CDP Private Cloud Data Services 1.5.1

Managing the Embedded Container Service (ECS)

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Contents

The Embedded Container Service (ECS)

Cloudera Manager provides tools for managing and monitoring the CDP Private Cloud Embedded Container Service.

The Embedded Container Service (ECS) service enables you to run CDP Private Cloud Data Services by creating container-based clusters in your data center. In addition to the option to use OpenShift, which requires that you deploy and manage the Kubernetes infrastructure, you can also deploy a Embedded Container Service cluster, which creates and manages an embedded Kubernetes infrastructure for use with CDP Private Cloud Data Services. Installing, configuring, and managing OpenShift is not required. You only need to provide hosts on which to install the service and Cloudera Manager sets up the Embedded Container Service cluster and also provides management and monitoring of the cluster.

When you create an Embedded Container Service cluster, two new services are added to the cluster:

- Embedded Container Service (ECS) service. The ECS service has two roles:

  - ECS Server -- runs on a single host in the Embedded Container Service cluster.
  - ECS Agent -- runs on all hosts except the host running the Server role in the Embedded Container Service Cluster.
- Docker service. The Docker service has a single role:

  - Docker Server -- runs on all hosts in the Embedded Container Service Cluster.

Configuring the Embedded Container Service

You use Cloudera Manager to configure the Embedded Container Service and clusters.

Procedure

1. Open the Cloudera Manager Admin Console
2. From the Home page, Click on the Embedded Container Service Cluster
3. Click the Hosts, ECS service, or the Docker service links.
4. Click the Configuration tab.
5. Use the Filters or Search functions to locate the configuration property you are looking for.
6. Enter your change.
7. Click Save Changes.

Related Information
Modifying Configuration Properties Using Cloudera Manager

Adding hosts to a CDP Private Cloud Data Services Cluster

Procedure to expand a Embedded Container Service cluster

About this task

You can add hosts to a Embedded Container Service cluster to increase capacity and performance.

Procedure

1. Follow the steps to Add a Host.

2. If your ECS hosts are running the CentOS 8.4, OEL 8.4, or RHEL 8 operating systems, you must install iptables on all the ECS hosts. Run the following command on each ECS host:

```
yum --setopt=tsflags=noscripts install -y iptables
```

3. Add the following role instances to each new host: ECS Agent Docker Server

   - ECS Agent
   - Docker Server

   > **Note:** The Regenerate missing keytab command on the Actions menu for these roles does not perform this action. There is no need to regenerate missing keytabs.

4. Restart the Embedded Container Service cluster.

Starting, stopping, restarting, and refreshing Embedded Container Service Clusters

Procedures to start, stop, restart, and refresh Private Cloud Experience clusters

Starting a Embedded Container Service Cluster

Procedure

1. On the HomeStatus tab, click the Actions Menu to the right of the Embedded Container Service cluster name and select Start.
2. Click the Start button that appears in the next screen to confirm. The Command Details window shows the progress of starting services.

Results
When the All services successfully started message appears, the task is complete and you can close the Command Details window.

Stopping a CDP Private Cloud Data Services Cluster

Procedure

1. On the HomeStatus tab, click the Actions Menu to the right of the Embedded Container Service cluster name and select Stop.
2. Click the Stop button in the confirmation screen. The Command Details window shows the progress of stopping services.

Results
When the All services successfully stopped message appears, the task is complete and you can close the Command Details window.

> **Note:** The cluster-level Stop action does not stop the Cloudera Management Service. You must stop the Cloudera Management Service separately.

Restarting a Embedded Container Service Cluster

Procedure

1. On the HomeStatus tab, click the Actions Menu to the right of the cluster name and select Restart.

2. Click the Restart button that appears in the next screen to confirm.
The Command Details window shows the progress of stopping services. When the All services successfully started message appears, the task is complete and you can close the Command Details window.

3. Click ActionsUnseal Vault

Refreshing a Embedded Container Service Cluster

Procedure

To refresh a cluster, in the HomeStatus tab, click the Actions Menu to the right of the cluster name and select Refresh Cluster.

Monitoring Embedded Container Service Clusters

Procedures to monitor Embedded Container Service clusters
Related Information
Monitoring Services
Monitoring Clusters
Docker Server Health Tests
ECS Health Tests
ECS Agent Health Tests
ECS Server Health Tests
Docker Server Metrics
ECS Agent Metrics
ECS Server Metrics

Viewing Health Status

Procedure

1. Open the Cloudera Manager Admin Console.

2. From the Home page, Click on the Embedded Container Service cluster.

3. Click on the ECS or Docker service.

Results
The Service status page displays the Health Test, Status Summary and Health History of the services.

Viewing the Kubernetes Dashboard

About this task
The Kubernetes Dashboard displays configuration and other information about the embedded Kubernetes infrastructure used in the Embedded Container Service cluster. Although you can make configuration changes using the dashboard (if you have the appropriate permissions), you should not make any changes using the dashboard. Cloudera Support may use the dashboard to diagnose problems with the cluster.

Procedure

1. In the Cloudera Manager Admin Console, go to the ECS service.

2. Click Web UIECS Web UI

Results
The Kubernetes Dashboard displays.

Viewing the Private Cloud Management Console

Procedure

1. In the Cloudera Manager Admin Console, go to the ECS service.
2. Click Web UIConsole

Results
The CDP Management Console displays.

Performing maintenance on an Embedded Container Service cluster

You can perform maintenance on the nodes in your ECS cluster by shutting down the nodes one at a time while keeping your Data Services running with slightly diminished capacity.

Before you begin

- The containerized cluster must be configured for ECS Server high availability. Contact Cloudera Professional Services for assistance in setting up high availability.
- You must be able to log into the nodes as root or have sudo privileges.
- The node to be maintained must have a status of Ready. A status of NotReady may suggest the node is having other complicating issues. Run the following command on an ECS server node to verify status of the nodes.

```
/var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.yaml
 get nodes
```

Procedure

1. Inform Kubernetes that it should no longer use this node for any new pods. This process is called cordon and Kubernetes tracks the node status as Ready,SchedulingDisabled.
   a) Run the following command to list the nodes:

   ```
   /var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.ya
   ml get nodes
   ```

   b) Run the following command for the node you are taking off line:

   ```
   /var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.ya
   ml cordon **node-name**
   ```

   c) Run the following command to verify the node status shows Ready,SchedulingDisabled:

   ```
   /var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.ya
   ml get nodes
   ```

2. Inform Kubernetes to evict this node's Data Services pods and cleanly detach any storage volumes. This allows the pods to be started up on other Ready nodes in the cluster and any replica volumes are migrated. The process is invoked by the drain command:

```
/var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.yaml
 drain *node-name* --delete-emptydir-data --ignore-daemonsets --pod-select
```

```
or='app!=csi-attacher,app!=csi-provisioner,app!=longhorn-admission-webho
ok,app!=longhorn-conversion-webhook,app!=longhorn-driver-deployer'
```

You will see a message

```
 "WARNING: ignoring DaemonSet-managed Pods:....
```

You can ignore this warning.

You will see repeating messages like this:

```
error when evicting pods/"instance-manager-r-xxxxxxxx" -n "longhorn-syst
em" (will retry after 5s): Cannot evict pod as it would violate the pod's
 disruption budget.
```

This is normal, after several iterations those pods will be evicted and the drain is completed.

3. Log in to the Cloudera Manager Admin Console.
4. Go to the ECS service page and verify that the Vault is not sealed. This information displays in the Health Tests section.
5. If the Vault is sealed, click ActionsUnseal Vault.
6. Click the Action menu next to the ECS cluster and select Stop.
7. Shutdown ECS roles.
    a) Click the Instances tab.
    b) Select the hosts where the ECS Agent role is running and click ActionsStop.
    c) Select two of the hosts running the ECS Server role is running and click ActionsStop.
8. Perform the maintenance.
9. Reboot the hosts.
10. Log in to the Cloudera Manager Admin Console.
11. Click the Action menu next to the ECS cluster and select Start.
12. Uncordon the node to start the Data Services by running the following command:

```
/var/lib/rancher/rke2/bin/kubectl --kubeconfig=/etc/rancher/rke2/rke2.yaml
 uncordon **node-name**
```

13. Run the following command to verify that the node status is Ready:

```
/var/lib/rancher/rke2/bin/kubectl get nodes
```

14. Click ActionsRefresh ECS Cluster.

Configuring a Containerized cluster with SELinux

You can configure a Containerized Cluster running the Embedded Compute Service (ECS).

Procedure

1. Ensure that the hosts you use for the Containerized cluster meet all hardware and software requirements for use with CDP Private Cloud Data Services.
2. Enable SELinux in Permissive mode by updating the /etc/selinux/config file on all ECS hosts by running the following commands:

```
sed -i 's/SELINUX=disabled/SELINUX=permissive/' /etc/selinux/config
reboot
```

3. Add the SELinux policies provided by RKE2 by installing the RPMs on all ECS hosts. Use the following commands:

```
yum localinstall -y http://mirror.centos.org/centos/7/extras/x86_64/Pack
ages/container-selinux-2.107-3.el7.noarch.rpm
wget https://github.com/rancher/rke2-selinux/releases/download/v0.8.stable
.2/rke2-selinux-0.8-2.el7.noarch.rpm
yum install -y rke2-selinux-0.8-2.el7.noarch.rpm
```

4. Uninstall the nscd service by running the following command on all ECS hosts :

```
yum erase -y nscd
```

5. Install a Containerized Cluster on all hosts. See Adding a Containerized Cluster.

6. Enable SELinux in Enforced mode by running the following commands on all ECS hosts:

```
setenforce 1
```

You can confirm that SELinux is running in Enforced mode by running the following command:

```
getenforce
```

7. Verify that the ECS Cluster hosts are sending heartbeats to the Cloudera Manager server.
   a) Open the Cloudera Manager Admin Console.
   b) Click HostsAll Hosts.
   c) Check the Last Heartbeat column for heartbeat status.

8. Verify that your workloads are functioning as expected.

Decommissioning ECS Hosts

You can decommission ECS hosts and remove them from the cluster.

About this task

1. Cordon the node. Longhorn will automatically disable the node scheduling when a Kubernetes node is cordoned. Run the following command on any ECS Server host:

```
kubectl cordon [***node***]
```

2. Drain the node to move the workload to somewhere else. Run the following command on any ECS Server host:

```
kubectl drain [***node***] --ignore-daemonsets --pod-selector='app!=csi-at
tacher,app!=csi-provisioner' --delete-emptydir-data
```

3. Detach all the volumes on the node. Navigate to the ECS Service page on Cloudera Manager UI.

   a. In the Web UI dropdown, select Storage UI to open the Longhorn UI.

   b. Under the Volume tab in Longhorn UI, select the volumes on this node. Click Detach and select Yes on the screen prompt.

   If the node has been drained, all the workloads should be migrated to another node already.

   If there are any other volumes remaining attached, detach them before continuing.

4. Remove the node from Longhorn using the Delete in the Node tab. Or, remove the node from Kubernetes. Run the following command on any ECS Server host:

```
kubectl delete node [***node-name***]
```

Longhorn will automatically remove the node from the cluster.

5. Uninstall ECS and Docker artifacts from the host. Run below commands on the host:

```
cd /opt/cloudera/parcels/ECS/bin
./rke2-killall.sh # usually 2 times is sufficient
./rke2-uninstall.sh
rm -rf /ecs/* # assumes the default defaultDataPath and lsoDataPath
rm -rf /var/lib/docker_server/* # deletes the auth and certs
rm -rf /etc/docker/certs.d/* # delete the ca.crt
rm -rf /docker # assumes the default defaultDataPath for docker
```

6. Go to the Hosts page for the ECS Cluster, select that host, and under Actions for Selected, click Begin Maintenance (Suppress Alerts/Decommission)