an alarm notification after the combined alarm data becomes duplicate. It is recommended that the time be set to hours. Duplication means that no new alarm is generated and no alarm status is changed while other attributes (such as titles and content) are changed. Value range: 0 minutes to 15 days. Recommended: 1 hour.

----End

Step 2: Create a Metric Alarm Rule (Configuration Mode Set to Select from all metrics)

You can set threshold conditions in metric alarm rules for resource metrics. If a metric value meets the threshold condition, a threshold alarm will be generated. If no metric data is reported, an insufficient data event will be generated.

Metric alarm rules can be created in the following modes: **Select from all metrics** and **PromQL**. The following describes how to create an alarm rule for monitoring all metrics at the ELB business layer.

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane, choose **Alarm Management** > **Alarm Rules**.

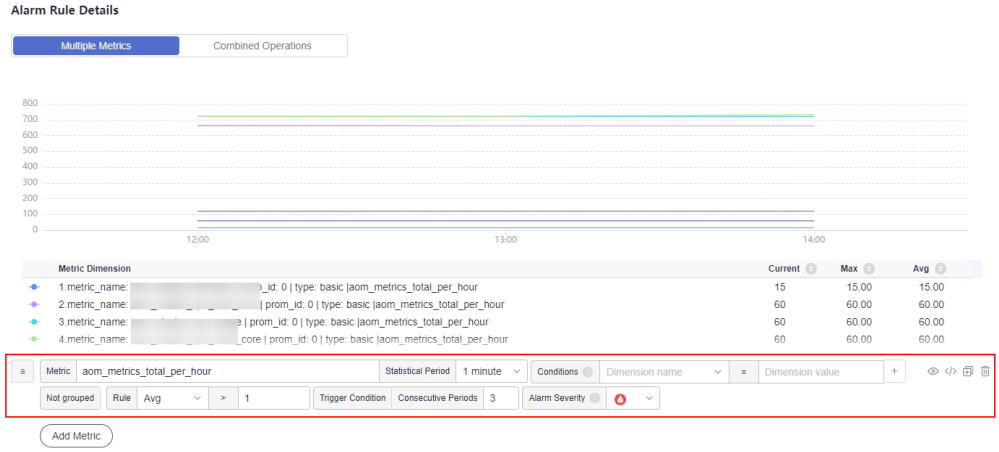
Step 3 On the **Metric/Event Alarm Rules** tab page, click **Create**.

Step 4 Set basic information about the alarm rule, such as the rule name.

Step 5 Set detailed information about the alarm rule.

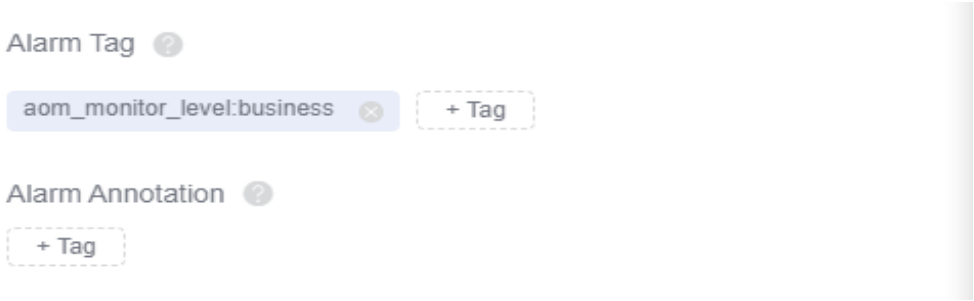
1. Set **Rule Type** to **Metric alarm rule** and **Configuration Mode** to **Select from all metrics**.
2. Set parameters such as the metric, environment, and check interval.

Figure 2-2 Setting the detailed information about the alarm rule



3. Set alarm tags and annotations to group alarms. They can be associated with alarm noise reduction policies for sending notifications. As a business-layer metric is selected in **Step 5.2**, set **Alarm Tag** to **aom_monitor_level:business**.

Figure 2-3 Customizing tag information



NOTE

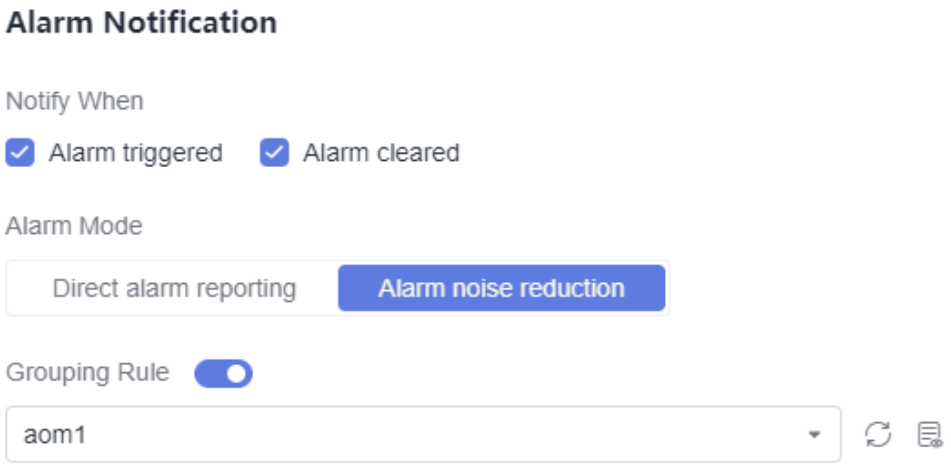
The tag of full metrics is in the format of "key:value". Generally, **key** is set to **aom_monitor_level**. **value** varies depending on the layer of metrics:

- Infrastructure metrics: **infrastructure**
- Middleware metrics: **middleware**
- Application metrics: **application**
- Business metrics: **business**

Step 6 Set an alarm notification policy. There are two alarm notification modes. In this example, the alarm noise reduction mode is selected.

Alarm noise reduction: Alarms are sent only after being processed based on noise reduction rules, preventing alarm storms.

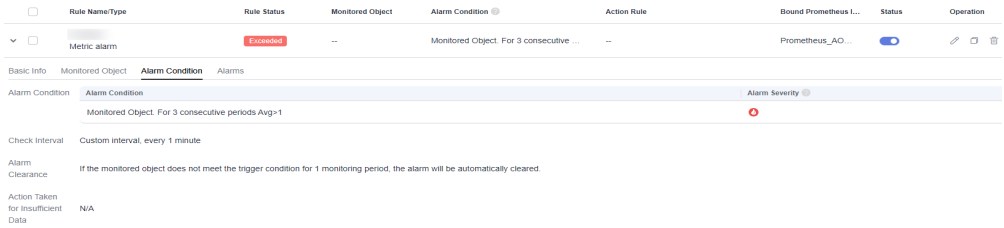
Figure 2-4 Selecting the alarm noise reduction mode



Step 7 Click **Confirm**. Then, click **Back to Alarm Rule List** to view the created alarm rule.

As shown in the following figure, a metric alarm rule is created. Click ⌄ in front of the rule name to view its details.

Figure 2-5 Creating a metric alarm rule



In the expanded list, if a metric value meets the configured alarm condition, a metric alarm is generated on the alarm page. To view the alarm, choose **Alarm Management** > **Alarm List** in the navigation pane.

If the preset notification policy is met, the system sends an alarm notification to the specified personnel by email, SMS, or WeCom.

----End

3 Customizing OS Images to Automatically Connect UniAgent

This section describes how to package images for connecting UniAgent in the Linux and Windows environments.

Overview

An image is an Elastic Compute Server (ECS) or Bare Metal Server (BMS) template that contains OS or service data and may also contain proprietary software and application software, such as database software. Images are classified into public, private, Marketplace, and shared images.

Image Management Service (IMS) provides easy-to-use, self-service image management functions. You can use a public, private, or shared image to apply for ECSs. You can also create private images from existing ECSs or using external image files.

Packaging an Image in the Linux Environment

In the Linux environment, you can package an image according to the following procedure:

Prerequisites

Ensure that no UniAgent has been installed on the Linux host where the image is to be packaged.

Procedure

Step 1 Create an ECS by referring to **ECS Getting Started**.

Step 2 For example, in the **CN North-Beijing4** region, download the **install_uniagentd_self_OS.sh** script to the **/root** directory of the ECS:

```
wget https://aom-uniagent-cn-north-4.obs.cn-north-4.myhuaweicloud.com/install_uniagentd_self_OS.sh
        {region_id}=cn-north-4
        {obs_domain}=obs.cn-north-4.myhuaweicloud.com
```

NOTE

Download command: **wget https://aom-uniagent-***{region_id}.{obs_domain}***/install_uniagentd_self_OS.sh**

Step 3 In the **/etc/init.d/** directory, set the **install_uniagentd_self_OS.sh** script to automatically start upon power-on:

```
bash /root/install_uniagentd_self_OS.sh config
```

If the **AOMInstall** startup script exists in the **/etc/init.d/** directory, your setting is successful.

Step 4 Delete the configuration script:

```
rm -f /root/install_uniagentd_self_OS.sh
```

NOTE

After the preceding steps are complete, you can create an image. Do not restart the Linux host before you create an image.

Step 5 Locate the target ECS and click **Create Image** in the **Operation** column to create a private image. For details, see **Creating an Image**.

Step 6 Configure image information as required.

----End

Packaging an Image in the Windows Environment

In the Windows environment, you can only install the UniAgent, delete some files, and then package your private image.

Step 1 Create an ECS by referring to **ECS Getting Started**.

Step 2 On the ECS, manually install the UniAgent by referring to **Installing a UniAgent**. Then check the UniAgent status on the UI.

Step 3 Run the following command on the ECS after the UniAgent is installed:

```
sc stop uniagentdservice
&& del /s/q C:\uniagentd\uniagentd.sn && rd /s/q C:\uniagentd\tmp C:\uniagentd\log C:\uniagentd\libexec
&& echo -e "${ak_info}\n${sk_info}\n${master_info}" > C:\uniagentd\conf\uniagentd.conf
```

NOTE

Obtain the values of *${ak_info}*, *${sk_info}*, and *${master_info}* from the manual installation page and replace them based on site requirements. Each AK/SK pair corresponds to a specific project.

Step 4 Locate the target ECS and click **Create Image** in the **Operation** column to create a private image. For details, see **Creating an Image**.

Step 5 Configure image information as required.

----End

4 Connecting Self-Built Middleware in the CCE Container Scenario

4.1 Connecting PostgreSQL Exporter

Application Scenario

When using PostgreSQL, you need to monitor their status and locate their faults in a timely manner. The Prometheus monitoring function monitors PostgreSQL running using Exporter in the CCE container scenario. This section describes how to deploy PostgreSQL Exporter and implement alarm access.

Prerequisites

- A CCE cluster has been created and PostgreSQL has been installed.
- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **postgres_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying PostgreSQL Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Use **Secret** to manage PostgreSQL passwords.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create from YAML** to configure a YAML file. In the YAML file, use Kubernetes **Secret** to manage and encrypt passwords. When starting PostgreSQL Exporter, the secret key can be directly used but the corresponding password needs to be changed as required.

   YAML configuration example:

   ```
   apiVersion: v1
   kind: Secret
   ```



```
metadata:
  name: postgres-test
type: Opaque
stringData:
  username: postgres
  password: you-guess # PostgreSQL password.
```

2. Deploy PostgreSQL Exporter.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create from YAML** to deploy Exporter.

   YAML configuration example (Change the parameters if needed):

```
apiVersion: apps/v1
kind: Deployment
metadata:
 name: postgres-test # Change the name based on requirements. You are advised to add the PostgreSQL instance information.
 namespace: default # Must be the same as the namespace of the PostgreSQL service.
 labels:
   app: postgres
   app.kubernetes.io/name: postgresql
spec:
 replicas: 1
 selector:
   matchLabels:
     app: postgres
     app.kubernetes.io/name: postgresql
 template:
   metadata:
     labels:
       app: postgres
       app.kubernetes.io/name: postgresql
   spec:
     containers:
     - name: postgres-exporter
       image: swr.cn-north-4.myhuaweicloud.com/aom-exporter/postgres-exporter:v0.8.0 # postgres-exporter image uploaded to SWR.
       args:
         - "--web.listen-address=:9187" # Enabled port of Exporter.
         - "--log.level=debug" # Log level.
       env:
         - name: DATA_SOURCE_USER
           valueFrom:
             secretKeyRef:
               name: postgres-test # Secret name specified in the previous step.
               key: username  # Secret key specified in the previous step.
         - name: DATA_SOURCE_PASS
           valueFrom:
             secretKeyRef:
               name: postgres-test # Secret name specified in the previous step.
               key: password  # Secret key specified in the previous step.
         - name: DATA_SOURCE_URI
           value: "x.x.x.x:5432/postgres?sslmode=disable"  # Connection information.
       ports:
       - name: http-metrics
         containerPort: 9187
```

3. Obtain metrics.

   The running time of the Postgres instance cannot be obtained by running the **curl http://exporter:9187/metrics** command. To obtain this metric, customize a **queries.yaml** file.

   a. Create a configuration that contains **queries.yaml**.

   b. Mount the configuration as a volume to a directory of Exporter.

   c. Use the configuration through **extend.query-path**. The following shows **Secret** and **Deployment**:


```
# The following shows the queries.yaml file that contains custom metrics:
---
apiVersion: v1
kind: ConfigMap
metadata:
  name: postgres-test-configmap
  namespace: default
data:
  queries.yaml: |
    pg_postmaster:
      query: "SELECT pg_postmaster_start_time as start_time_seconds from
pg_postmaster_start_time()"
      master: true
      metrics:
        - start_time_seconds:
            usage: "GAUGE"
            description: "Time at which postmaster started"

# The following shows the mounted Secret and ConfigMap, and defines Exporter deployment
parameters (such as the image):
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: postgres-test
  namespace: default
  labels:
    app: postgres
    app.kubernetes.io/name: postgresql
spec:
  replicas: 1
  selector:
    matchLabels:
      app: postgres
      app.kubernetes.io/name: postgresql
  template:
    metadata:
      labels:
        app: postgres
        app.kubernetes.io/name: postgresql
    spec:
      containers:
        - name: postgres-exporter
          image: wrouesnel/postgres_exporter:latest
          args:
            - "--web.listen-address=:9187"
            - "--extend.query-path=/etc/config/queries.yaml"
            - "--log.level=debug"
          env:
            - name: DATA_SOURCE_USER
              valueFrom:
                secretKeyRef:
                  name: postgres-test-secret
                  key: username
            - name: DATA_SOURCE_PASS
              valueFrom:
                secretKeyRef:
                  name: postgres-test-secret
                  key: password
            - name: DATA_SOURCE_URI
              value: "x.x.x.x:5432/postgres?sslmode=disable"
          ports:
            - name: http-metrics
              containerPort: 9187
          volumeMounts:
            - name: config-volume
              mountPath: /etc/config
      volumes:
        - name: config-volume
```

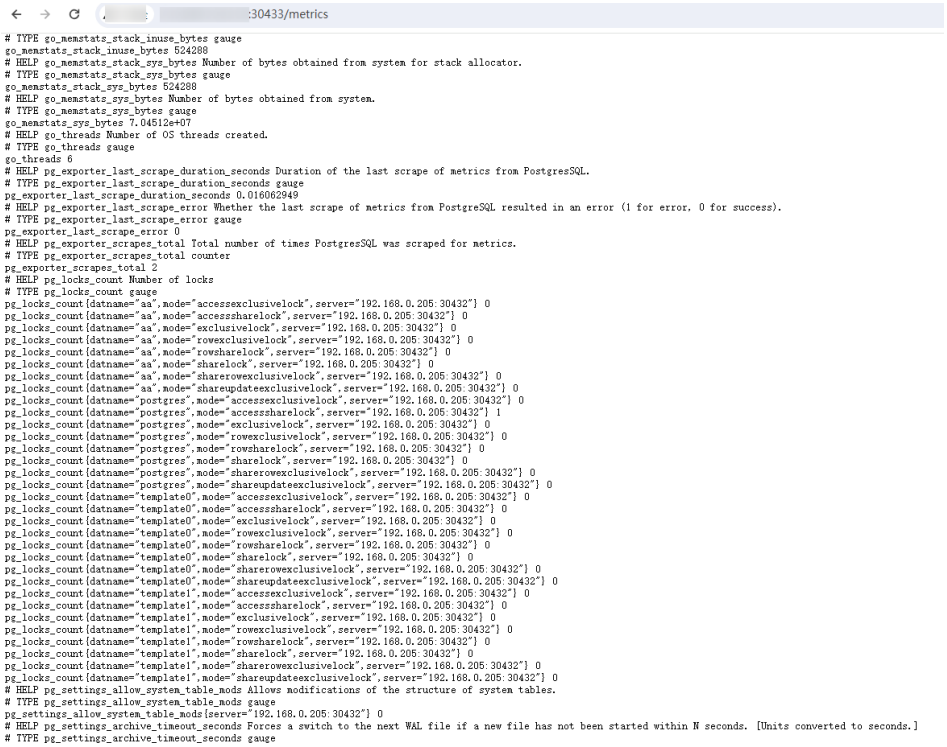


```
        configMap:
          name: postgres-test-configmap
---
apiVersion: v1
kind: Service
metadata:
  name: postgres
spec:
  type: NodePort
  selector:
    app: postgres
    app.kubernetes.io/name: postgresql
  ports:
    - protocol: TCP
      nodePort: 30433
      port: 9187
      targetPort: 9187
```

d. Access the following address:

http://*{Public IP address of any node in the cluster}***:30433/metrics**. You can then use the custom **queries.yaml** file to query the Postgres instance startup time.

Figure 4-1 Accessing a cluster node



----End

Adding a Collection Task

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.


```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: postgres-exporter
  namespace: default
spec:
  namespaceSelector:
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s
    path: /metrics
    port: http-metrics
  selector:
    matchLabels:
      app: postgres
```

Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**postgres-exporter** to query metrics starting with **pg**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.2 Connecting MySQL Exporter

Application Scenario

MySQL Exporter collects MySQL database metrics. Core database metrics collected through Exporter are used for alarm reporting and dashboard display. Currently, Exporter supports MySQL 5.6 or later. If the MySQL version is earlier than 5.6, some metrics may fail to be collected.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

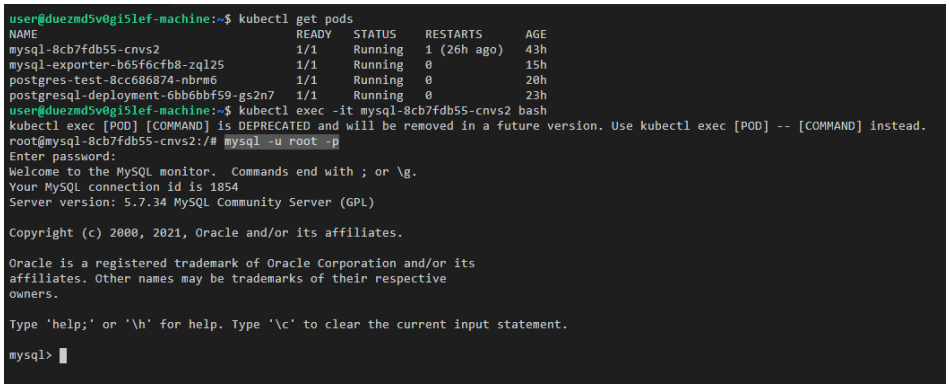
- A CCE cluster has been created and MySQL has been installed.
- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **mysql_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Database Authorization

Step 1 Log in to the cluster and run the following command:

```
kubectl exec -it ${mysql_podname} bash
mysql -u root -p
```

Figure 4-2 Executing the command



Step 2 Log in to the database and run the following command:

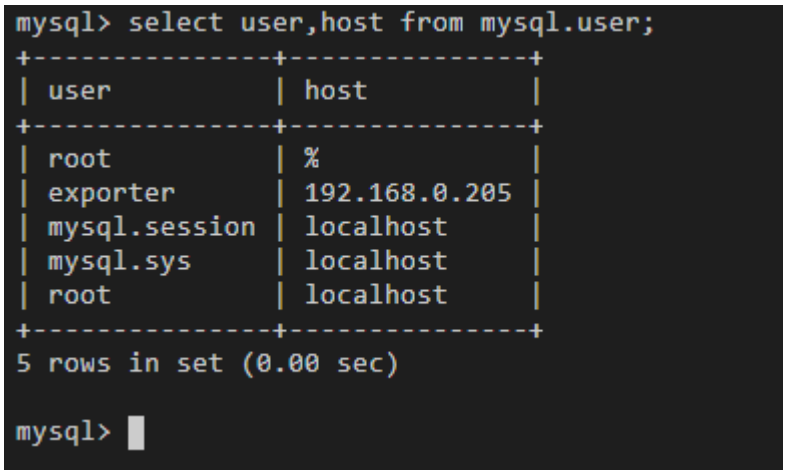
```
CREATE USER 'exporter'@'x.x.x.x(hostip)' IDENTIFIED BY 'xxxx(password)' WITH MAX_USER_CONNECTIONS 3;
GRANT PROCESS, REPLICATION CLIENT, SELECT ON *.* TO 'exporter'@'x.x.x.x(hostip)';
```

Step 3 Check whether the authorization is successful.

Enter the following SQL statement to check whether there is any Exporter data. *host* indicates the IP address of the node where the MySQL database is located.

```
select user,host from mysql.user;
```


Figure 4-3 SQL statement



----End

Deploying MySQL Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Use **Secret** to manage MySQL connection strings.

   In the navigation pane, choose **ConfigMaps and Secrets**. In the upper right corner, click **Create from YAML** and enter the following **.yml** file. The password is encrypted based on Opaque requirements.

   ```
   apiVersion: v1
   kind: Secret
   metadata:
     name: mysql-secret
     namespace: default
   type: Opaque
   stringData:
     datasource: "user:password@tcp(ip:port)/" # MySQL connection string, which needs to be encrypted.
   ```

   NOTE

   For details about how to configure a secret, see **Creating a Secret**.

2. Deploy MySQL Exporter.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create Workload**. Then select the **Deployment** workload and select a desired namespace to deploy MySQL Exporter. YAML configuration example for deploying Exporter:

   ```
   apiVersion: apps/v1
   kind: Deployment
   metadata:
     labels:
       k8s-app: mysql-exporter # Change the name based on service requirements. You are advised to add the MySQL instance information, for example, ckafka-2vrgx9fd-mysql-exporter.
     name: mysql-exporter # Change the name based on service requirements. You are advised to add the MySQL instance information, for example, ckafka-2vrgx9fd-mysql-exporter.
     namespace: default # Must be the same as the namespace of MySQL.
   spec:
   ```



```
  replicas: 1
  selector:
    matchLabels:
      k8s-app: mysql-exporter # Change the name based on service requirements. You are advised to add the MySQL instance information, for example, ckafka-2vrgx9fd-mysql-exporter.
  template:
    metadata:
      labels:
        k8s-app: mysql-exporter # Change the name based on service requirements. You are advised to add the MySQL instance information, for example, ckafka-2vrgx9fd-mysql-exporter.
    spec:
      containers:
      - env:
        - name: DATA_SOURCE_NAME
          valueFrom:
            secretKeyRef:
              name: mysql-secret
              key: datasource
        image: swr.cn-north-4.myhuaweicloud.com/aom-exporter/mysqld-exporter:v0.12.1
        imagePullPolicy: IfNotPresent
        name: mysql-exporter
        ports:
        - containerPort: 9104
          name: metric-port
        terminationMessagePath: /dev/termination-log
        terminationMessagePolicy: File
    dnsPolicy: ClusterFirst
    imagePullSecrets:
    - name: default-secret
    restartPolicy: Always
    schedulerName: default-scheduler
    securityContext: {}
    terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: mysql-exporter
spec:
  type: NodePort
  selector:
    k8s-app: mysql-exporter
  ports:
    - protocol: TCP
      nodePort: 30337
      port: 9104
      targetPort: 9104
```

NOTE

For details about Exporter parameters, see **mysql-exporter**.

3. Check whether MySQL Exporter is successfully deployed.

   a. On the **Deployments** tab page, click the Deployment created in **Step 3.2**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.

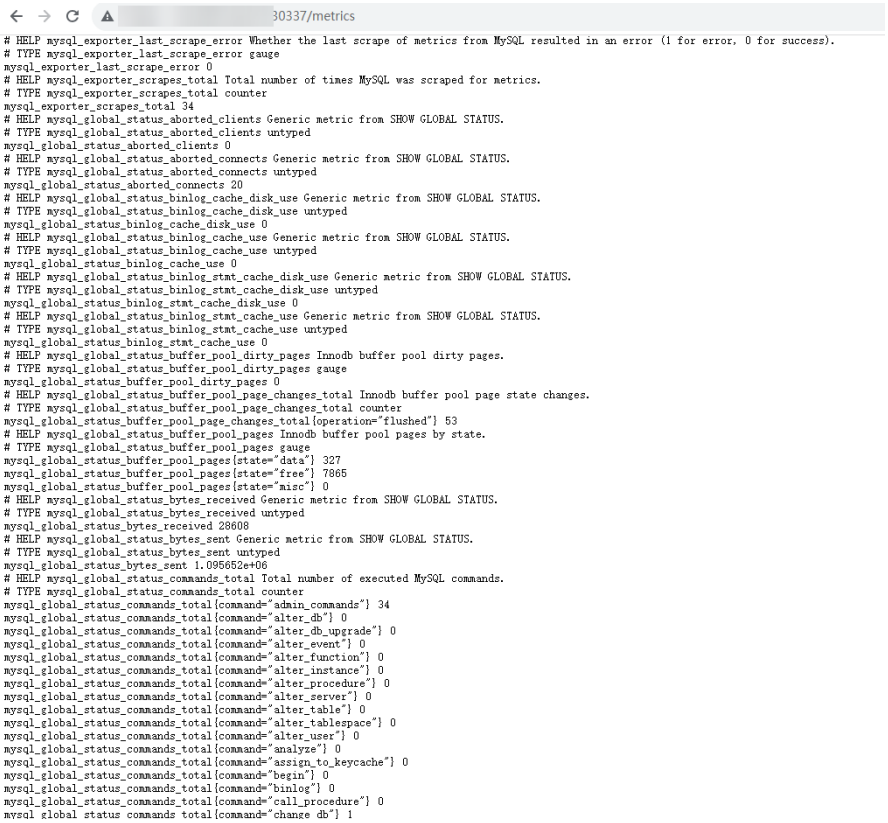
   b. Perform verification using one of the following methods:

      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9104/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30337/metrics**

      - In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:
        curl http://localhost:9104/metric

- Access **http://***{Public IP address of any node in the cluster}***:30337/metrics**.

Figure 4-4 Accessing a cluster node



----End

Collecting Service Data of the CCE Cluster

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

Configuration information:

```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: mysql-exporter
  namespace: default
spec:
  namespaceSelector:
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s
    path: /metrics
    port: metric-port
  selector:
    matchLabels:
      k8s-app: mysql-exporter
```


NOTE

In this example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.

Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**mysql-exporter** to query custom metrics starting with **mysql**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.3 Connecting Kafka Exporter

Application Scenario

When using Kafka, you need to monitor their running, for example, checking the cluster status and whether messages are stacked. The Prometheus monitoring function monitors Kafka running using Exporter in the CCE container scenario. This section describes how to deploy Kafka Exporter and implement alarm access.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

- A CCE cluster has been created and Kafka has been installed.
- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **kafka_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying Kafka Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Deploy Kafka Exporter.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create Workload**. Then select the **Deployment** workload and select a desired namespace to deploy Kafka Exporter. YAML configuration example for deploying Exporter:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    k8s-app: kafka-exporter # Change the name based on service requirements. You are advised to add the Kafka instance information, for example, ckafka-2vrgx9fd-kafka-exporter.
  name: kafka-exporter # Change the name based on service requirements. You are advised to add the Kafka instance information, for example, ckafka-2vrgx9fd-kafka-exporter.
  namespace: default # Namespace of an existing cluster
spec:
  replicas: 1
  selector:
    matchLabels:
      k8s-app: kafka-exporter # Change the name based on service requirements. You are advised to add the Kafka instance information, for example, ckafka-2vrgx9fd-kafka-exporter.
  template:
    metadata:
      labels:
        k8s-app: kafka-exporter # Change the name based on service requirements. You are advised to add the Kafka instance information, for example, ckafka-2vrgx9fd-kafka-exporter.
    spec:
      containers:
      - args:
        - --kafka.server=120.46.215.4:30092 # Address of the Kafka instance
        image: swr.cn-north-4.myhuaweicloud.com/mall-swarm-demo/kafka-exporter:latest
        imagePullPolicy: IfNotPresent
        name: kafka-exporter
        ports:
        - containerPort: 9308
          name: metric-port # Required when you configure a collection task
        securityContext:
          privileged: false
        terminationMessagePath: /dev/termination-log
        terminationMessagePolicy: File
      dnsPolicy: ClusterFirst
      imagePullSecrets:
```



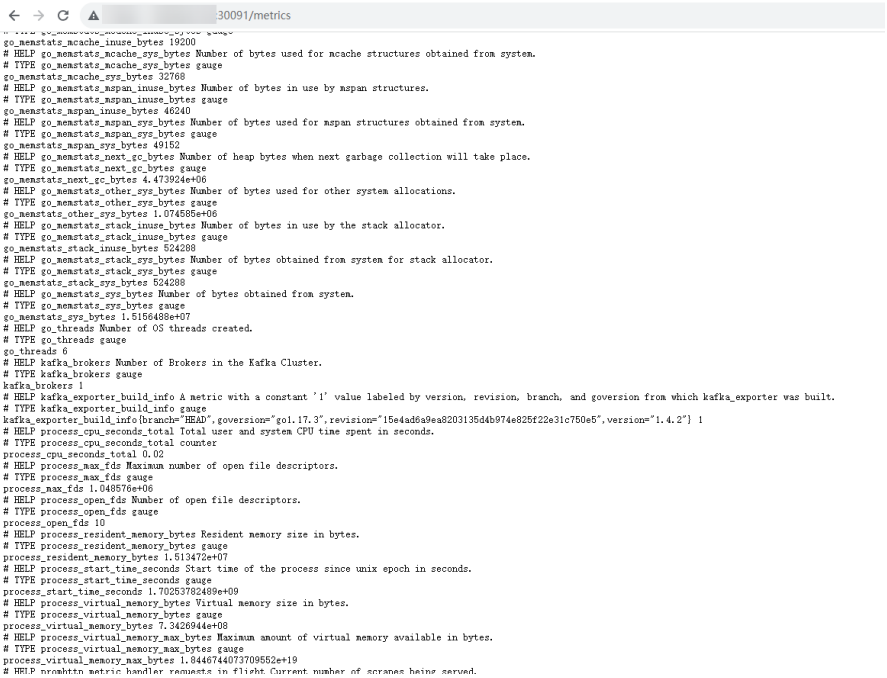
```
      - name: default-secret
      restartPolicy: Always
      schedulerName: default-scheduler
      securityContext: {}
      terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: kafka-exporter
spec:
  type: NodePort
  selector:
    k8s-app: kafka-exporter
  ports:
    - protocol: TCP
      nodePort: 30091
      port: 9308
      targetPort: 9308
```

NOTE

For more details about Exporter parameters, see **kafka-exporter**.

2. Check whether Kafka Exporter is successfully deployed.
   a. On the **Deployments** tab page, click the Deployment created in **Step 3.1**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.
   b. Perform verification using one of the following methods:
      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9308/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30091/metrics**
      - In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:
        curl http://localhost:9308/metric
      - Access **http://***{Public IP address of any node in the cluster}***:30091/metrics**.

Figure 4-5 Accessing a cluster node



----End

Collecting Service Data of the CCE Cluster

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.

Configuration information:

```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: kafka-exporter
  namespace: default
spec:
  namespaceSelector:
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s
    path: /metrics
    port: metric-port
  selector:
    matchLabels:
      k8s-app: kafka-exporter
```

Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**kafka-exporter** to query custom metrics starting with **kafka**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.4 Connecting Memcached Exporter

Application Scenario

When using Memcached, you need to monitor their running and locate their faults in a timely manner. The Prometheus monitoring function monitors Memcached running using Exporter in the CCE container scenario. This section describes how to monitor Memcached.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

- A CCE cluster has been created and Memcached has been installed.
- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **memcached_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying Memcached Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Configure a secret.

   In the navigation pane, choose **ConfigMaps and Secrets**. Then click **Create from YAML** in the upper right corner of the page. YAML configuration example:

   ```
   apiVersion: v1
   kind: Secret
   metadata:
     name: memcached-exporter-secret
     namespace: default
   type: Opaque
   stringData:
     memcachedURI: 120.46.215.4:11211  # Memcached address
   ```

   NOTE

   - Format of the Memcached connection string: **http://***{ip}***:***{port}*.
   - For details about how to configure a secret, see **Creating a Secret**.

2. Deploy Memcached Exporter.

   In the navigation pane, choose **Workloads**. On the **Deployments** tab page, click **Create from YAML** in the upper right corner and then configure a YAML file to deploy Exporter.

   YAML configuration example:

   ```
   apiVersion: apps/v1
   kind: Deployment
   metadata:
     labels:
       k8s-app: memcached-exporter # Change the value based on service requirements.
     name: memcached-exporter # Change the value based on service requirements.
     namespace: default
   spec:
     replicas: 1
     selector:
       matchLabels:
         k8s-app: memcached-exporter # Change the value based on service requirements.
     template:
       metadata:
         labels:
           k8s-app: memcached-exporter # Change the value based on service requirements.
       spec:
         containers:
         - env:
             - name: Memcached_Url
               valueFrom:
                 secretKeyRef:
                   name: memcached-exporter-secret # Secret name specified in the previous step.
                   key: memcachedURI # Secret key specified in the previous step.
             - name: Memcached_ALL
               value: "true"
           image: swr.cn-east-3.myhuaweicloud.com/aom-org/bitnami/memcached-exporter:0.13.0 #
   Image uploaded to SWR, as described in "Prerequisites".
           imagePullPolicy: IfNotPresent
           name: memcached-exporter
           ports:
           - containerPort: 9150
             name: metric-port
   ```



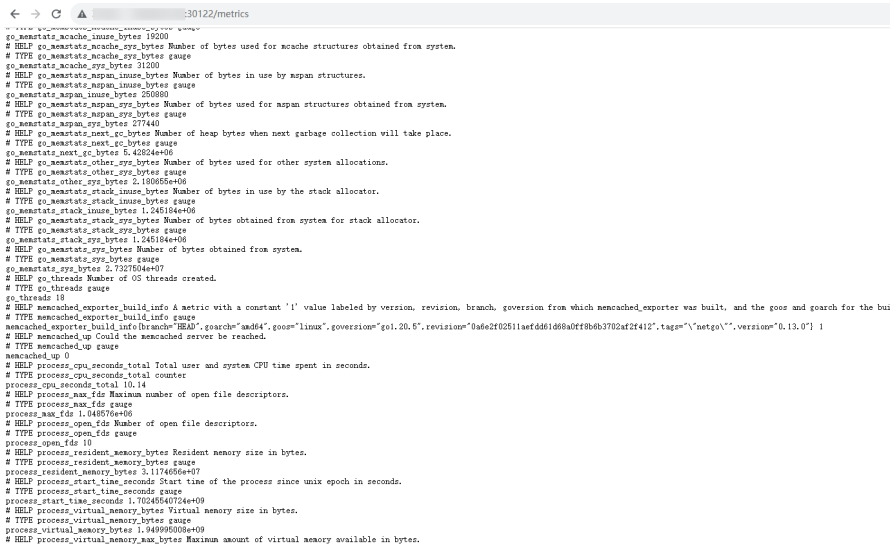
```
      securityContext:
        privileged: false
      terminationMessagePath: /dev/termination-log
      terminationMessagePolicy: File
  dnsPolicy: ClusterFirst
  imagePullSecrets:
  - name: default-secret
  restartPolicy: Always
  schedulerName: default-scheduler
  securityContext: {}
  terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: memcached-exporter
spec:
  type: NodePort
  selector:
    k8s-app: memcached-exporter
  ports:
    - protocol: TCP
      nodePort: 30122
      port: 9150
      targetPort: 9150
```

NOTE

For more details about Exporter parameters, see **memcached_exporter**.

3. Check whether Memcached Exporter is successfully deployed.
   a. On the **Deployments** tab page, click the Deployment created in **Step 3.2**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.
   b. Perform verification using one of the following methods:
      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9150/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30122/metrics**
      - Access **http://***{Public IP address of any node in the cluster}***:30122/metrics**.

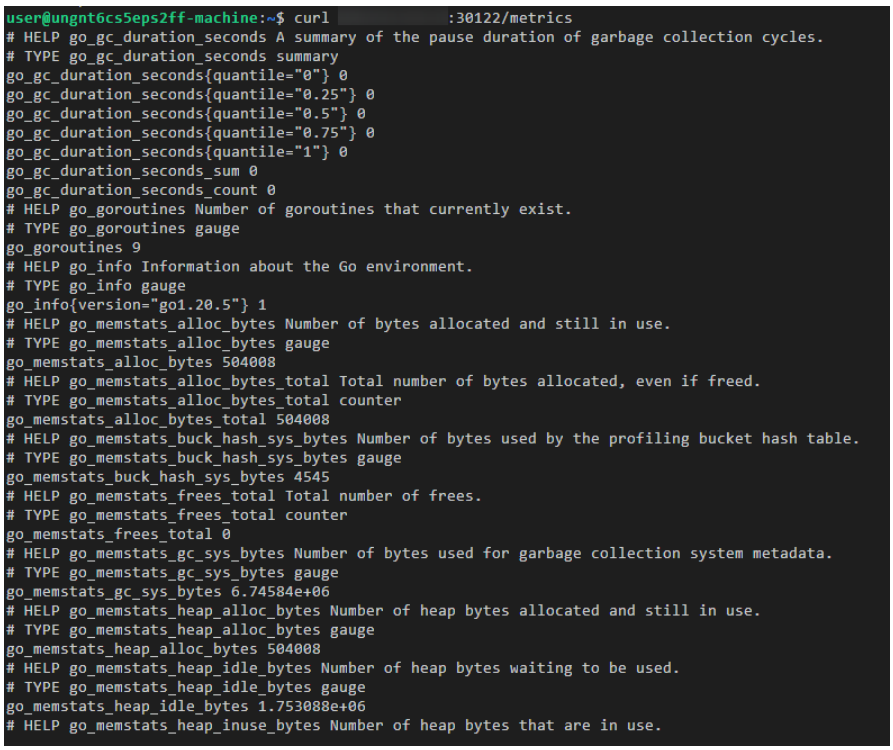
Figure 4-6 Accessing a cluster node



- In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:

```
curl http://localhost:9150/metric
```

Figure 4-7 Executing the command



----End

Adding a Collection Task

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.

```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: memcached-exporter
  namespace: default
spec:
  namespaceSelector:
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s
    path: /metrics
    port: metric-port
  selector:
    matchLabels:
      k8s-app: memcached-exporter
```


Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**memcached-exporter** to query metrics starting with **go_memstats**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.5 Connecting MongoDB Exporter

Application Scenario

When using MongoDB, you need to monitor MongoDB running and locate their faults in a timely manner. The Prometheus monitoring function monitors MongoDB running using Exporter in the CCE container scenario. This section describes how to deploy MongoDB Exporter and implement alarm access.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

- A CCE cluster has been created and MongoDB has been installed.

- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **mongodb_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying MongoDB Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Configure a secret.

   In the navigation pane, choose **ConfigMaps and Secrets**. Then click **Create from YAML** in the upper right corner of the page. YAML configuration example:

```
apiVersion: v1
kind: Secret
metadata:
    name: mongodb-secret-test
    namespace: default
type: Opaque
stringData:
    datasource: "mongodb://{user}:{passwd}@{host1}:{port1},{host2}:{port2},{host3}:{port3}/admin"  # Corresponding URI.
```

   NOTE

   - The password has been encrypted based on Opaque requirements.
   - For details about how to configure a secret, see **Creating a Secret**.

2. Deploy MongoDB Exporter.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create Workload**. Then select the **Deployment** workload and select a desired namespace to deploy MongoDB Exporter. YAML configuration example for deploying Exporter:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    k8s-app: mongodb-exporter # Change the value based on service requirements. You are advised to add the MongoDB instance information.
  name: mongodb-exporter # Change the value based on service requirements. You are advised to add the MongoDB instance information.
  namespace: default #Must be the same as the namespace of MongoDB.
spec:
  replicas: 1
  selector:
    matchLabels:
      k8s-app: mongodb-exporter # Change the value based on service requirements. You are advised to add the MongoDB instance information.
  template:
    metadata:
      labels:
        k8s-app: mongodb-exporter # Change the value based on service requirements. You are advised to add the MongoDB instance information.
    spec:
      containers:
        - args:
            - --collect.database       # Enable collection of database metrics.
```



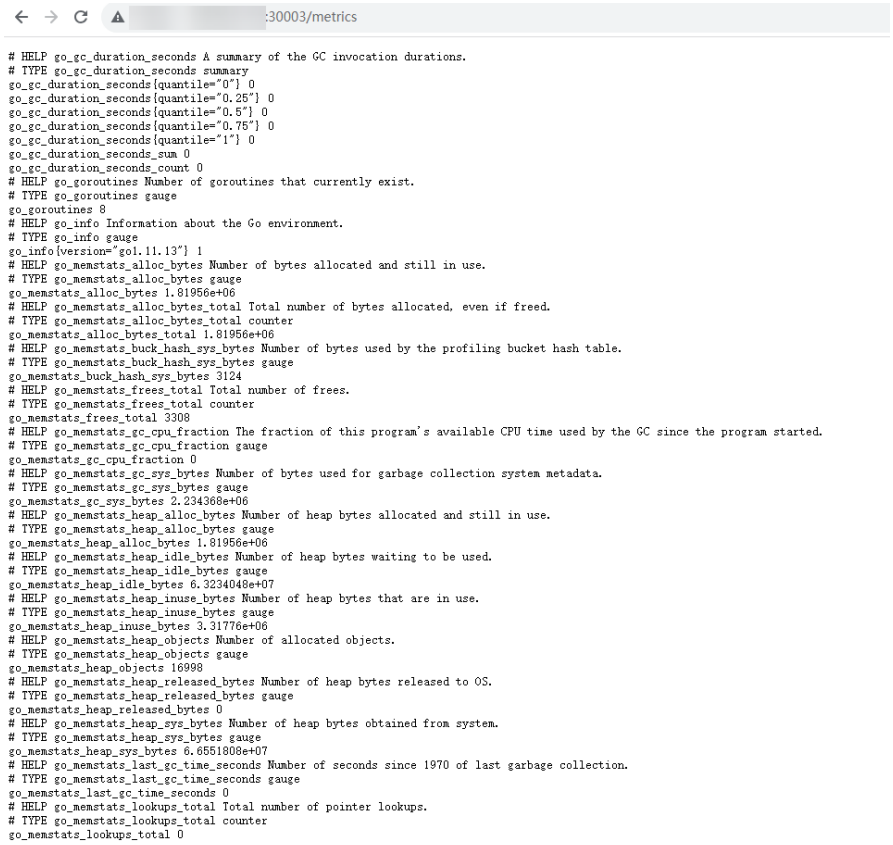
```
          - --collect.collection     # Enable collection of metric sets.
          - --collect.topmetrics     # Enable collection of database header metrics.
          - --collect.indexusage     # Enable collection of index usage statistics.
          - --collect.connpoolstats  # Enable collection of MongoDB connection pool statistics.
        env:
          - name: MONGODB_URI
            valueFrom:
              secretKeyRef:
                name: mongodb-secret-test
                key: datasource
        image: swr.cn-north-4.myhuaweicloud.com/mall-swarm-demo/mongodb-exporter:0.10.0
        imagePullPolicy: IfNotPresent
        name: mongodb-exporter
        ports:
          - containerPort: 9216
            name: metric-port  # Required when you configure a collection task.
        securityContext:
          privileged: false
        terminationMessagePath: /dev/termination-log
        terminationMessagePolicy: File
      dnsPolicy: ClusterFirst
      imagePullSecrets:
        - name: default-secret
      restartPolicy: Always
      schedulerName: default-scheduler
      securityContext: { }
      terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: mongodb-exporter
spec:
  type: NodePort
  selector:
    k8s-app: mongodb-exporter
  ports:
    - protocol: TCP
      nodePort: 30003
      port: 9216
      targetPort: 9216
```

NOTE

For more details about Exporter parameters, see **mongodb_exporter**.

3. Check whether MongoDB Exporter is successfully deployed.
   a. On the **Deployments** tab page, click the Deployment created in **Step 3.2**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.
   b. Perform verification using one of the following methods:
      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9216/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30003/metrics**
      - Access **http://***{Public IP address of any node in the cluster}***:30003/metrics**.

Figure 4-8 Accessing a cluster node



- In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:

```
curl http://localhost:9216/metric
```

----End

Collecting Service Data of the CCE Cluster

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.

```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: mongodb-exporter
  namespace: default
spec:
  namespaceSelector:
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s
    path: /metrics
    port: metric-port
  selector:
    matchLabels:
      k8s-app: mongodb-exporter
```


Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**MongoDB-exporter** to query custom metrics starting with **mongodb**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.6 Connecting Elasticsearch Exporter

Application Scenario

When using Elasticsearch, you need to monitor Elasticsearch running, such as the cluster and index status. The Prometheus monitoring function monitors Elasticsearch running using Exporter in the CCE container scenario. This section describes how to deploy Elasticsearch Exporter and implement alarm access.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

- A CCE cluster has been created and Elasticsearch has been installed.

- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **elasticsearch_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying Elasticsearch Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. Configure a secret.

   In the navigation pane, choose **ConfigMaps and Secrets**. Then click **Create from YAML** in the upper right corner of the page. The following shows a YAML configuration example:

   ```
   apiVersion: v1
   kind: Secret
   metadata:
     name: es-secret-test
     namespace: default
   type: Opaque
   stringData:
     esURI: http://124.70.14.51:30920 # URI of Elasticsearch. Use the IP address of the cluster or any node in the cluster.
   ```

   NOTE

   - Format of the Elasticsearch connection string: *<proto>*:// *<user>*:*<password>*@*<host>*:*<port>*, for example, **http://admin:pass@localhost:9200**. You can also leave the password blank, for example, **http://10.247.43.50:9200**.
   - The password has been encrypted based on Opaque requirements.
   - For details about how to configure a secret, see **Creating a Secret**.

2. Deploy Elasticsearch Exporter.

   In the navigation pane, choose **Workloads**. In the upper right corner, click **Create Workload**. Then select the **Deployment** workload and a desired namespace to deploy Elasticsearch Exporter. YAML configuration example for deploying Exporter:

   ```
   apiVersion: apps/v1
   kind: Deployment
   metadata:
     labels:
       k8s-app: es-exporter # Change the value based on service requirements.
     name: es-exporter # Change the value based on service requirements.
     namespace: default #Select a proper namespace to deploy Exporter. If no namespace is available, create one.
   spec:
     replicas: 1
     selector:
       matchLabels:
         k8s-app: es-exporter # Change the value based on service requirements.
     template:
       metadata:
         labels:
           k8s-app: es-exporter # Change the value based on service requirements.
       spec:
         containers:
   ```



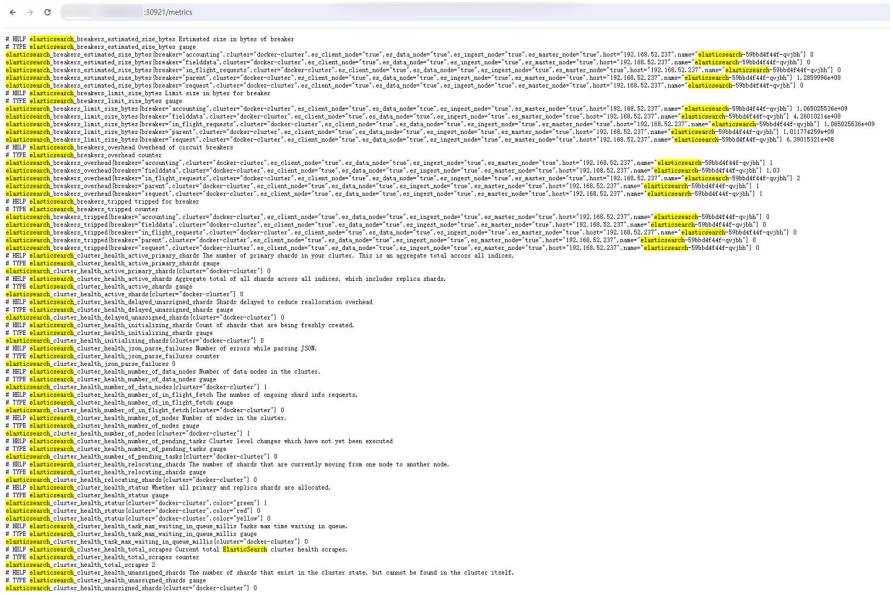
```
    - env:
        - name: ES_URI
          valueFrom:
            secretKeyRef:
              name: es-secret-test # Secret name specified in the previous step.
              key: esURI # Secret key specified in the previous step.
        - name: ES_ALL
          value: "true"
      image: swr.cn-north-4.myhuaweicloud.com/mall-swarm-demo/es-exporter:1.1.0
      imagePullPolicy: IfNotPresent
      name: es-exporter
      ports:
      - containerPort: 9114
        name: metric-port
      securityContext:
        privileged: false
      terminationMessagePath: /dev/termination-log
      terminationMessagePolicy: File
    dnsPolicy: ClusterFirst
    imagePullSecrets:
    - name: default-secret
    restartPolicy: Always
    schedulerName: default-scheduler
    securityContext: {}
    terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: es-exporter
  name-space: default # Must be the same as the namespace where Exporter is deployed.
spec:
  type: NodePort
  selector:
    k8s-app: es-exporter
  ports:
    - protocol: TCP
      nodePort: 30921
      port: 9114
      targetPort: 9114
```

NOTE

In the preceding example, **ES_ALL** is used to collect all Elasticsearch monitoring items. You can change parameters if needed. For more details about Exporter parameters, see **elasticsearch_exporter**.

3. Check whether Elasticsearch Exporter is successfully deployed.
   a. On the **Deployments** tab page, click the Deployment created in **Step 3.2**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.
   b. Perform verification using one of the following methods:
      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9114/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30921/metrics**
      - Access **http://***{Public IP address of any node in the cluster}***:30921/metrics**.

Figure 4-9 Accessing a cluster node



- In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:

```
curl http://localhost:9114/metric
```

----End

Collecting Service Data of the CCE Cluster

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.

```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: elasticSearch-exporter
  namespace: default
spec:
  namespaceSelector: # Select the namespace where Exporter is deployed.
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s # Set the metric collection period.
    path: /metrics # Enter the path corresponding to Prometheus Exporter. Default: /metrics.
port: metric-port # Enter the name of "ports" in the YAML file corresponding to Prometheus Exporter.
  selector: # Enter the label of the target Exporter pod.
    matchLabels:
      k8s-app: elasticSearch-exporter
```

Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Select job *{namespace}*/**elasticsearch-exporter** to query custom metrics starting with **elasticsearch**.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.7 Connecting Redis Exporter

Application Scenario

When using Redis, you need to monitor Redis running and locate their faults in a timely manner. The Prometheus monitoring function monitors Redis running using Exporter in the CCE container scenario. This section describes how to monitor Redis.

NOTE

You are advised to use CCE for unified Exporter management.

Prerequisites

- A CCE cluster has been created and Redis has been installed.
- Your service has been connected for Prometheus monitoring and a CCE cluster has also been connected. For details, see **Prometheus Instance for CCE**.
- You have uploaded the **redis_exporter** image to SoftWare Repository for Container (SWR). For details, see **Uploading an Image Through a Container Engine Client**.

Deploying Redis Exporter

Step 1 Log in to the CCE console.

Step 2 Click the connected cluster. The cluster management page is displayed.

Step 3 Perform the following operations to deploy Exporter:

1. In the navigation pane, choose **ConfigMaps and Secrets**. Switch to the **Secrets** tab. Then click **Create from YAML** in the upper right corner of the page. The following shows a YAML configuration example:

```
apiVersion: v1
kind: Secret
metadata:
    name: redis-secret-test
    namespace: default # Must be the same as the namespace where Exporter is deployed.
type: Opaque
stringData:
    password: redis123  # Redis password.
```

NOTE

- The password has been encrypted based on Opaque requirements.
- For details about how to configure a secret, see **Creating a Secret**.

2. Deploy Redis Exporter.

   In the navigation pane, choose **Workloads**. On the displayed page, click the **Deployments** tab, click **Create from YAML** in the upper right corner, and select a namespace. You can deploy Exporter through the console or using a YAML file. The following shows a YAML configuration example:

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    k8s-app: redis-exporter # Change the value based on service requirements. You are advised to add the Redis instance information, for example, crs-66e112fp-redis-exporter.
  name: redis-exporter # Change the value based on service requirements. You are advised to add the Redis instance information, for example, crs-66e112fp-redis-exporter.
  namespace: default #Select a proper namespace to deploy Exporter. If no namespace is available, create one.
spec:
  replicas: 1
  selector:
    matchLabels:
      k8s-app: redis-exporter # Change the name based on service requirements. You are advised to add the Redis instance information, for example, crs-66e112fp-redis-exporter.
  template:
    metadata:
      labels:
        k8s-app: redis-exporter # Change the name based on service requirements. You are advised to add the Redis instance information, for example, crs-66e112fp-redis-exporter.
    spec:
      containers:
      - env:
        - name: REDIS_ADDR
          value: 120.46.215.4:30379 # IP address:port number of Redis
        - name: REDIS_PASSWORD
          valueFrom:
            secretKeyRef:
              name: redis-secret-test # Secret name specified in the previous step.
              key: password  # Secret key specified in the previous step.
        image: swr.cn-north-4.myhuaweicloud.com/mall-swarm-demo/redis-exporter:v1.32.0  # Replace the value with the address of the image you uploaded to SWR.
        imagePullPolicy: IfNotPresent
        name: redis-exporter
        ports:
```



```
      - containerPort: 9121
        name: metric-port # Required when you configure a collection task.
      securityContext:
        privileged: false
      terminationMessagePath: /dev/termination-log
      terminationMessagePolicy: File
    dnsPolicy: ClusterFirst
    imagePullSecrets:
    - name: default-secret
    restartPolicy: Always
    schedulerName: default-scheduler
    securityContext: {}
    terminationGracePeriodSeconds: 30
---
apiVersion: v1
kind: Service
metadata:
  name: redis-exporter
  name-space: default # Must be the same as the namespace where Exporter is deployed.
spec:
  type: NodePort
  selector:
    k8s-app: redis-exporter
  ports:
    - protocol: TCP
      nodePort: 30378
      port: 9121
      targetPort: 9121
```

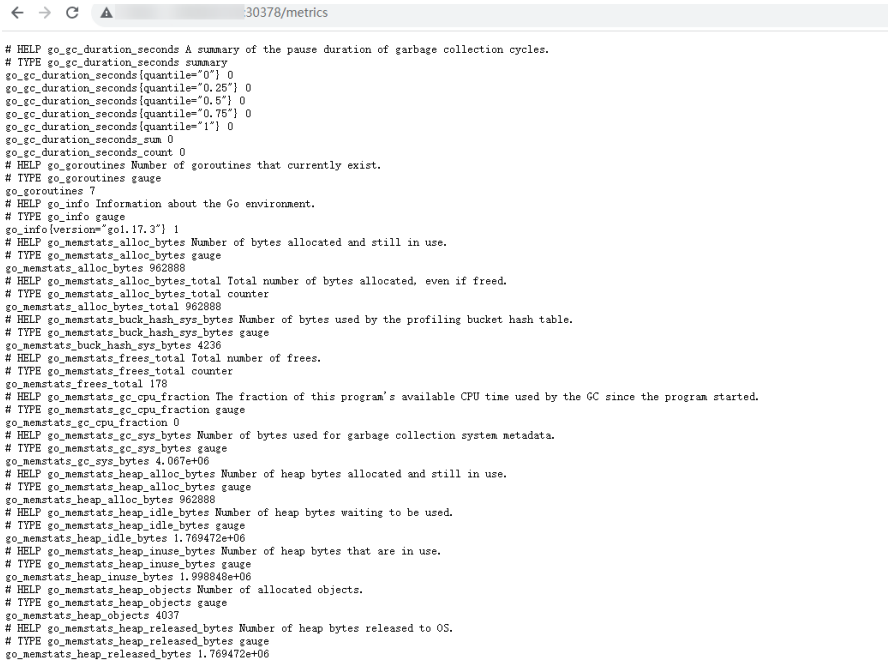
NOTE

For more details about Exporter parameters, see **redis_exporter**.

3. Check whether Redis Exporter is successfully deployed.
   a. On the **Deployments** tab page, click the Deployment created in **Step 3.2**. In the pod list, choose **More** > **View Logs** in the **Operation** column. The Exporter is successfully started and its access address is exposed.
   b. Perform verification using one of the following methods:
      - Log in to a cluster node and run either of the following commands:
        curl http://*{Cluster IP address}***:9121/metrics**
        curl http://*{Private IP address of any node in the cluster}***:30378/metrics**
      - Access **http://***{Public IP address of any node in the cluster}***:30378/metrics**.

        If no data is obtained, check whether the values of "REDIS_ADDR" and "REDIS_PASSWORD" in the YAML file set during **Redis Exporter deployment** are correct. The following shows an example:

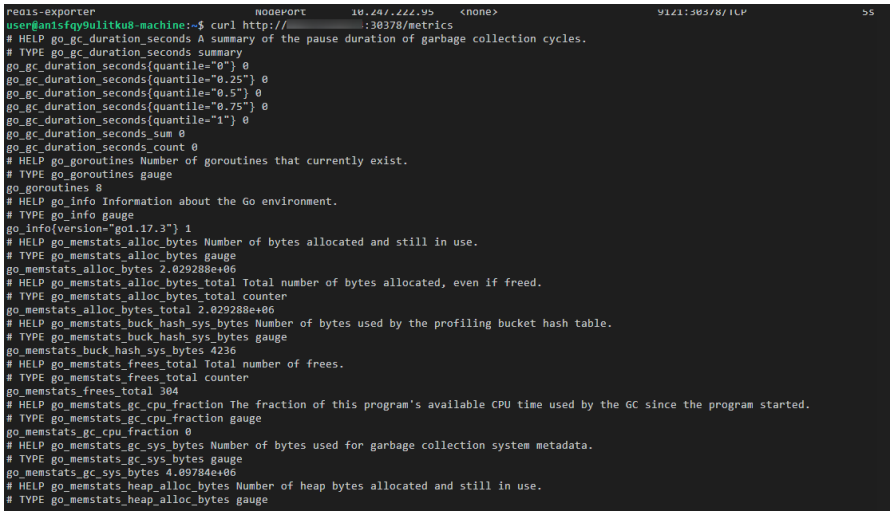
Figure 4-10 Accessing a cluster node



- In the instance list, choose **More** > **Remote Login** in the **Operation** column and run the following command:

```
curl http://localhost:9121/metrics
```

Figure 4-11 Executing the command



----End

Adding a Collection Task

Add PodMonitor to configure a collection rule for monitoring the service data of applications deployed in the CCE cluster.

NOTE

In the following example, metrics are collected every 30s. Therefore, you can check the reported metrics on the AOM page about 30s later.


```
apiVersion: monitoring.coreos.com/v1
kind: PodMonitor
metadata:
  name: redis-exporter
  namespace: default
spec:
  namespaceSelector: # Select the namespace where the target Exporter pod is located.
    matchNames:
      - default # Namespace where Exporter is located.
  podMetricsEndpoints:
  - interval: 30s # Set the metric collection period.
    path: /metrics # Enter the path corresponding to Prometheus Exporter. Default: /metrics.
    port: metric-port# Enter the name of "ports" in the YAML file corresponding to Prometheus Exporter.
  selector: # Enter the label of the target Exporter pod.
    matchLabels:
      k8s-app: redis-exporter
```

Verifying that Metrics Can Be Reported to AOM

Step 1 Log in to the AOM 2.0 console.

Step 2 In the navigation pane on the left, choose **Prometheus Monitoring** > **Instances**.

Step 3 Click the Prometheus instance connected to the CCE cluster. The instance details page is displayed.

Step 4 On the **Metrics** tab page of the **Metric Management** page, select your target cluster.

Step 5 Enter **redis** in the search box to search. If metrics starting with **redis** are displayed, the metrics are successfully connected to AOM.

----End

Setting a Dashboard and Alarm Rule on AOM

By setting a dashboard, you can monitor CCE cluster data on the same screen. By setting an alarm rule, you can detect cluster faults and implement warning in a timely manner.

- Setting a dashboard
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Dashboard**. On the displayed page, click **Add Dashboard** to add a dashboard. For details, see **Creating a Dashboard**.
  c. On the **Dashboard** page, select a Prometheus instance for CCE and click **Add Graph**. For details, see **Adding a Graph to a Dashboard**.
- Setting an alarm rule
  a. Log in to the AOM 2.0 console.
  b. In the navigation pane, choose **Alarm Management** > **Alarm Rules**.
  c. On the **Metric/Event Alarm Rules** tab page, click **Create** to create an alarm rule. For details, see **Creating a Metric Alarm Rule**.

4.8 Connecting Other Exporters

Application Scenario

Guidance has been provided for connecting common Exporters. AOM is compatible with the native Prometheus, so you can also connect other Exporters in the community.

Methods

Customize dashboards or use either of the following methods to integrate basic components for monitoring:

1. **Integrating Exporters in the open-source community**
2. Instructions in **connecting common self-built middleware in the container scenario**

