Application Performance Management

Getting Started

Issue 01

Date 2021-07-23

HUAWEI

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

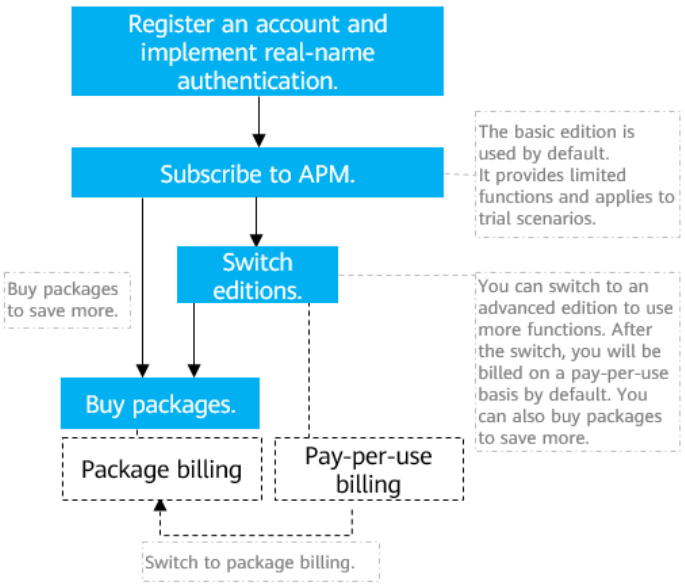
The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Contents

1 Subscribing to APM and Buying a Package

If you use Application Performance Management (APM) for the first time, subscribe to it first. The basic edition is used by default. It provides limited functions and applies to trial scenarios. You can switch editions and purchase packages as required. Professional, enterprise, and platinum editions of probe products, and professional edition of mesh products are available. For more information, see **APM Pricing Details**.

Subscription and Purchase Process



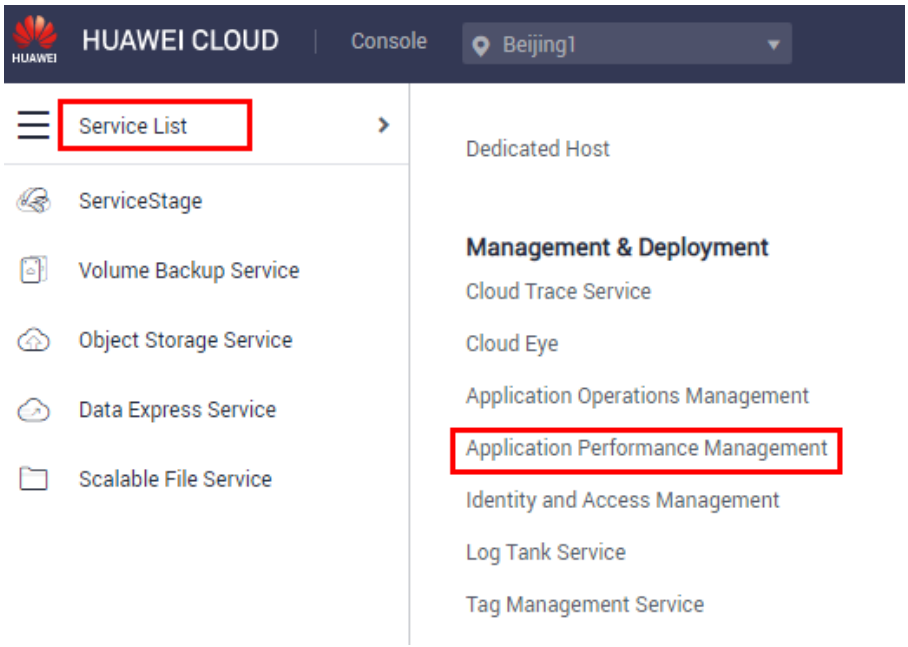
Registering an Account

Register a cloud account and **complete real-name authentication**.

Subscribing to APM

Step 1 Log in to the management console.

Step 2 Choose **Service List** > **Management & Deployment** > **Application Performance Management**.



Step 3 Click **Free opening**.

- After the subscription, click **Experience for Free**. Then, connect your applications to APM for monitoring according to **Monitoring Java Applications** and use the **functions supported in the basic edition**.
- If the basic edition does not meet your service requirements, switch to an advanced edition according to **Switching Editions**.

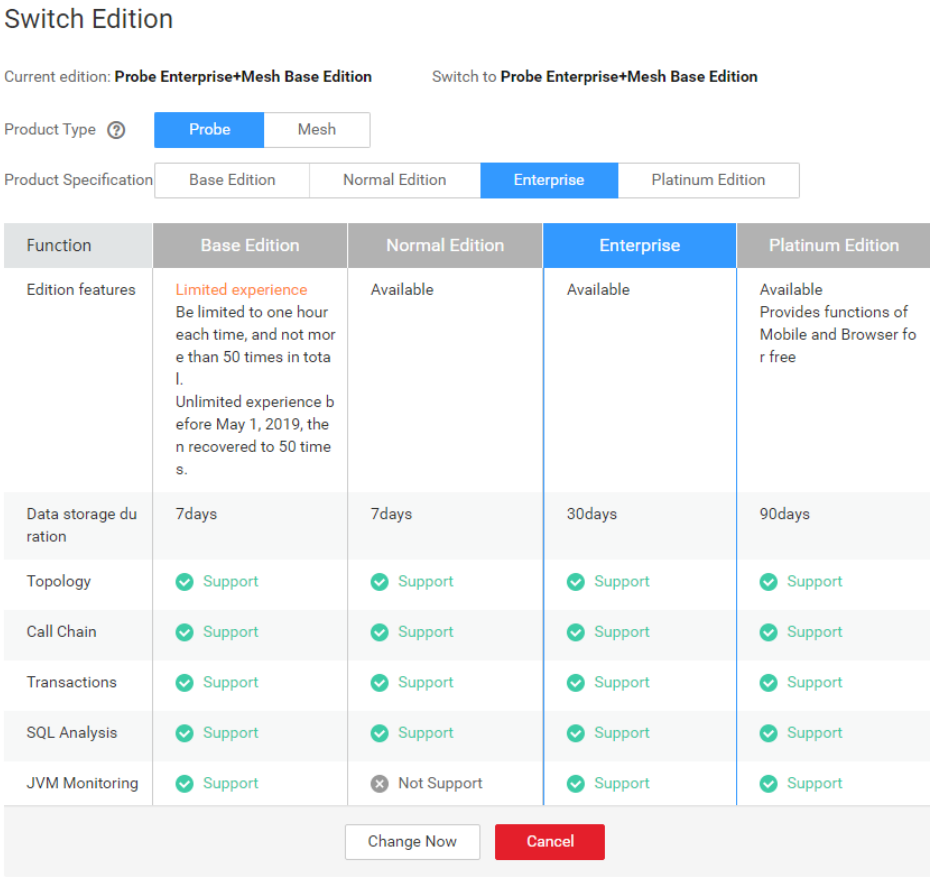
----End

Switching Editions

If an APM edition cannot meet your requirements, switch to a more advanced edition. You can also switch from an advanced version to an earlier version only once a month.

Step 1 On the **Dashboard** page of the APM console, click **Switch Edition**.

Step 2 On the page that is displayed, select the product type and specifications.



Step 3 After learning the functions supported by the desired edition, click **Change Now**.

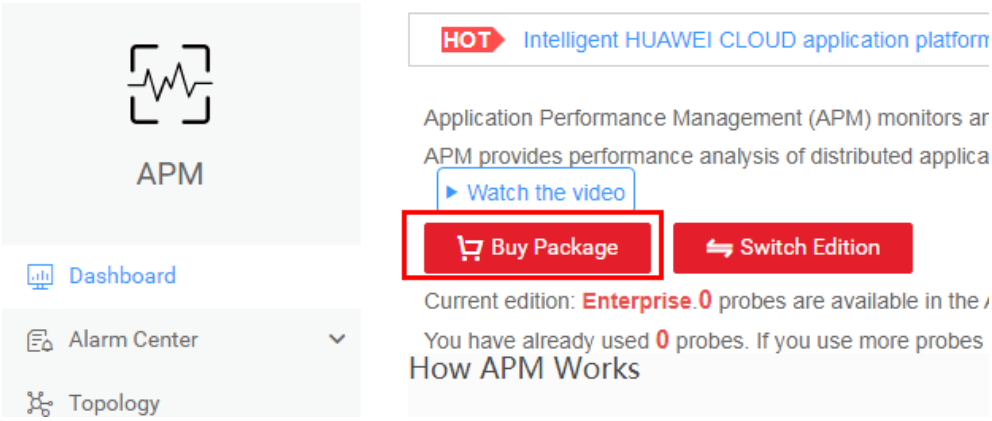
- If you purchase a package and switch to a new edition, the number of probes in the purchased package is automatically converted to that under the new edition.
- If you do not purchase any package and switch to a new edition, you will be billed on a pay-per-use basis.

----End

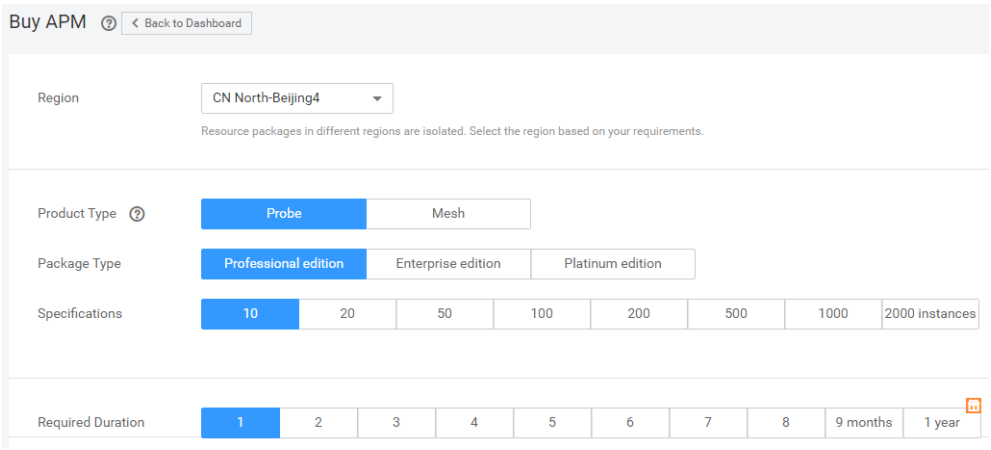
Buying a Package

If you need to use APM for a long period of time, purchase a package so that you can use more functions and save more.

Step 1 On the **Dashboard** page of the APM console, click **Buy Package**.



Step 2 On the displayed page, specify **Region**, **Product Type**, **Package Type**, **Specifications**, and **Required Duration**.



- **Product Type**: Mesh products are applicable to applications deployed in clusters of Istio mesh. Probe products are applicable to common applications, such as those deployed on VMs.
- **Package Type**: The functions supported by each package are different. For details, see **Package Details**.
- **Specifications**: indicates the number of probe instances in a package. An application process requires a probe. You can select specifications based on the total number of service processes. After a resource package expires, you will be billed on a pay-per-use basis for the resources used. If your account is in arrears, probes will no longer report data, affecting APM functions. For more information, see **Renewal Details**.

Step 3 Click **Pay Now** to buy the package.

After buying the package, connect your applications to APM for monitoring according to **Monitoring Java Applications**.

----End

2 Monitoring Java Applications

2.1 VM Applications

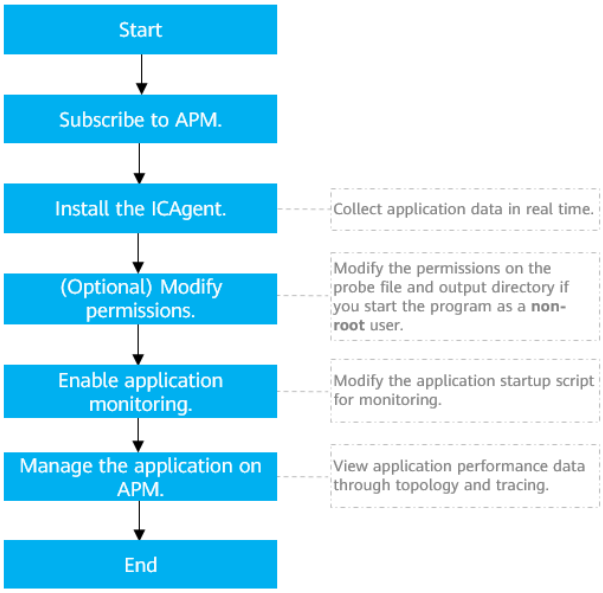
2.1.1 Connecting an ECS Application to APM

If your application is deployed on an Elastic Cloud Server (ECS), learn Application Performance Management (APM) based on the following procedure. This section describes how to connect a Java application on an ECS server to APM for monitoring.

Prerequisites

- You have **purchased an ECS server**.
- The ECS server meets the requirements in **Supported OSs**.
- The ECS server meets the requirements in **Supported Java Types**.
- The time and time zone of the local browser are consistent with those of the ECS server.

Procedure



Step 1: Subscribe to APM

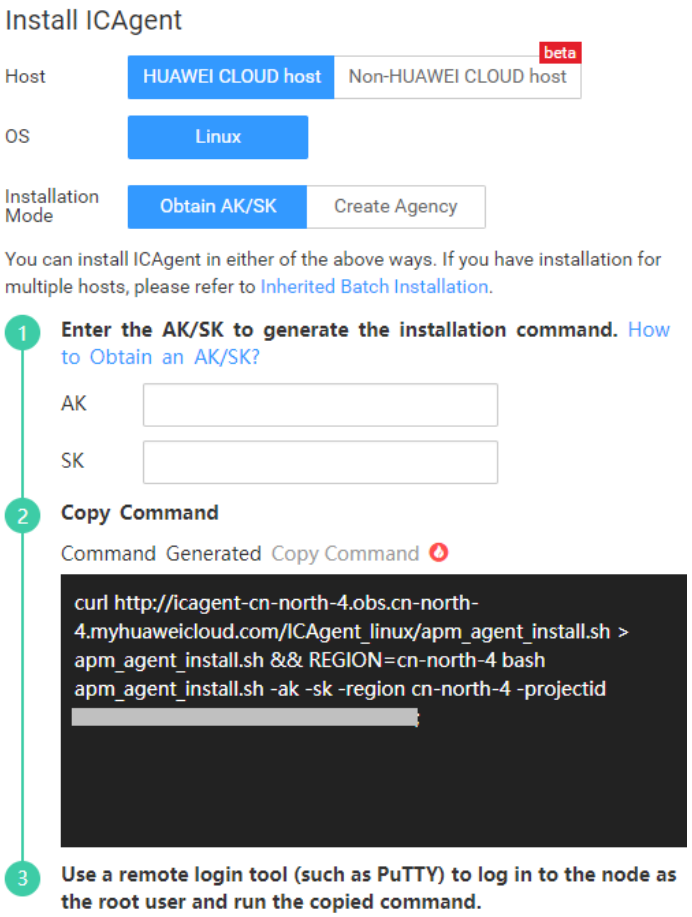
See **Subscribing to APM and Buying a Package**.

Step 2: Install the ICAgent

1. **Obtain an Access Key ID/Secret Access Key (AK/SK)**.
2. Log in to the **APM** console.
3. In the navigation pane, choose **Agent** > **Management**.
4. Click **Install ICAgent**. On the page that is displayed, set **Host** to **HUAWEI CLOUD host** and **OS** to **Linux**.
5. Select the **Obtain AK/SK** installation mode, enter the obtained AK/SK in the text box to generate the ICAgent installation command, and click **Copy Command**.

   NOTE

   Ensure that the AK/SK are correct. Otherwise, the ICAgent cannot be installed.



6. Remotely log in to the ECS server as the **root** user and run the preceding command to install the ICAgent.

   When the message "ICAgent install success" is displayed, the ICAgent is successfully installed in the **/opt/oss/servicemgr/** directory.

(Optional) Step 3: Modify Permissions

If you start the program as a non-root user, run the following commands to modify the permissions on the probe file and output directory before enabling application monitoring:

```
chmod -R 777 /opt/oss/servicemgr/ICAgent/pinpoint/
mkdir -p /paas-apm/collectors/pinpoint
chmod -R 777 /paas-apm
```

Step 4: Configure the Application Startup Script and Restart the Application

1. On the ECS server, if you do not use Tomcat to start the service, perform the following operations:

   a. Add the configuration items in the following table to the place below the **java** keyword in the Java application startup script to ensure that the Java application can be monitored by APM.

Table 2-1 Configuration items to be added

Parameter	Description
-javaagent	JAR package that collection probes depend on The fixed value is **/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar**.
-Dapm_application	Application name. The value must be 1 to 64 characters starting with a letter or an underscore (_). Only lowercase letters, digits, hyphens (-), and underscores are allowed.
-Dapm_tier	Application microservice name. The value must be 1 to 64 characters starting with a letter or an underscore (_). Only lowercase letters, digits, hyphens (-), and underscores are allowed.

Example of the modified startup script

The following shows an example startup script of the **Vmall** application with the **vmall-dao-service** and **vmall-user-service** services. You need to configure your script as required.

- Original startup script:
  ```
  java -Xmx512m -jar /root/testdemo/ecommerce-persistence-service-0.0.1-SNAPSHOT.jar --spring.config.location=file:/root/testdemo/application_dao.yml > dao.log 2>&1 &
  java -Xmx512m -jar /root/testdemo/ecommerce-user-service-0.0.1-SNAPSHOT.jar --spring.config.location=file:/root/testdemo/application_userservice.yml > user.log 2>&1 &
  ```
- Modified startup script (differences are in bold):
  ```
  java -javaagent:/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar -Dapm_application=vmall -Dapm_tier=vmall-dao-service -Xmx512m -jar /root/testdemo/ecommerce-persistence-service-0.0.1-SNAPSHOT.jar --spring.config.location=file:/root/testdemo/application_dao.yml > dao.log 2>&1 &
  java -javaagent:/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar -Dapm_application=vmall -Dapm_tier=vmall-user-service -Xmx512m -jar /root/testdemo/ecommerce-user-service-0.0.1-SNAPSHOT.jar --spring.config.location=file:/root/testdemo/application_userservice.yml > user.log 2>&1 &
  ```

b. Execute the modified application startup script to enable application monitoring.

2. On the ECS server, if you use Tomcat to start the service, perform the following operations:

   a. Go to the **bin** directory of Tomcat.

   b. Copy the following content to the **catalina.sh** file.
   ```
   JAVA_OPTS="$JAVA_OPTS -javaagent:/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar -Dapm_application=xxx -Dapm_tier=xxx"
   ```

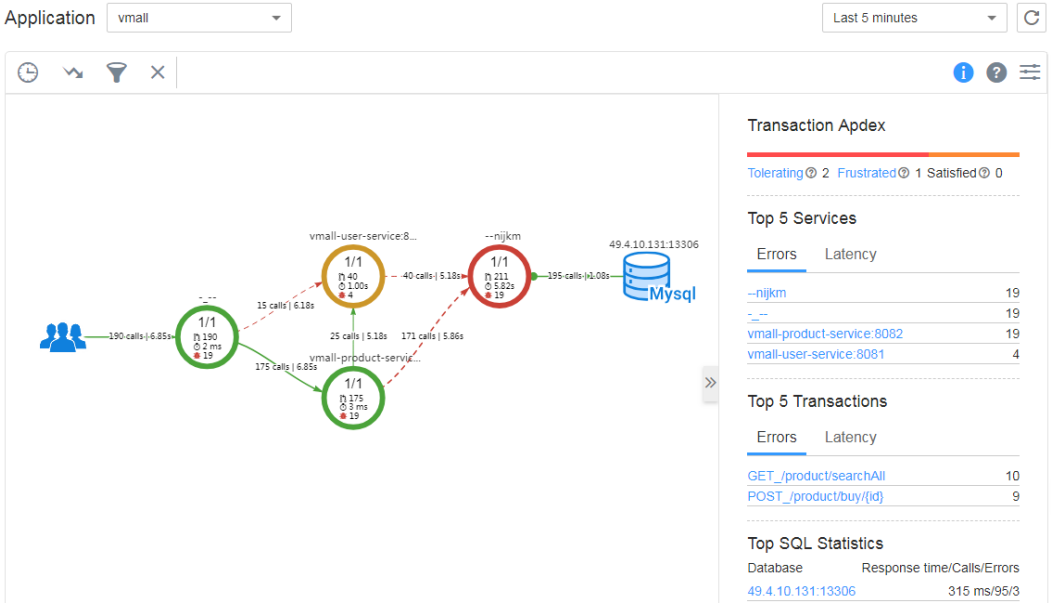

NOTE

1. Note that **-Dapm_application -Dapm_tier** needs to be configured based on **Table 2-1**.

c. Execute the modified application startup script to enable application monitoring.

Step 5: Manage the Application on APM

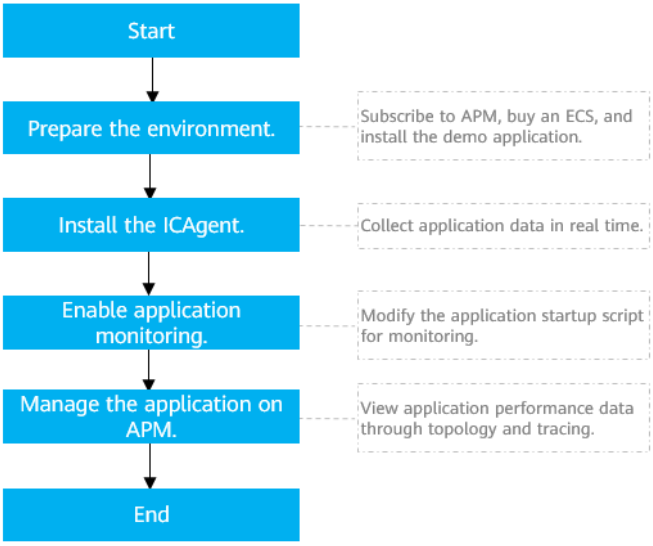
Three minutes after the application is started, its data will be displayed on the APM console. You can log in to the APM console and optimize application performance through topology and tracing. For details, see **APM User Guide**.



2.1.2 Connecting a Demo Application to APM

If you do not have your own applications, learn Application Performance Management (APM) by using a demo application. This section describes how to connect a demo application to APM for monitoring.

Procedure



Step 1: Prepare the Environment

1. Subscribe to APM. If you log in to the APM console for the first time, click **Free opening**.
2. **Purchase an Elastic Cloud Server (ECS)** and ensure that it meets the requirements in **Supported OSs**.
   - If you do not want to purchase any ECS servers, directly learn APM functions.
   - To ensure performance, you are advised to purchase an ECS server with two or more vCPU cores and 4 GB or greater memory.
3. Remotely log in to the **ECS** server as a **root** user.
4. Create an application directory, for example, **testdemo**, and go to the directory:

   ```
   mkdir /root/testdemo
   cd /root/testdemo
   ```

5. Download and install the JDK installation package.

   NOTE

   As the JDK installation package has been downloaded from the official JDK website and placed in **http://demos.obs.myhuaweicloud.com**, run the following command to download and install it:

   ```
   curl -l http://demos.obs.myhuaweicloud.com/jdk_install.sh > jdk_install.sh && bash jdk_install.sh
   ```

6. Download the application to the application directory and install it.

   NOTE

   As the application has been placed in **http://demos.obs.myhuaweicloud.com**, run the following command to download and install it:

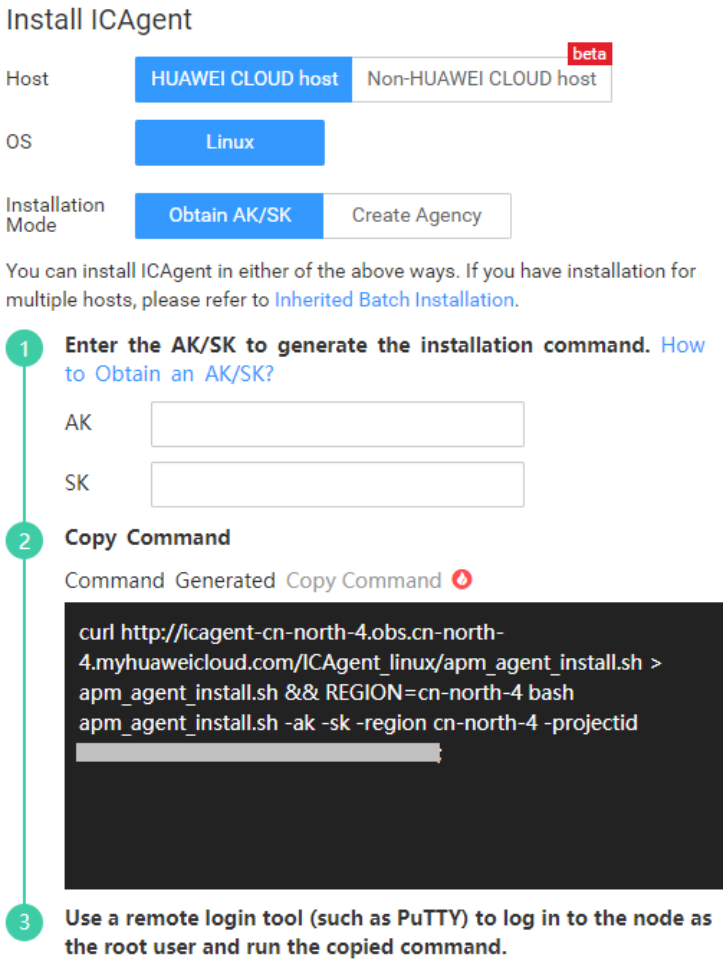
   ```
   curl -l http://demos.obs.myhuaweicloud.com/demo_install.sh > demo_install.sh && bash
   demo_install.sh
   ```


Step 2: Install the ICAgent

1. **Obtain an Access Key ID/Secret Access Key (AK/SK)**.
2. Log in to the **APM** console.
3. In the navigation pane, choose **Agent** > **Management**.
4. Click **Install ICAgent**. On the page that is displayed, set **Host** to **HUAWEI CLOUD host** and **OS** to **Linux**.
5. Select the **Obtain AK/SK** installation mode, enter the obtained AK/SK in the text box to generate the ICAgent installation command, and click **Copy Command**.

   NOTE

   Ensure that the AK/SK are correct. Otherwise, the ICAgent cannot be installed.

6. Remotely log in to the ECS server as the **root** user and run the preceding command to install the ICAgent.

   When the message "ICAgent install success" is displayed, the ICAgent is successfully installed in the **/opt/oss/servicemgr/** directory.

Step 3: Enable Application Monitoring

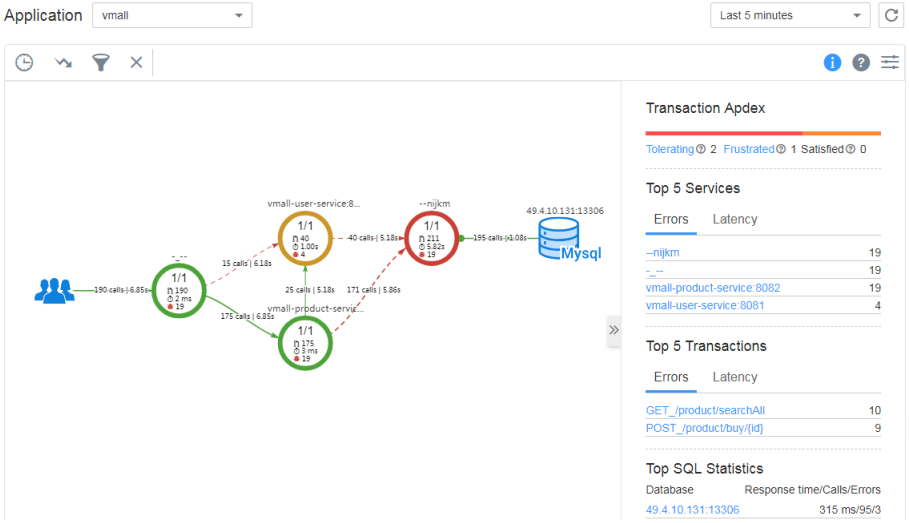
After the ICAgent is installed, modify the application startup parameters to enable application performance monitoring and load the ICAgent. Otherwise, the

application cannot be monitored by APM. APM has provided the modified script for the demo application. You only need to execute the modified script on the ECS server where the demo application is deployed:

```
cd /root/testdemo
chmod +x start_apminside.sh
bash start_apminside.sh
```

Step 4: Manage the Application on APM

1. Three minutes after the application is started, its data will be displayed on the APM console. You can log in to the APM console and optimize application performance through topology and tracing. For details, see **APM User Guide**.



2. (Optional) To access the demo application, perform the following operations:
   a. **Configure the security group rule**. Specifically, configure the access permission for port 80 of the security group in the inbound direction so that you can access the demo application using a browser.
   b. Open a browser, enter **http://***ECS EIP* in the address bar to access the demo application, and perform operations such as querying products and viewing shopping carts.

2.2 Containerized Applications

2.2.1 Connecting a HUAWEI CLOUD Containerized Application to APM

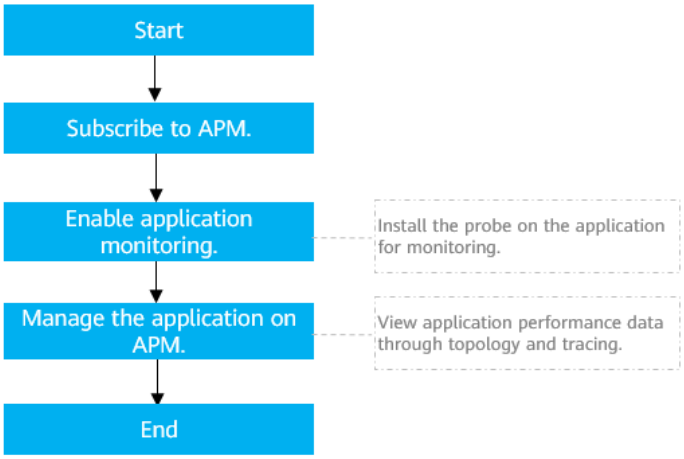
If your containerized application has been deployed on the cloud, learn Application Performance Management (APM) based on the following procedure. This section describes how to connect a Java application on a container service to APM through the Pinpoint probe.

Prerequisites

- You have subscribed to Cloud Container Engine (CCE), Application Orchestration Service (AOS), and ServiceStage.

- You have deployed Java applications on CCE, AOS, and ServiceStage.

Procedure



Step 1: Subscribe to APM

See **Subscribing to APM and Buying a Package**.

Step 2: Enable Application Monitoring

You need to perform operations based on application deployment modes. Currently, APM supports application deployment through:

- ServiceStage. For details, see **ServiceStage Mode**.
- AOS. For details, see **AOS Mode**.
- CCE. For details, see **CCE Mode**.

ServiceStage Mode

ServiceStage is a one-stop DevOps platform service oriented for enterprises and developers. If you select the probe when using ServiceStage to create a cluster, APM is automatically connected to the application.

Figure 2-1 Selecting the Java probe when creating an application

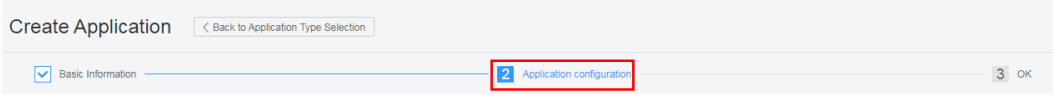
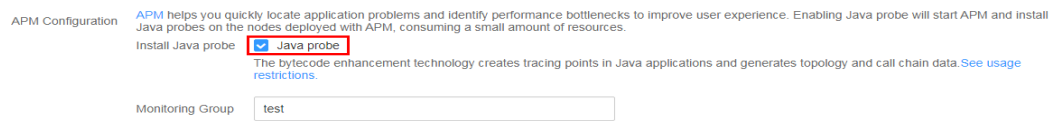


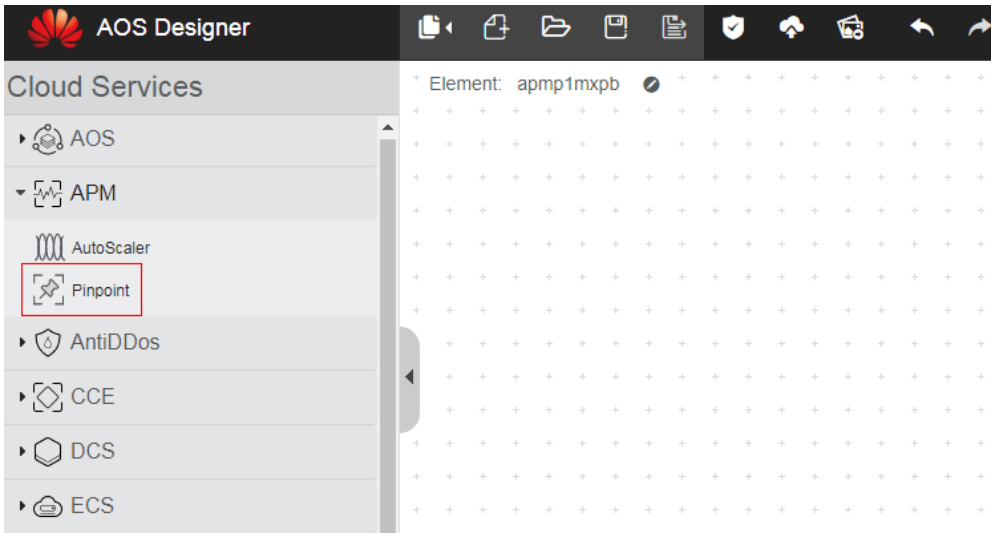
Figure 2-2 Selecting the Java probe



AOS Mode

For **AOS**, when you add the designer **pinpoint** to a template during compilation, the APM collection probe is added to a stack. After the template is compiled and the stack is created, APM is automatically connected to the application.

Adding the designer pinpoint to a template:



CCE Mode

CCE provides containerized application management. If you select the probe when creating or upgrading an application, the APM collection probe is installed on the application.

Figure 2-3 Selecting the Java probe when creating an application

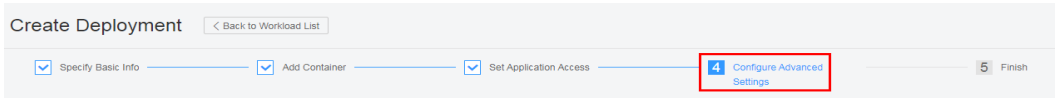


Figure 2-4 Selecting the Java probe

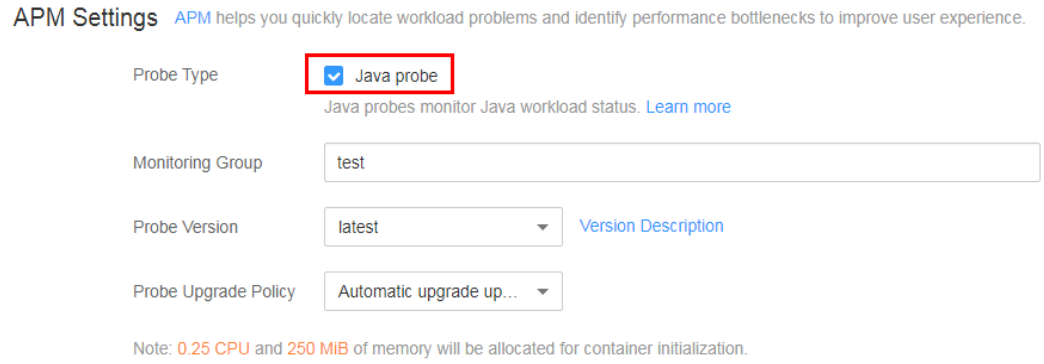
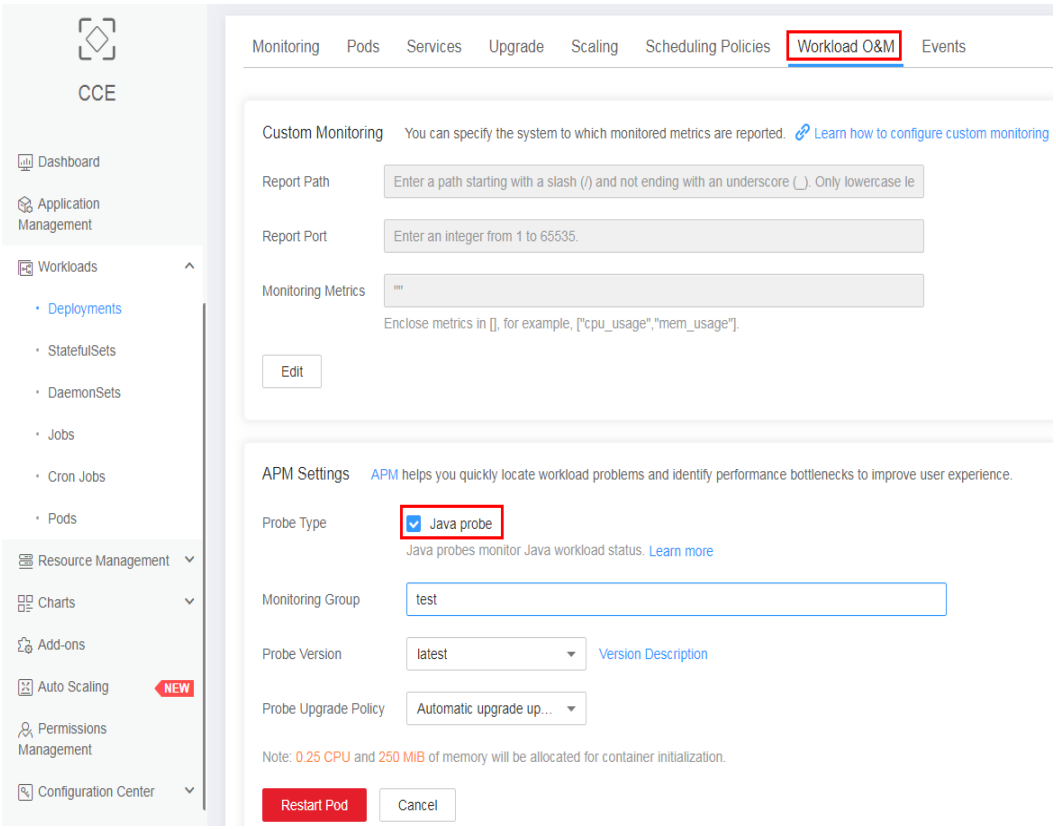
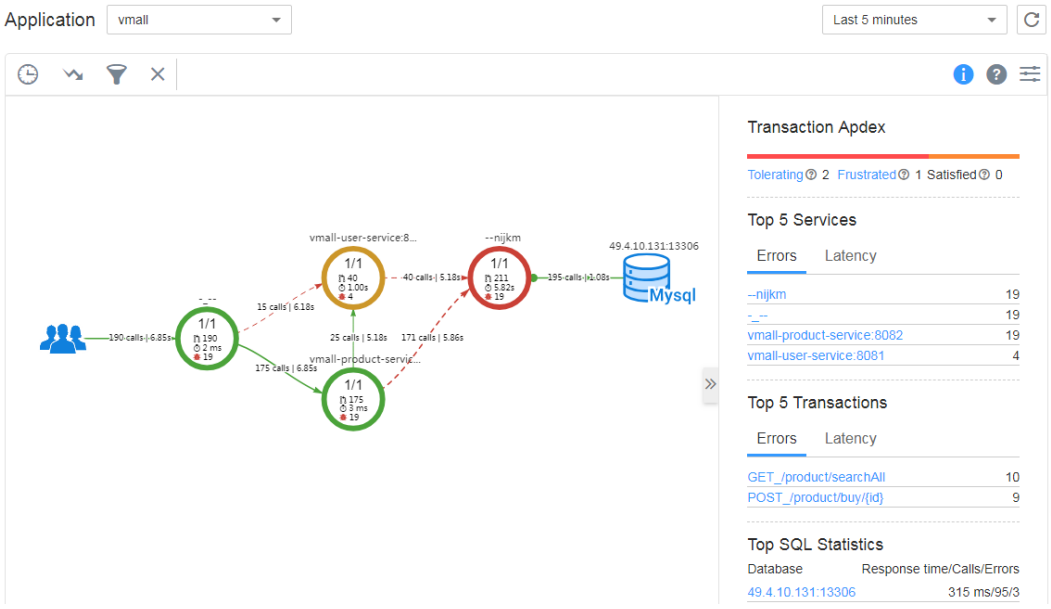


Figure 2-5 Selecting the probe when upgrading an application



Step 3: Manage the Application on APM

Three minutes after the application is started, its data will be displayed on the APM console. You can log in to the APM console and optimize application performance through topology and tracing. For details, see **APM User Guide**.



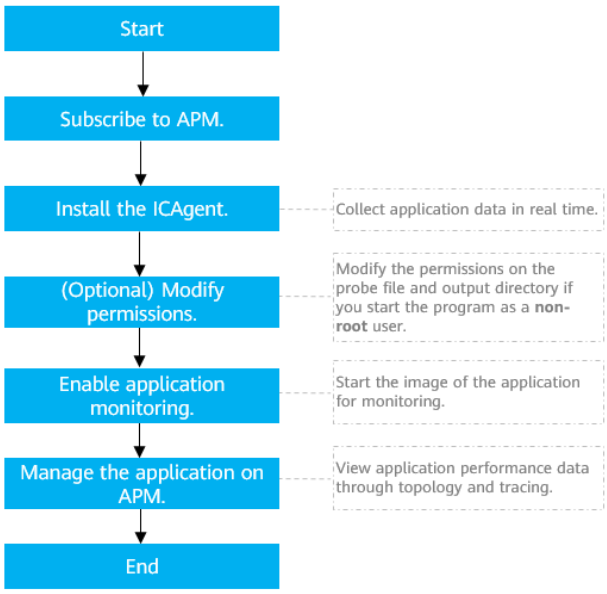
2.2.2 Connecting a Native Docker Application to APM

If you have a Java application image, you can add the parameters required by the Java probe to the native Docker startup command. In this case, by starting the image, you can connect the Java application to Application Performance Management (APM), and then view application data on the topology and transaction pages.

Prerequisite

You have deployed a Java application in Docker.

Procedure



Step 1: Subscribe to APM

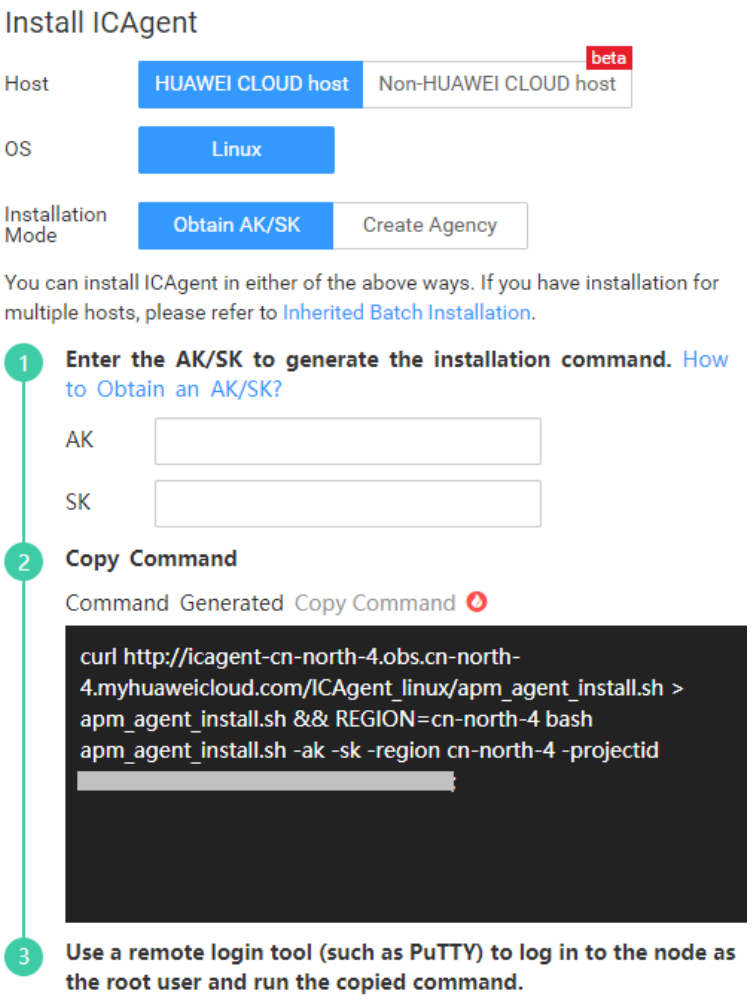
See **Subscribing to APM and Buying a Package**.

Step 2: Install the ICAgent

1. **Obtain an Access Key ID/Secret Access Key (AK/SK)**.
2. Log in to the **APM** console.
3. In the navigation pane, choose **Agent** > **Management**.
4. Click **Install ICAgent**. On the page that is displayed, set **Host** to **HUAWEI CLOUD host** and **OS** to **Linux**.
5. Select the **Obtain AK/SK** installation mode, enter the obtained AK/SK in the text box to generate the ICAgent installation command, and click **Copy Command**.

   NOTE

   Ensure that the AK/SK are correct. Otherwise, the ICAgent cannot be installed.



6. Remotely log in to the Elastic Cloud Server (ECS) server as the **root** user and run the preceding command to install the ICAgent.

   When the message "ICAgent install success" is displayed, the ICAgent is successfully installed in the **/opt/oss/servicemgr/** directory.

(Optional) Step 3: Modify Permissions

If you start the program as a non-root user, run the following commands to modify the permissions on the probe file and output directory before enabling application monitoring:

```
chmod -R 777 /opt/oss/servicemgr/ICAgent/pinpoint/
mkdir -p /opt/apm-container
chmod -R 777 /opt/apm-container
```

Step 4: Start an Image

Add the parameters required by the Java probe to the native Docker startup command, and adjust the application and service names as required. The following shows an example of the **VMall** application with the **vmall-dao-service** service.

1. Modify the Docker startup script.

   Example

Original startup command:

```
docker run -p 8080:8080 demo:latest
```

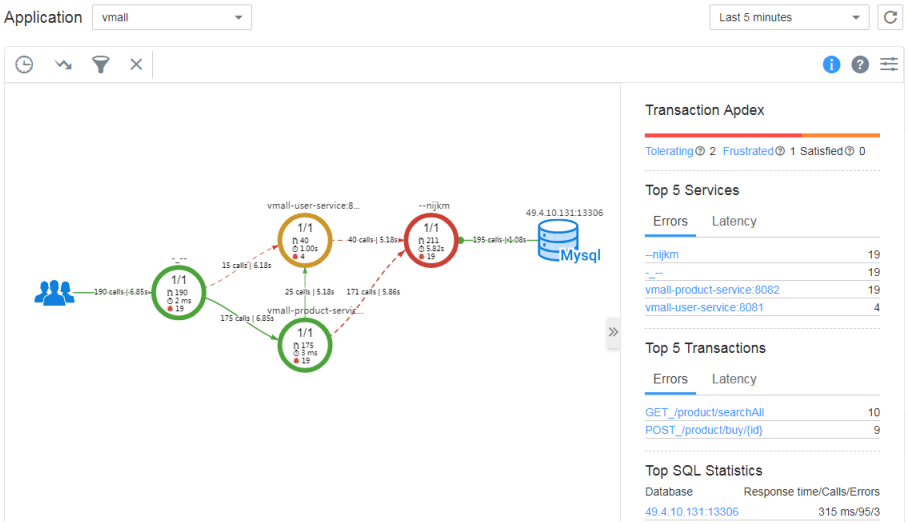
Modified startup command:

```
docker run -e JAVA_TOOL_OPTIONS="-javaagent:/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar -Dapm_application=vmall -Dapm_tier=vmall-dao-service -Dapm_container=true" -v /opt/apm-container:/paas-apm/collectors/pinpoint -v /opt/oss/servicemgr/ICAgent/pinpoint:/opt/oss/servicemgr/ICAgent/pinpoint -p 8080:8080 demo:latest
```

2. Run the **docker run** command to start the image, so that the Docker application can be connected to the APM console.

Step 5: Manage the Application on APM

Three minutes after the application is started, its data will be displayed on the APM console. You can log in to the APM console and optimize application performance through topology and tracing. For details, see **APM User Guide**.



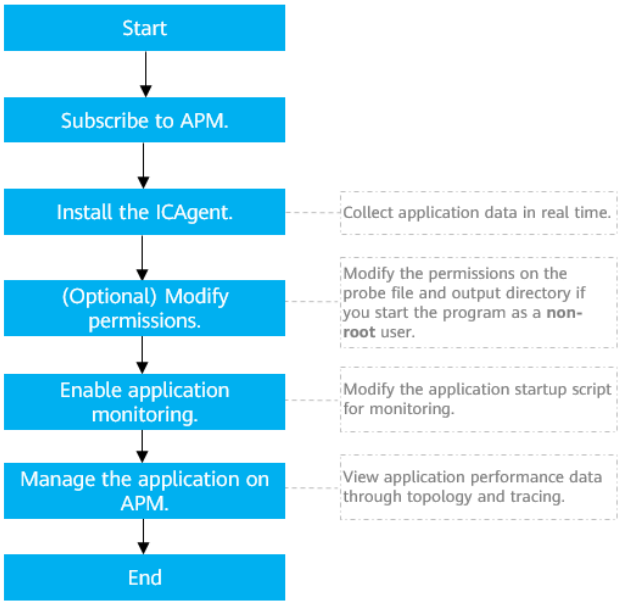
2.3 Connecting a Deployment Application to APM

Deployment is a workload that does not store any data or status. If you have deployed a Deployment application using Cloud Container Engine (CCE) or open-source Kubernetes, you can execute the configuration script to connect the application to Application Performance Management (APM) and view its data on the topology and transaction pages.

Prerequisites

- You have connected an Elastic Cloud Server (ECS) to a cluster by running the **kubectl** command. For details, see **Connecting to the Kubernetes Cluster Using kubectl**.
- You have deployed an application using CCE or open-source Kubernetes.

Procedure



Step 1: Subscribe to APM

See **Subscribing to APM and Buying a Package**.

Step 2: Install the ICAgent

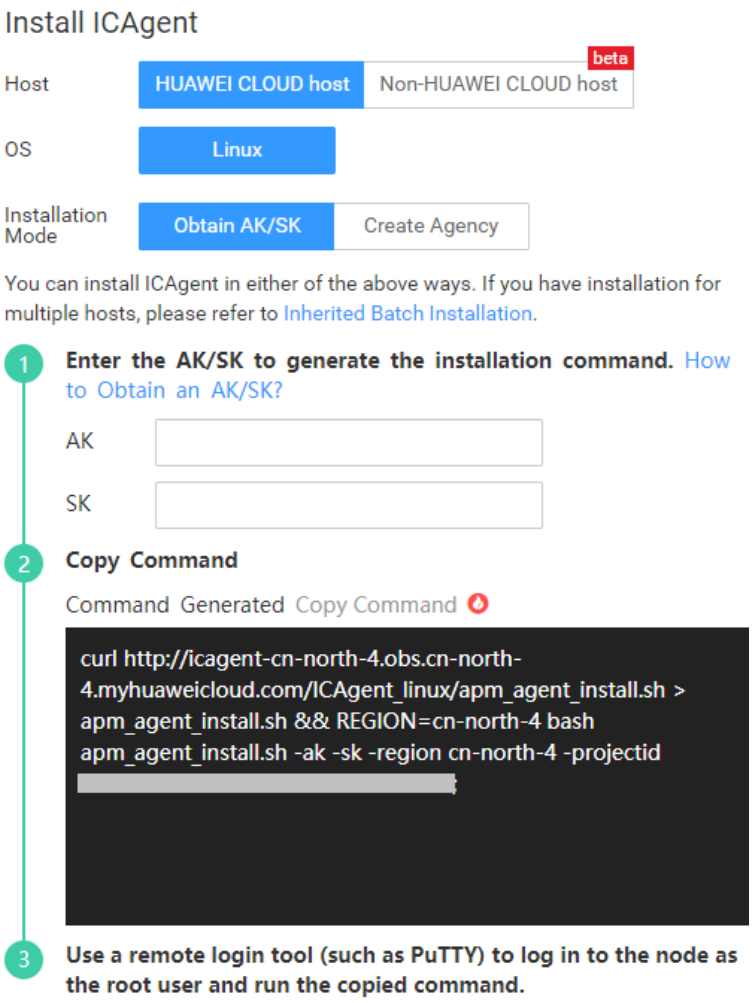
NOTE

If the ICAgent is bound to CCE, skip this step.

1. **Obtain an Access Key ID/Secret Access Key (AK/SK)**.
2. Log in to the **APM** console.
3. In the navigation pane, choose **Agent** > **Management**.
4. Click **Install ICAgent**. On the page that is displayed, set **Host** to **HUAWEI CLOUD host** and **OS** to **Linux**.
5. Select the **Obtain AK/SK** installation mode, enter the obtained AK/SK in the text box to generate the ICAgent installation command, and click **Copy Command**.

   NOTE

   Ensure that the AK/SK are correct. Otherwise, the ICAgent cannot be installed.



6. Remotely log in to the ECS server as the **root** user and run the preceding command to install the ICAgent.

   When the message "ICAgent install success" is displayed, the ICAgent is successfully installed in the **/opt/oss/servicemgr/** directory.

(Optional) Step 3: Modify Permissions

If you start the program as a non-root user, run the following commands to modify the permissions on the probe file and output directory before enabling application monitoring:

```
chmod -R 777 /opt/oss/servicemgr/ICAgent/pinpoint/
mkdir -p /opt/apm-container
chmod -R 777 /opt/apm-container
```

Step 4: Enable Application Monitoring

1. On the ECS or CCE, configure the startup script of the Deployment. Specifically, add the following information in bold to the **YAML** file.

   Run the following command to edit the YAML file:

   ```
   vi xxx.yaml
   ```


xxx indicates the name of the description file customized when you create the Deployment application. The following provides an example. For more information on deployments, see **Kubernetes documents**.

```
kind: Deployment
apiVersion: apps/v1
metadata:
  name: user-service
  namespace: default
  selfLink: /apis/apps/v1/namespaces/default/deployments/user-service
  uid: b231788d-9abd-11e8-80a5-fa163e3a2cc7
  resourceVersion: '50972062'
  generation: 13
  creationTimestamp: '2018-08-08T03:46:56Z'
  labels:
    app: user-service
    stack-name: auto-test
  annotations:
    deployment.kubernetes.io/revision: '5'
    description: ''
  enable: true
spec:
  replicas: 1
  selector:
    matchLabels:
      app: user-service
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: user-service
      enable: true
    spec:
      #External mount directory of the container, including the data output path and Java probe package path.
      volumes:
        - name: paas-apm
          hostPath:
            path: /opt/apm-container
        - name: pinpoint-pkg
          hostPath:
            path: /opt/oss/servicemgr/ICAgent/pinpoint
      containers:
        - name: user-service
          image: '100.125.0.198:20202/zhyyy/user-service:v1'
          ports:
            - containerPort: 8080
              protocol: TCP
          env:
            - name: PAAS_APP_NAME
              # Workload name (service name).
              value: user-service
            - name: PAAS_NAMESPACE
              #CCE cluster namespace. For a non-CCE cluster, this parameter is left blank.
              value: default
            - name: PAAS_PROJECT_ID
              #Tenant's project ID.
              value: d698369a975645bfb35f8437d11c5a12
            - name: PAAS_CLUSTER_ID
              #CCE cluster ID, which can be queried by pressing F12 on the CCE console. For a non-CCE cluster, this parameter is left blank.
              value: 89b49857-5433-11e8-941c-0255ac101f3e
            - name: PAAS_POD_ID
                valueFrom:
                  fieldRef:
                    fieldPath: metadata.uid
            - name: PAAS_MONITORING_GROUP
              # Application name (monitoring group). You are advised to set the same application name for the services that fulfill the same function.
              value: shoppingmall
```



```
          - name: JAVA_TOOL_OPTIONS
            value: -javaagent:/opt/oss/servicemgr/ICAgent/pinpoint/pinpoint-bootstrap.jar -
Dapm_container=true
        resources: {}
       #Internal mount directory of the container, including the data output path and Java probe
package path.
        volumeMounts:
          - name: paas-apm
            mountPath: /paas-apm/collectors/pinpoint
          - name: pinpoint-pkg
            mountPath: /opt/oss/servicemgr/ICAgent/pinpoint

        terminationMessagePath: /dev/termination-log
        terminationMessagePolicy: File
        imagePullPolicy: Always
    restartPolicy: Always
    terminationGracePeriodSeconds: 30
    dnsPolicy: ClusterFirst
    securityContext: {}
    schedulerName: default-scheduler
 strategy:
   type: RollingUpdate
   rollingUpdate:
     maxUnavailable: 0
     maxSurge: 1
 revisionHistoryLimit: 10
 progressDeadlineSeconds: 600
status:
 observedGeneration: 13
 replicas: 1
 updatedReplicas: 1
 readyReplicas: 1
 availableReplicas: 1
 conditions:
   - type: Progressing
     status: 'True'
     lastUpdateTime: '2018-09-02T13:25:46Z'
     lastTransitionTime: '2018-08-08T03:46:56Z'
     reason: NewReplicaSetAvailable
     message: ReplicaSet "user-service-f584f46b7" has successfully progressed.
   - type: Available
     status: 'True'
     lastUpdateTime: '2018-12-21T11:01:33Z'
     lastTransitionTime: '2018-12-21T11:01:33Z'
     reason: MinimumReplicasAvailable
     message: Deployment has minimum availability.
```

2. Restart the application using the modified script, and enable application performance monitoring.

Step 5: Manage the Application on APM

Three minutes after the application is started, its data will be displayed on the APM console. You can log in to the APM console and optimize application performance through topology and tracing. For details, see **APM User Guide**.