

Cloudera Data Services on premises Installation on the OpenShift Container Platform

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Requirements




Note: Cloudera Data Services on premises require the tmpfs file systems (example: '/tmp') mounts to be without the 'noexec' flag.

Software Support Matrix for OpenShift

This support matrix lists the supported software for the Cloudera Base on premises cluster and the Cloudera Data Services on premises containerized cluster when installing using the OpenShift Container Platform (OCP).

Base Cluster	Version	<ul style="list-style-type: none"> Cloudera Manager 7.13.1 CHF 3 7.1.7 SP 3 CHF 10 7.1.9 7.1.9 SP1 CHF 5
	Base OS	<ul style="list-style-type: none"> See Private Cloud Base OS requirements
	TLS	<ul style="list-style-type: none"> AutoTLS (Custom CMCA) AutoTLS (Self-signed) Manual TLS
	Kerberos	<ul style="list-style-type: none"> AD FreeIPA
	JDK	<ul style="list-style-type: none"> See Java Requirements
	Custom service principals	<ul style="list-style-type: none"> Not supported
	Data Lake Storage	<ul style="list-style-type: none"> HDFS Ozone Iceberg v2 (with HDFS and Ozone)
	Base DB (HMS access from CDW Data Services*)	<ul style="list-style-type: none"> Oracle 19c Oracle 19.9 MySQL 8 MySQL 5.7 MariaDB 10.2 MariaDB 10.3 MariaDB 10.4 MariaDB 10.5 MariaDB 10.6 Postgres 12 Postgres 13 Postgres 14 Postgres 15 Postgres 16 <p>* Cloudera Data Warehouse uses a TLS enabled connection</p>

Containerized Cluster	Kubernetes	<ul style="list-style-type: none"> • OCP 4.17 (K8s 1.30) [Fresh install] • OCP 4.17 [Upgrade from 1.5.3 or 1.5.4 to 1.5.5, no fresh install] <p>Important:</p>  <ul style="list-style-type: none"> • OCP upgrades from earlier versions are incremental. See OCP upgrade steps for Cloudera Private Cloud Data Services 1.5.5 for more information. • If you are using Cloudera Data Engineering and upgrading CDP version from 1.5.3 or 1.5.4 to 1.5.5, then OCP 4.17 is not supported on CDP 1.5.5. You must upgrade OCP version to 4.17 on CDP 1.5.5.
	Control Plane Metadata DB	<ul style="list-style-type: none"> • Embedded
	Vault	<ul style="list-style-type: none"> • External v1.9 (OCP only) • Embedded
	Docker registry type	<ul style="list-style-type: none"> • Secure registry with self signed CA certs (pwd protected + self signed certs), trusted CA certs
	Storage	<ul style="list-style-type: none"> • OCS (rebranded ODF) (SSD support only) • Pure Portworx
	NFS	<ul style="list-style-type: none"> • Embedded • External
	IdP	<ul style="list-style-type: none"> • FreeIPA • ActiveDirectory (LDAP) • OpenLDAPs
	Network Access	<ul style="list-style-type: none"> • Airgap • HTTP proxy (CML)
	TLS	<ul style="list-style-type: none"> • Manual - CA signed

Red Hat OpenShift Container Platform hardware requirements

Cloudera on premises requires hardware for a dedicated OpenShift Container Platform (OCP) cluster. An OpenShift cluster consists of several master nodes for managing OpenShift and many worker nodes for running your application on Cloudera.

The sizing of the OpenShift cluster depends on:

- The OpenShift cluster setup on the master nodes
- Application workloads deployed on the worker nodes

The Cloudera Data Services on premises is installed on the OpenShift worker nodes with SSD disks.



Note: Cloudera Data Services on premises is only certified and supported for standalone OCP cluster deployments. You must not have any other third party applications that utilize the same OCP cluster, as Cloudera will only support a single tenant use on OCP.

The following table lists the hardware requirements for each node type. You require at least 3 minimum OpenShift Master Nodes + 1 Cluster System Admin Host (CSAH) Node + 1 Bootstrap Node. You need worker nodes based on your application workload requirements.

Role	CPU cores	Memory	Storage (SSD support only)
Master	4	16 GB	120 GB
CSAH	4	64 GB	200 GB
Bootstrap	4	16 GB	120 GB
Worker	Depends on your workloads	Depends on your workloads	Depends on your workloads

Additionally, if you plan to run Cloudera Data Warehouse or Cloudera AI data services workloads, you need to ensure that you meet the minimum requirements for each of those Data Services.

You can install Cloudera Data Services on premises in a low resource mode for Cloudera Data Warehouse workloads. For more information about OpenShift low resource mode requirements for Cloudera Data Warehouse, see *Get started with OpenShift low resource mode requirements* using the link in the related information section.



Important: Lowering the minimum hardware requirement reduces the up-front investment to deploy on OpenShift or ECS pods, but it does impact performance. recommends that you use the Low Resource Mode option for proof of concept (POC) purposes only. This feature is not recommended for production deployment.

Complex queries and multiple queries on HS2 may fail due to limited memory configurations for HMS and HS2 in the low resource mode.

Cloudera Data Warehouse hardware requirements

Review the requirements needed to get started with the Cloudera Data Warehouse service on Red Hat OpenShift.

You can also use the Cloudera Data Services on premises Spreadsheet to model the number and specification of hosts required for a deployment. See [How to use the Cloudera Data Services on premises sizing spreadsheet](#) on page 12.

- must be installed and running.
- must be installed and running. See [Installing on OpenShift](#) and [Installing on ECS](#) for more details.
- An environment must have been registered with on the . See [Environments](#) for more details.
- In addition to the general requirements, also has the following minimum memory, storage, and hardware requirements for each worker node using the standard resource mode:

Depending on the number of executors you want to run on each physical node, the per-node requirements change proportionally. For example, if you are running 3 executor pods per physical node, you require 384 GB of memory and approximately 1.8 TB of locally attached SSD/NVMe storage.



Important:

When you add memory and storage, it is very important that you add it in the increments stated:

- increments of 128 GB of memory
- increments of 600 GB of locally attached SSD/NVMe storage

If you add memory or storage that is not in the above increments, the memory and storage that exceeds these increments is not used for executor pods. Instead, the extra memory and storage can be used by other pods that require fewer resources.

For example, if you add 200 GB of memory, only 128 GB is used by the executor pods. If you add 2 TB of locally attached storage, only 1.8 TB is used by the executor pods.

Security requirements

The service requires the "cluster-admin" role on the OpenShift and cluster in order to install correctly. The "cluster-admin" role enables namespace creation and the use of the OpenShift Local Storage Operator for local storage.

Low resource mode requirements

Review the memory, storage, and hardware requirements for getting started with the Cloudera Data Warehouse service in low resource mode on Red Hat OpenShift and Embedded Container Service (ECS). This mode reduces the minimum amount of hardware needed.

To get started with the Cloudera Data Warehouse service on Red Hat OpenShift or ECS low resource mode, make sure you have fulfilled the following requirements:



Important: Lowering the minimum hardware requirement reduces the up-front investment to deploy on OpenShift or ECS pods, but it does impact performance. recommends that you use the Low Resource Mode option for proof of concept (POC) purposes only. This feature is not recommended for production deployment.

Complex queries and multiple queries on HS2 may fail due to limited memory configurations for HMS and HS2 in the low resource mode.

- must be installed and running.
- must be installed and running. See [Installing on OpenShift](#) and [Installing on ECS](#) for more details.
- An environment must have been registered with on the . See [Environments](#) for more details.
- In addition to the general requirements, also has the following minimum memory, storage, and hardware requirements for each worker node using the standard resource mode:

Component	Low resource mode deployment
Nodes	4
CPU	4
Memory	48 GB
Storage	3 x 100 GB (SATA) or 2 x 200 GB (SATA)
Network Bandwidth	1 GB/s guaranteed bandwidth to every node



Important: When you add memory and storage for low resource mode, it is very important that you add it in the increments stated in the above table:

- increments of 48 GB of memory
- increments of at least 100 GB or 200 GB of SATA storage

If you add memory or storage that is not in the above increments, the memory and storage that exceeds these increments is not used for executor pods. Instead, the extra memory and storage can be used by other pods that require fewer resources.

Virtual Warehouse low resource mode resource requirements

The following requirements are in addition to the low resource mode requirements listed in the previous section.

Table 1: Impala Virtual Warehouse low resource mode requirements

Component	vCPU	Memory	Local Storage	Number of pods in XSMALL Virtual Warehouse
Coordinator (2)	2 x 0.4	2 x 24 GB	2 x 100 GB	2
Executor (2)	2 x 3	2 x 24 GB	2 x 100 GB	2
Statestore	0.1	512 MB	--	1
Catalogd	0.4	16 GB	--	1
Auto-scaler	0.1	1 GB	--	1
Hue (backend)	1	8 GB	--	1
Hue (frontend)	0.5	8 GB	--	1

Component	vCPU	Memory	Local Storage	Number of pods in XSMALL Virtual Warehouse
Total for XSMALL Virtual Warehouse	8 (7.9)	121.5 GB	400 GB - 3 volumes	--

Impala Admission Control Configuration

- Maximum concurrent queries per executor: 4
- Maximum query memory limit: 8 GB

Table 2: Hive Virtual Warehouse low resource mode requirements

Component	vCPU	Memory	Local Storage	Number of pods in XSMALL Virtual Warehouse
Coordinator (2)	2 x 1	2 x 4 GB	2 x 100 GB	2
Executor (2)	2 x 4	2 x 48 GB (16 GB heap; 32 GB off-heap)	2 x 100 GB	2
HiveServer2	1	16 GB	--	1
Hue (backend)	1	8 GB	--	1
Hue (frontend)	0.5	8GB	--	1
Standalone compute operator	0.1	100 MB (.1 GB)	--	--
Standalone query executor (separate)	Same as executor	Same as executor	Same as executor	--
Total for XSMALL Virtual Warehouse	21 (20.6)	237 GB (236.1)	400 GB - 4 volumes	--

Database Catalog low resource mode requirements

The HiveMetaStore (HMS) requires 2 CPUs and 8 GB of memory. Because HMS pods are in High Availability mode, they need a total of 4 CPUs and 16 GB of memory.

Data Visualization low resource requirements

Table 3: Data Visualization low resource mode requirements

vCPU	Memory	Local Storage	Number of pods in XSMALL Virtual Warehouse
0.5	8 GB	--	1

Requirements for Cloudera AI on OpenShift Container Platform

To launch the Cloudera AI service, the OpenShift Container Platform (OCP) host must meet several requirements. Review the following Cloudera AI-specific software, NFS server, and storage requirements.

Requirements



Note:

Only the usage of SSD disks is supported with Cloudera on premises on OpenShift Container Platform.

If needed, reach out to your Administrator to ensure the following requirements are met.

Compatibility requirements

- If you use OpenShift, check that the version of the installed OpenShift Container Platform is exactly as listed in [Software Support Matrix for OpenShift](#).

Required accesses

- If Cloudera AI needs access to a database on the Cloudera Base on premises cluster, then the user must be authenticated using Kerberos and must have Ranger policies set up to allow read/write operations to the default (or other specified) database.
- Ensure that Kerberos is enabled for all services in the cluster. Custom Kerberos principals are not supported currently. For more information, see [Authenticating Hue users with Kerberos](#).
- Cloudera AI assumes it has cluster-admin privileges on the cluster.
- If external NFS is used, the NFS directory and assumed permissions must be those of the cdsw user. For details see [Using an External NFS Server](#).
- If you intend to access a workbench over https, see [Deploying a Cloudera AI Workbench with support for TLS](#).

Requirements for functioning

- On OpenShift Container Platform, CephFS is used as the underlying storage provisioner for any new internal workbench on Cloudera on premises 1.5.x. A storage class named ocs-storagecluster-cephfs with csi driver set to openshift-storage.cephfs.csi.ceph.com must exist in the cluster for new internal workbenches to get provisioned.
- A block storage class must be marked as default in the cluster. This may be rook-ceph-block, Portworx, or another storage system. Confirm the storage class by listing the storage classes (run `oc get sc`) in the cluster, and check that one of them is marked default.

DNS-related requirements

- Forward and reverse DNS must be working.
- DNS lookups to sub-domains and the Cloudera AI Workbench itself shall work properly.
- In DNS, wildcard subdomains (such as *.cml.yourcompany.com) must be set to resolve to the master domain (such as cml.yourcompany.com). The TLS certificate (if TLS is used) must also include the wildcard subdomains. When a session or job is started, an engine is created for it, and the engine is assigned to a random, unique subdomain.

Configuration requirements

- The external load balancer server timeout needs to be set to 5 min. Without this, creating a project in a Cloudera AI Workbench with `git clone` or with the API may result in API timeout errors. For workarounds, see *Known Issue DSE-11837*.
- For non-TLS Cloudera AI Workbench, websockets need to be allowed for port 80 on the external load balancer.
- Only a TLS-enabled custom Docker Registry is supported. Ensure that you use a TLS certificate to secure the custom Docker Registry. The TLS certificate can be self-signed, or signed by a private or public trusted Certificate Authority (CA).
- On OpenShift, due to a [Red Hat issue](#) with OpenShift Container Platform 4.3.x, the image registry cluster operator configuration must be set to Managed.
- Check if storage is set up in the cluster image registry operator. See *Known Issues DSE-12778* for further information.

For more information on requirements, see [Cloudera Base on premises Installation Guide](#).

Hardware requirements

Storage

The cluster must have persistent storage classes defined for both block and filesystem volume Modes of storage. Ensure that a block storage class is set up. The exact amount of storage classified as block or filesystem storage depends on the specific workload used:

Table 4: Storage requirements for Cloudera AI on OCP

	Local Storage (for example, ext4)	Block PV (for example, Ceph or Portworx)	NFS (for Cloudera AI user project files)
Control Plane	N/A	250 GB	N/A
Cloudera AI	N/A	<p>The total (not per node) storage needed only for Cloudera AI in OCP without disaster recovery (drs) is 1800 Gi per workbench with the external NFS.</p> <p>If the Cloudera AI Workbench is using the internal NFS, the minimum storage needed per workbench is 3800 Gi, considering the replication factor of 2. If you have a different replication configured, this will change accordingly.</p> <p>Considering the DRS and a single backup of the workbench, the total storage needed is $1800 \text{ Gi} * 2 = 3600 \text{ Gi}$ for the workbench with external NFS. If the workbench uses internal NFS, the total storage needed is 7600Gi.</p>	1 TB per workbench (dependent on the size of the Cloudera AI user files)

**Note:**

NFS storage must be routable from all pods running in the cluster.

**Note:**

For monitoring, the recommended volume size is 60 GB.

**Note:**

The storage calculation is based on the replication factor of two. If a different replication factor is used, the calculation will adjust accordingly.

External NFS considerations

Cloudera AI requires NFS 4.0 for storing project files and folders. NFS storage is to be used only for storing project files and folders, and not for any other Cloudera AI data, such as PostgreSQL database and LiveLog.

OpenShift requirements for NFS storage

An internal user-space NFS server can be deployed into the cluster which serves a block storage device (persistent volume) managed by the cluster's software defined storage (SDS) system, such as Ceph or Portworx. This is the recommended option for Cloudera AI on OpenShift. Alternatively, the NFS server can be external to the cluster, such as a NetApp filer that is accessible from the on premises cluster nodes. NFS storage is to be used only for storing project files and folders, and not for any other Cloudera AI data, such as PostgreSQL database and LiveLog.

Cloudera AI does not support shared volumes, such as Portworx shared volumes, for storing project files. A read-write-once (RWO) persistent volume must be allocated to the internal NFS server (for example, NFS server provisioner) as the persistence layer. The NFS server uses the volume to dynamically provision read-write-many (RWX) NFS volumes for the Cloudera AI clients.

Cloudera Data Engineering hardware requirements

Review the requirements needed to get started with the Cloudera Data Engineering service on Red Hat OpenShift.

Requirements

- Cloudera Data Engineering assumes it has cluster-admin privileges on the OpenShift cluster.

- Openshift cluster should be configured with [route admission policy](#) set to namespaceOwnership: InterNamespaceAllowed. This allows Openshift cluster to run applications in multiple namespaces with the same domain name. The

```
oc -n openshift-ingress-operator patch ingresscontroller/default --patch
'{"spec":{"routeAdmission":
{"namespaceOwnership":"InterNamespaceAllowed"}}}' --type=merge
```

- Cloudera Data Engineering Service requirements: Overall for a Cloudera Data Engineering service, it requires 110 GB Block PV or NFS PV, 9 CPU cores, and 18 GB memory. The following are the Cloudera Data Engineering Service requirements:

Table 5: Cloudera Data Engineering Service requirements


Component	vCPU	Memory	Block PV or NFS PV	Number of replicas
Embedded DB	4	8 GB	100 GB	1
Admission Controller	250 m	512 MB	--	1
Config Manager	500 m	1 GB	--	2
Dex Downloads	250 m	512 MB	--	1
Knox	250 m	1 GB	--	1
Management API	1	2 GB	--	1
NGINX Ingress Controller	100 m	90 MB	--	1
Tgt Generator	350 m	630 MB	--	1
FluentD Forwarder	250 m	512 MB	--	1 to 5
Grafana	250 m	512 MB	10 GB	1
Keytab Management	250 m	512 MB	--	1
Data Connector	250 m	512 MB	--	1
Total	8600 m	17.71 GB	110 GB	

- Cloudera Data Engineering Virtual Cluster requirements:
 - For Spark 3: Overall storage of 400 GB Block PV or Shared Storage PV, 5.35 CPU cores, and 15.6 GB per virtual cluster.
 - For Spark 2: If you are using Spark 2, you need additional 500 m CPU, 4.5 GB memory and 100 GB storage, that is, the overall storage of 500 GB Block PV or Shared Storage PV, 5.85 CPU cores, and 20.1 GB per virtual cluster.

The following are the Cloudera Data Engineering Virtual Cluster requirements for Spark 3:

Table 6: Cloudera Data Engineering Virtual Cluster requirements for Spark 3

Component	vCPU	Memory	Block PV or NFS PV	Number of replicas
Airflow API	350 m	612 MB	100 GB	1
Airflow Scheduler	1	1 GB	100 GB	1
Airflow Web	250 m	512 MB	--	1
Runtime API	250 m	512 MB	100 GB	1
Livy	3	12 GB	100 GB	1
SHS	250 m	1 GB		1
Pipelines	250 m	512 MB	--	1
Total	5350 m	16.1 GB	400 GB	

-  **Important:** The above requirements does not include workloads. See the below workload information on the additional resources based on workload.
- Workloads: Depending upon the workload, you must configure resources.
 - The Spark Driver container uses resources based on the configured driver cores and driver memory and additional 40% memory overhead.
 - In addition to this, Spark Driver uses 110 m CPU and 232 MB for the sidecar container.
 - The Spark Executor container uses resources based on the configured executor cores and executor memory and additional 40 % memory overhead.
 - In addition to this, Spark Executor uses 10 m CPU and 32 MB for the sidecar container.
 - Minimal Airflow jobs need 100 m CPU and 200 MB memory per Airflow worker.

How to use the Cloudera Data Services on premises sizing spreadsheet

You can use the sizing spreadsheet to model the hardware requirements for a Cloudera Data Services on premises deployment.

Overview

The Cloudera Data Services on premises Sizing spreadsheet is a spreadsheet that you can use to model the quantity and specifications for worker hosts required in a Cloudera Data Services on premises deployment.

This spreadsheet is intended to use information about workloads you are planning to run and hardware specifications for worker nodes to arrive at an approximate number of worker nodes required for your deployment. Due to the complexity of estimating workloads, Cloudera recommends you review any sizing or purchasing decisions with Cloudera Professional Services before committing to those decisions.

How to access the spreadsheet

You can access the spreadsheet here: [Cloudera Private Cloud Data Services Sizing](#). The file is in Microsoft Excel format. You can open the file in Excel, or upload it to Google Sheets.

There are three tabs in the spreadsheet. You will make your inputs only on the Worker Node Totals tab. Do not modify the following tabs (these tabs contain data used to calculate values in the spreadsheet and should not be modified):

- Component Lookup
- K8s Resources



Important: Do not modify any cells except for the ones indicated below. Modifying the formulas in other cells will result in inaccurate calculations.

Workload inputs

The spreadsheet calculates the total amount vcores, RAM, and storage required based on information you enter about the combined workloads you intend to deploy. Then based on the hardware specifications entered, calculates the number of worker nodes required, which is displayed in cell F27.

The following sections describe values you must enter into the spreadsheet. Values are required for each Data Service you intend to deploy, and values to enter for the hardware specifications for your worker nodes.

Cloudera Control Plane monitoring

Label	Cell	Description
Cloudera Control Plane Monitoring	B3	Increment this number by one for each environment.

Cloudera Data Warehouse

If you will deploy Cloudera Data Warehouse, on the Worker Node Totals tab, enter the following information:

Label	Cell	Description
CDW Data Catalog (min 1 per env)	B5	Enter the number of Data Catalogs you will need in your deployment. You must have at least one Data Catalog.
CDW LLAP warehouses	B6	Enter the number of LLAP warehouses you will need for each Virtual Warehouse in your deployment.
-- LLAP Executors	B7	Enter the total number of LLAP Executors you will need in your deployment.
CDW Impala warehouses	B8	Enter the number of CDW Impala warehouses for each Virtual Warehouse you will need in your deployment.
-- Impala Coordinators (2 x for HA)	B9	Enter the number of Impala Warehouses you will need in your deployment. If you have enabled high availability, enter twice the number of Warehouses.
-- Impala Executors	B10	Enter the number of Impala Executors you will need in your deployment.
CDW Cache	B11	Enter the amount of CDW Cache space for each coordinator and executor (Default 600)
Data Viz - small instances	B12	Enter the size selected when creating a Data Visualization instance.
Data Viz - medium instances	B13	
Data Viz - large instances	B14	

For more information about sizing Cloudera Data Warehouse deployments, see:

- [Standard resource mode requirements](#)
- [Low resource mode requirements](#)

Cloudera AI

Sizing for a Cloudera AI deployment depends on the number of concurrent jobs you expect to run and the number of Workspaces you provision.

Label	Cell	Description
Cloudera AI Workbench (min of 1)	B16	Enter the number of workspaces you need in your deployment.
-- Cloudera AI small concurrent sessions	B17	Enter the number of concurrent small-sized sessions you intend to run.
-- Cloudera AI average concurrent sessions	B18	Enter the number of concurrent average-sized sessions you intend to run.

For more information about sizing the Cloudera AI service, see the following topics:

- [Additional resource requirements for Cloudera AI.](#)
- (OCP) [Cloudera AI requirements](#)
- (Cloudera Embedded Container Service) [Cloudera AI requirements](#)

Cloudera Data Engineering

Label	Cell	Description
CDE Service (min/max 1 per cluster)	B20	Enter the number of Cloudera Data Engineering clusters you will need in your deployment.
CDE Virtual Cluster	B21	Enter the number of Cloudera Data Engineering Virtual Clusters you will need in your deployment.
-- CDE Small concurrent jobs	B22	Enter the number of concurrent small-sized jobs you intend to run.
-- CDE Average concurrent jobs	B23	Enter the number of concurrent average-sized jobs you intend to run.

For more information about sizing the Cloudera Data Engineering service, see [Additional resource requirements for Cloudera Data Engineering](#).

Worker node hardware specifications

Based on the inputs you supplied for your workloads, the spreadsheet totals the number of vcores, RAM, and storage required for the cluster in cells C20-C26. Then, based on the worker node hardware specifications you enter in cells B26-B29, divides the totals for vcores, RAM and storage by each of the worker node specifications to arrive at the required number of nodes for vcores, RAM and storage shown in cells D5-D29. The final number, in cell E27 chooses the higher value of these cells.

You may notice that the calculated values in cells D26 and D27 are different. This indicates that some nodes are oversubscribed for RAM or vcores. Adjust the hardware specifications for CPU and RAM until the two cells are closer together in value. Changing these values may also change the calculated number of worker nodes.

Label	Cell	Description
CPU recommend 40+ cores (80 vcores)	B27	Enter the number of vcores for each worker node.
RAM (GB) recommend 415 GB RAM	B28	Enter the amount of RAM, in gigabytes, for each worker node.
Disk (GB) Block (OCP CSI block, Cloudera Embedded Container Service Longhorn)	B29	Enter the number of gigabytes Block required for: - OpenShift Container Platform: CSI block - Cloudera Embedded Container Service: Cloudera Embedded Container Service Longhorn
Disk (GB) Fast Cache for Cloudera Data Warehouse (nvme,ssd)	B30	Enter the number of gigabytes of Fast Cache used in Cloudera Data Warehouse.
Cloudera Control Plane Block Overhead per host (300 to 1024)	B31	Enter the Control Plane block overhead
NFS (GB) (choose 1 from below)	B33	Enter required storage in either cell B34 or cell B35
-- Embedded nfs - (subtract from Block provider) non-prod	B34	Enter the number of gigabytes storage for an embedded NFS.
-- External nfs	B35	Enter the number of gigabytes of storage for an External NFS.

Label	Cell	Description
<p>Cloudera Embedded Container Service Master Node requires 1 for non HA - 3 for HA</p> <p>If you are using the Cloudera Embedded Container Service, you will also need to provision a host for the Cloudera Embedded Container Service Master Node (a node running the ECS Server component).</p> <p>The values described here contain Cloudera's recommendations for specifications for the Cloudera Embedded Container Service Master node.</p>	B38	<p>Minimum:</p> <p>16 vcores</p> <p>Recommended:</p> <p>32 vcores</p>
	B39	<p>Minimum:</p> <p>32 GB RAM</p> <p>Recommended:</p> <p>64 GB RAM</p>
	B40	<p>Minimum: 300 GB HDD (This amount is adequate for a proof-of-concept cluster.)</p> <p>Recommended: 1 TB HDD</p>

Red Hat OpenShift Container Platform software requirements

You must understand the various OpenShift Container Platform (OCP) requirements before you install Cloudera Data Services on premises. Cloudera Data Services on premises requires at least one OpenShift cluster for the control plane and the environments. The Cloudera Data Warehouse, Cloudera AI, and Cloudera Data Engineering Data Services run on these environments.

Review the [Software Support Matrix for OpenShift](#) on page 4.

Read the following topics to understand the various OpenShift integration requirements:

- Credentials
- Security context credentials
- Load balancing and ingress
- Certificate management and DNS
- Storage classes
- Docker registry access

Credentials

You must have a kubeconfig file that has the cluster access information and authentication information for a single user, who has the “cluster-admin” pre-provisioned ClusterRole assigned.

Cloudera recommends that you use a kubeconfig file that does not expire, to avoid access issues to the installed software.

Security context credentials

The Cloudera software must have privileged access at runtime. Cloudera recommends that you configure security context in your OpenShift cluster to ensure access to Cloudera Data Services on premises.

You must install additional scc definitions into OpenShift that Cloudera provides as part of the installation software. For more information about security context credentials in OpenShift, see [Introduction to Security Contexts and SCCs](#).

Check with your Openshift Admin to add the registry entry of the external Docker repository server to the allowed registries in the Image Controller configuration (image.config.openshift.io/cluster), to avoid policy denial during deployment.

For example:

For more information please see this [link](#) from RedHat

```
[..]
spec:
  registrySources:
    allowedRegistries:
      - ##your_external docker repository server name###
      - quay.io
      - registry.redhat.io
      - image-registry.openshift-image-registry.svc:5000
      - registry.example.com:5000
```

Load balancing and ingress

OpenShift Route must be the default ingress controller setup on the cluster.

A non-terminating external load balancer must be configured to route ingress traffic on HTTP/HTTPS to the OpenShift cluster.

When a load balancer is used in front of the OCP external API, it must allow “Websocket traffic”, in addition to https.

Certificate management and DNS

You must be aware of the reasons why an external DNS is required for Cloudera Data Services on premises installation along with the required setup in the cluster.

An external DNS must be available to route inbound traffic to the cluster through the load balancer. The external DNS should contain forward and reverse zones for both the OpenShift and the Cloudera Base on premises cluster nodes.

Ensure that the canonical load balancers required for OpenShift is routable from within the OpenShift cluster and from any other location that you want to access resources in the Cloudera Management Console; this is a standard requirement for on-premises load balancers communicating Kubernetes clusters.

There must also be a set of certificates set up for use by the OpenShift Route ingress controller as defined in the *OpenShift bare metal install guide* that the Cloudera services use.

Storage classes

You need to have persistent storage classes defined in your OpenShift cluster. Storage classes can be defined by OpenShift cluster administrators.

The exact amount of storage classified as block or filesystem storage depends on the specific workloads (Cloudera AI or Cloudera Data Warehouse) and how they are used.

See the *Red Hat OpenShift documentation* for more information about OpenShift storage classes and persistent volumes.

To use Portworx as a storage platform, you must first create a Portworx storage class on your OCP cluster and then specify it in the Storage Class field while installing Cloudera Private Cloud Data Services on the OCP cluster. For information on how to create the storage class, see [Step 4: StorageClass Setup](#) in the Portworx documentation. See [Installing in internet environment](#) for information on how to install Cloudera Private Cloud Data Services on OCP.

After you specify the storage class while installing Cloudera Private Cloud Data Services, all other data services can use it.

Volume snapshot support

Volume snapshot support for the storage class must be installed in your OpenShift cluster.

Run the following commands to determine whether or not volume support for the storage class is installed in your OpenShift cluster:

```
kubectl get sc
```


NAME	RECLAIMPOLICY	VOLUMEBINDINGMODE	PROVISIONER	ALLOWVOLUMEEXPANSION	AGE
cdw-scratch	Delete	WaitForFirstConsumer	kubernetes.io/no-provisioner	false	82d
localblock	Delete	WaitForFirstConsumer	kubernetes.io/no-provisioner	false	82d
nfs	Delete	Immediate	nfs-server-provisioner	true	82d
ocs-storagecluster-ceph-rbd (default)	Delete	Immediate	openshift-storage.rbd.csi.ceph.com	true	82d
ocs-storagecluster-ceph-rgw	Delete	Immediate	openshift-storage.ceph.rook.io/buck	false	82d
et	Delete	Immediate	openshift-storage.cephfs.csi.ceph	true	82d
ocs-storagecluster-cephfs	Delete	Immediate	openshift-storage.noobaa.io	false	82d
.com	Delete	Immediate	openshift-storage.noobaa.io/obc	false	82d

```
kubectl get volumesnapshotclasses
```

NAME	DELETIONPOLICY	AGE	DRIVER
ocs-storagecluster-cephfsplugin-snapclass	Delete	82d	openshift-storage.cephfs.csi.ceph.com
ocs-storagecluster-rbdplugin-snapclass	Delete	82d	openshift-storage.rbd.csi.ceph.com

A storage class has a volume snapshot installed if there is an entry with the value in the DRIVER column returned by the second command that matches one of the values in the PROVISIONER column returned by the first command. In the example above, the following storage classes have volume snapshot support:

- ocs-storagecluster-ceph-rbd (default)
- ocs-storagecluster-cephfs

Related Information

[CSI volume snapshots](#)

Cloudera Base on premises requirements

Your Cloudera Base on premises cluster must have the operating system, JDK, database, Cloudera components, and Cloudera Runtime version required to install Cloudera Data Services on premises.

Operating system, JDK, and database:

- See [Cloudera Private Cloud Base Requirements and Supported Versions](#)

The PostgreSQL database instance must be configured to accept inbound TLS requests to the Hive Metastore database. A TLS connection is required when initiated from Cloudera Data Warehouse in OpenShift.

Cloudera Runtime components (services):

- Hive Metastore (HMS)
- Ranger
- Atlas
- HDFS
- Ozone
- YARN
- Kafka
- Solr

Additionally, do the following:

- Set up Kerberos on these clusters using an Active Directory.

- Enable TLS on the Cloudera Manager cluster for communication with components and services.
- Ensure that the Cloudera Private Cloud Base cluster is on the same network as the OpenShift cluster.
- Configure PostgreSQL database as an external database for the Cloudera Private Cloud Base cluster components.
- Configure the Cloudera Private Cloud Base cluster hostnames to be forward and reverse resolvable in DNS from the OpenShift cluster.
- Allow websocket traffic and https traffic when you use a load balancer with the OpenShift external API.
- Ensure hive user is able to create and list an Ozone bucket. For information about creating and listing ozone bucket, see *Managing buckets*.

You can use the Cloudera Management Console to create one or more environments. These environments can be associated with any of the Data Lake from the Cloudera Private Cloud Base clusters. The Cloudera Private Cloud Base Cloudera Manager deploys the Cloudera Management Console.

Cloudera currently does not support associating an environment with many Cloudera Private Cloud Base cluster installations.

Related Information

[Managing buckets](#)

Preparing Cloudera Base on premises

Use Cloudera Manager to configure your Cloudera Base on premises in preparation for the Cloudera Data Services on premises installation.

Procedure

1. Configure the Cloudera Base on premises cluster to use TLS.
For configuration steps, see [Configuring TLS Encryption for Cloudera Manager Using Auto-TLS](#).
2. Configure Cloudera Manager with a JKS-format (not PKCS12) TLS truststore.
For configuration steps, see [Database requirements](#).
3. Configure Cloudera Manager to include a root certificate that trusts the certificate for all Cloudera Manager server hosts expected to be used with Private Cloud.
 - a. Import the necessary certificates into the truststore configured in `Configure Administration Settings Security Cloudera Manager TLS/SSL Client Trust Store File`.



Note: This requires a Cloudera Manager restart.

4. Configure Ranger and LDAP for user authentication. Ensure that you have configured Ranger user synchronization.

For configuration steps, see [Configure Ranger authentication for LDAP](#) and [Ranger usersync](#).



Note: Upgrading to Oracle JDK 1.8.351 causes a Kerberos issue when deprecated 3DES and RC4 permitted encryption types are used.

Workaround: Remove the deprecated 3DES and RC4 encryption types in the `krb5.conf` and `kdc.conf` files.

5. Enable Kerberos for all the services in the cluster.

For configuration steps, see [Enabling Kerberos for authentication](#).



Note: To avoid connection issues from pods to FreeIPA leading to data services install issues, Cloudera recommends to update the `krb5.conf` file with the following value:

```
udp_preference_limit = 1
```

6. Configure LDAP using Cloudera Manager. Only Microsoft Active Directory (AD) and OpenLDAP are currently supported.

For configuration steps, see [Configure authentication using an LDAP-compliant identity service](#).

7. Check if all the running services in the cluster are healthy. To check this using Cloudera Manager, go to Cloudera Manager Clusters [****CLUSTER NAME****] Health Issues . If there are no health issues, the No Health Issues message is displayed.
8. Verify if you have the necessary Cloudera entitlements from Cloudera to access the on premises installation. To check this using Cloudera Manager, go to Cloudera Manager Private Cloud Select Repository [****REPOSITORY URL****] . If you have the required entitlements, the You are about to install Cloudera Private Cloud version [****VERSION****] message with a list of prerequisites is displayed. An error message is displayed if you do not have the necessary entitlements.
Contact your Cloudera account team to get the necessary entitlements.
9. If you want to reuse data from your legacy CDH or HDP deployment in your on premises, ensure that you have migrated that data into your Cloudera Base on premises. You must be using Cloudera Runtime 7.1.9 for migrating your data from your CDH or HDP cluster.
For more information about data migration, see the [Data Migration Guide](#).
10. For installing Cloudera Private Cloud Base, see [Install Cloudera Private Cloud Base](#)

Cloudera Data Services on premises Hardware Requirements

You must learn about the minimum and recommended hardware and network infrastructure requirements before deploying Cloudera Data Services on premises.

Architects and infrastructure administrators must understand these requirements to install Cloudera Data Services on premises in your data center.

You must know the minimum hardware requirements prior to:

- Installing a dedicated Red Hat OpenShift Container Platform cluster required for Cloudera on premises
- Installing and configuring Cloudera Data Services on premises
- Deploying and running the Cloudera Data Warehouse and Cloudera AI Data services

Related Information

[Cloudera Data Warehouse hardware requirements](#)

Cloudera Private Cloud Data Services deployment considerations

You must understand the deployment requirements to sufficiently provision node counts, CPU, memory, and other hardware resources required to install Cloudera on premises.

The Cloudera Private Cloud Data Services are installed on the OpenShift Cluster and run on the provisioned worker nodes. Cloudera Private Cloud Data Services deployment consists of a Cloudera Management Console on premises and one or more environments that are created for deploying the Data Services. The Cloudera Management Console is a service used by Cloudera administrators to manage environments, users, and services.

The worker node hardware requirements are described below. The number of worker nodes needed depends on factors such as the number of virtual warehouses or machine learning workspaces required for your workloads. The recommendation here is a guideline for a basic Cloudera Private Cloud Data Services installation. For hardware sizing in production environments, contact Cloudera Support or your Cloudera Account Team.

Component	Minimum	Recommended
Node Count	10	20
CPU	16	32 +
Memory	128 GB	384 GB
Storage	2 TB (SATA)	4 TB (SSD/NVMe)
Network Bandwidth	1 Gbps guaranteed bandwidth (minimum) dedicated to every CDP Private Cloud Base node	10 Gbps guaranteed bandwidth (minimum) dedicated to every CDP Private Cloud Base node

**Important:**

- You must be a Cluster System Admin Host for OpenShift system administration.
- You need the bootstrap node for the initial installation. It can be converted into an OpenShift worker after initial deployment.

To know about architecture, design choices, and deployment guidelines to use Cloudera Private Cloud Data Services with Dell EMC and Intel Infrastructure, and Cisco Intelligent Data Platform, see [Dell EMC and Intel Infrastructure Guide for Cloudera Data Platform Private Cloud](#) and [Cisco Data Intelligence Platform on Cisco UCS C240 M5 with Cloudera Data Platform Private Cloud Plus Design Guide](#).

Storage requirements

Storage requirements for Data Services.

Storage Requirements

Data Services	Storage type	Storage required	Purpose
Cloudera Data Engineering	Block	500GB per Virtual Cluster in Embedded NFS	Stores all information related to virtual clusters
Cloudera Data Warehouse	Local	100 GB per executor in LITE mode and 600 GB per executor in FULL mode	Used for caching
Cloudera Control Plane	Block	118 GB total if using an External Database, 318 GB total if using the Embedded Database (SSD support only)	Storage for Cloudera infrastructure including Fluentd logging, Prometheus monitoring, and Vault. Backing storage for an embedded DB for control plane configuration purpose, if applicable
Cloudera AI	Block	600 GB per node (minimum), 4.5 TB (recommended)	Stores all Cloudera AI Workbench information
	External NFS or Block	1 TB per Node	Stores all user project files. NFS storage can either use Longhorn NFS-provisioner on Longhorn OR directly connect to your NFS.
MonitoringApp	Block	30 GB + (Env cnt x 100 GB)	Stores metrics collected by Prometheus.
Cloudera Data Catalog	Requires Control Plane database and not a dedicated storage space	100 GB extra in Cloudera Control Plane database	Stores profiling metadata.

Cloudera Data Services on premises network infrastructure considerations

Learn about the networking infrastructure consideration necessary to install Cloudera on premises. The networking considerations for Cloudera Private Cloud Data Services are similar to the networking requirements for Cloudera Manager Virtual Private Clusters (CM VPC).

In Cloudera Private Cloud Data Services, the network bandwidth requirements are less stringent than those of the Cloudera Manager Virtual Private Cluster (VPC) because of data caching technology introduced at the compute layer, which is not available in VPCs.

While the initial load of data from the remote storage would require significant bandwidth between the compute and storage clusters, subject to the quantity of data ingested; subsequently, the network bandwidth requirements are lower.

The following list of network considerations will help you plan your network infrastructure before you install Cloudera Private Cloud Data Services:

- Use 1 Gbps guaranteed bandwidth between each OpenShift worker node and each Cloudera Base on premises DataNode. Cloudera recommends 10 Gbps guaranteed bandwidth.
- Stress test the network infrastructure with all the OpenShift nodes trying to read or write from the Cloudera Private Cloud Data Services nodes at the same time.
- Use the Spine-Leaf network architecture with no more than a 4:1 oversubscription between the spine and leaf switches.
- Check the applicable [ports used by Cloudera Runtime components](#) [ports used by Cloudera Runtime components](#).

For more information about minimum network performance requirements, network sizing, and designing a network topology, see [Networking Considerations for Virtual Private Clusters](#).

Cloudera Private Cloud Data Services Software Requirements

You must learn about the software and configuration requirements before deploying Cloudera on premises. Administrators and operators must understand these requirements to install Cloudera Private Cloud Data Services in your data center.

You must understand the following software requirements before you install Cloudera on premises:

- OpenShift integration requirements
- Cloudera Private Cloud Base requirements
- External database requirements
- External vault requirements

External vault requirements

You can learn about how to configure an external vault, build on HashiCorp, for Cloudera Private Cloud Data Services. Hashicorp Vault securely stores your passwords, tokens, certificates, and encryption keys.

Cloudera supports all the external vaults that uses Hashcorp.



Note: [Vault namespaces](#) are not supported.

Vault Token Policy

Cloudera Private Cloud Data Services can be installed using an internal or external Vault. If you are installing Cloudera Private Cloud Data Services with an external Vault, a Vault token with the following permissions is required.

- Create/Update/List/Read a secret engine of type kv-2 at the applicable path.
- Create/Update/List/Read auth of type kubernetes at the applicable path.
- Create/Update/List/Read policies.
- Access to List and Read the Vault token details.

Example Vault policy:

```
# Manage auth methods broadly across Vault
path "auth/*"
{
  capabilities = ["create", "read", "update", "list"]
}
# Create, update auth methods
path "sys/auth/*"
{
  capabilities = ["create", "update", "sudo"]
}

# List auth methods
```

```

path "sys/auth"
{
  capabilities = ["read"]
}

# List existing policies
path "sys/policies/acl"
{
  capabilities = ["list"]
}

# Create and manage ACL policies via API & UI
path "sys/policies/acl/*"
{
  capabilities = ["create", "read", "update", "list"]
}

# Manage secrets engines
path "sys/mounts/*"
{
  capabilities = ["create", "read", "update", "list"]
}

# List existing secrets engines.
path "sys/mounts"
{
  capabilities = ["read"]
}

```

For more information, see [HashiCorp Vault Policy Requirements](#).

Vault Token Use

The Vault token should be created using the preceding policy. It is recommended that the Vault administrator delete this token after the installation is complete.

External Vault Installation Parameters

- Vault Address – The external Vault FQDN (Fully Qualified Domain Name) with the port number.
- Token – The Vault token described above
- CA Certificate – A valid certificate for the Vault server in PEM format.

Vault Secrets Engine, Auth, and Policies

During installation, CDP enables a kv-v2 secrets engine and kubernetes authentication at unique paths in the following format:

```
cloudera-[***CONTROL PLANE NAMESPACE***]-[***SERVER-URL***]
```

It is recommended that you do not have any kv-v2 secrets and kubernetes auth enabled at the same path in your Vault server.

CDP also creates Vault policies that provide access to control plane services to write their protected data. These two policies have the following format:

```
[***NAMESPACE***]-[***SERVER URL***]
```

```
admin-[***NAMESPACE***]-[***SERVER URL***]
```

Docker repository access

You must ensure that the cluster has access to the Docker Container Repository in order to retrieve the container images for deployment.

There are several types of Docker Repositories you can use:

Cloudera Repository

Using the Cloudera Repository requires that the cluster have internet connectivity to the Cloudera public repository. Using the Cloudera Repository is the fastest option.

The Cloudera-hosted Docker Repository option may increase the time required to deploy or start the services in the cluster. Cloudera generates Docker Repository credentials that are identical to your payroll credentials. Refer to your welcome letter for the credentials or use the credential generator on cloudera.com to generate credentials from your license key.

This option is best suited for proof-of-concept, non-production deployments or deployments that do not have security requirements that disallow internet access.

Custom Repository

A Custom Repository is a repository that you manage in your environment and can be Enterprise grade and highly available.

During installation and upgrade, a custom script is generated that you use to copy the images. Copying images can take 4 - 5 hours.

Only TLS-enabled custom Docker Registry is supported. Ensure that you use a TLS certificate to secure the custom Docker Registry. The TLS certificate can be self-signed, or signed by a private or public trusted Certificate Authority (CA).



Important: When using an Cloudera Embedded Container Service cluster, passwords must not contain the \$ character.

Related Information

[Installation on the OpenShift Container Platform \(OCP\)](#)

[Installation using the Cloudera Embedded Container Service](#)

Cloudera AI on premises software requirements

To launch the Cloudera AI service, the on premises host must meet several software requirements. Review the following Cloudera AI-specific software requirements.

Requirements



Note:

Only the usage of SSD disks is supported with Cloudera on premises on OpenShift Container Platform.

If needed, reach out to your Administrator to ensure the following requirements are met.

Compatibility requirements

- If you use OpenShift, check that the version of the installed OpenShift Container Platform is exactly as listed in [Software Support Matrix for OpenShift](#).

Required accesses

- If Cloudera AI needs access to a database on the Cloudera Base on premises cluster, then the user must be authenticated using Kerberos and must have Ranger policies set up to allow read/write operations to the default (or other specified) database.
- Ensure that Kerberos is enabled for all services in the cluster. Custom Kerberos principals are not supported currently. For more information, see [Authenticating Hue users with Kerberos](#).
- Cloudera AI assumes it has cluster-admin privileges on the cluster.

- If external NFS is used, the NFS directory and assumed permissions must be those of the `cdsw` user. For details see [Using an External NFS Server](#).
- If you intend to access a workbench over https, see [Deploying a Cloudera AI Workbench with support for TLS](#).

Requirements for functioning

- On OpenShift Container Platform, CephFS is used as the underlying storage provisioner for any new internal workbench on Cloudera on premises 1.5.x. A storage class named `ocs-storagecluster-cephfs` with csi driver set to `openshift-storage.cephfs.csi.ceph.com` must exist in the cluster for new internal workbenches to get provisioned.
- A block storage class must be marked as default in the cluster. This may be `rook-ceph-block`, `Portworx`, or another storage system. Confirm the storage class by listing the storage classes (run `oc get sc`) in the cluster, and check that one of them is marked default.

DNS-related requirements

- Forward and reverse DNS must be working.
- DNS lookups to sub-domains and the Cloudera AI Workbench itself shall work properly.
- In DNS, wildcard subdomains (such as `*.cml.yourcompany.com`) must be set to resolve to the master domain (such as `cml.yourcompany.com`). The TLS certificate (if TLS is used) must also include the wildcard subdomains. When a session or job is started, an engine is created for it, and the engine is assigned to a random, unique subdomain.

Configuration requirements

- The external load balancer server timeout needs to be set to 5 min. Without this, creating a project in a Cloudera AI Workbench with `git clone` or with the API may result in API timeout errors. For workarounds, see *Known Issue DSE-11837*.
- For non-TLS Cloudera AI Workbench, websockets need to be allowed for port 80 on the external load balancer.
- Only a TLS-enabled custom Docker Registry is supported. Ensure that you use a TLS certificate to secure the custom Docker Registry. The TLS certificate can be self-signed, or signed by a private or public trusted Certificate Authority (CA).
- On OpenShift, due to a [Red Hat issue](#) with OpenShift Container Platform 4.3.x, the image registry cluster operator configuration must be set to Managed.
- Check if storage is set up in the cluster image registry operator. See *Known Issues DSE-12778* for further information.

For more information on requirements, see [Cloudera Base on premises Installation Guide](#).

Installation on the OpenShift Container Platform (OCP)

Cloudera Private Cloud Data Services pre-installation checklist

Before starting the installation, you must ensure that you have configured all the required hardware and software. There are several pre-installation tasks that you must complete using Cloudera Manager and OpenShift Container Platform.

Use the following checklists to ensure that you have completed all the pre-installation tasks:

- Cloudera Base on premises
- OpenShift Container Platform
- Cloudera Data Warehouse
- Cloudera AI
- Cloudera Data Engineering

Cloudera Base on premises checklist

Use this checklist to ensure that your Cloudera Base on premises is configured and ready for installing Cloudera Data Services on premises.



Note: The Cloudera Manager mentioned in this checklist is the Cloudera Base on premises Cloudera Manager using which you want to install Cloudera Data Services on premises.

Table 7: Cloudera Base on premises checklist to install Cloudera Data Services on premises

Item	Summary	Documentation	Notes
Runtime components	Ensure that you have Ranger, Atlas, Hive, HDFS, and Ozone installed in your Cloudera Base on premises.	<ul style="list-style-type: none"> Software Support Matrix for OpenShift on page 4 Cloudera Private Cloud Base requirements 	If you do not install these components, you see an error when creating an environment in Cloudera Data Services on premises.
Network requirement	Ensure that all the network routing hops in production. Cloudera recommends not to use more than 4:1 oversubscription between the spine-leaf switches.		
Cloudera Manager database requirement	Refer to the the Cloudera Base on premises database requirements.	<ul style="list-style-type: none"> Database Requirements Cloudera Support Matrix 	N/A
Cloudera Manager TLS configuration	Ensure that Cloudera Manager in the Cloudera Base on premises cluster is configured to use TLS.	Configuring TLS Encryption for Cloudera Manager Using Auto-TLS	You can also manually configure TLS to complete this task. See Manually Configuring TLS Encryption for Cloudera Manager
Cloudera Manager JKS-format TLS truststore	Ensure that the Cloudera Manager is configured with a JKS-format (not PKCS12) TLS truststore.	Obtain and Deploy Keys and Certificates for TLS/SSL	N/A
Cloudera Manager truststore and root certificate	Ensure that the Cloudera Manager truststore contains a root certificate that trusts the certificate for all Cloudera Manager server hosts used with CDP Private Cloud Data Services.	How to Add Root and Intermediate CAs to Truststore for TLS/SSL	Import the necessary certificates into the truststore configured in <code>Configure Administration > Settings > Security > Cloudera Manager TLS/SSL Client Trust Store File</code> .
LDAP configuration	Ensure that you configure LDAP using Cloudera Manager.	N/A	Only Microsoft Active Directory (AD) and OpenLDAP are currently supported.
Apache Ranger configuration for LDAP	Ensure that the Cloudera Base on premises cluster is configured with Apache Ranger and LDAP for user authentication.	Configure Ranger authentication for LDAP	N/A
Apache Ranger usersync configuration	Ensure that you have configured Apache Ranger and Apache Ranger usersync.	Ranger usersync	Apache Ranger user synchronization is used to get users and groups from the corporate ActiveDirectory to use in policy definitions.
Kerberos configuration	Ensure that Kerberos is enabled for all services in the cluster.	Enabling Kerberos for authentication	Custom Kerberos principals are not currently supported.
Internet access or air gap installation	Ensure that Cloudera Base on premises and the Cloudera Embedded Container Service hosts have access to the Internet. If you do not have access to the Internet, you must do an air gap installation.	Install Cloudera Private Cloud Data Services in air gap environment	You need access to the Docker registries and the Cloudera repositories during the installation process.

Item	Summary	Documentation	Notes
Services health check	Ensure that all services running in the cluster are healthy.	Cloudera Manager Health Tests	N/A
Cloudera on premises entitlement	Ensure that you have the necessary Cloudera entitlement to access the on premises installation.	N/A	
Reuse data from CDH or HDP (Optional)	To reuse data from your legacy CDH or HDP deployment in your on premises, ensure that you have migrated that data into your Cloudera Base on premises. You must be using Cloudera Runtime 7.1.7 for migrating data from your CDH or HDP cluster.	Data Migration Guide	N/A
(Recommended) Configure HDFS properties to optimize logging	Cloudera uses “out_webhdfs” Fluentd output plugin to write records into HDFS, in the form of log files, which are then used by different data services to generate diagnostic bundles. To optimize the size of logs that are captured and stored on HDFS, you must update a few HDFS configurations in the hdfs-site.xml file using Cloudera Manager.	Configuring HDFS properties to optimize logging	N/A

OpenShift Container Platform (OCP) checklist

Use this checklist to ensure that your OpenShift Container Platform (OCP) Cloudera Embedded Container Service is configured and ready for installing Cloudera Data Services on premises.

Table 8: OpenShift Container Platform (OCP) checklist to install Cloudera Data Services on premises

Item	Summary	Documentation	Notes
Network requirements			Cloudera Data Services on premises requires a single ethernet interface. Multihoming is currently not supported.
OpenShift Platform version	Check the the installed OpenShift Container Platform version.	<ul style="list-style-type: none"> OpenShift software requirements Software Support Matrix for OpenShift on page 4 	N/A
DNS configuration	Ensure that you have set up the DNS and Reverse DNS between OpenShift Container Platform (OCP) Cloudera Embedded Container Service hosts and Cloudera Base on premises. This is required for obtaining Kerberos ticket-granting tickets.	Certificate management and DNS	A wildcard DNS entry is required for resolving the ingress route for applications. The ingress route is usually behind a load balancer.
Check if you can access the OpenShift hostnames outside the cluster	Ensure that OpenShift Container Platform (OCP) Cloudera Embedded Container Service application hostnames can be accessed from outside the cluster.	A minimal Ingress resource example	Perform a DNS query on the route generated, to check if you can access the hostnames outside the cluster.

Item	Summary	Documentation	Notes
Storage classes configuration	Ensure that you have configured separate storage classes for the control plane and the compute clusters. Both the storage classes must be provisioned from Persistent Volumes.	Storage classes	N/A
OpenShift Container Platform (OCP)Cloudera Embedded Container Service Kubeconfig file	Ensure that you have access to the OpenShift Container Platform (OCP)Cloudera Embedded Container Service Kubeconfig file, cluster administrator privileges, and sufficient expiry time for you to complete your installation.	Download Kubernetes Configuration	The kubeconfig should have valid certificates in it for the cluster. If the kubeconfig does not have certificates, then the you must upload custom certifications during CDP installation.
Allow WebSocket traffic in addition to HTTPS	When a load balancer is used for your OpenShift Container Platform external API, you must allow WebSocket traffic in addition to HTTPS. The load balancer must allow WebSockets on port 80. Also, ensure that you set the load balancer server timeout to 5 minutes.	N/A	N/A
Clock time from NTP source	Ensure that the NTP clock in Cloudera Base on premises is in sync with the time configured in the OpenShift Container Platform (OCP)Cloudera Embedded Container Service cluster. This is an important step if your setup does not have access to the Internet.	Enable an NTP Service	Install Cloudera on Premises Data Services in air gap environment
Route admission policy	Ensure OpenShift Container Platform (OCP) cluster is configured to run applications in multiple namespaces with the same domain name.	Configuring the route admission policy	N/A

Cloudera Data Warehouse checklist

Use this checklist to ensure that you have all the requirements for Cloudera Data Warehouse in Cloudera Private Cloud Data Services.

Table 9: Cloudera Data Warehouse installation checklist for Cloudera Private Cloud Data Services

Item	Summary	Documentation	Notes
OpenShift requirements	Ensure that you have the required memory, storage, and hardware requirements for getting started with the Cloudera Data Warehouse service on Red Hat OpenShift.	OpenShift requirements	N/A
Security requirements	Ensure that you have all the security requirements needed to install and run the Cloudera Data Warehouse Private Cloud service on Red Hat OpenShift clusters.	Security requirements for Cloudera Data Warehouse Private Cloud	N/A

Item	Summary	Documentation	Notes
Database requirements	Ensure that you fulfill the requirements for the database that is used for the Hive Metastore on the base cluster (Cloudera Manager side) for Cloudera Data Warehouse (CDW) Private Cloud.	Database requirements	N/A

Cloudera AI checklist

Use this checklist to ensure that you have all the requirements for Cloudera AI in Cloudera Data Services on premises.

Table 10: Cloudera AI installation checklist for Cloudera Data Services on premises

Item	Summary	Documentation	Notes
Network File System (NFS) support	Ensure that you have either configured an external or an embedded NFS.	Cloudera AI requirements	N/A
NFS Provisioner	When OCP 4.8 is in use, NFS version 4.0 is required.		
Ranger policy configuration	Ensure that the user who is authenticated using Kerberos has Ranger policies that are configured to allow read/write to the default (or other specified) databases.	Cloudera AI requirements	N/A

Cloudera Data Engineering checklist

Use this checklist to ensure that you have all the requirements for Cloudera Data Engineering in Cloudera Private Cloud Data Services.

Table 11: Cloudera Data Engineering installation checklist for Cloudera Private Cloud Data Services

Item	Summary	Documentation	Notes
Ozone in Base cluster	For workloads to store logs, Ozone in Base cluster is a must. Ensure Ozone is installed on CDP Private Cloud Base cluster.	CDP Private Cloud Base Installation	N/A
Ranger policy configuration	Ensure that the user who is authenticated using Kerberos needs to have Ranger policies that are configured to allow read/write to the default (or other specified) databases.	Kerberos authentication for Apache Ranger	N/A

Installing in internet environment

Follow the steps in this topic to install Cloudera on premises.

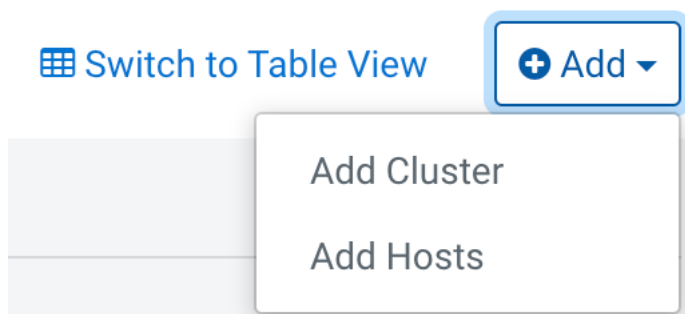
Before you begin

- Ensure that your Kubernetes kubeconfig has permissions to create Kubernetes namespaces.
- You require persistent storage classes defined in your OpenShift cluster. Storage classes can be defined by OpenShift cluster administrators.

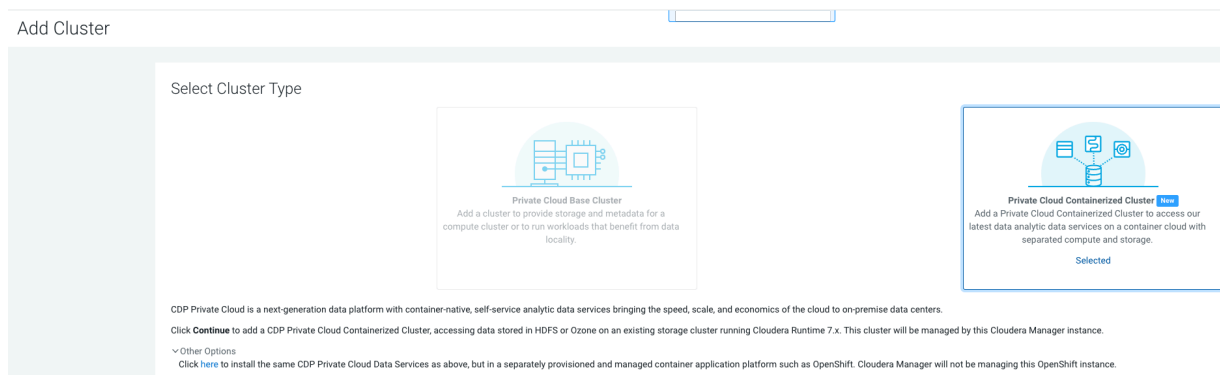
- Only TLS-enabled custom Docker Registry is supported. Ensure that you use a TLS certificate to secure the custom Docker Registry. The TLS certificate can be self-signed, or signed by a private or public trusted Certificate Authority (CA).
- Only TLS 1.2 is supported for authentication with Active Directory/LDAP. You require TLS 1.2 to authenticate the Cloudera Control Plane with your LDAP directory service like Active Directory.
- OCP network configurations that restrict pod communication are not supported. For example, [multi-tenancy isolation with network policy](#) is not supported.

Procedure

1. In Cloudera Manager, on the top right corner, click Add > Add Cluster. The Select Cluster Type page appears.



2. On the Select Cluster Type page, select the cluster type as Private Cloud Containerized Cluster. Under Other Options, click here to install CDP Private Cloud Data Services, then click Continue.



- On the Getting Started page of the installation wizard, select Internet as the Install Method. To use a custom repository link provided to you by Cloudera, click Custom Repository. Click Next.

Install Private Cloud Data Services on Existing Container Cloud



Note:

- Verify the prerequisites for the version that you're installing and then click Next.
- You can also apply a template that you may have downloaded during a previous installation. The template contains all the installation configurations. Click Apply Previously Download Template to browse and upload a template stored on your machine.

- On the Configure Docker Repository page, you must select one of the Docker repository options. If you select Use a custom Docker Repository option, enter your local Docker Repository in the Custom Docker Repository field in the following format: `[*DOCKER REGISTRY*]/[*REPOSITORY NAME*]`. Alternatively, you can use Cloudera's default Docker Repository if you are setting up CDP Private Cloud in non-production environments.



Note:

- Use a custom Docker Repository - Copies all images (Internet or Air Gapped) to the embedded registry
- Use Cloudera's default Docker Repository - Copies images from Internet to the embedded registry. This uses the default repository that is in manifest.json. Use Cloudera's default Docker Repository option can be selected only if you have selected Internet as the install method.

You can follow these steps to prepare your Docker Repository from a machine that is running Docker locally and has access to all the Docker images either directly from Cloudera or a local HTTP mirror in your network.

- Click Generate the copy-docker script on the wizard or download the script file.
- Log in to your custom Docker Registry and run the script using the following commands.

```
docker login <your_custom_registry> -u <user_with_write_access>
```

```
bash copy-docker.txt
```



Note: This command downloads 100+ Docker images and it will take some time to download.

- c) Enter your Docker user name and password.
- d) Click Choose File to upload your Docker certificate.
- e) Click Next.

Install Private Cloud Data Services on Existing Container Cloud

Configure Docker Repository

Cloudera uses a Docker Repository to deliver CDP Private Cloud Data Services. [Learn more](#) about how to set up custom Docker Repository for CDP Private Cloud Data Services.

☐ Use a custom Docker Repository (Recommended for production)
☒ Use Cloudera's default Docker Repository

Install Private Cloud Data Services on Existing Container Cloud

Configure Docker Repository

Cloudera uses a Docker Repository to deliver CDP Private Cloud Data Services. [Learn more](#) about how to set up custom Docker Repository for CDP Private Cloud Data Services.

☒ Use a custom Docker Repository (Recommended for production)
☐ Use Cloudera's default Docker Repository

Custom Docker Repository [?](#)

Prepare your Docker Repository from a machine that is running Docker locally and has access to all the Docker images either directly from Cloudera or from a local http mirror in your network.

1. [Generate the copy-docker script](#)
2. Optionally, review the script. The file contains usage information and lists the Docker images that it will download and push.
3. Login to your custom Docker Registry and run the script with the following commands (Note: this downloads 100+ Docker images and it will take a while):

```
docker login <your_custom_registry> -u <user_with_write_access>
bash copy-docker.txt
```

☐ I confirm that I have downloaded all the Docker images to my custom Docker Repository.

Docker Username [?](#)

Docker Password [?](#)

Docker Certificate [?](#)

[Choose File](#)

5. On the Configure Databases page, click Next.

Install Private Cloud Data Services on Existing Container Cloud

Configure Databases

CDP Private Cloud Control Plane uses an embedded Database to store configuration and other metadata information for the cluster being managed.

Embedded Database Disk Space (GiB) ⓘ

200

Cancel ← Back Next →

6. On the Configure Kubernetes page, enter your Kubernetes, Docker, database, and vault information.
- Upload a Kubernetes configuration (kubeconfig) file from your existing environment. You can obtain this file from your OpenShift Container Platform administrator. Ensure that this kubeconfig has permissions to create Kubernetes namespaces.
 - In the Kubernetes Namespace field, enter the Kubernetes namespace that you want to use with this CDP Private Cloud deployment. Kubernetes virtual clusters are called namespaces. For more information, see [Kubernetes namespaces](#)
 - Enter your Vault information and upload a CA certificate. Cloudera recommends that you use an external Vault for production environments. Enter the Vault address and token, and upload a CA certificate.
 - Enter a Storage Class to be configured on the Kubernetes cluster. CDP Private Cloud uses Persistent Volumes to provision storage. You can leave this field empty if you have a default storage class configured on your Openshift cluster. Click Continue.
 - Under the Additional Certificates section, click Choose File and add the SSL certificate for your HMS database (MariaDB, MySQL, PostgreSQL, or Oracle). For Cloudera Data Warehouse, it is mandatory to

secure the network connection between the default Database Catalog Hive MetaStore (HMS) in CDW and the relational database hosting the base cluster's HMS.

Install Private Cloud Data Services on Existing Container Cloud

Configure Kubernetes

Kubernetes Environment

CDP Private Cloud uses the Kubernetes platform. Please provide a Kubernetes configuration file (also known as a kubeconfig file) from your existing Kubernetes environment.

Kubernetes Configuration

[Choose File](#)

Kubernetes Namespace

cdp

After the installation, CDP management console can be accessed from <https://console-cdp.apps.shared-os-qe-04.kcloud.cloudera.com>

Additional Certificates

Optional additional Certificates to be used during installation and during the runtime of CDP. Examples: Custom Ingress, Custom Kubernetes API,...

Miscellaneous Certificates

[Choose File](#)

Configure Vault

Vault is a secret management tool. You can connect to an existing customer Vault or create a new Vault with this installer. [Learn more](#) on Vault on CDP Private Cloud Data Services.

☒ Embedded vault

☐ External Vault (Recommended for production)

Embedded Vault Disk Space (GiB)

2

Storage

CDP Private Cloud Data Services uses Persistent Volumes to provision storage. This wizard requires a Storage Class to be configured on the Kubernetes cluster prior to launching installation.

Storage Class

[Tip: Before clicking Next, download the current installation configurations as a file template and apply it if you need to reinstall using the same settings.](#)

[Download as Template](#)

- If you want to use this installation configuration again to install CDP Private Cloud, you have the option to download this information as a template.

Tip: Before clicking Next, download the current installation configurations as a file template and apply it if you need to reinstall using the same settings.

[Download as Template](#)

The template file is a text file that contains the database and vault information that you entered for this installation. This template is useful if you will be installing Private Cloud again with the same databases, as the template will populate the fields here automatically. Note that the user password information is not saved in the template.

8. The Installation Progress page appears. When the installation is complete, click Next.

Install Private Cloud Data Services on Existing Container Cloud

Installation Progress

Installing the CDP Private Cloud Management Console to the namespace cdp.

- Downloading the CDP Private Cloud install utility.
- Extracting the CDP Private Cloud install utility.
- Configuring and installing the helm charts.
- Waiting for all the pods to start or timeout.

Show Logs

Service	Progress	Status	Age
cdp-release-dps-gateway-1.0-cf7db56b-sm48	3/3	Running	0
cdp-release-dwx-server-844cfb7899-g9jjn	2/2	Running	0
cdp-release-dwx-ui-698f4f85c6-4bpk5	2/2	Running	0
cdp-release-dwx-ui-698f4f85c6-bgrmf	2/2	Running	0
cdp-release-grafana-7c65c4566d-wx5tn	3/3	Running	0
cdp-release-logger-alert-receiver-86d67cdfb-4r2mh	2/2	Running	0
cdp-release-metrics-server-exporter-6fb489845b-ch5cf	2/2	Running	0
cdp-release-monitoring-app-67c7bf8fb4-cm82s	2/2	Running	0
cdp-release-monitoring-metricproxy-7948d869df-c672g	2/2	Running	0
cdp-release-monitoring-metricproxy-7948d869df-pjgsx	2/2	Running	0
cdp-release-monitoring-pvcservice-75d986856d-skswq	2/2	Running	0
cdp-release-prometheus-alertmanager-0	3/3	Running	0
cdp-release-prometheus-alertmanager-1	3/3	Running	0
cdp-release-prometheus-kube-state-metrics-658fbfc4f8-tb94h	2/2	Running	0
cdp-release-prometheus-server-7dd745d8f7-zpxq6	3/3	Running	0
cdp-release-resource-pool-manager-6967756fb4-kzcjs	2/2	Running	0
cdp-release-thunderhead-cdp-private-authentication-consolewcm2w	2/2	Running	0
cdp-release-thunderhead-cdp-private-commonconsole-65584957n8w9q	2/2	Running	0
cdp-release-thunderhead-cdp-private-environments-console-6kfczm	2/2	Running	0
cdp-release-thunderhead-compute-api-d5556b87d-82q14	2/2	Running	0
cdp-release-thunderhead-consoleauthenticationcdp-6d74fd8b4hhjfj	2/2	Running	0
cdp-release-thunderhead-de-api-57d466787f-59tc7	2/2	Running	0
cdp-release-thunderhead-environment-688965d7c8-gch8d	2/2	Running	1
cdp-release-thunderhead-environments2-api-6b9fbc676-42jz7	2/2	Running	0
cdp-release-thunderhead-iam-api-5475d7779c-qgqwr	2/2	Running	0
cdp-release-thunderhead-iam-console-7b95d69df7-tpws4	2/2	Running	0
cdp-release-thunderhead-kerberosgmt-api-5544d69bbd-z7nnz	2/2	Running	0
cdp-release-thunderhead-ml-api-8c684979f-bd8sc	2/2	Running	0
cdp-release-thunderhead-resource-management-console-6f78c5z8brs	2/2	Running	0
cdp-release-thunderhead-sdx2-api-54cdc9ccfb-qnlnd	2/2	Running	0
cdp-release-thunderhead-servicediscoverysimple-66d98ff555-khfkq	2/2	Running	0
cdp-release-thunderhead-usermanagement-private-788d988b96-msh7f	2/2	Running	0
dp-mlx-control-plane-app-7569dbd5bb-9z9vk	2/2	Running	0
dp-mlx-control-plane-app-health-poller-6c776fd948-rnn8w	2/2	Running	0
fluentd-aggregator-0	2/2	Running	0
snmp-notifier-855d984d7-k2kq6	2/2	Running	0

2022/04/28 16:15:51 To launch CDP Private Cloud, open <https://console-cdp.apps.shared-os-qe-04.kccloud.cloudera.com/environments/welcome.html>

2022/04/28 16:15:51 CDP Private Cloud Installation to cdp completed.

9. The summary message with a link to Launch CDP appears.

Install Private Cloud Data Services on Existing Container Cloud

Summary

Congratulations, you have successfully installed CDP Private Cloud Management Console.

[Launch CDP Private Cloud](#)

Click **Finish** to exit the wizard. You can also access links to CDP Private Cloud Data Services from Home -> Data Services.

The default login is admin/admin.

What to do next

- Click Launch CDP to launch your CDP Private Cloud.
- Log in using the default user name and password admin.
- In the Welcome to CDP Private Cloud page, click Change Password to change the Local Administrator Account password.
- Set up external authentication using the URL of the LDAP server and a CA certificate of your secure LDAP. Follow the instructions on the Welcome to CDP Private Cloud page to complete this step.

- Click Test Connection to ensure that you are able to connect to the configured LDAP server.
- [Register a Cloudera Private Cloud environment](#)
- [Create your first Virtual Warehouse in the Cloudera Data Warehouse Data Services](#)
- [Provision an ML Workspace in the Cloudera AI Data Services](#)

Installing in air gap environment

You can launch the Cloudera Private Cloud Data Services installation wizard from Cloudera Manager and follow the steps to install Cloudera Private Cloud Data Services in an air gap environment where your Cloudera Manager instance or your Kubernetes cluster does not have access to the Internet.

Before you begin

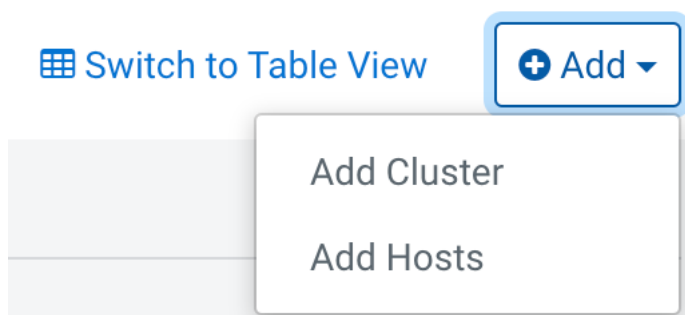
- Ensure that your Kubernetes kubeconfig has permissions to create Kubernetes namespaces.
- You require persistent storage classes defined in your OpenShift cluster. Storage classes can be defined by OpenShift cluster administrators.
- Only TLS-enabled custom Docker Registry is supported. Ensure that you use a TLS certificate to secure the custom Docker Registry. The TLS certificate can be self-signed, or signed by a private or public trusted Certificate Authority (CA).
- Only TLS 1.2 is supported for authentication with Active Directory/LDAP. You require TLS 1.2 to authenticate the Cloudera Control Plane with your LDAP directory service like Active Directory.
- OCP network configurations that restrict pod communication are not supported. For example, [multi-tenancy isolation with network policy](#) is not supported.

About this task

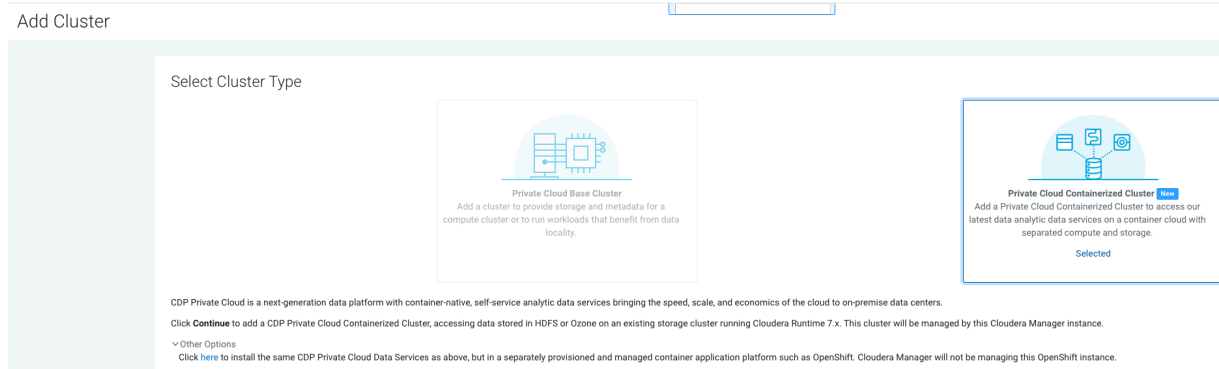
If this Cloudera Manager instance or your Kubernetes cluster does not have connectivity to <https://archive.cloudera.com/p/cdp-pvc-ds/>, you must mirror the Cloudera archive URL using a local HTTP server.

Procedure

1. In Cloudera Manager, on the top right corner, click Add > Add Cluster. The Select Cluster Type page appears.



2. On the Select Cluster Type page, select the cluster type as Private Cloud Containerized Cluster. Under Other Options, click here to install CDP Private Cloud Data Services. Click Continue.



3. On the Getting Started page of the installation wizard, select Air Gapped as the Install Method. When you select the Air Gapped install option, extra steps are displayed. Follow these steps to download the Cloudera Data Services deliverables .

- a. Offline download everything under the release you have been asked to download with the below command:
`LINK=https://<username>:<password>@archive.cloudera.com/p/cdp-pvc-ds/ && echo "$LINK$(curl -I "$LINK/latest/" 2>/dev/null | grep location | awk '{print $2}' | awk -F/" '{print $4}"/" |xargs wget -l 0 --recursive --no-parent -e robots=off -nH --cut-dirs=2 --reject="index.html*" -t 10`

In the above command, replace username, password as provided by Cloudera.



Note: If you want to download a specific version, locate the release name and version from <https://archive.cloudera.com/p/cdp-pvc-ds/> and replace '\$LINK/latest' to '\$LINK/<release name and version>' in the above command. For example, to download 1.5.4-h4, replace '\$LINK/latest' with '\$LINK/1.5.4-h4' in the above command.



Note: The deliverables of Data Services are huge (over a 100 GB), hence ensure that you have adequate storage before downloading. Also, in order to save time and storage after all the downloads, you can delete from the downloaded folder the following:

Considering, 1.5.4-h4 as an example:

- Under 1.5.4-h4/parcels keep only the files related to your OS (either RHEL8 or RHEL9)
- Under 1.5.4-h4/images you will get all the images for all matching base releases. For example, if you are using CDP base 7.1.9, then you can safely remove all the files that contain the string *7.1.7* or *7.1.8* to reduce the folder size. Since these images are among the largest in the folder, it should reduce the size of the overall release dramatically, and eventually you should have around 100 GB.

- b. Once you have all the needed files, create on your local http server a new folder (parallel to the folders of the Cloudera Manager and the CDH releases) as follows (example given for the 1.5.4-h4 release):

```
sudo mkdir -p
/var/www/html/cloudera-repos/cdp-pvc-ds/1.5.4-h4
```

- c. In case needed, pass the files to the customer for approval, and once they are approved, ask the customer to place them in the target folder created above (or into the customer organizational repository in case such is used). Once the files were moved into the folder, ensure that they have the same permissions as the cm7 files by running (example given for the 1.5.4-h4 release):

```
sudo chmod -R 755
```

```
/var/www/html/cloudera-repos/cdp-pvc-ds/1.5.4-h4
```

- d. Visit the Repository URL: <http://cloudera-repos/> in your browser and verify the files you downloaded are present. If you do not see anything, your web server may have been configured to not show indexes.
- e. Click the Select Repository drop-down and select http://your_local_repo/cdp-pvc-ds/1.5.4-h4 (example given for the 1.5.4-h4 release)
- f. Click Next.

Install Private Cloud Data Services on Existing Container Cloud

Getting Started

This wizard provides step-by-step guidance for installing CDP Private Cloud Data Services onto an **dedicated on-premises** OpenShift cluster.

Installation of the CDP Private Cloud Data Services components (for trial purposes or for production use) requires an appropriate license key.

Visit the [CDP Private Cloud Installation](#) documentation for more information.

Install Method

☐ Internet ☒ Air Gapped

Installing via a local mirror with an http server. You will need to setup a full mirror of Cloudera's repositories via a temporary http server within the perimeter network of all hosts.

- Download everything under <https://archive.cloudera.com/p/cdp-pvc-ds/latest>

```
$ wget -l 0 --recursive --no-parent -e robots=off -nH --cut-dirs=2 --reject="index.html*" -t 10 https://<username>:<password>@archive.cloudera.com/p/cdp-pvc-ds/latest
```

- Modify the file manifest.json inside the downloaded directory, change "http_url": "..." to "http_url": "http://your_local_repo/cdp-pvc-ds/latest"
- Mirror the downloaded directory to your local http server, e.g. http://your_local_repo/cdp-pvc-ds/latest
- Add http://your_local_repo/cdp-pvc-ds/latest to your [Custom Repository](#) settings and select it from the dropdown below.
- Select Repository

[https://cloudera-build-us-west-1.vpc.cloudera.com/s3/build/</>/cdp-pvc/1.x/](#)

You are about to install CDP Private Cloud Data Services version 1.4.0-

[Apply Previously Downloaded Template](#)

Before you start, verify the following prerequisites:

- A Cloudera Runtime 7.1.6+ cluster with a set of required services (Hive, Ranger, Atlas, HDFS, Ozone).
- Kerberos has been setup on the cluster using an MIT KDC or Active Directory.
- TLS has been enabled on the cluster.
- A functioning OpenShift 4.5 or 4.6 Kubernetes infrastructure.
- A kubeconfig, which has cluster access information and authentication information for a single user, who has the 'cluster-admin' pre-provisioned ClusterRole assigned.
- Optionally, a local docker registry connected to the Kubernetes.

What's new in version 1.4.0-

- Data Warehouse
- Machine Learning
- Data Engineering



Note: You can also apply a template that you may have downloaded during a previous installation. The template contains all the installation configurations. Click [Apply Previously Download Template](#) to browse and upload a template stored on your machine.

4. On the Configure Docker Repository page, you must select one of the Docker repository options. If you select Use a custom Docker Repository option, then enter your local Docker Repository in the Custom Docker Repository field in the following format: `[*DOCKER REGISTRY*]/[*REPOSITORY NAME*]`. Alternatively, you can use Cloudera's default Docker Repository if you are setting up CDP Private Cloud in non-production environments.



Note:

- Use a custom Docker Repository - Copies all images (Internet or Air Gapped) to the embedded registry
- Use Cloudera's default Docker Repository - Copies images from Internet to the embedded registry. This uses the default repository that is in manifest.json. Use Cloudera's default Docker Repository option can be selected only if you have selected Internet as the install method.

You can follow these steps to prepare your Docker Repository from a machine that is running Docker locally and has access to all the Docker images either directly from Cloudera or a local HTTP mirror in your network.

- a) Click Generate the copy-docker script on the wizard or download the script file.
- b) Log in to your custom Docker Registry and run the script using the following commands.

```
docker login <your_custom_registry> -u <user_with_write_access>
```

```
bash copy-docker.txt
```



Note: This command downloads 100+ Docker images and it will take some time to download.

- c) Enter your Docker user name and password.
- d) Click Choose File to upload your Docker certificate.
- e) Click Continue.

Install Private Cloud Data Services on Existing Container Cloud

If you select Use an embedded Docker Repository option, then you can download and deploy the Data Services that you need for your cluster.

- a. By selecting Default, all the data services will be downloaded and deployed.
- b. By selecting Select the optional images:
 - If you switch off the Machine Learning toggle key, then the Machine Learning runtimes will not be installed.
 - If you switch on the Machine Learning toggle key, then the Machine Learning runtimes will be installed.

Install Private Cloud Data Services on Existing Container Cloud

Install Private Cloud Data Services on Existing Container Cloud

CDP Deployment from 2022-Mar-14 07:47

Getting Started

Configure Docker Repository

Configure Databases

Configure Kubernetes

Installation Progress

Summary

Configure Docker Repository

Cloudera uses a Docker Repository to deliver CDP Private Cloud Data Services. [Learn more](#) about how to set up custom Docker Repository for CDP Private Cloud Data Services.

☒ Use a custom Docker Repository (Recommended for production)
☐ Use Cloudera's default Docker Repository

This release comes with 232 container images that need to be deployed to the Docker repository. Some images are optional and can be skipped by toggling them from the list below. Other images are always installed.

☐ Default ☒ Select the Optional Images

☐ Cloudera Machine Learning
 Docker images required to create a Cloudera Machine Learning workspace. Without these images, it will not be possible to use Cloudera Machine Learning.

You will need to deploy 203 container images, approximately 88.7 GiB, to the specified Docker repository. Run the generated script available from the link below.

Custom Docker Repository [🔗](#)

Prepare your Docker Repository from a machine that is running Docker locally and has access to all the Docker images either directly from Cloudera or from a local http mirror in your network.

- Generate the copy-docker script
- Optionally, review the script. The file contains usage information and lists the Docker images that it will download and push.
- Login to your custom Docker Registry and run the script with the following commands (Note: this downloads 100+ Docker images and it will take a while):

```
docker login <your_custom_registry> -u <user_with_write_access>
bash copy-docker.txt
```

☐ I confirm that I have downloaded all the Docker images to my custom Docker Repository.

Docker Username [🔗](#)

Docker Password [🔗](#)

Docker Certificate [🔗](#)
[Choose File](#)

Install Private Cloud Data Services on Existing Container Cloud

CDP Deployment from 2022-Mar-14 07:47

Getting Started

Configure Docker Repository

Configure Databases

Configure Kubernetes

Installation Progress

Summary

Configure Docker Repository

Cloudera uses a Docker Repository to deliver CDP Private Cloud Data Services. [Learn more](#) about how to set up custom Docker Repository for CDP Private Cloud Data Services.

☒ Use a custom Docker Repository (Recommended for production)
☐ Use Cloudera's default Docker Repository

This release comes with 232 container images that need to be deployed to the Docker repository. Some images are optional and can be skipped by toggling them from the list below. Other images are always installed.

☐ Default ☒ Select the Optional Images

☒ Cloudera Machine Learning
 Docker images required to create a Cloudera Machine Learning workspace. Without these images, it will not be possible to use Cloudera Machine Learning.

You will need to deploy 204 container images, approximately 99.7 GiB, to the specified Docker repository. Run the generated script available from the link below.

Custom Docker Repository [🔗](#)

Prepare your Docker Repository from a machine that is running Docker locally and has access to all the Docker images either directly from Cloudera or from a local http mirror in your network.

- Generate the copy-docker script
- Optionally, review the script. The file contains usage information and lists the Docker images that it will download and push.
- Login to your custom Docker Registry and run the script with the following commands (Note: this downloads 100+ Docker images and it will take a while):

```
docker login <your_custom_registry> -u <user_with_write_access>
bash copy-docker.txt
```

☐ I confirm that I have downloaded all the Docker images to my custom Docker Repository.

Docker Username [🔗](#)

Docker Password [🔗](#)

Docker Certificate [🔗](#)
[Choose File](#)

Click Continue.

5. On the Configure Databases page, click Next.

Install Private Cloud Data Services on Existing Container Cloud

Configure Databases

CDP Private Cloud Control Plane uses an embedded Database to store configuration and other metadata information for the cluster being managed.

Embedded Database Disk Space (GiB) ⓘ

200

Cancel

← Back

Next →

6. On the Configure Kubernetes page, enter your Kubernetes, Docker, database, and vault information.
 - a) Upload a Kubernetes configuration (kubeconfig) file from your existing environment. You can obtain this file from your OpenShift Container Platform administrator. Ensure that this kubeconfig has permissions to create Kubernetes namespaces.
 - b) In the Kubernetes Namespace field, enter the Kubernetes namespace that you want to use with this CDP Private Cloud deployment. Kubernetes virtual clusters are called namespaces. For more information, see [Kubernetes namespaces](#)
 - c) Enter your Vault information and upload a CA certificate. Cloudera recommends that you use an external Vault for production environments. Enter the Vault address and token, and upload a CA certificate.
 - d) Enter a Storage Class to be configured on the Kubernetes cluster. CDP Private Cloud uses Persistent Volumes to provision storage. You can leave this field empty if you have a default storage class configured on your Openshift cluster. Click Continue.

Install Private Cloud Data Services on Existing Container Cloud

Getting Started

Configure Docker Repository

Configure Databases

4 Configure Kubernetes

5 Installation Progress

6 Summary

Configure Kubernetes

Kubernetes Environment

CDP Private Cloud uses the Kubernetes platform. Please provide a Kubernetes configuration file (also known as a kubeconfig file) from your existing Kubernetes environment.

Kubernetes Configuration

[Choose File](#)

Kubernetes Namespace

cdp

After the installation, CDP management console can be accessed from <https://console-cdp.apps.shared-os-qe-04.kcloud.cloudera.com>

Additional Certificates

Optional additional Certificates to be used during installation and during the runtime of CDP. Examples: Custom Ingress, Custom Kubernetes API,...

Miscellaneous Certificates [?](#)

[Choose File](#)

Configure Vault

Vault is a secret management tool. You can connect to an existing customer Vault or create a new Vault with this installer. [Learn more](#) on Vault on CDP Private Cloud Data Services.

☒ Embedded vault

☐ External Vault (Recommended for production)

Embedded Vault Disk Space (GiB) [?](#)

2

Storage

CDP Private Cloud Data Services uses Persistent Volumes to provision storage. This wizard requires a Storage Class to be configured on the Kubernetes cluster prior to launching installation.

Storage Class [?](#)

[?](#) Tip: Before clicking Next, download the current installation configurations as a file template and apply it if you need to reinstall using the same settings.

7. If you want to use this installation configuration again to install CDP Private Cloud, you have the option to download this information as a template.

i Tip: Before clicking Next, download the current installation configurations as a file template and apply it if you need to reinstall using the same settings. [Download as Template](#)

The template file is a text file that contains the database and vault information that you entered for this installation. This template is useful if you will be installing Private Cloud again with the same databases, as the template will populate the fields here automatically. Note that the user password information is not saved in the template.

8. The Installation Progress page appears. Click Continue.

Install Private Cloud Data Services on Existing Container Cloud

Installation Progress

Installing the CDP Private Cloud Management Console to the namespace cdp.

- Downloading the CDP Private Cloud install utility.
- Extracting the CDP Private Cloud install utility.
- Configuring and installing the helm charts.
- Waiting for all the pods to start or timeout.

Show Logs

Name	Version	Status	Age
cdp-release-dps-gateway-1.0-cf7db56b-sm48	3/3	Running	4m31s
cdp-release-dwx-server-844cfb7899-g9jjn	2/2	Running	3m58s
cdp-release-dwx-ui-698f4f85c6-4bpk5	2/2	Running	3m58s
cdp-release-dwx-ui-698f4f85c6-bgrmf	2/2	Running	3m56s
cdp-release-grafana-7c65c4566d-wx5tn	3/3	Running	2m5s
cdp-release-logger-alert-receiver-86d67cdfb-4r2mh	2/2	Running	3m39s
cdp-release-metrics-server-exporter-6fb489845b-ch5cf	2/2	Running	3m38s
cdp-release-monitoring-app-67c7bf8fb4-cm82s	2/2	Running	3m26s
cdp-release-monitoring-metricproxy-7948d869df-c672g	2/2	Running	3m28s
cdp-release-monitoring-metricproxy-7948d869df-pjgsx	2/2	Running	3m27s
cdp-release-monitoring-pvcservice-75d986856d-skswq	2/2	Running	3m21s
cdp-release-prometheus-alertmanager-0	3/3	Running	3m35s
cdp-release-prometheus-alertmanager-1	3/3	Running	2m16s
cdp-release-prometheus-kube-state-metrics-658fbfc4f8-tb94h	2/2	Running	3m32s
cdp-release-prometheus-server-7dd745d8f7-zpxq6	3/3	Running	3m29s
cdp-release-resource-pool-manager-6967756fb4-kzcjs	2/2	Running	3m51s
cdp-release-thunderhead-cdp-private-authentication-consolewcm2w	2/2	Running	4m26s
cdp-release-thunderhead-cdp-private-commonconsole-65584957n8w9q	2/2	Running	4m29s
cdp-release-thunderhead-cdp-private-environments-console-6kfczm	2/2	Running	4m21s
cdp-release-thunderhead-compute-api-d5556b87d-82q14	2/2	Running	4m6s
cdp-release-thunderhead-consoleauthenticationcdp-6d74fd8b4hhjfj	2/2	Running	4m48s
cdp-release-thunderhead-de-api-57d466787f-59tc7	2/2	Running	4m3s
cdp-release-thunderhead-environment-688965d7c8-gch8d	2/2	Running	4m28s
cdp-release-thunderhead-environments2-api-6b9fbc676-42jz7	2/2	Running	4m18s
cdp-release-thunderhead-iam-api-5475d7779c-qgqwr	2/2	Running	4m35s
cdp-release-thunderhead-iam-console-7b95d69df7-tpws4	2/2	Running	4m23s
cdp-release-thunderhead-kerberosgmt-api-5544d69bbd-z7nnz	2/2	Running	4m8s
cdp-release-thunderhead-ml-api-8c684979f-bd8sc	2/2	Running	4m10s
cdp-release-thunderhead-resource-management-console-6f78c5z8brs	2/2	Running	3m13s
cdp-release-thunderhead-sdx2-api-54cdc9ccfb-qnlnd	2/2	Running	4m17s
cdp-release-thunderhead-servicediscoverysimple-66d98ff555-khfkq	2/2	Running	4m14s
cdp-release-thunderhead-usermanagement-private-788d988b96-msh7f	2/2	Running	4m42s
dp-mlx-control-plane-app-7569dbd5bb-9z9vk	2/2	Running	4m
dp-mlx-control-plane-app-health-poller-6c776fd948-rnn8w	2/2	Running	4m2s
fluentd-aggregator-0	2/2	Running	3m15s
snmp-notifier-855d984d7-k2kq6	2/2	Running	65s

2022/04/28 16:15:51 To launch CDP Private Cloud, open <https://console-cdp.apps.shared-os-qe-04.kccloud.cloudera.com/environments/welcome.html>
 2022/04/28 16:15:51 CDP Private Cloud Installation to cdp completed.

9. The summary message with a link to Launch CDP appears.

Install Private Cloud Data Services on Existing Container Cloud

Summary

Congratulations, you have successfully installed CDP Private Cloud Management Console.

[Launch CDP Private Cloud](#)

Click **Finish** to exit the wizard. You can also access links to CDP Private Cloud Data Services from Home -> Data Services.
 The default login is admin/admin.

What to do next

1. Click Launch CDP to launch your Cloudera Private Cloud Data Services.
2. Log in using the default user name and password admin/admin.
3. In the Welcome to CDP Private Cloud page, click Change Password to change the Local Administrator Account password.
4. Set up external authentication using the URL of the LDAP server and a CA certificate of your secure LDAP. Follow the instructions on the Welcome to CDP Private Cloud page to complete this step.

5. Click Test Connection to ensure that you can connect to the configured LDAP server.
6. [Register a Cloudera Private Cloud Data Services environment](#).
7. [Create your first Virtual Warehouse in the Cloudera Data Warehouse Data Services](#) and/or [Provision an ML Workspace in the Cloudera AI Data Services](#).

Uninstall Cloudera Private Cloud Data Services

You can uninstall Cloudera Private Cloud Data Services from your Cloudera Private Cloud Base Cloudera Manager.

Before you begin

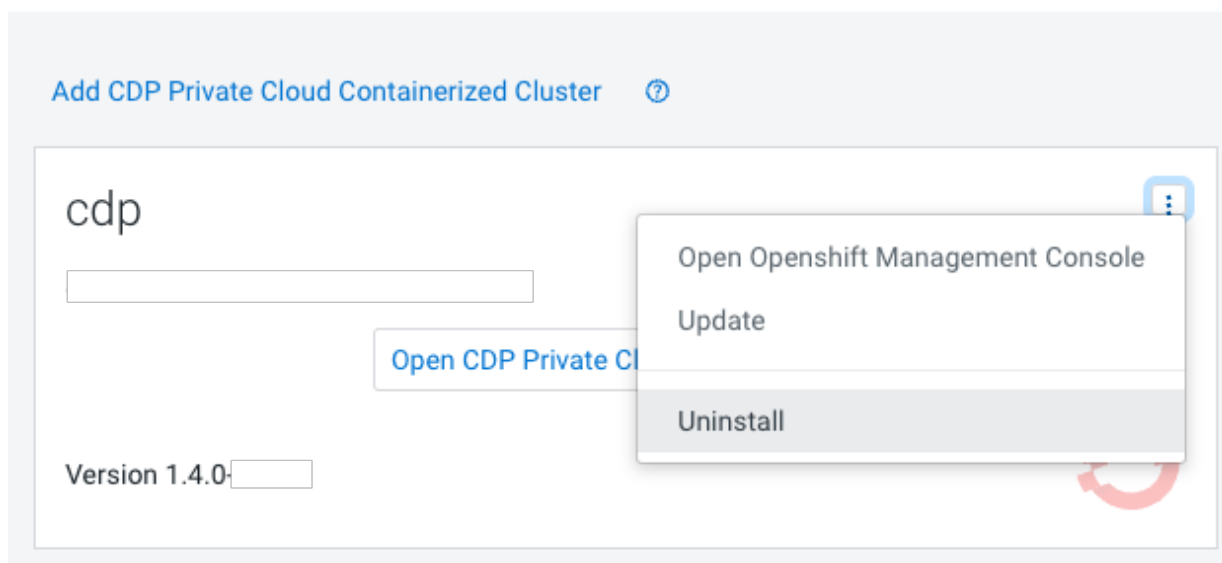
Before you uninstall Cloudera Private Cloud Data Services, ensure that you have deleted all the CDP Private Cloud environments registered in your Cloudera Private Cloud Data Services. You can delete your registered environments using Cloudera Management Console.

Procedure

1.

In Cloudera Manager, navigate to Cloudera Private Cloud Data Services and click . Click Uninstall.

CDP Private Cloud Data Services



- The Collect Information page appears. You must select the checkbox associated with your CDP Private Cloud Environments. Click Choose File to upload your kubeconfig file associated with your Kubernetes cluster.

Uninstall Private Cloud Data Services (cdp)

CDEP De

1 Collect Information
2 Uninstallation Progress
3 Summary

Collect Information

This wizard uninstalls CDP Private Cloud Data Services.

Visit the [CDP Private Cloud Data Services Uninstallation](#) documentation for more information.

✓

Before you proceed, delete all CDP Private Cloud environments from the [Management Console](#).

☒ All CDP Private Cloud environments have been deleted. (Required)

Kubernetes Environment

Kubernetes Configuration

[Choose File](#)

Kubernetes Cluster

Delete shared Cloudera installed artifacts on this Kubernetes Cluster?

☐ Keep shared artifacts

☒ Delete shared artifacts

Choose this option if there are other CDP Private Cloud instances running in this Kubernetes cluster or if you are not sure.

Choose this option if you are uninstalling the **only** CDP Private Cloud instance in this Kubernetes cluster.

- Select Keep shared artifacts if you have other Cloudera Private Cloud Data Services instances running in your Kubernetes cluster, or select Delete shared artifacts to remove any cluster global security policies or objects associated with this Kubernetes namespace.

Uninstall Private Cloud Data Services (cdp)

CDEP De

1 Collect Information
2 Uninstallation Progress
3 Summary

Collect Information

This wizard uninstalls CDP Private Cloud Data Services.

Visit the [CDP Private Cloud Data Services Uninstallation](#) documentation for more information.

✓

Before you proceed, delete all CDP Private Cloud environments from the [Management Console](#).

☒ All CDP Private Cloud environments have been deleted. (Required)

Kubernetes Environment

Kubernetes Configuration

[Choose File](#)

Kubernetes Cluster

Delete shared Cloudera installed artifacts on this Kubernetes Cluster?

☐ Keep shared artifacts

☒ Delete shared artifacts

Choose this option if there are other CDP Private Cloud instances running in this Kubernetes cluster or if you are not sure.

Choose this option if you are uninstalling the **only** CDP Private Cloud instance in this Kubernetes cluster.

- Click Continue to complete the process.

Uninstall Private Cloud Data Services (cdp)

✓ Collect Information

2 Uninstallation Progress

3 Summary

Uninstallation Progress

Uninstalling the CDP Private Cloud Management Console in the namespace cdp.

- ✓ Downloading the CDP Private Cloud uninstall utility.
- ✓ Extracting the CDP Private Cloud uninstall utility.
- ✓ Uninstalling CDP Private Cloud.

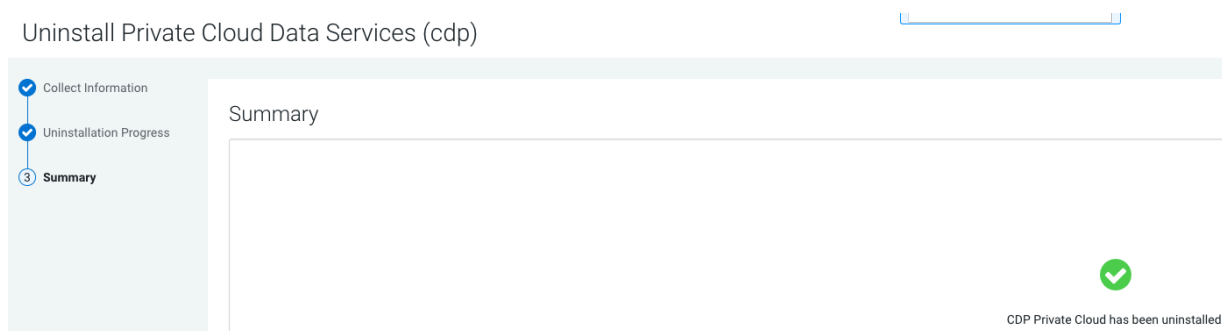
✓ Show Logs

```

2022/04/28 16:29:26 Delete entities of type deployment in namespace yunikorn.
deployment.apps "yunikorn-admission-controller" deleted
deployment.apps "yunikorn-scheduler" deleted
2022/04/28 16:29:26 Delete entities of type pod in namespace yunikorn.
pod "yunikorn-admission-controller-66bd9fdff5-6prpd" deleted
pod "yunikorn-scheduler-5774d5954d-7kc5k" deleted
2022/04/28 16:30:01 Delete entities of type rolebinding in namespace yunikorn.
rolebinding.rbac.authorization.k8s.io "system:deployers" deleted
rolebinding.rbac.authorization.k8s.io "system:image-builders" deleted
rolebinding.rbac.authorization.k8s.io "system:image-pullers" deleted
2022/04/28 16:30:02 Delete entities of type serviceaccount in namespace yunikorn.
serviceaccount "builder" deleted
serviceaccount "default" deleted
serviceaccount "deployer" deleted
serviceaccount "yunikorn-admin" deleted
2022/04/28 16:30:03 Delete entities of type role in namespace yunikorn.
No resources found
2022/04/28 16:30:03 Delete entities of type pvc in namespace yunikorn.
No resources found
2022/04/28 16:30:03 Delete entities of type configmap in namespace yunikorn.
configmap "kube-root-ca.crt" deleted
configmap "openshift-service-ca.crt" deleted
configmap "yunikorn-quotamanager-configs" deleted
configmap "yunikorn-scheduler-plugin-configs" deleted
2022/04/28 16:30:03 Delete entities of type secret in namespace yunikorn.
secret "builder-dockercfg-hcrmv" deleted
secret "builder-token-qzk6c" deleted
secret "builder-token-wgdc4" deleted
secret "cdp-private-installer-docker-cert" deleted
secret "cdp-private-installer-docker-registry" deleted
secret "default-dockercfg-wkkf9" deleted
secret "default-token-69gdb" deleted
secret "deployer-dockercfg-4rj7q" deleted
secret "deployer-token-hkfgf" deleted
secret "deployer-token-tfmc6" deleted
2022/04/28 16:30:06 Delete entities of type networkpolicy in namespace yunikorn.
No resources found
namespace "yunikorn" deleted
2022/04/28 16:30:19 Global Shared Objects Deletion completed.

```

You will now see that CDP Private Cloud has been uninstalled.



Dedicating OCP nodes for specific workloads

You can use the `kubectl taint` command to dedicate OCP cluster nodes for specific workloads. You can dedicate GPU nodes for Cloudera AI Workbench, and NVME nodes for Cloudera Data Warehouse workloads.

About this task

Run the following command to get a list of all of the cluster nodes:

```
kubectl get nodes
```

Run the following command to list information about a specific cluster node:

```
kubectl describe node <node_name>
```

In the returned output, look for the Taints field.

Dedicate a GPU node for Cloudera AI Workbench

1. Run the following command to dedicate a GPU node for Cloudera AI Workbench:

```
kubectl taint nodes <node_name> nvidia.com/gpu=true:NoSchedule
```

No other workload pods will be allowed to run on the tainted node.

2. Run the following command to confirm that the taint has been successfully applied:

```
kubectl describe node <node_name>
```

In the returned output, look for the Taints field.

- To remove the taint, run the following command:

```
kubectl taint nodes <node_name> nvidia.com/gpu=true:NoSchedule-
```

This command returns:

```
node/<node_name> untainted
```

Dedicate a SSD node for Cloudera Data Warehouse workloads

1. Run the following command to dedicate a GPU node for Cloudera Data Warehouse workloads:

```
kubectl taint nodes <node_name> ssd/nvme=true:NoSchedule
```

No other workload pods will be allowed to run on the tainted node.

2. Run the following command to confirm that the taint has been successfully applied:

```
kubectl describe node <node_name>
```

In the returned output, look for the Taints field.

- To remove the taint, run the following command:

```
kubectl taint nodes <node_name> ssd/nvme=true:NoSchedule-
```

This command returns:

```
node/<node_name> untainted
```

Additional Notes



Note:

To taint the node of an existing cluster which already has Cloudera AI and Cloudera Data Warehouse workspaces running, you must also run the following commands:

```
kubectl drain <node_name> --ignore-daemonsets --delete-emptydir-data --  
timeout=600s  
kubectl uncordon <node_name>
```



Note:

You cannot apply a taint to a master node, or to a single-node cluster.

Related Information

[Taints and Tolerations](#)

Configuring GPU node labeling on OCP

You can use NVIDIA Feature Discovery to generate labels for the set of GPUs available on OCP nodes. You can use these node labels to assign workloads to specific GPU devices. This feature is enabled by default on ECS, but must be configured manually on OCP.

Configuring GPU node labeling on OCP nodes

1. Review the prerequisites listed on the [NVIDIA GPU feature discovery](#) page.
2. Use the instructions under [Deployment via helm](#) to deploy the GPU node labeling feature.
3. Information about using GPU node labeling is also available on the [NVIDIA GPU feature discovery](#) page.

Known Issues and Limitations

- GPU node labeling is only supported for GPU cards manufactured by NVIDIA.