CDP Private Cloud Base 7

In-Place Upgrade HDP 3 to CDP Private Cloud Base

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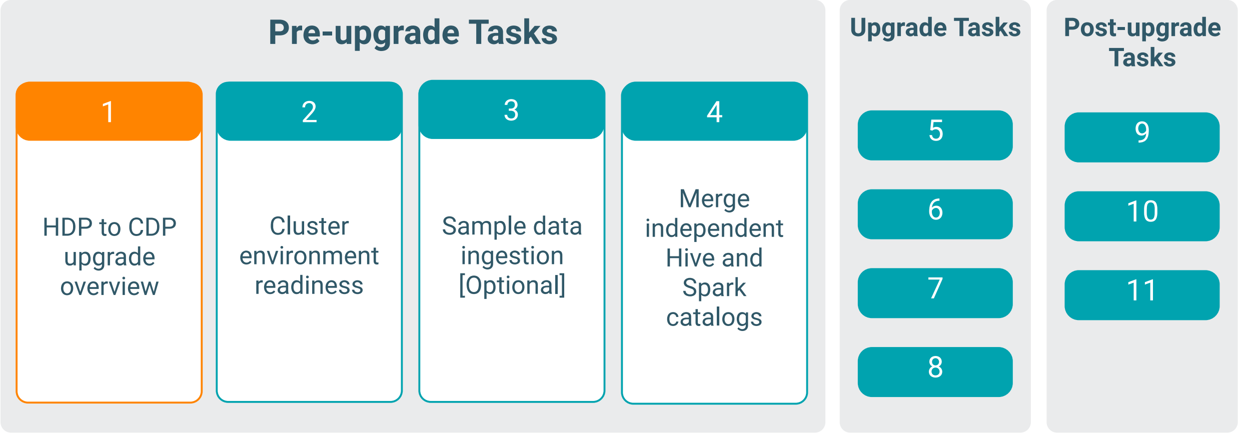
HDP to CDP Upgrade Overview

The process of upgrading to CDP Private Cloud Base involves understanding the supported in-place upgrade paths and verifying the software and hardware considerations and requirements prior to performing the upgrade steps.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In-place upgrade overview

To plan your upgrade from Ambari managed HDP 3.1.5 to Cloudera Private Cloud Base, you must be aware of the two stages of in-place upgrade along with the pre-upgrade, upgrade, and post-upgrade tasks.

About this task

This upgrade path consists of two stages:

1. Upgrade HDP 3.1.5 to Cloudera Runtime 7.1.x using Ambari.
2. Transition the management platform from Ambari to Cloudera Manager.

Note:

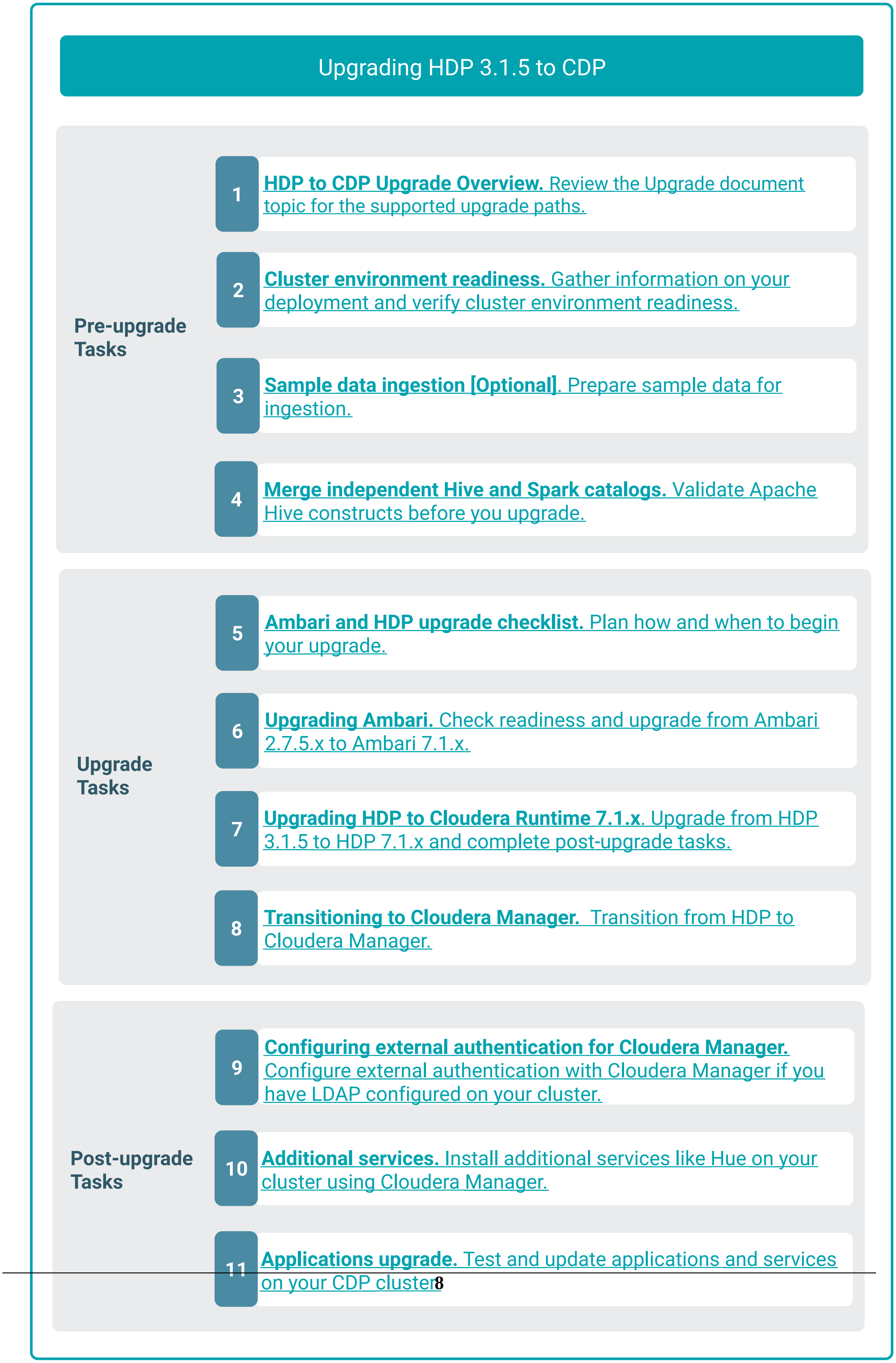
The importance of security in a production environment cannot be understated. TLS and Kerberos form the baseline for secure operations of your CDP Runtime environment. Cloudera supports security services such as Ranger and Atlas only when they are run on clusters where Kerberos is enabled to authenticate users.

To upgrade to Cloudera Runtime 7.1.x, you must first upgrade from Ambari 2.7.5.x (source) to Ambari 7.1.x.x (target) and then upgrade from HDP 3.1.5 to Cloudera Runtime 7.1.x.

Note: For this in-place upgrade to CDP Private Cloud Base 7.1.6 or 7.1.7, or 7.1.8, the minimum supported version of HDP is 3.1.5.

Upgrading and transitioning to Cloudera Private Cloud Base

To upgrade and transition to Cloudera Private Cloud Base using the documentation, perform the following steps.



Upgrading HDP 3.1.5 to CDP

Pre-upgrade Tasks

1. **HDP to CDP Upgrade Overview.** Review the Upgrade document topic for the supported upgrade paths.
2. **Cluster environment readiness.** Gather information on your deployment and verify cluster environment readiness.
3. **Sample data ingestion [Optional]**. Prepare sample data for ingestion.
4. **Merge independent Hive and Spark catalogs.** Validate Apache Hive constructs before you upgrade.

Upgrade Tasks

5. **Ambari and HDP upgrade checklist.** Plan how and when to begin your upgrade.
6. **Upgrading Ambari.** Check readiness and upgrade from Ambari 2.7.5.x to Ambari 7.1.x.
7. **Upgrading HDP to Cloudera Runtime 7.1.x**. Upgrade from HDP 3.1.5 to HDP 7.1.x and complete post-upgrade tasks.
8. **Transitioning to Cloudera Manager.** Transition from HDP to Cloudera Manager.

Post-upgrade Tasks

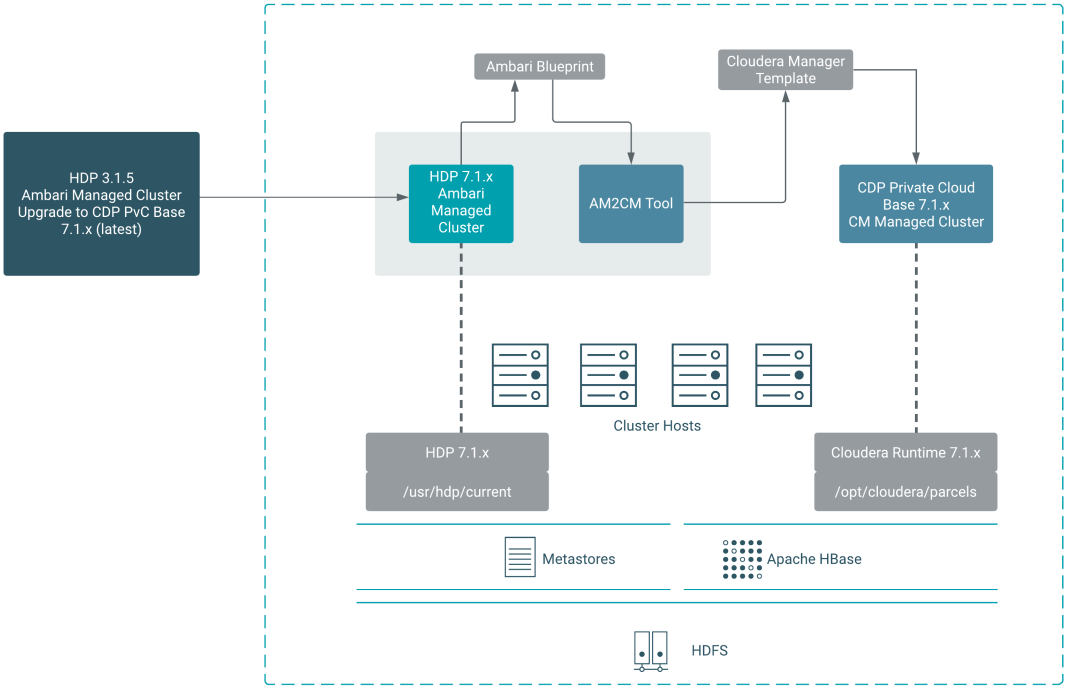
9. **Configuring external authentication for Cloudera Manager.** Configure external authentication with Cloudera Manager if you have LDAP configured on your cluster.
10. **Additional services.** Install additional services like Hue on your cluster using Cloudera Manager.
11. **Applications upgrade.** Test and update applications and services on your CDP cluster.

Note: If you are upgrading to 7.5.1 or higher in order to install version 1.5.4, you must use version 7.1.6 or higher. For more information, see .

Note: If you want to upgrade CDP Private Cloud Data Services, you must upgrade using the following path:

1. Upgrade to Cloudera Manager 7.6.7.
2. Upgrade the Base cluster to 7.1.7 SP2.
3. Upgrade CDP Private Cloud Data Services to 1.5.0.

Architecture diagram of the upgrade and transition:



Important:

- While the upgrade process will temporarily install HDP intermediate bits, the HDP intermediate bits is an interim artifact that enables you to complete the upgrade to Cloudera Private Cloud Base and is not a new release of HDP intended for production use. When the upgrade process is complete, your cluster will be using the Cloudera Runtime 7.1.x parcel.
- If you are migrating from HDP 3.1.5 to CDP Private Cloud Base 7.1.7 SP2, then:
  - The supported Runtime version is 7.1.7 SP2.
  - The supported Cloudera Manager version is 7.6.7.
  - The supported AM2CM tool version is AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, and AM2CM 2.4.1.1.
- If you are migrating from HDP 3.1.5 to CDP Private Cloud Base 7.1.8, then:
  - The supported Runtime version is 7.1.8.
  - The supported Cloudera Manager version is 7.7.1.
  - The supported AM2CM tool version is AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, and AM2CM 2.4.1.1.
- If you are migrating from HDP 3.1.5 to CDP Private Cloud Base 7.1.7 SP1, then:
  - The supported Runtime version is 7.1.7 SP1.
  - The supported Cloudera Manager version is 7.6.1.
  - The supported AM2CM tool version is AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, and AM2CM 2.4.1.1.
- If you are migrating from HDP 3.1.5 to CDP Private Cloud Base 7.1.7, then:
  - The supported Runtime version is 7.1.7.
  - The supported Cloudera Manager version is 7.4.4.
  - The supported AM2CM tool version is AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, AM2CM 2.4.1.1,AM2CM 2.4.0,2.3.0.0,2.1.0.0, 2.0.4.0, 2.0.3.0, and 2.0.2.0.
- If you are migrating from HDP 3.1.5 to CDP Private Cloud Base 7.1.6, then:
  - The supported Runtime version is 7.1.6.
  - The supported Cloudera Manager version is 7.3.1.
  - The supported AM2CM tool version is AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, AM2CM 2.4.1.1,AM2CM 2.4.0,2.3.0.0,2.1.0.0, 2.0.4.0, 2.0.3.0, and 2.0.2.0.
- The following table shows the supported versions of HDP and Ambari on the source cluster, Cloudera Manager and CDP on the target cluster, and the AM2CM tool:

HDP Version	Operating System	Ambari Version	AM2CM Version	Cloudera Manager Version	CDP Version
HDP 3.1.5	RHEL 7, Sles 12, and Ubuntu 18	Ambari 2.7.5	AM2CM 2.8.1.0,AM2CM 2.6.0.0, AM2CM 2.4.3.0,AM2CM 2.4.2.0, AM2CM 2.4.1.1,	Cloudera Manager 7.6.7	CDP PvC Base 7.1.7 SP2
HDP 3.1.5	RHEL 7, Sles 12, and Ubuntu 18	Ambari 2.7.5	AM2CM 2.8.1.0,AM2CM 2.6.0.0,AM2CM 2.4.3.0,AM2CM 2.4.2.0,	Cloudera Manager 7.7.1	CDP PvC Base 7.1.8

			AM2CM 2.4.1.1,		
HDP 3.1.5	RHEL 7, Sles 12, and Ubuntu 18	Ambari 2.7.5	AM2CM 2.8.1.0, AM2CM 2.4.3.0,AM2CM 2.4.2.0, AM2CM 2.4.1.1,	Cloudera Manager 7.6.1	CDP PvC Base 7.1.7 SP1
HDP 3.1.5	RHEL 7, Sles 12, and Ubuntu 18	Ambari 2.7.5	AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0, AM2CM 2.4.1.1,AM2CM 2.4.0,2.3.0.0,2.1.0.0, 2.0.4.0, 2.0.3.0, and 2.0.2.0	Cloudera Manager 7.4.4	CDP PvC Base 7.1.7
HDP 3.1.5	RHEL 7	Ambari 2.7.5	AM2CM 2.8.1.0, AM2CM 2.4.3.0, AM2CM 2.4.2.0,AM2CM 2.4.1.1,AM2CM 2.4.0,2.3.0.02.1.0.0, 2.0.4.0, 2.0.3.0, 2.0.2.0, and1.2.0.0	Cloudera Manager 7.3.1	CDP PvC Base 7.1.6

The final step of the upgrade process is to transition from the Ambari to Cloudera Manager latest version using the AM2CM tool. It includes the following steps:

- HDP cluster blueprint is exported from Ambari and converted to a Cloudera Manager deployment template using the AM2CM tool.
- Deploy the template to Cloudera Manager and activate the Cloudera Runtime 7.1.x parcels.
- Start using the CDP Private Cloud Base cluster with Cloudera Manager.
- Uninstall Ambari and the HDP stack

Important: Hive LLAP is not part of Cloudera Private Cloud Base. If you are running Hive LLAP workloads, contact Cloudera account team or Cloudera Support for further assistance.

Note: Rolling Upgrades are not supported when upgrading to CDP Private Cloud Base.

Note:

1. If you are upgrading from HDP 3.0.0.x/3.0.1.x/3.1.0.x/3.1.4.x/3.1.5.0 and HBase is part of your HDP cluster, you must first upgrade to HDP 3.1.5.6091-7 to prevent HBase data loss. Also, ensure that all the previously installed hotfixes on your current HDP version are part of HDP 3.1.5.6091-7. If the hotfixes are not a part or you are not certain, you must contact Cloudera Support.
2. If you are upgrading from a hotfix on top of HDP 3.1.5 and HBase is part of your HDP cluster, you must contact Cloudera Support and ask for HBASE-23044 and HBASE-25206 in a hotfix and upgrade to the hotfix.

Troubleshooting: A selection of Cloudera Knowledge Base articles are available that describe common issues encountered by Cloudera customers during upgrades and migrations. See CDP Upgrade/Migrate Troubleshooting Articles. (Cloudera login required.)

CDP Upgrade Readiness

In preparation for the upgrade, review the cluster environment requirements. You must also be familiar with the new features, behavior changes, and impact of the upgrade on existing configurations before the upgrade.

Your Cloudera Account team can help you assess the impact of the following with respect to your upgrade. Cloudera will work with you to ensure your cluster is ready and meets all the criteria.

- Cluster environment readiness - latest supported versions
  - Ensure supported Operating System, HDP stack, database, and java JDK versions are up-to-date and supported.
  - See the upgrade documentation to ensure that your environments are ready for the upgrade.
- On removed components, sevices, and functionalities, see Hive unsupported interfaces and features, HDP Core component version changes, and Changes to Ambari and HDP services.
- Changes in behaviour:
  - You need to do a number of migration-related tasks due to semantic changes, and a couple of syntax changes in Hive 3, for example db.table references and DROP CASCADE, might require changes to your applications.
  - Spark and Hive tables interoperate using the Hive Warehouse Connector and Spark Direct Reader to access ACID managed tables. You can access external tables from Spark directly using SparkSQL.
- Downtime:
  - In-place upgrades will require downtime and automation of the tasks will limit the extent of the downtime
  - Migrating to new cluster options may limit downtime.
- Ports - Reset the old ports to standard Cloudera Manager ports. It simplifies the Cloudera Manager managed CDP Private Cloud Base environment for better future support and standards.
- Bespoke configuration - Consider the impact of upgrading on any bespoke applications and customizations either to or integrating with the HDP platform. For example, devops integration tooling, monitoring, and so on.
- Network multihoming is not supported. If the HDP cluster is configured for multihomed networks, then you must reconfigure to disable that. For more information, see Networking and Security Requirements
- Third-party application readiness - Ensure that the third-party software products you are integrating with are certified to work with the HDP intermediate bits and CDP Private Cloud Base.
- Ambari mpacks are not all compatible with HDP-7.1.x and/or CDP-7.1.x (CSDs are the Cloudera Manager equivalent of mpacks)
- Not all Management Packs are compatible with the HDP intermediate bits. Cloudera Support can help you assess the feasibility of your upgrade if you have Management Packs other than HDF installed.
- The HDP interim bits are not intended for production use.

How much time should I plan for to complete my upgrade?

An in-place upgrade can take a variable amount of time to complete. Learn about how to plan for and shorten the amount of time required for your upgrade.

The amount of time required for an in-place upgrade depends on many factors, including:

- The number of hosts in your clusters.
- The mix of services you have deployed in your clusters.
- The amount of data stored in your clusters.

Generally, an upgrade can be completed in 24-48 hours. Upgrades from HDP to may take somewhat longer due to the Ambari to conversion process (AM2CM).

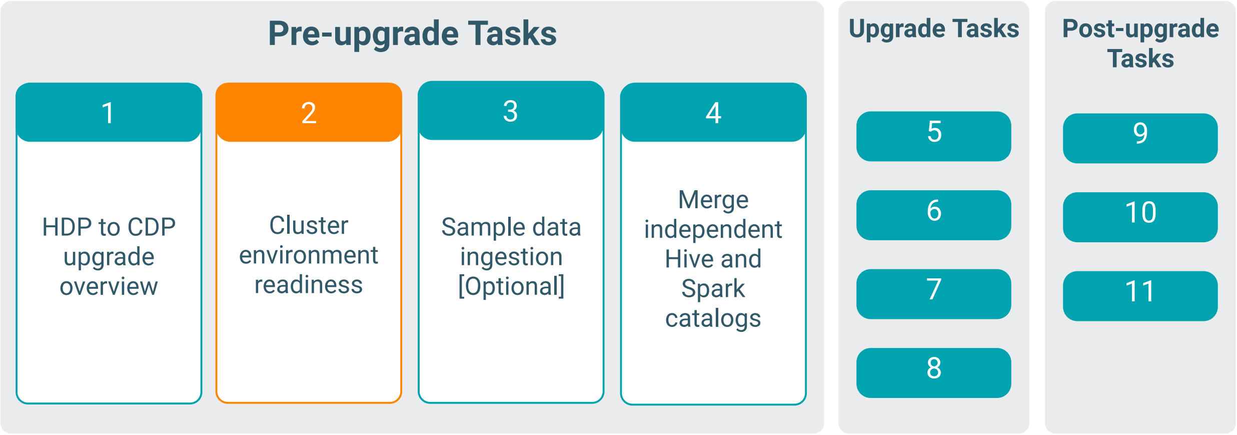
The following table provides some additional information to help you plan for your upgrade.

Table 1: Upgrade Time Planning

Component/Process	Notes
Parcel	The parcel must be distributed to all hosts before upgrading the hosts. Downloading the parcel directly from archive.cloudera.com over the internet may add additional time. You can download the parcels and serve them from a local web server to decrease this time. In addition, after downloading the parcels to a local repository, you can distribute them in advance of launching the upgrade wizard to save additional time.
	You must upgrade before upgrading your clusters. can continue to mange older versions of and CDH until the upgrade.
Cluster cold start	The cluster will need to be restarted at least once during an in-place upgrade. The amount of time required for a restart depends on how many files and blocks are stored in the cluster and the number of hosts in the cluster.
HBase checks	While Running HBase checks does not take significant time, remediating any issues can take significant time. To save time during the upgrade, you can plan to do this before running the Upgrade Wizard.
Solr export/backup	This process depends on how much data has to be imported after the upgrade.

Cluster environment readiness

You must ensure all the nodes have the supported operating system, Java version, and base Ambari version. Verify the disk space and mount point requirements before you begin the upgrade to the recommended interim HDP bits and CDP Private Cloud Base.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Operating System on all nodes	Operating System & Upgrading the cluster's underlying OS
Requirements and Supported Versions	CDP Private Cloud Base Requirements and Supported Versions
Java version on all nodes	Java Versions
Ambari base version on all nodes	Ambari version is 2.7.5.x.
Repositories	Software download matrix
Review disk space	Disk space and mountpoint considerations

Disk space and mountpoint considerations

Review the minimum disk space requirements before you upgrade from HDP 3.1.5 to CDP 7.1.x.

Partition	Storage	Detail
/usr/hdp	10 GB	Minimum space required for each installed HDP version.
/opt/cloudera	100 GB for CM 100 GB for all hosts	Minimum space required for each installed and retained CDP version.
/usr/hdp	35 GB	If you are upgrading from HDP 3.1.5.x to CDP 7.1.x, there is an interim step to upgrade to HDP intermediate bits. You would need a minimum 30 GB available space to make the transition.
/var/log	200 GB - 500 GB	Minimum space required for storing the logs. **Note:** Ensure this is not part of the root OS partition.
/var/*	2 GB	Minimum space required for Cloudera Manager agent and for the Cloudera components.
/tmp	20GB	At least 20 GB of free space required for storing the temp data by CLDR services.
/<data-dir>	Varies	Datanode, Kafka Logs, Namenode Image and Edits, Journal Node, ZooKeeper. These should all be on separate mounts to avoid disk issues with the os partition. Performance Impact: For the Namenode, Journal Node, and ZooKeeper data directories, these

Partition	Storage	Detail
		should be on dedicated disks (and mounts) for the most optimal performance of these critical services. Disk contention with other write operations will have an impact on these services. Performance Impact: Data-directories for Datanode and Kafka-Logs should be simple JBOD drives. RAID support has a support impact and these services are storage redundant at the service level. RAID is NOT recommended for these service data directories.
/<yarn-local>	Varies by workload “yarn.nodemanager.local-dirs`”Between 5-25% of host storage depending on workload types.	Applications that are heavy in MR technologies will benefit tremendously by using the “SSD”storage.

For more information on the hardware requirements for Runtime components, see Cloudera Runtime.

For more information on the CM server storage requirements, see Cloudera Manager Server.

For more information on the CDP Private Cloud Base requirements, see CDP Private Cloud Base Requirements and Supported Versions.

Downloading and Publishing the Package Repository

Download the package repository for the product you want to install.

Cloudera Manager 7.7.1

1. Download the package repository for the product you want to install:

   Cloudera Manager 7

   To download the files for a Cloudera Manager release, download the repository tarball for your operating system. Then unpack the tarball, move the files to the web server directory, and modify file permissions. For example:

   ```
   $ sudo mkdir -p /var/www/html/cloudera-repos/cm7
   ```

   ```
   $ wget https://[username]:[password]@archive.cloudera.com/p/cm7/
   7.7.1/repo-as-tarball/cm7.7.1-redhat7.tar.gz
   ```

   ```
   $ tar xvfz cm7.7.1-redhat7.tar.gz -C /var/www/html/cloudera-repo
   s/cm7 --strip-components=1
   ```

   ```
   sudo chmod -R ugo+rX /var/www/html/cloudera-repos/cm7
   ```

2. Visit the Repository URL http://<*WEB_SERVER*>/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.

Cloudera Manager 7.6.7

1. Download the package repository for the product you want to install:

   Cloudera Manager 7

   To download the files for a Cloudera Manager release, download the repository tarball for your operating system. Then unpack the tarball, move the files to the web server directory, and modify file permissions. For example:

   ```
   $ sudo mkdir -p /var/www/html/cloudera-repos/cm7
   ```

   ```
   $ wget https://[username]:[password]@archive.cloudera.com/p/cm7/
   7.6.7/repo-as-tarball/cm7.6.7-redhat7.tar.gz
   ```

   ```
   $ tar xvfz cm7.6.7-redhat7.tar.gz -C /var/www/html/cloudera-repo
   s/cm7 --strip-components=1
   ```

   ```
   sudo chmod -R ugo+rX /var/www/html/cloudera-repos/cm7
   ```

Cloudera Manager 7.6.1

1. Download the package repository for the product you want to install:

   Cloudera Manager 7

   To download the files for a Cloudera Manager release, download the repository tarball for your operating system. Then unpack the tarball, move the files to the web server directory, and modify file permissions. For example:

   ```
   $ sudo mkdir -p /var/www/html/cloudera-repos/cm7
   ```

   ```
   $ wget https://[username]:[password]@archive.cloudera.com/p/cm7/
   7.6.1/repo-as-tarball/cm7.6.1-redhat7.tar.gz
   ```

   ```
   $ tar xvfz cm7.6.1-redhat7.tar.gz -C /var/www/html/cloudera-repo
   s/cm7 --strip-components=1
   ```

   ```
   sudo chmod -R ugo+rX /var/www/html/cloudera-repos/cm7
   ```

2. Visit the Repository URL http://<*WEB_SERVER*>/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.

Cloudera Manager 7.4.4

1. Download the package repository for the product you want to install:

   Cloudera Manager 7

   To download the files for a Cloudera Manager release, download the repository tarball for your operating system. Then unpack the tarball, move the files to the web server directory, and modify file permissions. For example:

   ```
   $ sudo mkdir -p /var/www/html/cloudera-repos/cm7
   ```

   ```
   $ wget https://[username]:[password]@archive.cloudera.com/p/cm7/
   7.4.4-24429768/repo-as-
   ```

```
                      tarball/cm7.4.4-redhat7.tar.gz
```

```
$ tar xvfz cm7.4.4-redhat7.tar.gz -C /var/www/html/cloudera-repo
s/cm7 --strip-components=1
```

```
sudo chmod -R ugo+rX /var/www/html/cloudera-repos/cm7
```

2. Visit the Repository URL http://<*WEB_SERVER*>/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.

Cloudera Manager 7.3.1

1. Download the package repository for the product you want to install:

   Cloudera Manager 7

   To download the files for a Cloudera Manager release, download the repository tarball for your operating system. Then unpack the tarball, move the files to the web server directory, and modify file permissions. For example:

```
$ sudo mkdir -p /var/www/html/cloudera-repos/cm7
```

```
$ wget https://[username]:[password]@archive.cloudera.com/p/cm7/
7.3.1/repo-as-
                      tarball/cm7.3.1-redhat7.tar.gz
```

```
$ tar xvfz cm7.3.1-redhat7.tar.gz -C /var/www/html/cloudera-repo
s/cm7 --strip-components=1
```

```
sudo chmod -R ugo+rX /var/www/html/cloudera-repos/cm7
```

2. Visit the Repository URL http://<*WEB_SERVER*>/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.

Downloading and Publishing the Parcel Repository

Download the parcels that you want to install and publish the parcel directory.

Procedure

1. Download manifest.json and the parcel files for the product you want to install:

   Runtime 7.1.8

   To download the files for the latest Runtime 7 release, run the following commands on the Web server host:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories https://[username]:[password]@archive.cloudera.com/p/
cdh7/7.1.8/parcels/ -P /var/www/html/cloudera-repos
```

```
                  sudo chmod -R ugo+rX /var/www/html/cloudera-r
epos/p/cdh7
```

Runtime 7.1.7.2000

Apache Impala, Apache Kudu, Apache Spark 2, and Cloudera Search are included in the Runtime parcel. To download the files for the latest Runtime 7 release, run the following commands on the Web server host:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories https://[username]:[password]@archive.cloudera.com/p/
cdh7/7.1.7.2000/parcels/ -P /var/www/html/cloudera-repos
                  sudo chmod -R ugo+rX /var/www/html/cloudera-r
epos/p/cdh7
```

Runtime 7.1.7.1000

Apache Impala, Apache Kudu, Apache Spark 2, and Cloudera Search are included in the Runtime parcel. To download the files for the latest Runtime 7 release, run the following commands on the Web server host:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories https://[username]:[password]@archive.cloudera.com/p/
cdh7/7.1.7.1000/parcels/ -P /var/www/html/cloudera-repos
                  sudo chmod -R ugo+rX /var/www/html/cloudera-r
epos/p/cdh7
```

Runtime 7.1.7.78

Apache Impala, Apache Kudu, Apache Spark 2, and Cloudera Search are included in the Runtime parcel. To download the files for the latest Runtime 7 release, run the following commands on the Web server host:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories https://[username]:[password]@archive.cloudera.com/p/
cdh7/7.1.7.78/parcels/ -P /var/www/html/cloudera-repos
                  sudo chmod -R ugo+rX /var/www/html/cloudera-r
epos/p/cdh7
```

Note: 7.1.7.78 is same a 7.1.7.0. However, 7.1.7.78 includes a critical vulnerability in log4j.

Runtime 7.1.6.0

Apache Impala, Apache Kudu, Apache Spark 2, and Cloudera Search are included in the Runtime parcel. To download the files for the latest Runtime 7 release, run the following commands on the Web server host:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories https://[username]:[password]@archive.cloudera.com/p/
cdh7/7.1.6.0/parcels/ -P /var/www/html/cloudera-repos
```

```
                  sudo chmod -R ugo+rX /var/www/html/cloudera-r
epos/p/cdh7
```

Sqoop Connectors

To download the parcels for a Sqoop Connector release, run the following commands on the Web server host. This example uses the latest available Sqoop Connectors:

```
sudo mkdir -p /var/www/html/cloudera-repos
                  sudo wget --recursive --no-parent --no-host-dir
ectories http://archive.cloudera.com/sqoop-connectors/parcels/la
test/ -P /var/www/html/cloudera-repos
                  sudo chmod -R ugo+rX /var/www/html/cloudera-
repos/sqoop-connectors
```

If you want to create a repository for a different Sqoop Connector release, replace latest with the Sqoop Connector version that you want. You can see a list of versions in the parcels parent directory.

2. Visit the Repository URL http://<*WEB_SERVER*>/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.

Hadoop Users (user:group) and Kerberos Principals

During the Cloudera Manager installation process, several Linux user accounts and groups are created by default. These are listed in the table below. Integrating the cluster to use Kerberos for authentication requires creating Kerberos principals and keytabs for these user accounts.

Table 2: Users and Groups

Component (Version)	Unix User ID	Groups	Functionality
Apache Atlas	atlas	atlas, hadoop	Apache Atlas by default has atlas as user and group. It is configurable
Apache Flink	flink	flink	The Flink Dashboard runs as this user.
Apache HBase	hbase	hbase	The Master and the RegionServer processes run as this user.
Apache HBase Indexer	hbase	hbase	The indexer servers are run as this user.
Apache HDFS	hdfs	hdfs, hadoop	The NameNode and DataNodes run as this user, and the HDFS root directory as well as the directories used for edit logs should be owned by it.
Apache Hive Hive on Tez	hive	hive	The HiveServer2 process and the Hive Metastore processes run as this user.A user must be defined for Hive access to its Metastore DB (for example, MySQL or Postgres) but it can be any identifier and does not correspond to a Unix uid. This is javax.jdo.option.ConnectionUserName in hive-site.xml.
Apache Impala	impala	impala, hive	Impala services run as this user.

Component (Version)	Unix User ID	Groups	Functionality
Apache Kafka	kafka	kafka	Kafka brokers, mirrorMaker, and Connect workers run as this user.
Apache Knox	knox	knox	Apache Knox Gateway Server runs as this user
Apache Kudu	kudu	kudu	Kudu services run as this user.
Apache Livy	livy	livy	The Livy Server process runs as this user
Apache NiFi	nifi	nifi	Runs as the nifi user
Apache NiFi Registry	nifiregistry	nifiregistry	Runs as the nifiregistry user
Apache Oozie	oozie	oozie	The Oozie service runs as this user.
Apache Ozone	hdfs	hdfs, hadoop	Ozone Manager, Storage Container Manager (SCM), Recon and Ozone Datanodes run as this user.
Apache Parquet	~	~	No special users.
Apache Phoenix	phoenix	phoenix	The Phoenix Query Server runs as this user
Apache Ranger	ranger	ranger, hadoop	Ranger Admin, Usersync and Tagsync services by default have ranger as user and ranger, hadoop as groups. It is configurable.
Apache Ranger KMS	kms	kms	Ranger KMS runs with kms user and group. It is configurable.
Apache Ranger Raz	rangerraz	ranger	Ranger Raz runs with rangerraz user and is part of the ranger group.
Apache Ranger RMS	rangerrms	ranger	Ranger RMS runs with rangerrms user and is part of the ranger group.
Apache Solr	solr	solr	The Solr processes run as this user.
Apache Spark	spark	spark	The Spark History Server process runs as this user.
Apache Sqoop	sqoop	sqoop	This user is only for the Sqoop1 Metastore, a configuration option that is not recommended.
Apache YARN	yarn	yarn, hadoop	Without Kerberos, all YARN services and applications run as this user. The LinuxContainerExecutor binary is owned by this user for Kerberos.
Apache Zeppelin	zeppelin	zeppelin	The Zeppelin Server process runs as this user
Apache ZooKeeper	zookeeper	zookeeper	The ZooKeeper processes run as this user. It is not configurable.

Component (Version)	Unix User ID	Groups	Functionality
Cloudera Manager (all versions)	cloudera-scm	cloudera-scm	Clusters managed by Cloudera Manager run Cloudera Manager Server, monitoring roles, and other Cloudera Server processes as cloudera-scm. Requires keytab file named cmf.keytab because name is hard-coded in Cloudera Manager.
Cruise Control	cruisecontrol	hadoop	The Cruise Control process runs as this user.
HttpFS	httpfs	httpfs	The HttpFS service runs as this user. See "HttpFS authentication" for instructions on how to generate the merged httpfs-http.keytab file.
Hue	hue	hue	Hue services run as this user.
Hue Load Balancer	apache	apache	The Hue Load balancer has a dependency on the apache2 package that uses the apache user name. Cloudera Manager does not run processes using this user ID.
Key Trustee Server	keytrustee	keytrustee	The Key Trustee Server service runs as this user.
Schema Registry	schemaregistry	hadoop	The Schema Registry process runs as this user.
Streams Messaging Manager	streamsmsgmgr	streamsmsgmgr	The Streams Messaging Manager processes runs as this user.
Streams Replication Manager	streamsrepmgr	streamsrepmgr	The Streams Replication Manager processes runs as this user.

Keytabs and Keytab File Permissions

Linux user accounts, such as hdfs, are mapped to the username portion of the Kerberos principal names, as follows:

```
username/host.example.com@EXAMPLE.COM
```

For example, the Kerberos principal for Apache Hive would be:

```
hive/host.example.com@EXAMPLE.COM
```

Keytabs that contain multiple principals are merged automatically from individual keytabs by Cloudera Manager. If you override a service configuration to not use the CM-provided keytab, then you must ensure that all the principals required for the given role instance on a specific host are merged together in the keytab file you deploy manually on that host.

For example, for Filename (*.keytab), the Atlas keytab filename would be atlas.keytab, HBase would be hbase.keytab, and Cloudera Manager would be cmf.keytab and scm.keytab.

Keytab File Owner:Group matters when Cloudera Manager starts a role. For example, Cloudera Manager starts the role "DataNode"". Cloudera Manager launches the DataNode process as a user (here, "hdfs"). Because that process needs to access the HDFS keytab, Cloudera Manager puts the HDFS keytab in the DataNode's process directory, and the keytab is given the owner:group that is listed in the table. Thus, the DataNode process properly owns the keytab file.

The tables below lists the usernames to use for Kerberos principal names, for clusters managed by Cloudera Manager.

Apache Atlas

Role: atlas-ATLAS_SERVER

Kerberos Principals

atlas

Filename (*.keytab)

atlas

Keytab File Owner:Group

atlas:atlas

File Permission (octal)

600

Apache Flink

Role: flink

Kerberos Principals

flink

Filename (*.keytab)

flink

Keytab File Owner:Group

flink:flink

File Permission (octal)

600

Apache HBase

Role: hbase-HBASETHRIFTSERVER

Kerberos Principals

hbase, HTTP

Filename (*.keytab)

hbase, HTTP

Keytab File Owner:Group

hbase:hbase

File Permission (octal)

600

Role: hbase-REGIONSERVER

Kerberos Principals

hbase, HTTP

Filename (*.keytab)

hbase, HTTP

Keytab File Owner:Group

hbase:hbase

File Permission (octal)

600

Role: hbase-HBASERESTSERVER

Kerberos Principals

hbase, HTTP

Filename (*.keytab)

hbase, HTTP

Keytab File Owner:Group

hbase:hbase

File Permission (octal)

600

Role: hbase-MASTER
Kerberos Principals

hbase, HTTP

Filename (*.keytab)

hbase, HTTP

Keytab File Owner:Group

hbase:hbase

File Permission (octal)

600

Apache HBase indexer

Role: ks_indexer-HBASE_INDEXER
Kerberos Principals

hbase, HTTP

Filename (*.keytab)

hbase

Keytab File Owner:Group

hbase:hbase

File Permission (octal)

600

Apache HDFS

Role: hdfs-NAMENODE
Kerberos Principals

hdfs, HTTP

Filename (*.keytab)

hdfs

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: hdfs-DATANODE
Kerberos Principals

hdfs, HTTP

Filename (*.keytab)

hdfs

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: hdfs-SECONDARYNAMENODE
Kerberos Principals

hdfs, HTTP

Filename (*.keytab)

hdfs

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Apache Hive, Hive on Tez

Role: hive-HIVESERVER2
Kerberos Principals

hive

Filename (*.keytab)

hive

Keytab File Owner:Group

hive:hive

File Permission (octal)

600

Role: hive-HIVEMETASTORE
Kerberos Principals

hive

Filename (*.keytab)

hive

Keytab File Owner:Group

cloudera-scm:cloudera-scm

File Permission (octal)

600

Apache Impala

Role: impala-STATESTORE
Kerberos Principals

impala, HTTP

Filename (*.keytab)

impala

Keytab File Owner:Group

impala:impala

File Permission (octal)

600

Role: impala-CATALOGSERVER
Kerberos Principals

impala, HTTP

Filename (*.keytab)

impala

Keytab File Owner:Group

impala:impala

File Permission (octal)

600

Role: impala-IMPALAD
Kerberos Principals

impala, HTTP

Filename (*.keytab)

impala

Keytab File Owner:Group

impala:impala

File Permission (octal)

600

Apache Kafka

Role: kafka-KAFKA_BROKER
Kerberos Principals

kafka

Filename (*.keytab)

kafka

Keytab File Owner:Group

kafka:kafka

File Permission (octal)

600

Role: kafka-KAFKA_MIRROR_MAKER
Kerberos Principals

kafka_mirror_maker

Filename (*.keytab)

kafka

Keytab File Owner:Group

kafka:kafka

File Permission (octal)

600

Role: kafka-KAFKA_CONNECT
Kerberos Principals

kafka

Filename (*.keytab)

kafka

Keytab File Owner:Group

kafka:kafka

File Permission (octal)

600

Apache Knox

Role: knox-KNOX_GATEWAY

Kerberos Principals

knox, HTTP

Filename (*.keytab)

hbase

Keytab File Owner:Group

knox:knox

File Permission (octal)

600

Apache Kudu

Role: kudu-KUDU_MASTER

Kerberos Principals

kudu

Filename (*.keytab)

kudu

Keytab File Owner:Group

kudu:kudu

File Permission (octal)

600

Role: kudu-KUDU_TSERVER

Kerberos Principals

kudu

Filename (*.keytab)

kudu

Keytab File Owner:Group

kudu:kudu

File Permission (octal)

600

Apache Livy

Role: livy-LIVY_SERVER

Kerberos Principals

livy

Filename (*.keytab)

livy

Keytab File Owner:Group

livy:livy

File Permission (octal)

600

Apache NiFi

Role: nifi

Kerberos Principals

nifi, HTTP

Filename (*.keytab)

nifi

Keytab File Owner:Group

nifi:nifi

File Permission (octal)

600

Apache NiFi Registry

Role: nifiregistry
Kerberos Principals

nifiregistry, HTTP

Filename (*.keytab)

nifiregistry

Keytab File Owner:Group

nifiregistry:nifiregistry

File Permission (octal)

600

Apache Oozie

Role: oozie-OOZIE_SERVER
Kerberos Principals

oozie, HTTP

Filename (*.keytab)

oozie

Keytab File Owner:Group

oozie:oozie

File Permission (octal)

600

Apache Ozone

Role: ozone-OZONE_MANAGER
Kerberos Principals

om, HTTP

Filename (*.keytab)

ozone

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: ozone-STORAGE_CONTAINER_MANAGER
Kerberos Principals

scm, HTTP

Filename (*.keytab)

ozone

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: ozone-OZONE_DATANODE
Kerberos Principals

dn, HTTP

Filename (*.keytab)

ozone

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: ozone-OZONE_RECON
Kerberos Principals

recon, HTTP

Filename (*.keytab)

ozone

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Role: ozone-S3_GATEWAY
Kerberos Principals

HTTP

Filename (*.keytab)

ozone

Keytab File Owner:Group

hdfs:hdfs

File Permission (octal)

600

Apache Phoenix

Role: phoenix-PHOENIX_QUERY_SERVER
Kerberos Principals

phoenix, HTTP

Filename (*.keytab)

phoenix

Keytab File Owner:Group

phoenix:phoenix

File Permission (octal)

600

Apache Ranger

Role: ranger-RANGER_ADMIN
Kerberos Principals

rangeradmin, rangerlookup, HTTP

Filename (*.keytab)

ranger

Keytab File Owner:Group

ranger:ranger

File Permission (octal)

600

Role: ranger-RANGER_USERSYNC
Kerberos Principals

rangerusersync

Filename (*.keytab)

ranger

Keytab File Owner:Group

ranger:ranger

File Permission (octal)

600

Role: ranger-RANGER_TAGSYNC
Kerberos Principals

rangertagsync

Filename (*.keytab)

ranger

Keytab File Owner:Group

ranger:ranger

File Permission (octal)

600

Apache Ranger KMS

Role: ranger-RANGER_TAGSYNC
Kerberos Principals

rangerkms, HTTP

Filename (*.keytab)

ranger_kms

Keytab File Owner:Group

kms:kms

File Permission (octal)

600

Apache Ranger Raz

Role: ranger-RANGER_RAZ
Kerberos Principals

rangerraz, HTTP

Filename (*.keytab)

rangerraz

Keytab File Owner:Group

ranger:rangerraz

File Permission (octal)

600

Apache Ranger RMS

Role: ranger-RANGER_RMS

Kerberos Principals

rangerrms

Filename (*.keytab)

rangerrms

Keytab File Owner:Group

ranger:rangerrms

File Permission (octal)

600

Apache Solr

Role: solr-SOLR_SERVER

Kerberos Principals

solr, HTTP

Filename (*.keytab)

solr

Keytab File Owner:Group

solr:solr

File Permission (octal)

600

Apache Spark

Role: spark_on_yarn-SPARK_YARN_HISTORY_SERVER

Kerberos Principals

spark

Filename (*.keytab)

spark

Keytab File Owner:Group

spark:spark

File Permission (octal)

600

Apache YARN

Role: yarn-NODEMANAGER

Kerberos Principals

yarn, HTTP

Filename (*.keytab)

yarn

Keytab File Owner:Group

yarn:hadoop

File Permission (octal)

644

Role: yarn-RESOURCEMANAGER
Kerberos Principals

yarn, HTTP

Filename (*.keytab)

yarn

Keytab File Owner:Group

yarn:hadoop

File Permission (octal)

600

Role: yarn-JOBHISTORY
Kerberos Principals

mapred

Filename (*.keytab)

mapred

Keytab File Owner:Group

yarn:hadoop

File Permission (octal)

600

Apache Zeppelin

Role: zeppelin-ZEPPELIN_SERVER
Kerberos Principals

zeppelin, HTTP

Filename (*.keytab)

zeppelin

Keytab File Owner:Group

zeppelin:zeppelin

File Permission (octal)

600

Apache ZooKeeper

Role: zookeeper-server
Kerberos Principals

zookeeper

Filename (*.keytab)

zookeeper

Keytab File Owner:Group

zookeeper:zookeeper

File Permission (octal)

600

Cloudera Management

Role: cloudera-mgmt-REPORTSMANAGER
Kerberos Principals

hdfs

Filename (*.keytab)

headlamp

Keytab File Owner:Group

cloudera-scm:cloudera-scm

File Permission (octal)

600

Role: cloudera-mgmt-SERVICEMONITOR
Kerberos Principals

hue

Filename (*.keytab)

cmon

Keytab File Owner:Group

cloudera-scm:cloudera-scm

File Permission (octal)

600

Role: cloudera-mgmt-ACTIVITYMONITOR
Kerberos Principals

hue

Filename (*.keytab)

cmon

Keytab File Owner:Group

cloudera-scm:cloudera-scm

File Permission (octal)

600

Cloudera Manager

Kerberos Principals

cloudera-scm, HTTP

Filename (*.keytab)

cmf, scm

Keytab File Owner:Group

cloudera-scm:cloudera-scm

File Permission (octal)

600

CruiseControl

Role: cruise_control-CRUISE_CONTROL_SERVER
Kerberos Principals

cruisecontrol, kafka, HTTP

Filename (*.keytab)

cruise_control

Keytab File Owner:Group

cruisecontrol:hadoop

File Permission (octal)

600

HttpFS

Role: hdfs-HTTPFS

Kerberos Principals

httpfs, HTTP

Filename (*.keytab)

httpfs

Keytab File Owner:Group

httpfs:httpfs

File Permission (octal)

600

Hue

Role: hue-KT_RENEWER

Kerberos Principals

hue

Filename (*.keytab)

hue

Keytab File Owner:Group

hue:hue

File Permission (octal)

600

Schema Registry

Role: schemaregistry-SCHEMA_REGISTRY_SERVER

Kerberos Principals

schemaregistry, HTTP

Filename (*.keytab)

schemaregistry

Keytab File Owner:Group

schemaregistry:hadoop

File Permission (octal)

600

Streams Messaging Manager

Role: streams_messaging_manager-STREAMS_MESSAGING_MANAGER_SERVER

Kerberos Principals

streamsmsgmgr, HTTP

Filename (*.keytab)

streams_messaging_manager

Keytab File Owner:Group

streamsmsgmgr:streamsmsgmgr

File Permission (octal)

600

Streams Replication Manager

Role: streams_replication_manager-STREAMS_REPLICATION_MANAGER_DRIVER
Kerberos Principals

streamsrepmgr

Filename (*.keytab)

streams_replication_manager

Keytab File Owner:Group

streamsrepmgr:streamsrepmgr

File Permission (octal)

600

Role: streams_replication_manager-STREAMS_REPLICATION_MANAGER_SERVICE
Kerberos Principals

streamsrepmgr

Filename (*.keytab)

streams_replication_manager

Keytab File Owner:Group

streamsrepmgr:streamsrepmgr

File Permission (octal)

600

Create Service Principals and Keytab Files for HDP

This section is optional. During the HDP 3.1.5 to HDP intermediate bits upgrade, Ambari can generate the principals and keytabs. However, before upgrading, you can manually generate the principals and keytabs. First, create the principal using mandatory naming conventions and then create the keytab file with the principal's information. Lastly, copy the keytab file to the keytab directory on the appropriate service host.

To create a service principal, use the kadmin utility. The kadmin utility is a command-line driven utility where you can run Kerberos commands to manipulate the central database. To start kadmin, run the following commands:

1. `'kadmin $USER/admin@REALM'`
2. `kadmin: addprinc -randkey $principal_name/$service-host-FQDN@$hadoop.realm`

Note:

a. You must have a principal with administrative permissions to run the above commands.
b. The randkey is used to generate the password.
c. The `$principal_name` part of the name must match the values in the table below.

In the example mentioned in step 2, each service principal's name is appended with a fully qualified domain name of the host on which the principal is running. This is to provide a unique principal name for services that run on multiple hosts, like DataNodes and TaskTrackers. The addition of the hostname serves to distinguish, for example, a request from DataNode A from a request from DataNode B. This is important for two reasons:

- If the Kerberos credentials for one DataNode are compromised, it does not automatically compromise all other DataNodes.
- If multiple DataNodes have the same principal and are simultaneously connecting to the NameNode, and if the Kerberos authenticator sent has the same timestamp, then the authentication is rejected as a replay request.

Note: The NameNode, Secondary NameNode, and Oozie require two principals each.

If you are configuring High Availability (HA) for a Quorum-based NameNode, you must also generate a principle (jn/$FQDN) and keytab (jn.service.keytab) for each JournalNode. JournalNode also requires the keytab for its HTTP service. If the JournalNode is deployed on the same host as a NameNode, the same keytab file (spnego.service.keytab) can be used for both. In addition, HA requires two NameNodes. Both the active and standby NameNodes require their own principal and keytab files. The service principles of the two NameNodes can share the same name, specified with the dfs.namenode.kerberos.principal property in hdfs-site.xml, but the NameNodes still have different fully qualified domain names.

Service	Component/Role	Principal Name	Mandatory Keytab Filename
HDFS	NameNode	nn/$FQDN	nn.service.keytab
	SecondaryNameNode	nn/$FQDN	nn.service.keytab
	DataNode	dn/$FQDN	dn.service.keytab
	Journal Server*	jn/$FQDN	jn.service.keytab
	NameNode HTTP	HTTP/$FQDN	spengo.service.keytab
	SecondaryNameNode HTTP	HTTP/$FQDN	spnego.service.keytab
MapReduce	MR2 History Server	jhs/$FQDN	nm.service.keytab
	MR2 History Server HTTP	HTTP/$FQDN	spnego.service.keytab
YARN	Node Manager	nm/$FQDN	nm.service.keytab
	Resource Manager	rm/$FQDN	rm.service.keytab
	YARN Timeline Server	yarn-ats/$FQDN	yarn-ats.service.keytab
	HTTP	HTTP/$FQDN	spnego.service.keytab
Oozie	Oozie Server	oozie/$FQDN	oozie..service.keytab
	Oozie HTTP	HTTP/$FQDN	spnego.service.keytab
Hive	HiverServer2, HMS	hive/$FQDN	hive.service.keytab
	Hive HTTP	HTTP/$FQDN	spnego.service.keytab
HBase	HBase Master Server	hbase/$FQDN	hbase.service.keytab
	HBase RegionServer	hbase/$FQDN	hbase.service.keytab
Kafka	Kafka Broker	kafka/$FQDN	kafka.service.keytab
Zeppelin	Zeppelin Server	zeppelin/$FQDN	zeppelin.service.keytab
Zookeeper		zookeeper/$FQDN	zk.service.keytab
Knox		knox/$FQDN	knox.service.keytab
Ranger	Admin Server	rangeradmin/$FQDN	rangeradmin.service.keytab
	Lookup Server	rangerlookup/$FQDN	rangerlookup.service.keytab
	KMS	rangerkms/$FQDN	rangerkms.service.keytab
	UserSync	rangerusersync/$FQDN	rangerusersync.service.keytab
	TagSync	rangertagsync/$FQDN	rangertagsync.service.keytab
AMS		amshbase/$FQDN	ams-hbase.master.keytab
		amsmon/$FQDN	ams.collector.keytab
		amszk/$FQDN	ams-zk.service.keytab
Spark2		spark/$FQDN	spark.service.keytab
Druid		druid/$FQDN	druid.service.keytab
Infra-Solr		infra-solr/$FQDN	ambari-infra-solr.service.keytab
Atlas		atlas/$FQDN	atlas.service.keytab
Livy		livy/$FQDN	livy.service.keytab

* Only required if you are setting up NameNode HA. For example, to create the principal for a DataNode service, run the command `kadmin: addprinc -randkey dn/$datanode-host@$hadoop.realm`

3. Extract the related keytab file and place it in the keytab directory of the respective components. The default directory is /etc/krb5.keytab.

- `kadmin: xst -k $keytab_file_name $principal_name/fully.qualified.domain.name`

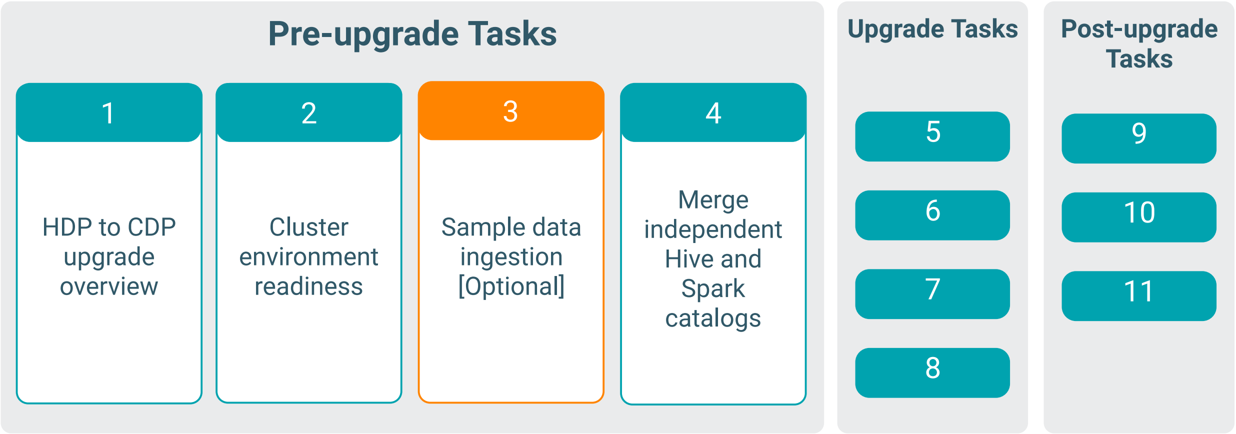
  You must use the mandatory names for the $keytab_file_name variable shown in the table above. For example, to create the keytab files for the NameNode, run the command `kadmin: xst -k nn.service.keytab nn/$namenode-host kadmin: xst -k spnego.service.keytab HTTP/$namenode-host`

  After creating the keytab files, copy the keytab files to the keytab directory of the respective service hosts.

4. On each service in your cluster, verify that the correct keytab files and principals are associated with the correct service using the klist command. For example, on the NameNode, run the command `klist –k -t /etc/security/nn.service.keytab`

Sample data ingestion

Cloudera recommends you use a subset of your workload or any sample data for any jobs or queries and do a benchmarking. You can record the time taken for the critical jobs and compare the performance of pre and post upgrade setup.


Pre-upgrade Tasks
1
HDP to CDP upgrade overview
2
Cluster environment readiness
3
Sample data ingestion [Optional]
4
Merge independent Hive and Spark catalogs
Upgrade Tasks
5
6
7
8
Post-upgrade Tasks
9
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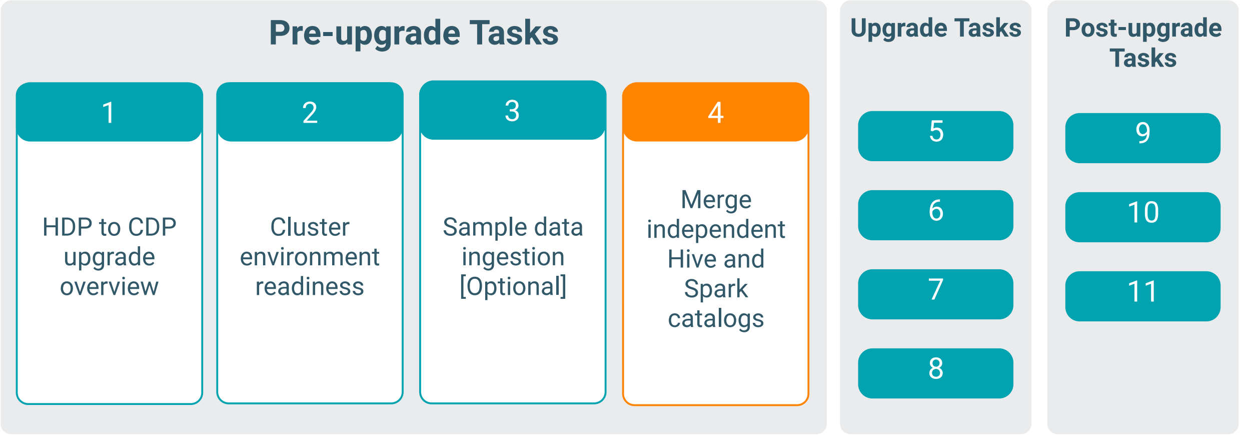
Cloudera recommends you use a subset of your workload or any sample data for any jobs or queries and do a benchmarking if required. You can record the time taken for the critical jobs and compare the performance of pre and post upgrade setup.

Merge Independent Hive and Spark Catalogs

If you upgraded to HDP 3.1.5 from an earlier version of HDP 3.x and did not convert independent catalogs to a shared catalog, you must do this before migrating tables to CDP.

About this task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1
HDP to CDP upgrade overview
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Cluster environment readiness
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Sample data ingestion [Optional]
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Merge independent Hive and Spark catalogs
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In HDP 3.0 - 3.1.4, Spark and Hive use independent catalogs for accessing tables created using SparkSQL or Hive tables. A table created from Spark resides in the Spark catalog. A table created from Hive resides in the Hive catalog. Databases fall under the catalog namespace, similar to how tables belong to a database namespace. In HPD 3.1.5, Spark and Hive share a catalog in Hive metastore (HMS) instead of using separate catalogs.

The Apache Hive schematool in HDP 3.1.5 and CDP releases supports the mergeCatalog task. This task performs the following actions:

- Detects conflicts in DB names across catalogs and in case of conflicts, lists each conflict, and exits.
- When there are no conflicts, the following changes occur:
  - Adds EXTERNAL=true to the table properties of all managed tables in the source catalog.
  - Adds external.table.purge=true in table properties of all managed tables in the source catalog.
  - Sets tableType=EXTERNAL for all managed tables in the source catalog.
  - Sets CTLG_NAME=<toCatalog> for all databases in the source catalog.

Use the following syntax to merge the databases in the catalog named spark into a catalog named hive, which is the default catalog for HiveServer (HS2).

```
schematool -dbType <database> -mergeCatalog spark -toCatalog hive [-verbose]
 [-dryRun]
```

The default names of the catalogs are spark and hive. The dryRun option rolls back the changes.

To merge catalogs:

Procedure

1. On the operating system command line, run a Hive schematool query test, using the dryRun option to roll back changes. For example:

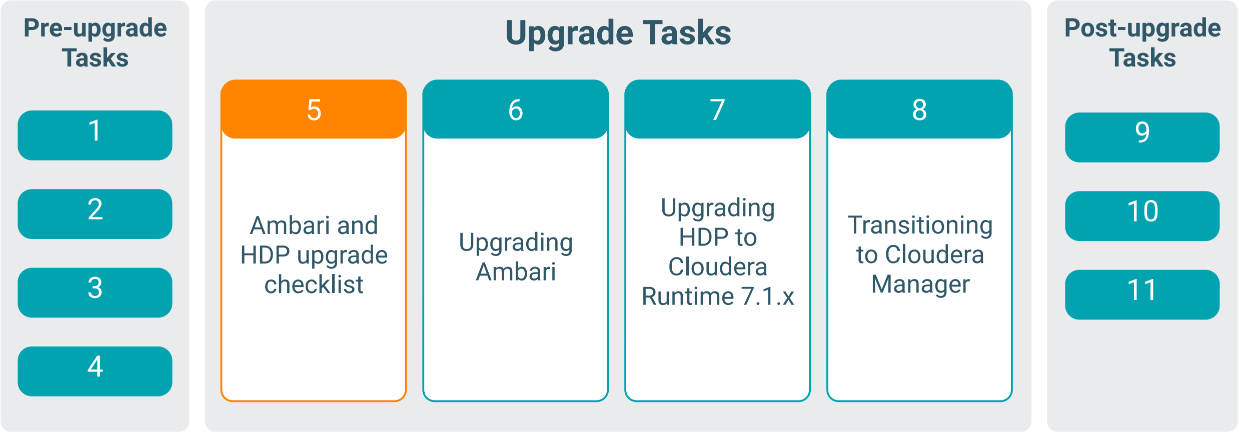
   ```
   bin/schematool -mergeCatalog spark -toCatalog hive -verbose  -dbType mysql
    --dryRun
   ```

2. Check the output, and if there are no conflicts, merge catalogs. For example:

   ```
   bin/schematool -mergeCatalog spark -toCatalog hive -verbose  -dbType mysql
   ```

Ambari and HDP Upgrade Checklist

Before upgrading Ambari and HDP, you must review the checklist for activities that you must perform to ensure the cluster is ready for the upgrade.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Ambari upgrade checklist

When preparing to upgrade Ambari and the HDP Cluster, Cloudera recommends that you review this checklist to confirm that your cluster operation is healthy. Attempting to upgrade a cluster that is operating in an unhealthy state can produce unexpected results.

Pre-upgrade checklist

When preparing to upgrade Ambari and the HDP Cluster, Cloudera recommends that you review this checklist to confirm that your cluster operation is healthy. Attempting to upgrade a cluster that is operating in an unhealthy state can produce unexpected results.

Important: Always ensure that you are using the most recent version of Ambari to perform your upgrade.

- Ensure all services in the cluster are running.
- Run each Service Check (found under the Service Actions menu) and confirm they execute successfully.
- Clear all alerts, or understand why they are being generated. Remediate as necessary.
- Confirm that the start and stop options for all services are executing successfully.
- Record the time it takes to start and stop each service. The time to start and stop services is a big contributor to overall upgrade time so having this information handy is useful.
- Download the software packages prior to the upgrade. Place them in a local repository and consider using a storage proxy because multi-gigabyte downloads are required on all nodes in the cluster.
- Ensure point-in-time backups are taken of all databases that support the cluster. This includes (among others) Ambari, Hive, Ranger, Druid, Superset, and Oozie.

Note: To find all the download links in a centralised location, see Software download matrix

Download cluster blueprints without hosts

Ensure you download the cluster blueprints before you begin the upgrade. The blueprint of your old cluster is used as the template of the new cluster after you transition to Cloudera Manager.

About this task

Procedure

To download the cluster blueprints without hosts, do the following:

```
curl ${securecurl} -H "X-Requested-By: ambari" -X GET -u ${ambariuser}:${amb
aripwd} ${ambariprotocol}://${ambariserver}:${ambariport}/api/v1/clusters/${
clustername}?format=blueprint > "${backupdir}"/${clustername}_blueprint_with
out_hosts_"$(date +"%Y%m%d%H%M%S")".json
```

where,

securecurl = -k for https

ambariuser = Ambari User Name

ambaripwd = Ambari Password

ambariprotocol = http or https

ambariserver = Ambari Server Name

ambariport = Ambari Port

clustername = The Name of the cluster

backupdir = The folder to download the blueprint

HDP upgrade checklist

You must ensure that your HDP cluster satisfies specific prerequisites before initiating the upgrade to Ambari 7.1.x.x.

- You must have root, administrative, or root-equivalent authorization on the Ambari Server host and all Ambari Agent hosts in the cluster.
- You must make a safe copy of the Ambari Server configuration file found at /etc/ambari-server/conf/ambari.properties.
- If your cluster is SSO-enabled, do not stop Knox before upgrading Ambari.
- You must disable the Queue Priority Support feature of YARN.

Checklist for large clusters

If you have a large cluster with a large data volume, you should configure the Ambari NameNode restart timeout parameter on the Ambari Server host, to ensure that the Ambari requests for starting the NameNode do not timeout during an upgrade.

In a large cluster, NameNode startup processes can take a long time. NameNode startup time depends not only on host properties, but also on data volume and network parameters. To ensure that the Ambari requests for starting the NameNode do not timeout during an upgrade, you should configure the Ambari NameNode restart timeout parameter, upgrade.parameter.nn-restart.timeout in /etc/ambari-server/conf/ambari.properties on the Ambari Server host. You may need to add the restart timeout parameter and value to the Ambari server host following a default installation. For a large cluster, you should add 10% to the usual time (in seconds) required to restart your NameNode. Although no standard way to determine an appropriate value exists, you may use the following guidance:

For example, record the time (seconds) required to restart the active NameNode for your current Ambari server version. If restarting takes 10 minutes, (600 seconds), then add upgrade.parameter.nn-restart.timeout=660 to the /etc/ambari-server/conf/ambari.properties file on the Ambari Server host.

After adding or resetting the Ambari NameNode restart parameter, restart your Ambari server before starting the HDP upgrade.

```
ambari-server restart
```

For Ambari Upgrades

- Review supported Ambari Server database versions using the *Cloudera Support Matrix*. Review the resources required for the database upgrade. You will upgrade your Ambari Server database during the Ambari upgrade procedure.
- Ambari 7.1.x.x only supports the following operations when running against a HDP 3.1.5 cluster:
- - Run Service Checks
  - Start, Stop, Restart a Service
  - Change Configuration
  - Enable and Disable Maintenance Mode
  - Disable Auto Start
  - Remove Services
  - Remove Components
  - Remove and Decommission Hosts

To restore full management functionality, use Ambari 7.1.x.x to upgrade to HDP intermediate bits as soon as possible.

For HDP Cluster Upgrades

- Ensure sufficient disk space on /usr/hdp/<version> (roughly 10GB for each additional HDP release).
- Additional components are added to the cluster as part of the HDP intermediate bits upgrade including YARN ATSv2, YARN Registry DNS, and additional Hive clients required for the Spark history server. If your cluster has kerberos enabled, you must configure Ambari to manage the kerberos administrator credentials prior to the upgrade, so that the appropriate kerberos principals can be created during the upgrade process.
- You must take a backup of the running topology processes if your HDP cluster includes the Storm component. You must stop and remove the Storm services during the upgrade. Cloudera Private Cloud Base cluster does not support Storm. Storm can be replaced with Cloudera Streaming Analytics (CSA) powered by Apache Flink. For more information on Component changes in CDP Private Cloud, see Updated HDP Components.

Related Information

Cloudera Support Matrix

Before upgrading any cluster

Prior to installing HDP intermediate bits using Ambari as a part of the CDP upgrade process, your cluster must meet the certain prerequisites to ensure that the cluster is in a healthy operating mode and can successfully manage the upgrade process.

For any Cluster

Disk Space: Be sure to have adequate space on /usr/hdp for the target HDP version. Each complete install of an HDP version occupies about 10GB of disk space.

Ambari Agent Heartbeats: All Ambari Agents must be communicating and heartbeating to Ambari Server. Any hosts that are not heartbeating must be in Maintenance mode.

Hive Upgrade: The upgrade process does not back up the Hive Metastore, nor does it compact ACID tables. Before upgrading Hive, you must:

- Manually back up your Hive metastore database after using the pre-upgrade tool, described later, and before upgrading.

- If you have ACID tables in your Hive metastore database, enable ACID operations using Ambari Web or set Hive configuration properties to enable ACID.

Note: You must remove the components that are unsupported in CDP Private Cloud Base. For more information, see HDP Core component version changes. If you are not using a component in the CDP cluster, then you must remove them. The unused component extends the time and complexity of the HDP to CDP upgrade.

Host Maintenance Mode

The following two scenarios are checked:

- Any hosts in Maintenance mode must not be hosting any Service Master Components.
- Any host in Maintenance Mode that is not hosting Master Components is allowed but you will receive a warning. You can proceed with the upgrade. But these hosts will not be upgraded and before finalising the upgrade, you must delete these hosts from the cluster.

Service Maintenance Mode: No services can be in Maintenance mode, except for Ambari Metrics System, SmartSense, and Log Search.

Services Started: All services must be started, except for Ambari Metrics System, SmartSense, and Log Search.

Service Checks: All service checks must pass. Be sure to run Service Actions > Run Service Check on all services (and remediate if necessary) prior to attempting an HDP upgrade.

Managing MPacks

You must review the information mentioned in this section before you proceed with the upgrade.

- Not all Management Packs are compatible with the HDP intermediate bits. Cloudera Support can help you assess the feasibility of your upgrade if you have Management Packs other than HDF installed.
- If you have both HDF and HDP managed by the same Ambari instance, you must be on HDF 3.5.2. Once you've upgraded to HDF 3.5.2 you must have Ambari 2.7.5 with HDP 3.1.5 and HDF 3.5.2. At this point, the in-place upgrade process using AM2CM will take care of both HDP and HDF at the same time to transition you to CDP cluster including the CFM parcel (which contains NiFi and NiFi Registry). You must read the HDF documentation before proceeding with the In-place upgrade of HDF to CFM on CDP. For more information, see HDF to CFM on CDP documentation.
- If you have doubts or concerns or questions about the migration process, you must contact the Cloudera Support for further assistance to help you determine the best migration plan for your business needs.
- The latest and supported version of AM2CM is AM2CM 2.3.0. However, this version is capable of handling only HDF 3.5.2.0 # CPD 7.1.7.0 upgrade path.

Changes to Ambari services and views

Review the list of additional components that are added to your cluster, along with the deprecated services and views that are removed during the process of upgrading to Ambari 7.1.x and HDP intermediate bits.

These services are removed automatically as part of the upgrade process. You can also remove these services manually prior to the upgrade by following the steps below:

1. Log in to the Ambari UI.
2. Click the service you wish to remove.
3. Stop the service.
4. Delete the service.

Ambari 2.7.5.x to Ambari 7.1.x.x.

The Ambari 2.7.5.x to Ambari 7.1.x.x upgrade removes the following views:

- Accumulo

- Storm
- Superset
- Pig

The HDP 2.6.5.x to HDP intermediate bits upgrade removes the following services:

- Accumulo
- Storm
- Superset
- Pig
- SmartSense

Caution:

- When you upgrade Ambari to a later version, Accumulo service is not supported as Accumulo is not compatible with other components and cannot access the data. Hence, you must delete Accumulo service when upgrading Ambari.

Note: You must remove Accumulo on the Ambari managed HDP cluster as the AM2CM tool does not transition the Accumulo component from HDP to CDP. However, you can add Accumulo as a service on the Cloudera manager managed CDP Private Cloud Base cluster.

Important:

- Upgrading from HDP 3.1.5 to HDP intermediate bits does not support HDP Search to Cloudera Search upgrade.
- LLAP is not supported in Cloudera Private Cloud Base. You can move the LLAP workloads to CDW Public cloud or Private Cloud.
- You must manually remove Storm before upgrading to the HDP Intermediate bits as it is not supported in the HDP intermediate bits.

HDP Core component version changes

You must be aware of the version number changes for the core components included in HDP 3.1.5.x.

Component	HDP 3.1.5	Ambari 7.1.x.x	Cloudera Private Cloud Base (Cloudera Manager)
Hadoop	3.1.1	3.1.1	3.1.1
Hive	3.1.0 2.1.0 (LLAP)	3.1.3000 CLI Removed	3.1.3000
Hive MR	1.2.1	Removed	Removed
Hive LLAP	Available	Removed	Removed
Hive TEZ	0.9.1	0.9.1	0.9.1
Oozie	4.3.1	5.1.0	5.1.0
Sqoop	1.4.7	1.4.7	1.4.7
Flume	Removed	Removed	Removed
Pig	0.16.0	Removed	Removed
HBase	2.1.6	2.2.3	2.2.3
Phoenix	5.0.0	5.0.0	5.0.0
Knox	1.0.0	1.3.0	1.3.0
Ranger	1.2.0	2.0.0	2.0.0
Ranger KMS	1.2.0	2.0.0	2.0.0

Component	HDP 3.1.5	Ambari 7.1.x.x	Cloudera Private Cloud Base (Cloudera Manager)
Druid	0.12.1	Not available	Not available
Storm	1.2.1	Removed	Removed
Spark	2.3.2	2.4.5	2.4.5
ZooKeeper	3.4.6	3.5.5	3.5.5
Zeppelin	0.8.0	0.8.2	0.8.2
Falcon	Removed	Removed	Removed
Atlas	2.0.0	2.0.0	2.1.0
Kafka	2.0.0	2.4.0	2.4.0
Tez	0.9.1	0.9.1	0.9.1
Accumulo	1.7.0	Removed	Removed
Infra Solr	0.1.0	0.1.0	Removed
Ambari Metrics	0.2.0	0.2.1	Removed
Log Search	0.5.0	0.5.0	Removed
SmartSense	1.5.1	Removed	Removed
Superset	0.23.0	Removed	Removed

Note:

Some of the components are removed between HDP and Ambari PvC Base. You must work with the application teams to transition workloads to another part of the stack before you upgrade. When the transition is complete, remove those components from the HDP stack before you upgrade to Ambari-DC.

Upgrading the cluster’s underlying OS

Ensure that all your hosts in the cluster are on the operating systems supported with the HDP intermediate bits and Ambari 7.1.x.x before starting the upgrade from HDP 3.1.5.x to HDP intermediate bits.

Only RHEL, CentOS, and Ubuntu operating systems are supported with the HDP intermediate bits and Ambari 7.1.x.x. Ensure that all your hosts in the cluster are on the supported operating system before starting the upgrade from HDP 3.1.5.x to HDP intermediate bits. For more information on the supported versions of Operating systems, see Operating system requirements.

Note: SLES 12 SP5 is now supported for use with the HDP intermediate bits and Cloudera Private Cloud Base 7.1.4 and higher.

For many, this is a process that takes time and orchestration between multiple teams within your organization. Two high-level guidelines for moving from one major operating system version to another is as follows:

In-Place and Restore:

Perform an In-place OS refresh and use Ambari Restore Host feature

Move and Decom:

Move Masters and Decom/Recom Workers

Each option has advantages and disadvantages and high-level decision criteria.

In-Place and Restore

Review the activities involved in ensuring important metadata and data are stored on a volume that is not being used by the operating system, and leveraging component high availability to maintain maximum cluster availability before starting the upgrade to HDP intermediate bits.

This option should be used in medium to large clusters (25 or more nodes), with operational teams that have environment automation experience, and have followed best practices when setting up component High Availability and HDP directory structures (such as ensuring that the HDP component data and metadata are not stored on the root volume).

This option involves going through each host in the cluster and ensuring important metadata and data are stored on a volume that is not being used by the operating system, and leverages component high availability to maintain maximum cluster availability. When visiting each host, the host is shut down, the operating system volume is refreshed with the new version of the chosen operating system, the host is configured with the same IP address and hostname, all volumes are re-mounted, and the Ambari agent is installed and configured. After the host has rejoined the cluster, the Ambari Recover Host functionality is used to reinstall, reconfigure, and start services. To ensure that no data is lost during the reinstall of the operating system, verify that your OS volumes do not contain any HDP data or metadata. Additionally, during the OS reinstall, make sure that you do not erase or reformat any non-operating-system volumes, such as HDFS data drives, as this may result in data loss.

Move and Decommission

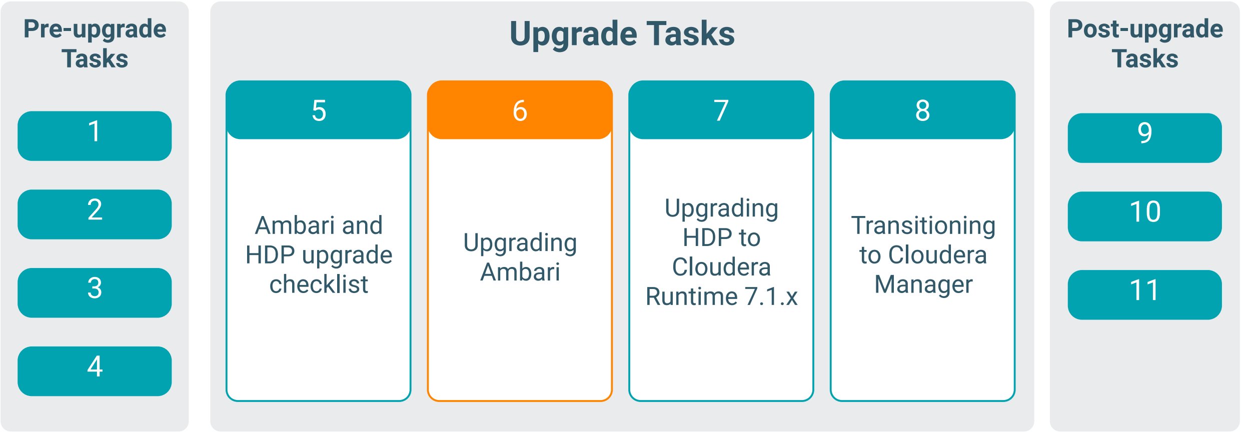
You have the option to replace worker nodes with new operating system and move master nodes to hosts wth new operating system when operating teams either do not have access to the operating system or have not followed the best practices when setting up the HDP directory structures.

This option should be used in smaller clusters (under 25 nodes), where operational teams may not have access to operating system and configuration management automation tooling or have not yet followed best practices when setting up the HDP directory structures (such as ensuring HDP component data and metadata are not stored on the root volume).

This option involves decommissioning worker nodes and replacing them with worker nodes that have the new operating system version on them. For master nodes, the move-master operation is used to move all masters off of a host, and on to a new host with the new operating system version on them. Decommissioning worker nodes can take a great deal of time, depending on the density of the nodes, and move-master operations require many cluster services to be restarted, so this is a time-consuming process that requires multiple periods downtime, but it does not require any operating system level operations to be performed.

Upgrading Ambari

You must understand the considerations and the process to upgrade from the current version of Ambari to Ambari 7.1.x.x.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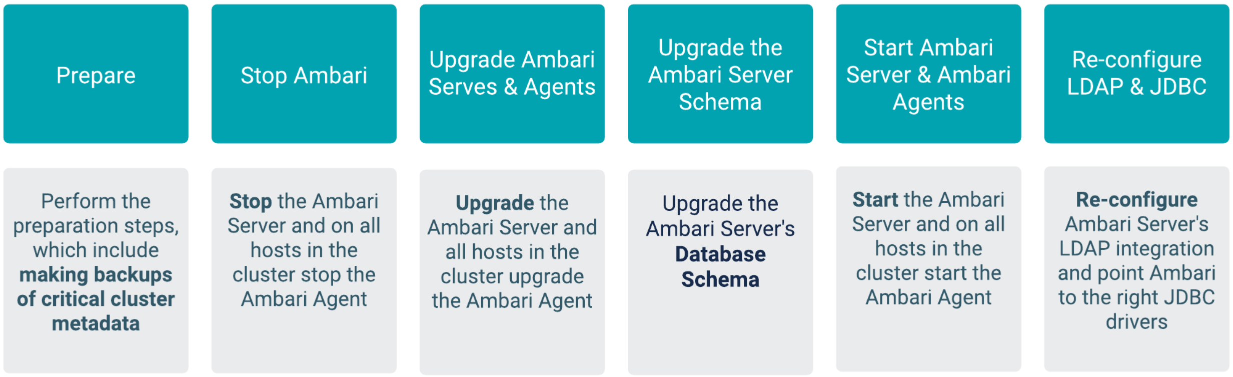
Before you upgrade Ambari

You must be aware of the exact steps and understand the interdependencies and order of the steps so that you can adjust and account for any special configurations for your cluster before starting the Ambari upgrade process.

Ambari and the HDP cluster being managed by Ambari can be upgraded independently. This section describes the process to upgrade Ambari. Cloudera recommends you to read completely through this entire document before starting the upgrade process, to that you understand the interdependencies and order of the steps. Cloudera recommends you to validate these steps in a test environment to adjust and account for any special configurations for your cluster.

- Preparing to Upgrade Ambari
- Upgrade Ambari
- The high-level process for upgrading Ambari is as follows:



Prepare

Stop Ambari

Upgrade Ambari Serves & Agents

Upgrade the Ambari Server Schema

Start Ambari Server & Ambari Agents

Re-configure LDAP & JDBC

Perform the preparation steps, which include **making backups of critical cluster metadata**

Stop the Ambari Server and on all hosts in the cluster stop the Ambari Agent

Upgrade the Ambari Server and all hosts in the cluster upgrade the Ambari Agent

Upgrade the Ambari Server's **Database Schema**

Start the Ambari Server and on all hosts in the cluster start the Ambari Agent

Re-configure Ambari Server's LDAP integration and point Ambari to the right JDBC drivers

Note: Ambari 7.1.x.x is not intended to be a long-term solution, only a brief interim step to Cloudera Private Cloud Base.

Backup Ambari

You must back up the current Ambari database. It creates a copy of the current Ambari database and meta information.

Procedure

1. On the Ambari Server host, stop the original Ambari Server.

```
ambari-server stop
```

2. Stop Ambari Agent.

```
Stop  Ambari Agent on all host
ambari-agent stop
```

3. Create a directory to hold the database backups.

```
cd /tmp
mkdir dbdumps/
cd dbdumps/
```

4. Create the database backups.

   POSTGRES

   ```
   pg_dump [AMBARI_DB_USERNAME] -U [AMBARI_DB_USERNAME] -f pre_upgrade.sql
   Password: [AMBARI_DB_PASSWORD]
   ```

   MYSQL

   ```
   mysqldump [AMBARI_DB_NAME] -u [AMBARI_DB_USERNAME] > pre_upgrade.sql
   ```

Variable	Description	Default
[AMBARI_DB_NAME]	The database name.	ambari
[AMBARI_DB_USERNAME]	The database username.	ambari
[AMBARI_DB_PASSWORD]	The database password.	bigdata

5. Create a backup of the Ambari properties.

   ```
   /etc/ambari-server/conf/ambari.properties
   /etc/ambari-agent/conf/ambari-agent.ini
   ```

Setting up a local repository

You need to set up a local repository, update the version repository base URLs, and edit the repository configuration file.

As a first step, you must set up a local repository for Ambari and HDP. For more information, see set up a local repository.

A case-study of setting up local repositories: Case study for setting up a local repo

When the local repository is created, update the version repository base urls in Ambari. For more information, see update the version repository base urls.

Finally, edit the repository configuration file to use this new local repository. For more information, see edit the repository configuration file

Note: You can use the case studies to set up a local repository for all of the 7.1.x versions. For example, the case studies in this section help you to set up a local repository for the 7.1.7 version.

Updating Ambari repo files

Some services depend on components that are installed from the Ambari repository. It is not updated automatically. Also, Package Manager displays an error about the unavailable repository URL when you update the package lists. Cloudera recommends you to manually update the URLs located at /etc/yum.repos.d/ambari.repo on all hosts (including server host).

Updating HDP repo files

When the cluster settings for the HDP repository URL is updated, repository files on hosts are not immediately regenerated. The files are re-generated when you add a new component or service. But an inaccessible repository URL causes the Package Manager to display an error about the unavailable repository URL when you update the package lists. Cloudera recommends you to manually update the URLs in the HDP repository files (for example, /etc/yum.repos.d/ambari-hdp-1.repo) on all agent hosts.

Before you begin

Note: Ambari 7.1.x.x and HDP 7.1.x.x are version numbers. For example, Ambari 7.1.8.0 and HDP 7.1.8.0 or Ambari 7.1.7.0 and HDP 7.1.7.0 or Ambari 7.1.6.0 and HDP 7.1.6.0 and so on.

Case study for setting up an HDP-GPL local repository

If the cluster is using the GPL components, you must replace the HDP-GPL repository URL with a local repository.

Procedure

1. Set up a local HDP-GPL repository

```
wget -nv https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.2000/centos7/hdp
.repo -O /etc/yum.repos.d/hdp.gpl.repomkdir -p /var/www/html/hdp-gpl/cen
tos7cd /var/www/html/hdp-gpl/centos7/reposync -r HDP-GPL-7.1.x.xcreatere
po /var/www/html/hdp-gpl/centos7/HDP-GPL-7.1.x.x/
```

2. Edit /etc/ambari-server/conf/ambari.properties.
3. Replace gpl.license.accepted=false with gpl.license.accepted=true.
4. Restart Ambari server.
5. You must edit the HDP-GPL repository similar to the HDP repository. However, the URL and Local repository contents, and the UI fields are different for both the repositories. For more information on updating the version repository, see Update version repository base urls. If you do not plan use the GPL components, disable the gpl.license.accepted property.
6. Restart Ambari server

Setting up local repository with temporary internet access

You must have completed the Getting Started Setting up a Local Repository procedure.

About this task

To finish setting up your local repository, complete the following:

Procedure

1. Install the repository configuration files for Ambari and the Stack on the host.
2. Confirm repository availability:
   - For RHEL, CentOS, Oracle or Amazon Linux: `yum repolist`
   - For SLES: `zypper repos`
   - For Debian and Ubuntu: `dpkg-list`

3. Synchronize the repository contents to your mirror server:

a) Browse to the web server directory:

- For RHEL, CentOS, Oracle or Amazon Linux: `cd /var/www/html`
- For SLES: `cd /srv/www/htdocs/rpms`
- For Debain and Ubuntu: `cd /var/www/html`

b) For Ambari, create the ambari directory and reposync: `mkdir -p ambari/<OS>`, `cd ambari/<OS>`, and `reposync -r Updates-Ambari-7.1.x.x`. In this syntax, the value of <OS> is amazonlinux2, centos7, sles12, ubuntu16, ubuntu18, or debian9.

Important: Due to a known issue in version 1.1.31-2 of the Debian 9 reposync, we advise using reposync version 11.3.1-3 or above when working on a Debian 9 host.

c) For Hortonworks Data Platform (HDP) stack repositories, create the hdp directory and reposync: `mkdir -p hdp/<OS>`, `cd hdp/<OS>`, and `reposync -r HDP-<latest.version>`, and `reposync -r HDP-UTILS-<version>`.

d) For HDF Stack Repositories, create an hdf directory and reposync. `mkdir -p hdf/<OS>`, `cd hdf/<OS>`, and `reposync -r HDF-<latest.version>`.

4. Generate the repository metadata:

- For Ambari: `createrepo <web.server.directory>/ambari/<OS>/Updates-Ambari-7.1.x.x`
- For HDP Stack Repositories: `createrepo <web.server.directory>/hdp/<OS>/HDP-<latest.version> createrepo <web.server.directory>/hdp/<OS>/HDP-UTILS-<version>`
- For HDF Stack Repositories: `createrepo <web.server.directory>/hdf/<OS>/HDF-<latest.version>`

5. Confirm that you can browse to the newly created repository:

- Ambari Base URL http://<web.server>/ambari/<OS>/Updates-Ambari-7.1.x.x
- HDF Base URL http://<web.server>/hdf/<OS>/HDF-<latest.version>
- HDP Base URL http://<web.server>/hdp/<OS>/HDP-<latest.version>
- HDP-UTILS Base URL http://<web.server>/hdp/<OS>/HDP-UTILS-<version>

Where:

- `<web.server>` – The FQDN of the web server host
- `<version>` – The Hortonworks stack version number
- `<OS>` – centos7, sles12, ubuntu16, ubuntu 18, or debian9

Important: Be sure to record these Base URLs. You need them when you are installing Ambari and the Cluster.

6. Optional. If you have multiple repositories configured in your environment, deploy the following plug-in on all the nodes in your cluster.

a) Install the plug-in. For RHEL/CentOS/Oracle 7: `yum install yum-plugin-priorities`

b) Edit the /etc/yum/pluginconf.d/priorities.conf file to add the following: [main] enabled=1 gpgcheck=0

Case study for setting up local repository

Review this case study to understand - how to prepare a local repository for Ambari 7.1.x.x and HDP 7.1.x.x on Centos7:

```
yum install yum-utils createrepo -y
yum install httpd -y
//firewall configuration
sudo systemctl start httpd
sudo systemctl status httpd
mkdir -p /var/www/html/
```

```
wget -nv https://archive.cloudera.com/p/ambaridc/7.x/7.1.7.2000/centos7/amb
aridc.repo -O /etc/yum.repos.d/ambari.repo
wget -nv archive.cloudera.com/p/HDPDC/7.x/7.1.7.2000/centos7/hdp.repo -O /
etc/yum.repos.d/hdp.repo
yum repolist
cd /var/www/html
mkdir -p ambari/centos7
cd ambari/centos7/
reposync -r ambari-7.1.x.x
cd ../..
mkdir -p hdp/centos7
cd hdp/centos7/
reposync -r HDP-7.1.x.x
reposync -r HDP-UTILS-1.1.0.22
createrepo /var/www/html/ambari/centos7/ambari-7.1.x.x
createrepo /var/www/html/hdp/centos7/HDP-7.1.x.x
createrepo /var/www/html/hdp/centos7/HDP-UTILS-1.1.0.22/
```

```
Result:
The repositories will be available at the local web server:
http://<web.server>/ambari/centos7/ambari-7.1.x.x/
http://<web.server>/hdp/centos7/HDP-7.1.x.x/
http://<web.server>/hdp/centos7/HDP-UTILS-1.1.0.22/
```

Update version repository base urls

Use Admin/Versions/Repositories to provide URLs for your source repositories.

Procedure

1. Browse to Ambari Admin > Versions > Manage Versions > OK.
2. In Admin/Versions, click the version name you want to modify.
3. In Repositories, modify the base URLs for the repositories. To use the private software repositories, see the list of available HDP repositories for each OS. Or, if you are using a local repository, enter the Base URLs for the local repository you have created.
4. Click Save.
5. Click Confirm Change. You must confirm the change since you are about to change repository Base URLs that are already in use. Please confirm that you intend to make this change and that the new Base URLs point to the same exact stack version and build.

Preparing Ambari Repository Configuration File to use Local Repository

You must prepare the Ambari Repository Configuration File to use the Local Repository.

Procedure

1. Download the ambari.repo file from the private repository: https://username:password@archive.cloudera.com/p/ambaridc/7.x/7.1.7.2000/<OS>/ambaridc.repo/
2. Edit the ambari.repo file and replace the Ambari Base URL baseurl obtained when setting up your local repository.

```
#VERSION_NUMBER=7.1.7.2000-3
[ambari-7.1.7.2000-3]
#json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
name=ambari Version - ambari-7.1.7.2000
baseurl=https://archive.cloudera.com/p/ambaridc/7.x/7.1.7.2000/centos7/
gpgcheck=1
gpgkey=https://archive.cloudera.com/p/ambaridc/7.x/7.1.7.2000/centos7/RPM-GP
G-KEY/RPM-GPG-KEY-Jenkins
```

```
enabled=1
priority=1
```

Note: You can disable the GPG check by setting gpgcheck =0. Alternatively, you can keep the check enabled but replace gpgkey with the URL to GPG-KEY in your local repository.

3. Base URL for a Local Repository.

    - Built with Repository Tarball (No Internet Access) http://<web.server>/Ambari-7.1.x.x/<OS>
    - Built with Repository File (Temporary Internet Access) http://<web.server>/ambari/<OS>/Updates-Ambari-7.1.x.x where <web.server> = FQDN of the web server host, and <OS> is amazonlinux2, centos7, sles12, ubuntu16, ubuntu18, or debian9.

4. Place the ambari.repo file on the host you plan to use for the Ambari server:

    - For RHEL/CentOS/Oracle/Amazon Linux: /etc/yum.repos.d/ambari.repo
    - For SLES: /etc/zypp/repos.d/ambari.repo
    - For Debain/Ubuntu: /etc/apt/sources.list.d/ambari.list

5. Edit the /etc/yum/pluginconf.d/priorities.conf file to add the following values: [main] enabled=1 gpgcheck=0

Preparing to Upgrade Ambari

You must prepare to upgrade Ambari to 7.1.x.x. Review this section before you upgrade.

- You must have root, administrative, or root-equivalent authorization on the Ambari Server host and all Ambari Agent hosts in the cluster.
- You must backup the Ambari Server database.
- You must make a safe copy of the Ambari Server configuration file found at /etc/ambari-server/conf/ambari.properties.
- If your cluster is SSO-enabled, do not stop Knox before upgrading Ambari.

During the Ambari upgrade, the existing /var/lib/ambari-server/ambari-env.sh file is overwritten and a backup copy of ambari-env.sh (with extension .rpmsave) is created. If you have manually modified ambari-env.sh (for example, to change Ambari Server heap), you must re-apply your changes in the new file.

Upgrade to Ambari 7.1.x.0

After reviewing the information related to Ambari UI and the Quick Links, and backing up the Ambari Server configuration file, perform the recommended steps for upgrading Ambari.

Upgrading Ambari

Related Information

Cloudera Support Matrix

Upgrade to Ambari 7.1.8

After reviewing the information related to Ambari UI and the Quick Links, and backing up the Ambari Server configuration file, perform the recommended steps for upgrading Ambari.

Procedure

1. If you are running Ambari Metrics in your cluster, stop the service and put it in Maintenance Mode. From Ambari Web, browse to Services > Ambari Metrics and select Stop from the Service Actions menu.
2. Stop the Ambari Server. On the host running Ambari Server: ambari-server stop
3. Stop all Ambari Agents. On each host in your cluster running an Ambari Agent: ambari-agent stop.

4. Fetch the new Ambari repo and replace the old repository file with the new repository file on all hosts in your cluster.

   Important: Important: Check your current directory before you download the new repository file to make sure that there are no previous versions of the ambaridc.repo file. If you do not, and a previous version exists, the new download will be saved with a numeric extension, such as ambari.repo.1. Make sure that the version you copy is the new version.

   Select the repository appropriate for your environment from the following list:

   - For RHEL/CentOS/Oracle Linux 7:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.8/centos7/ambari.repo -O /etc/yum.repos.d/ambari.
     repo
     ```
   - For Ubuntu 18:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.8/ubuntu18/ambari.list -O /etc/apt/sources.list.d/amb
     ari.list
     ```
   - For Sles 12:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.8/sles12/ambari.repo -O /etc/zypp/repos.d/ambari.repo
     ```
5. Upgrade Ambari Server. On the host running Ambari Server:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   ```

   Before upgrading Ambari Server, you must update the username and password of baseurl and gpgkey in the ambari.repo file. Run the following command:

   ```
   vi /etc/yum.repos.d/ambari.repo
   ```

   For example, the output displays the following:

   ```
   #VERSION_NUMBER=7.1.8.0-21
                               [ambari-7.1.8.0
                               #json.url = https://archive.cloudera.com/p/HD
   P/hdp_urlinfo.json
                               name=ambari Version - ambari-7.1.8.0
                               baseurl=https://[***USERNAME***]:[***PASSWOR
   D***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/centos7
                               gpgcheck=1
                               gpgkey=https://[***USERNAME***]:[***PASSWOR
   D***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/centos7/RPM-GPG-KEY/RPM-
   GPG-KEY-Jenkins
                               enabled=1
   ```

```
                            priority=1
```

```
yum info ambari-server
```

In the information output, visually validate that there is an available version containing "7.1.8.0"

```
yum upgrade ambari-server
```

For Ubuntu 18:

```
apt-get clean all
```

Before upgrading Ambari Server, you must update the username and password in the ambari.list file. Run the following command:

```
vi /etc/apt/sources.list.d/ambari.list
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.8.0-21
                            #json.url = https://archive.cloudera.com/p/HD
P/hdp_urlinfo.json
                            deb https://[***USERNAME***]:[***PASSWORD***]
@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/ubuntu18 Ambari main
                            apt-get update
                            apt-cache show ambari-server | grep Version
```

In the information output, visually validate that there is an available version containing "7.1.8.0"

```
apt-get upgrade ambari-server
```

For SLES 12:

```
zypper clean
```

Before upgrading Ambari Server, you must update the username and password in the ambari.repo file. Run the following command:

```
vi /etc/zypp/repos.d/ambari.repo
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.8.0-21
                            [ambari-7.1.8.0]
                            #json.url = https://archive.cloudera.com/p/H
DP/hdp_urlinfo.json
                            name=ambari Version - ambari-7.1.8.0
                            baseurl=https://[***USERNAME***]:[***PASSWO
RD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/sles12
                            gpgcheck=0
                            gpgkey=https://[***USERNAME***]:[***PASSWOR
D***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/sles12/RPM-GPG-KEY/RPM-
GPG-KEY-Jenkins
                            enabled=1
                            priority=1
```

Create the following file with your paywall credentials (replace <username> with your paywall username and <password> accordingly): /etc/zypp/credentials.d/ambari.cat

```
username=<username>
                            password=<password>
```

In the information output, visually validate that there is an available version containing "7.1.8.0"

```
Zypper up ambari-server
```

6. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

For RHEL/CentOS/Oracle Linux 7:rpm -qa | grep ambari-server

For SLES 12:rpm -qa | grep ambari-server

For Ubuntu 18:

```
dpkg -l ambari-server
```

7. Check for upgrade success by noting progress during the Ambari Server installation process you started in Step 5.

- As the process runs, the console displays output similar to the following:

  Setting up Upgrade Process Resolving Dependencies Running transaction check
- If the upgrade fails, the console displays output similar to the following:

  Setting up Upgrade Process No Packages marked for Update
- A successful upgrade displays output similar to the following:

  Updated: ambari-server.noarch 0:7.1.8.0. Complete!

Important: Confirm there is only one ambari-server*.jar file in /usr/lib/ambari-server. If there is more than one JAR file with name ambari-server*.jar, move all JARs except ambari-server-7.1.8*.jar to /tmp before proceeding with upgrade.

8. Upgrade all Ambari Agents. On each host in your cluster running an Ambari Agent:

- For RHEL/CentOS/Oracle Linux: Before upgrading Ambari Agent, you must update the username and password in the ambari.repo file. Run the following command:

  ```
  vi /etc/yum.repos.d/ambari.repo
  ```

  For example, the output displays the following:

  ```
  #VERSION_NUMBER=7.1.8.0-21
                                      [ambari-7.1.8.0
                                      #json.url = https://archive.cloud
  era.com/p/HDP/hdp_urlinfo.json
                                      name=ambari Version - ambari-7.1.8.0
                                      baseurl=https://[***USERNAME***]:[**
  *PASSWORD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/centos7
                                      gpgcheck=1
                                      gpgkey=https://[***USERNAME***]:[**
  *PASSWORD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/centos7/RPM-GP
  G-KEY/RPM-GPG-KEY-Jenkins
                                      enabled=1
                                      priority=1
  ```

  ```
  yum upgrade ambari-agent
  ```

- For Ubuntu: Before upgrading Ambari Agent, you must update the username and password in the ambari.list file. Run the following command:

  ```
  vi /etc/apt/sources.list.d/ambari.list
  ```

  For example, the output displays the following:

  ```
  #VERSION_NUMBER=7.1.8.0-21
                                      #json.url = https://archive.cloud
  era.com/p/HDP/hdp_urlinfo.json
                                      deb https://[***USERNAME***]:[***
  PASSWORD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/ubuntu18 Ambari
   main
  ```

  ```
  apt-get update
                                          apt-get install ambari-agent
  ```

- For SLES: Before upgrading Ambari Agent, you must update the username and password in the ambaridc.repo file. Run the following command:

  ```
  vi /etc/zypp/repos.d/ambari.repo
  ```

  For example, the output displays the following:

  ```
  #VERSION_NUMBER=7.1.8.0-21
                                      [ambari-7.1.8.0]
                                      #json.url = https://archive.cloudera
  .com/p/HDP/hdp_urlinfo.json
                                      name=ambari Version - ambari-7.1.8.0
                                      baseurl=https://[***USERNAME***]:[*
  **PASSWORD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/sles12
                                      gpgcheck=0
                                      gpgkey=https://[***USERNAME***]:[**
  *PASSWORD***]@archive.cloudera.com/p/ambaridc/7.x/7.1.8.0/sles12/RPM-GPG
  -KEY/RPM-GPG-KEY-Jenkins
                                      enabled=1
                                      priority=1
  ```

  Perform ambari-agent upgrade

  ```
  zypper up ambari-agent
  ```

9. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

   For RHEL/CentOS/Oracle Linux 7:

   ```
   rpm -qa | grep ambari-agent
   ```

   For SLES 12:

   ```
   rpm -qa | grep ambari-agent
   ```

   For Ubuntu 18:

   ```
   dpkg -l ambari-agent
   ```

10. Upgrade Ambari Server database schema. On the host running Ambari Server: ambari-server upgrade. When the Ambari Server database schema has been upgraded, you should see command output like this: Ambari Server ‘u pgrade’ completed successfully.
11. Start the Ambari Server. On the host running Ambari Server: `ambari-server start`
12. Start all Ambari Agents. On each host in your cluster running an Ambari Agent: `ambari-agent start`
13. Open Ambari Web UI. Point your browser to the Ambari Web UI:

    - When Ambari Server is configured for HTTPS: https://<your.ambari.server>:8443
    - When Ambari Server is configured for HTTP: http://<your.ambari.server>:8080

    where <your.ambari.server> is the name of your ambari server host. For example, c7401.ambari.apache.org.

    Important: Refresh your browser so that it loads the new version of the Ambari Web code. If you have problems, clear your browser cache manually, then restart Ambari Server.

14. Log in using the Ambari administrator credentials that you have set up. For example, the default name/password is admin/admin. You will see a Restart indicator next to each service after upgrading. Ambari upgrade has modified the configuration properties of your cluster based on the new configuration types and properties being made available for each service with this release of Ambari. Review these changes by comparing the previous configuration with the latest version created by "ambari-upgrade".

    Caution: Do not manually restart these services unless future steps in the upgrade guide prompt you to do so. Manually restarting these services may significantly disrupt your upgrade. Ambari will restart each service automatically during the HDP upgrade.

    Note: Even though the installer prompts you to sync LDAP, doing so is not required.

Upgrade to Ambari 7.1.7.1

After reviewing the information related to Ambari UI and the Quick Links, and backing up the Ambari Server configuration file, perform the recommended steps for upgrading Ambari.

Procedure

1. If you are running Ambari Metrics in your cluster, stop the service and put it in Maintenance Mode. From Ambari Web, browse to Services > Ambari Metrics and select Stop from the Service Actions menu.
2. Stop the Ambari Server. On the host running Ambari Server: ambari-server stop
3. Stop all Ambari Agents. On each host in your cluster running an Ambari Agent: ambari-agent stop.

4. Fetch the new Ambari repo and replace the old repository file with the new repository file on all hosts in your cluster.

   Important: Important: Check your current directory before you download the new repository file to make sure that there are no previous versions of the ambaridc.repo file. If you do not, and a previous version exists, the new download will be saved with a numeric extension, such as ambari.repo.1. Make sure that the version you copy is the new version.

   Select the repository appropriate for your environment from the following list:

   - For RHEL/CentOS/Oracle Linux 7:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.7.1/centos7/ambari.repo -O /etc/yum.repos.d/ambari.re
     po
     ```

   - For Ubuntu 18:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.7.1/ubuntu18/ambari.list -O /etc/apt/sources.list.d/a
     mbari.list
     ```

   - For Sles 12:

     ```
     wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.7.1/sles12/ambari.repo -O /etc/zypp/repos.d/ambari.re
     po
     ```

5. Upgrade Ambari Server. On the host running Ambari Server:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   ```

   Before upgrading Ambari Server, you must update the username and password of baseurl and gpgkey in the ambari.repo file. Run the following command:

   ```
   vi /etc/yum.repos.d/ambari.repo
   ```

   For example, the output displays the following:

   ```
   #VERSION_NUMBER=7.1.7.1-14
   [ambari-7.1.7.1]
   #json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
   name=ambari Version - ambari-7.1.7.1
   baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
   ambaridc/7.x/7.1.7.1/centos7
   gpgcheck=1
   gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/am
   baridc/7.x/7.1.7.1/centos7/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
   enabled=1
   ```

```
priority=1
```

```
yum info ambari-server
```

In the information output, visually validate that there is an available version containing "7.1.7.1"

```
yum upgrade ambari-server
```

For Ubuntu 18:

```
apt-get clean all
```

Before upgrading Ambari Server, you must update the username and password in the ambari.list file. Run the following command:

```
vi /etc/apt/sources.list.d/ambari.list
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.7.1-14
#json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
deb https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/amba
ridc/7.x/7.1.7.1/ubuntu18 Ambari main
apt-get update
apt-cache show ambari-server | grep Version
```

In the information output, visually validate that there is an available version containing "7.1.7.1"

```
apt-get upgrade ambari-server
```

For SLES 12:

```
zypper clean
```

Before upgrading Ambari Server, you must update the username and password in the ambari.repo file. Run the following command:

```
vi /etc/zypp/repos.d/ambari.repo
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.7.1-14
[ambari-7.1.7.1]
#json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
name=ambari Version - ambari-7.1.7.1
baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.7.1/sles12
gpgcheck=0
gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.7.1/sles12/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
enabled=1
priority=1
```

Create the following file with your paywall credentials (replace <username> with your paywall username and <password> accordingly): /etc/zypp/credentials.d/ambari.cat

```
username=<username>
```

```
password=<password>
```

In the information output, visually validate that there is an available version containing "7.1.7.1"

```
Zypper up ambari-server
```

6. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

   For RHEL/CentOS/Oracle Linux 7:rpm -qa | grep ambari-server

   For SLES 12:rpm -qa | grep ambari-server

   For Ubuntu 18:

   ```
   dpkg -l ambari-server
   ```

7. Check for upgrade success by noting progress during the Ambari Server installation process you started in Step 5.

   - As the process runs, the console displays output similar to the following:

     Setting up Upgrade Process Resolving Dependencies Running transaction check
   - If the upgrade fails, the console displays output similar to the following:

     Setting up Upgrade Process No Packages marked for Update
   - A successful upgrade displays output similar to the following:

     Updated: ambari-server.noarch 0:7.1.7.1. Complete!

   Important: Confirm there is only one ambari-server*.jar file in /usr/lib/ambari-server. If there is more than one JAR file with name ambari-server*.jar, move all JARs except ambari-server-7.1.7*.jar to /tmp before proceeding with upgrade.

8. Upgrade all Ambari Agents. On each host in your cluster running an Ambari Agent:

   - For RHEL/CentOS/Oracle Linux: Before upgrading Ambari Agent, you must update the username and password in the ambari.repo file. Run the following command:

     ```
     vi /etc/yum.repos.d/ambari.repo
     ```

     For example, the output displays the following:

     ```
     #VERSION_NUMBER=7.1.7.1-14
     [ambari-7.1.7.1]
     #json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
     name=ambari Version - ambari-7.1.7.1
     baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
     p/ambaridc/7.x/7.1.7.1/centos7
     gpgcheck=1
     gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
     ambaridc/7.x/7.1.7.1/centos7/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
     enabled=1
     priority=1
     ```

     ```
     yum upgrade ambari-agent
     ```
   - For Ubuntu: Before upgrading Ambari Agent, you must update the username and password in the ambari.list file. Run the following command:

     ```
     vi /etc/apt/sources.list.d/ambari.list
     ```

     For example, the output displays the following:

     ```
     #VERSION_NUMBER=7.1.7.1-14
     ```

```
#json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
deb https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.7.1/ubuntu18 Ambari main
```

```
apt-get update
apt-get install ambari-agent
```

- For SLES: Before upgrading Ambari Agent, you must update the username and password in the ambaridc.repo file. Run the following command:

```
vi /etc/zypp/repos.d/ambari.repo
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.7.1-14
[ambari-7.1.7.1]
#json.url = https://archive.cloudera.com/p/HDP/hdp_urlinfo.json
name=ambari Version - ambari-7.1.7.1
baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
p/ambaridc/7.x/7.1.7.1/sles12
gpgcheck=0
gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.7.1/sles12/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
enabled=1
priority=1
```

Perform ambari-agent upgrade

```
zypper up ambari-agent
```

9. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

For RHEL/CentOS/Oracle Linux 7:

```
rpm -qa | grep ambari-agent
```

For SLES 12:

```
rpm -qa | grep ambari-agent
```

For Ubuntu 18:

```
dpkg -l ambari-agent
```

10. Upgrade Ambari Server database schema. On the host running Ambari Server: ambari-server upgrade. When the Ambari Server database schema has been upgraded, you should see command output like this: Ambari Server ‘u pgrade’ completed successfully.

11. Start the Ambari Server. On the host running Ambari Server: `ambari-server start`

12. Start all Ambari Agents. On each host in your cluster running an Ambari Agent: `ambari-agent start`

13. Open Ambari Web UI. Point your browser to the Ambari Web UI:

- When Ambari Server is configured for HTTPS: https://<your.ambari.server>:8443
- When Ambari Server is configured for HTTP: http://<your.ambari.server>:8080

where <your.ambari.server> is the name of your ambari server host. For example, c7401.ambari.apache.org.

Important: Refresh your browser so that it loads the new version of the Ambari Web code. If you have problems, clear your browser cache manually, then restart Ambari Server.

14. Log in using the Ambari administrator credentials that you have set up. For example, the default name/password is admin/admin. You will see a Restart indicator next to each service after upgrading. Ambari upgrade has modified the configuration properties of your cluster based on the new configuration types and properties being made available for each service with this release of Ambari. Review these changes by comparing the previous configuration with the latest version created by "ambari-upgrade".

    Caution: Do not manually restart these services unless future steps in the upgrade guide prompt you to do so. Manually restarting these services may significantly disrupt your upgrade. Ambari will restart each service automatically during the HDP upgrade.

    Note: Even though the installer prompts you to sync LDAP, doing so is not required.

    Note: While upgrading from HDP 3.1.5 to CDP Private Cloud Base 7.1.7 using Ambari 7.1.7, you may encounter the following error message

    ```
    Fail: HBase is not ready to upgrade.
    ```

    .

    The workaround is to click IGNORE AND PROCEED.

Upgrade to Ambari 7.1.6.0

After reviewing the information related to Ambari UI and the Quick Links, and backing up the Ambari Server configuration file, perform the recommended steps for upgrading Ambari.

Procedure

1. If you are running Ambari Metrics in your cluster, stop the service and put it in Maintenance Mode. From Ambari Web, browse to Services > Ambari Metrics and select Stop from the Service Actions menu.
2. Stop the Ambari Server. On the host running Ambari Server: ambari-server stop
3. Stop all Ambari Agents. On each host in your cluster running an Ambari Agent: ambari-agent stop.
4. Fetch the new Ambari repo and replace the old repository file with the new repository file on all hosts in your cluster.

    Important: Important: Check your current directory before you download the new repository file to make sure that there are no previous versions of the ambaridc.repo file. If you do not, and a previous version exists, the new download will be saved with a numeric extension, such as ambaridc.repo.1. Make sure that the version you copy is the new version.

    Select the repository appropriate for your environment from the following list:

    - For RHEL/CentOS/Oracle Linux 7:

      ```
      wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
      p/ambaridc/7.x/7.1.6.0/centos7/ambaridc.repo -O /etc/yum.repos.d/ambarid
      c.repo
      ```

    - For Ubuntu 18:

      ```
      wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
      p/ambaridc/7.x/7.1.6.0/ubuntu18/ambaridc.list -O /etc/apt/sources.list.d
      /ambaridc.list
      ```

    - For Sles 12:

      ```
      wget -nv https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
      p/ambaridc/7.x/7.1.6.0/sles12/ambaridc.repo -O /etc/zypp/repos.d/ambari.
      repo
      ```

5. Upgrade Ambari Server. On the host running Ambari Server:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   ```

   Before upgrading Ambari Server, you must update the username and password of baseurl and gpgkey in the ambaridc.repo file. Run the following command:

   ```
   vi /etc/yum.repos.d/ambaridc.repo
   ```

   For example, the output displays the following:

   ```

   #VERSION_NUMBER=7.1.6.0-38
   [ambari-7.1.6.0]
   #json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
   name=ambari Version - ambari-7.1.6.0
   baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
   ambaridc/7.x/7.1.6.0/centos7/
   gpgcheck=1
   gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/am
   baridc/7.x/7.1.6.0/centos7/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
   enabled=1
   priority=1
   ```

   ```
   yum info ambari-server
   ```

   In the information output, visually validate that there is an available version containing "7.1.6.0"

   ```
   yum upgrade ambari-server
   ```

   For Ubuntu 18:

   ```
   apt-get clean all
   ```

   Before upgrading Ambari Server, you must update the username and password in the ambaridc.list file. Run the following command:

   ```
   vi /etc/apt/sources.list.d/ambaridc.list
   ```

   For example, the output displays the following:

   ```
   #VERSION_NUMBER=7.1.6.0-38
   #json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
   deb https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/am
   baridc/7.x/7.1.6.0/ubuntu18/ Ambari main
   apt-get update
   ```

```
apt-cache show ambari-server | grep Version
```

In the information output, visually validate that there is an available version containing "7.1.6.0"

```
apt-get upgrade ambari-server
```

For SLES 12:

```
zypper clean
```

Before upgrading Ambari Server, you must update the username and password in the ambari.repo file. Run the following command:

```
vi /etc/zypp/repos.d/ambaridc.repo
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.6.0-38
[ambari-7.1.6.0]
#json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
name=ambari Version - ambari-7.1.6.0
baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.6.0/sles12/
gpgcheck=0
gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.6.0/sles12/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
enabled=1
priority=1
```

Create the following file with your paywall credentials (replace <username> with your paywall username and <password> accordingly): /etc/zypp/credentials.d/ambari.cat

```
username=<username>
password=<password>
```

In the information output, visually validate that there is an available version containing "7.1.6.0"

```
Zypper up ambari-server
```

6. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

For RHEL/CentOS/Oracle Linux 7:rpm -qa | grep ambari-server

For SLES 12:rpm -qa | grep ambari-server

For Ubuntu 18:

```
dpkg -l ambari-server
```

7. Check for upgrade success by noting progress during the Ambari Server installation process you started in Step 5.

    - As the process runs, the console displays output similar to the following:

      Setting up Upgrade Process Resolving Dependencies Running transaction check
    - If the upgrade fails, the console displays output similar to the following:

      Setting up Upgrade Process No Packages marked for Update
    - A successful upgrade displays output similar to the following:

      Updated: ambari-server.noarch 0:7.1.6.0. Complete!

    Important: Confirm there is only one ambari-server*.jar file in /usr/lib/ambari-server. If there is more than one JAR file with name ambari-server*.jar, move all JARs except ambari-server-7.1.6*.jar to /tmp before proceeding with upgrade.
8. Upgrade all Ambari Agents. On each host in your cluster running an Ambari Agent:

    - For RHEL/CentOS/Oracle Linux: Before upgrading Ambari Agent, you must update the username and password in the ambaridc.repo file. Run the following command:

      ```
      vi /etc/yum.repos.d/ambaridc.repo
      ```

      For example, the output displays the following:

      ```
      #VERSION_NUMBER=7.1.6.0-38
      [ambari-7.1.6.0]
      #json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
      name=ambari Version - ambari-7.1.6.0
      baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
      p/ambaridc/7.x/7.1.6.0/centos7/
      gpgcheck=1
      gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
      ambaridc/7.x/7.1.6.0/centos7/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
      enabled=1
      priority=1
      ```

      ```
      yum upgrade ambari-agent
      ```
    - For Ubuntu: Before upgrading Ambari Agent, you must update the username and password in the ambari.list file. Run the following command:

      ```
      vi /etc/apt/sources.list.d/ambaridc.list
      ```

      For example, the output displays the following:

      ```
      #VERSION_NUMBER=7.1.6.0-38
      #json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
      deb https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/am
      baridc/7.x/7.1.6.0/ubuntu18/ Ambari main
      ```

      ```
      apt-get update
      apt-get install ambari-agent
      ```
    - For SLES: Before upgrading Ambari Agent, you must update the username and password in the ambaridc.repo file. Run the following command:

```
vi /etc/zypp/repos.d/ambaridc.repo
```

For example, the output displays the following:

```
#VERSION_NUMBER=7.1.6.0-38
[ambari-7.1.6.0]
#json.url = http://public-repo-1.hortonworks.com/HDP/hdp_urlinfo.json
name=ambari Version - ambari-7.1.6.0
baseurl=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/
p/ambaridc/7.x/7.1.6.0/sles12/
gpgcheck=0
gpgkey=https://[***USERNAME***]:[***PASSWORD***]@archive.cloudera.com/p/
ambaridc/7.x/7.1.6.0/sles12/RPM-GPG-KEY/RPM-GPG-KEY-Jenkins
enabled=1
priority=1
```

Perform ambari-agent upgrade

```
zypper up ambari-agent
```

9. After the upgrade process completes, check Ambari host to make sure the new files have been installed:

   For RHEL/CentOS/Oracle Linux 7:

   ```
   rpm -qa | grep ambari-agent
   ```

   For SLES 12:

   ```
   rpm -qa | grep ambari-agent
   ```

   For Ubuntu 18:

   ```
   dpkg -l ambari-agent
   ```

10. Upgrade Ambari Server database schema. On the host running Ambari Server: ambari-server upgrade. When the Ambari Server database schema has been upgraded, you should see command output like this: Ambari Server ‘u pgrade’ completed successfully.
11. Start the Ambari Server. On the host running Ambari Server: `ambari-server start`
12. Start all Ambari Agents. On each host in your cluster running an Ambari Agent: `ambari-agent start`
13. Open Ambari Web UI. Point your browser to the Ambari Web UI:

    - When Ambari Server is configured for HTTPS: https://<your.ambari.server>:8443
    - When Ambari Server is configured for HTTP: http://<your.ambari.server>:8080

    where <your.ambari.server> is the name of your ambari server host. For example, c7401.ambari.apache.org.

    ⚠ **Important:** Refresh your browser so that it loads the new version of the Ambari Web code. If you have problems, clear your browser cache manually, then restart Ambari Server.

14. Log in using the Ambari administrator credentials that you have set up. For example, the default name/password is admin/admin. You will see a Restart indicator next to each service after upgrading. Ambari upgrade has modified the configuration properties of your cluster based on the new configuration types and properties being

made available for each service with this release of Ambari. Review these changes by comparing the previous configuration with the latest version created by "ambari-upgrade".

Caution: Do not manually restart these services unless future steps in the upgrade guide prompt you to do so. Manually restarting these services may significantly disrupt your upgrade. Ambari will restart each service automatically during the HDP upgrade.

Note: Even though the installer prompts you to sync LDAP, doing so is not required.

Download cluster blueprints

Ensure you download the cluster blueprints before you begin the upgrade.

About this task

Procedure

1. To download the cluster blueprints with hosts, do the following:

```
curl ${securecurl} -H "X-Requested-By: ambari" -X GET -u ${ambariuser}:$
{ambaripwd} ${ambariprotocol}://${ambariserver}:${ambariport}/api/v1/clu
sters/${clustername}?format=blueprint_with_hosts > "${backupdir}"/${clus
tername}_blueprint_with_hosts_"$(date +"%Y%m%d%H%M%S")".json
```

2. To download the cluster blueprints without hosts, do the following:

```
curl ${securecurl} -H "X-Requested-By: ambari" -X GET -u ${ambariuser}:$
{ambaripwd} ${ambariprotocol}://${ambariserver}:${ambariport}/api/v1/clu
sters/${clustername}?format=blueprint > "${backupdir}"/${clustername}_bl
ueprint_without_hosts_"$(date +"%Y%m%d%H%M%S")".json
```

where,

securecurl = -k for https

securecurl = -k for https

ambariuser = Ambari User Name

ambaripwd = Ambari Password

ambariprotocol = http or https

ambariserver = Ambari Server Name

ambariport = Ambari Port

clustername = The Name of the cluster

backupdir = The folder to download the blueprint

Mandatory Post-Upgrade Tasks

You must ensure to complete the post-upgrade tasks after upgrading to Ambari 7.1.x.x.

Depending on the configuration of your cluster and your current Ambari version, you must upgrade any of the following features in your cluster, as described in the following topics:

Upgrading Ambari Infra

If you have Ambari Solr installed, you must upgrade Ambari Infra after upgrading Ambari.

Procedure

1. Make sure Ambari Infra services are stopped. From Ambari Web, browse to Services > Ambari Infraand select Stop from the Service Actions menu.
2. On every host in your cluster with an Infra Solr Client installed, run the following commands:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   yum upgrade ambari-infra-solr-client
   ```

   For SLES:

   ```
   zypper clean
   zypper up ambari-infra-solr-client
   ```

   For Ubuntu/Debian:

   ```
   apt-get clean all
   apt-get update
   apt-get install ambari-infra-solr-client
   ```
3. Execute the following command on all hosts running an Ambari Infra Solr Instance:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum upgrade ambari-infra-solr
   ```

   For SLES:

   ```
   zypper up ambari-infra-solr
   ```

   For Ubuntu/Debian:

   ```
   apt-get install ambari-infra-solr
   ```
4. Start the Ambari Infra services.

   From Ambari Web, browse to Services > Ambari Infra select Service Actions then choose Start.

Upgrading Ambari Log Search

If you have Ambari Log Search installed, you must upgrade Ambari Log Search after upgrading Ambari.

About this task

Prerequisites: Before starting this upgrade, ensure the Ambari Infra components have been upgraded.

Procedure

1. Make sure Ambari Log Search service is stopped. From Ambari Web, browse to Services > Log Search and select Stop from the Service Actions menu.
2. On every host in your cluster running a Log Feeder, run the following commands:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   ```

```
yum upgrade ambari-logsearch-logfeeder
```

For SLES:

```
zypper clean
zypper up ambari-logsearch-logfeeder
```

For Ubuntu:

```
apt-get clean all
apt-get update
apt-get install ambari-logsearch-logfeeder
```

3. Execute the following command on all hosts running the Log Search Server:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum upgrade ambari-logsearch-portal
   ```

   For SLES:

   ```
   zypper up ambari-logsearch-portal
   ```

   For Ubuntu:

   ```
   apt-get install ambari-logsearch-portal
   ```

4. Start Log Search Service.

   From Ambari Web, browse to Services > Log Search select Service Actions then choose Start.

Upgrading Ambari Metrics

About this task

Upgrade to Ambari and perform necessary post-upgrade checks. Make sure all services are up and healthy.

Procedure

1. Make sure Ambari Metrics service is stopped. From Ambari Web, browse to Services > Ambari Metrics and select Stop from the Service Actions menu.
2. On every host in your cluster running a Metrics Monitor, run the following commands:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum clean all
   yum upgrade ambari-metrics-monitor
   yum upgrade ambari-metrics-hadoop-sink
   ```

   For SLES:

   ```
   zypper clean
   zypper up ambari-metrics-monitor
   zypper up ambari-metrics-hadoop-sink
   ```

   For Ubuntu:

   ```
   apt-get clean all
   apt-get update
   apt-get install ambari-metrics-assembly
   ```

3. Execute the following command on all hosts running the Metrics Collector:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum upgrade ambari-metrics-collector
   ```

   For SLES:

   ```
   zypper up ambari-metrics-collector
   ```

   For Ubuntu:

   ```
   apt-get clean all
   apt-get update
   apt-get install ambari-metrics-collector
   ```

4. Execute the following command on all hosts running the Grafana component:

   For RHEL/CentOS/Oracle Linux:

   ```
   yum upgrade ambari-metrics-grafana
   ```

   For SLES:

   ```
   zypper up ambari-metrics-grafana
   ```

   For Ubuntu:

   ```
   apt-get clean all
   apt-get update
   apt-get install ambari-metrics-grafana
   ```

5. Start Ambari Metrics Service.

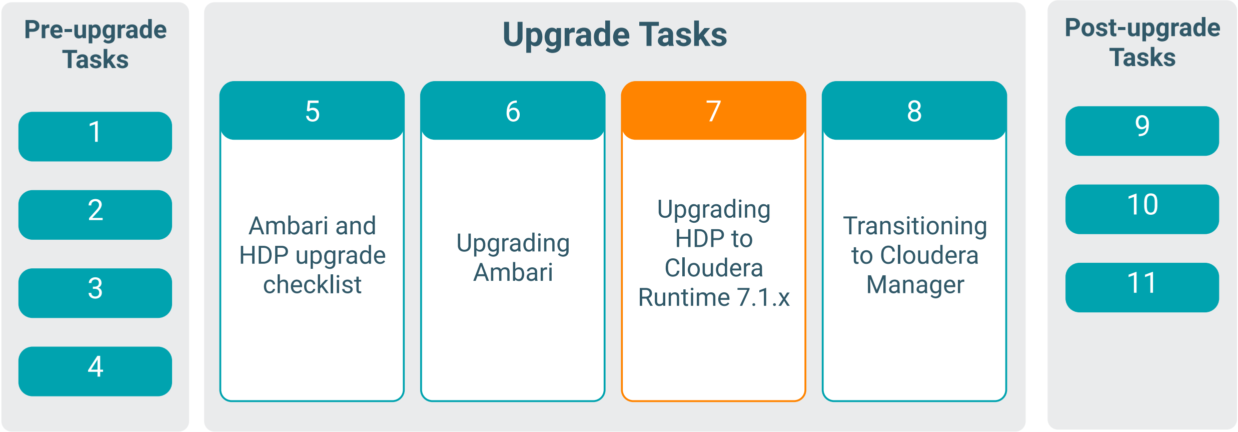
   From Ambari Web, browse to Services > Ambari Metrics select Service Actions then choose Start.

   Note:

   - Do not start the Ambari Metrics System service. Do not restart other services. The HDP upgrade process will restart all the services.
   - The updated Ambari Metrics Sink jars will be installed on all hosts. During the upgrade process, after the restart, each service start uses the latest sink implementations.

Upgrading HDP to Cloudera Runtime 7.1.x

To complete the first stage of upgrading from HDP 3.1.5.x to CDP Private Cloud Base, you must upgrade to Cloudera Runtime 7.1.x.


Pre-upgrade Tasks
1
2
3
4
Upgrade Tasks
5
Ambari and HDP upgrade checklist
6
Upgrading Ambari
7
Upgrading HDP to Cloudera Runtime 7.1.x
8
Transitioning to Cloudera Manager
Post-upgrade Tasks
9
10
11

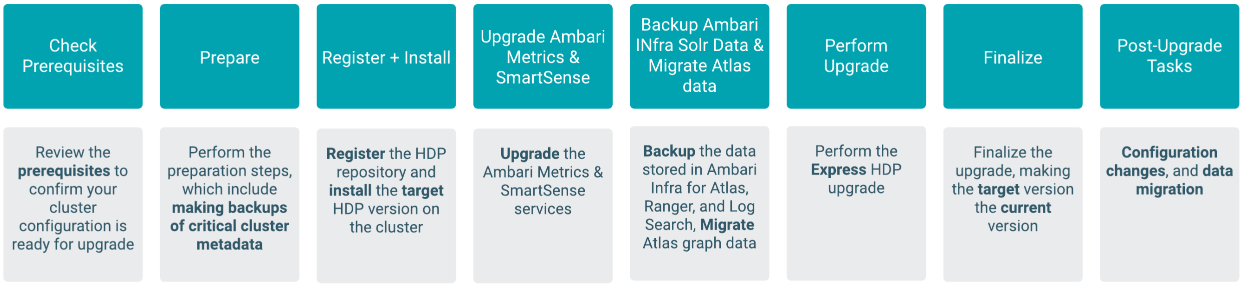
HDP Prerequisites

Before upgrading from HDP 3.1.5.x to the Cloudera Runtime 7.1.x, you must review and complete the prerequisites.

Upgrade process

Read through the complete information about the upgrade options, prerequisites, and the overall process before starting the upgrade. Cloudera recommends that you validate these steps in a test environment to adjust and account for any special configurations for your cluster.

The high-level process for performing an HDP intermediate bits upgrade is as follows:



Check Prerequisites: Review the **prerequisites** to confirm your cluster configuration is ready for upgrade

Prepare: Perform the preparation steps, which include **making backups of critical cluster metadata**

Register + Install: **Register** the HDP repository and **install** the **target** HDP version on the cluster

Upgrade Ambari Metrics & SmartSense: **Upgrade** the Ambari Metrics & SmartSense services

Backup Ambari INfra Solr Data & Migrate Atlas data: **Backup** the data stored in Ambari Infra for Atlas, Ranger, and Log Search, **Migrate** Atlas graph data

Perform Upgrade: Perform the **Express** HDP upgrade

Finalize: Finalize the upgrade, making the **target** version the **current** version

Post-Upgrade Tasks: **Configuration changes**, and **data migration**

Ambari will guide you through the steps required to upgrade the HDP intermediate bits. Make sure Ambari and the cluster are healthy, operating normally, and all service checks are passing.

Note: Be sure to review the available HDP intermediate bits upgrade scenarios below. Cloudera recommends that you first upgrade to Ambari 7.1.x.x before upgrading to the HDP intermediate bits unless otherwise noted. After upgrading Ambari, ensure that the cluster is operating normally and service checks are passing prior to attempting an HDP upgrade.

Ambari 2.7.5.x supports express methods for upgrading HDP 3.1.5.x to HDP 7.1.x.x. An Express Upgrade orchestrates the HDP upgrade in an order that will incur cluster downtime.

Note: Spark Atlas Connector (SAC) is disabled by default. If you enable SAC on HDP, the Spark entities are created using the Spark model (spark_db, spark_table). In CDP Private Cloud Base, SAC uses HMS and the entities are created using the Hive model (hive_db, hive_table, and hive_column). Hence Spark model entities in HDP are not in sync with the Hive model entities in CDP Private Cloud Base. In CDP Private Cloud Base, the lineage stitching and metadata update is not available on the Spark entities created in HDP.

Note:

- In the HDP 3.1.5.x cluster, Hive hook and HBase hook are enabled by default.
- SAC (Spark Atlas Connector or Spark Hook) is disabled by default.
- Note that, in HDP, SAC is in a Technical Preview state. In CDP Private Cloud Base, Hive Hook and HBase hook are enabled by default, In the AM2CM upgrade flow, if the Hive Hook and HBase hook are enabled in the HDP 3.1.5.x cluster, post-upgrade, it is enabled in CDP Private Cloud Base.
- HMS Hook functionality did not exist in HDP 3.1.5.x, hence it must be manually enabled in CDP Private Cloud Base.
- Similarly SAC in CDP Private Cloud Base must also be manually enabled.

Note: Intermittently, the default owner permissions for /warehouse/tablespace/external/hive directory is updated to activity_analyzer user from the smartsense service in the HDP3 cluster, because of these permissions issues the hive external table creation fails. The workaround is to Kinit as the HDFS user and update the permissions for warehouse directory using HDFS cli.

- `$ hdfs dfs -chown hdfs:hdfs /warehouse`
- `$ hdfs dfs -chown hdfs:hdfs /warehouse/tablespace`
- `$ hdfs dfs -chown hdfs:hdfs /warehouse/tablespace/external`
- `$ hdfs dfs -chown hdfs:hdfs /warehouse/tablespace/external/hive`

Before upgrading any cluster

To perform an HDP intermediate bits upgrade using Ambari, your cluster must meet certain prerequisites. Meeting these prerequisites is essential for Ambari to know that the cluster is in a healthy operating mode and can successfully manage the upgrade process.

For any Cluster

Disk Space: Be sure to have adequate space on /usr/hdp for the target HDP version. Each complete install of an HDP version occupies about 10GB of disk space.

Ambari Agent Heartbeats: All Ambari Agents must be communicating and heartbeating to Ambari Server. Any hosts that are not heartbeating must be in Maintenance mode.

Hive Upgrade: The upgrade process does not back up the Hive Metastore, nor does it compact ACID tables. Before upgrading Hive, you must:

- Manually back up your Hive metastore database.
- If you have ACID tables in your Hive metastore database, enable ACID operations using Ambari Web or set Hive configuration properties to enable ACID.

Note: You must remove the components that are unsupported in CDP Private Cloud Base. For more information, see HDP Core component version changes. If you are not using a component in the CDP cluster, then you must remove them. The unused component extends the time and complexity of the HDP to CDP upgrade.

Host Maintenance Mode

The following two scenarios are checked:

- Any hosts in Maintenance mode must not be hosting any Service Master Components.
- Any host in Maintenance Mode that is not hosting Master Components is allowed but you will receive a warning. You can proceed with the upgrade. But these hosts will not be upgraded and before finalising the upgrade, you must delete these hosts from the cluster.

Service Maintenance Mode: No services can be in Maintenance mode, except for Ambari Metrics System, SmartSense, and Log Search.

Services Started: All services must be started, except for Ambari Metrics System, SmartSense, and Log Search.

Service Checks: All service checks must pass. Be sure to run Service Actions > Run Service Check on all services (and remediate if necessary) prior to attempting an HDP upgrade.

Backup HDP Cluster

Cloudera recommends that you back up the HDP 3.1.5.x services managed by Ambari 2.7.5.x.

Note: These backups are required and helps you incase in the middle of the upgrade to HDP 7.1.x you decide to downgrade the cluster back to original state.

Backup and Restore Databases

The steps for backing up and restoring databases differ depending on the database vendor and version that you select for your cluster. It is beyond the scope of this document.

Important: Restore the databases to their exact state as of when you took the backup. Do not merge any changes that may have occurred during the subsequent upgrade.

See the following vendor resources for more information:

- For MariaDB 5.5, see MariaDB
- For MySQL 5.5, see MySQL5.5
- For MySQL 5.6, see MySQL 5.6
- For MySQL 5.7, see MySQL 5.7
- For PostgreSQL 8.4, see PostgreSQL 8.4
- For PostgreSQL 9.2, see PostgreSQL 9.2
- For PostgreSQL 9.3, see PostgreSQL 9.3
- For Oracle 11gR2, see Oracle 11gR2

Backup Ranger

You must stop the Ranger Admin and Ranger KMS Service and its dependent services.

Backup Ranger Admin Database

You must run the below commands on the Ranger database host.

MySQL

1. First create directory (mkdir -p /root/backups/ranger/db/admin)

   ```
   $ mysqldump -u [username] -p db_name > dump_fileName.sql
   ```

   or specify destination as

   ```
   /some_dir/dump_fileName.sql
   ```

2. Select the Enter key.
3. Type the database password at the password prompt.

Example

```
mysqldump -u rangeradmin -p ranger > /root/backups/ranger/db/admin/ranger.sql
```

POSTGRES

1. Dump the contents of a database to a file by running the following command. Replace database name with the name of the database to be backed up:

   pg_dump -U username dbname > dbname.bak

   Example

   pg_dump -U rangeradmin ranger > /root/backups/ranger/db/admin/db/ranger.sql
2. Type the database password at the password prompt.

Backup Ranger KMS Database

You must backup the MySQL, POSTEGRES, and Oracle databases.

> **Note:** It is a good practice to note down the master key password before backing up the databases.
>
> MySQL
>
> 1. Create directory (mkdir /etc/ranger/hdp3_backup/db/kms)
> 2. $ mysqldump -u [username] -p db_name > dump_fileName.sql (or specify destination as /some_dir/dump_fileName.sql)
> 3. Select the Enter key.
> 4. Type the database password at the password prompt.
>
>   Example
>
>   mysqldump -u rangerkms -p rangerkms > /root/backups/ranger/db/kms/rangerkms.sql

POSTGRES

1. Dump the contents of a database to a file by running the following command. Replace dbname with the name of the database to be backed up:

   ```
   pg_dump -U [username for database] rangerkms > rangerkms.sql
   ```

   Example

   pg_dump -U rangerkms rangerkms > /root/backups/ranger/db/kms/rangerkms.sql

Oracle

1. Set path to Oracle home :
   - export ORACLE_HOME=/opt/oracle/product/12.2.0
   - export PATH=${PATH}:${ORACLE_HOME}/bin
   - export ORACLE_SID=orcl12c (db_name)
2. Backup Ranger admin database:

   ```
   exp userid=rangeradmin/rangeradmin owner=rangeradmin log=backups/ranger/
   db/admin/admin_db_bkp.log file=backups/ranger/db/admin/orcl12c.sql stati
   stics=none
   ```
3. Backup Ranger KMS database:

   ```
   exp userid=rangerkms/rangerkms owner=rangerkms log=backups/ranger/db/kms/
   kms_db_bkp.log
   file=backups/ranger/db/kms/orcl12c.sql statistics=none
   ```

Backup Atlas

You can back up Atlas data by backing-up HBase tables.

Procedure

1. Stop the Atlas service from Ambari.

2. Setup Kerberos credentials. Locate the atlas user's keytab and use kinit to cache the kerberos ticket for atlas user. For example,

   ```
   kinit -kt path/to/atlas.service.keytab atlas/hostname@domain
   ```

Backup HBase tables

Follow these steps to back up atlas_janus table.

Procedure

1. Go to HBase Shell.
2. Disable atlas_janus and ATLAS_ENTITY_AUDIT_EVENTS tables.
3. Create a snapshot of the atlas_janus and ATLAS_ENTITY_AUDIT_EVENTS HBase tables.
4. (Optional step) If the backup needs to be preserved on the local file system, then use the additional command to copy it locally.

   ```
   hbase org.apache.hadoop.hbase.snapshot.ExportSnapshot -snapshot 'atlas-j
   anus-backup'
   -copy-to /path/to/backup/location
   ```

   The above steps can be performed using the following commands from HBase shell.

   ```
   > disable 'atlas_janus'
   > snapshot 'atlas_janus', 'atlas-janus-backup'
   > enable 'atlas_janus'
   > exit
   ```

   ```
   > disable 'ATLAS_ENTITY_AUDIT_EVENTS'
   > snapshot 'ATLAS_ENTITY_AUDIT_EVENTS','ATLAS_ENTITY_AUDIT_EVENTS-backup'
   > enable 'ATLAS_ENTITY_AUDIT_EVENTS'
   > exit
   ```

Backup Ambari Infra Solr

Back up all your ambari infra solr collections. Run the Solr APIs to backup the collections individually. You must create the backup directory on each Ambari Infra Solr node. However, the backup command takes the backup of shards only on the nodes where they reside.

About this task

The specified /path/to/backup/ directory must be created first on the host where the ambari-infra-solr is installed. The specified location needs to be accessible to the user by executing the command.

```
mkdir -p /path/to/backup/directory
chown -R infra-solr:hadoop /path/to/backup
```

For unsecured cluster

```
#Atlas infra-solr collections
curl -v
"http://$INFRA_SOLR_URL/solr/vertex_index/replication?command=BACKUP&name
=vertex_index_backup&location=/path/to/backup/directory"

curl -v
"http://$INFRA_SOLR_URL/solr/edge_index/replication?command=BACKUP&name=e
dge_index_backup&location=/path/to/backup/directory"

curl -v
```

```
"http://$INFRA_SOLR_URL/solr/fulltext_index/replication?command=BACKUP&na
me=fulltext_index_backup&location=/path/to/backup/directory"

#Ranger audit infra-solr collections
curl -v
"http://$INFRA_SOLR_URL/solr/ranger_audits/replication?command=BACKUP&name=r
anger_audits_backup&location=/path/to/backup/directory"
#Log Search infra-solr collections
curl -v
"http://$INFRA_SOLR_URL/solr/hadoop_logs/replication?command=BACKUP&name=ha
doop_logs_backup&location=/path/to/backup/directory"

curl -v
"http://$INFRA_SOLR_URL/solr/audit_logs/replication?command=BACKUP&name=a
udit_logs_backup&location=/path/to/backup/directory"

curl -v
"http://$INFRA_SOLR_URL/solr/history/replication?command=BACKUP&name=hist
ory_backup&location=/path/to/backup/directory"
```

For secured cluster

If the cluster is Kerberized, then you must kinit as the service principal.

```
#Atlas infra-solr collections
curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/vertex_index/replication?command=BACKUP&name
=vertex_index_backup&location=/path/to/backup/directory"

curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/edge_index/replication?command=BACKUP&name=e
dge_index_backup&location=/path/to/backup/directory"

curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/fulltext_index/replication?command=BACKUP&na
me=fulltext_index_backup&location=/path/to/backup/directory"

#Ranger audit infra-solr collections
curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/ranger_audits/replication?command=BACKUP&name=r
anger_audits_backup&location=/path/to/backup/directory"
#Log Search infra-solr collections
curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/hadoop_logs/replication?command=BACKUP&name=ha
doop_logs_backup&location=/path/to/backup/directory"

curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/audit_logs/replication?command=BACKUP&name=a
udit_logs_backup&location=/path/to/backup/directory"

curl -v --negotiate -u:
"http://$INFRA_SOLR_URL/solr/history/replication?command=BACKUP&name=hist
ory_backup&location=/path/to/backup/directory"
```

It is highly recommended to save the data folder for disaster recovery.

Procedure

1. Stop Ambari-Infra service in Ambari UI.
2. Back-up services data to restore later. For Ambari-Infra on the node where the ambari-infra-solr is installed.

   ```
   tar -czf ambari-infra-backup.tar.gz /var/lib/ambari-infra-solr/data
   ```

Backup Ambari-Metrics

Procedure

1. Stop Ambari-Metrics service in Ambari UI .
2. Back-up services data to restore later. For Ambari-Metrics on the node where the ambari-metrics-collector is installed.

   ```
   tar czf ams-backup.tar.gz /var/lib/ambari-metrics-collector/hbase
   ```

   Note: Ensure that you check the AMS configuration and the HBase root directory to determine the backup directory.

Backup Hive

To backup the Hive service, you must backup the Hive database and create a snapshot of the Hive warehouse.

Backup Hive table data using a snapshot

In Ambari, go to Services > Hive > Configs, and check the value of hive.metastore.warehouse.dir to determine the location of the Hive warehouse, /apps/hive/warehouse by default.

1. On any node in the cluster, as the HDFS superuser, enable snapshots. For example,

   ```
   $ sudo su - hdfs
   $ hdfs dfsadmin -allowSnapshot /apps/hive/warehouse
   ```

   Output is:

   ```
   Allowing snaphot on /apps/hive/warehouse succeeded
   ```
2. Create a snapshot of the Hive warehouse. For example,

   ```
   $ hdfs dfs -createSnapshot /apps/hive/warehouse
   ```

   Output includes the name and location of the snapshot:

   ```
   Created snapshot /apps/hive/warehouse/.snapshot/s20210308-104702.892
   ```

Back up Hive Metastore

On the node where the database you use for Hive Metastore resides, back up Hive Metastore before upgrading to HDP. For example, in MySQL, dump each database as follows:

```
mysqldump -u <hive_db_user> <hive_db_schema_name> > </path/to/dump_file>
```

If you use another database for the Hive Metastore, use the equivalent command, such as pg_dump for Postgres to dump the database.

Backup HBase

The rollback procedure rolls back HDFS and, the data in HBase is also rolled back automatically as part of this procedure. In addition, HBase metadata stored in ZooKeeper is recovered as part of the ZooKeeper rollback procedure.

About this task

If your cluster is configured to use HBase replication, Cloudera recommends that you document all replication peers. If necessary (for example, because the HBase znode has been deleted), you can roll back HBase as part of the HDFS rollback without the ZooKeeper metadata. This metadata can be reconstructed in a fresh ZooKeeper installation, with the exception of the replication peers, which you must add back.

Procedure

Stop HBase before backing up HDFS.

Backup Kafka

Before you begin the upgrade process, you need to explicitly set the Kafka protocol version to match what's being used currently among the brokers and clients. Update server.properties on all brokers as follows:

Procedure

1. Log in to Ambari.
2. Choose the Kafka service.
3. Select the Configs page.
4. Find the Custom kafka-broker section.
5. Add the following properties:
   - inter.broker.protocol.version=current_Kafka_version
   - log.message.format.version=current_Kafka_version

   Replace current_Kafka_version with the version of Apache Kafka currently being used, in case of HDP 3.1.5 it is 2.0.0.
6. Save your changes. The information is automatically copied to each broker.

   Important: Once the Kafka log format and protocol version configurations (the inter.broker.protocol.version and log.message.format.version properties) are set to the new version (or left blank, which means to use the latest version), Kafka rollback is not possible.

Backup Oozie

To backup the Oozie service, you must backup the Oozie database.

For other databases, Cloudera recommends that you perform backup of your databases before beginning the upgrade.

- Ambari database
- Hive Metastore database (after the pre-upgrade tool runs compaction)
- Oozie Server database
- Ranger database
- Ranger KMS database
- Druid database
- Superset Database

Backup Knox

With the backup and rollback of Ambari, Knox is also backed up and rolled back by default.

Backup Logsearch

With the backup of Ambari-Infra, Logsearch is also backed up by default.

Backup Zeppelin

With the backup and rollback of HDFS, Zeppelin is also backed up and rolled back by default.

Important: Deprecation notice for Zeppelin: Zeppelin is deprecated in Cloudera Runtime 7.1.9 and 7.2.18. For more information, see the deprecation notices in the corresponding Cloudera Runtime release notes.

Related Information

Deprecation notice for Zeppelin

Backup HDFS

You can roll back an upgrade from CDP Private Cloud Base 7 to HDP 3. The rollback restores your HDP cluster to the state it was in before the upgrade. This means any change that happened after taking the backups as instructed from points 4 to 7 will be reverted from the HDFS cluster. You must perform additional steps before upgrading your HDP cluster if you have configured the NameNode HA.

Procedure

1. If you have configured the NameNode HA, then locate the Active NameNode from Ambari Web > Services > HDFS in the Summary area.
2. Check the NameNode directory to ensure that there is no snapshot of any prior HDFS upgrade. Specifically, using Ambari Web, browse to Services > HDFS > Configs, and examine the dfs.namenode.name.dir in the NameNode Directories property. Make sure that only a /current directory exists and remove /previous directory on the NameNode host.
3. Create the following log and other files. The commands below back up additional state from the file system in addition to what fsImage contains. This information can be used to validate the filesystem state after the upgrade by comparing the output before or after the upgrade. This is helpful, but it is not required for troubleshooting any issues that arise during the upgrade.

   Note: The fsck or ls command may take a significant amount of time if the number of blocks or files in HDFS is in the ten to a hundred million or more range.

   Authenticate as the HDFS user su -l [HDFS_USER]

   Note: If the cluster is Kerberized, then you must kinit as the service principal. If the cluster is not Kerberized, then you must run as a cluster administrator user or log in as the service user.

   Run the following, where [HDFS_USER] is the HDFS Service user. For example, hdfs:

   a) Run fsck with the following flags and send the results to a log. The resulting file contains a complete block map of the file system. Use this log later to confirm the upgrade.

   ```
   hdfs fsck / -files -blocks -locations > dfs-old-fsck-1.log
   ```

   b) Create a list of all the DataNodes in the cluster.

   ```
   hdfs dfsadmin -report > dfs-old-report-1.log
   ```

   c) Capture the complete namespace of the file system. The following command does a recursive listing of the root file system:

   ```
   hdfs dfs -ls -R / > dfs-old-lsr-1.log
   ```

   d) Take a backup of the HDFS data to the backup instance of your HDFS, if you have such a system.
4. Create a backup from the configuration directory under /etc/hadoop/conf into a backup directory on all of your hosts.
5. Save the namespace. As the HDFS user, " su -l [HDFS_USER] ", you must put the cluster in Safe Mode.

   ```
   hdfs dfsadmin -safemode enter
   hdfs dfsadmin -saveNamespace
   ```

   Note: In a highly-available NameNode configuration, the command `hdfs dfsadmin -saveNamespace` sets a checkpoint in the first NameNode specified in the configuration, in dfs.ha.namenodes.[nameserviceID]. You can also use the dfsadmin -fs.
6. Create a backup from the directory located in $[dfs.namenode.name.dir]/ current into a backup directory.

7. Create a backup from the directory located in $[dfs.journalnode.edits.dir]/current into a backup directory.
8. As the HDFS user, su -l [HDFS_USER], take the NameNode out of Safe Mode. hdfs dfsadmin -safemode leave

   From this point, you have all the data that might be required to restore HDFS to the state where it was at the time when HDFS entered safe mode.

   A few points to consider regarding the backups:

   - fsck ls, and other command outputs happened before entering safe mode if you went step by step over the guide. The guide initiates safe mode before the commands that require safe mode, however you can enter safe mode earlier.
   - If you come out of safe mode, and leave the cluster running, then you are allowing mutations on the filesystem that are not saved in the backup.

Backup ZooKeeper

Procedure

1. Stop the Zookeeper service in Ambari UI.
2. Back-up services data to restore later. For Zookeeper on every node.

```
tar -czf backup.tar.gz /hadoop/zookeeper
```

Backup databases

To continue upgrading to Cloudera Runtime 7.1.x, you must have completed the HDP prerequisites tasks. Ensure you backup your databases before beginning the upgrade.

Before you upgrade

Make sure that you have reviewed and completed all prerequisites described above.

Cloudera recommends that you perform backup of your databases before beginning the upgrade.

- Ambari database
- Hive Metastore database (after the pre-upgrade tool runs compaction)
- Oozie Server database
- Ranger database
- Ranger KMS database
- Druid database
- Superset Database

Checkpoint HDFS

You must perform additional steps before upgrading your HDP cluster if you have configured NameNode HA to create a checkpoint for HDFS.

Procedure

1. If you are configured for NameNode HA, then locate the Active NameNode from Ambari Web > Services > HDFS in the Summary area.
2. Check the NameNode directory to ensure that there is no snapshot of any prior HDFS upgrade. Specifically, using Ambari Web, browse to Services > HDFS > Configs, and examine the dfs.namenode.name.dir in the NameNode Directories property. Make sure that only a /current directory exists and remove /previous directory on the NameNode host.

3. **3.** Create the following log and other files. Creating these logs allows you to check the integrity of the file system after the Stack upgrade.

   As the HDFS user, su -l [HDFS_USER], run the following (where [HDFS_USER] is the HDFS Service user, for example, hdfs):

   - Run fsck with the following flags and send the results to a log. The resulting file contains a complete block map of the file system. You use this log later to confirm the upgrade.

     `hdfs fsck / -files -blocks -locations > dfs-old-fsck-1.log`
   - Create a list of all the DataNodes in the cluster. `hdfs dfsadmin -report > dfs-old-report-1.log`
   - Optional: Capture the complete namespace of the file system. The following command does a recursive listing of the root file system: `hdfs dfs -ls -R / > dfs-old-lsr-1.log`
   - Optional: Take a backup of the HDFS data to your local file system or the backup instance of your HDFS.
4. **4.** Save the namespace. As the HDFS user, " su -l [HDFS_USER] ", you must put the cluster in Safe Mode.

   - `hdfs dfsadmin -safemode enter`
   - `hdfs dfsadmin -saveNamespace`

   Note: In a highly-available NameNode configuration, the command `hdfs dfsadmin -saveNamespace` sets a checkpoint in the first NameNode specified in the configuration, in dfs.ha.namenodes.[nameserviceID]. You can also use the `dfsadmin -fs` .
5. **5.** Copy the checkpoint files located in $[dfs.namenode.name.dir]/current into a backup directory.
6. **6.** Store the layout version for the NameNode located at $[dfs.namenode.name.dir]/current/VERSION into a backup directory where $[dfs.namenode.name.dir] is the value of the config parameter NameNode directories.
7. **7.** This file will be used later to verify that the layout version is upgraded. As the HDFS user, `su -l [HDFS_USER]`, take the NameNode out of Safe Mode. `hdfs dfsadmin -safemode leave`

Pre-upgrade steps

You must complete the pre-upgrade steps for the components and services that you are going to upgrade.

Ranger Service connection with Oracle database

If you have configured Ranger with Oracle Database as its backend, you must add the property with Key and Value.

Ranger connection with Oracle DB

If you have configured Ranger with Oracle Database as its backend, you must add the property conf/ranger-admin-site.xml with the key and value provided below for the Custom ranger-admin-site section in Ambari: Key: ranger.jpa.jdbc.preferredtestquery value: select 1 from dual;

Ranger admin password

During the HDP upgrade, Ranger admin fails to apply the Java patch to change all admin passwords if the hadoop.security.credstore.java-keystore-provider.password-file property is set in core-site.

About this task

Before you upgrade from HDP 3.1.5 to HDP intermediate bits, you must manually perform the following steps:

Procedure

1. **1.** SSH to the ranger admin host
2. **2.** `cd /etc/ranger/admin/conf/`
3. **3.** `vi ranger-admin-env-credstore.sh`

4. `add "export HADOOP_CREDSTORE_PASSWORD=none" in the "ranger-admin-env-credstore.sh" file`
5. `chown ranger:ranger ranger-admin-env-credstore.sh`
6. `chmod 755 ranger-admin-env-credstore.sh`

Preparing Spark for upgrade

You must migrate catalog data from dual catalog mode to single catalog mode before you upgrade HDP 3.1.5.x to HDP intermediate bits.

About this task

Dual catalog mode is not supported in CDP Private Cloud Base 7.1.6. For more information on how to migrate catalog data, see the Merge Independent Hive and Spark Catalogs section in HDP3 to CDP Private Cloud Base One Stage upgrade document linked below.

Procedure

- Cloudera supports only a single catalog HDP 3.1.5 upgrade to CDP Private Cloud Base 7.1.6.
- If your cluster version is HDP 3.1.4 or less, then you must upgrade to HDP 3.1.5 and then migrate to the single catalog.
- You must validate that all the tables are present in the single shared catalog.

Related Information

HDP3 to CDP Private Cloud Base One Stage upgrade

Backing up Ambari infra Solr data

In Ambari 7.1.x.x, Ambari Infra Solr uses Solr 8.4.1. For data stored in the existing Solr 5 implementation used by Ambari 2.6.2.x, the data stored in Ambari Infra must be backed up and the Ambari Infra Solr services must be upgraded.

The next section walks you through steps to both back up the data stored in Ambari Infra and upgrade the Ambari Infra components. The backed up data will be migrated and restored after the HDP upgrade is complete.

Back up and upgrade Ambari infra Solr and Ambari Log Search

The Ambari Infra Solr instance is used to index data for Atlas, Ranger, and Log Search. The version of Solr used by Ambari Infra in Ambari 2.7.5 is Solr 7. The version of Solr used by Ambari Infra in Ambari 7.1.x.x is Solr 8.4.1. When moving from Solr 7 to Solr 8.4.1 indexed data must be backed up from Solr 7, migrated, and restored into Solr 8.4.1 as there are on-disk format changes, and collection-specific schema changes.

The Ambari Infra Solr components must also be upgraded. Scripts are available to do both, and are explained below.

Back up and upgrade

This process will be broken up into four steps:

Generate Migration Config

The migration utility requires some basic information about your cluster and this step generates a configuration file that captures that information.

Back up Ambari Infra Solr Data

This process backs up all indexed data either to a node-local disk, shared disk (NFS mount), or HDFS filesystem.

Remove existing collections and Upgrade Binaries

This step removes the Solr 7 collections, upgrades Ambari Infra to Solr 8.4.1, and creates the new collections with the upgraded schema required by the HDP intermediate bits services. This step also upgrades LogSearch binaries if they are installed.

Migrate and Restore

This step migrates the backed up data to the new format required by Solr 8.4.1 and restores the data into the new collections. This step is completed after the HDP intermediate bits upgrade has been completed in the Post-upgrade Steps section of the upgrade guide

Generate migration configuration

The utility used in this process is included in the ambari-infra-solr-client package. This package must be upgraded before the utility can be run. To do this:

Procedure

1. SSH into a host that has an Infra Solr Instance installed on it. You can locate this host by clicking Hosts on the Ambari Web UI. Click on the Filter icon and type Infra Solr Instance: All to find each host that has an Infra Solr Instance installed on it.
2. Upgrade the ambari-infra-solr-client package.

   - `yum clean all`
   - `yum upgrade ambari-infra-solr-client -y`

   For Ubuntu18:

   - `apt-get clean all`
   - `apt-get install -y ambari-infra-solr-client`
3. You can now proceed to configuring and running the migration tool from the same host. Run the following commands as root, or as a user with sudo access: Export the variable that will hold the full path and filename of the configuration file that is generated in the next step.

   ```
   export CONFIG_INI_LOCATION=ambari_solr_migration.ini
   ```
4. Run the migrationConfigGenerator.py script, located in the /usr/lib/ambari-infra-solr-client/ directory, with the following parameters:

   --ini-file $CONFIG_INI_LOCATION

   This is the previously exported environmental variable that holds the path and filename of the configuration file that will be generated.

   --host=ambari.hortonworks.local

   This should be the hostname of the Ambari Server.

   --port=8080

   This is the port of the Ambari Server. If the Ambari Server is configured to use HTTPS, use the HTTPS port and add the -s parameter to configure HTTPS as the communication protocol.

   --cluster=cl1

   This is the name of the cluster that is being managed by Ambari. To find the name of your cluster, look in the upper right and corner of the Ambari Web UI, just to the left of the background operations and alerts.

   --username=admin

   This is the name of a user that is an Ambari Admin.

   --password=admin

   This is the password of the user.

   --backup-base-path=/my/path

   This is the location where the backed up data is stored. Data is backed up to this local directory path on each host that is running an Infra Solr instance in the cluster. So, if you have 3 Infra Solr server instances and you use --backup-base-path=/home/solr/backup, this directory is created on all 3 hosts and the data for that host is backed up to this path.

If you are using a shared file system that is mounted on each Infra Solr instance in the cluster, use the --shared-drive parameter instead of --backup-base-path. The value of this parameter should be the path to the mounted drive that is used for the backup. When this option is chosen, a directory is created in this path for each Ambari Infra Solr instance with the backed up data. For example, if you had an NFS mount /export/solr on each host, you would use --shared-drive=/exports/solr. Only use this option if this path exists and is shared amongst all hosts that are running the Ambari Infra Solr.

--java-home=/usr/jdk64/jdk1.8.0_112

This should point to a valid Java 1.8 JDK that is available at the same path on each host in the cluster that is running an Ambari Infra Solr instance.

If the Ranger Audit collection is being stored in HDFS, add the parameter, --ranger-hdfs-base-path.

The value of this parameter should be set to the path in HDFS where the Solr collection for the Ranger Audit data has been configured to store its data.

Example:--ranger-hdfs-base-path=/user/infra-solr

Example Invocations:

If using HTTPS for the Ambari Server:

```
/usr/bin/python /usr/lib/ambari-infra-solr-client/migrationConfigGenerat
or.py \
--ini-file $CONFIG_INI_LOCATION \
--host=c7401.ambari.apache.org \
--port=8443 -s \
--cluster=cl1 \
--username=admin \
--password=admin \
--backup-base-path=/home/solr/backup \
--java-home=/usr/jdk64/jdk1.8.0_112
```

If using HTTP for the Ambari Server:

```
/usr/bin/python /usr/lib/ambari-infra-solr-client/migrationConfigGenerat
or.py \
--ini-file $CONFIG_INI_LOCATION \
--host=c7401.ambari.apache.org \
--port=8080 \
--cluster=cl1 \
--username=admin \
--password=admin \
--backup-base-path=/home/solr/backup \
--java-home=/usr/jdk64/jdk1.8.0_112
```

Ensure the script generates cleanly and there are no yellow warning texts visible. If so, review the yellow warnings.

Back up Ambari Infra Solr data

After the configuration file is generated, you must review the ini file created by the process.

About this task

There is a configuration section for each collection that was detected. If you do not want to backup a specific collection you can set enabled = false and the collection will not be backed up. Ensure that enabled = true is set for all of the collections you do wish to back up. By default, only the Atlas and Ranger collections will be backed up and Log Search will not be backed up..

Procedure

- To execute the backup, run the following command from the same host on which you generated the configuration file:

  ```
  # /usr/lib/ambari-infra-solr-client/ambariSolrMigration.sh \
  --ini-file $CONFIG_INI_LOCATION \
  --mode backup | tee backup_output.txt
  ```

  During this process, the script generates Ambari tasks that are visible in the Background Operations dialog in the Ambari Server. Once the process has completed, retain the output of the script for your records. This output is helpful when debugging any issues that may occur during the migration process, and the output contains information regarding the number of documents and size of each backed up collection.

Remove Existing Collections and Upgrade Binaries

Once the data has been backed up, the old collections need to be deleted, and the Ambari Infra Solr, and Log Search (if installed) components need to be upgraded.

Procedure

- To do all of that, run the following script:

  ```
  /usr/lib/ambari-infra-solr-client/ambariSolrMigration.sh \
  --ini-file $CONFIG_INI_LOCATION \
  --mode delete | tee delete_output.txt
  ```

  During this process, the script generates Ambari tasks that are visible in the Background Operations dialog in the Ambari Server.

  After the process has completed, retain the output of the script for your records. This output is helpful when debugging any issues that may occur during the migration process.
- Starting services in Ambari

  a) Enable the ignore_groupsusers_create property by running the following commands from the ambari server host cd /var/lib/ambari-server/resources/scripts

     ```
     python configs.py -l <AMBARI_HOST> -t <AMBARI_PORT> -u <ADMIN_USERNAME> -p <ADMIN_PASSWORD> \ -n <CLUSTER_NAME> -a set -s http -c cluster-env -k ignore_groupsusers_create -v true
     ```

  b) After the ignore_groupsusers_create property is enabled, start services using Ambari and proceed with the upgrade.

  c) After this step is completed, you must revert the ignore_groupsusers_create property by running the following commands from the ambari server host cd /var/lib/ambari-server/resources/scripts

     ```
     python configs.py -l <AMBARI_HOST> -t <AMBARI_PORT> -u <ADMIN_USERNAME> -p <ADMIN_PASSWORD> \ -n <CLUSTER_NAME> -a set -s http -c cluster-env -k ignore_groupsusers_create -v false
     ```

     Caution: By setting the ignore_groupsusers_create property, you are stopping the Apache Solr migration from creating a new solr user which is already created. If you do not revert the ignore_groupsusers_create property, then when you get to the step in the upgrade where a new yarn_ats user must be created as it is not available in HDP 3.1.5.x, that yarn_ats user creation fails and an upgrade error is displayed. You must ensure to revert the setting immediately after this Solr upgrade step.

Preparing HBase for upgrade

You must remove the HBase backup-and-restore-utility configuration present in your HDP 3.1.5 cluster before you migrate to CDP. CDP Private Cloud Base does not support the backup-and-restore utility present in HDP 3.1.5.

About this task

Remove the configuration properties that you added when you enabled the HBase backup-and-restore feature in HDP 3.1.5. If you do not perform this pre-upgrade step, HBase service fails to start after upgrading to CDP Private Cloud Base.

Note: If you do not find the below-mentioned properties in the hbase-site.xml configuration file, you can skip this section.

Procedure

1. Open the hbase-site.xml configuration file on your HDP 3.1.5 cluster.
2. Delete the following properties:

```
hbase.backup.enable=true
hbase.master.logcleaner.plugins=org.apache.hadoop.hbase.backup.master.B
ackupLogCleaner
hbase.procedure.master.classes=org.apache.hadoop.hbase.backup.master.Log
RollMasterProcedureManager
hbase.procedure.regionserver.classes=org.apache.hadoop.hbase.backup.regio
nserver.LogRollRegionServerProcedureManager
```

3. Edit the hbase.coprocessor.region.classes property to remove the org.apache.hadoop.hbase.backup.BackupObserver class.

   For example, the hbase.coprocessor.region.classes property looks like the following snippet after the edit:

```
hbase.coprocessor.region.classes=org.apache.hadoop.hbase.security.access
.SecureBulkLoadEndpoint
```

4. Save the changes made to the hbase-site.xml configuration file on your HDP 3.1.5 cluster.
5. Restart the HBase cluster.

Preparing the backend HMS database for upgrade

Learn how you can prevent upgrade failures when you have materialized views or MSSQL indexed views created on top of Hive backend schemas, such as SYS or INFORMATION_SCHEMA tables.

About this task

If you have created any materialized views or MSSQL indexed views on Hive SYS or INFORMATION_SCHEMA tables, your upgrade process can fail when the upgrade SQL statements are trying to drop these tables.

You must drop the materialized views before performing an upgrade and then recreate the views after the upgrade process is complete.

Important: Cloudera recommends that you do not create any materialized views or indexed views on the SYS and INFORMATION_SCHEMA tables. However, if you have already created the views, then follow the steps provided in this topic to identify such views and drop them before upgrading the cluster.

Before you begin

You must back up the Hive metastore (HMS) backend database before dropping the materialized views.

Procedure

1. Start a Hive Beeline session and run the following query to identify materialized views that are created on top of the SYS and INFORMATION_SCHEMA tables:

```
SELECT DISTINCT d.DB_LOCATION_URI, d.NAME, t.TBL_NAME, t.TBL_TYPE, t.OWN
ER, t.VIEW_EXPANDED_TEXT
```

```
FROM sys.TBLS t
         INNER JOIN sys.DBS d ON t.DB_ID = d.DB_ID
         INNER JOIN sys.MV_CREATION_METADATA mv ON mv.TBL_NAME = t.TBL_N
AME
         INNER JOIN sys.MV_TABLES_USED tu ON mv.MV_CREATION_METADATA_ID =
 tu.MV_CREATION_METADATA_ID
WHERE tu.TBL_ID IN (SELECT distinct t.TBL_ID
                    FROM sys.MV_CREATION_METADATA mv
                             INNER JOIN sys.MV_TABLES_USED tu ON mv.MV_CR
EATION_METADATA_ID = tu.MV_CREATION_METADATA_ID
                             INNER JOIN sys.TBLS t ON tu.TBL_ID = t.TBL_ID
                             INNER JOIN sys.DBS d ON t.DB_ID = d.DB_ID
                    WHERE lower(d.NAME) IN ('sys', 'information_schema'))
  AND upper(t.TBL_TYPE) = 'MATERIALIZED_VIEW';
```

2. If the query returns any materialized views, drop each view using the DROP statement.
   DROP MATERIALIZED VIEW [db_name.]materialzed_view_name;
3. Upgrade the cluster and recreate the views after the upgrade process is complete.

Turn off YARN GPU

If YARN GPU is enabled on your HDP cluster, then you must turn off the YARN GPU feature on the HDP cluster and enable it on the CDP cluster.

Procedure

1. Log in to the HDP cluster
2. On the left navigation pane, click YARN
3. Click Configurations
4. Click Advanced
5. In the search box, search for yarn.resource-types
6. If the input field contains yarn.io/gpu, you must remove it from the string value
7. Click Save
8. Click Proceed anyway
9. In the search box, search for yarn.nodemanager.resource-plugins
10. If the input field contains yarn.io/gpu, you must remove it from the string value
11. Click Save
12. Click Proceed anyway
13. In the search box, search for container-executor configuration template
14. If the container-executor.cfg file template contains the gpu section, you must remove it completely. For example,

```
{{ '[gpu]' }}
  module.enabled={{gpu_module_enabled}}
```

15. Click Save
16. Click Proceed anyway
17. Restart the YARN service

Preparing HDP Search for upgrade

Cloudera provides the solr-upgrade.sh script to transition HDP Search 2 or 3 configurations to make them compatible with Solr 8 that is shipped with Cloudera Runtime 7.1.1 or higher. To run this script, you need to download configuration metadata from your HDP Search instance and copy it to an interim CDP cluster with Solr service. You can then use that same cluster to validate and test the migrated configuration metadata.

Note:

Do not perform the upgrade tasks on a production cluster, during an actual HDP to CDP upgrade, because the process is time consuming and may require fixing incompatibilities manually.

The migration script cannot upgrade the Lucene index files. After upgrading, you must reindex your collections. For more information, see Reindexing in Solr in the Apache Solr wiki.

HDP Search to Cloudera Search transition process

1. Deploy an interim CDP cluster with Cloudera Runtime 7.1.1 or higher. Start a Solr service.
2. Download the HDP Search configuration and copy it to the interim CDP cluster.
3. Transition the HDP Search configuration using the interim cluster.
4. Validate the transitioned configuration, using the interim cluster.
5. Test the transitioned configuration, using the interim cluster.
6. Upgrade HDP to Cloudera Runtime 7.1.x.
7. Perform *Search post-HDP-upgrade tasks*.

Warnings and prerequisites

Preparing HDP Search for a CDP Private Cloud Base upgrade is a complex task.

Warning: The procedure documented here is not applicable to transition infra-Solr deployments from HDP to CDP.

Warning: Due to changes in the underlying Apache Lucene file format between the HDP Search 2 or 3 and the Solr shipped with Cloudera Runtime 7.1.1 or higher, it is not possible to directly upgrade your existing indexes. The following procedures update only your Solr configuration and metadata to be compatible with the new Solr version. After upgrading to Cloudera Runtime 7.1.1 or higher, you must reindex your collections.

Make sure that the source data that was used to index your collections is still available before upgrading. Plan downtime for any applications or services that use your Search deployment.

Warning:

The solr-upgrade.sh script shipped with Cloudera Manager 7.3.1 or earlier downloads aliases.json from ZooKeeper during the pre-upgrade transition, but it fails to upload the file to the upgraded cluster. You need to recreate aliases manually on the upgraded cluster. For more information on aliases, see Collection aliasing.

If you run Cloudera Manager 7.4.2 or higher, you can disregard this warning.

Warning: Although the configuration transformation script addresses known incompatibilities, there might be incompatible configurations that are not detected by the script. Do not upgrade your production Cloudera Search services to Cloudera Runtime 7.1.1 or higher until you have tested the migrated configuration with Cloudera Runtime 7.1.1 or higher on a testing or development cluster.

Prerequisites

- Obtain the solr-download-metadata.sh script by creating a support ticket at the support site.
- Provision an interim Cloudera Runtime 7 cluster with a Solr service before you start the upgrade process. You need it to perform some of the upgrade transformation steps and you can also use it for upgrade testing.
- Stop making changes to your HDP Search environment. Make sure that no configuration changes are made to HDP Search for the duration of the transition and upgrade. This includes adding or removing Solr Server hosts, moving Solr Server roles between hosts, changing hostnames, and so on.
- Plan for an outage for any applications or services that use your Search deployment until you have completed reindexing after the upgrade.
- If you use Kerberos, create a jaas.conf file for the Search service superuser (solr by default).
- Do not create, delete, or modify any collections for the duration of the transition and upgrade.
- Make a backup of your HDP Search deployment.

Download Solr configuration from HDP Search ZooKeeper

The solr-download-metadata.sh script downloads metadata from HDP Search ZooKeeper. You can then copy this information into a CDP cluster and use it as input for the CDP Private Cloud Base upgrade process.

Before you begin

The migration script uses jq for JSON file processing, this tool has to be installed:

For example, yum install jq

Procedure

1. Copy the solr-download-metadata.sh script to any of the nodes in the cluster where HDP Search is deployed.

```
#!/bin/bash
exec 3>/dev/null

set -e

ZKCLI_HDP_LUCIDWORKS=/opt/lucidworks-hdpsearch/solr/server/scripts/cloud-
scripts/zkcli.sh
ZKCLI_HDP_CLOUDERA=/usr/cloudera-hdp-solr/current/cloudera-hdp-solr/solr/
server/scripts/cloud-scripts/zkcli.sh
ZKCLI_CDH=/opt/cloudera/parcels/CDH/lib/solr/bin/zkcli.sh

error() {
  >&2 echo "$1"
  exit 1
}
remove_trailing_slash() {
  echo "$1" | sed 's@/*$@@'
}

check_jq() {
  if ! command -v jq &> /dev/null; then
    echo "Command jq could not be found"
    exit
  fi
}
check_java() {
  if ! command -v java &> /dev/null; then
    echo "Command java could not be found"
    exit
  fi
}

check_zkcli() {
  if [ ! -f ${ZKCLI_HDP_LUCIDWORKS} ]; then
    if [ ! -f ${ZKCLI_HDP_CLOUDERA} ]; then
      if [ ! -f ${ZKCLI_CDH} ]; then
        error "Cannot find zkcli.sh"
      else
        zkcli=${ZKCLI_CDH}
      fi
    else
      zkcli=${ZKCLI_HDP_CLOUDERA}
    fi
  else
    zkcli=${ZKCLI_HDP_LUCIDWORKS}
  fi
  echo "Found zklci.sh at ${zkcli}"
}
```

```
run_zk_cli() {
  : ${SOLR_ZK_ENSEMBLE:?"Please configure Solr ZooKeeper ensemble using
 the SOLR_ZK_ENSEMBLE env variable"}
  ${zkcli} -zkhost "$SOLR_ZK_ENSEMBLE" "$@" 2>&3
}
get_collections() {
  if ! jq -r 'to_entries[] | .key' < "$1"; then
    error "Cannot find collections in file $1. Please check the contents
 of the file."
  fi
}
get_configname() {
   jq -r '.["'$2'"].configName' < "$1"
}


download_zk_metadata() {
#  echo "Cleaning up $1"
#  rm -rf "${1:?}"/*

  mkdir -p "$1/collections"
  mkdir -p "$1/configs"

  echo "Copying clusterstate.json"
  # run_zk_cli -cmd get /clusterstate.json > "$1"/clusterstate.json;
  : ${SOLR_ADMIN_URI:?"Please configure Solr URI using the SOLR_ADMIN_URI
 env variable"}
  SOLR_ADMIN_URI=$(remove_trailing_slash "$SOLR_ADMIN_URI")
  curl --retry 5 -s -L -k --negotiate -u : "${SOLR_ADMIN_URI}/admin/col
lections?action=CLUSTERSTATUS&wt=json" 2> /dev/null | jq -r '.cluster.co
llections' > "$1"/clusterstate.json
  echo "Copying clusterprops.json"
  if ! run_zk_cli -cmd get /clusterprops.json > "$1"/clusterprops.json;
then
    echo "Missing/empty clusterprops.json file in ZooKeeper, creating e
mpty json"
    echo "{}" > "$1"/clusterprops.json
  fi

  echo "Copying solr.xml"
  if ! run_zk_cli -cmd get /solr.xml > "$1"/solr.xml; then
    echo "Missing/empty solr.xml in ZK, copying from local dir"
    if ! cp /etc/solr/home/solr.xml "$1"/solr.xml; then
      if ! cp /etc/solr/data_dir/solr.xml "$1"/solr.xml; then
        if ! cp /opt/solr/data/solr.xml "$1"/solr.xml; then
          if ! cp /opt/lucidworks/solr.xml  "$1"/solr.xml; then
            : ${SOLR_XML_PATH:?"Cannot download solr.xml from ZooKeeper a
nd cannot find it locally. Please specify its location using the SOLR_XM
L_PATH variable"}
            if ! cp "${SOLR_XML_PATH}" "$1"/solr.xml; then

              error "Cannot find solr.xml. Exiting."
            fi
          fi
        fi
      fi
    fi
  fi

  echo "Copying aliases.json"
  if ! run_zk_cli -cmd get /aliases.json > "$1"/aliases.json ; then
    echo "Unable to copy aliases.json. Please check if it contains any dat
a ?"
    echo "Continuing with the download..."
  fi

  collections=$(get_collections "$1"/clusterstate.json)
  for c in ${collections}; do
    echo "Downloading configuration for collection ${c}"
    run_zk_cli -cmd get /collections/"$c" > "$1/collections/${c}_config
.json"
    coll_conf=$(get_configname "$1/clusterstate.json" "$c")
    echo "Downloading config named ${coll_conf} for collection ${c}"
    run_zk_cli -cmd downconfig -confdir "$1/configs/${coll_conf}/conf" -
confname "${coll_conf}"
  done

  echo "Successfully downloaded Solr metadata from ZooKeeper"
}
[[ -z "$1" ]] && error "Please specify output directory"

check_jq
check_java
check_zkcli
download_zk_metadata "$1"
```

2. Set the JAVA_HOME environment variable to the JDK location. For example:

   ```
   export JAVA_HOME=/usr/jdk64/jdk1.8.0_112
   ```

3. Add java to PATH. For example:

   ```
    export PATH=$PATH:$JAVA_HOME/bin
   ```

4. On a host running Solr server, set the SOLR_ZK_ENSEMBLE environment variable:

   ```
   export SOLR_ZK_ENSEMBLE=[***HOSTNAME***]:2181/solr
   ```

   Replace *[***HOSTNAME***]* with a value that is valid in your environment.

5. On a host running Solr server, set the SOLR_ADMIN_URI environment variable:

   ```
   export SOLR_ADMIN_URI=[***HOSTNAME***]:8983/solr
   ```

   Replace *[***HOSTNAME***]* with an actual value that is valid in your environment. Make sure that you include the protocol (HTTP or HTTPS) and do not include a trailing slash (/).

   For example:

   ```
   export SOLR_ADMIN_URI=htp://example.com:8983/solr
   ```

6. On a secure cluster you may need to set additional zkcli flags, for instance:

   ```
   export ZKCLI_JVM_FLAGS="-Djava.security.auth.login.config=[***/PATH/TO/
   JAAS.CONF***]"
   ```

   Replace *[***/PATH/TO/JAAS.CONF***]* with path to a valid jaas.conf file.

7. If you have enabled Kerberos, run the kinit command with the Solr service superuser. For example:

   ```
   kinit solr@[***EXAMPLE.COM***]
   ```

   Replace *[***EXAMPLE.COM***]* with your Kerberos realm name.

8. Download the current (HDP Search 2 or 3) Solr configuration from ZooKeeper:

   -
     ```
     solr-download-metadata.sh [***DIRECTORY***]
     ```

     Replace *[***DIRECTORY***]* with the path to the directory where you want to download the Solr configuration.
   - If you have enabled Kerberos and configured ZooKeeper Access Control Lists (ACLs), specify your JAAS configuration file by adding the --jaas parameter to the command.

     ```
     solr-download-metadata.sh --jaas [***/PATH/TO/
     JAAS.CONF***] [***DIRECTORY***]
     ```

     Replace *[***/PATH/TO/JAAS.CONF***]* with the path to a valid jaas.conf file.

     Replace *[***DIRECTORY***]* with the path to the directory where you want to download the Solr configuration.

   In case of a successful run, the last line printed out by the script is:

   Successfully downloaded SOLR metadata from Zookeeper

   Note: Make a backup copy of the downloaded configuration.

9. Copy the migrated data to $HOME/cr7-solr-migration in the interim Solr instance.
10. Initialize a directory for the migrated configuration as a copy of the current configuration:

    cp -r $HOME/cr7-solr-migration $HOME/cr7-migrated-solr-config

Transition Solr configuration

Depending on the Cloudera Manager version, select the transition process that is applicable to your case.

Transition Solr configuration using Cloudera Manager versions 7.1.1 to 7.2.4

The migration script transforms configuration metadata before the actual upgrade and checks its validity for the target Solr version. In case it identifies incompatibilities it cannot resolve, the script stops, letting you fix the input file with the incompatibility. Afterwards, you can rerun the script to continue with the transition process.

Warning: Although the configuration transformation script addresses known incompatibilities, there might be incompatible configurations that are not detected by the script. Do not upgrade your production Cloudera Search services to Cloudera Runtime 7.1.1 or higher until you have tested the migrated configuration with Cloudera Runtime 7.1.1 or higher on a testing or development cluster.

1. Run the migration script:

   a. ```
      /opt/cloudera/cm/solr-upgrade/solr-upgrade.sh config-upgrade -t \
      solrxml -c $HOME/cr7-solr-migration/solr.xml -u \
      /opt/cloudera/cm/solr-upgrade/validators/solr_4_to_8_processors.xml \
      -d /tmp
      ```

      If Kerberos is enabled, specify your JAAS configuration file by appending --jaas */PATH/TO/SOLR-JAAS.CONF* to the command.

   b. If the script reports any incompatibilities, fix them in the working directory ($HOME/cr7-solr-migration/solr.xml in this example) and then rerun the script. Each time you run the script, the files in the output directory (/tmp in this example) are overwritten. Repeat until there are no incompatibilities and the solr.xml migration is successful. For example:

      ```
      Validating solrxml...
      No configuration errors found...
      No configuration warnings found...

      Following incompatibilities will be fixed by auto-transformations
      ```
      ```

```
(using --upgrade command):
    * System property used to define SOLR server port has changed from
      solr.port to jetty.port

Solr solrxml validation is successful. Please review
/tmp/solrxml_validation.html for more details.

Applying auto transformations...

The upgraded configuration file is available at /tmp/solr.xml
```

2. Copy the migrated solr.xml file to the migrated configuration directory:

   ```
   cp /tmp/solr.xml $HOME/cr7-migrated-solr-config
   ```

3. For each collection configuration set in $HOME/cr7-solr-migration/configs/, migrate the configuration and schema. Each time you run the script, the output file is overwritten. Do not proceed to the next collection until the migration is successful and you have copied the migrated file to its final destination.

   a. Run the migration script for solrconfig.xml. For example, for a configuration set named *TWEETS_CONFIG*:

      ```
      /opt/cloudera/cm/solr-upgrade/solr-upgrade.sh config-upgrade -t \
      solrconfig -c $HOME/cr7-solr-migration/configs/tweets_config/conf/solr
      config.xml -u \
      /opt/cloudera/cm/solr-upgrade/validators/solr_4_to_8_processors.xml \
      -d /tmp
      ```

   b. If the script reports any incompatibilities, fix them in the working directory ($HOME/cr7-solr-migration/configs/tweets_config/conf/solrconfig.xml in this example) and then rerun the script. Repeat until there are no incompatibilities and the solrconfig.xml migration is successful. You should see a message similar to the following:

      ```
      Solr solrconfig validation is successful. Please review
      /tmp/solrconfig_validation.html for more details.

      Applying auto transformations...

      The upgraded configuration file is available at /tmp/solrconfig.xml
      ```

   c. Copy the migrated solrconfig.xml file to the collection configuration directory in the migrated directory. For example:

      ```
      cp /tmp/solrconfig.xml \
      $HOME/cr7-migrated-solr-config/configs/tweets_config/conf/
      ```

   d. Run the migration script for schema.xml (or managed-schema). For example, for a configuration set named *TWEETS_CONFIG*:

      ```
      /opt/cloudera/cm/solr-upgrade/solr-upgrade.sh config-upgrade \
      -t schema \
      -c $HOME/cr7-solr-migration/configs/tweets_config/conf/schema.xml \
      -u /opt/cloudera/cm/solr-upgrade/validators/solr_4_to_8_processors.xml \
      -d /tmp
      ```

   e. If the script reports any incompatibilities, fix them in the working directory ($HOME/cr7-solr-migration/configs/tweets_config/conf/schema.xml in this example) and then rerun the script. Repeat until there are no incompatibilities and the solrconfig.xml migrations are all successful.

   f. Copy the migrated schema.xml file to the collection configuration directory in the migrated directory. For example:

      ```
      cp /tmp/schema.xml $HOME/cr7-migrated-solr-config/configs/tweets_config/
      conf/
      ```

g. Repeat for all configuration sets in $HOME/cr7-solr-migration/configs/.

Transition the configuration using Cloudera Manager versions 7.3.1 or higher

The migration script transforms configuration metadata before the actual upgrade and checks its validity for the target Solr version. In case it identifies incompatibilities it cannot resolve, the script stops, letting you fix the input file with the incompatibility. Afterwards, you can rerun the script to continue with the transition process.

Before you begin

When running the script, you must specify the location of the CDH 5 Solr binaries using the CDH_SOLR_HOME environment variable. Solr binaries are located at /opt/cloudera/parcels/CDH/lib/solr.

For example:

```
export CDH_SOLR_HOME=/opt/cloudera/parcels/CDH/lib/solr
```

For information on solr-upgrade.sh command syntax and usage options, run the following command:

```
./solr-upgrade.sh help
```

Warning: Although the configuration transformation script addresses known incompatibilities, there might be incompatible configurations that are not detected by the script. Do not upgrade your production Cloudera Search services to Cloudera Runtime 7.1.1 or higher until you have tested the migrated configuration with Cloudera Runtime 7.1.1 or higher on a testing or development cluster.

About this task

In this procedure you run solr-upgrade.sh with the upgrade-metadata option. It transforms configuration metadata to make it compatible with the target Solr version. The input of the script ([***/SOLR/METADATA/INPUT/DIRECTORY***]) is the Solr configuration that you have downloaded from the ZooKeeper service of the source version.

The Solr configuration transition script, solr-upgrade.sh, is included with Cloudera Manager 7.1 agent software. This enables you to run the script after upgrading to Cloudera Manager 7.1, but before upgrading to Cloudera Runtime 7.1.1 or higher.

The script is located at /opt/cloudera/cm/solr-upgrade/solr-upgrade.sh.

Procedure

1. Make sure that you run the script on a host that is assigned a Solr Server or Solr service Gateway role. Confirm that the SOLR_ZK_ENSEMBLE environment variable is set in /etc/solr/conf/solr-env.sh:

   ```
   cat /etc/solr/conf/solr-env.sh
   ```

   ```
   export SOLR_ZK_ENSEMBLE=[***ZK01.EXAMPLE.COM:2181,ZK02.EXAMPLE.COM:2181/
   SOLR***] \
   export SENTRY_CONF_DIR=/etc/solr/[***CONF.EXAMPLE.SOLR-1888]/sentry-conf
   ```

   Replace [***ZK01.EXAMPLE.COM:2181,ZK02.EXAMPLE.COM:2181/SOLR***] and [***CONF.EXAMPLE.SOLR-1***] with actual values valid in your environment.
2. Run the migration script:

   ```
   /opt/cloudera/cm/solr-upgrade/solr-upgrade.sh upgrade-metadata \
   -c [***/SOLR/METADATA/INPUT/DIRECTORY***] \
   ```

```
-d [***SOLR/METADATA/OUTPUT/DIRECTORY***]
```

Replace *[***/SOLR/METADATA/INPUT/DIRECTORY***]* and *[***SOLR/METADATA/OUTPUT/DIRECTORY***]* with actual values valid in your environment.

For example:

```
/opt/cloudera/cm/solr-upgrade/solr-upgrade.sh upgrade-metadata \
-c $HOME/cr7-solr-migration -d $HOME/cr7-migrated-solr-config
```

If you have enabled Kerberos, specify your JAAS configuration file by adding --jaas *[***PATH/TO/SOLR/JAAS.CONF***]* to the command.

For example:

```
/opt/cloudera/cm/solr-upgrade/solr-upgrade.sh \
--jaas [***PATH/TO/SOLR/JAAS.CONF***] \
upgrade-metadata -c $HOME/cr7-solr-migration -d $HOME/cr7-migrated-solr-c
onfig
```

The output directory does not only contain the migrated configuration files but several *_validation.html files for all the steps of the migration and a new index_validation.html file linking to these files.

The output contains the following logs at the beginning and end of the steps:

```
---------- upgrading ...
---------- upgrade successful for …
```

If a step reports an error, the script stops at that point and the METADATA UPGRADE SUCCESSFUL message is missing. Check the output for the problematic step. If the script stops on error, the last step printed only has the upgrading but not the upgrade successful line.

3. Fix the erroneous file in the input directory ($HOME/cr7-solr-migration in this example) and re-run the script.

   Each time you run the script, the files in the output directory ($HOME/cr7-migrated-solr-config in this example) are overwritten. Repeat until the script outputs no incompatibilities.

   If the script runs successfully, the last line of the output is the following:

```
METADATA UPGRADE SUCCESSFUL FOR METADATA IN [***/SOLR/METADATA/INPUT/
DIRECTORY***]
OUTPUT STORED IN [***SOLR/METADATA/OUTPUT/DIRECTORY***]
```

   For example:

```
METADATA UPGRADE SUCCESSFUL FOR METADATA IN $HOME/cr7-solr-migration
OUTPUT STORED IN $HOME/cr7-migrated-solr-config
```

Validate transitioned Solr configuration

The solr-upgrade.sh script includes a validate-metadata command that you can run against the migrated Solr configuration and metadata to make sure that they can be used to reinitialize the Solr service after the CDH cluster upgrade.

About this task

The script performs a series of checks to make sure that:

- Required configuration files (such as solr.xml, clusterstate.json, and collection configuration sets) are present.
- The configuration files are compatible with the Solr version being upgraded to (Solr 8, in this case).

Before you begin

Procedure

Validate the configuration by running the following script:

```
/opt/cloudera/cm/solr-upgrade/solr-upgrade.sh \
validate-metadata -c [***SOLR/METADATA/OUTPUT/DIRECTORY***]
```

Replace *[***SOLR/METADATA/OUTPUT/DIRECTORY***]* with the path to the directory containing the migrated Solr configuration.

If you have enabled Kerberos, specify your JAAS configuration file by adding --jaas *[***PATH/TO/SOR/JAAS.CONF***]* to the command.

For example:

```
/opt/cloudera/cm/solr-upgrade/solr-upgrade.sh validate-metadata \
-c $HOME/cr7-migrated-solr-config
```

Results

If the validation is successful, the script outputs a message similar to the following:

```
Validation successful for metadata in /home/solruser/[***SOLR/METADATA/
OUTPUT/DIRECTORY***]
```

For example,

```
Validation successful for metadata in
/home/solruser/cr7-migrated-solr-config
```

If the validation fails, you can revisit the steps in *Transition the configuration*.

Test transitioned Solr configuration on a Cloudera Runtime cluster

Copy the upgraded Solr configuration to a test or development CDP cluster to test it for incompatibilities not detected by the upgrade script before you initiate the upgrade on your production environment.

About this task

Warning: Although the configuration transformation script addresses known incompatibilities, there might be incompatible configurations that are not detected by the script. Do not upgrade your production Cloudera Search services to Cloudera Runtime 7.1.1 or higher until you have tested the migrated configuration with Cloudera Runtime 7.1.1 or higher on a testing or development cluster.

To test the migrated configuration on a Cloudera Runtime 7.1.1 or higher cluster, you can either provision a new host in your upgraded Cloudera Manager 7 environment and add a Cloudera Runtime 7.1.1 or higher cluster using that host, or you can upgrade a development or test cluster to Cloudera Runtime 7.1.1 or higher. You can then use the Cloudera Runtime 7.1.1 or higher cluster to test the migrated configuration to make sure that it works on Cloudera Runtime 7.1.1 or higher before upgrading your production environment.

Procedure

1. Create a TAR file of the configuration files in the *[***SOLR/METADATA/OUTPUT/DIRECTORY***]* (in this example cr7-migrated-solr-config) directory and copy them over to a Solr host on the test CDP cluster.

   ```
   tar -czvf cr7-migrated-solr-config.tar.gz \
   /home/solruser/cr7-migrated-solr-config
   ```

2. On the Solr host in the test CDP cluster, extract the TAR file created in the previous step.

   ```
   tar -xzvf cr7-migrated-solr-config.tar.gz
   ```

3. Kinit as a solr user in the test CDP cluster:

   ```
   kinit solr@EXAMPLE.COM
   ```

   Replace solr@EXAMPLE.COM with your Kerberos realm name.
4. Run the following commands to create a Solr collection:

   ```
   solrctl instancedir --create /[***PATH/TO/MIGRATED/CONFIG***]/cr7-migrate
   d-solr-config/configs/testcollection_config
   ```

   ```

   solrctl collection --create testcollection_config
   ```

   - Replace *[***CONFIG***]* with the name of the configuration (NOT the name fo the collection) that you want to test.
   - Replace *[***PATH/TO/MIGRATED/CONFIG***]* with the path to where you extracted cr7-migrated-solr-config.tar.gz.

   If Kerberos is enabled and configured ZooKeeper Access Controll Lists (ACLs), specify your JAAS configuration file by adding the --jaas parameter to the command. For example:

   ```
   solrctl --jaas $HOME/SOLR-JAAS.CONF \
   instancedir --create testcollection_config \
   /[***PATH***]/cr7-migrated-solr-config/configs/testcollection_config
   ```

   ```

   solrctl collection --create testcollection_config
   ```
5. Check the Solr web UI on the host where the above collections were created, and make sure the collection is created.
6. Repeat the above steps for all collections you want to transition to CDP.

Preparing ZooKeeper for upgrade

About this task

ZooKeeper 3.5 is trying to load an existing 3.4 data directory in which no snapshot file is created. This usually happens if transaction count has not reached the limit of snapshot creation. An extra startup check is introduced in 3.5.5 (ZOOKEEPER-2325) to prevent a potential data inconsistency issue which makes ZooKeeper unable to start when no snapshot files are present. It is a valid scenario in 3.4, but in 3.5 it will result in failure to start ZooKeeper. For CDP 7.0.2+, you must set the property before the upgrade and remove it after the upgrade is finished.

Note:

1. The updated ZooKeeper 3.5 in CDP 7 will not start properly, if only log files (these are write-ahead-logs) are present for ZooKeeper but there is no snapshot file available.
2. You must set the below configuration only if you identify that there is no snapshot file for ZooKeeper before the upgrade.

This fix allows you to specify a new configuration that will disable the sanity check and allows ZooKeeper to start. You can set this configuration in two ways, choose one of the following:

- Adding a new system property for the ZooKeeper server: `-Dzookeeper.snapshot.trust.empty=true`
- You can also add this config to the zoo.cfg file, but in this case you need to omit the "zookeeper." prefix and you need to add the `snapshot.trust.empty=true` property to the zoo.cfg file

Preparing Kafka for upgrade

To successfully upgrade Kafka, you must set the protocol version to match the protocol version used by the brokers and clients.

Procedure

1. In Ambari Configs, update the following properties:
    - inter.broker.protocol.version = current_Kafka_version
    - log.message.format.version = current_Kafka_version

    Note: current_Kafka_version is the version of Kafka you are currently running. For example, 1.0.

    Review the *HDP Release Notes* for the Apache Kafka version in use with your HDP installation.
2. Save your changes.

Extract Kafka broker ID

You must extract the Kafka broker IDs before you upgrade the HDP cluster from 3.1.5.x to HDP intermediate bits.

You must extract the Kafka broker IDs manually from the HDP 3.1.5.x cluster. When you migrate to Cloudera Manager, you must manually enter the broker IDs to the real values in Kafka.

Procedure 1

To extract the broker IDs from the HDP 3.1.5 cluster, use the following commands: This procedure helps you only if the Kafka service is not stopped.

- For Unsecure environments:
  ```
  sh /usr/hdp/current/kafka-broker/bin/kafka-broker-api-versions.sh --bootstrap-server <host:port> | grep "id" | awk -F'[=:]' '{print $1,$3}' | awk '{print $1,$2}' > /tmp/kafka-broker-ids.ini
  ```
- For Secure environments:
  ```
  sh /usr/hdp/current/kafka-broker/bin/kafka-broker-api-versions.sh --bootstrap-server <host:port> --command-config <client.config> | grep "id" | awk -F'[=:]' '{print $1,$3}' | awk '{print $1,$2}' > /tmp/kafka-broker-ids.ini
  ```
- For example,
  ```
  sh /usr/hdp/current/kafka-broker/bin/kafka-broker-api-versions.sh --bootstrap-server c6111-node2.coelab.cloudera.com:6667 --command-config <client.config> | grep "id" | awk -F'[=:]' '{print $1,$3}' | awk '{print $1,$2}' > /tmp/kafka-broker-ids.ini
  ```

  where <client.config> contains environment specific Kafka client security configuration for connecting the source Kafka cluster. For more information on configuring Kafka client, see Kafka documentation and Kafka client configuration.

  Note: This command generates the kafka-broker-ids.ini file. The kafka-broker-ids.ini file must be manually copied to $am2cm-1.2.0.0-xx/conf/ path before running the AM2CM tool.

Procedure 2

1. Create kafka-broker-ids.ini file
2. Navigate to each Kafka broker host > $log.dirs/meta.properties
3. Pick up the broker.id value.

4. Copy the hostname broker.id to kafka-broker-ids.ini file

   An example of the file format:

   ctr-e153-xxxxx-xxxx71.cloudera.site 1001

   ctr-e153-xxxxx-xxxx72.cloudera.site 1002

   ctr-e153-xxxxx-xxxx73.cloudera.site 1003

Register software repositories

Before you use Ambari to perform the stack upgrade, you must register the software repositories for the new target version with Ambari and then install the software on all hosts in the cluster.

Procedure

1. Log into Ambari.
2. Browse to Cluster Admin Stack and Versions .
3. Click the Versions tab. You see the version currently running, marked as Current.

   Note: The full version depends on the HDP version you are actually running. For example, if you are currently running the HDP 3.0.1.0 release, you would see something like HDP-3.0.1.0-187 as the full version number.
4. Click Manage Versions.
5. Proceed to register a new version by clicking Register Version.
6. Select the software version for your cluster.Choose the HDP Version

   If your Ambari host has internet access, available maintenance versions display as options in a drop-down list.

   Make sure to use the Version Definition File (VDF) option for HDP 7.1.x.x.

   If you see the VDF option for another version, click Add Version… and upload the VDF file for HDP 7.1.x.x. In addition, a Default Version Definition is also included in the list if you do not have Internet access or are not sure which specific version to install. If you choose the Default Version Definition, you must enter a "two-digit Version Number" in the Name input field. If you have difficulties, contact Cloudera Support to obtain the VDF for HDP 7.1.x.x.
7. Click Save.
8. Click Dashboard.

   Note: For SLES 12:

   - Create the hdp.cat file with your paywall credentials. The file is available here: /etc/zypp/credentials.d/hdp.cat. This is the default location. If there is a change in the location of the hdp.cat file, then you must provide the changed location. You must update the username and password in the hdp.cat file:

     username=<username>

     password=<password>
   - Add ?credentials=hdp.cat as a postfix to the end of BaseURL and gpgkey. For example, https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ambari.repo?credentials=hdp.cat
   - For more information, see Zypp Configuration options.

HDP Intermediate bits for 7.1.x.0 Repositories

HDP repositories are available for RHEL/CentOS, Sles, and Ubuntu.

Note: For repositories that are behind the paywall, ensure that the URL is in this format: https://<username>:<password>@archive.cloudera.com/...

For example, https://<username>:<password>@archive.cloudera.com/p/HDPDC-GPL/centos7/7.x/updates/7.1.8.0-801/

Operating System	Version Number	Repository Name	Format	URL
CentOS	HDP-7.1.8.0-801.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7/HDP-7.1.8.0-801.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7/hdp.repo
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7/HDP-7.1.8.0-centos7-rpm.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7/HDP-7.1.8.0-centos7-rpm.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/centos7/HDP-7.1.8.0-centos7-rpm.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.md5

Operating System	Version Number	Repository Name	Format	URL
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/centos7/hdp.gpl.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/centos7/HDP-GPL-7.1.8.0-centos7-gpl.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/centos7/HDP-GPL-7.1.8.0-centos7-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/centos7/HDP-GPL-7.1.8.0-centos7-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
Ubuntu 18	HDP-7.1.8.0-801.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18/HDP-7.1.8.0-801.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18/hdp.list
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18/HDP-7.1.8.0-ubuntu18-deb.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18/HDP-7.1.8.0-ubuntu18-deb.tar.gz.md5

Operating System	Version Number	Repository Name	Format	URL
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/ubuntu18/HDP-7.1.8.0-ubuntu18-deb.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.asc
		HDPDC-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/ubuntu18/hdp.gpl.list
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/ubuntu18/HDP-GPL-7.1.8.0-ubuntu18-gpl.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/ubuntu18/HDP-GPL-7.1.8.0-ubuntu18-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/ubuntu18/HDP-GPL-7.1.8.0-ubuntu18-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
SLES 12	HDP-7.1.8.0-801.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12/HDP-7.1.8.0-12.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12/hdp.repo
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12/HDP-7.1.8.0-sles12-rpm.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12/HDP-7.1.8.0-sles12-rpm.tar.gz
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.8.0/sles12/HDP-7.1.8.0-sles12-rpm.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/sles12/hdp.gpl.repo

Operating System	Version Number	Repository Name	Format	URL
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/sles12/HDP-GPL-7.1.8.0-sles12-gpl.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/sles12/HDP-GPL-7.1.8.0-sles12-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.8.0/sles12/HDP-GPL-7.1.8.0-sles12-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
CentOS	HDP-7.1.7.78-12.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7/HDP-7.1.7.78-12.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7/hdp.repo
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7/HDP-7.1.7.78-centos7-rpm.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7/HDP-7.1.7.78-centos7-rpm.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/centos7/HDP-7.1.7.78-centos7-rpm.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/

Operating System	Version Number	Repository Name	Format	URL
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/centos7/hdp.gpl.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/centos7/HDP-GPL-7.1.7.78-centos7-gpl.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/centos7/HDP-GPL-7.1.7.78-centos7-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/centos7/HDP-GPL-7.1.7.78-centos7-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
Ubuntu 18	HDP-7.1.7.78-12.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18/HDP-7.1.7.78-12.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18

Operating System	Version Number	Repository Name	Format	URL
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18/hdp.list
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18/HDP-7.1.7.78-ubuntu18-deb.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18/HDP-7.1.7.78-ubuntu18-deb.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/ubuntu18/HDP-7.1.7.78-ubuntu18-deb.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.asc
		HDPDC-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/ubuntu18/hdp.gpl.list
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/ubuntu18/HDP-GPL-7.1.7.78-ubuntu18-gpl.tar.gz

Operating System	Version Number	Repository Name	Format	URL
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/ubuntu18/HDP-GPL-7.1.7.78-ubuntu18-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/ubuntu18/HDP-GPL-7.1.7.78-ubuntu18-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
SLES 12	HDP-7.1.7.78-12.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12/HDP-7.1.7.78-12.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12/hdp.repo
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12/HDP-7.1.7.78-sles12-rpm.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12/HDP-7.1.7.78-sles12-rpm.tar.gz
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.7.78/sles12/HDP-7.1.7.78-sles12-rpm.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz

Operating System	Version Number	Repository Name	Format	URL
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/sles12/hdp.gpl.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/sles12/HDP-GPL-7.1.7.78-sles12-gpl.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/sles12/HDP-GPL-7.1.7.78-sles12-gpl.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.7.78/sles12/HDP-GPL-7.1.7.78-sles12-gpl.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
CentOS	HDP-7.1.6.0-203.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7/HDP-7.1.6.0-297.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7/hdpdc.repo
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7/HDPDC-7.1.6.0-centos7-rpm.tar.gz

Operating System	Version Number	Repository Name	Format	URL
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7/HDPDC-7.1.6.0-centos7-rpm.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/centos7/HDPDC-7.1.6.0-centos7-rpm.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/centos7/HDP-UTILS-1.1.0.22-centos7.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/centos7/hdpdc.gpl.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/centos7/HDPDC-GPL-7.1.6.0-centos7-tars-tarball.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/centos7/HDPDC-GPL-7.1.6.0-centos7-tars-tarball.tar.gz.md5

Operating System	Version Number	Repository Name	Format	URL
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/centos7/HDPDC-GPL-7.1.6.0-centos7-tars-tarball.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
Ubuntu 18	HDP-7.1.6.0-203.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/HDP-7.1.6.0-297.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/7.1.6.0 HDP main
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/hdpdc.list
			Tarball	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/HDPDC-7.1.6.0-ubuntu18-deb.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/HDPDC-7.1.6.0-ubuntu18-deb.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/ubuntu18/HDPDC-7.1.6.0-ubuntu18-deb.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.md5

Operating System	Version Number	Repository Name	Format	URL
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/ubuntu18/HDP-UTILS-1.1.0.22-ubuntu18.tar.gz.asc
		HDPDC-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/ubuntu18/hdpdc.gpl.list
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/ubuntu18/HDPDC-GPL-7.1.6.0-ubuntu18-deb.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/ubuntu18/HDPDC-GPL-7.1.6.0-ubuntu18-deb.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/ubuntu18/HDPDC-GPL-7.1.6.0-ubuntu18-deb.tar.gz.asc

Operating System	Version Number	Repository Name	Format	URL
SLES 12	HDP-7.1.6.0-203.xml	HDPDC	Version Definition File (VDF)	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/sles12/HDP-7.1.6.0-297.xml
			Base URL	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/sles12
			Repo File	https://archive.cloudera.com/p/HDPDC/7.x/7.1.6.0/sles12/hdpdc.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/HDPDC-GPL-7.1.6.0-sles12-tars-tarball.tar.gz

Operating System	Version Number	Repository Name	Format	URL
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/HDPDC-GPL-7.1.6.0-sles12-tars-tarball.tar.gz.md5
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/HDPDC-GPL-7.1.6.0-sles12-tars-tarball.tar.gz.asc
		HDP-UTILS	Base URL	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12
			Tarball	https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz
				md5 https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.md5
				asc https://archive.cloudera.com/p/HDP-UTILS/1.1.0.22/repos/sles12/HDP-UTILS-1.1.0.22-sles12.tar.gz.asc
		HDP-GPL	URL	https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/hdpdc.gpl.repo
			Tarball	https://archive.cloudera.com/p/HDPDC-GPL/sles12/7.x/updates/7.1.6.0/HDPDC-GPL-7.1.6.0-sles12-rpm.tar.gz
				md5 https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/HDPDC-GPL-7.1.6.0-sles12-rpm.tar.gz.md5

Operating System	Version Number	Repository Name	Format	URL
				asc https://archive.cloudera.com/p/HDPDC-GPL/7.x/7.1.6.0/sles12/HDPDC-GPL-7.1.6.0-sles12-rpm.tar.gz.asc

Software download matrix for 3.1.5 to CDP 7.1.x

All the download links related to HDP, Ambari, Cloudera Manager, Cloudera Private Cloud Base, and so on are available here.

Product	Download location	Note
Ambari	Ambari 7.1.x.0	
HDP	HDP 7.1.x.0	
Cloudera Runtime	Cloudera Runtime	Includes parcels for Cloudera Runtime 7.1.x and the Sqoop connectors.
AM2CM 2.8.1.0 tool - This tool consists of log4j security updates.	AM2CM 2.8.1.0	This latest AM2CM tool supports the upgrades from: **1.** HDP 3.1.5 to CDP 7.1.7 SP2 **2.** HDP 3.1.5 to CDP 7.1.8 **3.** HDP 3.1.5 to CDP 7.1.7 SP1 **4.** HDP 3.1.5 to CDP 7.1.7 **5.** HDP 3.1.5 to CDP 7.1.6
AM2CM Legacy tools	To access the AM2CM legacy tools, see AM2CM legacy tools download	
Cloudera Manager	Cloudera Manager	

AM2CM legacy tools download

All the download links related to the AM2CM legacy tools are available here.

Product	Download location	Note
AM2CM 2.6.0.0 tool - This tool consists of log4j security updates.	AM2CM 2.6.0.0	This latest AM2CM tool supports the upgrades from: **1.** HDP 3.1.5 to CDP 7.1.7 SP2 **2.** HDP 3.1.5 to CDP 7.1.8
AM2CM 2.4.3 tool - This tool consists of log4j security updates.	AM2CM 2.4.3.0	This latest AM2CM tool supports the upgrades from: **1.** HDP 3.1.5 to CDP 7.1.6 **2.** HDP 3.1.5 to CDP 7.1.7 **3.** HDP 3.1.5 to CDP 7.1.8
AM2CM 2.4.2 tool - This tool consists of log4j security updates.	AM2CM 2.4.2.0	This latest AM2CM tool supports the upgrades from: **1.** HDP 3.1.5 to CDP 7.1.6 **2.** HDP 3.1.5 to CDP 7.1.7 **3.** HDP 3.1.5 to CDP 7.1.8
AM2CM 2.4.1 tool - This tool consists of log4j security updates.	AM2CM 2.4.1.1 and AM2CM 2.4.1.0	This latest AM2CM tool supports the upgrades from: **1.** HDP 3.1.5 to CDP 7.1.6 **2.** HDP 3.1.5 to CDP 7.1.7 **3.** HDP 3.1.5 to CDP 7.1.8

Product	Download location	Note
AM2CM 2.4.0 tool - This tool consists of log4j security updates.	AM2CM 2.4.0	This latest AM2CM tool supports the upgrades from: 1. HDP 3.1.5 to CDP 7.1.6 2. HDP 3.1.5 to CDP 7.1.7 3. HDP 3.1.5 to CDP 7.1.8
AM2CM 2.3.0 tool - This tool consists of log4j security updates.	AM2CM 2.3.0 RHEL7 AM2CM 2.3.0 Ubuntu18 AM2CM 2.3.0 Sles12	Supports the upgrades from: 1. HDP 3.1.5 to CDP 7.1.6 2. HDP 3.1.5 to CDP 7.1.7 3. HDP 3.1.5 to CDP 7.1.8
AM2CM 2.x.x tools - The AM2CM 2.1.0, 2.0.4, and 2.0.3 tools consists of log4j security updates.	AM2CM 2.1.0 RHEL7 AM2CM 2.1.0 Ubuntu18 AM2CM 2.1.0 Sles12	Supports the upgrades from: 1. HDP 3.1.5 to CDP 7.1.6 2. HDP 3.1.5 to CDP 7.1.7
	AM2CM 2.0.4 RHEL7 AM2CM 2.0.4 Ubuntu18 AM2CM 2.0.4 Sles12	
	AM2CM 2.0.3 RHEL7 AM2CM 2.0.3 Ubuntu18 AM2CM 2.0.3 Sles12	
	AM2CM 2.0.2 RHEL7 AM2CM 2.0.2 Ubuntu18 AM2CM 2.0.2 Sles12	
AM2CM Legacy tools	AM2CM 2.0.0.0 RHEL7 AM2CM 2.0.0.0 Ubuntu18 AM2CM 2.0.0.0 Sles12	To upgrade from HDP 3.1.5 to CDP 7.1.7
	AM2CM 1.2.0.0	To upgrade from HDP 3.1.5 to CDP 7.1.6

Install software on the hosts

If you have successfully registered the software repositories for the new target version with Ambari, you can now install the software on all hosts in the cluster.

Procedure

1. Browse to Cluster Admin > Stack and Versions.
2. Click the Versions tab.
3. On a registered target version, click Install Packages and click OK to confirm.
   The install version operation starts. This installs the target version on all hosts in the cluster. You can monitor the progress of the installation by clicking the Installing link. When the installation completes, the Upgrade button replaces the Install Packages button.

Perform the HDP upgrade

After you have performed the required pre-upgrade steps and backed up all the relevant data, you can proceed with the process to upgrade your cluster to HDP intermediate bits.

Procedure

1. Log into Ambari.
2. Browse to Cluster Admin Stack and Versions .
3. Click the Versions tab.

   The registered and installed target HDP version displays an Upgrade button.
4. Click Upgrade on the target version.

   Based on your current HDP version and the target HDP version, Ambari performs a set of prerequisite checks to determine if you can perform a rolling or an express upgrade. A dialog displays the options available.

5. Select the Express Upgrade method. (Only supported method for upgrading from HDP 3.1.5 to HDP intermediate bits.) Advanced options are also available.
   - Skip all Service Check failures:

     Ambari automatically skips any Service Check failures and completes the task without requiring user actions. After all the Service Checks have run in a task, you see a summary of the failures and options to continue the upgrade or pause.
   - Skip all Slave Component failures

     Ambari automatically skips any Secondary Component failures and completes the task of upgrading Secondary components without requiring user actions. After all the Secondary Components have been upgraded, you see a summary of the failures and options to continue the upgrade or pause.
6. Click Proceed.

Perform express upgrade

You must use the Express Upgrade method to upgrade your cluster from HDP 3.1.5.x to HDP intermediate bits.

Procedure

1. Ambari checks that your cluster meets prerequisites. A dialog displays the results:
   - If any required prerequisites are not met, the result displays an error.

     You cannot proceed with the upgrade until you make the appropriate corrections and return to Perform Upgrade again.
   - If any optional prerequisites are not met, the result displays a warning.

     You may proceed with the upgrade.
   - Ambari displays a list of configuration changes that occur during the upgrade.
2. When the prerequisite checks complete, the upgrade starts. The time required to perform the upgrade depends on many factors. As part of the upgrade process, each component in the cluster restarts in a serial fashion. The stop/start times contribute to the total upgrade time.
3. The upgrade process includes the following stages. Some stages require that you complete an action during normal operation. If any stage fails, the upgrade stops and prompts you for action.

Stage	Description	Action required
Prepare Upgrade	You should stop all apps on YARN queues, and deactivate & kill all running Storm topologies.	Perform the actions to prepare for the upgrade.
Stop Components for High-Level Services	This will stop all components for High-Level Services. This includes all master components except those of HDFS, HBase, ZooKeeper and Ranger.	None
Perform Backups	This step prompts you to confirm that you have taken proper backups before proceeding.	You must acknowledge the prompt for database backups.
Stop Components for Core Service	Stops all components with HDFS, HBase, ZooKeeper and Ranger.	None
Update Target Repository	Updates the stack version in Ambari to the target version.	None
Update Service Configs	Updates (i.e. transfers or replaces) any configurations that are necessary for the upgrade.	None

Restart Components	Restarts all core components such as ZooKeeper, Ranger, HDFS, YARN, MapReduce2 and various Clients (Tez, Pig, Sqoop).	In an SSO-enabled cluster: If the cookie is lost/session is expired:client should use local login to access the Ambari and proceed further. For example: <ambari_host:ambari_port>/#/login/local
All Service Checks	All Service Checks are performed against the cluster.	Any service check that fails prompts you to Ignore and Continue, Downgrade or Retry. If you selected the Skip all Service Check failures option, you are only prompted when all Service Checks complete.
Restart Components	Restarts the remaining components such as Oozie, Hive, Spark2 and others.	None
Set Version on All Hosts	Sets the HDP version on all hosts to the target HDP version.	None
Finalize Upgrade Pre-Check	Checks if any hosts were not upgraded, either because the host was in Maintenance Mode, or one or more components on the host failed to upgrade (and were skipped).	Click the list that displays # hosts for details on the hosts (and their components) that are not upgraded. You can Pause Upgrade, delete the hosts and return to finalize.
Finalize Upgrade	The component upgrades are complete. You are presented the option to Finalize, which when selected, completes the upgrade process and saves the cluster state.	Prompted to Finalize or Finalize Later or Downgrade.

4. When the upgrade stages complete, you can choose to Finalize the upgrade, or to Finalize Later. Finalizing later gives you a chance to perform more validation on the cluster.

   Note: If you choose to finalize later, both versions are listed on the Stack and Versions tab with the starting version displaying as Current. It is not until you finalize that Ambari makes the target version the current version. Also, until you finalize, you will not be able to perform operational changes to the cluster (such as move components, change configurations, and so on).

5. Click Finalize to complete the express upgrade process.

Post-HDP-upgrade tasks

After the HDP cluster is upgraded to Cloudera Private Cloud Base, ensure that you check the cluster settings, migration, and restore settings are correct.

Upload HDFS entity information

You must also configure specific properties to update the values of the Ranger tag store only if you are using Ranger Tagsync.

Property: ranger.tagsync.atlas.hdfs.instance.cl1.ranger.service

Note: cl1 refers to cluster name.

Preconditions:

- If you have Tagsync configured previously, then manually set this property.
- Not already set. Default service name is cl1_hadoop.
- This property is applicable only if you are upgrading from HDP to CDP Private Cloud Base. If you are on a completely new cluster, you can ignore this property.

Ambari infra-migrate and restore

Follow the steps below to restore the data previously backed up:

Procedure

1. SSH to the host where the migrationConfigGenerator.py was run prior to the HDP Upgrade. This will be from one of your Ambari Infra Solr instances. Ensure you are in the current working directory containing the ambari_solr_migration.ini file.
2. Export the variable used to hold the path to the ini file.

   ```
   export CONFIG_INI_LOCATION=ambari_solr_migration.ini
   ```

3. Migrate the data to ensure it’s in the right format to import into Solr 7. Note that this script can take a long time to run depending on the volume of data backed up. It is recommended to run this script using the nohup command.

   ```
   nohup /usr/lib/ambari-infra-solr-client/ambariSolrMigration.sh --ini-file
    \ $CONFIG_INI_LOCATION --mode migrate-restore
   ```

4. Re-index the migrated data into your current collections so the backed up data is visible in all of the tools using the Infra Solr instances. Note that this script can take a long time to run depending on the volume of data backed up. It is recommended to run this script using the nohup command.

   ```
   nohup /usr/lib/ambari-infra-solr-client/ambariSolrMigration.sh --ini-file
    \ $CONFIG_INI_LOCATION --mode transport
   ```

Ambari Metrics and LogSearch

Take the Ambari Metrics and Log Search Services out of Maintenance Mode by choosing Actions > Turn Off Maintenance Mode from each Service page.

Back up the Ranger configuration

You must backup the Ranger configuration.

After the upgrade, in case of SSL enabled environment, keystore & truststore configurations used by Ranger tagsync, usersync & plugins must be verifiied to ensure proper communication to Ranger Admin.

In case of errors, keystore must be recreated and corresponding configurations in Ambari updated. The example for tagsync and the command used to create the keystore for tagsync is: `keytool -genkey -keyalg RSA -alias rangertagsync -keystore rangertagsynckeystore.jks -storepass xasecure -validity 360 -keysize 2048`.

After keystore is updated, update the tagsync properties (in the Advanced ranger-tagsync-policymgr-ssl section) xasecure.policymgr.clientssl.keystore with correct value and set the password.

Backup Infra Solr collections

Backup the Infra solr collections from the Ambari managed Infra Solr service and restore them on the Infra Solr service managed by Cloudera Manager. When you are creating a backup of the Infra solr data, ensure that only Infra Solr and Zookeeper services are started and other services are stopped. Similarly, when you are restoring the data on Infra Solr managed by Cloudera Manager, you must start HDFS and Zookeeper only. This ensures no operations are performed by services which can push data to Infra Solr.

About this task

To create a backup of the Infra solr collections from Infra Solr service, perform the following steps:

Procedure

1. The assumption is /opt/solrdata is the work directory which must pre-exist on both local file system and HDFS.

   Note: If the Solr cloud is a multi node, then /opt/solrdata should be a common mount accessible from all the Solr server hosts.

   ```
   mkdir -p /opt/solrdata/
   kinit -kt hdfs.keytab hdfs; hdfs dfs -mkdir -p /opt/solrdata
   ```

2. Set the path for the ini configuration file.

   ```
   CONFIG_INI_LOCATION=/opt/solrdata/ambari_solr_migration.ini
   ```

3. For the backup of data from Infra Solr to HDFS:

   a) Generate the ini configuration file which is used by the migration helper.

   ```
   /usr/bin/python /usr/lib/ambari-infra-solr-client/migrationConfigGenerat
   or.py --ini-file $CONFIG_INI_LOCATION --host <Ambari Server Host> --port
    <Ambari Server Port> --cluster <Cluster-Name> --username <Ambari admin
   username> --password <Ambari admin password> --backup-base-path=/opt/sol
   rdata --hdfs-base-path=/opt/solrdata --java-home <JAVA JDK HOME which is
    also used by Ambari > -s < use -s if TLS is enabled for Ambari>
   ```

   b) Backup collections:

   ```
   /usr/lib/ambari-infra-solr-client/migrationHelper.py --ini-file $CONFIG_
   INI_LOCATION --action backup
   ```

   c) Copy the backup to HDFS:

   ```
   /usr/lib/ambari-infra-solr-client/migrationHelper.py --ini-file $CONFIG_
   INI_LOCATION --action copy-to-hdfs
   ```

   You can now use the AM2CM tool to migrate from the Ambari-managed HDP cluster to the Cloudera Manager-managed CDP cluster.

Troubleshooting the HDP upgrade

In the event of a problem, contacting Cloudera Support is highly recommended. Alternatively, you can perform these troubleshooting procedures.

YARN Registry DNS instance fails to start

The YARN Registry DNS instance will fail to start if another process on the host is bound to port 53. Ensure no other services that are binding to port 53 are on the host where the YARN Registry DNS instance is deployed.

HDP 3.1.5 to HDP 7.1.7 Intermediate bits Kafka upgrade

You must use this method to resolve if you face issues during the Kafka service check.

While upgrading from HDP 3.1.5 to HDP 7.1.7, if you have some hosts with Kafka broker installed but without zookeeper, the following error may occur during Kafka service check:

```
Exception in thread "main" java.lang.NoClassDefFoundError: org/apache/
zookeeper/client/ZKClientConfig
 at kafka.zookeeper.ZooKeeperClient.$anonfun$clientConfig
$1(ZooKeeperClient.scala:106)
 at kafka.zookeeper.ZooKeeperClient.<init>(ZooKeeperClient.scala:106)
 at kafka.zk.KafkaZkClient$.apply(KafkaZkClient.scala:1863)
```

```
 at kafka.admin.TopicCommand$ZookeeperTopicService
$.apply(TopicCommand.scala:341)
 at kafka.admin.TopicCommand$.main(TopicCommand.scala:55)
 at kafka.admin.TopicCommand.main(TopicCommand.scala)
Caused by: java.lang.ClassNotFoundException:
 org.apache.zookeeper.client.ZKClientConfig
 at java.net.URLClassLoader.findClass(URLClassLoader.java:381)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:424)
 at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:331)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:357)
 ... 6 more
```

This issue occurs because Ambari does not set the correct version with the hdp-select option.

Workaround

You must select the correct version manually and resume the upgrade procedure:

- `hdp-select set zookeeper-client 7.1.7.0-551`
- `hdp-select set zookeeper-server 7.1.7.0-551`

Rollback Ambari 7.1.x to Ambari 2.7.5

You must use the backup of Ambari 2.7.5 to perform the following steps.

About this task

In 7.1.x, x represents greater than or equal to 6. For example, 7.1.6, 7.1.7, and so on.

Procedure

1. Stop all services in Ambari UI.
2. On the Ambari Server host, stop the Ambari Server.

```
ambari-server stop
Stop  Ambari Agent on all host
ambari-agent stop
```

3. Obtain Ambari Repositories:

```
wget -nv
https://archive.cloudera.com/p/ambari/2.x/${your_ambari_version}/centos7/a
mbari.repo -O
/etc/yum.repos.d/ambari.repo
yum clean all
```

4. Downgrade ambari-server, ambari-agent packages manually using “yum downgrade <packagename>”

```
yum  downgrade ambari-server
yum  downgrade ambari-agent # on all hosts
```

5. Reinitialize Ambari DB - Drop the old schema and initialize blank new schema :

   Example - Postgres

```
psql -W -d ${AMBARI_DB_NAME} --user ${AMBARI_DB_USER}
DROP SCHEMA ${AMBARI_DB_NAME} CASCADE;
CREATE SCHEMA ambari;
```

```
GRANT ALL ON SCHEMA ambari TO ambari;
```

MYSQL

```
mysql -u ${AMBARI_DB_USER}
drop database ${AMBARI_DB_NAME};
create database ${AMBARI_DB_NAME};
```

6. Populate the Ambari database with backup data:

   POSTGRES

   ```
   psql -W -d ${AMBARI_DB_NAME} --user ${AMBARI_DB_USER} < pre_upgrade.sql
   ```

   MYSQL

   ```
   mysql -u ${AMBARI_DB_USER} ${AMBARI_DB_NAME} < pre_upgrade.sql
   ```

7. Restore these files from the backup:

   ```
   /etc/ambari-server/conf/ambari.properties
   /etc/ambari-agent/conf/ambari-agent.ini
   ```

8. Restore old stack symlinks on Agent nodes:

   ```
   hdp-select set all 3.1.5.0-152
   ```

9. Check ambari-server user:

   ```
   grep ambari-server.user /etc/ambari-server/conf/ambari.properties
   ```

   If ambari-server is running as non-root user, set permissions for files by running:

   ambari-server setup

10. Start Ambari

Rollback HDP Services from CDP 7.1.x

After Ambari rollback, you must rollback the HDP services in the following order to restore to HDP 3.1.5.

In 7.1.x, x represents greater than or equal to 6. For example, 7.1.6, 7.1.7, and so on.

Overview

You can roll back an upgrade from HDP 3.1.5.x to CDP Private Cloud Base 7.1.x. The rollback restores your HDP cluster to the state it was in before the upgrade, including Kerberos and TLS/SSL configurations.

In 7.1.x, x represents greater than or equal to 6. For example, 7.1.6, 7.1.7, and so on.

Before you start rolling back the CDP Private Cloud Base 7 to HDP 3, review the following information.

Caveats

- Any data created after the upgrade is lost.
- In a typical upgrade, you first upgrade Ambari from version 2.7.5 to version 7.1.x, and then you use the upgraded version of Ambari 7.1.x to upgrade HDP 3 to CDP Private Cloud Base 7. (See Upgrading a Cluster) If you want to roll back this upgrade, follow these steps to roll back your cluster to its state prior to the upgrade.
- Follow all of the steps in the order presented in this topic. Cloudera recommends that you read through the backup and rollback steps before starting the backup process. You may want to create a detailed plan to help you anticipate potential problems.

- You can roll back to HDP 3 after upgrading to CDP Private Cloud Base 7 only if the HDFS upgrade has not been finalized. The rollback restores your HDP cluster to the state it was in before the upgrade, including Kerberos and TLS/SSL configurations.
- These rollback steps depend on complete backups taken before upgrading Ambari and HDP. See Back Up Ambari and Backing up HDP cluster. For steps where you need to restore the contents of a directory, clear the contents of the directory before copying the backed-up files to the directory. If you fail to do this, artifacts from the original upgrade can cause problems if you attempt the upgrade again after the rollback.

Review Limitations

The rollback procedure has the following limitations. This rollback guide covers rolling back upgrade before finalizing the HDP7 upgrade in Ambari and does not cover the AM2CM Stage.

- HDFS – If you have finalized the HDFS upgrade, you cannot roll back your cluster.
- Configuration changes, including the addition of new services or roles after the upgrade are not retained after rolling back Ambari. Cloudera recommends that you not make configuration changes or add new services and roles until you have finalized the HDFS upgrade and no longer require the option to roll back your upgrade.
- HBase – If your cluster is configured to use HBase replication, data written to HBase after the upgrade might not be replicated to peers when you start your rollback. This topic does not describe how to determine which, if any, peers have the replicated data and how to roll back that data. For more information about HBase replication, see HBase Replication.
- Kafka – Once the Kafka log format and protocol version configurations (the inter.broker.protocol.version and log.message.format.version properties) are set to the new version (or left blank, which means to use the latest version), Kafka rollback is not possible.

Unsupported components

For more information on supported components, see unsupported components.

ZooKeeper

Use the following step to restore the backed-up data for ZooKeeper. For zookeeper, the default folder is /hadoop/zookeeper.

Procedure

1. Execute the following command to clean up and restore:

```
rm -rf /hadoop/zookeeper
tar xf up.tar.gz -C /
```

2. Start Zookeeper in Ambari UI.

Ambari-Metrics

To restore the backed-up Ambari-Metrics data, downgrade the ambari-metrics packages on all hosts and restore the backed-up-ambari-metrics data.

Procedure

1. Downgrade ambari-metrics packages on all hosts where they are installed.

   On every host in your cluster running a Metrics Monitor, run the following commands:

   ```
   yum downgrade ambari-metrics-monitor ambari-metrics-hadoop-sink
   ```

   Run the following command on all hosts running the Metrics Collector:

   ```
   yum downgrade ambari-metrics-collector
   ```

   Run the following command on the host running the Grafana component:

   ```
   yum downgrade ambari-metrics-grafana
   ```

2. Restore backed-up ambari-metrics data on the host where the ambari-metrics-collector is installed

   ```
   rm -rf /var/lib/ambari-metrics-collector
   tar xf ams-backup.tar.gz  -C /
   ```

3. Start Ambari-Metics in Ambari UI.

   Known Issue Description: AMS crashes after metrics DB rollback.

   Workaround:

   a. Stop Metrics Collector via ambari UI.
   b. Disable auto-start for Metrics Collector via ambari UI.
   c. SSH to metrics collector host.
   d. Find all processes run under AMS user and kill them.
   e. Remove PID files on the host (pid files are in /var/run/ambari-metrics-collector/ and /var/run/ams-hbase/ directories).
   f. Remove the previous content of hbase.rootdir and restore the back-up of metrics DB again.
   g. Remove the directory specified in AMS hbase.zookeeper.property.dataDir property.
   h. Remove the directory specified in AMS ams-hbase-site/phoenix.spool.directory property.
   i. Start Metrics Collector via ambari UI.
   j. Enable auto-start for Metrics Collector via ambari UI.

Ambari Infra Solr

Use the following steps to restore backed-up ambari infras solr data.

Procedure

1. Downgrade ambari-infra-solr, ambari-infra-solr-client packages on all hosts where they are installed.

   Run the following command on all hosts running the infra Solr Instance:

   ```
   yum downgrade ambari-infra-solr
   ```

   Run the following command on all hosts running the infra Solr Client:

   ```
   yum downgrade ambari-infra-solr-client
   ```

2. Restore backed-up infra-solr data on the node where the infra-solr is installed.

   Start the Ambari-Infra service in Ambari UI and run the following commands:

   For unsecured cluster

   ```
   curl -v
   ```

```
"http://${INFRA_SOLR_URL}/solr/vertex_index/replication?command=restore
&location=/path/to/backup/directory&name=vertex_index_backup"

curl -v
"http://${INFRA_SOLR_URL}/solr/edge_index/replication?command=restore&lo
cation=/path/to/backup/directory&name=edge_index_backup"

curl -v
"http://${INFRA_SOLR_URL}/solr/fulltext_index/replication?command=restore
&location=/path/to/backup/directory&name=fulltext_index_backup"
curl -v
"http://${INFRA_SOLR_URL}/solr/ranger_audits/replication?command=restor
e&location=/path/to/backup/directory&name=ranger_audits_backup"
curl -v
"http://${INFRA_SOLR_URL}/solr/hadoop_logs/replication?command=restore&
location=/path/to/backup/directory&name=hadoop_logs_backup"
curl -v
"http://${INFRA_SOLR_URL}/solr/audit_logs/replication?command=restore&loca
tion=/path/to/backup/directory&name=audit_logs_backup"

curl -v
"http://${INFRA_SOLR_URL}/solr/history/replication?command=restore&loca
tion=/path/to/backup/directory&name=history_backup"
```

For secured cluster

If the cluster is Kerberized, then you must kinit as the service principal.

```
curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/vertex_index/replication?command=restore
&location=/path/to/backup/directory&name=vertex_index_backup"

curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/edge_index/replication?command=restore&lo
cation=/path/to/backup/directory&name=edge_index_backup"

curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/fulltext_index/replication?command=restore
&location=/path/to/backup/directory&name=fulltext_index_backup"
curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/ranger_audits/replication?command=restore&l
ocation=/path/to/backup/directory&name=ranger_audits_backup"

curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/hadoop_logs/replication?command=restore&lo
cation=/path/to/backup/directory&name=hadoop_logs_backup"

curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/audit_logs/replication?command=restore&lo
cation=/path/to/backup/directory&name=audit_logs_backup"

curl -v --negotiate -u:
"http://${INFRA_SOLR_URL}/solr/history/replication?command=restore&locati
on=/path/to/backup/directory&name=history_backup"
```

3. Start Ambari-Infra in Ambari UI.

Ranger

Rollback procedure of Ranger includes restoring Ranger admin database and Ranger KMS database.

Restore Ranger Admin Database

You must restore the Ranger Admin database for MySQL and PostgreSQL.

You must stop Ranger Admin and KMS service if they are running. Restore Ranger admin databases.

MySQL

Perform the following steps to restore a database.

1. Delete the existing Database.
2. Create an empty new database on the database host.
3. Restore the database using below msyql command.

   ```
   mysql -u root
   drop database ranger;
   create database ranger;
   GRANT ALL PRIVILEGES ON ranger.* TO 'rangeradmin'@'localhost';
   $ mysql -u [username] -p  existing_empty_db_name < dump_fileName.sql
   ```

Example

```
mysql -u rangeradmin -p rangeradmin < /root/backups/ranger/db/admin/ranger.s
ql
```

Press the Enter key. Type the database password when the password prompts.

POSTGRES

Perform the following steps to restore a database.

1. Delete an existing Database.
2. Create an empty new database in its place.
3. Run the below command on postgres db host.

   ```
   dropdb -U owner_username dbname; [Enter db owner password at the prompt]
   ```

   Example

   ```
   dropdb -U rangeradmin ranger;
   ```

   ```
   su  -  postgres
   psql
   create database ranger;
   ALTER DATABASE ranger OWNER TO rangeradmin;
   \q
   exit
   psql -U rangeradmin ranger < /root/backups/ranger/db/admin/ranger.sql
   ```

   Press the Enter key. Type the database password when the password prompts.

   Oracle

   Set the path to Oracle home if required :

   ```
   export ORACLE_HOME=/opt/oracle/product/12.2.0
   export PATH=${PATH}:${ORACLE_HOME}/bin
   export ORACLE_SID=orcl12c
   ```

   Restore ranger admin database.

   ```
   rm -rf del_admin_tbl_cmd.sql
   sqlplus -s rangeradmin/rangeradmin << EOF
              spool on
              spool del_admin_tbl_cmd.sql
   ```

```
            SELECT 'DROP TABLE "' || TABLE_NAME || '" CASCADE CONSTRAINTS;'
 FROM user_tables
            union ALL
            select 'drop '||object_type||' '|| object_name || ';' from us
er_objects
            where object_type in ('VIEW','PACKAGE','SEQUENCE', 'PROCEDURE',
 'FUNCTION')
            union ALL
            SELECT 'drop '
            ||object_type
            ||' '
            || object_name
            || ' force;'
            FROM user_objects
            WHERE object_type IN ('TYPE');
            spool off
            @del_admin_tbl_cmd.sql
            exit;
                              EOF
```

Type the database password when the password prompts and then run the following command:

```
imp rangeradmin/rangeradmin file=backups/ranger/db/admin/orcl12c.sql log
=backups/ranger/db/admin/restore.log
```

Restore Ranger KMS Database

Restoring Ranger KMS involves steps for restoring MSQL, POSTGRES, and Oracle databases.

MySQL

To restore the database, perform the folllowing:

- Delete the existing database.
- Create an empty new database on the Database host.
- Restore the database using below msyql command.

```
mysql -u root
drop database rangerkms;
create database rangerkms;
GRANT ALL PRIVILEGES ON rangerkms.* TO 'rangerkms'@'localhost';
$ mysql -u [username] -p  existing_empty_db_name < dump_fileName.sql
```

Example

```
mysql -u rangerkms -p rangerkms < /root/backups/ranger/db/kms/rangerkms.sql
```

Press the Enter key. Type the database password when the password prompts.

POSTGRES

To restore data, perform the folllowing:

- Delete the existing database.
- Create an empty new database in its place.
- Run the below command on postgres database host.

```
dropdb -U owner_username dbname; [Enter db owner password at the prompt]
```

Example

```
dropdb -U rangerkms  rangerkms;
su  -  postgres
```

```
psql
create database rangerkms;
ALTER DATABASE rangerkms OWNER TO rangerkms;
\q
exit
psql -U rangerkms rangerkms < /root/backups/ranger/db/kms/rangerkms.sql
[Enter db owner password at the prompt as rangeradmin]
```

For Oracle

```
rm -rf del_kms_tbl_cmd.sql
         sqlplus -s rangerkms/rangerkms << EOF
               spool on
         spool del_kms_tbl_cmd.sql
         SELECT 'DROP TABLE "' || TABLE_NAME || '" CASCADE CONSTRAINTS;' FR
OM user_tables
           union ALL
           select 'drop '||object_type||' '|| object_name || ';' from user_o
bjects
           where object_type in ('VIEW','PACKAGE','SEQUENCE', 'PROCEDURE', '
FUNCTION')
           union ALL
           SELECT 'drop '
           ||object_type
           ||' '
           || object_name
           || ' force;'
           FROM user_objects
           WHERE object_type IN ('TYPE');
         spool off
 @del_kms_tbl_cmd.sql
 exit;
EOF
```

Press Enter and then run the following command.

```
imp rangerkms/rangerkms file=backups/ranger/db/kms/orcl12c.sql
log=backups/ranger/db/kms/restore.log
```

Note: If you have performed Ambari-Infra rollback already, then there are no additional rollback steps required to restore the Solr Collections.

HDFS

Before starting the rollback procedure, make sure that all the HDFS service roles are stopped.

About this task

Note: Before the HDFS rollback, Zookeeper, Ranger, Ambari-Metrics, and Ambari-Infra has to be rolled back and started in Ambari UI.

Procedure

1. Roll back all the JournalNodes. (Only required for clusters where high availability is enabled for HDFS). Use the JournalNode backup that you have created when you backed up HDFS before upgrading to the CDP Private Cloud Base.

   a) Log in to each JournalNode host and do the following:

      1. remove the $[dfs.journalnode.edits.dir]/current directory
      2. restore the backup of $[dfs.journalnode.edits.dir]/current into $[dfs.journalnode.edits.dir]/current into $[dfs.journalnode.edits.dir]/current

2. Note down the target of the /etc/hadoop/conf symbolic link and remove it
3. Move the backup of /etc/hadoop/conf back to its original place, and perform these steps on all the cluster nodes where HDFS roles are installed, so on all NameNodes, JournalNodes and DataNodes.
4. Roll back all of the NameNodes.

   Note: If high availability is not enabled on your cluster, then leave the Secondary NameNode as it is for now.

   Use the backup of the Hadoop configuration directory you created during the backup phase.

   Perform the following steps on all NameNode hosts:

   a) Start FailoverControllers and JournalNodes
   b) If you use Kerberos authentication, authenticate with kinit with the NameNode's principal, otherwise change to the hdfs service user (usually sudo -u hdfs)
   c) Run the following command: hdfs namenode -rollback
   d) Restart HDFS FailoverControllers and JournalNodes in Ambari, then start the NameNodes note that one of the NameNodes should start, and one of them will remain in the starting state. When one of the NameNodes are marked as started proceed to DataNode rollback.

5. Roll back all of the DataNodes. Use the backup of the Hadoop configuration directory you created during the backup phase. Perform the following steps on all the DataNode hosts:

   a) If you use Kerberos authentication, authenticate with kinit with the NameNode's principal, otherwise change to the hdfs service user (usually sudo -u hdfs)
   b) Run the following commands:

      - export HADOOP_SECURE_DN_USER=<hdfs service user>
      - hdfs datanode -rollback
      - Look for output from the command similar to the following that indicates when the DataNode rollback is complete. wait until all storage directories are rolled back:

        ```
        INFO common.Storage: Layout version rolled back to -57 for storage /
        storage/dir_x
        INFO common.Storage (DataStorage.java:doRollback(952)) - Rollback
        of /storage/dir_x is complete
        ```

        Note: If you do not see the output, check for the privileged-root-datanode-${hostname}.err file in the DataNode's log directory. If you see these log messages in the output, or in the privileged-root-datanode-${hostname}.err file for all of your DataNode data folders, then stop the process by typing ctrl+c as the DataNode rollback is ready.

6. If your cluster is not configured for NameNode High Availability, roll back the Secondary NameNode. Perform the following steps on the Secondary NameNode host:
   a) Move the Secondary NameNode data directory to a backup location. ($[dfs.namenode.name.dir])
   b) If you use Kerberos authentication, authenticate with kinit with the NameNode's principal, otherwise change to the hdfs service user (usually sudo -u hdfs)
   c) Run the following command: hdfs secondarynamenode -format

      After rolling back the Secondary NameNode, terminate the console session by typing Control-C. Look for output from the command similar to the following that indicates when the DataNode rollback is complete:

      ```
      INFO namenode.SecondaryNameNode: Web server init done
      ```
7. Restore the original symlink with the noted target as /etc/hadoop/conf on all the nodes where it has changed.
8. Restart the HDFS service. Open Ambari, and go to the HDFS service page, in the Service actions dropdown select Start.
9. Monitor the service, and if everything comes up fine, check the HDFS file system availability, you can run an hdfs fsck / or generate the file system listing with hdfs dfs -ls -R / and compare it with the one that you did as part of the backup procedure to see if everything got rolled back properly. In case of any issues, please contact Cloudera Support before you proceed.

YARN

Before starting the rollback procedure, make sure that HDFS and Zookeeper are rolled back.

1. Log in to the TIMELINE SERVICE V2.0 READER host.
2. Setup Kerberos Credentials in case of secured cluster. Locate the yarn-ats-hbase's keytab and use kinit to cache the kerberos ticket.
   - `kinit -kt path/to/yarn-ats.hbase-master.keytab yarn-ats-hbase/hostname@domain`.
   - `export JVMFLAGS="-Djava.security.auth.login.config=/etc/hadoop/conf/embedded-yarn-ats-hbase/yarn_hbase_master_jaas.conf"`
3. Delete the atsv2-hbase-secure znode in the Zookeeper `zookeeper-client -server ${zk_server_url} rmr /atsv2-hbase-secure`.

HBase

If you have performed Zookeeper and HDFS rollback already, there are no additional rollback steps required for HBase.

1. Start HBase in Ambari UI.
2. If the HBase master does not start, ZooKeeper data must be cleaned by following these steps:
   a. Log in to the HBase Master host.
   b. Setup Kerberos Credentials in case of secured cluster.
      1. `kinit -kt path/to/yarn-ats.hbase-master.keytab yarn-ats-hbase/hostname@domain`
      2. `export JVMFLAGS= "-Djava.security.auth.login.config=/usr/hdp/current/hbase-master/conf/hbase_master_jaas.conf"`
   c. Delete the hbase-secure znode in the Zookeeper. `zookeeper-client -server ${zk_server_url} rmr /hbase-secure`

Kafka

To roll back Kafka, perform the following steps.

Procedure

1. Kafka service depends on Zookeeper. Make sure Zookeeper data is restored.

2. After rollback, start the Kafka service, and check, if the producers and consumers can connect to the cluster.
3. Remove the inter broker protocol and log format version settings from the Kafka settings:
   a) Log in to Ambari.
   b) Choose the Kafka service.
   c) Select the Configuration page.
   d) Find the Custom kafka-broker section.
   e) Remove following properties:
      - inter.broker.protocol.version=current_Kafka_version
      - log.message.format.version=current_Kafka_version
   f) Restart the Kafka service.
   g) Start Kafka in Ambari UI

Atlas

Perform the following steps to restore HBase tables and ATLAS_ENTITY_AUDIT_EVENTS table.

Procedure

1. Stop Atlas from Ambari
2. Setup Kerberos Credentials in case of secured cluster . Locate the atlas user's keytab and use kinit to cache the kerberos ticket for atlas user .

   Example

   ```
   kinit -kt path/to/atlas.service.keytab atlas/hostname@domain
   ```
3. Restore the HBase tables, atlas_janus and ATLAS_ENTITY_AUDIT_EVENTS.
4. Restore the Solr Collections.

Restore HBase Tables

You must restore atlas_janus table.

```
> disable 'atlas_janus'
> restore_snapshot 'atlas-janus-backup'
> enable 'atlas_janus'
```

Restore ATLAS_ENTITY_AUDIT_EVENTS table

You must restore ATLAS_ENTITY_AUDIT_EVENTS table.

```
> disable 'ATLAS_ENTITY_AUDIT_EVENTS'
> restore_snapshot 'ATLAS_ENTITY_AUDIT_EVENTS-backup'
> enable 'ATLAS_ENTITY_AUDIT_EVENTS'
```

Restore Solr snapshots

You must restore Solr snapshots.

Procedure

1. For unsecure cluster

   ```
   curl -v "http://${URL}/solr/vertex_index/replication?command=restore&loc
   ation=/path/to/backup/directory&name=vertex_index_backup"
   curl -v "http://${URL}/solr/edge_index/replication?command=restore&locatio
   n=/path/to/backup/directory&name=edge_index_backup"
   curl -v "http://${URL}/solr/fulltext_index/replication?command=restore&l
   ocation=/path/to/backup/directory&name=fulltext_index_backup"
   ```

2. For secured cluster

```
curl -v --negotiate -u: "http://${URL}/solr/vertex_index/replication?com
mand=restore&location=/path/to/backup/directory&name=vertex_index_backup"
curl -v --negotiate -u: "http://${URL}/solr/edge_index/replication?command
=restore&location=/path/to/backup/directory&name=edge_index_backup"
curl -v --negotiate -u: "http://${URL}/solr/fulltext_index/replication?c
ommand=restore&location=/path/to/backup/directory&name=fulltext_index_ba
ckup"
```

Hive

Before starting the rollback procedure, make sure that HDFS and Zookeeper have already rolled back.

You must delete your existing Hive Metastore database to roll back the Hive services.

To restore data on the node where the Hive Metastore database is located, perform the following steps.

1. Delete an existing database.Create an empty database in its place. `$ mysql -u <hive_user>drop database <hive_db>;create database <hive_db>;`
2. Restore Hive Metastore database `$ mysql -u <hive_user> <hive_db> < </path/to/dump_file>`. If you haveve performed HDFS rollback already, there are no additional rollback steps required for Hive.
3. Start Hive service in Ambari UI.

Spark

Know more about the Spark roll back.

- The Spark application history lives in HDFS, and with the rollback of HDFS, the history at the time of the backup is restored. Any Spark applications run after the backup and rollback will not be visible.
- After the rollback, versions of Spark applications built against HDP 2 should be used instead of versions that are rebuilt against CDP.
- Start Spark in Ambari UI.

Oozie

To roll back the Oozie service, you must restore the Oozie database.

- Start Oozie in Ambari UI.

  It is needed to re-generate the oozie.ha.keytab file using the spnego.service.keytab files from the Oozie server hosts and from the Oozie load balancer host and then distribute the generated oozie.ha.keytab onto the respective Oozie hosts. In order to achieve this, follow the steps listed in this website.

- Restart Oozie.

Knox

With the backup and rollback of Ambari, Knox is also backed up and rolled back by default.

Start Knox in Ambari UI.

Zeppelin

With the backup and rollback of HDFS, Zeppelin is also backed up and rolled back by default.

Start Zeppelin in Ambari UI.

Log Search

Procedure

1. On every host in your cluster running a Log Search Server, run the following commands:

```
yum downgrade ambari-logsearch-portal
```

2. Execute the following command on all hosts running the Logfeeder:

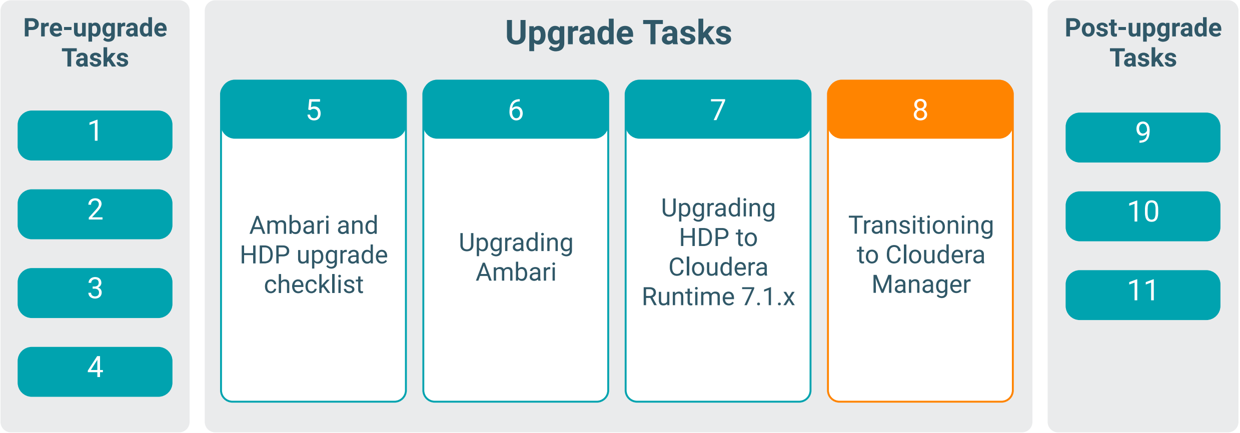
```
yum downgrade ambari-logsearch-logfeeder
```

Note: If you have performed Ambari-Infra already, there are no additional rollback steps required.

3. Start Log Search in Ambari UI.

Transitioning to Cloudera Manager

This section helps you to transition from HDP 3.1.5.x to Cloudera Manager and Cloudera Private Cloud Base


Pre-upgrade Tasks
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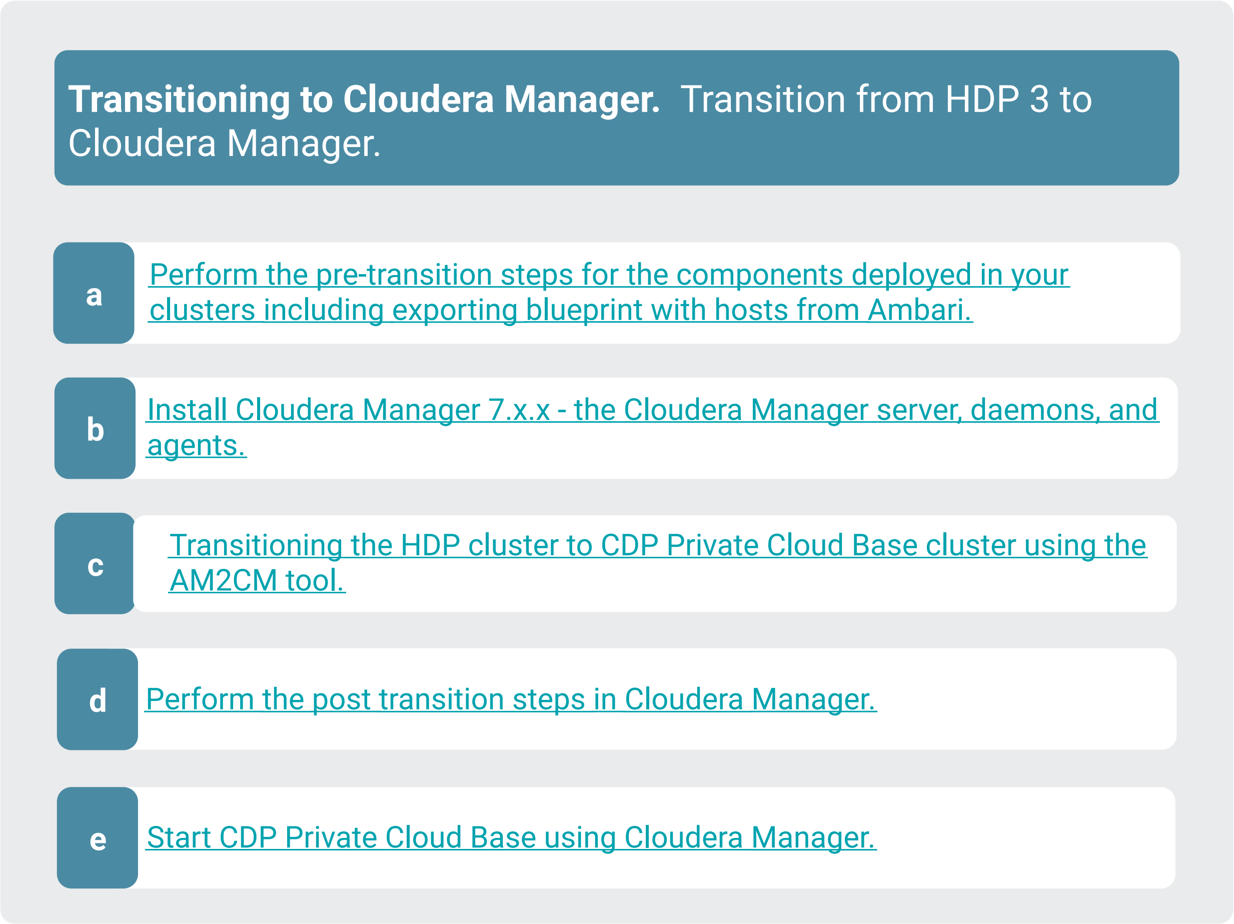
The high level of steps to transition from the HDP 3.1.5 cluster to Cloudera Manager:



Transitioning to Cloudera Manager. Transition from HDP 3 to Cloudera Manager.

a Perform the pre-transition steps for the components deployed in your clusters including exporting blueprint with hosts from Ambari.

b Install Cloudera Manager 7.x.x - the Cloudera Manager server, daemons, and agents.

c Transitioning the HDP cluster to CDP Private Cloud Base cluster using the AM2CM tool.

d Perform the post transition steps in Cloudera Manager.

e Start CDP Private Cloud Base using Cloudera Manager.

Pre-transition steps

From Ambari configurations, collect passwords of databases, keystores, and IDM services for components that are not part of the transition. This information will help in starting the services in Cloudera Manager after transition.

Note:

1. The AM2CM tool does not migrate the Ambari Infra service to Cloudera Manager. However, the tool adds a Solr service in place of Ambari Infra to the Cloudera Manager-managed CDP cluster. The tool does not migrate Ambari Infra configurations and data to Solr in Cloudera Manager.
2. Spark upgrade:
   - Cloudera supports only a single catalog HDP 3.1.5 upgrade to CDP Private Cloud Base 7.1.6 or higher.
   - If your cluster version is HDP 3.1.4 or less, then you must upgrade to HDP 3.1.5 and then migrate to the single catalog.
   - You must validate that all the tables are present in the single shared catalog.

Important:

- Backup custom files from /etc/hadoop/ in the HDP cluster. For example, /etc/hadoop/conf/topology_script.py
- Ensure no components or hosts are in decommissioned state.
- Ambari Metrics will not be migrated from Ambari to Cloudera Manager.

Important: For log4j configuration migrations, AM2CM tool migrates only log file names, location, backup index , size, and logging level. All other details will not be migrated or translated.

Knox SSO on Ambari and Cloudera Manager:

- After you upgrade your cluster with Knox SSO and proxy enabled, the post upgrade Cloudera Manager tests fail because it is going through Knox SSO. The workaround is to disable the Ambari SSO before migrating the cluster because Ambari- specific configurations are not migrated to Cloudera Manager. You must explicitly enable SSO in Cloudera Manager after migration. For more information, see Proxy Cloudera Manager through Apache Knox.

Databases

Before you start upgrading from Ambari HDP to Cloudera Manager Cloudera Private Cloud Base, you must ensure that you have a backup of the following component databases: Hive Metastore, Ranger, Ranger KMS, and Oozie.

Cloudera recommends that you transfer data from the old databases to a new set of databases, and use the new databases as reference in Cloudera Private Cloud Base. You can retain the old databases for reference, and to research any issues that you may encounter when running your applications in Cloudera Private Cloud Base.

Kerberos

Prior to installing Kerberos on Cloudera Manager, you must collect the details from the Kerberos installation in Ambari.

Collect the values for the following settings:

- KDC Type (AD, MIT KDC, Redhat IPA)
- Admin Account Username
- Admin Account Password
- Kerberos Domain
- Kerberos Realm
- KDC Host
- KDC Admin Host
- Service Port (if non standard)
- Encryption Type (default ‘rc4-hmac’)
- AD Directory Suffix

Cloudera Manager maintains a single principal for all the roles in a service. Hence Auth_to_local rules are not migrated.

Service user names in Ambari will be migrated to Kerberos principal names in Cloudera manager as part of the transition process.

Kerberos principal

Kafka service in Cloudera Manager does not take non-default principal names. This section is not applicable if you are upgrading to CDP Private Cloud Base 7.1.8.

Currently, the Kafka service in Cloudera Manager does not take non-default principal names. The Kafka principal name is not migrated to Cloudera Manager if you use any custom principal name in the Kafka service on Ambari.

HDFS

Perform the following pre-transition steps.

Do not change the HA namespace during the upgrade. Changing HA namespace impacts Hive metadata locations and possibly HBase (if the location reference includes the full HDFS location).

Preparing HDFS

Make sure HDFS is healthy.

Before you begin

To ensure HDFS is healthy

Procedure

- Save the Namespace
- Ensure that the under-replicated blocks do not exist
- Ensure that the Exclude hosts list is empty. Before upgrading, remove the decommissioned datanodes from HDFS.

Backup the non-default Rack Awareness Topology script

Backup any custom configurations of the rack awareness topology script.

In the Ambari HDFS service, if net.topology.script.file.name is configured with a non default topology script (that is not the default /etc/hadoop/conf/topology_script.py script), then take a backup of it.

After transitioning to Cloudera Manager, you can reconfigure your script.

Note: The reason for this is that the default script has a different name in Cloudera Manager. That is the default script is the same in Ambari and Cloudera Manager but the two management systems have different names for that same script.

Spark

Run the following commands on all the hosts where the spark components (Spark 2 History Server, Livy for Spark2 Server, and Spark2 Client) are installed to take the backup.

Perform the following steps:

```
mkdir /usr/bin/sparkbackup
mv /usr/bin/spark-shell /usr/bin/sparkbackup/
mv /usr/bin/spark-submit /usr/bin/sparkbackup/
mv /usr/bin/pyspark /usr/bin/sparkbackup/
mv /usr/bin/spark-class /usr/bin/sparkbackup/
mv /usr/bin/spark-script-wrapper.sh /usr/bin/sparkbackup/
mv /usr/bin/spark-sql /usr/bin/sparkbackup/
```

Spark2/Livy

Check the Livy server component.

Livy server

Cloudera Manager does not allow more than one Livy server component. Remove if Ambari has more than one Livy server component before migration.

Ranger

Configure Ranger in Cloudera Manager-managed Cloudera Private Cloud Base cluster.

Usually, Ranger and most HDP services are set up to synchronize and authenticate against an LDAP/AD service. In the Cloudera Manager-managed Cloudera Private Cloud Base cluster, additional options are available to manage integrations using the aspects of the existing operating system's IDM integration.

The configuration for Ranger in Cloudera Manager-managed Cloudera Private Cloud Base cluster is through PAM (Pluggable Authentication Module). In a Kerberized environment, PAM integration is available at the Operating system level.

You can use the Ranger services for authentication, user, and group synchronization using the PAM integration.

If PAM integration is not an option, then you must record the details from Ambari to install and configure Ranger in Cloudera Manager.

Solr

The AM2CM tool does not migrate Ambari Infra Solr configuration and data to Cloudera Manager. However, it adds a new Solr service. To take a backup, perform the following steps after the transition.

1. Create a local directory for backups first:

   ```
   mkdir -p [backup_dir]
   ```
2. Execute the following commands on the hosts where Solr is installed.

   ```
   mv /etc/alternatives/solr-conf [backup_dir]/solr-confhdp
   mv /etc/alternatives/hue-conf [backup_dir]/hue-confhdp
   mv /etc/alternatives/hbase-solr-conf [backup_dir]/hbase-solr-confhdp
   ```

   For RHEL:

   ```
   mv /var/lib/alternatives/solr-conf [backup_dir]/solr-confhdp
   ```

   For Ubuntu:

   ```
   mv /var/lib/dpkg/alternatives [backup_dir]/solr-confhdp
   ```

   For Sles:

   ```
   mv /var/lib/rpm/alternatives [backup_dir]/solr-confhdp
   ```

Cloudera Manager Installation and Setup

Install Cloudera Manager, install Cloudera Manager agent and daemons, add Cloudera Management service, enable TLS, and finally configure clusters to use Kerberos.

About this task

Procedure

1. Prepare to install and configure the Cloudera Manager packages. For more information, see Configuring Repository. Do this if you have not done it already. Confirm that the repo is set up.
2. Install Cloudera Manager Server. For more information on installing Cloudera Manager Server, see Installing Cloudera Manager.

   Note: During the upgrade process, you can place Cloudera Manager and its related Cloudera Manager Services components on the same node as Ambari. Ensure that the node has sufficient capacity to temporarily run Cloudera Manager and Ambari in parallel. If you do not wish to colocate these services, you can place them on separate management nodes in the cluster.

3. Preconfigure the databases for:

   - Ranger
   - Cloudera Manager Server
   - Cloudera Management Service roles - Reports Manager
   - Data Analytics Studio (DAS) Supported with PostgreSQL only.
   - Hue
   - Each Hive metastore
   - Oozie
   - Schema Registry
   - Streams Messaging Manager

   For more information, see Setup Cloudera Manager database and Install and Configure Databases.
4. Install Agent on all hosts in the cluster. It is possible to add hosts to Cloudera Manager using the Installation Wizard.
5. Start Cloudera Manager Server and Cloudera Manager agent on all hosts. For more information, see Cloudera Manager Agent and Cloudera Manager Server.
6. Install Cloudera Manager User licence. For more information, see Installation Wizard. (Upload the license file and exit the cluster setup by clicking the Cloudera Manager icon)

   Caution:

   - Do not set up a cluster using the Wizard (Step 7) .
   - Do not proceed to Welcome (Add Cluster - Installation).
7. Add Hosts to Cloudera Manager. To add hosts to Cloudera Manager, see Adding Hosts to a cluster.
8. Add Cloudera Manager management service to the cluster. To add services to the cluster, see Select Services.

   Note: Some of the services in Cloudera Manager management service may not come up due to port conflicts in HDP. The respective service needs to be stopped in the Ambari-manager HDP cluster to workaround the issue.
9. Set up Kerberos. If you have a Kerberos cluster, then you must add the KDC details in the Administration>Security>Kerberos Credentials>Setup KDC for Cloudera Manager page using Cloudera Manager. For more information on Kerberos and Active Directory, see Enabling Kerberos authentication for CDP

   Note:

   - You must set the value of Maximum Renewable Life for Principals to 0 or to the value that was provided for Ambari KDC. If Maximum Renewable Life for Principal and Ambari KDC do not match, keytabs generation fails in Cloudera Manager.
   - If you are not upgrading from CDH or HDP to CDP Private Cloud Base, you can follow the Production Installation instructions to perform a fresh installation in your production environment.
10. The AM2CM tool migrates service principal names from the service user names in the HDP cluster. If the HDP cluster has default service usernames then Cloudera Manager is configured with default principal names. For example hdfs, yarn, and hive. If the HDP cluster contains user names like cstm-hdfs and cstm-hive then Cloudera Manager is configured the principal names with same names. For more information, see Hadoop Users (user:group) and Kerberos Principals.

Related Information

Configuring Repository

Cloudera Manager Server

Installation Wizard

How to Configure Clusters to Use Kerberos for Authentication

Software download matrix

Installing JDBC Driver

You must install the required JDBC driver.

Download, extract, and copy the renamed JDBC driver, to /usr/share/java/. If the target directory does not yet exist, you must create the directory.

Installing the Postgres JDBC Driver

1. Install the PostgreSQL JDBC driver. If you would like to use the PostgreSQL JDBC driver version shipped with the OS repositories, run the following command:

   ```
   yum install postgresql-jdbc*
   ```

   You can also download the JDBC driver from the official PostgreSQL JDBC Driver website – https://jdbc.postgresql.org.
2. Rename the Postgres JDBC driver .jar file to postgresql-connector-java.jarand copy it to the /usr/share/java directory. The following copy command can be used if the Postgres JDBC driver .jar file is installed from the OS repositories:

   ```
   cp /usr/share/java/postgresql-jdbc.jar /usr/share/java/postgresql-connec
   tor-java.jar
   ```
3. Confirm that the .jar file is in the Java share directory:

   ```
   ls /usr/share/java/postgresql-connector-java.jar
   ```
4. Change the access mode of the .jar file to 644:

   ```
   chmod 644 /usr/share/java/postgresql-connector-java.jar
   ```

Installing the MySQL JDBC Driver for MariaDB

The MariaDB JDBC driver is not supported. Follow the steps in this section to install and use the MySQL JDBC driver instead.

Install the JDBC driver on the Cloudera Manager Server host, as well as any other hosts running services that require database access.

Note: If you already have the JDBC driver installed on the hosts that need it, you can skip this section. However, MySQL 5.6 requires a version 5.1.26 or higher.

Cloudera recommends that you consolidate all roles that require databases on a limited number of hosts, and install the driver on those hosts. Locating all such roles on the same hosts is recommended but not required. Make sure to install the JDBC driver on each host running roles that access the database.

Note: Cloudera recommends using only version 5.1 of the JDBC driver.

OS	Command

RHEL	⚠ **Important:** Using the yum install command to install the MySQL driver package before installing a JDK installs OpenJDK, and then uses the Linux alternatives command to set the system JDK to be OpenJDK. If you intend to use an Oracle JDK, make sure that it is installed before installing the MySQL driver using yum install. If you want to use OpenJDK, you can install the driver using yum.
	Alternatively, use the following procedure to manually install the driver.
	1. Download the MySQL JDBC driver from http://www.mysql.com/downloads/connector/j/5.1.html (in .tar.gz format). As of the time of writing, you can download version 5.1.46 using wget as follows:
	`wget https://dev.mysql.com/get/Downloads/Connector-J/mysql-connector-java-5.1.46.tar.gz`
	2. Extract the JDBC driver JAR file from the downloaded file. For example:
	`tar zxvf mysql-connector-java-5.1.46.tar.gz`
	3. Copy the JDBC driver, renamed, to /usr/share/java/. If the target directory does not yet exist, create it. For example:
	`sudo mkdir -p /usr/share/java/`
	`cd mysql-connector-java-5.1.46`
	`sudo cp mysql-connector-java-5.1.46-bin.jar /usr/share/java/mysql-connector-java.jar`

SLES	`sudo zypper install mysql-connector-java`
Ubuntu or Debian	`sudo apt-get install libmysql-java`

Installing the MySQL JDBC Driver

Install the JDBC driver on the Cloudera Manager Server host, as well as any other hosts running services that require database access.

Note: If you already have the JDBC driver installed on the hosts that need it, you can skip this section. However, MySQL 5.6 requires a 5.1 driver version 5.1.26 or higher.

Cloudera recommends that you consolidate all roles that require databases on a limited number of hosts, and install the driver on those hosts. Locating all such roles on the same hosts is recommended but not required. Make sure to install the JDBC driver on each host running roles that access the database.

Note: Cloudera recommends using only version 5.1 of the JDBC driver.

OS	Command

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	`wget https://dev.mysql.com/get/Downloads/Connector-J/mysql-connector-java-5.1.46.tar.gz`
	2. Extract the JDBC driver JAR file from the downloaded file. For example:
	`tar zxvf mysql-connector-java-5.1.46.tar.gz`
	3. Copy the JDBC driver, renamed, to /usr/share/java/. If the target directory does not yet exist, create it. For example:
	`sudo mkdir -p /usr/share/java/`
	`cd mysql-connector-java-5.1.46`
	`sudo cp mysql-connector-java-5.1.46-bin.jar /usr/share/java/mysql-connector-java.jar`

SLES	`sudo zypper install mysql-connector-java`
Ubuntu	`sudo apt-get install libmysql-java`

Installing the Oracle JDBC Connector

You must install the JDBC connector on the Cloudera Manager Server host and any other hosts that use a database.

1. Download the Oracle JDBC Driver from the Oracle website. For example, the version 6 JAR file is named ojdbc6.jar.

   For more information about supported Java versions, see Java Requirements.

   To download the JDBC driver, visit the Oracle JDBC and UCP Downloads page, and click on the link for your Oracle Database version. Download the ojdbc6.jar file (or ojdbc8.jar, for Oracle Database 12.2).
2. Copy the Oracle JDBC JAR file to /usr/share/java/oracle-connector-java.jar. The Cloudera Manager databases and the Hive Mestastore database use this shared file. For example:

```
sudo mkdir -p /usr/share/java
sudo cp /tmp/ojdbc8-12.2.0.1.jar /usr/share/java/oracle-connector-java.jar
sudo chmod 644 /usr/share/java/oracle-connector-java.jar
```

Proxy Cloudera Manager through Apache Knox

In order to have Cloudera Manager proxied through Knox, there are some steps you must complete.

Procedure

1. Set the value for frontend_url: Cloudera Manager Administration Settings Cloudera Manager Frontend URL :
    - Non-HA value: https://$Knox_host:$knox_port
    - HA value: https://$Knox_loadbalancer_host:$Knox_loadbalancer_port
2. Set allowed groups, hosts, and users for Knox Proxy: Cloudera Manager Administration Settings External Authentication :
    - Allowed Groups for Knox Proxy: *
    - Allowed Hosts for Knox Proxy: *
    - Allowed Users for Knox Proxy: *
3. Enable Kerberos/SPNEGO authentication for the Admin Console and API: Cloudera Manager Administration Settings External Authentication Enable SPNEGO/Kerberos Authentication for the Admin Console and API: : true
4. From Cloudera Manager Administration Settings External Authentication , set Knox Proxy Principal: knox.

What to do next

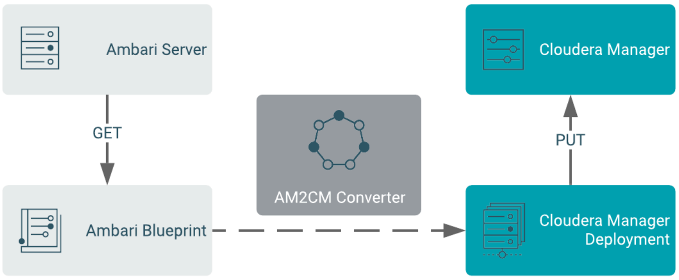
External authentication must be set up correctly. Cloudera Manager must be configured to use LDAP, following the standard procedure for setting up LDAP. This LDAP server should be the same LDAP that populates local users on Knox hosts (if using PAM authentication with Knox), or the same LDAP that Knox is configured to use (if using LDAP authentication with Knox).

Transitioning HDP cluster to CDP Private Cloud Base cluster using the AM2CM tool

Use AM2CM tool to transition from Ambari-managed cluster to Cloudera Manager-managed cluster.

The purpose of this tool is to convert the Ambari blueprint to Cloudera Manager Deployment template. Download and export the Ambari blueprint to the AM2CM tool. The AM2CM tool converts the Ambari blueprint to Cloudera Manager Deployment template. Import the converted template to Cloudera Manager, start the services through the Cloudera Manager UI, and validate the cluster.

Note: Before you use the AM2CM tool, you must understand the HDP cluster configuration to resolve any edge-case issues that may occur during migration.



Transitioning HDP 3.1.5 cluster to CDP Private Cloud Base 7.1.x cluster using the AM2CM tool

Use the AM2CM tool to transition from Ambari-managed HDP cluster to Cloudera Manager-managed CDP cluster.

Transition from HDP to CDP

The latest and supported version of the AM2CM tool is AM2CM 2.8.1.0. The AM2CM tool 2.0.2 and higher supports the transition from HDP to CDP Private Cloud Base 7.1.6 and 7.1.7. However, HDP to CDP 7.1.8 is supported by only from AM2CM 2.3.0 and higher. For more information, see Software download matrix

Related Information

Configure a Repository for Cloudera Manager

Transitioning the cluster from HDP to CDP Private Cloud Base using the AM2CM tool

Transition the HDP cluster managed by Ambari to Cloudera Private Cloud Base cluster managed by Cloudera Manager using the AM2CM tool. Here we have taken the AM2CM 2.8.1.0 tool as an example.

Before you begin

Take a copy of your blueprint before transitioning your cluster. It helps you to understand the changes and differences between HDP 3.1.5 versus HDP 7.1.x versus Cloudera Manager.

Note:

If you have more than 200 nodes, you can choose to pre-deploy the CDP parcels. You can pre-deploy the CDP parcels before Cloudera Manager starts managing the CDP Private Cloud Base cluster.

The pre-deployment of parcels can help you in reducing downtime. The downtime is the difference between the shutdown of Ambari-managed HDP Intermediate bits and the start of Cloudera Manager-managed CDP Private Cloud Base.

For more information, see the community article on How to pre-distribute CDP 7 parcels before migration from HDP 2.6.5.

About this task

Perform the following steps:

Procedure

1. Log in to the Ambari server.
2. In the new tab, enter the URL: http://<ambari_ip>:<port>/api/v1/clusters/<cluster-name>?format=blueprint_with_hosts

   Note: If there are browser issues, use this API call on CLI:

   ```
   curl  -u username:password http://<ambari_ip>:<port>/api/v1/clusters/
   <cluster-name>?format=blueprint_with_hosts
   ```
3. Download the Ambari blueprint and save it in JSON format.
4. Download the AM2CM tool from Software download matrix.
5. Extract the am2cm-tool-2.8.1.0-1.tar file to am2cm-tool-2.8.1.0-1 folder.
6. Set the JAVA_HOME variable. For example, $ export JAVA_HOME= [path to your installed JDK]
7. The kafka-broker-ids.ini file generated must be manually copied to $am2cm-tool-2.8.1.0-1/conf/ path before running the tool. For more information, see Extract Kafka Broker ID.
8. Navigate to the am2cm-tool-2.8.1.0-1/conf/user-settings.ini file and update Parcels, Cluster name, passwords, and JDBC URL information.

   Note:

   - When you are configuring the password fields in the user-setting.ini file, you must not enclose the password with double-quotes. You must provide correct passwords. If you use double quotes, then this causes an issue when you import the template into Cloudera Manager.
   - For more information on resetting the Ranger Web UI admin's password, see the Knowledge Base article.

   ```
   # Cluster details cluster.name=<Cluster-Name> cluster.displayname=<Clust
   er-Name>
                               ambari.cluster.name=<Ambari-cluster-Name cm
   .rolegroups.enable = false
   ```

```
                            # Hive JDBC settings
                            SERVICE_HIVE_hive_metastore_database_passwo
rd=<DB-Password> SERVICE_HIVE_hive_jdbc_url_override=<JDBC_URL>

                            # Oozie JDBC settings
                            SERVICE_OOZIE_oozie_database_password=<DB-Pas
sword> SERVICE_OOZIE_oozie_service_JPAService_jdbc_url=<JDBC_URL>

                            # Ranger JDBC settings
                            SERVICE_RANGER_ranger_database_password=<Range
r-DB-Password>
                            SERVICE_RANGER_rangeradmin_user_password=<Ran
geradmin-user-Password>
                            SERVICE_RANGER_rangerusersync_user_password=
<Rangerusersync-user-Password>
                            SERVICE_RANGER_rangertagsync_user_password=<R
angertagsync-user-Password>
                            SERVICE_RANGER_rangerkeyadmin_user_password=
<Rangerkeyadmin-user-Password>
                            SERVICE_RANGER_KMS_ranger_kms_master_key_pass
word=<Rangerksmmaster-key-Password>
                            SERVICE_RANGER_KMS_ranger_kms_database_passw
ord=<Rangerkms-database-Password>

                            #Knox Settings
                            SERVICE_KNOX_gateway_master_secret=admin
```

9. Generate the Cloudera Manager Deployment template.

   Note: If you want skip any pre-upgrade validations of your blueprint, run the following command: `-spu or --skip-pre-upgrade`

```
# cd am2cm-2.8.1.0-1
                            # chmod +x ./am2cm.sh
                            # ./am2cm.sh -bp /PATH/TO/Amb_blueprint.json
 -dt /PATH/TO/cm_deployment_template.json -sv <hdp_version> -tv <cdp_ver
sion>
                            Where -sv <hdp_version> -tv <cdp_version> can
be selected from the below list:
                            -sv hdp3 -tv 7.1.6
                            -sv hdp3 -tv 7.1.7
                            -sv hdp3 -tv 7.1.8
```

   Note: This generates a cm_deployment_template.json file in the am2cm-tool-2.8.1.0-1 folder.

10. Check for errors in the console or in the am2cm-tool-2.8.1.0-1/cm_migration.log logs.
11. Stop HDP services from Ambari.
12. In Ambari UI, disable Auto Start Settings. For more information, see Disable service auto start settings from Ambari Web

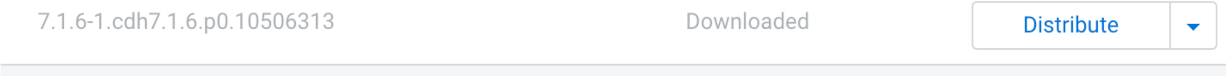
13. Import the template into Cloudera Manager using the Cloudera Manager API through browser or CLI.

- Using browser: If you are using browser, you must authenticate to the Swagger UI using the Cloudera Manager full admin credentials.

  a. Copy the URL in the browser and enter. http://<CM_HOST>:7180/static/apidocs/ui/index.html#!/ClouderaManagerResource/updateDeployment2
  b. Navigate to Cloudera ManagerResource
  c. Copy the template in body.
  d. Click Tryit out!
- Using CLI:

```
curl --user admin:admin -k -X PUT -H "Content-Type: application/json" -d @cm_deployment_template.json 'http://<CM_HOST>:7180/api/v41/cm/deployment?deleteCurrentDeployment=false'
```

14. In Cloudera Manager Parcel screen, download Cloudera Runtime and distribute the parcel. Cloudera Manager deploys the parcel to the cluster hosts. The default is 10 concurrent hosts. You can adjust this to a maximum of 50 by increasing the setting in the Other Parcel Configurations screen, but must be configured before the template is applied.



7.1.6-1.cdh7.1.6.p0.10506313 Downloaded

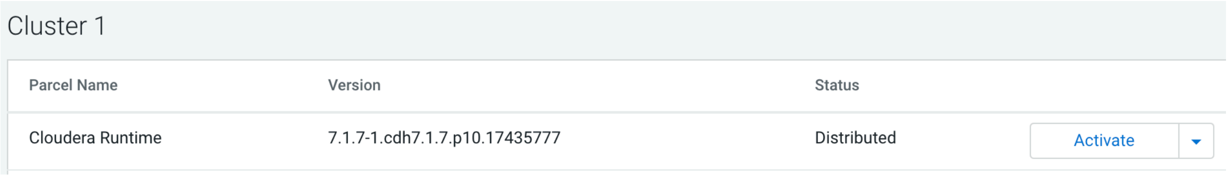
Note:

a. After the parcels are distributed, the Cloudera Agent unpacks them. Ensure that you have sufficient free space on /opt/cloudera to hold both the parcel and its unpacked copy.
b. By default, the AM2CM tool migrates the Ambari configuration groups as host overrides in Cloudera Manager. To migrate as **Role Groups**, you must enable the cm.rolegroups.enable=true parameter. This is an experimental feature and you must validate this in your lower environments before using this in production environment. The migrated Role groups will not have the same configuration group names defined in Ambari. For example, hdfs-DATANODE-host_group_2. You can rename this in ClouderaManager after importing the template.

15. Enable Cloudera Manager TLS (Optional) if you want:

- Certificate management: Creating certificates, keystores, and truststores.
- Certificate distribution or configuration:
    - Copying keystores & truststores to servers.
    - Configuring services to reference these keystores & truststores.
    - Configuring related TLS properties for service.
- Ensure that you compare Manual TLS and Auto TLS and then proceed. For more information, see Comparing manual TLS and Auto-TLS
- If you select the Manual TLS option, you must manually configure TLS. For more information, see Manually configure TLS Encryption for Cloudera Manager.
- If you select the Auto TLS option 1, Cloudera Manager handles it independent of any company certificate authority. This is basically creating a private certificate authority that only Cloudera Manager knows about.
    - If you want TLS but you do not have any of the external certificate management infrastructures then you will probably want this.
    - The benefit is you get full automation for the cluster side (management & certificate distribution and configuration) but requires client configuration to trust the private certificate authority. For more information, see Auto TLS 1
- If you select Auto TLS option 2a, Cloudera Manager handles certificate management based on a company certificate authority. Cloudera Manager generates certificates on your behalf using the certificate authority and performs distribution and configuration for you.
    - If you want TLS and are willing to extend trust from an external certificate authority to Cloudera Manager and allow Cloudera Manager to generate certificates will want this.
    - The benefit is you get full automation for the cluster side (management & certificate distribution and configuration) but requires extending trust to Cloudera Manager. Clients need not require any additional configuration because they would already trust the global company certificate authority. For more information, see Auto TLS 2
- If you select AutoTLS option 2b, you are only doing certificate distribution and configuration because you are doing certificate management outside of Cloudera Manager and manually loading those certificates into Cloudera Manager's certificate repository.
    - If you want TLS but are unwilling to extend trust from an external certificate authority to Cloudera Manager will want this.
    - The benefit is you get partially automated for the cluster side (certificate distribution and configuration only). Per-host or per-service certificate management done outside of Cloudera Manager and certificates manually uploaded into Cloudera Manager by an admin. For more information, see Auto TLS 2

16. After the parcels are deployed on Cloudera Manager, activate the Cloudera Runtime 7.1.x parcels.



Cluster 1

Parcel Name	Version	Status	
Cloudera Runtime	7.1.7-1.cdh7.1.7.p10.17435777	Distributed	Activate

17. LZO package configuration: If HDP is configured with LZO packages then follow the steps given below.

a) Go to the Parcels/Parcel Repository & Network Settings page on Cloudera Manager user interface and add Remote Parcel Repository URLs.URL

b) In the Parcels screen - Download, Distribute, and Activate “GPLEXTRAS”. If the HDP intermediate bits or Ambari 7.1.x.x has used LZO packages, then enable or add the packages to Cloudera Manager. For more information, see the Configuring Data Compression documentation.

Post transition steps

You must complete the post transition steps to start the services in Cloudera Private Cloud Base.

The AM2CM tool transitions the service configurations. However, you must configure and perform additional steps to start the services in Cloudera Private Cloud Base.

Note:

- Review configuration warnings for all the services.
- Review JVM parameters and configurations for all services as some of the JVM parameters and configurations are not transitioned. Most of the heap configurations are transitioned.
- Review the Log4j configurations. Log4j configurations such as logs dir, size, and backup index are transitioned to Cloudera Manager.
- Spark Atlas Connector (SAC) is disabled by default. If you enable SAC on HDP, the Spark entities are created using the Spark model (spark_db, spark_table). In CDP Private Cloud Base, SAC uses HMS and the entities are created using the Hive model (hive_db, hive_table, and hive_column). Hence Spark model entities in HDP are not in sync with the Hive model entities in CDP Private Cloud Base. In CDP Private Cloud Base, the lineage stitching and metadata update is not available on the Spark entities created in HDP.
- In the HDP 3.1.5.x cluster, Hive hook and HBase hook are enabled by default. SAC (Spark Atlas Connector or Spark Hook) is disabled by default. Note that, in HDP, SAC is in a Technical Preview state. In CDP Private Cloud Base, Hive Hook and HBase hook are enabled by default, In the AM2CM upgrade flow, if the Hive Hook and HBase hook are enabled in the HDP-3.1.5.x cluster, post-upgrade, it is enabled in CDP Private Cloud Base. HMS Hook functionality did not exist in HDP 3.1.5.x, hence it must be manually enabled in CDP Private Cloud Base. Similarly SAC in CDP Private Cloud Base must also be manually enabled.
- There are no manual steps required to enable SSO for the services on CDP. SSO is available by default on CDP.

Generating keytabs in Cloudera Manager

If your cluster is kerberized, you can generate keytabs in Cloudera Manager.

Procedure

1. Log in to Cloudera Manager Admin Console.
2. Select AdministrationSecurity.
3. Click the Kerberos Credentials tab.
4. Click Generate Missing Credentials.

Enable Auto Start setting

Ensure that you enable Auto Start Settings in Cloudera Manager for all the components.

About this task

If you enable Auto Start Settings in Ambari, the Ambari services are configured to start automatically on system boot. However, post migration to Cloudera Manager, this Auto Start Settings field is enabled only for Zookeeper-Server. For other components, enable this setting manually in Cloudera Manager.

Procedure

1. In the Search box, search for Automatically Restart Process.
   Results are displayed for all the components.
2. Select the component from the results displayed.
3. Click the Automatically Restart Process checkbox.

ZooKeeper

You must complete the following steps to start the ZooKeeper service.

Procedure

1. Remove or move the myid file from the ZooKeeper server hosts. The path is ${dataDir}/myid. For example,

   ```
   # mv /hadoop/zookeeper/myid /hadoop/zookeeper/myid.bak
   ```
2. Start ZooKeeper service from Cloudera Manager

Delete ZNodes

Remove the ZNode for HDFS, YARN, Hive, HBase, and Oozie

About this task

If the cluster is configured for Namenode HA, the Failover controllers cannot determine the Active Namenode after the migration. This is because the naming conventions used to identify Namenodes for the HA service are different for Ambari and Cloudera Manager. You must format the ZooKeeper ZNode for the Failover controller to continue further.

If the cluster is configured for Yarn HA, the Resource Managers cannot elect an Active Resource Manager after the migration. You must clear the previous Znode from ZooKeeper so that YARN replaces it.

If the cluster is configured for Ranger KMS, you must delete the Ranger KMS Znode with superuser privileges. When you restart Ranger KMS, the znode gets created with correct privileges.

You must format the ZooKeeper Znode for the failover controller to continue further.

Procedure

1. Start ZooKeeper client CLI session from a master node. (Assuming that the skipACL is set to Yes to avoid authentication issues). zookeeper-client -server   <zk_hostname>
2. Remove the HDFS HA Failover controller Znode

   ```
   deleteall /hadoop-ha
   ```
3. Remove the YARN ZNode

   ```
   deleteall /yarn-leader-election
   ```
4. Remove the Hive ZNode

   ```
   deleteall /hive
   ```

   ```
   deleteall /hiveserver2
   ```
5. Remove the HBase ZNode

   ```
   deleteall /hbase-secure
   ```
6. Remove the Oozie ZNode

   ```
   deleteall /oozie
   ```
7. Remove the Ranger KMS ZNode

   ```
   deleteall /zktsm
   ```

Ranger

You must change the port number for Ranger port numbers on Cloudera Manager.

After transitioning the cluster, the ranger.service.https.port and ranger.service.http.port configurations must have different port numbers in Cloudera Manager. Otherwise, Cloudera Manager displays a warning.

1. Start the Ranger server
2. Click Actions
3. Click Setup Ranger Plugin Service

Ranger Service connection with Oracle database

If you have configured Ranger with Oracle Database as its backend, you must add the property conf/ranger-admin-site.xml with the key and value provided below for the Ranger Admin Advanced Configuration Snippet (Safety Valve) in Cloudera Manager: Key: ranger.jpa.jdbc.preferredtestquery value: select 1 from dual;

Ranger KMS

You must add the key and value to Ranger KMS property. This procedure is not required if you are on Cloudera Manager 7.4.4 and above and CDP 7.1.5 and above.

You must set RANGER_KMS_SERVER_role_env_safety_valve setting to JAVA_OPTS in Cloudera Manager. This is needed only for non default zookeeper principal.

1. Log in to Cloudera Manager UI
2. Navigate to Clusters
3. Select the Ranger KMS service
4. Go to Configurations
5. Search for RANGER_KMS_SERVER_role_env_safety_valve and add key JAVA_OPTS and value -Dzookeeper.sasl.client.username=<zookeeper custom principal name set on the cluster> For example, if the principal is set to custom principal value zk-test then, -Dzookeeper.sasl.client.username=zk-test
6. Start Ranger KMS service

Add Ranger policies for components on the CDP Cluster

Enable the default ranger policies on the CDP Private Cloud Base cluster.

Before you begin

The default Ranger policies created on the CDP cluster under cm_<servicename> are effective after the policies are moved under <clustername>_<servicename>. For example, in the case of knox, the default ranger policy for Knox in CDP is CDP Proxy UI and API that is created under the service name cm_knox which can be moved under cl1_knox. The <clustername> is the name registered under ambari.

About this task

To migrate policies from cm_<servicename> to <clustername>_<servicename>, perform the following

Procedure

1. Log in to Cloudera Manager UI
2. Navigate to Clusters
3. Select the Ranger service
4. Click Web UI. This redirects to the Ranger service page.
5. On the Ranger Admin UI, click Service Manager
6. Add the policies available in the table

Table 3:

Service Type	Policy Name	Existing Groups	Existing Users	Existing Permissions	Add new default users to the existing policies	Add new default groups	Add new Permissions
Kafka							
*	all-topic		kafka		cruisecontrol, streamsmsgmgr, streamsrepmgr		N.A
			rangerlookup				N.A

Service Type	Policy Name	Existing Groups	Existing Users	Existing Permissions	Add new default users to the existing policies	Add new default groups	Add new Permissions
*	all - cluster		kafka		cruisecontrol, streamsmsgmgr, streamsrepmgr		N.A
			rangerlookup				N.A
*	all - transactionalid		kafka		cruisecontrol, streamsmsgmgr, streamsrepmgr		N.A
			rangerlookup				N.A
*	all - delegationtoken		kafka		cruisecontrol, streamsmsgmgr, streamsrepmgr		N.A
			rangerlookup				N.A
*	ATLAS_HOOK		hive, hbase, storm, spark_atlas		impala, mlgov, nifi		N.A
			atlas	consume			create configure consume publish
*	ATLAS_ENTITIES		atlas	publish			create configure publish
			rangertagsync				
Atlas							
*	all - entity-type, entity-classification, entity		atlas, rangerlookup, admin		beacon, dpprofiler,admin, nifi, admin (remove atlas user from policy)		
			rangertagsync			public	
			atlas		(remove atlas user from policy)		
					rangerlookup		entity-read
*	all - relationship-type, end-one-entity-type, end-one-entity-classification, end-one-entity, end-two-entity-type, end-two-entity-classification, end-two-entity	public	atlas rangerlookup admin		beacon, dpprofiler, admin, nifi, admin (remove atlas user from policy)		
			atlas		(remove atlas user from policy)		

Service Type	Policy Name	Existing Groups	Existing Users	Existing Permissions	Add new default users to the existing policies	Add new default groups	Add new Permissions
*	all - atlas-service		atlas, rangerlookup, admin		beacon, dpprofiler, admin, nifi, admin (remove atlas user from policy)		admin-purge, admin-audits
			atlas		(remove atlas user from policy)		
*	all - type-category, type		atlas, rangerlookup, admin		beacon, dpprofiler, admin, nifi, admin (remove atlas user from policy)		
			atlas		(remove atlas user from policy)		
		public					
*	all - entity-type, entity-classification, entity, entity-label		atlas		beacon, dpprofiler, admin, nifi, admin (remove atlas user from policy)		
		public	rangertagsync				
				rangerlookup			entity-read
*	all - entity-type, entity-classification, entity, entity-business-metadata		atlas		beacon, dpprofiler, admin, nifi, admin (remove atlas user from policy)		
		public	rangertagsync				
				rangerlookup			entity-read
*	Allow users to manage favorite searches		{USER}				entity-read, entity-create, entity-update, entity-delete
	Entity Type = __AtlasUserProfile __AtlasUserSavedSearch						
	Entity Classification = *						
	Entity ID = {USER} {USER}:*						
Hive							

Service Type	Policy Name	Existing Groups	Existing Users	Existing Permissions	Add new default users to the existing policies	Add new default groups	Add new Permissions
*	all - hiveservice		hive, rangerlookup		hive, beacon, dpprofiler, hue, admin, impala (remove rangerlookup user from policy item)		
					rangerlookup		read
*	all - global		hive, rangerlookup		hive, beacon, dpprofiler, hue, admin, impala (remove rangerlookup user from policy item)		
					rangerlookup		read
*	all - url		hive, rangerlookup		hive, beacon, dpprofiler, hue, admin, impala (remove rangerlookup user from policy item)		
					rangerlookup		read
*	all - database, table, column		hive, rangerlookup		hive, beacon, dpprofiler, hue, admin, impala (remove rangerlookup user from policy item)		
					rangerlookup		read
					{OWNER}		all
*	all - database, table, column		hive, rangerlookup		hive, beacon, dpprofiler, hue, admin, impala (remove rangerlookup user from policy item)		
					rangerlookup		read
					{OWNER}		all
*	default database tables columns					public	create
	Hive Database	default					
	Hive Table	*					
	Hive Column	*					

Service Type	Policy Name	Existing Groups	Existing Users	Existing Permissions	Add new default users to the existing policies	Add new default groups	Add new Permissions
*	Information_schema database tables columns					public	select
	Hive Database	information_schema					
	Hive Table	*					
	Hive Column	*					
HDFS							
*	all - path		hadoop, rangerlookup		Remove rangerlookup from policy item		
						rangerlookup	read

Knox	Policy Name	Knox topolgoy	Knox service	Allow conditions - Group	Allow conditions - Permission
	CDP Proxy UI and API	cdp-proxy, cdp-proxy-api	*	public	Allow

Set maximum retention days for Ranger audits

You can now update the solr document expiry ranger.audit.solr.config.ttl and ranger.audit.solr.config.delete.trigger parameters from Ranger configurations in Cloudera Manager and refresh the configurations to get the Solr collection for Ranger audits updated with ttl and delete trigger.

In HDP 3.1.5, the ranger_audit_max_retention_days attribute in Ranger Configurations is used to specify the maximum number of days to retain the Ranger Audit records in Ambari Infra solr. By default it is set to 90 days.

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the Ranger service
4. Go to Configurations
5. Search for the ranger.audit.solr.config.ttl and ranger.audit.solr.config.delete.trigger parameters and update them.

   Cloudera Manager displays a refresh configuration notification for the Ranger service.
6. You must refresh the **Configurations** action which updates the parameters in the Ranger audits collection in Solr. For more information, see the Manual process available.

Search post-HDP-upgrade tasks

After upgrading your HDP cluster to Cloudera Runtime, you need to add a Solr service to your CDP cluster where you can recreate the collections you transitioned from HDP Search. Once done, you can proceed with reindexing data to the transitioned collections.

Before you begin

- HDP is upgraded to Cloudera Runtime 7.1.1 or higher.
- The management platform is transitioned from Ambari to Cloudera Manager.

Procedure

1. In the Cloudera Manager Admin Console, add Solr service to your CDP cluster.

   For more information, see Adding a Service.
2. In the Cloudera Manager Admin Console, go to Solr service Configuration .
3. In the Search field, type upgrade to filter the configuration parameters.
4. For the Solr Server for Upgrade property, select one of your Solr Server hosts. When you run the migration script, make sure to run it on this host.
5. For the Upgrade Backup Directory property, specify a directory in HDFS. This directory must exist and be writable by the Solr service superuser (solr by default). Examples in these procedures use /cr7-solr-upgrade/backup for this HDFS directory.
6. For the Upgrade Metadata Directory property, specify a directory on the local filesystem of the host you selected as the Solr Server for Upgrade. When you run the migration script, make sure that you copy the migrated configuration to this directory. This directory must also be writable by the Solr service superuser. Examples in these procedures use /cr7-solr-metadata/migrated-config for this local directory.
7. Enter a Reason for change and then click Save Changes to commit the changes.
8. Copy the transitioned configuration metadata to the Solr server host designated as Solr Server for Upgrade.
9. Reinitialize Solr state for upgrade:
   a) In the Cloudera Manager Admin Console, go to Solr service .
   b) Select Actions Reinitialize Solr State for Upgrade and click Reinitialize Solr State for Upgrade to confirm.
10. Bootstrap the Solr configuration:
    a) In the Cloudera Manager Admin Console, go to Solr service .
    b) Select Actions Bootstrap Solr Configuration and click Bootstrap Solr Configuration to confirm.
11. Start the Solr service:
    a) In the Cloudera Manager Admin Console, go to Solr service .
    b) Select Actions Start .
12. Bootstrap the Solr collections:
    a) In the Cloudera Manager Admin Console, go to Solr service .
    b) Select Actions Bootstrap Solr Collections and click Bootstrap Solr Collections to confirm.

What to do next

1. Recreate aliases, if you were using them.
2. Reindex Solr collections.

HDFS

Perform the following post migration steps.

Configure the ports, check the HA NameNode, custom topology, and review other configurations to ensure that HDFS service is set up.

Ports

Ensure that you review service configuration warnings and address inconsistencies.

Start all role instances in HDFS service.

TLS/SSL

If the TLS/SSL is not enabled in the CDP Private Cloud Base cluster, then you must reset the dfs.data.transfer.protection configuration.

About this task

Perform the following steps

Procedure

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the HDFS service
4. Search for dfs.data.transfer.protection and click the click to revert to default option
5. Click Save changes

HDFS HA

You must check HDFS HA and set Failover controller.

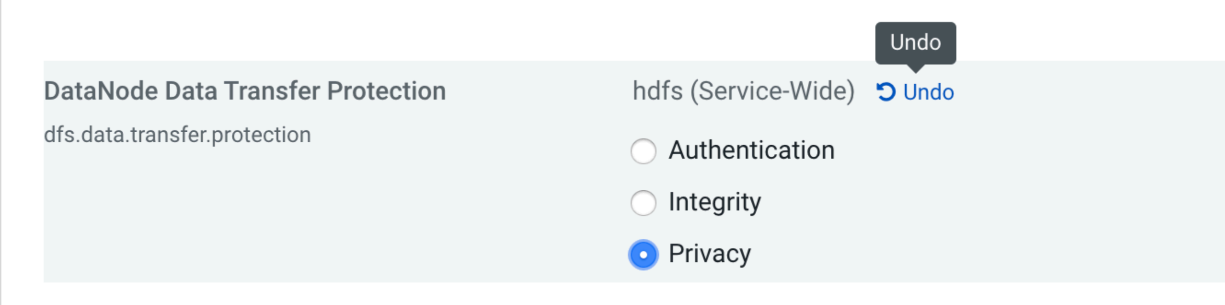
About this task

Perform the task.

Procedure

1. Cloudera Manager does not support the comma separated entries. Review dfs.data.transfer.protection and hadoop.rpc.protection parameters. If SSL is not enabled, then click Undo. This will clear the selections.

   Note: Privacy option requires SSL.

   DataNode Data Transfer Protection — hdfs (Service-Wide)
   dfs.data.transfer.protection
   ○ Authentication
   ○ Integrity
   ● Privacy

2. Start HDFS service.
   Failover Controller fails to start. You must continue with step 3 or 4.
3. Format the ZooKeeper Failover controller ZnNode. SSH to the Failover controller host And perform the following using the example:# cd /var/run/cloudera-scm-agent/process/<xx>-hdfs-FAILOVERCONTROLLER /opt/cloudera/parcels/CDH/bin/hdfs --config /var/run/cloudera-scm-agent/process/<xx>-hdfs-FAILOVERCONTROLLER/ zkfc -formatZK
   a) Check the output in the log for success. If the error is: `ERROR tools.DFSZKFailoverController: DFSZKFailOverController exiting due to earlier exception java.io.IOException: Running in secure mode, but config doesn't have a keytab`.
   b) The ZooKeeper nodes are not created. You must manually create the ZNodes for the Failover controllers to start and allow an Active Namenode to be elected.
   c) With the zookeeper-client, open a ZooKeeper Shell `zookeeper-client -server <a_zk_server>`
   d) Create the required ZNodes create /hadoop-ha create /hadoop-ha/<namenode_namespace>.
4. This is an alternative step to the above step 3.
   a) Log in to Cloudera Manager.
   b) Navigate to Clusters
   c) Click HDFS
   d) Go to the Instances tab
   e) Click Failover Controller instance
   f) Click Actions
   g) Initialize Automatic Failover Znode
5. Start HDFS service again.

Custom Topology

Custom topology configuration in Cloudera Manager.

In the Ambari HDFS service, if net.topology.script.file.name is configured with custom topology file, then, in Cloudera Manager > HDFS Configuration page, you must configure net.topology.script.file.name with the same file.

Note:

- You must migrate the net.topology.script.file.name parameter to Cloudera Manager only if the value of the net.topology.script.file.name parameter is different from the default value set in Ambari.
- If you had a custom script previously set, you must ensure that it is not in the path with symlinks. Symlinks may have changed during the upgrade process.

Add Balancer Role to HDFS

Use HDFS Balancer for balancing the data.

The HDFS Balancer is a tool for balancing the data across the storage devices of a HDFS cluster. For more information on HDFS Balancer, see *Balancing data across an HDFS cluster*.

Note: This section is required if you are upgrading up to and including CDP Private Cloud Base 7.1.6. However, if you are upgrading to CDP Private Cloud Base 7.1.7 and upwards, then this section is not required as the latest AM2CM tool handles it.

Related Information

Balancing data across an HDFS cluster

Other review configurations for HDFS

Review configurations

1. Review dfs.client.failover.proxy.provider.mycluster value. If this parameter has a non-default value, then configure this parameter in Cloudera Manager. This configuration is not migrated from the Ambari managed HDP cluster to Cloudera Manager.
2. Review and add the cloud service-related configurations as those are not transitioned to Cloudera Manager.

Configuring HDFS properties to optimize log collection

CDP 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. Over time, these log files can grow in size. To optimize the size of logs that are captured and stored on HDFS, you must update certain HDFS configurations in the hdfs-site.xml file using Cloudera Manager.

Procedure

1. Log in to Cloudera Manager as an Administrator.
2. Go to Clusters HDFS service Configuration .
3. Select the Enable WebHDFS (dfs_webhdfs_enabled) option.
4. Add the following lines in the HDFS Service Advanced Configuration Snippet (Safety Valve) for hdfs-site.xml field by clicking View as XML to enable append operations:

```
<property>
  <name>dfs.support.append</name>
  <value>true</value>
</property>

<property>
  <name>dfs.support.broken.append</name>
  <value>true</value>
</property>
```

5. Click Save Changes.

6. Restart the HDFS service.
7. Restart your CDP cluster.

Related Information

Fluentd documentation

Solr

You must create a Ranger Plug-in audit directory and HDFS Home directory and start the Solr service.

On the Cloudera Manager UI:

1. Initialize Solr
2. Create Ranger Plug-in audit directory
3. Create HDFS Home directory
4. Start Solr service

Restore Solr collections on CDP cluster

To restore the data on Solr managed by Cloudera Manager, you must start HDFS and Zookeeper only. This ensures no operations are performed by services which can push data to Solr.

About this task

To restore the data on Solr managed by Cloudera Manager, perform the following steps:

Procedure

1. After migrating to CDP Private Cloud Base, you must update the infra_solr section ini file by collecting properties from Solr on Cloudera Manager. (keep a backup of the existing file);

   - - protocol: Solr protocol (http if TLS is not enabled https if TLS is enabled)
     - hosts: Solr server hosts
     - zk_connect_string: Solr Zookeeper connection string, should be available as part of process Environment Variables
     - znode: Solr Znode configured, default value is /solr_ user : Solr service
     - user: default value is solr
     - port: Solr Server port, default 8983 and 8985 when TLS is enabled for Solr
     - keytab: Absolute path for Solr keytab
     - principal: Solr Service principal
     - zk_principal_user: Zookeeper principal
2. After updating the ini configuration file, restore the solr collections using AM2CM 2.0.0.0 tool

   - To change ownership of the Solr data in HDFS

     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action change-ownership-in-hdfs
     ```
   - To delete newly created default Cloudera Manager Solr collections

     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action delete-new-solr-collections
     ```
   - To restore original collections

     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action full-restore
     ```

3. If you do not want to update the ini file you can have the same parameters handy and pass them as arguments to the above three commands.

   -
     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action c
     hange-ownership-in-hdfs --protocol=<Solr service protocol> --hosts=<Solr
      Server Hosts comma separated> --zk-connect-string=<Zookeeper Connection
      String> --znode=/solr-infra --user=solr --port=8985 --keytab=<full path
      to solr.keytab> --principal=<Solr principal> --zk-principal-user=<Zooke
     eper principal>
     ```

   -
     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action d
     elete-new-solr-collections --action change-ownership-in-hdfs --protocol=
     <Solr service protocol> --hosts=<Solr Server Hosts comma separated> --zk
     -connect-string=<Zookeeper Connection String> --znode=/solr-infra --user
     =solr --port=8985 --keytab=<full path to solr.keytab> --principal=<Solr
     principal> --zk-principal-user=<Zookeeper principal>
     ```

   -
     ```
     python restore_collections.py --ini-file $CONFIG_INI_LOCATION --action f
     ull-restore --action change-ownership-in-hdfs --protocol=<Solr service p
     rotocol> --hosts=<Solr Server Hosts comma separated> --zk-connect-string
     =<Zookeeper Connection String> --znode=/solr-infra --user=solr --port=89
     85 --keytab=<full path to solr.keytab> --principal=<Solr principal> --zk
     -principal-user=<Zookeeper principal>
     ```

Kafka

You must cleanup metadata on broker hosts after migrating the Ambari-managed HDP cluster to Cloudera Private Cloud Base.

About this task

Cleanup Metadata on Broker Hosts

Procedure

1. On each Broker host, remove $log.dirs/meta.properties file from Kafka broker hosts. For example, `#mv /grid/0/kafka-logs/meta.properties /tmp`.

   Remove ${log.dirs}/meta.properties file from Kafka broker.

   If the Kafka log.dirs property points to /kafka-logs, then the command is

   ```
   #mv /kafka-logs/meta.properties /tmp
   ```
2. Set the Kafka port value. For more information, see Change Kafka Port Value.
3. Start the Kafka service.

Change Kafka port value

Change the Kafka JMX port value if the Ranger KMS port is conflicting with Kafka JMX port.

The Ranger KMS ranger.service.https.port port value is migrated from the HDP cluster. In Cloudera Manager, if the Kafka jmx_port port value is the same as the Ranger KMS port value from HDP, then you must change the value of the Kafka JMX port number in Cloudera Manager.

Unsetting Kafka Protocol version

You must unset the Kafka protocol version from Cloudera Manager after the upgrade is complete. This allows you to use the updated Kafka version using Cloudera Manager.

On the HDP cluster, using Ambari, you have set the Kafka protocol versions to the older Kafka version to make sure that all the messages are stored in a manner that Kafka can handle. After upgrading to the CDP cluster, the messages are still stored according to the older version of Kafka. This gives you the ability to roll it back if something goes wrong.

After the Kafka Protocol version properties are unset using Cloudera Manager, Kafka will use its current version (the new and updated Kafka version) and newly stored messages will not be handled by the older Kafka version.

Note: Do not unset the older Kafka protocol version until you have completed your upgrade testing. Unsetting the version will prevent rollback to the older Kafka release.

To unset the Kafka Protocol version on Cloudera Manager, perform the following steps:

1. Remove the following properties from the Kafka Broker Advanced Configuration Snippet (Safety Valve) configuration property:
   - `Inter.broker.protocol.version`
   - `log.message.format.version`
2. Save your changes.
3. Perform a rolling restart:
   - Select the Kafka service.
   - Click Actions > Rolling Restart.
   - In the pop-up dialog box, select the options you want and click Rolling Restart.
   - Click Close after the command has finished.

Impala

After transitioning your cluster from HDP 3.1.5.x to Cloudera Private Cloud Base, you can manually install the Impala service.

Impala is a new service that is not available in HDP. By default Impala uses the cm_hive ranger service for authorization.

Note: Impala uses the same Ranger service as Hive to ensure consistent access control and authorization policies.

To configure Impala to use the Ranger service which Hive is using, you must:

On the Cloudera Manager UI:

1. Update the service name through safety valve in Cloudera Manager UI for the Impala service. In ranger-impala-security.xml, add ranger.plugin.hive.service.name = <migrated_hive_ranger_service_name> hive service name. For example, cl1_hive

On the Ranger Admin UI:

1. Add the Impala user in policy.download.auth.users and tag.download.auth.users configurations in the migrated hive ranger service. For example, cl1_hive.
2. Add the Impala user to the default policies in the migrated hive ranger service. For example, cl1_hive.

YARN

Perform the following post migration steps.

Start job history

You must start job history after migration.

About this task

To start job history after migration

Procedure

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Click YARN

4. Under the Actions drop-down, click Create Job History Dir
5. Create Job History Dir dialog box appears, click Create Job History Dir.
   Successfully created HDFS directory. message appears

Yarn Mapreduce framework jars

About this task

Perform the following steps

Procedure

1. Go to Cloudera Manager UI.
2. Navigate to YARN
3. Under Actions drop-down, click Install Yarn Mapreduce framework jars

GPU Scheduling

You must enable GPU on the CDP cluster if GPU was enabled on the HDP cluster.

- If you have enabled GPU in the HDP cluster and want to enable it in the CDP cluster, then you must turn on the configure GPU scheduling and Isolation. For more information, see Configure GPU scheduling and Isolation

YARN CGroups

If YARN CGroups was enabled in the HDP cluster, you must manually enable the Host-level CGroups settings.

Procedure

1. Log into Cloudera Manager UI
2. Navigate to Clusters
3. Click YARN
4. Click Hosts
5. Select Hosts configuration
6. In the category filter, click Resource Management
7. Enable Enable Cgroup-based Resource Management
8. Click Save
9. Go to Cloudera Manager’s main screen and click on any of the Stale configuration: Restart needed icons.
10. Click Restart.
11. Select Deploy client configuration
    All services with stale configurations will restart.

Reset ZNode ACLs

If you have a kerberized cluster, you manually have to reset the ZNode ACLs after upgrading from HDP to CDP.

About this task

ZNode ACLs have to be reset only for kerberized cluster. If you have a non-kerberized cluster, skip this post-upgrade task.

Note:

If the cluster is heavily used and the yarn.resourcemanager.max-completed-applications is kept high (10k-100k) resetting ACLs on YARN ZooKeeper nodes can take a large amount of time to finish.

Procedure

1. Log into Cloudera Manager UI.

2. Set the -Dzookeeper.skipACL property to yes.
   a) Navigate to ZooKeeper Configuration .
   b) Find the Java Configuration Options for ZooKeeper Server property.
   c) Add the following setting: -Dzookeeper.skipACL=yes
   d) Click Save.
   e) Restart the ZooKeeper service.
3. Select the YARN service.
4. Click Actions.
5. Select the Reset ACLs on YARN Zookeeper nodes action.
6. After the command is executed, remove the -Dzookeeper.skipACL property:
   a) Navigate to ZooKeeper Configuration .
   b) Find the Java Configuration Options for ZooKeeper Server property.
   c) Remove the following setting: -Dzookeeper.skipACL=yes
   d) Click Save.
   e) Restart the ZooKeeper service.

Placement rules evaluation engine

If you are upgrading to Cloudera Runtime 7.1.6 or higher you need to learn about the new placement rules evaluation engine.

This list is only an overview of the most prominent changes regarding placement rules evaluation. For a more detailed guide, see Managing placement rules.

JSON-based format

From Cloudera Runtime 7.1.6 placement rules are described in a JSON-based format. The new engine has full backward compatibility with the old format as well but only if you use safety valves which you must not do. Cloudera recommends managing your placement rules through the YARN Queue Manager UI. The format conversion is automatically done at the first time you use the YARN Queue Manager UI in CDP Private Cloud Base 7.1.6 or higher. For more information about the automatic placement rules format conversion, see *Converting old mapping rule format to JSON-based placement rule format*.

Enabling dynamic queues

The new placement rules evaluation engines support the create flag which was also introduced in Cloudera Runtime 7.1.6. Non-existing queues are only created if dynamic queue creation is enabled when the applicable placement rule is created. That means in order to enable dynamic child queues you have to perform two steps:

1. Enable the dynamic auto child creation feature for the queue that you want to use as a parent queue for the dynamic child queues.
2. Ensure that the Create the target queue if it does not exist? property is checked when the applicable placement rule is created.

Fallback action configuration

With the new placement rules and evaluation engine you can define the action that should happen if the target queue of a placement rule does not exist or it cannot be created. This action is called the fallback action. Fallback action can be configured for each placement rule by the user and it can have the following values:

- Skip: Ignore the current rule and proceed to the next.
- PlaceDefault: Place the application to the default queue root.default (unless it is overriden to something else). This is how Capacity Scheduler worked with the old mapping rules.
- Reject: Reject the submission.

Placement rule policies

Placement rule policies were introduced as a more user friendly solution for mapping rule creation. Placement rule policies cover the functionality of the placement rules and provide shortcuts for the most common use cases.

All legacy Capacity Scheduler mapping rule options are now available as policy. They provide the same functionality without having to manually write rules. For example, the u:%user:%primary_group.%user rule can be achieved using the primaryGroupUser policy. However, a custom policy option is available that allows you to define the target queue manually without using any predefined placement rule policy.

Converting old mapping rule format to JSON-based placement rule format

Reviewing how the old colon-separated mapping rule format is converted into the new JSON-based mapping rules format can help you understand the automatic placement rule conversion.

From Cloudera Runtime 7.1.6 placement rules are described in a JSON-based format. This format conversion is automatically done at the first time you use the YARN Queue Manager UI in CDP Private Cloud Base 7.1.6 or higher. If you use Cloudera Runtime 7.1.6 or higher you must use the new JSON-based placement rule format.

Note: You cannot manage the new JSON-based placement rules by directly editing them in the capacity-scheduler.xml configuration file. Instead, you use the YARN Queue Manager UI to manage placement rules. The table is only provided so that you can better understand how the automatic conversion happens.

Table 4: Mapping rule conversion into the new JSON-based placement rule format

Old mapping rule	New JSON-based placement rule

u:username:root.user.queue	{
	"type": "user",
	"matches": "username",
	"policy": "custom",
	"customPlacement": "root.user.queue",
	"fallbackResult":"placeDefault"
	}

u:%user:%user	{
	"type": "user",
	"matches": "*",
	"policy": "user",
	"fallbackResult":"placeDefault"
	}

u:%user:root.parent.%user	{
	"type": "user",
	"matches": "*",
	"policy": "user",
	"parentQueue": "root.parent",
	"fallbackResult":"placeDefault"
	}

u:%user:%primary_group	{
	"type": "user",
	"matches": "*",
	"policy": "primaryGroup",
	"fallbackResult":"placeDefault"
	}

u:%user:%primary_group.%user	{
	"type": "user",
	"matches": "*",
	"policy": "primaryGroupUser",
	"fallbackResult":"placeDefault"
	}

u:%user:root.groups.%primary_group.%user	{
	"type": "user",
	"matches": "*",
	"policy": "primaryGroupUser",
	"parentQueue": "root.groups",
	"fallbackResult":"placeDefault"
	}

u:%user:%secondary_group	{
	"type": "user",
	"matches": "*",
	"policy": "secondaryGroup",
	"fallbackResult":"placeDefault"
	}

u:%user:%secondary_group.%user	{ "type": "user",

It's worth noting that %application:%application requires a user type matcher. It is because internally, the "*" is interpreted only for users. If you set the type to application, then the "*" means to match an application which is named "*".

Setting the owner and permissions of /user/yarn

If you want to add a VPC or Compute cluster after migration, ensure that the correct owner and permissions are set for /user/yarn in HDFS.

About this task

If either the owner or the permissions of /user/yarn is set incorrectly, you can encounter errors when trying to add a VPC or Compute cluster.

Before you begin

- You have permission to impersonate a hdfs user.
- If you use Custom Service Accounts, add it to the supergroup group.

Procedure

1. SSH to a cluster node
2. Change the owner of /user/yarn:

   If you do not use Custom Service Accounts, change the owner to hdfs:supergroup:

   ```
   sudo -u hdfs hdfs dfs -chown hdfs:supergroup /user/yarn
   ```

   If you use Custom Service Accounts, change the owner to ***HDFS CUSTOM USER***:supergroup:

   ```
   sudo -u hdfs hdfs dfs -chown ***HDFS CUSTOM USER***:supergroup /user/yarn
   ```
3. Change the permissions of /user/yarn to drwxr-xr-x:

   ```
   sudo -u hdfs hdfs dfs -chmod 755 /user/yarn
   ```

Spark

You must initialize a few directories for the Spark service.

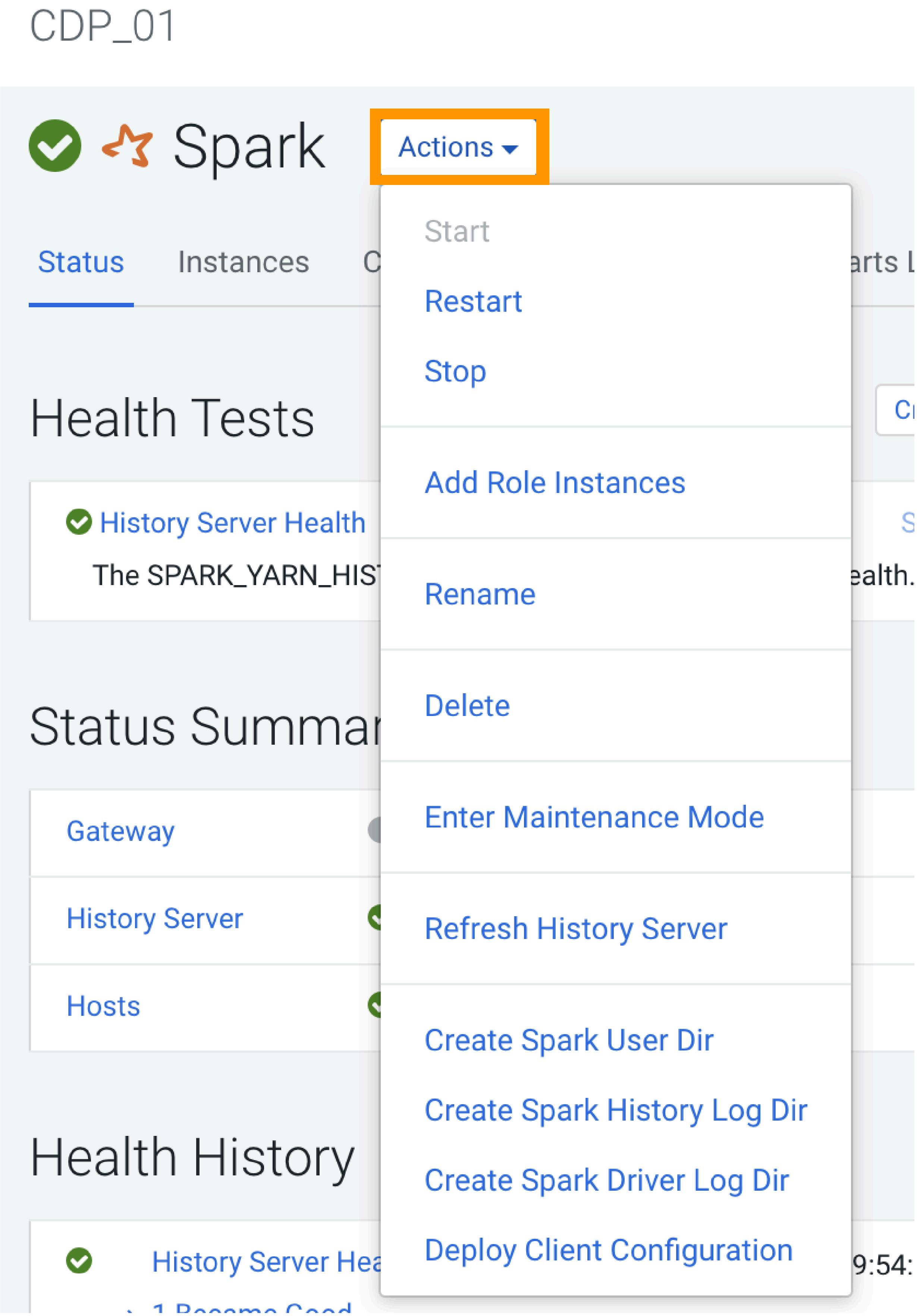
Before you begin

Run the following directory options:

Procedure

- Create Spark User Dir
- Create Spark History Log Dir

- Create Spark Driver Log Dir



CDP_01

Spark

Actions

Start

Restart

Stop

Add Role Instances

Rename

Delete

Enter Maintenance Mode

Refresh History Server

Create Spark User Dir

Create Spark History Log Dir

Create Spark Driver Log Dir

Deploy Client Configuration

Status Instances C arts L

Health Tests

History Server Health

The SPARK_YARN_HIS ealth.

Status Summar

Gateway

History Server

Hosts

Health History

History Server Hea 9:54:

Livy2

The CMA tool directly transitions the Livy service from HDP to CDP. However, any custom parameter configured on Ambari for Livy must be manually set on CDP using Cloudera Manager.

This step is for the custom parameters that Livy has on HDP, especially the Heap Size which is not a standalone configuration on CDP. The parameter export LIVY_SERVER_JAVA_OPTS=-Xmx2g is set on Advanced livy2-env while in Cloudera Manager it is set on livy_max_heapsize.

This table provides the location of the Ambari UI configurations. If custom properties are defined for the configurations mentioned in Column 2, then you must provide the property value in Cloudera Manager using the configuration names provided in Column 3.

Location	Ambari UI configuration name	Cloudera Manager configuration name
ServicesSpark2ConfigsAdvanced	Advanced livy2-env	LIVY_service_env_safety_valve
ServicesSpark2ConfigsAdvanced	Custom livy2-conf	livy-conf/livy.conf_role_safety_valve
ServicesSpark2ConfigsAdvanced	Custom livy2-client-conf	livy-conf/livy-client.conf_client_config_safety_valve

To set the value for the Livy parameters, perform the following:

1. Log in to Cloudera Manager.
2. Select the Livy service.
3. Select the Configurations tab.
4. Search for the parameters mentioned above and provide the value.
5. Click Save Changes.

Tez

Install the Tez tar files on HDFS.

About this task

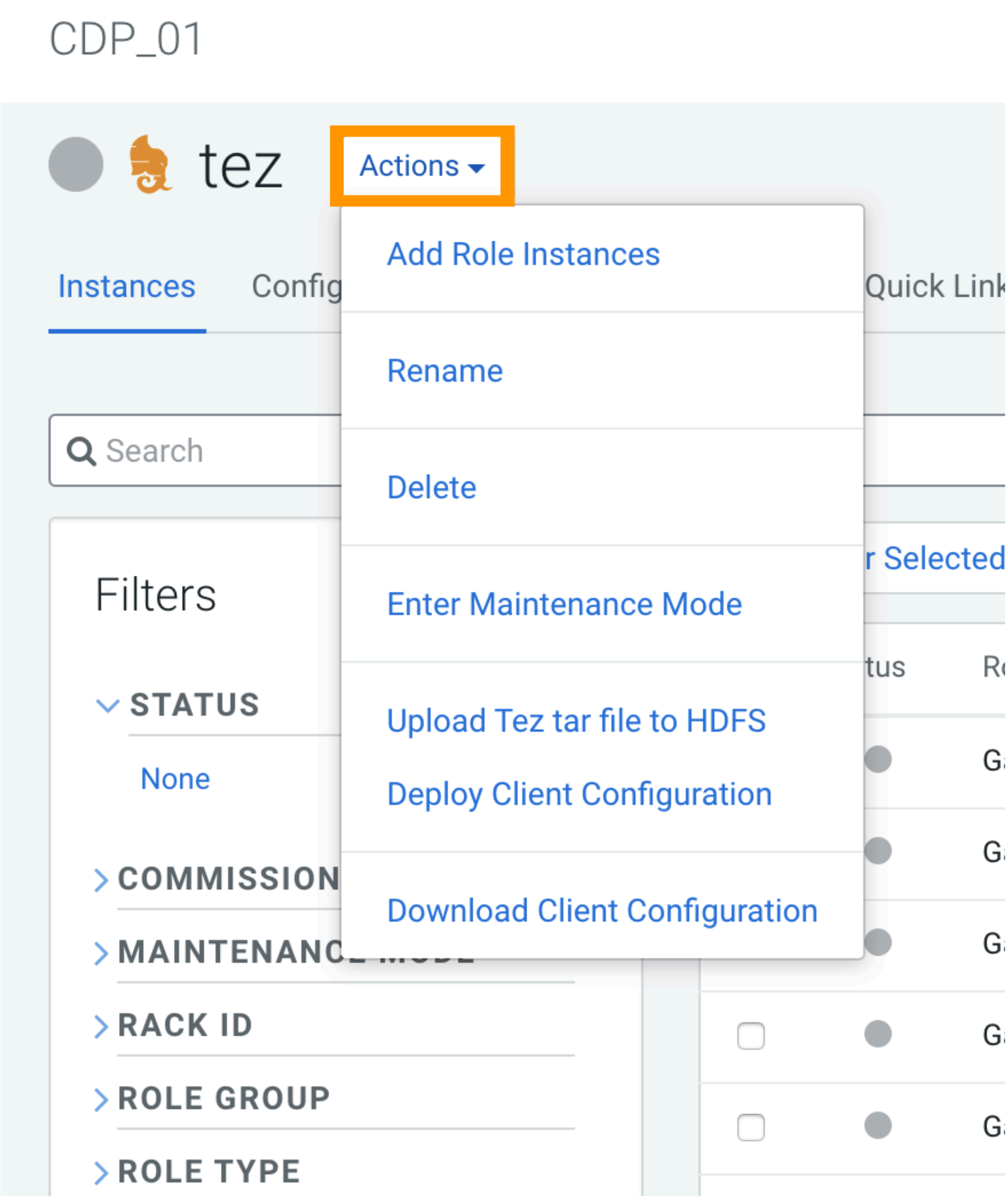
From the Tez cluster service, install Tez tar files on HDFS used by Hive use and then deploy Client Configuration.

Procedure

1. Run Upload Tez tar file to HDFS

2. Deploy Client Configuration.

Note: You must provide sufficient permissions to HDFS or Ranger to install Tez and deploy configuration.



Hive

You need to complete some post-migration tasks after upgrading to CDP. You need to activate Ranger services for Hadoop SQL (Hive resources) and HDFS paths to external tables. See Cloudera Private Cloud Base Post-Upgrade Migration (link below) for information about several other tasks and important post-upgrade information.

Related Information

Hive Post-Upgrade Tasks

Identifying and fixing invalid Hive schema versions

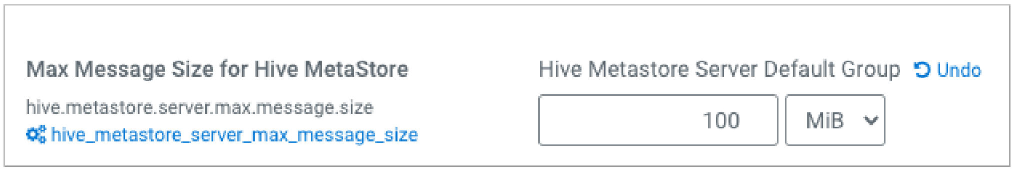
As Administrator, after upgrading from Ambari-managed HDP to Cloudera Private Cloud Base, you need to identify Hive metastore operations that might fail due to Hive schema version incompatibility.

About this task

Incompatibility might exist if the upgrade process failed to make schema updates. You need to turn on the Hive Metastore Schema validation process for the metastore during the migration of your workloads to CDP. The Hive metastore captures any schema updates that occur during the upgrade, and displays issues in the Hive metastore logs. With this information, you can use the Apache Hive Schema tool to fix any problems.

Procedure

1. In Cloudera Manager, click Clusters HIVE Configuration .
2. Check the hive.metastore.server.max.message.size.



Max Message Size for Hive MetaStore

hive.metastore.server.max.message.size

hive_metastore_server_max_message_size

Hive Metastore Server Default Group

100 MiB

3. Set hive.metastore.server.max.message.size to the recommended value: 10% of the value of your Java heap size for Hive Metastore Server in bytes, but no more than 21478364. Recommended value: 214748364
4. Click Clusters HIVE Configuration , and search for schema.
5. Check Strict Hive Metastore Schema Validation to set hive.metastore.schema.verification to true.
6. Check the Hive metastore logs and set a compatible metastore schema for the current Hive version using the Apache Hive Schema Tool.

Create HIVE sys database

You need to perform this procedure when you are upgrading to Cloudera Manager to 7.7.1 version and runtime to 7.1.8 version.

About this task

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the HIVE service
4. Click Actions drop-down.
5. Click Create Hive Sys database

Setting up Hive metastore for Atlas

As Administrator, you might plan to recommend Atlas for Hive metadata management and data governance. You have to check that Hive metastore for Atlas is set up, so users can build catalogs of data assets, classify, and govern the assets. If Atlas is not set up you learn how to do so. This section is not applicable if you are upgrading to CDP Private Cloud Base 7.1.7.

About this task

In this task, you set the name of the Atlas service for Hive metastore to use.

Procedure

1. In Cloudera Manager, click Clusters Hive Configurations .
2. Search for Atlas Service.
3. Choose a method based on the results of your search:
    - If Cloudera Manager finds the Atlas Service, check the checkbox to enable the Hive Metastore hook in your Cloudera Manager instance.
    - If Cloudera Manager does not find the Atlas Service, in Hive Service Advanced Configuration Snippet (Safety Valve) for atlas-application properties, enter an XML snippet in the value element that provides the name of your Atlas service, myatlasservice in the example below.

      ```
      <property>
        <name>atlas_service</name>
        <value>myatlasservice</value>
      </property>
      ```
4. Save changes.
5. Restart the Hive metastore service.

HMS health check

Check the Hive Metastore health.

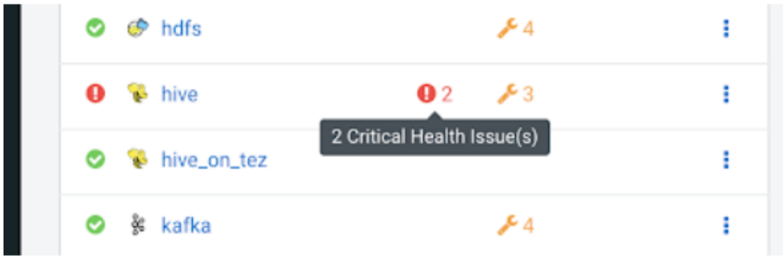
About this task

On Cloudera Manager UI, if you observe the Hive Metastore Server Canary Health check errors after migrating from HDP 3.1.5.x to CDP Private Cloud Base, perform the following steps to add the required Ranger policies for the Hue user.

Note: Ensure that you add a Hue user before proceeding to add the required Ranger policies for the Hue user.

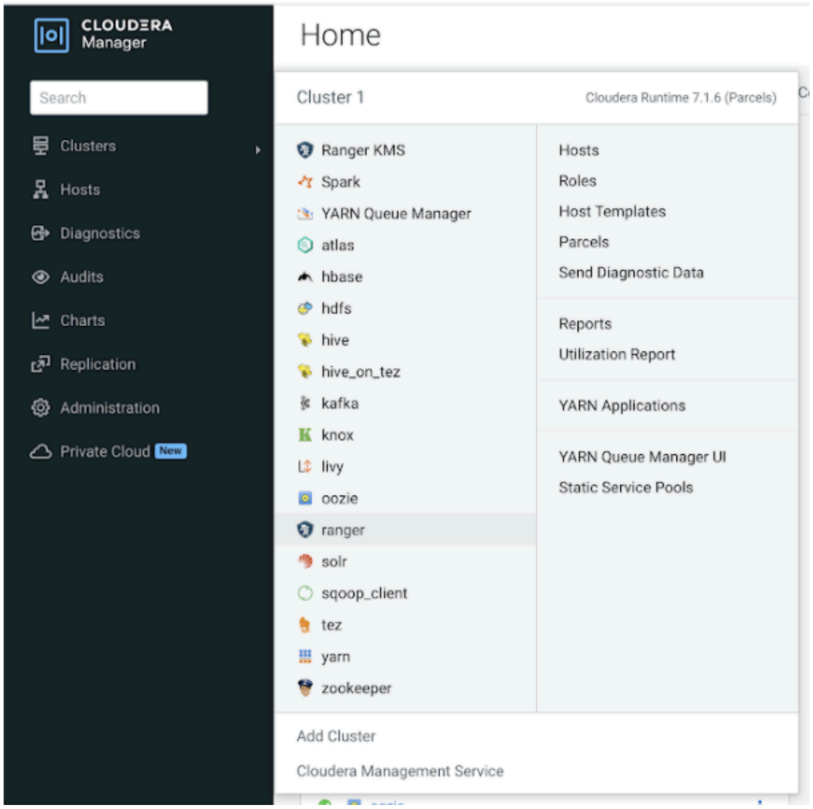
Procedure

1. Log in to Cloudera Manager UI
2. See if Health check issue is observed.

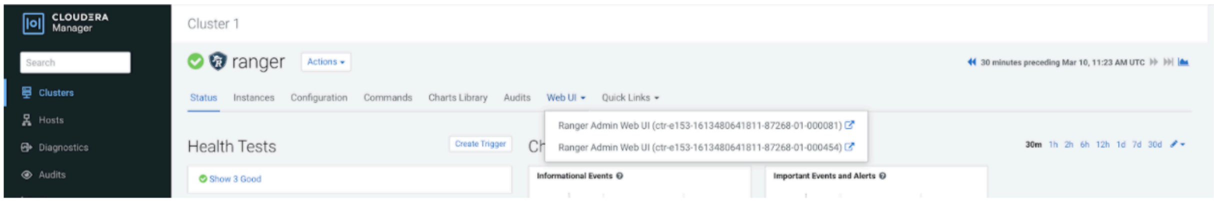


3. Navigate to Clusters

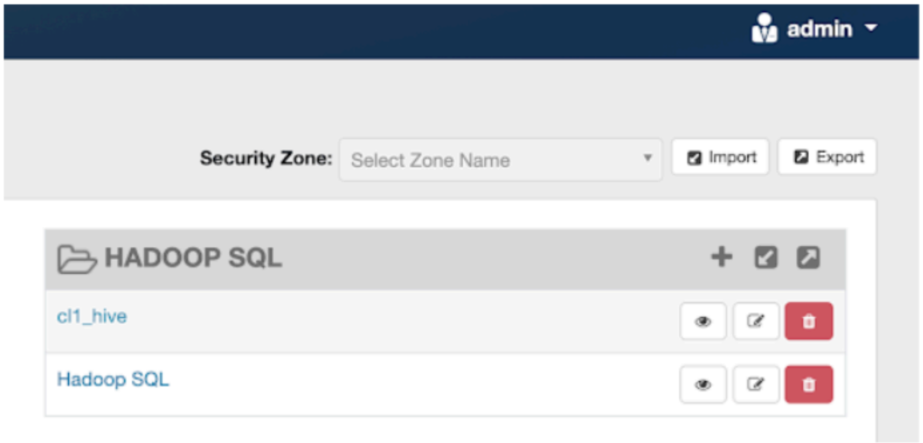
4. Select the Ranger service



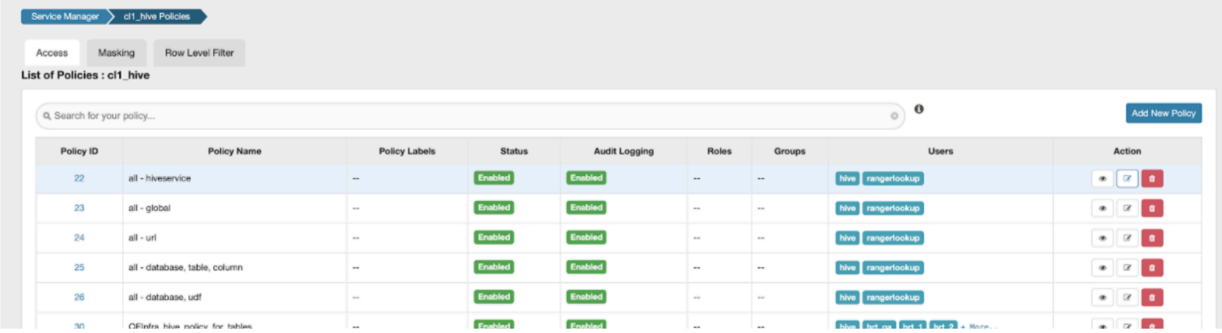
5. Click Web UI. This redirects to the Ranger service page.



6. On the Ranger Admin UI, click Service Manager



7. Add the required Ranger policies for Hue user



Service Manager > cl1_hive Policies

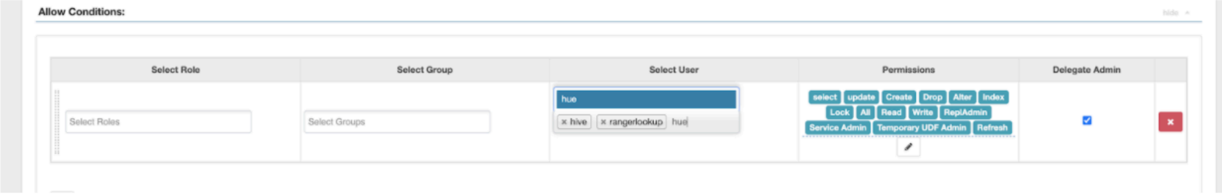
Access | Masking | Row Level Filter

List of Policies : cl1_hive

Search for your policy...

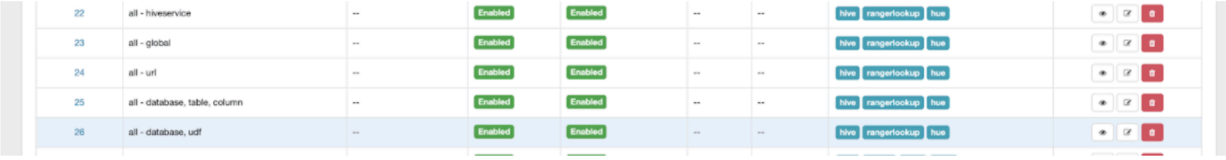
Add New Policy

Policy ID	Policy Name	Policy Labels	Status	Audit Logging	Roles	Groups	Users	Action
22	all - hiveservice	--	Enabled	Enabled	--	--	hive rangerlookup	
23	all - global	--	Enabled	Enabled	--	--	hive rangerlookup	
24	all - url	--	Enabled	Enabled	--	--	hive rangerlookup	
25	all - database, table, column	--	Enabled	Enabled	--	--	hive rangerlookup	
26	all - database, udf	--	Enabled	Enabled	--	--	hive rangerlookup	
30	QEInfra_hive_policy_for_tables	--	Enabled	Enabled	--	--	hive hrt_qa hrt_1 hrt_2 + More..	



Allow Conditions:

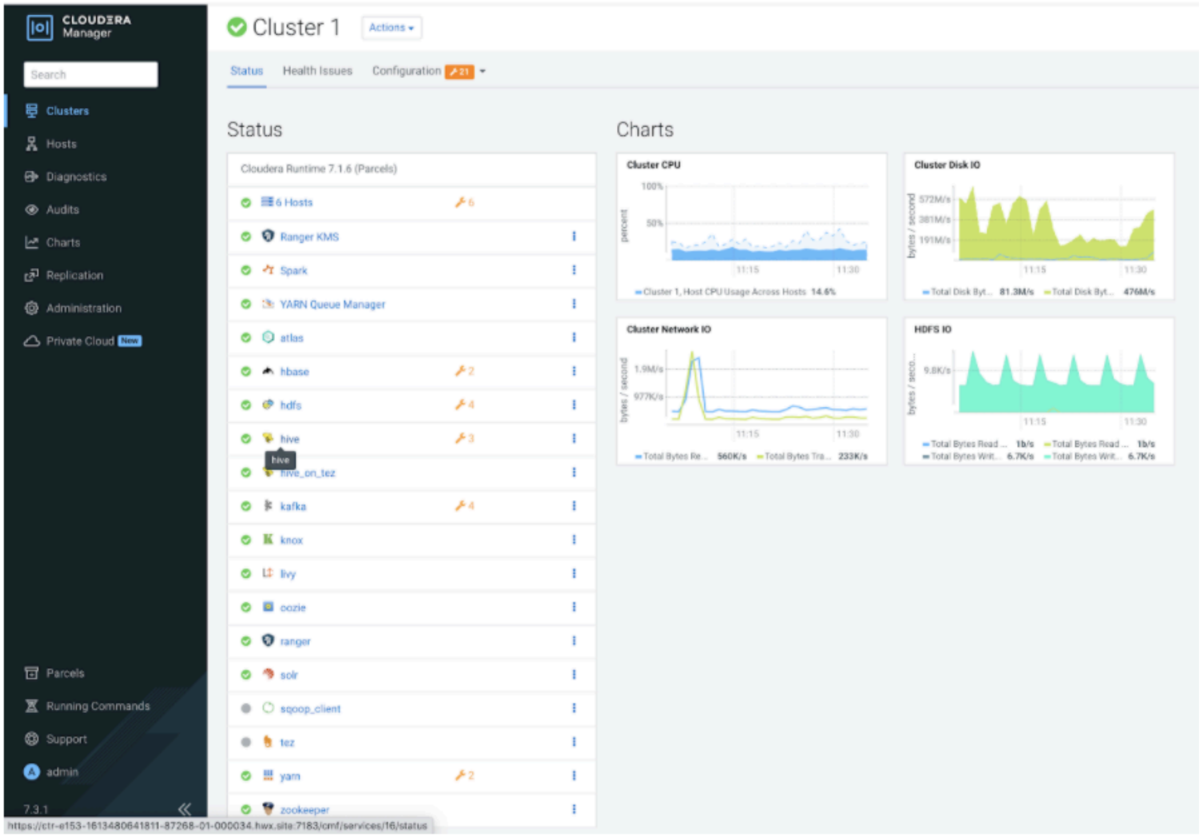
Select Role	Select Group	Select User	Permissions	Delegate Admin
Select Roles	Select Groups	hue × hive × rangerlookup hue	select update Create Drop Alter Index Lock All Read Write ReplAdmin Service Admin Temporary UDF Admin Refresh	☑



22	all - hiveservice	--	Enabled	Enabled	--	--	hive rangerlookup hue	
23	all - global	--	Enabled	Enabled	--	--	hive rangerlookup hue	
24	all - url	--	Enabled	Enabled	--	--	hive rangerlookup hue	
25	all - database, table, column	--	Enabled	Enabled	--	--	hive rangerlookup hue	
26	all - database, udf	--	Enabled	Enabled	--	--	hive rangerlookup hue	

The Policies include all - hiveservice, all - global, all - url, all - database, table, column and all - database,udf policies created under cl1_hive. For more information, see Ranger policies for components.

After the Hue user is added to the policies metastore health check issue is no longer observed in the Cloudera Manager portal.



HBase

Post-migration, HBase hook for Atlas is not enabled by default on AM2CM migrated clusters. you must manually enable HBase hook.

To enable the Hive Metastore hook in your Cloudera Manager instance:

1. Log in to your Cloudera Manager instance.
2. Select the HBase service.
3. Select Configurations tab.
4. Search for Enable Atlas Hook that the HBase service depends on and check this.
5. Click Save Changes.

Installing dependencies for Hue

You must install the psycopg2 Python package for PostgreSQL-backed Hue and MySQL clients for MariaDB and MySQL databases depending on your operating systems.

Note: This task is applicable only if you are upgrading to 7.1.8 and higher. If you are upgrading to 7.1.7 or lower, then you can skip this task.

If you are using Oracle as a backend database for Hue, then review Using Oracle database with Hue to ensure that Hue connects to your database.

Installing Python 3.8

Certain services, such as Hue, in CDP 7.1.8 and higher use Python 3.8. You must install Python 3.8 on all the hosts running the affected services after you have installed Cloudera Manager and before adding the services to your cluster.

Note: This task is applicable only if you are installing or upgrading to CDP 7.1.8 and higher. If you are installing or upgrading to CDP 7.1.7 or lower, then you can skip this task.

Attention: Installing Python 3.8 is mandatory if you want to use Hue.

Ubuntu 20 comes preinstalled with Python 3.8. You must install Python 3.8 manually on CentOS 7, RHEL 8, SLES 12, and Ubuntu 18.

Installing Python 3.8 on CentOS 7 for Hue

You must install Python 3.8 on all hosts on which you want to run the Hue service after installing Cloudera Manager and before adding the services to your cluster.

Before you begin

Install the necessary developer tools such as gcc and make on your system.

Install the following packages before installing Python 3.8:

- openssl-devel
- bzip2-devel
- libffi-devel
- zlib-devel

```
yum install gcc openssl-devel bzip2-devel libffi-devel zlib-devel -y
```

Note: You cannot install the openssl-devel package on a FIPS cluster.

Procedure

1. SSH into the host system as a root user.
2. Download Python 3.8 and decompress the package by running the following commands:

   ```
   cd /opt
   curl -O https://www.python.org/ftp/python/3.8.12/Python-3.8.12.tgz
   ```

   ```
   tar -zxvf Python-3.8.12.tgz
   ```
3. Change directory to where you decompressed the Python 3.8 package:

   ```
   cd /opt/Python-3.8.12
   ```

4. Install Python 3.8 as follows:

   ```
   ./configure --enable-shared --prefix=[***CUSTOM-INSTALL-PATH***]
   ```

   Attention: By default, Python could be installed in any one of the following locations:

   - /usr/bin
   - /usr/local/python38/bin
   - /usr/local/bin
   - /opt/rh/rh-python38/root/usr/bin

   If you are installing Python 3.8 in any other location, then you must specify the path using the --prefix option. You must also create a symbolic link pointing to /usr/bin or to /usr/local/bin by running the following command:

   ```
   ln -s [***SOURCE***] [***DESTINATION***]
   ```

   For example:

   ```
   ln -s [***CUSTOM-PYTON-PATH***]/python3.8 /usr/bin/python3.8
   ```

   The --enabled-shared option is used to build a shared library instead of a static library.

5. Build Python 3.8 as follows:

   a) Run the make command to compile the files:

   ```
   make
   ```

   b) Run the following command to put the compiled files in the default location or in the custom location that you specified using the --prefix option:

   ```
   make install
   ```

   c) Copy the shared compiled library files (libpython3.8.so) to the /lib64/ directory:

   ```
   cp --no-clobber ./libpython3.8.so* /lib64/
   ```

   The --no-clobber option is used to prevent overwriting files.

   d) Change the permissions of the libpython3.8.so files as follows:

   ```
   chmod 755 /lib64/libpython3.8.so*
   ```

   If you see an error such as “error while loading shared libraries: libpython3.8.so.1.0: cannot open shared object file: No such file or directory”, then run the following command:

   ```
   export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib/
   ```

6. Change the permission of the Python 3.8 installation directory to 755 so that Hue and its related services can leverage the binary and the site packages, as follows:

   ```
   chmod -R 755 /usr/local/lib/python3.8
   ```

What to do next

(For Hue) If you have installed Python 3.8 at a custom location, then you must append the custom path in Cloudera Manager Clusters Hue Configuration Hue Service Environment Advanced Configuration Snippet (Safety Valve) separated by colon (:) as follows after and restart the Hue service:

Key: PATH

Value: [***CUSTOM-INSTALL-PATH***]:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin

Installing Python 3.8 on RHEL 8 for Hue

You must install Python 3.8 on all hosts after installing Cloudera Manager and before adding the services to your cluster.

Before you begin

Install the necessary developer tools such as gcc and make on your system.

Install the following packages before installing Python 3.8:

- openssl-devel
- bzip2-devel
- libffi-devel
- zlib-devel

```
yum install gcc openssl-devel bzip2-devel libffi-devel zlib-devel -y
```

Note: You cannot install the openssl-devel package on a FIPS cluster.

You must also install the following Python 3.8 packages and libraries:

- python38-devel
- python38-libs
- python38-setuptools
- python38-pip
- python38-pip-wheel

Note: Python 3.8 is distributed with Red Hat Enterprise Linux version 8.

Procedure

1. SSH into the host system as a root user.
2. Download Python 3.8 and decompress the package by running the following commands:

   ```
   cd /opt
   curl -O https://www.python.org/ftp/python/3.8.12/Python-3.8.12.tgz
   ```

   ```
   tar -zxvf Python-3.8.12.tgz
   ```
3. Change directory to where you decompressed the Python 3.8 package:

   ```
   cd /opt/Python-3.8.12
   ```

4. Install Python 3.8 as follows:

```
./configure --enable-shared --prefix=[***CUSTOM-INSTALL-PATH***]
```

⚠ **Attention:** By default, Python could be installed in any one of the following locations:

- /usr/bin
- /usr/local/python38/bin
- /usr/local/bin
- /opt/rh/rh-python38/root/usr/bin

If you are installing Python 3.8 in any other location, then you must specify the path using the --prefix option. You must also create a symbolic link pointing to /usr/bin or to /usr/local/bin by running the following command:

```
ln -s [***SOURCE***] [***DESTINATION***]
```

For example:

```
ln -s [***CUSTOM-PYTON-PATH***]/python3.8 /usr/bin/python3.8
```

The --enabled-shared option is used to build a shared library instead of a static library.

5. Build Python 3.8 as follows:

a) Run the make command to compile the files:

```
make
```

b) Run the following command to put the compiled files in the default location or in the custom location that you specified using the --prefix option:

```
make install
```

c) Copy the shared compiled library files (libpython3.8.so) to the /lib64/ directory:

```
cp --no-clobber ./libpython3.8.so* /lib64/
```

The --no-clobber option is used to prevent overwriting files.

d) Change the permissions of the libpython3.8.so files as follows:

```
chmod 755 /lib64/libpython3.8.so*
```

If you see an error such as “error while loading shared libraries: libpython3.8.so.1.0: cannot open shared object file: No such file or directory”, then run the following command:

```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib/
```

6. Change the permission of the Python 3.8 installation directory to 755 so that Hue and its related services can leverage the binary and the site packages, as follows:

```
chmod -R 755 /usr/local/lib/python3.8
```

What to do next

(For Hue) If you have installed Python 3.8 at a custom location, then you must append the custom path in Cloudera Manager Clusters Hue Configuration Hue Service Environment Advanced Configuration Snippet (Safety Valve) separated by colon (:) as follows and restart the Hue service:

Key: PATH

Value: [***CUSTOM-INSTALL-PATH***]:/usr/local/sbin:/usr/local/bin:/usr/sbin:

Installing Python 3.8 on SLES 12 for Hue

You must install Python 3.8 on all hosts on which you want to run the Hue service after installing Cloudera Manager and before adding the services to your cluster.

Before you begin

Install the necessary developer tools such as gcc and make on your system.

Install the openssl package, and place its binaries in the /lib/ directory. This is needed for installing the MySQL client on MySQL and MariaDB databases.

1. Download the openssl package on the host on which you want to install the Python 3.8 package and decompress the file:

   ```
   cd /opt wget https://www.openssl.org/source/openssl-1.0.2o.tar.gz
   ```

   ```
   tar -xzf openssl-1.0.2o.tar.gz
   ```
2. Change directory to openssl-1.0.2o:

   ```
   cd cd openssl-1.0.2o
   ```
3. Run the following commands to build and compile the files:

   ```
   ./config --shared
   make
   make install
   ```
4. Copy the following files to the /lib/ directory:

   ```
   cp libcrypto.so /lib/
   cp libssl.so /lib/
   cp libcrypto.a /lib/
   cp libssl.a /lib/
   cp libcrypto.pc /lib/
   cp libssl.pc /lib/
   cp openssl.pc /lib/
   ```
5. Delete the openssl-1.0.2o.tar.gz file that you had downloaded:

   ```
   rm ./openssl-1.0.2o.tar.gz
   ```
6. Configure openssl as follows:

   ```
   custom_openssl = " --with-openssl=/opt/openssl-1.0.2o"
   ./configure --enable-shared[***CUSTOM-OPENSSL***]
   ```

Install the following packages before installing Python 3.8:

- libffi-devel-gcc5
- libbz2-devel
- libzip2
- libffi-devel
- libz1
- zlib-devel

```
zypper install -y libffi-devel-gcc5 libbz2-devel libzip2 libffi-devel libz1
zlib-devel
```

Procedure

1. SSH into the host system as a root user.
2. Download Python 3.8 and decompress the package by running the following commands:

   ```
   cd /opt
   curl -O https://www.python.org/ftp/python/3.8.12/Python-3.8.12.tgz
   ```

   ```
   tar -zxvf Python-3.8.12.tgz
   ```

3. Change directory to where you decompressed the Python 3.8 package:

   ```
   cd /opt/Python-3.8.12
   ```

4. Install Python 3.8 as follows:

   ```
   ./configure --enable-shared --prefix=[***CUSTOM-INSTALL-PATH***]
   ```

   Attention: By default, Python could be installed in any one of the following locations:

   - /usr/bin
   - /usr/local/python38/bin
   - /usr/local/bin
   - /opt/rh/rh-python38/root/usr/bin

   If you are installing Python 3.8 in any other location, then you must specify the path using the --prefix option. You must also create a symbolic link pointing to /usr/bin or to /usr/local/bin by running the following command:

   ```
   ln -s [***SOURCE***] [***DESTINATION***]
   ```

   For example:

   ```
   ln -s [***CUSTOM-PYTON-PATH***]/python3.8 /usr/bin/python3.8
   ```

   The --enabled-shared option is used to build a shared library instead of a static library.

5. Build Python 3.8 as follows:
   a) Run the make command to compile the files:

   ```
   make
   ```

   b) Run the following command to put the compiled files in the default location or in the custom location that you specified using the --prefix option:

   ```
   make install
   ```

   c) Copy the shared compiled library files (libpython3.8.so) to the /lib64/ directory:

   ```
   cp --no-clobber ./libpython3.8.so* /lib64/
   ```

   The --no-clobber option is used to prevent overwriting files.

   d) Change the permissions of the libpython3.8.so files as follows:

   ```
   chmod 755 /lib64/libpython3.8.so*
   ```

   If you see an error such as “error while loading shared libraries: libpython3.8.so.1.0: cannot open shared object file: No such file or directory”, then run the following command:

   ```
   export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib/
   ```

6. Change the permission of the Python 3.8 installation directory to 755 so that Hue and its related services can leverage the binary and the site packages, as follows:

   ```
   chmod -R 755 /usr/local/lib/python3.8
   ```

What to do next

- (For Hue) If you have installed Python 3.8 at a custom location, then you must append the custom path in Cloudera Manager Clusters Hue Configuration Hue Service Environment Advanced Configuration Snippet (Safety Valve) separated by colon (:) as follows and restart the Hue service:

  Key: PATH

  Value: [***CUSTOM-INSTALL-PATH***]:/usr/local/sbin:/usr/local/bin:/usr/sbin:
- Clean up the compiled openssl artifacts by running the following commands:

  ```
  rm /lib/libcrypto.so
  rm /lib/libssl.so
  rm /lib/libcrypto.a
  rm /lib/libssl.a
  rm /lib/libcrypto.pc
  rm /lib/libssl.pc
  rm /lib/openssl.pc
  ```

Installing Python 3.8 on Ubuntu 18 for Hue

You must install Python 3.8 on all hosts on which you want to run the Hue service after installing Cloudera Manager and before adding the services to your cluster.

Before you begin

Install the necessary developer tools such as gcc and make on your system.

Install the following packages before installing Python 3.8:

- build-essential
- zlib1g-dev

- libssl-dev
- libffi-dev
- libbz2-dev

```
sudo apt install -y build-essential zlib1g-dev libssl-dev libffi-dev libbz2-dev
```

Procedure

1. SSH into the host system as a root user.
2. Download Python 3.8 and decompress the package by running the following commands:

   ```
   cd /opt
   curl -O https://www.python.org/ftp/python/3.8.12/Python-3.8.12.tgz
   ```

   ```
   tar -zxvf Python-3.8.12.tgz
   ```
3. Change directory to where you decompressed the Python 3.8 package:

   ```
   cd /opt/Python-3.8.12
   ```
4. Install Python 3.8 as follows:

   ```
   ./configure --enable-shared --prefix=[***CUSTOM-INSTALL-PATH***]
   ```

   Attention: By default, Python could be installed in any one of the following locations:

   - /usr/bin
   - /usr/local/python38/bin
   - /usr/local/bin
   - /opt/rh/rh-python38/root/usr/bin

   If you are installing Python 3.8 in any other location, then you must specify the path using the --prefix option. You must also create a symbolic link pointing to /usr/bin or to /usr/local/bin by running the following command:

   ```
   ln -s [***SOURCE***] [***DESTINATION***]
   ```

   For example:

   ```
   ln -s [***CUSTOM-PYTON-PATH***]/python3.8 /usr/bin/python3.8
   ```

   The --enabled-shared option is used to build a shared library instead of a static library.

5. Build Python 3.8 as follows:
   a) Run the make command to compile the files:

      ```
      make
      ```

   b) Run the following command to put the compiled files in the default location or in the custom location that you specified using the --prefix option:

      ```
      make install
      ```

   c) Copy the shared compiled library files (libpython3.8.so) to the /lib64/ directory:

      ```
      cp --no-clobber ./libpython3.8.so* /lib64/
      ```

      The --no-clobber option is used to prevent overwriting files.
   d) Change the permissions of the libpython3.8.so files as follows:

      ```
      chmod 755 /lib64/libpython3.8.so*
      ```

   If you see an error such as "error while loading shared libraries: libpython3.8.so.1.0: cannot open shared object file: No such file or directory", then run the following command:

   ```
   export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib/
   ```

6. Change the permission of the Python 3.8 installation directory to 755 so that Hue and its related services can leverage the binary and the site packages, as follows:

   ```
   chmod -R 755 /usr/local/lib/python3.8
   ```

What to do next

(For Hue) If you have installed Python 3.8 at a custom location, then you must append the custom path in Cloudera Manager Clusters Hue Configuration Hue Service Environment Advanced Configuration Snippet (Safety Valve) separated by colon (:) as follows and restart the Hue service:

Key: PATH

Value: [***CUSTOM-INSTALL-PATH***]:/usr/local/sbin:/usr/local/bin:/usr/sbin:

Installing the psycopg2 Python package for PostgreSQL database

If you are using PostgreSQL as a backend database for Hue on 7.x.x, then you must install a version of the psycopg2 package to be at least 2.9.5 on all Hue hosts. The psycopg2 package is automatically installed as a dependency of Agent, but the version installed is often lower than 2.9.3.

Before you begin, you must disable the postgresql10 section from the cloudera-manager.repo file as follows:

1. SSH in to the host as an Administrator.
2. Change to the directory where you had downloaded the cloudera-manager.repo file. On RHEL, the file is present under the /etc/yum.repos.d directory.
3. Open the file for editing and update the value of the enabled property to 0 as follows:

   ```
   [postgresql10]
   name=Postgresql 10
   baseurl=https://archive.cloudera.com/postgresql10/redhat8/
   gpgkey=https://archive.cloudera.com/postgresql10/redhat8/RPM-GPG-KEY-PG
   DG-10
   enabled=0
   gpgcheck=1
   module_hotfixes=true
   ```

4. Save the file and exit.

Note: The steps to disable the postgresql10 section are applicable to all supported operating systems (CentOS, RHEL, SLES, and Ubuntu).

For CentOS RHEL OEL 7 8

The following steps apply to CentOS 7, RHEL 7, OEL 7, CentOS 8, RHEL 8, and OEL 8:

1. SSH into the Hue server host as a root user.
2. Install the psycopg2-binary package as follows:

   ```
   pip3.8 install psycopg2-binary
   ```
3. Repeat these steps on all the Hue server hosts.

If you get the "Error: pg_config executable not found" error while installing the psycopg2-binary package, then run the following commands to install the postgresql, postgresql-devel, python-devel packages:

```
yum install postgresql postgresql-devel python-devel
```

For RHEL 9

The following steps apply to RHEL 9, as the minimum version of Python is 3.9:

1. SSH into the Hue server host as a root user.
2. Install pip for Python as follows:

   ```
   yum install python3-pip -y
   ```
3. Add the /usr/local/bin path to the PATH environment variable:

   ```
   export PATH=$PATH:/usr/local/bin
   echo $PATH
   ```
4. Install the psycopg2-binary package as follows:

   ```
   pip3 install psycopg2-binary
   ```
5. Repeat these steps on all the Hue server hosts.

If you get the "Error: pg_config executable not found" error while installing the psycopg2-binary package, then run the following commands to install the postgresql, postgresql-devel, python-devel packages:

```
yum install postgresql postgresql-devel python-devel
```

For SLES

The following steps apply to SLES 12 (upgrades to Cloudera Runtime 7.1.8) and SLES 15 SP4 (upgrades to Cloudera Runtime 7.1.9 or higher):

1. SSH into the Hue host as a root user.
2. Install the psycopg2 package dependencies by running the following commands:

   ```
   zypper install xmlsec1
   zypper install xmlsec1-devel
   zypper install xmlsec1-openssl-devel
   ```
3. Install the postgresql-devel package corresponding to your database version by running the following command:

   ```
   zypper -n postgresql[***DB-VERSION***]-devel
   ```

4. Add the location of the installed postgresql-devel package to the PATH environment variable by running the following command:

   ```
   export PATH=$PATH:/usr/local/bin
   ```

5. Install the psycopg2 package by running the following command:

   ```
   pip3.8 install psycopg2==2.9.3 --ignore-installed
   ```

For Ubuntu

The following steps apply to Ubuntu 18 (upgrades to Cloudera Runtime 7.1.8) and Ubuntu 20 (upgrades to Cloudera Runtime 7.1.9 or higher):

1. SSH into the Hue host as a root user.
2. Install the psycopg2 package dependencies by running the following commands:

   ```
   apt-get install -y xmlsec1
   apt-get install libxmlsec1-openssl
   apt-get install libpq-dev python3-pip -y
   ```

3. Install the python3-dev and libpq-dev packages by running the following command:

   ```
   apt install python3-dev libpq-dev
   ```

4. Add the location of the installed postgresql-devel package to the PATH environment variable by running the following command:

   ```
   export PATH=$PATH:/usr/local/bin
   ```

5. Install the psycopg2 package by running the following command:

   ```
   pip3.8 install psycopg2==2.9.3 --ignore-installed
   ```

Installing MySQL client for MySQL databases

To use MySQL as a backend database for Hue, you must install the MySQL client and other required dependencies on all the Hue hosts based on your operating system.

Attention: The version 2.2.0 of the MySQL client requires that you set the values of the MYSQLCLIENT_CFLAGS and MYSQLCLIENT_LDFLAGS environment variables, as follows:

```
$ export MYSQLCLIENT_CFLAGS=`pkg-config mysqlclient --cflags`
$ export MYSQLCLIENT_LDFLAGS=`pkg-config mysqlclient --libs`
```

The version 2.2.0 of the MySQL client also requires you to install the Python 3 and MySQL development headers and libraries, as follows on Debian or Ubuntu operating systems:

```
sudo apt-get install python3-dev default-libmysqlclient-dev build-essential
```

or as follows on CentOS and RHEL operating systems:

```
sudo yum install python3-devel mysql-devel
```

Alternatively, you can install and use the version 2.1.1 of the MySQL client, as follows, which does not have this requirement:

```
pip3 install mysqlclient=2.1.1
```

For Cent OS

1. SSH into the Hue host as a root user.
2. Download the MySQL yum repository as follows:

   ```
   curl -sSLO https://dev.mysql.com/get/mysql80-community-release-el7-5.noa
   rch.rpm
   ```

3. Install the package as follows:

   ```
   rpm -ivh mysql80-community-release-el7-5.noarch.rpm
   ```

4. Install the required dependencies as follows:

   ```
   yum install mysql-devel
   yum install -y xmlsec1  xmlsec1-openssl
   ```

   For MySQL version 8.0.27, add the mysql-community-client-8.0.25 client package as follows:

   ```
   yum install mysql-community-client-8.0.25
   ```

5. Add the path where you installed the MySQL client and packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```

6. Install the MySQL client as follows:

   ```
   pip3.8 install mysqlclient
   ```

For RHEL

1. SSH into the Hue host as a root user.
2. Download the MySQL yum repository as follows:

   (RHEL 7)

   ```
   curl -sSLO https://dev.mysql.com/get/mysql80-community-release-el7-5.noa
   rch.rpm
   ```

   (RHEL 8)

   ```
   curl -sSLO https://dev.mysql.com/get/mysql80-community-release-el8-8.noa
   rch.rpm
   ```

   (RHEL 9)

   ```
   curl -sSLO https://dev.mysql.com/get/mysql80-community-release-el9-4.noa
   rch.rpm
   ```

3. Install the package as follows:

   (RHEL 7)

   ```
   rpm -ivh mysql80-community-release-el7-5.noarch.rpm
   ```

   (RHEL 8)

   ```
   rpm -ivh mysql80-community-release-el8-8.noarch.rpm
   ```

   (RHEL 9)

   ```
   rpm -ivh mysql80-community-release-el9-4.noarch.rpm
   ```
4. Install the required dependencies as follows:

   ```
   yum install mysql-devel
   yum install -y xmlsec1  xmlsec1-openssl
   ```
5. Add the path where you installed the MySQL client and packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```
6. Install the MySQL client as follows:

   (RHEL 8)

   ```
   pip3.8 install mysqlclient
   ```

   (RHEL 9)

   ```
   pip3.9 install mysqlclient
   ```

For SLES

1. SSH into the Hue host as a root user.
2. Install the required packages and dependencies as follows:

   ```
   zypper install libmysqlclient-devel
   zypper install xmlsec1
   zypper install xmlsec1-devel
   zypper install xmlsec1-openssl-devel
   ```
3. Add the path where you installed the packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```
4. Install the MySQL client as follows:

   ```
   pip3.8 install mysqlclient
   ```

For Ubuntu

1. SSH into the Hue host as a root user.
2. Install the required packages and dependencies as follows:

   ```
   apt-get install libmysqlclient-dev
   apt-get install -y xmlsec1
   apt-get install libxmlsec1-openssl
   ```

3. Add the path where you installed the packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```

4. Install the MySQL client as follows:

   ```
   pip3.8 install mysqlclient
   ```

Installing MySQL client for MariaDB databases

To use MariaDB as a backend database for Hue, you must install the MySQL client and other required dependencies on all the Hue hosts based on your operating system.

For Cent OS

1. SSH into the Hue host as a root user.
2. Install the required dependencies as follows:

   ```
   yum install -y xmlsec1  xmlsec1-openssl
   ```

3. Add the path where you installed the packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```

4. Install the MySQL client as follows:

   ```
   pip3.8 install mysqlclient
   ```

For RHEL

1. SSH into the Hue host as a root user.
2. Install the required dependencies as follows:

   ```
   yum install mysql-devel
   yum install -y xmlsec1  xmlsec1-openssl
   ```

3. Add the path where you installed the packages to the PATH environment variable as follows:

   ```
   export PATH=/usr/local/bin:$PATH
   ```

4. Install the MySQL client as follows:

   (RHEL 8)

   ```
   pip3.8 install mysqlclient
   ```

   (RHEL 9)

   ```
   pip3.9 install mysqlclient
   ```

For SLES

1. SSH into the Hue host as a root user.
2. Install the required packages and dependencies as follows:

   ```
   zypper install libmysqlclient-devel
   zypper install xmlsec1
   zypper install xmlsec1-devel
   zypper install xmlsec1-openssl-devel
   ```

3. Add the path where you installed the packages to the PATH environment variable as follows:

```
export PATH=/usr/local/bin:$PATH
```

4. Install the MySQL client as follows:

```
pip3.8 install mysqlclient
```

For Ubuntu

1. SSH into the Hue host as a root user.
2. Install the required packages and dependencies as follows:

```
apt-get install libmysqlclient-dev
apt-get install -y xmlsec1
apt-get install libxmlsec1-openssl
```

3. Add the path where you installed the packages to the PATH environment variable as follows:

```
export PATH=/usr/local/bin:$PATH
```

4. Install the MySQL client as follows:

```
pip3.8 install mysqlclient
```

Ozone

To start Ozone service after migrating to the CDP Private Cloud Base cluster with ranger plugin enabled. Perform the following steps:

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the Ozone service
4. Select Configurations tab
5. Search for Ozone Manager Environment Advanced Configuration Snippet (Safety Valve)
6. Add Key - PARCEL_DIRNAMES and Value - CDH

Oozie

Perform the following post migration tasks by validating the database URL, installing the new shared libraries, accessing Oozie Loadbalancer URL, and configuring load balancer.

Validate Database URL

Validate the database URL.

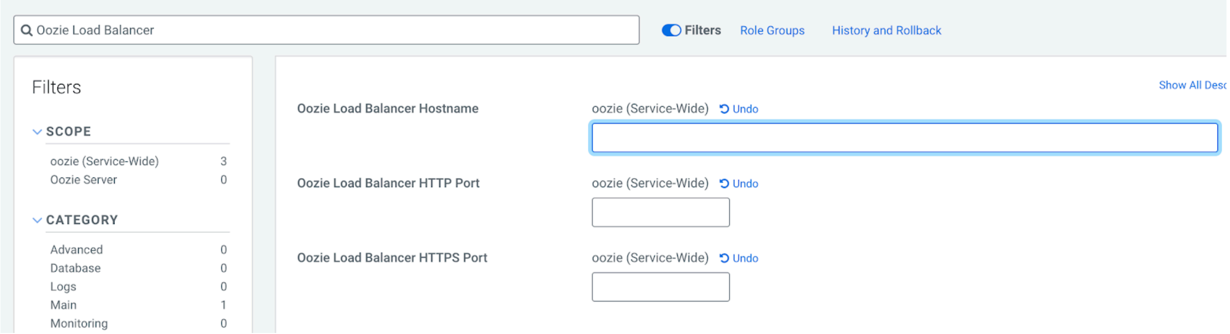
Before you begin

Validate the configured Oozie JDBC URL. Before starting the Oozie service, check the value.

Procedure

1. Verify JDBC Database settings in Oozie service.

2. Configure Oozie Load Balancer Hostname, Oozie Load Balancer HTTP Port and Oozie Load Balancer HTTPS Port if OOZIE HA is enabled.



Oozie Load Balancer Hostname — oozie (Service-Wide)

Oozie Load Balancer HTTP Port — oozie (Service-Wide)

Oozie Load Balancer HTTPS Port — oozie (Service-Wide)

3. In Oozie service configurations under Oozie Server Advanced Configuration Snippet (Safety Valve) for oozie-site.xml add oozie.service.AuthorizationService.admin.users configuration with value of oozie, oozie-admin.

Note: Replace Oozie with the service account username if it is different from default one.

Installing the new Shared Libraries

Install new Shared Libraries

About this task

Follow the steps:

Procedure

1. Start Oozie services.
2. Set ShareLib Root Directory=/user/<oozie user> in Oozie configs
3. From Cloudera Manager, navigate to Cloudera Manager > Oozie > Install Oozie Shared Lib

Note: Tez libraries are removed from Oozie ShareLib. If you are using Tez on Oozie, then you must manually copy the Tez jar files and execute a ShareLib update.

Update Oozie properties

You must manually check and update the properties for Oozie in Cloudera Manager if the same properties had custom values in Ambari. Similarly, check the admin user's configuration.

Manually update the following properties:

- Oozie Server Plugins
- Oozie SchemaService Workflow Extension Schemas
- Oozie ActionService Executor Extension Classes
- Oozie Credential Classes

Adding Oozie service dependencies

After migrating from HDP to CDP you must enable certain inter-cluster dependencies for Oozie or some of the features will not work. For a reference why Oozie needs these services, please always refer to the Cloudera runtime documentation.

Atlas (available from 7.1.8)

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the Oozie service
4. Select Configurations tab

5. Search for atlas_service configuration
6. Select the checkbox
7. Restart the Oozie service

Spark on YARN

Ensure that the Spark Gateway role is added to the hosts containing Oozie.

1. Log in to Cloudera Manager
2. Navigate to Clusters
3. Select the Oozie service
4. Select Configurations tab
5. Search for spark_on_yarn_service configuration
6. Select the checkbox
7. Restart the Oozie service

Access Oozie load balancer URL

After transitioning your cluster from HDP 3.1.5.x to Cloudera Private Cloud Base, you must access Oozie load balancer using the workaround in Cloudera Private Cloud Base.

Procedure

1. Log in to the load balancer host.
2. In the /etc/httpd/conf/httpd.conf file, change SSLProxyVerify required to SSLProxyVerify off.
3. Stop `httpd "apachectl -k stop"`.
4. Start `httpd "apachectl -k start"`.
   You can now access the Oozie load balancer URL.

Oozie Load Balancer configuration

To enable Oozie High Availability, you must manually configure a Load Balancer.

About this task

Cloudera recommends using the HAProxy Load Balancer. These steps explain how to configure the HAProxy load balancer. However, you can choose to configure a different Load Balancer.

Procedure

1. Install HAProxy on the host where you are setting up and configuring the Oozie load balancer. For more information, see the HAProxy documentation.
2. You must configure the Oozie load balancer for both HTTP and HTTPS ports.

```
This is an example:
global
    log         127.0.0.1 local2
    pidfile     /var/run/haproxy.pid
    maxconn     4000
    user        haproxy
    group       haproxy
    daemon
    stats       socket /tmp/haproxy

defaults
    mode                    http
    log                     global
    option                  httplog
    option                  dontlognull
    option forwardfor       except 127.0.0.0/8
    option                  redispatch
    retries                 3
    timeout http-request    10s
    timeout queue           1m
    timeout connect         10s
    timeout client          10m
    timeout server          10m
    timeout check           10s
    maxconn                 3000

listen admin
        bind *:8000
        stats enable

#----------------------------------------------------------------------
# main frontend which proxys to the backends
#----------------------------------------------------------------------
frontend                        oozie_front
    bind                        *:5000 ssl crt /var/lib/cloudera-scm-agent
/agent-cert/cdep-host_key_cert_chain_decrypted.pem
    default_backend             oozie

#----------------------------------------------------------------------
# round robin balancing between the various backends
#----------------------------------------------------------------------
backend oozie
    balance                     roundrobin
    server  oozie1 my-oozie-host-1:11443/oozie check ssl ca-file /var/lib/
cloudera-scm-agent/agent-cert/cm-auto-global_cacerts.pem
    server  oozie2 my-oozie-host-2:11443/oozie check ssl ca-file /var/lib/
cloudera-scm-agent/agent-cert/cm-auto-global_cacerts.pem
    server  oozie3 my-oozie-host-3:11443/oozie check ssl ca-file /var/lib/
cloudera-scm-agent/agent-cert/cm-auto-global_cacerts.pem

#----------------------------------------------------------------------
# main frontend which proxys to the http backends
#----------------------------------------------------------------------
frontend                        oozie_front_http
    bind                        *:5002
    default_backend             oozie_http

#----------------------------------------------------------------------
# round robin balancing between the various http backends
#----------------------------------------------------------------------
backend oozie_http
    balance                     roundrobin
    server  oozie_http1 my-oozie-host-1:11000/oozie check
    server  oozie_http2 my-oozie-host-2:11000/oozie check
    server  oozie_http3 my-oozie-host-3:11000/oozie check
```

Using the example, the load balancer is setup for three Oozie instances. The load balancer listens on port 5002 for HTTP connections and forwards it to Oozie’s port 11000. The load balancer listens on port 5000 for HTTPS connections and forwards it to Oozie’s port 11443.

If you not enabled SSL in Oozie, then you do not need the HTTPS load balancer. For HTTPS load balancing, ensure that you set up the certificate.

3. Continue to configure the load balancer by enabling Oozie High Availability. For information about enabling Oozie High Availability, see Enabling Oozie High Availability .

Atlas advanced configuration snippet (Safety valve)

If non-default user names are used, then you must set this parameter. This section is not applicable if you are upgrading to CDP Private Cloud Base 7.1.7.

Note: This setting is needed only for non default zookeeper user.

1. Log into Cloudera Manager UI.
2. Navigate to Clusters
3. Select the Atlas service
4. Go to Configurations
5. Search for Atlas Server Environment Advanced Configuration Snippet
6. Rename ATLAS_OPTS to ATLAS_CUSTOM_OPTS

Migrating Atlas data

After Atlas is available on the Cloudera Private Cloud Base cluster, you must import the Atlas data that the Atlas migration exporter utility exported from the HDP 3.1.5.x cluster.

Before you begin

Use these properties to improve the speed of Atlas data import:

For a node with 4 cores and 8 GB of heap space, the estimated duration for import is 0.75 million entities per hour.

1. Navigate to Atlas Configs Advanced Custom application-properties :
2. Configure atlas.migration.mode.batch.size: Recommended value is 300.
3. Configure atlas.migration.mode.workers: The recommended value is 3 when using one Atlas Solr shard.

   The value to be set depends on the following calculation:

   if ATLAS_SOLR_SHARDS > 1,

   atlas.patch.numWorkers=ATLAS_SOLR_SHARDS * 3

Additional patches are applied after the migration is completed. These properties help with improving the speed of patches.

Procedure

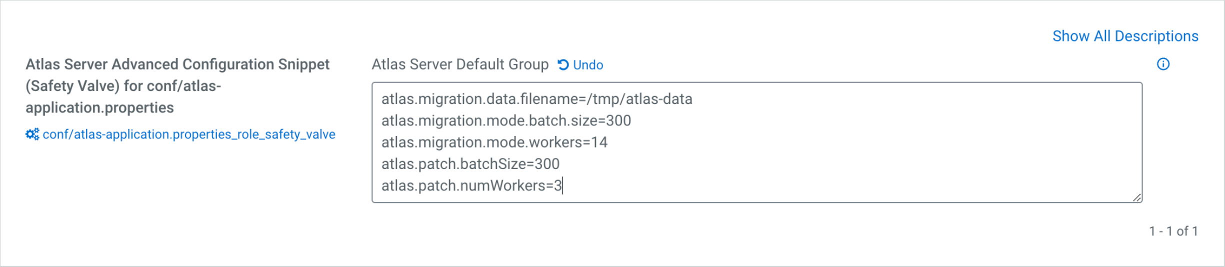
1. Configure Atlas in Cloudera Private Cloud Base with the location of the exported data.
2. Configure atlas.migration.data.filename property.
3. In Cloudera Manager, navigate to Clusters and select Atlas.
4. From Atlas configuration, set the Advanced Configuration Snippet (Safety Valve) for conf/atlas-application.properties value to the location which contains exported Atlas data.

5. Set additional properties:

   - atlas.migration.mode.batch.size=300.
   - atlas.migration.mode.workers=<use the value from calculation above>
   - atlas.patch.batchSize=300
   - atlas.patch.numWorkers=<use the value from calculation above>

   For example:

   - atlas.migration.data.filename=/var/lib/atlas-data
   - atlas.migration.mode.batch.size=300.
   - atlas.migration.mode.workers=3
   - atlas.patch.batchSize=300
   - atlas.patch.numWorkers=3



Show All Descriptions

Atlas Server Advanced Configuration Snippet (Safety Valve) for conf/atlas-application.properties

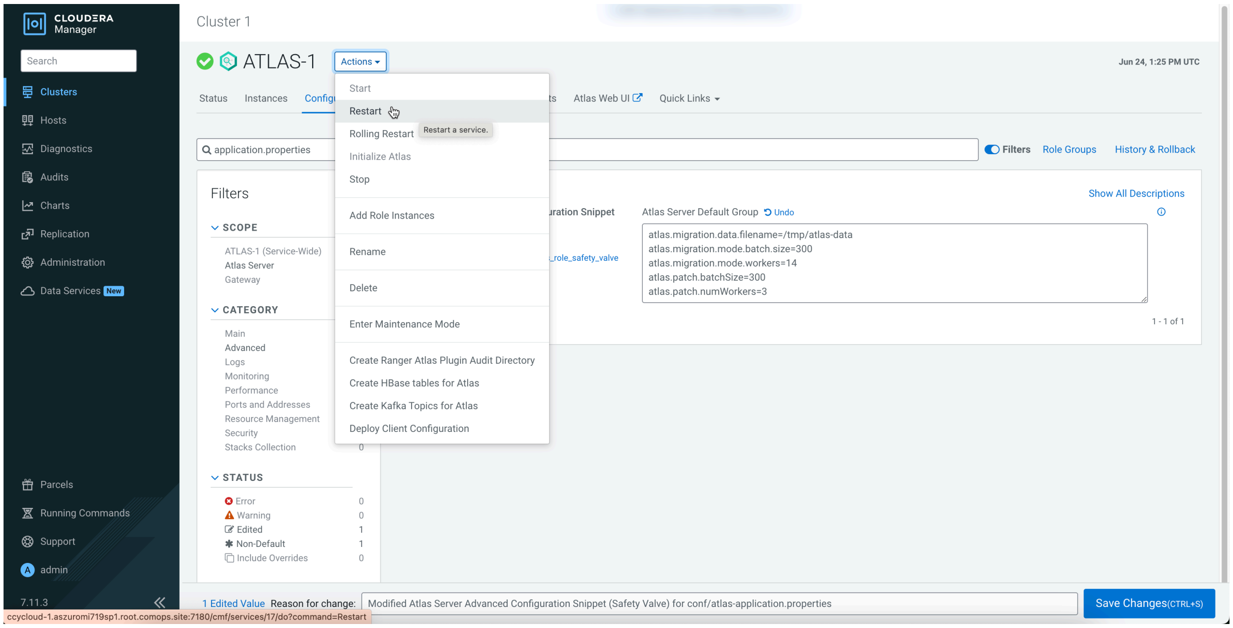
conf/atlas-application.properties_role_safety_valve

Atlas Server Default Group Undo

```
atlas.migration.data.filename=/tmp/atlas-data
atlas.migration.mode.batch.size=300
atlas.migration.mode.workers=14
atlas.patch.batchSize=300
atlas.patch.numWorkers=3
```

1 - 1 of 1

6. Save the configuration.
7. Restart Atlas from Cloudera Manager. Go to Atlas Actions Restart .



```
atlas.migration.data.filename=/tmp/atlas-data
atlas.migration.mode.batch.size=300
atlas.migration.mode.workers=14
atlas.patch.batchSize=300
atlas.patch.numWorkers=3
```

Reason for change: Modified Atlas Server Advanced Configuration Snippet (Safety Valve) for conf/atlas-application.properties

8. Atlas starts in the migration mode and data import should commence. During the migration process, Atlas blocks all the REST API calls and Atlas Hook notification processing.
9. To check the migration status

```
http://[atlas_server]:21000/api/atlas/admin/status
The migration status is displayed in the browser window:
{"Status":"Migration","currentIndex":139,"percent":67,"
startTimeUTC":"2018-04-06T00:54:53.399Z"}
```

10. The progress of import can be monitored using Atlas logs on the node where the migration is running. On the completion of migration, the log should have this entry: Done! loadLegacyGraphSON. (GraphDBGraphSONMigrator:76)
11. After the migration is complete, change the status of Atlas from migration mode to normal operation by removing the atlas.migration.data.filename property and restarting Atlas in Cloudera Manager.

> **Note:**
>
> **a.** After Atlas is up and running, it continues processing messages from the integrated services. Explicitly importing data through import scripts is not required.
>
> **b.** As part of this migration, the value of atlas.cluster.name is mapped to the new property atlas.metadata.namespace. This value is used within Atlas for generating unique names of entities.
>
> **c.** You must restart Atlas and then remove the property atlas.migration.mode.hdp.to.cdp=true from the Atlas Server Advanced Configuration Snippet (Safety Valve) for conf/atlas-application.properties after the solr collections are migrated to the CDP cluster.

Phoenix

Add the Apache Phoenix service. If you are using Phoenix Query Server (PQS) in your source HDP deployment, you must manually add the Apache Phoenix service using Cloudera Manager to complete the Phoenix upgrade.

About this task

You must add the Apache Phoenix service using Cloudera Manager. To add the Apache Phoenix service:

Procedure

1. In Cloudera Manager, click Home CLOUDERA Manager.
2. Click ⋮ to the right of the cluster name and select Add Service. A list of service types display. Select Phoenix from the list and click Continue. Follow the wizard to add the Phoenix service.

Map Phoenix schemas to HBase namespaces

HBase namespaces enable tighter control of where a particular data set is stored on the HBase RegionServers. If you have mapped Phoenix schemas to HBase namespaces in your source HDP cluster, you must enable namespace mapping by configuring a set of properties using Cloudera Manager.

You can check if you have enabled namespace mapping in source HDP deployment Ambari’s HBase service. Check the following HBase configurations in your source HDP deployment to see if you have mapped Phoenix schemas to HBase namespaces.

HBase Config	Value
phoenix.schema.isNamespaceMappingEnabled	true
phoenix.schema.mapSystemTablesToNamespace	true

If you have enabled namespace mapping in HDP, and want to use in CDP, you must enable namespace mapping in CDP using Cloudera Manager. For more information, see *Enable namespace mapping* using the link in the related information section.

Related Information

Enable namespace mapping

Starting all services

You must now start all the services.

Start all the services and ensure that all the services of Cloudera Private Cloud Base are up and running.

Knox

The following post migration steps are optional.

About this task

After migrating to CDP Private Cloud Base, you can use the cdp-proxy (UIs) and cdp-proxy-api (APIs) topologies to access services through Knox. To use advanced gateway, some of the following post-migration steps are required.

Note: In CDP Private Cloud Base, SSO is provided to the platform through the proxying of UIs via cdp-proxy topology.

Topology migration

Migrate the custom HDP topologies to the CDP cluster.

Before you begin

There are existing Knox topologies in the CDP cluster available. If you have any custom topologies on the HDP cluster and you want to migrate to the CDP cluster, then perform the following steps:

Procedure

1. Add a provider configuration with the details from the providers section of the topology (or provider configuration) to be migrated. If the provider configuration contains any credential aliases, then you must add them. For more information on adding a provider configuration, see Add a provider configuration and for aliases, see Saving Aliases
2. Add a descriptor with the services and corresponding parameters from the topology (or descriptor) to be migrated, referencing the newly added provider configuration. For more information on adding a descriptor, see Add a descriptor

Migrate Credential Aliases

Migrate the HDP credential aliases to the CDP cluster.

Before you begin

If you want to migrate Credential Aliases, then see Saving Aliases

Migrate signing key

Migrate Knox’s signing key to the CDP cluster.

Before you begin

To add Knox signing key, you must add the credential aliases and configure the gateway properties.

Procedure

1. If you want to migrate the signing key then the following credential aliases must be added with the corresponding values from the HDP signing key store:
   - gateway.signing.keystore.password.alias - The password for the signing keystore.
   - gateway.signing.key.passphrase.alias - The passphrase to sign the private key stored in the signing keystore.
2. In addition, the following gateway properties must be configured with the Cloudera Manager UI:
   - gateway.signing.keystore.name
   - gateway.signing.key.alias
   - gateway.signing.keystore.type
   - gateway.signing.keystore.password.alias
   - gateway.signing.key.passphrase.alias

Configure Apache Knox authentication for AD/LDAP

Knox authentication configurations for LDAP and AD in Cloudera Manager.

About this task

For more information on configuring Knox LDAP in Cloudera Manager, see Configuring Knox LDAP

Client Configurations

Migrating from Ambari to Cloudera Manager can leave the Ambari-managed HDP artifacts and links that may not have changed. After everything has been configured, deploy Client Configuration [Cloudera Manager > Clusters > Actions > Deploy Client Configurations]. This fixes any missing configuration references in the cluster.

Securing ZooKeeper

By default, the AM2CM tool adds the -Dzookeeper.skipACL=yes configuration to assist with the migration. You must remove the -Dzookeeper.skipACL=yes configuration under Java Configuration Options for Zookeeper Service to secure ZooKeeper and restart the service.

Zeppelin Shiro configurations

If you had Zeppelin Shiro configurations in the HDP cluster, then you must configure them manually on the CDP Private Cloud Base cluster.

⚠ **Important: Deprecation notice for Zeppelin**: Zeppelin is deprecated in Cloudera Runtime 7.1.9 and 7.2.18. For more information, see the deprecation notices in the corresponding Cloudera Runtime release notes.

About this task

Perform the following steps:

Procedure

1. Log into Cloudera Manager
2. Navigate to Clusters
3. Select Zeppelin service
4. Click to Configuration tab
5. Search for Shiro and add the configurations
6. Click Save Changes

Related Information

Deprecation notice for Zeppelin

Migrating Spark workloads to

Migrating Spark workloads from CDH or HDP to involves learning the Spark semantic changes in your source cluster and the target cluster. You get details about how to handle these changes.

Spark 1.6 to Spark 2.4 Refactoring

Because Spark 1.6 is not supported on , you need to refactor Spark workloads from Spark 1.6 on CDH or HDP to Spark 2.4 on .

This document helps in accelerating the migration process, provides guidance to refactor Spark workloads and lists migration. Use this document when the platform is migrated from CDH or HDP to .

Handling prerequisites

You must perform a number of tasks before refactoring workloads.

About this task

Assuming all workloads are in working condition, you perform this task to meet refactoring prerequistes.

Procedure

1. Identify all the workloads in the cluster (CDH/HDP) which are running on Spark 1.6 - 2.3.
2. Classify the workloads.

   Classification of workloads will help in clean-up of the unwanted workloads, plan resources and efforts for workload migration and post upgrade testing.

   Example workload classifications:

   - Spark Core (scala)
   - Java-based Spark jobs
   - SQL, Datasets, and DataFrame
   - Structured Streaming
   - MLlib ()
   - PySpark (Python on Spark)
   - Batch Jobs
   - Scheduled Jobs
   - Ad-Hoc Jobs
   - Critical/Priority Jobs
   - Huge data Processing Jobs
   - Time taking jobs
   - Resource Consuming Jobs etc.
   - Failed Jobs

Identify configuration changes

3. Check the current Spark jobs configuration.

   - Spark 1.6 - 2.3 workload configurations which have dependencies on job properties like scheduler, old python packages, classpath jars and might not be compatible post migration.
   - In , Capacity Scheduler is the default and recommended scheduler. Follow Fair Scheduler to Capacity Scheduler transition guide to have all the required queues configured in the cluster post upgrade. If any configuration changes are required, modify the code as per the new capacity scheduler configurations.
   - For workload configurations, see the Spark History server UI http://spark_history_server:18088/history/<application_number>/environment/.
4. Identify and capture workloads having data storage locations (local and HDFS) to refactor the workloads post migration.
5. Refer to unsupported Apache Spark features, and plan refactoring accordingly.

Spark 1.6 to Spark 2.4 changes

A description of the change, the type of change, and the required refactoring provide the information you need for migrating from Spark 1.6 to Spark 2.4.

New Spark entry point SparkSession

There is a new Spark API entry point: SparkSession.

Type of change

Syntactic/Spark core

Spark 1.6

Hive Context and SQLContext, such as import SparkContext, HiveContext are supported.

Spark 2.4

SparkSession is now the entry point.

Action Required

Replace the old SQLContext and HiveContext with SparkSession. For example:

```
import org.apache.spark.sql.SparkSession
```

```
     val spark = SparkSession
     .builder()
     .appName("Spark SQL basic example")
     .config("spark.some.config.option", "some-value")
     .getOrCreate()
```

.

Dataframe API registerTempTable deprecated

The Dataframe API registerTempTable has been deprecated in Spark 2.4.

Type of change:

Syntactic/Spark core change

Spark 1.6

registerTempTable is used to create a temporary table on a Spark dataframe. For example, df.registerTempTable('tmpTable").

Spark 2.4

registerTempTable is deprecated.

Action Required

Replace registerTempTable using createOrReplaceTempView. df.createOrReplaceTempView('tmpTable').

union replaces unionAll

The dataset and DataFrame API unionAll has been deprecated and replaced by union.

Type of change: Syntactic/Spark core change

Spark 1.6

unionAll is supported.

Spark 2.4

unionAll is deprecated and replaced by union.

Action Required

Replace unionAll with union. For example:val df3 = df.unionAll(df2) with val df3 = df.union(df2)

Empty schema not supported

Writing a dataframe with an empty or nested empty schema using any file format, such as parquet, orc, json, text, or csv is not allowed.

Type of change: Syntactic/Spark core

Spark 1.6 - 2.3

Writing a dataframe with an empty or nested empty schema using any file format is allowed and will not throw an exception.

Spark 2.4

An exception is thrown when you attempt to write dataframes with empty schema. For example, if there are statements such as df.write.format("parquet").mode("overwrite").save(somePath), the following error occurs: org.apache.spark.sql.AnalysisException: Parquet data source does not support null data type.

Action Required

Make sure that DataFrame is not empty. Check whether DataFrame is empty or not as follows:

```
if (!df.isEmpty) df.write.format("parquet").mode("overwrite").save("somePath
")
```

Referencing a corrupt JSON/CSV record

In Spark 2.4, queries from raw JSON/CSV files are disallowed when the referenced columns only include the internal corrupt record column.

Type of change: Syntactic/Spark core

Spark 1.6

A query can reference a _corrupt_record column in raw JSON/CSV files.

Spark 2.4

An exception is thrown if the query is referencing _corrupt_record column in these files. For example, the following query is not allowed: spark.read.schema(schema).json(file).filter($"_corrupt_record".isNotNull).count()

Action Required

Cache or save the parsed results, and then resend the query.

```
val df = spark.read.schema(schema).json(file).cache()
    df.filter($"_corrupt_record".isNotNull).count()
```

Dataset and DataFrame API explode deprecated

Dataset and DataFrame API explode has been deprecated.

Type of change: Syntactic/Spark SQL change

Spark 1.6

Dataset and DataFrame API explode are supported.

Spark 2.4

Dataset and DataFrame API explode have been deprecated. If explode is used, for example dataframe.explode(), the following warning is thrown:

```
warning: method explode in class Dataset is deprecated: use flatMap() or sel
ect() with functions.explode() instead
```

Action Required

Use functions.explode() or flatMap (import org.apache.spark.sql.functions.explode).

CSV header and schema match

Column names of csv headers must match the schema.

Type of change: Configuration/Spark core changes

Spark 1.6 - 2.3

Column names of headers in CSV files are not checked against the against the schema of CSV data.

Spark 2.4

If columns in the CSV header and the schema have different ordering, the following exception is thrown:java.lang.IllegalArgumentException: CSV file header does not contain the expected fields.

Action Required

Make the schema and header order match or set enforceSchema to false to prevent getting an exception. For example, read a file or directory of files in CSV format into Spark DataFrame as follows: df3 = spark.read.option("delimiter", ";").option("header", True).option("enforeSchema", False).csv(path)

The default "header" option is true and enforceSchema is False.

If enforceSchema is set to true, the specified or inferred schema will be forcibly applied to datasource files, and headers in CSV files are ignored. If enforceSchema is set to false, the schema is validated against all headers in CSV files when the header option is set to true. Field names in the schema and column names in CSV headers are checked by their positions taking into account spark.sql.caseSensitive. Although the default value is true,you should disable the enforceSchema option to prevent incorrect results.

Table properties support

Table properties are taken into consideration while creating the table.

Type of change: Configuration/Spark Core Changes

Spark 1.6 - 2.3

Parquet and ORC Hive tables are converted to Parquet or ORC by default, but table properties are ignored. For example, the compression table property is ignored:

```
CREATE TABLE t(id int) STORED AS PARQUET TBLPROPERTIES (parquet.compression
'NONE')
```

This command generates Snappy Parquet files.

Spark 2.4

Table properties are supported. For example, if no compression is required, set the TBLPROPERTIES as follows: (parquet.compression 'NONE').

This command generates uncompressed Parquet files.

Action Required

Check and set the desired TBLPROPERTIES.

CREATE OR REPLACE VIEW and ALTER VIEW not supported

ALTER VIEW and CREATE OR REPLACE VIEW AS commands are no longer supported.

Type of change: Configuration/Spark Core Changes

Spark 1.6

You can create views as follows:

```
CREATE OR REPLACE [ [ GLOBAL ] TEMPORARY ] VIEW [ IF NOT EXISTS ] view_name
  [ column_list ]
  [ COMMENT view_comment ]
  [ properties ]
  AS query

  ALTER VIEW view_name
  { rename |
  set_properties |
  unset_properties |
  alter_body }
```

Spark 2.4

ALTER VIEW and CREATE OR REPLACE commands above are not supported.

Action Required

Recreate views using the following syntax:

```
CREATE [ [ GLOBAL ] TEMPORARY ] VIEW [ IF NOT EXISTS ] view_name
    [ column_list ]
    [ COMMENT view_comment ]
    [ properties ]
    AS query
```

Managed table location

Creating a managed table with nonempty location is not allowed.

Type of change: Property/Spark core changes

Spark 1.6 - 2.3

You can create a managed table having a nonempty location.

Spark 2.4

Creating a managed table with nonempty location is not allowed. In Spark 2.4, an error occurs when there is a write operation, such as df.write.mode(SaveMode.Overwrite).saveAsTable("testdb.testtable"). The error side-effects are the cluster is terminated while the write is in progress, a temporary network issue occurs, or the job is interrupted.

Action Required

Set spark.sql.legacy.allowCreatingManagedTableUsingNonemptyLocation to true at runtime as follows:

```
spark.conf.set("spark.sql.legacy.allowCreatingManagedTableUsingNonemptyLocat
ion","true")
```

Write to Hive bucketed tables

Type of change: Property/Spark SQL changes

Spark 1.6

By default, you can write to Hive bucketed tables.

Spark 2.4

By default, you cannot write to Hive bucketed tables.

For example, the following code snippet writes the data into a bucketed Hive table:

```
newPartitionsDF.write.mode(SaveMode.Append).format("hive").insertInto(hive_t
est_db.test_bucketing)
```

The code above will throw the following error:

```
org.apache.spark.sql.AnalysisException: Output Hive table `hive_test_db`.`te
st_bucketing` is bucketed but Spark currently does NOT populate bucketed out
put which is compatible with Hive.
```

Action Required

To write to a Hive bucketed table, you must use hive.enforce.bucketing=false and hive.enforce.sorting=false to forego bucketing guarantees.

Rounding in arithmetic operations

Arithmetic operations between decimals return a rounded value, instead of NULL, if an exact representation is not possible.

Type of change: Property/Spark SQL changes

Spark 1.6

Arithmetic operations between decimals return a NULL value if an exact representation is not possible.

Spark 2.4

The following changes have been made:

- Updated rules determine the result precision and scale according to the SQL ANSI 2011.
- Rounding of the results occur when the result cannot be exactly represented with the specified precision and scale instead of returning NULL.

- A new config spark.sql.decimalOperations.allowPrecisionLoss which default to true (the new behavior) to allow users to switch back to the old behavior. For example, if your code includes import statements that resemble those below, plus arithmetic operations, such as multiplication and addition, operations are performed using dataframes.

```
from pyspark.sql.types import DecimalType
from decimal import Decimal
```

Action Required

If precision and scale are important, and your code can accept a NULL value (if exact representation is not possible due to overflow), then set the following property to false. spark.sql.decimalOperations.allowPrecisionLoss = false

Precedence of set operations

Set operations are executed by priority instead having equal precedence.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2.3

If the order is not specified by parentheses, equal precedence is given to all set operations.

Spark 2.4

If the order is not specified by parentheses, set operations are performed from left to right with the exception that all INTERSECT operations are performed before any UNION, EXCEPT or MINUS operations.

For example, if your code includes set operations, such as INTERSECT , UNION, EXCEPT or MINUS, consider refactoring.

Action Required

Change the logic according to following rule:

If the order of set operations is not specified by parentheses, set operations are performed from left to right with the exception that all INTERSECT operations are performed before any UNION, EXCEPT or MINUS operations.

If you want the previous behavior of equal precedence then, set spark.sql.legacy.setopsPrecedence.enabled=true.

HAVING without GROUP BY

HAVING without GROUP BY is treated as a global aggregate.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2,3

HAVING without GROUP BY is treated as WHERE. For example, SELECT 1 FROM range(10) HAVING true is executed as SELECT 1 FROM range(10) WHERE true, and and returns 10 rows.

Spark 2.4

HAVING without GROUP BY is treated as a global aggregate. For example, SELECT 1 FROM range(10) HAVING true returns one row, instead of 10, as in the previous version.

Action Required

Check the logic where having and group by is used. To restore previous behavior, set spark.sql.legacy.parser.havingWithoutGroupByAsWhere=true.

CSV bad record handling

How Spark treats malformations in CSV files has changed.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2.3

CSV rows are considered malformed if at least one column value in the row is malformed. The CSV parser drops malformed rows in the DROPMALFORMED mode or outputs an error in the FAILFAST mode.

Spark 2.4

A CSV row is considered malformed only when it contains malformed column values requested from CSV datasource, other values are ignored.

Action Required

To restore the Spark 1.6 behavior, set spark.sql.csv.parser.columnPruning.enabled to false.

Spark 2.4 CSV example

A CSV example illustrates the CSV-handling change in Spark 2.4.

In the following CSV file, the first two records describe the file. These records are not considered during processing and need to be removed from the file. The actual data to be considered for processing has three columns (jersey, name, position).

```
These are extra line1
These are extra line2
10,Messi,CF
7,Ronaldo,LW
9,Benzema,CF
```

The following schema definition for the DataFrame reader uses the option DROPMALFORMED. You see only the required data; all the description and error records are removed.

```
schema=Structtype([Structfield("jersy",StringType()),Structfield("name",Stri
ngType()),Structfi
eld("position",StringType())])
df1=spark.read\
.option("mode","DROPMALFORMED")\
.option("delimiter",",")\
.schema(schema)\
.csv("inputfile")
df1.select("*").show()
```

Output is:

jersy	name	position
10	Messi	CF
7	Ronaldo	LW
9	Benzema	CF

Select two columns from the dataframe and invoke show():

```
df1.select("jersy","name").show(truncate=False)
```

jersy	name
These are extra line1	null
These are extra line2	null
10	Messi
7	Ronaldo
9	Benzema

Malformed records are not dropped and pushed to the first column and the remaining columns will be replaced with null.This is due to the CSV parser column pruning which is set to true by default in Spark 2.4.

Set the following conf, and run the same code, selecting two fields.

```
spark.conf.set(“spark.sql.csv.parser.columnPruning.enabled”,False)
```

```
df2=spark.read\
   .option(“mode”,”DROPMALFORMED”)\
   .option(“delimiter”,”,”)\
   .schema(schema)\
   .csv(“inputfile”)
   df2.select(“jersy”,”name”).show(truncate=False)
```

jersy	name
10	Messi
7	Ronaldo
9	Benzema

Conclusion: If working on selective columns, to handle bad records in CSV files, set spark.sql.csv.parser.columnPruning.enabled to false; otherwise, the error record is pushed to the first column, and all the remaining columns are treated as nulls.

Configuring storage locations

To execute the workloads in , you must modify the references to storage locations. In , references must be changed from HDFS to a cloud object store such as S3.

About this task

The following sample query shows a Spark 2.4 HDFS data location.

```
scala> spark.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_2(Region st
ring, Country string,Item_Type string,Sales_Channel string,Order_Priority st
ring,Order_Date date,Order_ID int,Ship_Date date,Units_sold string,Unit_Pric
e string,Unit_cost string,Total_revenue string,Total_Cost string,Total_Profi
t string) row format delimited fields terminated by ','")
scala> spark.sql("load data local inpath '/tmp/sales.csv' into table defau
lt.sales_spark_2")
scala> spark.sql("select count(*) from default.sales_spark_2").show()
```

The following sample query shows a Spark 2.4 S3 data location.

```
scala> spark.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_2(Region st
ring, Country string,Item_Type string,Sales_Channel string,Order_Priority st
ring,Order_Date date,Order_ID int,Ship_Date date,Units_sold string,Unit_Pric
e string,Unit_cost string,Total_revenue string,Total_Cost string,Total_Profi
t string) row format delimited fields terminated by ','")
scala> spark.sql("load data inpath 's3://<bucket>/sales.csv' into table de
fault.sales_spark_2")
scala> spark.sql("select count(*) from default.sales_spark_2").show()
```

Querying Hive managed tables from Spark

Hive-on-Spark is not supported on . You need to use the Hive Warehouse Connector (HWC) to query Apache Hive managed tables from Apache Spark.

To read Hive external tables from Spark, you do not need HWC. Spark uses native Spark to read external tables. For more information, see the Hive Warehouse Connector documentation.

The following example shows how to query a Hive table from Spark using HWC:

```
spark-shell --jars /opt/cloudera/parcels/CDH/jars/hive-warehouse-connector-a
ssembly-1.0.0.7.1.4.0-203.jar --conf spark.sql.hive.hiveserver2.jdbc.url=jdb
c:hive2://cdhhdp02.uddeepta-bandyopadhyay-s-account.cloud:10000/default --co
nf spark.sql.hive.hiveserver2.jdbc.url.principal=hive/cdhhdp02.uddeepta-band
yopadhyay-s-account.cloud@Uddeepta-bandyopadhyay-s-Account.CLOUD
scala> val hive = com.hortonworks.hwc.HiveWarehouseSession.session(spark).b
uild()
scala> hive.executeUpdate("UPDATE hive_acid_demo set value=25 where key=4")
scala> val result=hive.execute("select * from default.hive_acid_demo")
scala> result.show()
```

Compiling and running Spark workloads

After modifying the workloads, compile and run (or dry run) the refactored workloads on Spark 2.4.

You can write Spark applications using Java, Scala, Python, SparkR, and others. You build jars from these scripts using one of the following compilers.

- Java (with Maven/Java IDE),
- Scala (with sbt),
- Python (pip).
- SparkR (RStudio)

Compiling and running a Java-based job

You see by example how to compile a Java-based Spark job using Maven.

About this task

In this task, you see how to compile the following example Spark program written in Java:

```
/* SimpleApp.java */
import org.apache.spark.sql.SparkSession;
import org.apache.spark.sql.Dataset;

public class SimpleApp {
  public static void main(String[] args) {
    String logFile = "YOUR_SPARK_HOME/README.md"; // Should be some file on
 your system
    SparkSession spark = SparkSession.builder().appName("Simple Applicatio
n").getOrCreate();
    Dataset<String> logData = spark.read().textFile(logFile).cache();

    long numAs = logData.filter(s -> s.contains("a")).count();
    long numBs = logData.filter(s -> s.contains("b")).count();

   System.out.println("Lines with a: " + numAs + ", lines with b: " + num
Bs);

    spark.stop();
  }
}
```

You also need to create a Maven Project Object Model (POM) file, as shown in the following example:

```
<project>
  <groupId>edu.berkeley</groupId>
  <artifactId>simple-project</artifactId>
  <modelVersion>4.0.0</modelVersion>
  <name>Simple Project</name>
  <packaging>jar</packaging>
  <version>1.0</version>
```

```
<properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    <maven.compiler.source>1.8</maven.compiler.source>
    <maven.compiler.target>1.8</maven.compiler.target>
  </properties>
<dependencies>
    <dependency> <!-- Spark dependency -->
   <groupId>org.apache.spark</groupId>
   <artifactId>spark-sql_2.12</artifactId>
   <version>2.4.0</version>
   <scope>provided</scope>
    </dependency>
</dependencies>
</project>
```

Before you begin

- Install Apache Spark 2.4.x, JDK 8.x, and maven
- Write a Java Spark program .java file.
- Write a pom.xml file. This is where your Scala code resides.
- If the cluster is Kerberized, ensure the required security token is authorized to compile and execute the workload.

Procedure

1. Lay out these files according to the canonical Maven directory structure.
   For example:

   ```
   $ find .
   ./pom.xml
   ./src
   ./src/main
   ./src/main/java
   ./src/main/java/SimpleApp.java
   ```

2. Package the application using maven package command.
   For example:

   ```
   # Package a JAR containing your application
   $ mvn package
   ...
   [INFO] Building jar: {..}/{..}/target/simple-project-1.0.jar
   ```

   After compilation, several new files are created under new directories named project and target. Among these new files, is the jar file under the target directory to run the code. For example, the file is named simple-project-1.0.jar.

3. Execute and test the workload jar using the spark submit command.
   For example:

   ```
   # Use spark-submit to run your application
   spark-submit \
   --class "SimpleApp" \
   --master yarn \
   target/simple-project-1.0.jar
   ```

Compiling and running a Scala-based job

You see by example how to use sbt software to compile a Scala-based Spark job.

About this task

In this task, you see how to use the following .sbt file that specifies the build configuration:

```
cat build.sbt
name := "Simple Project"
version := "1.0"
scalaVersion := "2.12.15"
libraryDependencies += "org.apache.spark" %% "spark-sql" % "2.4.0"
```

You also need to create a compile the following example Spark program written in Scala:

```
/* SimpleApp.scala */
import org.apache.spark.sql.SparkSession

object SimpleApp {
  def main(args: Array[String]) {
 val logFile = "YOUR_SPARK_HOME/README.md" // Should be some file on your
system
 val spark = SparkSession.builder.appName("Simple Application").getOrCrea
te()
 val logData = spark.read.textFile(logFile).cache()
 val numAs = logData.filter(line => line.contains("a")).count()
 val numBs = logData.filter(line => line.contains("b")).count()
    println(s"Lines with a: $numAs, Lines with b: $numBs")
 spark.stop()
  }
```

Before you begin

- Install Apache Spark 2.4.x.
- Install JDK 8.x.
- Install Scala 2.12.
- Install Sbt 0.13.17.
- Wrtie an .sbt file for configuration specifications, similar to a C include file.
- Write a Scala-based Spark program (a .scala file).
- If the cluster is Kerberized, ensure the required security token is authorized to compile and execute the workload.

Procedure

1. Compile the code using sbt package command from the directory where the build.sbt file exists.
   For example:

   ```
   # Your directory layout should look like this
   $ find .
   .
   ./build.sbt
   ./src
   ./src/main
   ./src/main/scala
   ./src/main/scala/SimpleApp.scala

   # Package a jar containing your application
   $ sbt package
   ...
   [info] Packaging {..}/{..}/target/scala-2.12/simple-project_2.12-1.0.jar
   ```

   Several new files are created under new directories named project and target, including the jar file named simple-project_2.12-1.0.jar after the project name, Scala version, and code version.

2. Execute and test the workload jar using spark submit.
   For example:

```
# Use spark-submit to run your application
spark-submit \
  --class "SimpleApp" \
  --master yarn \
  target/scala-2.12/simple-project_2.12-1.0.jar
```

Running a Python-based job

You can run a Python script to execute a spark-submit or pyspark command.

About this task

In this task, you execute the following Python script that creates a table and runs a few queries:

```
/* spark-demo.py */
from pyspark import SparkContext
sc = SparkContext("local", "first app")
from pyspark.sql import HiveContext
hive_context = HiveContext(sc)
hive_context.sql("drop table default.sales_spark_2_copy")
hive_context.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_2_copy as
 select * from default.sales_spark_2")
hive_context.sql("show tables").show()
hive_context.sql("select * from default.sales_spark_2_copy limit 10").show()
hive_context.sql("select count(*) from default.sales_spark_2_copy").show()
```

Before you begin

Install Python 2.7 or Python 3.5 or higher.

Procedure

1. Log into a Spark gateway node.
2. Ensure the required security token is authorized to compile and execute the workload (if your cluster is Kerberized).
3. Execute the script using the spark-submit command.

```
spark-submit spark-demo.py --num-executors 3 --driver-memory 512m --exec
utor-memory 512m --executor-cores 1
```

4. Go to the Spark History server web UI at http://<spark_history_server>:18088, and check the status and performance of the workload.

Using pyspark

About this task

Run your application with the pyspark or the Python interpreter.

Before you begin

Install PySpark using pip.

Procedure

1. Log into a Spark gateway node.
2. Ensure the required security token is authorized to compile and execute the workload (if your cluster is Kerberized).
3. Ensure the user has access to the workload script (python or shell script).

4. Execute the script using pyspark.

```
pyspark spark-demo.py --num-executors 3 --driver-memory 512m --executor-
memory 512m --executor-cores 1
```

5. Execute the script using the Python interpreter.

```
python spark-demo.py
```

6. Go to the Spark History server web UI at http://<spark_history_server>:18088, and check the status and performance of the workload.

Running a job interactively

About this task

Procedure

1. Log into a Spark gateway node.
2. Ensure the required security token is authorized to compile and execute the workload (if your cluster is Kerberized).
3. Launch the “spark-shell”.
   For example:

```
 spark-shell --jars target/mylibrary-1.0-SNAPSHOT-jar-with-dependencies.
jar
```

4. Create a Spark context and run workload scripts.

```
cala> import org.apache.spark.sql.hive.HiveContext
scala> val sqlContext = new HiveContext(sc)
scala> sqlContext.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_1(R
egion string, Country string,Item_Type string,Sales_Channel string,Order
_Priority string,Order_Date date,Order_ID int,Ship_Date date,Units_sold
string,Unit_Price string,Unit_cost string,Total_revenue string,Total_Cos
t string,Total_Profit string) row format delimited fields terminated by
',' ")
scala> sqlContext.sql("load data local inpath '/tmp/sales.csv' into table
default.sales_spark_1")
scala> sqlContext.sql("show tables")
scala> sqlContext.sql("select * from default.sales_spark_1 limit 10").s
how()
scala> sqlContext.sql ("select count(*) from default.sales_spark_1").show(
)
```

5. Go to the Spark History server web UI at http://<spark_history_server>:18088, and check the status and performance of the workload.

Post-migration tasks

After the workloads are executed on Spark 2.4, validate the output, and compare the performance of the jobs with CDH/HDP cluster executions.

After the workloads are executed on Spark 2.4, validate the output, and compare the performance of the jobs with CDH/HDP cluster executions. After you perform the post migration configurations, do benchmark testing on Spark 2.4.

Troubleshoot the failed/slow performing workloads by analyzing the application event logs/driver logs and fine tune the workloads for better performance.

For more information, see the following documents:

- https://spark.apache.org/docs/2.4.4/sql-migration-guide-upgrade.html

  https://spark.apache.org/releases/spark-release-2-4-0.html

  https://spark.apache.org/releases/spark-release-2-2-0.html

  https://spark.apache.org/releases/spark-release-2-3-0.html

  https://spark.apache.org/releases/spark-release-2-1-0.html

  https://spark.apache.org/releases/spark-release-2-0-0.html

  For additional information about known issues please also refer:

  Known Issues in Cloudera Manager 7.4.4 | CDP Private Cloud

  For additional information about known issues please also refer to:

  Known Issues in 7.4.4 |

Spark 2.3 to Spark 2.4 Refactoring

Because Spark 2.3 is not supported on , you need to refactor Spark workloads from Spark 2.3 on CDH or HDP to Spark 2.4 on .

This document helps in accelerating the migration process, provides guidance to refactor Spark workloads and lists migration. Use this document when the platform is migrated from CDH or HDP to .

Handling prerequisites

You must perform a number of tasks before refactoring workloads.

About this task

Assuming all workloads are in working condition, you perform this task to meet refactoring prerequistes.

Procedure

1. Identify all the workloads in the cluster (CDH/HDP) which are running on Spark 1.6 - 2.3.
2. Classify the workloads.

   Classification of workloads will help in clean-up of the unwanted workloads, plan resources and efforts for workload migration and post upgrade testing.

   Example workload classifications:

   - Spark Core (scala)
   - Java-based Spark jobs
   - SQL, Datasets, and DataFrame
   - Structured Streaming
   - MLlib ()
   - PySpark (Python on Spark)
   - Batch Jobs
   - Scheduled Jobs
   - Ad-Hoc Jobs
   - Critical/Priority Jobs
   - Huge data Processing Jobs
   - Time taking jobs
   - Resource Consuming Jobs etc.
   - Failed Jobs

Identify configuration changes

3. Check the current Spark jobs configuration.
    - Spark 1.6 - 2.3 workload configurations which have dependencies on job properties like scheduler, old python packages, classpath jars and might not be compatible post migration.
    - In , Capacity Scheduler is the default and recommended scheduler. Follow Fair Scheduler to Capacity Scheduler transition guide to have all the required queues configured in the cluster post upgrade. If any configuration changes are required, modify the code as per the new capacity scheduler configurations.
    - For workload configurations, see the Spark History server UI http://spark_history_server:18088/history/<application_number>/environment/.
4. Identify and capture workloads having data storage locations (local and HDFS) to refactor the workloads post migration.
5. Refer to unsupported Apache Spark features, and plan refactoring accordingly.

Spark 2.3 to Spark 2.4 changes

A description of the change, the type of change, and the required refactoring provide the information you need for migrating from Spark 2.3 to Spark 2.4.

Empty schema not supported

Writing a dataframe with an empty or nested empty schema using any file format, such as parquet, orc, json, text, or csv is not allowed.

Type of change: Syntactic/Spark core

Spark 1.6 - 2.3

Writing a dataframe with an empty or nested empty schema using any file format is allowed and will not throw an exception.

Spark 2.4

An exception is thrown when you attempt to write dataframes with empty schema. For example, if there are statements such as df.write.format("parquet").mode("overwrite").save(somePath), the following error occurs: org.apache.spark.sql.AnalysisException: Parquet data source does not support null data type.

Action Required

Make sure that DataFrame is not empty. Check whether DataFrame is empty or not as follows:

```
if (!df.isEmpty) df.write.format("parquet").mode("overwrite").save("somePath
")
```

CSV header and schema match

Column names of csv headers must match the schema.

Type of change: Configuration/Spark core changes

Spark 1.6 - 2.3

Column names of headers in CSV files are not checked against the against the schema of CSV data.

Spark 2.4

If columns in the CSV header and the schema have different ordering, the following exception is thrown:java.lang.IllegalArgumentException: CSV file header does not contain the expected fields.

Action Required

Make the schema and header order match or set enforceSchema to false to prevent getting an exception. For example, read a file or directory of files in CSV format into Spark DataFrame as follows: df3 = spark.read.option("delimiter", ";").option("header", True).option("enforeSchema", False).csv(path)

The default "header" option is true and enforceSchema is False.

If enforceSchema is set to true, the specified or inferred schema will be forcibly applied to datasource files, and headers in CSV files are ignored. If enforceSchema is set to false, the schema is validated against all headers in CSV files when the header option is set to true. Field names in the schema and column names in CSV headers are checked by their positions taking into account spark.sql.caseSensitive. Although the default value is true,you should disable the enforceSchema option to prevent incorrect results.

Table properties support

Table properties are taken into consideration while creating the table.

Type of change: Configuration/Spark Core Changes

Spark 1.6 - 2.3

Parquet and ORC Hive tables are converted to Parquet or ORC by default, but table properties are ignored. For example, the compression table property is ignored:

```
CREATE TABLE t(id int) STORED AS PARQUET TBLPROPERTIES (parquet.compression
'NONE')
```

This command generates Snappy Parquet files.

Spark 2.4

Table properties are supported. For example, if no compression is required, set the TBLPROPERTIES as follows: (parquet.compression 'NONE').

This command generates uncompressed Parquet files.

Action Required

Check and set the desired TBLPROPERTIES.

Managed table location

Creating a managed table with nonempty location is not allowed.

Type of change: Property/Spark core changes

Spark 1.6 - 2.3

You can create a managed table having a nonempty location.

Spark 2.4

Creating a managed table with nonempty location is not allowed. In Spark 2.4, an error occurs when there is a write operation, such as df.write.mode(SaveMode.Overwrite).saveAsTable("testdb.testtable"). The error side-effects are the cluster is terminated while the write is in progress, a temporary network issue occurs, or the job is interrupted.

Action Required

Set spark.sql.legacy.allowCreatingManagedTableUsingNonemptyLocation to true at runtime as follows:

```
spark.conf.set("spark.sql.legacy.allowCreatingManagedTableUsingNonemptyLocat
ion","true")
```

Precedence of set operations

Set operations are executed by priority instead having equal precedence.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2.3

If the order is not specified by parentheses, equal precedence is given to all set operations.

Spark 2.4

If the order is not specified by parentheses, set operations are performed from left to right with the exception that all INTERSECT operations are performed before any UNION, EXCEPT or MINUS operations.

For example, if your code includes set operations, such as INTERSECT , UNION, EXCEPT or MINUS, consider refactoring.

Action Required

Change the logic according to following rule:

If the order of set operations is not specified by parentheses, set operations are performed from left to right with the exception that all INTERSECT operations are performed before any UNION, EXCEPT or MINUS operations.

If you want the previous behavior of equal precedence then, set spark.sql.legacy.setopsPrecedence.enabled=true.

HAVING without GROUP BY

HAVING without GROUP BY is treated as a global aggregate.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2,3

HAVING without GROUP BY is treated as WHERE. For example, SELECT 1 FROM range(10) HAVING true is executed as SELECT 1 FROM range(10) WHERE true, and and returns 10 rows.

Spark 2.4

HAVING without GROUP BY is treated as a global aggregate. For example, SELECT 1 FROM range(10) HAVING true returns one row, instead of 10, as in the previous version.

Action Required

Check the logic where having and group by is used. To restore previous behavior, set spark.sql.legacy.parser.havingWithoutGroupByAsWhere=true.

CSV bad record handling

How Spark treats malformations in CSV files has changed.

Type of change: Property/Spark SQL changes

Spark 1.6 - 2.3

CSV rows are considered malformed if at least one column value in the row is malformed. The CSV parser drops malformed rows in the DROPMALFORMED mode or outputs an error in the FAILFAST mode.

Spark 2.4

A CSV row is considered malformed only when it contains malformed column values requested from CSV datasource, other values are ignored.

Action Required

To restore the Spark 1.6 behavior, set spark.sql.csv.parser.columnPruning.enabled to false.

Spark 2.4 CSV example

A CSV example illustrates the CSV-handling change in Spark 2.4.

In the following CSV file, the first two records describe the file. These records are not considered during processing and need to be removed from the file. The actual data to be considered for processing has three columns (jersey, name, position).

```
These are extra line1
These are extra line2
10,Messi,CF
7,Ronaldo,LW
9,Benzema,CF
```

The following schema definition for the DataFrame reader uses the option DROPMALFORMED. You see only the required data; all the description and error records are removed.

```
schema=Structtype([Structfield(“jersy”,StringType()),Structfield(“name”,Stri
ngType()),Structfi
eld(“position”,StringType())])
df1=spark.read\
.option(“mode”,”DROPMALFORMED”)\
.option(“delimiter”,”,”)\
.schema(schema)\
.csv(“inputfile”)
df1.select(“*”).show()
```

Output is:

jersy	name	position
10	Messi	CF
7	Ronaldo	LW
9	Benzema	CF

Select two columns from the dataframe and invoke show():

```
df1.select(“jersy”,”name”).show(truncate=False)
```

jersy	name
These are extra line1	null
These are extra line2	null
10	Messi
7	Ronaldo
9	Benzema

Malformed records are not dropped and pushed to the first column and the remaining columns will be replaced with null.This is due to the CSV parser column pruning which is set to true by default in Spark 2.4.

Set the following conf, and run the same code, selecting two fields.

```
spark.conf.set(“spark.sql.csv.parser.columnPruning.enabled”,False)
```

```
df2=spark.read\
   .option(“mode”,”DROPMALFORMED”)\
   .option(“delimiter”,”,”)\
   .schema(schema)\
   .csv(“inputfile”)
   df2.select(“jersy”,”name”).show(truncate=False)
```

jersy	name
10	Messi
7	Ronaldo
9	Benzema

Conclusion: If working on selective columns, to handle bad records in CSV files, set spark.sql.csv.parser.columnPruning.enabled to false; otherwise, the error record is pushed to the first column, and all the remaining columns are treated as nulls.

Configuring storage locations

To execute the workloads in , you must modify the references to storage locations. In , references must be changed from HDFS to a cloud object store such as S3.

About this task

The following sample query shows a Spark 2.4 HDFS data location.

```
scala> spark.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_2(Region st
ring, Country string,Item_Type string,Sales_Channel string,Order_Priority st
ring,Order_Date date,Order_ID int,Ship_Date date,Units_sold string,Unit_Pric
e string,Unit_cost string,Total_revenue string,Total_Cost string,Total_Profi
t string) row format delimited fields terminated by ','")
scala> spark.sql("load data local inpath '/tmp/sales.csv' into table defau
lt.sales_spark_2")
scala> spark.sql("select count(*) from default.sales_spark_2").show()
```

The following sample query shows a Spark 2.4 S3 data location.

```
scala> spark.sql("CREATE TABLE IF NOT EXISTS default.sales_spark_2(Region st
ring, Country string,Item_Type string,Sales_Channel string,Order_Priority st
ring,Order_Date date,Order_ID int,Ship_Date date,Units_sold string,Unit_Pric
e string,Unit_cost string,Total_revenue string,Total_Cost string,Total_Profi
t string) row format delimited fields terminated by ','")
scala> spark.sql("load data inpath 's3://<bucket>/sales.csv' into table de
fault.sales_spark_2")
scala> spark.sql("select count(*) from default.sales_spark_2").show()
```

Querying Hive managed tables from Spark

Hive-on-Spark is not supported on . You need to use the Hive Warehouse Connector (HWC) to query Apache Hive managed tables from Apache Spark.

To read Hive external tables from Spark, you do not need HWC. Spark uses native Spark to read external tables. For more information, see the Hive Warehouse Connector documentation.

The following example shows how to query a Hive table from Spark using HWC:

```
spark-shell --jars /opt/cloudera/parcels/CDH/jars/hive-warehouse-connector-a
ssembly-1.0.0.7.1.4.0-203.jar --conf spark.sql.hive.hiveserver2.jdbc.url=jdb
c:hive2://cdhhdp02.uddeepta-bandyopadhyay-s-account.cloud:10000/default --co
nf spark.sql.hive.hiveserver2.jdbc.url.principal=hive/cdhhdp02.uddeepta-band
yopadhyay-s-account.cloud@Uddeepta-bandyopadhyay-s-Account.CLOUD
scala> val hive = com.hortonworks.hwc.HiveWarehouseSession.session(spark).b
uild()
scala> hive.executeUpdate("UPDATE hive_acid_demo set value=25 where key=4")
scala> val result=hive.execute("select * from default.hive_acid_demo")
scala> result.show()
```

Compiling and running Spark workloads

After modifying the workloads, compile and run (or dry run) the refactored workloads on Spark 2.4.

You can write Spark applications using Java, Scala, Python, SparkR, and others. You build jars from these scripts using one of the following compilers.

- Java (with Maven/Java IDE),
- Scala (with sbt),
- Python (pip).
- SparkR (RStudio)

Post-migration tasks

After the workloads are executed on Spark 2.4, validate the output, and compare the performance of the jobs with CDH/HDP cluster executions.

After the workloads are executed on Spark 2.4, validate the output, and compare the performance of the jobs with CDH/HDP cluster executions. After you perform the post migration configurations, do benchmark testing on Spark 2.4.

Troubleshoot the failed/slow performing workloads by analyzing the application event logs/driver logs and fine tune the workloads for better performance.

For more information, see the following documents:

- https://spark.apache.org/docs/2.4.4/sql-migration-guide-upgrade.html

  https://spark.apache.org/releases/spark-release-2-4-0.html

  https://spark.apache.org/releases/spark-release-2-2-0.html

  https://spark.apache.org/releases/spark-release-2-3-0.html

  https://spark.apache.org/releases/spark-release-2-1-0.html

  https://spark.apache.org/releases/spark-release-2-0-0.html

  For additional information about known issues please also refer:

  Known Issues in Cloudera Manager 7.4.4 | CDP Private Cloud

  For additional information about known issues please also refer to:

  Known Issues in 7.4.4 |

Apache Hive Changes in CDP

You need to know where your tables are located and the property changes that the upgrade process makes. You need to perform some post-migration tasks before using Hive tables and handle semantic changes.

Understanding Apache Hive 3 major design features, such as default ACID transaction processing, can help you use Hive to address the growing needs of enterprise data warehouse systems.

Hive Configuration Property Changes

You need to know the property value changes made by the upgrade process as the change might impact your work. You might need to consider reconfiguring property value defaults that the upgrade changes.

Hive Configuration Property Values

The upgrade process changes the default values of some Hive configuration properties and adds new properties. The following list describes those changes that occur after upgrading from CDH or HDP to .

datanucleus.connectionPool.maxPoolSize

Before upgrade: 30

After upgrade: 10

datanucleus.connectionPoolingType

Before upgrade: BONECP

After upgrade: HikariCP

hive.auto.convert.join.noconditionaltask.size

Before upgrade: 20971520

After upgrade: 52428800

Exception: Preserves pre-upgrade value if old default is overridden; otherwise, uses new default.

hive.auto.convert.sortmerge.join

Before upgrade: FALSE in the old CDH; TRUE in the old HDP.

After upgrade: TRUE

hive.auto.convert.sortmerge.join.to.mapjoin

Before upgrade: FALSE

After upgrade: TRUE

hive.cbo.enable

Before upgrade: FALSE

After upgrade: TRUE

hive.cbo.show.warnings

Before upgrade: FALSE

After upgrade: TRUE

hive.compactor.worker.threads

Before upgrade: 0

After upgrade: 5

hive.compute.query.using.stats

Before upgrade: FALSE

After upgrade: TRUE

hive.conf.hidden.list

Before upgrade:

```
javax.jdo.option.ConnectionPassword,hive.server2.keystore.passwo
rd,hive.metastore.dbaccess.ssl.truststore.password,fs.s3.awsAcce
ssKeyId,fs.s3.awsSecretAccessKey,fs.s3n.awsAccessKeyId,fs.s3n.aw
sSecretAccessKey,fs.s3a.access.key,fs.s3a.secret.key,fs.s3a.prox
y.password,dfs.adls.oauth2.credential,fs.adl.oauth2.credential,f
s.azure.account.oauth2.client.secret
```

After upgrade:

```
javax.jdo.option.ConnectionPassword,hive.server2.keystore.passwo
rd,hive.druid.metadata.password,hive.driver.parallel.compilation
.global.limit
```

hive.conf.restricted.list

Before upgrade:

```
hive.security.authenticator.manager,hive.security.authorization.
manager,hive.users.in.admin.role,hive.server2.xsrf.filter.enable
d,hive.spark.client.connect.timeout,hive.spark.client.server.con
nect.timeout,hive.spark.client.channel.log.level,hive.spark.clie
nt.rpc.max.size,hive.spark.client.rpc.threads,hive.spark.client.
secret.bits,hive.spark.client.rpc.server.address,hive.spark.clie
nt.rpc.server.port,hive.spark.client.rpc.sasl.mechanisms,hadoop.
bin.path,yarn.bin.path,spark.home,bonecp.,hikaricp.,hive.driver.
parallel.compilation.global.limit,_hive.local.session.path,_hive
.hdfs.session.path,_hive.tmp_table_space,_hive.local.session.pat
h,_hive.hdfs.session.path,_hive.tmp_table_space
```

After upgrade:

```
hive.security.authenticator.manager,hive.security.authorization.
manager,hive.security.metastore.authorization.manager,hive.secur
ity.metastore.authenticator.manager,hive.users.in.admin.role,hiv
e.server2.xsrf.filter.enabled,hive.security.authorization.enable
```

```
d,hive.distcp.privileged.doAs,hive.server2.authentication.ldap.b
aseDN,hive.server2.authentication.ldap.url,hive.server2.authenti
cation.ldap.Domain,hive.server2.authentication.ldap.groupDNPatte
rn,hive.server2.authentication.ldap.groupFilter,hive.server2.aut
hentication.ldap.userDNPattern,hive.server2.authentication.ldap.
userFilter,hive.server2.authentication.ldap.groupMembershipKey,h
ive.server2.authentication.ldap.userMembershipKey,hive.server2.a
uthentication.ldap.groupClassKey,hive.server2.authentication.lda
p.customLDAPQuery,hive.privilege.synchronizer.interval,hive.spar
k.client.connect.timeout,hive.spark.client.server.connect.timeou
t,hive.spark.client.channel.log.level,hive.spark.client.rpc.max.
size,hive.spark.client.rpc.threads,hive.spark.client.secret.bits
,hive.spark.client.rpc.server.address,hive.spark.client.rpc.serv
er.port,hive.spark.client.rpc.sasl.mechanisms,bonecp.,hive.druid
.broker.address.default,hive.druid.coordinator.address.default,h
ikaricp.,hadoop.bin.path,yarn.bin.path,spark.home,hive.driver.pa
rallel.compilation.global.limit,_hive.local.session.path,_hive.h
dfs.session.path,_hive.tmp_table_space,_hive.local.session.path,
_hive.hdfs.session.path,_hive.tmp_table_space
```

hive.default.fileformat.managed

Before upgrade: None

After upgrade: ORC

hive.default.rcfile.serde

Before upgrade: org.apache.hadoop.hive.serde2.columnar.ColumnarSerDe

After upgrade: org.apache.hadoop.hive.serde2.columnar.LazyBinaryColumnarSerDe

Not supported in Impala. Impala cannot read Hive-created RC tables.

hive.driver.parallel.compilation

Before upgrade: FALSE

After upgrade: TRUE

hive.exec.dynamic.partition.mode

Before upgrade: strict

After upgrade: nonstrict

In , accidental use of dynamic partitioning feature is not prevented by default.

hive.exec.max.dynamic.partitions

Before upgrade: 1000

After upgrade: 5000

In , fewer restrictions on dynamic paritioning occur than in the pre-upgrade CDH or HDP cluster.

hive.exec.max.dynamic.partitions.pernode

Before upgrade: 100

After upgrade: 2000

In , fewer restrictions on dynamic paritioning occur than in the pre-upgrade CDH or HDP cluster.

hive.exec.post.hooks

Before upgrade:

```
com.cloudera.navigator.audit.hive.HiveExecHookContext,org.apache
.hadoop.hive.ql.hooks.LineageLogger
```

After upgrade: org.apache.hadoop.hive.ql.hooks.HiveProtoLoggingHook

A prime number is recommended.

hive.exec.reducers.max

Before upgrade: 1099

After upgrade: 1009

Exception: Preserves pre-upgrade value if old default is overridden; otherwise, uses new default

hive.execution.engine

Before upgrade: mr

After upgrade: tez

Tez is now the only supported execution engine, existing queries that change execution mode to Spark or MapReduce within a session, for example, fail.

hive.fetch.task.conversion

Before upgrade: minimal

After upgrade: more

hive.fetch.task.conversion.threshold

Before upgrade: 256MB

After upgrade: 1GB

Exception: Preserves pre-upgrade value if old default is overridden; otherwise, uses new default.

hive.hashtable.key.count.adjustment

Before upgrade: 1

After upgrade: 0.99

Exception: Preserves pre-upgrade value if old default is overridden; otherwise, uses new default.

hive.limit.optimize.enable

Before upgrade: FALSE

After upgrade: TRUE

hive.limit.pushdown.memory.usage

Before upgrade: 0.1

After upgrade: 0.04

Exception: Preserves pre-upgrade value if old default is overridden; otherwise, uses new default.

hive.mapjoin.hybridgrace.hashtable

Before upgrade: TRUE

After upgrade: FALSE

hive.mapred.reduce.tasks.speculative.execution

Before upgrade: TRUE

After upgrade: FALSE

hive.metastore.aggregate.stats.cache.enabled

Before upgrade: TRUE

After upgrade: FALSE

hive.metastore.disallow.incompatible.col.type.changes

Before upgrade: FALSE

After upgrade: TRUE

Schema evolution is more restrictive in than in CDH to avoid data corruption. The new default disallows column type changes if the old and new types are incompatible.

hive.metastore.dml.events

Before upgrade: FALSE

After upgrade: TRUE

hive.metastore.event.message.factory

Before upgrade: org.apache.hadoop.hive.metastore.messaging.json.ExtendedJSONMessageFactory

After upgrade: org.apache.hadoop.hive.metastore.messaging.json.gzip.GzipJSONMessageEncoder

hive.metastore.uri.selection

Before upgrade: SEQUENTIAL

After upgrade: RANDOM

hive.metastore.warehouse.dir

Before upgrade from CDH: /user/hive/warehouse

Before upgrade from HDP: /apps/hive/warehouse

After upgrade from CDH: /warehouse/tablespace/managed/hive

After upgrade from HDP: /warehouse/tablespace/managed/hive

For information about the location of old tables and new tables, which you create after the upgrade, see Changes to CDH Hive Tables or Changes to HDP Hive tables.

hive.optimize.metadataonly

Before upgrade: FALSE

After upgrade: TRUE

hive.optimize.point.lookup.min

Before upgrade: 31

After upgrade: 2

hive.prewarm.numcontainers

Before upgrade: 10

After upgrade: 3

hive.script.operator.env.blacklist

Before upgrade: hive.txn.valid.txns,hive.script.operator.env.blacklist

After upgrade: hive.txn.valid.txns,hive.txn.tables.valid.writeids,hive.txn.valid.writeids,hive.script.operator.env.blacklist

hive.security.authorization.sqlstd.confwhitelist

Before upgrade:

```
hive\.auto\..*hive\.cbo\..*hive\.convert\..*hive\.exec\.dynamic\
.partition.*hive\.exec\..*\.dynamic\.partitions\..*hive\.exec\.c
ompress\..*hive\.exec\.infer\..*hive\.exec\.mode.local\..*hive\.
exec\.orc\..*hive\.exec\.parallel.*hive\.explain\..*hive\.fetch.
task\..*hive\.groupby\..*hive\.hbase\..*hive\.index\..*hive\.ind
ex\..*hive\.intermediate\..*hive\.join\..*hive\.limit\..*hive\.l
og\..*hive\.mapjoin\..*hive\.merge\..*hive\.optimize\..*hive\.or
c\..*hive\.outerjoin\..*hive\.parquet\..*hive\.ppd\..*hive\.prew
arm\..*hive\.server2\.proxy\.userhive\.skewjoin\..*hive\.smbjoin
\..*hive\.stats\..*hive\.strict\..*hive\.tez\..*hive\.vectorized
\..*mapred\.map\..*mapred\.reduce\..*mapred\.output\.compression
\.codecmapred\.job\.queuenamemapred\.output\.compression\.typema
```

```
pred\.min\.split\.sizemapreduce\.job\.reduce\.slowstart\.complet
edmapsmapreduce\.job\.queuenamemapreduce\.job\.tagsmapreduce\.in
put\.fileinputformat\.split\.minsizemapreduce\.map\..*mapreduce\
.reduce\..*mapreduce\.output\.fileoutputformat\.compress\.codecm
apreduce\.output\.fileoutputformat\.compress\.typeoozie\..*tez\.
am\..*tez\.task\..*tez\.runtime\..*tez\.queue\.namehive\.transpo
se\.aggr\.joinhive\.exec\.reducers\.bytes\.per\.reducerhive\.cli
ent\.stats\.countershive\.exec\.default\.partition\.namehive\.ex
ec\.drop\.ignorenonexistenthive\.counters\.group\.namehive\.defa
ult\.fileformat\.managedhive\.enforce\.bucketmapjoinhive\.enforc
e\.sortmergebucketmapjoinhive\.cache\.expr\.evaluationhive\.quer
y\.result\.fileformathive\.hashtable\.loadfactorhive\.hashtable\
.initialCapacityhive\.ignore\.mapjoin\.hinthive\.limit\.row\.max
\.sizehive\.mapred\.modehive\.map\.aggrhive\.compute\.query\.usi
ng\.statshive\.exec\.rowoffsethive\.variable\.substitutehive\.va
riable\.substitute\.depthhive\.autogen\.columnalias\.prefix\.inc
ludefuncnamehive\.autogen\.columnalias\.prefix\.labelhive\.exec\
.check\.crossproductshive\.cli\.tez\.session\.asynchive\.compath
ive\.exec\.concatenate\.check\.indexhive\.display\.partition\.co
ls\.separatelyhive\.error\.on\.empty\.partitionhive\.execution\.
enginehive\.exec\.copyfile\.maxsizehive\.exim\.uri\.scheme\.whit
elisthive\.file\.max\.footerhive\.insert\.into\.multilevel\.dirs
hive\.localize\.resource\.num\.wait\.attemptshive\.multi\.insert
\.move\.tasks\.share\.dependencieshive\.support\.quoted\.identif
iershive\.resultset\.use\.unique\.column\.nameshive\.analyze\.st
mt\.collect\.partlevel\.statshive\.exec\.schema\.evolutionhive\.
server2\.logging\.operation\.levelhive\.server2\.thrift\.results
et\.serialize\.in\.taskshive\.support\.special\.characters\.tabl
enamehive\.exec\.job\.debug\.capture\.stacktraceshive\.exec\.job
\.debug\.timeouthive\.llap\.io\.enabledhive\.llap\.io\.use\.file
id\.pathhive\.llap\.daemon\.service\.hostshive\.llap\.execution\
.modehive\.llap\.auto\.allow\.uberhive\.llap\.auto\.enforce\.tre
ehive\.llap\.auto\.enforce\.vectorizedhive\.llap\.auto\.enforce\
.statshive\.llap\.auto\.max\.input\.sizehive\.llap\.auto\.max\.o
utput\.sizehive\.llap\.skip\.compile\.udf\.checkhive\.llap\.clie
nt\.consistent\.splitshive\.llap\.enable\.grace\.join\.in\.llaph
ive\.llap\.allow\.permanent\.fnshive\.exec\.max\.created\.filesh
ive\.exec\.reducers\.maxhive\.reorder\.nway\.joinshive\.output\.
file\.extensionhive\.exec\.show\.job\.failure\.debug\.infohive\.
exec\.tasklog\.debug\.timeouthive\.query\.id
```

After upgrade:

```
hive\.auto\..*hive\.cbo\..*hive\.convert\..*hive\.druid\..*hive\
.exec\.dynamic\.partition.*hive\.exec\.max\.dynamic\.partitions.
*hive\.exec\.compress\..*hive\.exec\.infer\..*hive\.exec\.mode.l
ocal\..*hive\.exec\.orc\..*hive\.exec\.parallel.*hive\.exec\.que
ry\.redactor\..*hive\.explain\..*hive\.fetch.task\..*hive\.group
by\..*hive\.hbase\..*hive\.index\..*hive\.index\..*hive\.interme
diate\..*hive\.jdbc\..*hive\.join\..*hive\.limit\..*hive\.log\..
*hive\.mapjoin\..*hive\.merge\..*hive\.optimize\..*hive\.materia
lizedview\..*hive\.orc\..*hive\.outerjoin\..*hive\.parquet\..*hi
ve\.ppd\..*hive\.prewarm\..*hive\.query\.redaction\..*hive\.serv
er2\.thrift\.resultset\.default\.fetch\.sizehive\.server2\.proxy
\.userhive\.skewjoin\..*hive\.smbjoin\..*hive\.stats\..*hive\.st
rict\..*hive\.tez\..*hive\.vectorized\..*hive\.query\.reexecutio
n\..*reexec\.overlay\..*fs\.defaultFSssl\.client\.truststore\.lo
cationdistcp\.atomicdistcp\.ignore\.failuresdistcp\.preserve\.st
atusdistcp\.preserve\.rawxattrsdistcp\.sync\.foldersdistcp\.dele
te\.missing\.sourcedistcp\.keystore\.resourcedistcp\.liststatus\
.threadsdistcp\.max\.mapsdistcp\.copy\.strategydistcp\.skip\.crc
distcp\.copy\.overwritedistcp\.copy\.appenddistcp\.map\.bandwidt
h\.mbdistcp\.dynamic\..*distcp\.meta\.folderdistcp\.copy\.listin
```

```
g\.classdistcp\.filters\.classdistcp\.options\.skipcrccheckdistc
p\.options\.mdistcp\.options\.numListstatusThreadsdistcp\.option
s\.mapredSslConfdistcp\.options\.bandwidthdistcp\.options\.overw
ritedistcp\.options\.strategydistcp\.options\.idistcp\.options\.
p.*distcp\.options\.updatedistcp\.options\.deletemapred\.map\..*
mapred\.reduce\..*mapred\.output\.compression\.codecmapred\.job\
.queue\.namemapred\.output\.compression\.typemapred\.min\.split\
.sizemapreduce\.job\.reduce\.slowstart\.completedmapsmapreduce\.
job\.queuenamemapreduce\.job\.tagsmapreduce\.input\.fileinputfor
mat\.split\.minsizemapreduce\.map\..*mapreduce\.reduce\..*mapred
uce\.output\.fileoutputformat\.compress\.codecmapreduce\.output\
.fileoutputformat\.compress\.typeoozie\..*tez\.am\..*tez\.task\.
.*tez\.runtime\..*tez\.queue\.namehive\.transpose\.aggr\.joinhiv
e\.exec\.reducers\.bytes\.per\.reducerhive\.client\.stats\.count
ershive\.exec\.default\.partition\.namehive\.exec\.drop\.ignoren
onexistenthive\.counters\.group\.namehive\.default\.fileformat\.
managedhive\.enforce\.bucketmapjoinhive\.enforce\.sortmergebucke
tmapjoinhive\.cache\.expr\.evaluationhive\.query\.result\.filefo
rmathive\.hashtable\.loadfactorhive\.hashtable\.initialCapacityh
ive\.ignore\.mapjoin\.hinthive\.limit\.row\.max\.sizehive\.mapre
d\.modehive\.map\.aggrhive\.compute\.query\.using\.statshive\.ex
ec\.rowoffsethive\.variable\.substitutehive\.variable\.substitut
e\.depthhive\.autogen\.columnalias\.prefix\.includefuncnamehive\
.autogen\.columnalias\.prefix\.labelhive\.exec\.check\.crossprod
uctshive\.cli\.tez\.session\.asynchive\.compathive\.display\.par
tition\.cols\.separatelyhive\.error\.on\.empty\.partitionhive\.e
xecution\.enginehive\.exec\.copyfile\.maxsizehive\.exim\.uri\.sc
heme\.whitelisthive\.file\.max\.footerhive\.insert\.into\.multil
evel\.dirshive\.localize\.resource\.num\.wait\.attemptshive\.mul
ti\.insert\.move\.tasks\.share\.dependencieshive\.query\.results
\.cache\.enabledhive\.query\.results\.cache\.wait\.for\.pending\
.resultshive\.support\.quoted\.identifiershive\.resultset\.use\.
unique\.column\.nameshive\.analyze\.stmt\.collect\.partlevel\.st
atshive\.exec\.schema\.evolutionhive\.server2\.logging\.operatio
n\.levelhive\.server2\.thrift\.resultset\.serialize\.in\.taskshi
ve\.support\.special\.characters\.tablenamehive\.exec\.job\.debu
g\.capture\.stacktraceshive\.exec\.job\.debug\.timeouthive\.llap
\.io\.enabledhive\.llap\.io\.use\.fileid\.pathhive\.llap\.daemon
\.service\.hostshive\.llap\.execution\.modehive\.llap\.auto\.all
ow\.uberhive\.llap\.auto\.enforce\.treehive\.llap\.auto\.enforce
\.vectorizedhive\.llap\.auto\.enforce\.statshive\.llap\.auto\.ma
x\.input\.sizehive\.llap\.auto\.max\.output\.sizehive\.llap\.ski
p\.compile\.udf\.checkhive\.llap\.client\.consistent\.splitshive
\.llap\.enable\.grace\.join\.in\.llaphive\.llap\.allow\.permanen
t\.fnshive\.exec\.max\.created\.fileshive\.exec\.reducers\.maxhi
ve\.reorder\.nway\.joinshive\.output\.file\.extensionhive\.exec\
.show\.job\.failure\.debug\.infohive\.exec\.tasklog\.debug\.time
outhive\.query\.idhive\.query\.tag
```

hive.security.command.whitelist

Before upgrade: set,reset,dfs,add,list,delete,reload,compile

After upgrade: set,reset,dfs,add,list,delete,reload,compile,llap

hive.server2.enable.doAs

Before upgrade: TRUE (in case of an insecure cluster only)

After upgrade: FALSE (in all cases)

Affects only insecure clusters by turning off impersonation. Permission issues are expected to arise for affected clusters.

hive.server2.idle.session.timeout

Before upgrade: 12 hours

After upgrade: 24 hours

Exception:Preserves pre-upgrade value if old default is overridden; otherwise, uses new default.

hive.server2.max.start.attempts

Before upgrade: 30

After upgrade: 5

hive.server2.parallel.ops.in.session

Before upgrade: TRUE

After upgrade: FALSE

A Tez limitation requires disabling this property; otherwise, queries submitted concurrently on a single JDBC connection fail or execute slower.

hive.server2.support.dynamic.service.discovery

Before upgrade: FALSE

After upgrade: TRUE

hive.server2.tez.initialize.default.sessions

Before upgrade: FALSE

After upgrade: TRUE

hive.server2.thrift.max.worker.threads

Before upgrade: 100

After upgrade: 500

Exception: Preserves pre-upgrade value if the old default is overridden; otherwise, uses new default.

hive.server2.thrift.resultset.max.fetch.size

Before upgrade: 1000

After upgrade: 10000

hive.service.metrics.file.location

Before upgrade: /var/log/hive/metrics-hiveserver2/metrics.log

After upgrade: /var/log/hive/metrics-hiveserver2-hiveontez/metrics.log

This location change is due to a service name change.

hive.stats.column.autogather

Before upgrade: FALSE

After upgrade: TRUE

hive.stats.deserialization.factor

Before upgrade: 1

After upgrade: 10

hive.support.special.characters.tablename

Before upgrade: FALSE

After upgrade: TRUE

hive.tez.auto.reducer.parallelism

Before upgrade: FALSE

After upgrade: TRUE

hive.tez.bucket.pruning

Before upgrade: FALSE

After upgrade: TRUE

hive.tez.container.size

Before upgrade: -1

After upgrade: 4096

hive.tez.exec.print.summary

Before upgrade: FALSE

After upgrade: TRUE

hive.txn.manager

Before upgrade: org.apache.hadoop.hive.ql.lockmgr.DummyTxnManager

After upgrade: org.apache.hadoop.hive.ql.lockmgr.DbTxnManager

hive.vectorized.execution.mapjoin.minmax.enabled

Before upgrade: FALSE

After upgrade: TRUE

hive.vectorized.execution.mapjoin.native.fast.hashtable.enabled

Before upgrade: FALSE

After upgrade: TRUE

hive.vectorized.use.row.serde.deserialize

Before upgrade: FALSE

After upgrade: TRUE

Related Information

Changes to HDP Hive Tables

Customizing critical Hive configurations

As Administrator, you need property configuration guidelines. You need to know which properties you need to reconfigure after upgrading. You must understand which the upgrade process carries over from the old cluster to the new cluster.

The upgrade process tries to preserve your Hive configuration property overrides. These overrides are the custom values you set to configure Hive in the old CDH or HDP cluster. The upgrade process does not perserve all overrides. For example, a custom value you set for hive.exec.max.dynamic.partitions.pernode is preserved. In the case of other properties, for example hive.cbo.enable, the upgrade ignores any override and just sets the -recommended value.

The upgrade process does not preserve overrides to the configuration values of the following properties that you likely need to reconfigure to meet your needs:

- hive.conf.hidden.list
- hive.conf.restricted.list
- hive.exec.post.hooks
- hive.script.operator.env.blacklist
- hive.security.authorization.sqlstd.confwhitelist
- hive.security.command.whitelist

The Apache Hive Wiki describes these properties. The values of these properties are lists.

The upgrade process ignores your old list and sets a new generic list. For example, the hive.security.command.whitelist value is a list of security commands you consider trustworthy and want to keep. Any overrides of this list that you set in the old cluster are not preserved. The new default is probably a shorter (more restrictive) list than the original default you were using in the old cluster. You need to customize this to meet your needs.

Check and change each property listed above after upgrading as described in the next topic.

Consider reconfiguring more property values than the six listed above. Even if you did not override the default value in the old cluster, the default might have changed in a way that impacts your work.

Setting Hive Configuration Overrides

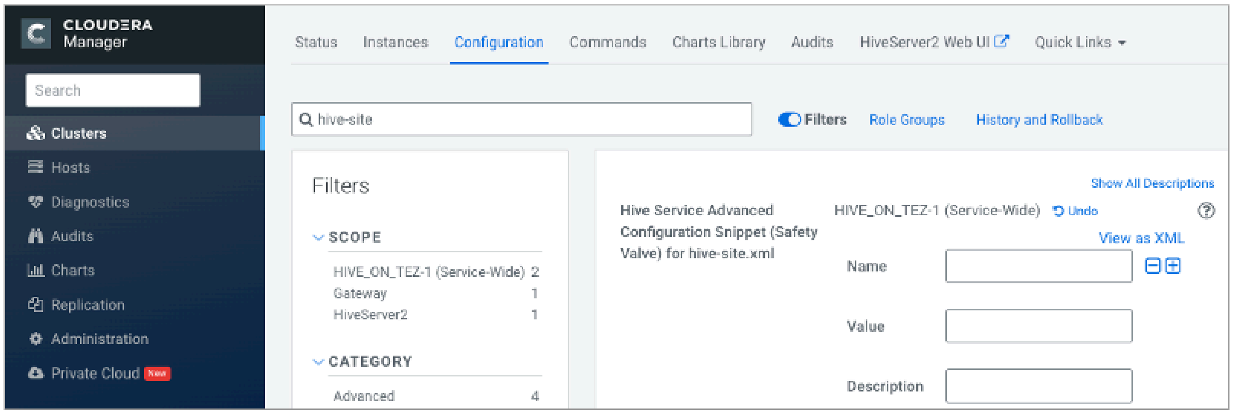
You need to know how to configure the critical customizations that the upgrade process does not preserve from your old Hive cluster. Referring to your records about your old configuration, you follow steps to set at least six critical property values.

About this task

By design, the six critical properties that you need to customize are not visible in , as you can see from the Visible in column of Configurations Requirements and Recommendations. You use the Safety Valve to add these properties to hive-site.xml as shown in this task.

Procedure

1. In   Clusters select the Hive on Tez service. Click Configuration, and search for hive-site.xml.
2. In Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml, click +.



3. In Name, add the hive.conf.hidden.list property.
4. In Value, add your custom list.
5. Customize the other critical properties: hive.conf.restricted.list, hive.exec.post.hooks, hive.script.operator.env.blacklist, hive.security.authorization.sqlstd.confwhitelist, hive.security.command.whitelist.

   Use hive.security.authorization.sqlstd.confwhitelist.append, for example, to set up the list.
6. Save the changes and restart the Hive service.
7. Look at the Configurations Requirements and Recommendations to understand which overrides were preserved or not.

Hive Configuration Requirements and Recommendations

You need to set certain Hive and HiveServer (HS2) configuration properties after upgrading. You review recommendations for setting up for your needs, and understand which configurations remain unchanged after upgrading, which impact performance, and default values.

Requirements and Recommendations

The following table includes the Hive service and HiveServer properties that the upgrade process changes. Other property values (not shown) are carried over unchanged from CDH or HDP to

- Set After Upgrade column: properties you need to manually configure after the upgrade to . Pre-existing customized values are not preserved after the upgrade.

- Default Recommended column: properties that the upgrade process changes to a new value that you are strongly advised to use.
- Impacts Performance column: properties changed by the upgrade process that you set to tune performance.
- Safety Value Overrides column: How the upgrade process handles Safety Valve overrides.
    - Disregards: the upgrade process removes any old CDH Safety Valve configuration snippets from the new CDP configuration.
    - Preserves means the upgrade process carries over any old CDH snippets to the new CDP configuration.
    - Not applicable means the value of the old parameter is preserved.
- Visible in CM column: property is visible in Cloudera Manager after upgrading. after upgrading.

  If a property is not visible, and you want to configure it, use the Safety Valve to safely add the parameter to the correct file, for example to a cluster-wide, hive-site.xml file.

Table 5:

Property	Set After Upgrade	Default Recomme	Impacts Performa	New Feature	Safety Valve Overrides	Visible in CM
datanucleus.connectionPool.maxPoolSize			#		Preserve	
datanucleus.connectionPoolingType			#		Disregard	
hive.async.log.enabled					Disregard	#
hive.auto.convert.join.noconditionaltask.size					Not applicable	#
hive.auto.convert.sortmerge.join					Preserve	
hive.auto.convert.sortmerge.join.to.mapjoin					Preserve	
hive.cbo.enable					Disregard	#
hive.cbo.show.warnings					Disregard	
hive.compactor.worker.threads				#	Disregard	#
hive.compute.query.using.stats			#		Disregard	#
hive.conf.hidden.list	#				Disregard	
hive.conf.restricted.list	#				Disregard	
hive.default.fileformat.managed					Disregard	#
hive.default.rcfile.serde		#			Preserve	
hive.driver.parallel.compilation					Disregard	#
hive.exec.dynamic.partition.mode					Disregard	
hive.exec.max.dynamic.partitions					Preserve	
hive.exec.max.dynamic.partitions.pernode					Preserve	
hive.exec.post.hooks	#				Disregard	
hive.exec.reducers.max		# or other prime number			Not applicable	#
hive.execution.engine					Disregard	
hive.fetch.task.conversion			#		Not applicable	#
hive.fetch.task.conversion.threshold			#		Not appliable	#
hive.hashtable.key.count.adjustment			#		Preserve	
hive.limit.optimize.enable		#			Disregard	
hive.limit.pushdown.memory.usage			#		Not Applicable	#

Property	Set After Upgrade	Default Recomme	Impacts Performa	New Feature	Safety Valve Overrides	Visible in CM
hive.mapjoin.hybridgrace.hashtable		#	#		Disregard	
hive.mapred.reduce.tasks.speculative.execution		#			Disregard	
hive.metastore.aggregate.stats.cache.enabled		#	#		Disregard	
hive.metastore.disallow.incompatible.col.type.changes					Disregard	
hive.metastore.dml.events					Disregard	#
hive.metastore.event.message.factory		#			Disregard	
hive.metastore.uri.selection		#			Disregard	
hive.metastore.warehouse.dir					Preserve	#
hive.optimize.metadataonly		#			Disregard	
hive.optimize.point.lookup.min					Disregard	
hive.prewarm.numcontainers					Disregard	
hive.script.operator.env.blacklist	#				Disregard	
hive.security.authorization.sqlstd.confwhitelist	#				Disregard	
hive.security.command.whitelist	#				Disregard	
hive.server2.enable.doAs					Disregard	#
hive.server2.idle.session.timeout					Not applicable	#
hive.server2.max.start.attempts					Preserve	
hive.server2.parallel.ops.in.session					Preserve	
hive.server2.support.dynamic.service.discovery				#	Disregard	#
hive.server2.tez.initialize.default.sessions				#	Disregard	
hive.server2.thrift.max.worker.threads					Not Applicable	#
hive.server2.thrift.resultset.max.fetch.size					Preserve	
hive.service.metrics.file.location					Disregard	#
hive.stats.column.autogather		#			Disregard	
hive.stats.deserialization.factor		#			Disregard	
hive.support.special.characters.tablename		#			Disregard	
hive.tez.auto.reducer.parallelism				#	Disregard	#
hive.tez.bucket.pruning				#	Disregard	#
hive.tez.container.size				#	Disregard	#
hive.tez.exec.print.summary				#	Disregard	#
hive.txn.manager				#	Disregard	#
hive.vectorized.execution.mapjoin.minmax.enabled		#			Disregard	
hive.vectorized.execution.mapjoin.native.fast.hashtable.enabled		#			Disregard	
hive.vectorized.use.row.serde.deserialize		#			Disregard	

Removing the LLAP Queue

Before upgrading from HDP to CDP, if you used LLAP, a YARN interactive query queue was created. This queue is carried over to your CDP cluster. You must remove this queue, likely named llap, after the upgrade.

About this task

When you set up LLAP in an HDP cluster, Ambari creates a queue named llap by default; however, you might have created the LLAP queue manually and assigned a different name to the queue. Look for your LLAP and remove it as follows:

Note: LLAP is not supported on Cloudera Private Cloud Base.

Procedure

1. In Cloudera Manager, select Clusters YARN YARN Queue Manager UI .
   A graphical queue hierarchy is displayed in the Overview tab.
2. Click the options menu ⋮ for the interactive query queue.
3. Click Delete Queue, and confirm deletion.

Configuring HiveServer for ETL using YARN queues

You need to set several configuration properties to allow placement of the Hive workload on the Yarn queue manager, which is common for running an ETL job. You need to set several parameters that effectively disable the reuse of containers. Each new query gets new containers routed to the appropriate queue.

About this task

Hive configuration properties affect mapping users and groups to YARN queues. You set these properties to use with YARN Placement Rules.

To set Hive properties for YARN queues:

Procedure

1. In Cloudera Manager, click Clusters Hive-on-Tez Configuration .
2. Search for the Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml setting.
3. In the Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml setting, click +.
4. In Name enter the property hive.server2.tez.initialize.default.sessions and in value enter false.
5. In Name enter the property hive.server2.tez.queue.access.check and in value enter true.
6. In Name enter the property hive.server2.tez.sessions.custom.queue.allowed and in value enter true.

Related Information

Managing YARN queue users

Configuring authorization to tables

Although the upgrade process makes no change to the location of external tables, you need to set up access to external tables in HDFS. If you choose the recommended Ranger security model for authorization, you need to set up policies and configure Hive metastore (HMS).

About this task

Set up access to external tables in HDFS using one of the following methods.

- Set up a Hive HDFS policy in Ranger (recommended) to include the paths to external table data.
- Put an HDFS ACL in place. Store the external text file, for example a comma-separated values (CSV) file, in HDFS that will serve as the data source for the external table.

If you want to use Ranger to authorize access to your tables, you must configure a few HMS properties for authorization in addition to setting up Ranger policies. If you have not configured HMS, attempting to create a table using Spark SQL, Beeline, or Hue results in the following error:

```
org.apache.hadoop.hive.ql.ddl.DDLTask. MetaException(message:No privilege 'C
reate' found for outputs { database:DATABASE_NAME, table:TABLE_NAME})
```

Related Information

Authorizing Apache Hive Access

Configuring HMS properties for authorization

Updating Hive and Impala JDBC/ODBC drivers

After upgrading, Cloudera recommends that you update your Hive and Impala JDBC and ODBC drivers. You follow a procedure to download a driver.

Before you begin

Configure authenticated users for running SQL queries through a JDBC or ODBC driver. For example, set up a Ranger policy.

Getting the JDBC driver

You learn how to download the Cloudera Hive and Impala JDBC drivers to give clients outside the cluster access to your SQL engines.

Procedure

1. Download the lastest Hive JDBC driver for CDP from the Hive JDBC driver download page.
2. Go to the Impala JDBC driver page, and download the latest Impala JDBC driver.
3. Follow JDBC driver installation instructions on the download page.

Getting the ODBC driver

You learn how to download the Cloudera ODBC drivers for Hive and Impala.

Procedure

1. Download the latest Hive ODBC driver for CDP from the Cloudera ODBC driver download page.
2. Go to the Impala ODBC driver page, and download the latest Impala ODBC driver.
3. Follow ODBC driver installation instructions on the download page.

Setting up access control lists

Several sources of information about setting up HDFS ACLS plus a brief Ranger overview and pointer to Ranger information prepare you to set up Hive authorization.

In , HDFS supports POSIX ACLs (Access Control Lists) to assign permissions to users and groups. In lieu of Ranger policies, you use HDFS ACLs to check and make any necessary changes in HDFS permission changes. For more information, see HDFS ACLs, Apache Software Foundation HDFS Permissions Guide, and HDFS ACL Permissions.

In Ranger, you give multiple groups and users specific permissions based on your use case. You apply permissions to a directory tree instead of dealing with individual files. For more information, see Authorizing Apache Hive Access.

If possible, you should use Ranger policies over HDFS ACLs to control HDFS access. Controlling HDFS access through Ranger provides a single, unified interface for understanding and managing your overall governance framework and policy design. If you need to mimic the legacy Sentry HDFS ACL Sync behavior for Hive and Impala tables, consider using Ranger RMS.

Configure encryption zone security

Under certain conditions, you as Administrator, need to perform a security-related task to allow users to access to tables stored in encryption zones. You find out how to prevent access problems to these tables.

About this task

Hive on Tez cannot run some queries on tables stored in encryption zones under certain conditions. Perform the following procedure only when the cluster uses self-signed certificates.

Important: Skip this task for clusters where TLS certificates are properly signed by a Certificate Authority (CA), and the CA is in the truststore files.

Procedure

1. Copy the ssl-client.xml file to a directory that is available on all hosts.
2. In , click Clusters Hive on Tez Configuration .
3. Search for the Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml setting.
4. In the Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml setting, click + .
5. In Name enter the property tez.aux.uris and in value enter path-to-ssl-client.xml.

   Ensure that you include the file URI scheme in the path. For example:

   ```
   tez.aux.uris=file:///etc/hadoof/conf
   ```

Renaming tables

To harden the system, Hive data can be stored in HDFS encryption zones. RENAME has been changed to prevent moving a table outside the same encryption zone or into a no-encryption zone.

Before Upgrade to

In CDH and HDP, renaming a managed table moves its HDFS location.

After Upgrade to

Renaming a managed table moves its location only if the table is created without a LOCATION clause and is under its database directory.

Action Required

None

Configure edge nodes as gateways

If you use command-line clients, such as Sqoop, to access Hive, you must configure these gateways to use defaults for your service. You can accomplish this task in a few steps.

About this task

By default, the HS2 instances configured in the migration already have the default beeline-site.xml file defined for the service. Other hosts do not. Configure these hosts as a gateway for that service.

Procedure

1. Find the notes you made before the upgrade about edge nodes and default, connected endpoints.
2. In , configure hosts other than HiveServer (HS2) hosts that you want to be Hive Gateway nodes as gateways for the default beeline-site.xml file for the gateway service.

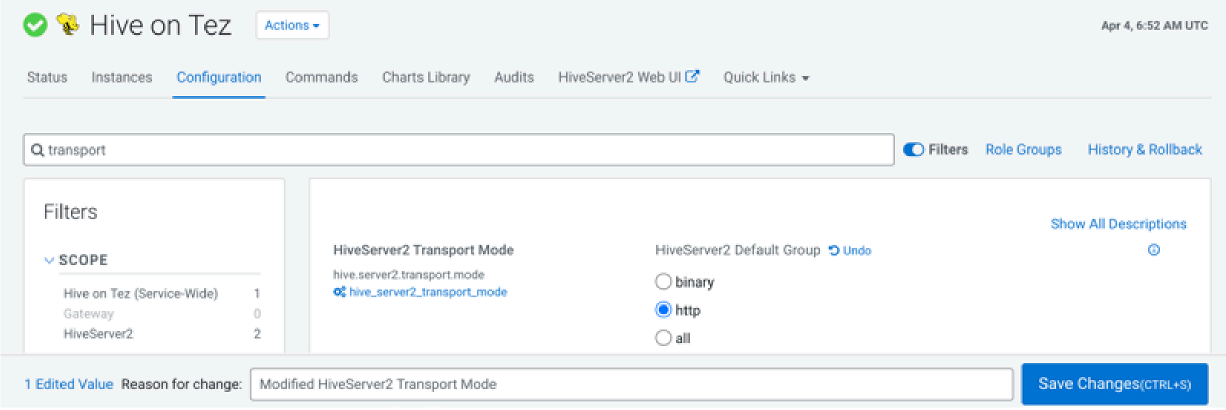
Configure HiveServer HTTP mode

If you use Knox, you might need to change the HTTP mode configuration. If you installed Knox on and want to proxy HiveServer with Knox, you need to change the default HiveServer transport mode (hive.server2.transport.mode).

Procedure

1. Click Clusters HIVE_ON_TEZ Configuration

2. In Search, type transport.
3. In HiveServer2 Transport Mode, select http.



transport

HiveServer2 Transport Mode
hive.server2.transport.mode
hive_server2_transport_mode

HiveServer2 Default Group

○ binary
● http
○ all

Reason for change: Modified HiveServer2 Transport Mode

4. Save and restart Hive on Tez.

Configuring HMS for high availability

To provide failover to a secondary Hive metastore if your primary instance goes down, you need to know how to add a Metastore role in Cloudera Manager and configure a property.

About this task

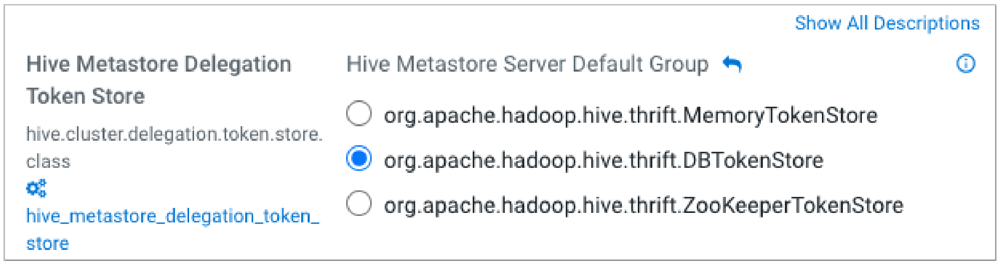
Multiple HMS instances run in active/active mode. No load balancing occurs. An HMS client always reaches the first instance unless it is down. In this case, the client scans the hive.metastore.uris property that lists the HMS instances for a replacement HMS. The second HMS is the designated replacement if hive.metastore.uri.selection is set to SEQUENTIAL (recommended and the default); otherwise, the replacement is selected randomly from the list if hive .metastore.uri.selection is set to RANDOM.

Before you begin

Minimum Required Role: Configurator (also provided by Cluster Administrator, Full Administrator)

Procedure

1. In Cloudera Manager, click Clusters Hive Configuration .
2. Take one of the following actions:
   - If you have a cluster secured by Kerberos, search for Hive Delegation Token Store, which specifies storage for the Kerberos token as described below.
   - If you have an unsecured cluster, skip the next step.
3. Select org.apache.hadoop.hive.thrift.DBTokenStore, and save the change.



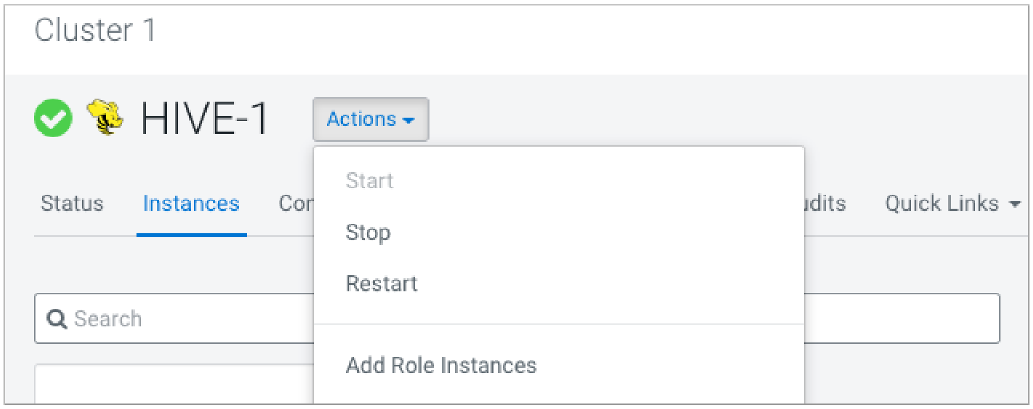
Hive Metastore Delegation Token Store
hive.cluster.delegation.token.store.class
hive_metastore_delegation_token_store

Hive Metastore Server Default Group

○ org.apache.hadoop.hive.thrift.MemoryTokenStore
● org.apache.hadoop.hive.thrift.DBTokenStore
○ org.apache.hadoop.hive.thrift.ZooKeeperTokenStore

Storage for the Kerberos delegation token is defined by the hive.cluster.delegation.token.store.class property. The available choices are Zookeeper, the Metastore, and memory. Cloudera recommends using the database by setting the org.apache.hadoop.hive.thrift.DBTokenStore property.

4. Click Instances Actions Add Role Instances



5. In Assign Roles, in Metastore Server, click Select Hosts.
6. In Hosts Selected, scroll and select the host that you want to serve as the backup Metastore, and click OK.
7. Click Continue until you exit the wizard.
8. Start the Metastore role on the host from the Actions menu.

   The hive.metastore.uris property is updated automatically.
9. To check or to change the hive.metastore.uri.selection property, go to Clusters Hive Configurations , and search for Hive Service Advanced Configuration Snippet (Safety Valve) for hive-site.xml.
10. Add the property and value (SEQUENTIAL or RANDOM).

Installing Hive on Tez and adding a HiveServer role

services include Hive on Tez and Hive Metastore (HMS). Hive on Tez is a SQL query engine using Apache Tez that performs the HiveServer (HS2) role in a cluster. You must install the Hive service (HMS) before Hive on Tez and HMS in the correct order; otherwise, HiveServer will fail. You must add the HiveServer role additionally to Hive on Tez, not the Hive service; otherwise, HiveServer will fail.

Procedure

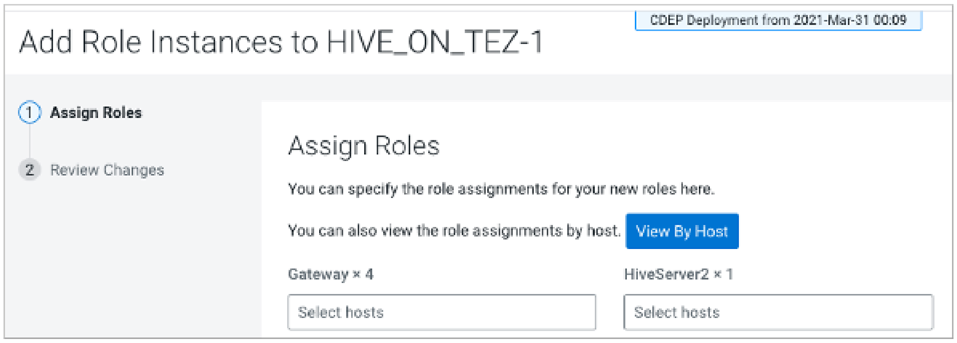
1. Install the HMS, designated Hive service in .
2. Install Hive on Tez
   HiveServer is installed automatically during this process.
3. Accept the default, or change the Hive warehouse location for managed and external tables as described below.

Adding a HiveServer role

Procedure

1. In Cloudera Manager, click Clusters Hive on Tez .

   Do not click Clusters Hive by mistake. This selects the Hive metastore and ultimately results in failure.
2. Click Actions Add Role Instances .

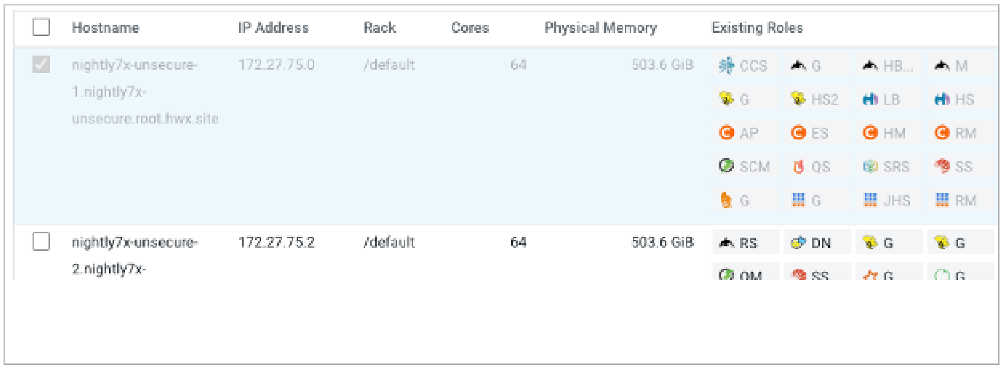


Assign Roles

You can specify the role assignments for your new roles here.

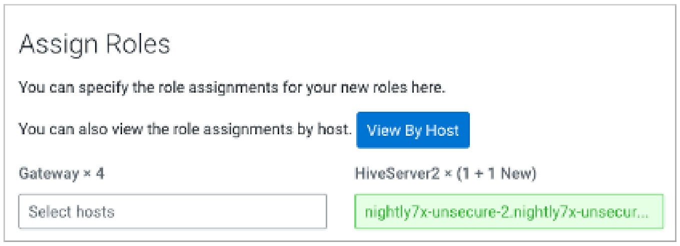
You can also view the role assignments by host.

3. Click in the HiveServer2 box to select hosts.



□	Hostname	IP Address	Rack	Cores	Physical Memory	Existing Roles
☑	nightly7x-unsecure-1.nightly7x-unsecure.root.hwx.site	172.27.75.0	/default	64	503.6 GiB	CCS G HB... M G HS2 LB HS AP ES HM RM SCM QS SRS SS G G JHS RM
□	nightly7x-unsecure-2.nightly7x-	172.27.75.2	/default	64	503.6 GiB	RS DN G G OM SS G G

4. In the Host name column, select a host for the HiveServer2 role, and click OK.
   The selected host name you assigned the HiveServer2 role appears under HiveServer2.



Assign Roles

You can specify the role assignments for your new roles here.

You can also view the role assignments by host.

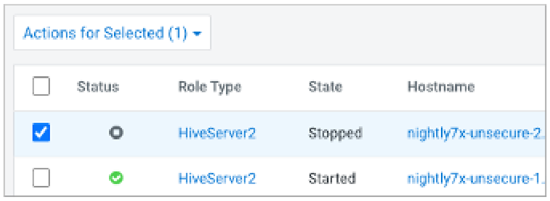
Gateway × 4: Select hosts

HiveServer2 × (1 + 1 New): nightly7x-unsecure-2.nightly7x-unsecur...

5. Click Continue.

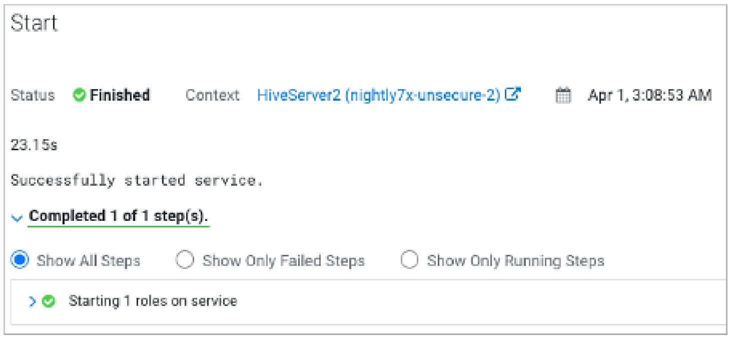
   The new HiveServer2 role state is stopped.

6. Select the new HiveServer2 role.



□	Status	Role Type	State	Hostname
☑	○	HiveServer2	Stopped	nightly7x-unsecure-2.
□	✓	HiveServer2	Started	nightly7x-unsecure-1.

7. In Actions for Selected, select Start, and then click Start to confirm.
   You see that the service successfully started.



Start

Status ✓ Finished Context HiveServer2 (nightly7x-unsecure-2) Apr 1, 3:08:53 AM

23.15s

```
Successfully started service.
```

Completed 1 of 1 step(s).

● Show All Steps ○ Show Only Failed Steps ○ Show Only Running Steps

> ✓ Starting 1 roles on service

Changing the Hive warehouse location

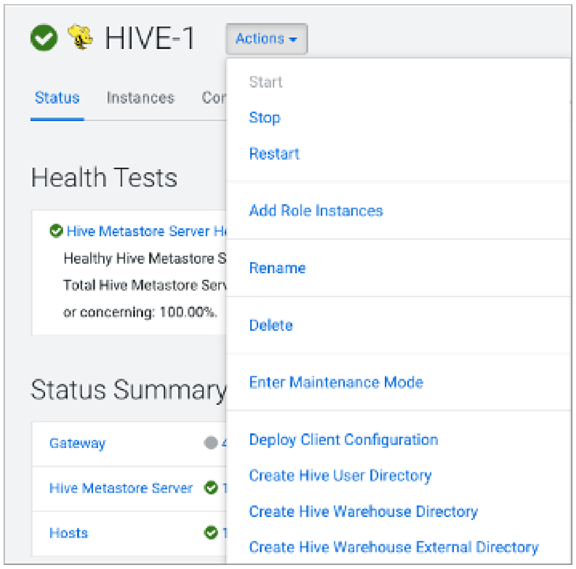
About this task

You use the Hive Metastore Action menu in Cloudera Manager, and navigate to one of the following menu items in the first step below.

- Hive Action Menu Create Hive Warehouse Directory
- Hive Action Menu Create Hive Warehouse External Directory

Procedure

1. Set up directories for the Hive warehouse directory and Hive warehouse external directory from Cloudera Manager Actions.



2. In Cloudera Manager, click Clusters Hive (the Hive Metastore service) Configuration , and change the hive.metastore.warehouse.dir property value to the path you specified for the new Hive warehouse directory.
3. Change the hive.metastore.warehouse.external.dir property value to the path you specified for the Hive warehouse external directory.
4. Configure Ranger policies or set up ACL permissions to access the directories.

Handling table reference syntax

For ANSI SQL compliance, Hive 3.x rejects `db.table` in SQL queries as described by the Hive-16907 bug fix. A dot (.) is not allowed in table names. As a Data Engineer, you need to ensure that Hive tables do not contain these references before migrating the tables to , that scripts are changed to comply with the SQL standard references, and that users are aware of the requirement.

About this task

To change queries that use such `db.table` references thereby preventing Hive from interpreting the entire db.table string incorrectly as the table name, you enclose the database name and the table name in backticks as follows:

A dot (.) is not allowed in table names.

Procedure

1. Find a table having the problematic table reference.
   For example, math.students appears in a CREATE TABLE statement.
2. Enclose the database name and the table name in backticks.

```
CREATE TABLE `math`.`students` (name VARCHAR(64), age INT, gpa DECIMAL(3
,2));
```

Add Backticks to Table References

CDP Private Cloud Base includes the Hive-16907 bug fix, which rejects `db.table` in SQL queries. A dot (.) is not allowed in table names. You need to change queries that use such references to prevent Hive from interpreting the entire db.table string as the table name.

Procedure

1. Find a table having the problematic table reference.

   ```
   math.students
   ```

   appears in a CREATE TABLE statement.
2. Enclose the database name and the table name in backticks.

   ```
    CREATE TABLE `math`.`students` (name VARCHAR(64), age INT, gpa DECIMAL
   (3,2));
   ```

Unsupported Interfaces and Features

You need to know the interfaces available in HDP or CDH platforms that are no longer supported in CDP. Some features you might have used are also unsupported.

Unsupported Interfaces

- Druid
- LLAP (available in CDP Public Cloud only)
- S3 for storing tables (available in CDP Public Cloud only)
- Apache Hive Standalone driver

Storage Based Authorization

Storage Based Authorization (SBA) is not longer supported in CDP. Ranger integration with Hive metastore provides consistency in Ranger authorization enabled in HiveServer (HS2). SBA did not provide authorization support for metadata that does not have a file/directory associated with it. Ranger-based authorization has no such limitation.

Related Information

Configuring HMS for high availability

Changes to HDP Hive tables

As a Data Scientist, Architect, Analyst, or other Hive user you need to locate and use your Apache Hive 3 tables after an upgrade. The upgrade process from HDP 3.1.5 to CDP makes no changes in the location of tables.

After the upgrade, the format of a Hive table is the same as before the upgrade. For example, native or non-native tables remain native or non-native, respectively.

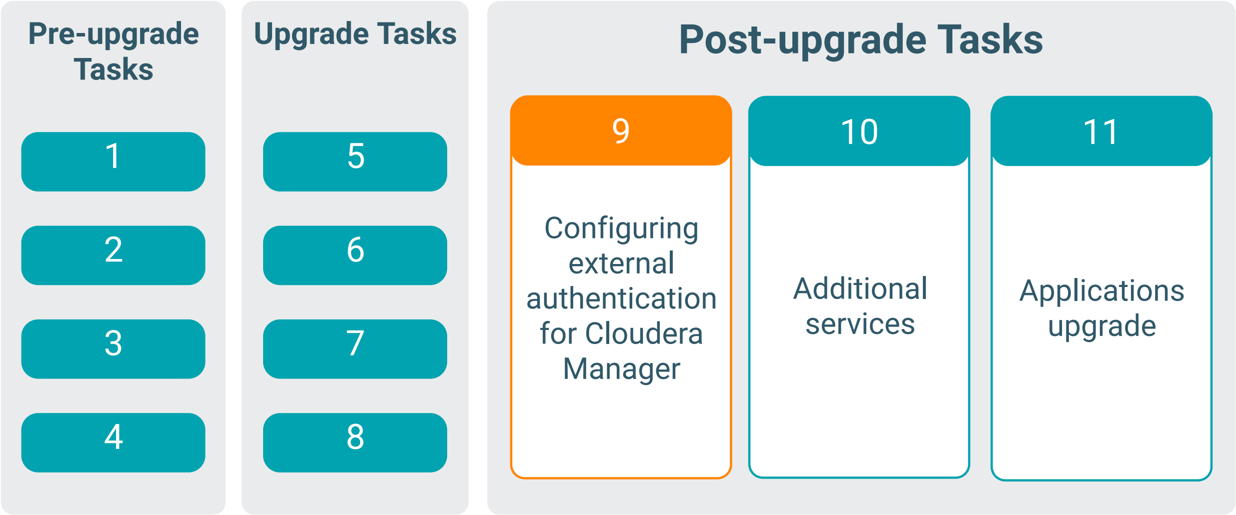
After the upgrade, the location of managed tables or partitions do not change:

Managed files reside in the Hive warehouse /warehouse/tablespace/managed/hive. The upgrade process carries the external files over to CDP with no change in location. By default, Hive places any new external tables you create in /warehouse/tablespace/external/hive. The upgrade process sets the hive.metastore.warehouse.dir property to this location, designating it the Hive warehouse location.

Hive 3.x in Cloudera Private Cloud Base supports transactional and non-transactional tables. Transactional tables have atomic, consistent, isolation, and durable (ACID) properties. In Hive 3.x, the mature version of ACID is ACID v2, which is the default table type in Cloudera Private Cloud Base.

Configuring External Authentication for Cloudera Manager

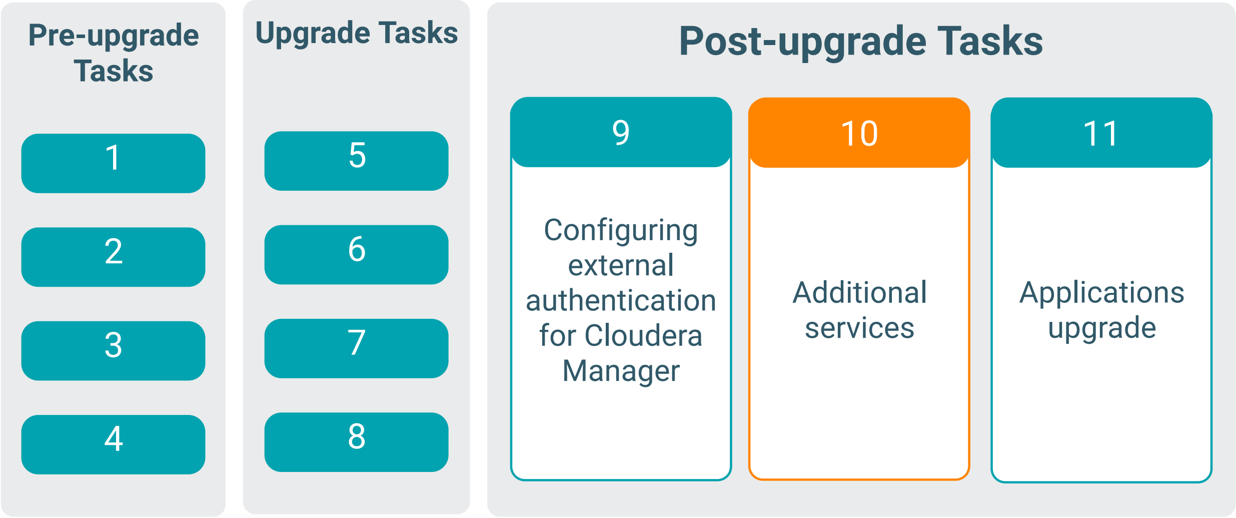
If you have LDAP configured on your cluster, then continue further with this document.



Configuring External Authentication

Additional Services

The Hue and DAS services are optional.



Installing Data Analytics Studio on a Cloudera Private Cloud Base cluster using Ambari

This section applies only if you were on HDP 2.6.5 running Hive LLAP and Druid workloads, and using Ambari Views to manage and monitor the performance of your queries. With Cloudera Private Cloud Base, Data Analytics Studio (DAS) replaces Ambari Views (Hive View and Tez View) and offers additional analytical capabilities.

The tasks listed in this section assume that you have already upgraded Ambari and HDP cluster from 2.6.5 to Cloudera Private Cloud Base 7.1.x.

Note:

1. DAS requires a backend database for storing query event information, and supports only PostgreSQL versions 9.6, 10, and 12.
2. Data Analytics Studio (DAS) has been deprecated and is no longer available in CDP Private Cloud Base starting with 7.1.9. For more information, see Deprecation Notice for DAS.

Check cluster configuration for Hive and Tez

Before you add the DAS service to your Cloudera Private Cloud Base cluster, check the configuration settings for Hive and Tez in the Ambari UI. This can ensure that your queries appear properly when you use DAS.

Procedure

1. Go to Ambari Services Hive CONFIGS ADVANCED . Make sure that the Hive configurations are as follows:

   - hive.hook.proto.base-directory: {hive_metastore_warehouse_external_dir}/sys.db/query_data/
   - hive.exec.failure.hooks: org.apache.hadoop.hive.ql.hooks.HiveProtoLoggingHook
   - hive.exec.post.hooks: org.apache.hadoop.hive.ql.hooks.HiveProtoLoggingHook
   - hive.exec.pre.hooks: org.apache.hadoop.hive.ql.hooks.HiveProtoLoggingHook
   - hive.metastore.transactional.event.listeners: org.apache.hive.hcatalog.listener.DbNotificationListener

   Note: If you have upgraded your cluster from HDP 2.6.x to Cloudera Private Cloud Base 7.1.x, then specify org.apache.hive.hcatalog.listener.DbNotificationListener in the hive.metastore.transactional.event.listeners property under Advanced hivemetastore-site.
2. Go to Ambari Services Tez CONFIGS Custom tez-site . Make sure that the Tez configuration is as follows:

   - tez.history.logging.service.class: org.apache.tez.dag.history.logging.proto.ProtoHistoryLoggingService
   - tez.history.logging.proto-base-dir: {hive_metastore_warehouse_external_dir}/sys.db/

Add the DAS service

Adding the DAS service from the Ambari UI makes DAS available on your cluster.

Procedure

1. On the Ambari UI, click Actions Add Service .

   The Add Service Wizard is displayed.
2. On the Choose Services page of the Wizard, select Data Analytics Studio.

   Other required services are automatically selected.
3. When prompted to confirm the addition of dependent services, give a positive confirmation to all.

   This adds the other required services.
4. On the Customize Services page, expand Advance_data_analytics_studio-database and fill in the database details and other required fields that are highlighted.

   Note:

   - Enter a password in the password field. Do not leave this field empty.
   - Uncheck the Create Data Analytics Studio database checkbox, and specify the same database hostname in the Data Analytics Studio database hostname field on which your database is running.

5. In the user_authentication field, specify the authentication method that you want to use. You can specify one of the following:

   - NONE: Specify NONE if you do not want to enable user authentication. In this case, all the queries will be executed as the hive service user.
   - KNOX_SSO: Specify KNOX_SSO to enable single sign-on experience to authenticate users as configured in the Knox SSO topology.
   - KNOX_PROXY: Specify KNOX_PROXY to use DAS behind a Knox proxy. The user is authenticated as configured in the Knox proxy topology. It also enables SPNEGO authentication.
   - SPNEGO: Specify SPNEGO to authenticate users using a token-based authentication.

   You can configure the user authentication separately, after you have added the DAS service as part of the post-installation tasks.
6. You can add additional configuration information in rest of the fields as appropriate.
7. Complete the remaining installation wizard steps and exit the wizard.
8. Ensure that all components required for the DAS service start successfully.
9. Make sure to restart all the affected services in Ambari.

DAS post-installation tasks

After adding the DAS service on the Cloudera Private Cloud Base 7.1.x cluster, complete the tasks in this section to start using DAS.

Additional configuration tasks

You can increase or decrease the time for which the audit and event logs are retained in the system, after which they are auto-purged. You can also make DAS work with HiveServer2 in case your Hive deployment is not LLAP-enabled and does not have Hive Server Interactive.

Making DAS work with HiveServer2

If your Hive deployment is not LLAP-enabled and does not have Hive Server Interactive, you need to update the configuration for DAS to work with HiveServer2 as follows:

Go to Ambari Data Analytics Studio Configs and change use.hive.interactive.mode=true to use.hive.interactive.mode=false

Customizing the retention period of audit and event logs

Audit and event logs are written by Hive/Tez to HDFS for DAS to consume to generate DAG information. Once DAS consumes them, this information on HDFS is no longer required. They are cleaned automatically via a thread in HMS (Hive metastore).

The time to live count of the audit logs is defined in the hive.hook.proto.events.ttl parameter. By default, the logs are retained for seven days. To configure a custom value:

1. From the Ambari UI, go to Hive HiveMetaStore Configs and specify the time to live in the hive.hook.proto.events.ttl parameter.

   For example, to retain the logs for 30 days, specify 30d.

   Typically, a 30-day duration is useful if you want to download older DAG data.
2. Restart the Hive service.

Setting up the tmp directory

DAS allows you to download logs for secure clusters. To download logs, make sure that the DAS service user has write permission to the /tmp directory. Also make sure that the /tmp directory has sufficient storage space to hold logs from a query for the download logs feature to work.

Configuring DAS for SSL/TLS

If your HDP cluster is SSL enabled, then you can configure SSL. This is an optional configuration.

You can use one of the two options to set up SSL certificates:

- Set up trusted CA certificates
- Set up self-signed certificates

Set up trusted CA certificate

You can enable SSL for the DAS Engine using a certificate from a trusted Certificate Authority (CA). Certificates from a trusted CA are primarily used in production environments. For a test environment, you can use a self-signed certificate.

Before you begin

- You must have root user access to the clusters on which DAS Engine is installed.
- You must have obtained a certificate from your CA, following their instructions.

Procedure

1. Log in as root user on the cluster with DAS Engine installed.
2. Import the Certificate Chain Certificate and the certificate you obtained from your CA.

```
keytool -import -alias root -keystore <path_to_keystore_file> -trustcace
rts -file <certificate_chain_certificate>
```

```
keytool -import -alias jetty -keystore <path_to_keystore_file> -file <ce
rtificate_from_CA>
```

Note: Ignore the following warning:

```
The JKS keystore uses a proprietary format. It is recommended
 to migrate to PKCS12 which is an industry standard format using
 "keytool -importkeystore -srckeystore <keystore_file_path> -
destkeystore <keystore_file_path> -deststoretype pkcs12".
```

Set up self-signed certificates

You can enable SSL for the DAS Engine using a self-signed certificate. Self-signed certificates are primarily used in test environments. For a production environment, you should use a certificate from a trusted CA.

Before you begin

You must have root user access to the clusters on which DAS Engine is installed.

Procedure

1. Log in as root user on the cluster with DAS Engine installed.

2. Generate a key pair and keystore for use with DAS Engine.

```
keytool -genkey -alias jetty -keystore <certificate_file_path> -storepass
 <keystore_password> -dname 'CN=das.host.com, OU=Eng, O=ABC Corp, L=Santa
 Clara, ST=CA, C=US' -keypass <key_password> -keyalg RSA
```

Note: Ignore the following warning:

```
The JKS keystore uses a proprietary format. It is recommended
 to migrate to PKCS12 which is an industry standard format using
 "keytool -importkeystore -srckeystore <keystore_file_path> -
destkeystore <keystore_file_path> -deststoretype pkcs12".
```

Follow the prompts and enter the required information.

- CN must be the FQDN of the DAS Engine host.
- Default value for the key password is *password*.

  If you change the password, then you have to update the DAS configuration.

Following is a sample command output:

```
keytool -genkey -alias jetty -keystore ~/tmp/ks -storepass password
What is your first and last name?
  [Unknown]:  das.host.com
What is the name of your organizational unit?
  [Unknown]:  Eng
What is the name of your organization?
  [Unknown]:  ABC Corp
What is the name of your City or Locality?
  [Unknown]:  Santa Clara
What is the name of your State or Province?
  [Unknown]:  CA
What is the two-letter country code for this unit?
  [Unknown]:  US
Is CN=das.host.com, OU=Eng, O=ABC Corp, L=Santa Clara, ST=CA, C=US correct?
  [no]:  yes

Enter key password for <jetty>
  (RETURN if same as keystore password):
```

Note: You will have to use this keystore file while configuring the DAS Engine for TLS in Ambari.

Configure SSL/TLS in Ambari

In the Ambari UI, you enable TLS for DAS Engine and update the DAS Engine configuration if settings change.

Procedure

1. Copy the keystore files generated in the earlier procedures to webapp and event processor hosts. Make sure they are owned by configured user for DAS. The default user is hive.

   For example:

   ```
   /etc/security/certs/das-cert.jks
   ```

2. Navigate to Data Analytics Studio Configs .
3. Set the following properties in Advanced data_analytics_studio-security-site section.

Field	Value
ssl_enabled	Make sure it is checked.

Field	Value
webapp_keystore_file	Enter the keystore path on the webapp host.
das_webapp_keystore_password	Enter the password used in the previous procedure.
event_processor_keystore_file	Enter the keystore path on the event processor.
das_event_processor_keystore_password	Enter the password used in the previous procedure.

4. In the Advanced data_analytics_studio-webapp-properties section, set Data Analytics Studio Webapp server protocol property to https.
5. In the Advanced data_analytics_studio-event_processor-properties section, set Data Analytics Studio Event Processor server protocol property to https.

Configuring user authentication in Ambari

You can authenticate the users by using either Knox SSO, Knox proxy, or SPNEGO. You can also choose not to set up user authentication. In this case, all the queries are executed as a Hive service user.

Configuring user authentication using Knox SSO

In a Cloudera Private Cloud Base deployment, to enable DAS to work with the CDP cluster SSO, configure the Knox settings as described in this topic.

About this task

Note: Follow these instructions only if you choose to configure secure clusters.

Before you begin

You need to export the Knox certificate from the Knox gateway host. To find the Knox gateway host, go to Ambari Services Knox CONFIGS Knox Gateway hosts .

Procedure

1. SSH in to the Knox gateway host with a root or a knoxuser user.
2. Export the Knox certificate by running the following command:

   ```
   /usr/hdp/current/knox-server/bin/knoxcli.sh export-cert --type PEM
   ```

   Note: If you have already integrated Knox SSO earlier, then the gateway-identity.pem file would exist. Check whether the gateway-identity.pem file exists or not before running this command.

   ```
   /usr/hdp/current/knox-server/data/security/keystores/gateway-identity.pem
   ```

   If the export is successfully, the following message is displayed:

   ```
   Certificate gateway-identity has been successfully exported to: /usr/hdp/
   current/knox-server/data/security/keystores/gateway-identity.pem
   ```

   Note the location where you save the gateway-identity.pem file.
3. If not done already, specify KNOX_SSO in the user_authentication field under Ambari Data Analytics Studio Config .

4. Enable the Knox SSO topology settings. From the Ambari UI, go to Data Analytics Studio Config Advanced data_analytics_studio-security-site and make the following configuration changes:
   a) Specify KNOX_SSO in the user_authentication field.
   b) Specify the Knox SSO URL in the knox_sso_url field in the following format:

      https:*KNOX-HOST*>:8443/gateway/knoxsso/api/v1/websso
   c) Copy the contents of the PEM file that you exported earlier in the knox_publickey field without the header and the footer.
   d) Add the list of users in the admin_users field who need admin access to DAS.

      You can specify * (asterisk) in the admin_users field to make all users the admin users.

      You can also specify an admin group in the admin_groups field.

      Note: Only admin users have access to all the queries. Non-admin users can access only their queries.
   e) Click Save and click through the confirmation pop-ups.
   f) Restart DAS and any services that require restart by clicking Actions Restart All Required .

Configuring user authentication using Knox proxy

In the Cloudera Private Cloud Base 7.1.x release, Knox Proxy is configured via the Knox Admin UI. To set up proxy, you first define the provider configurations and descriptors, and the topologies are automatically generated based on those settings.

Procedure

1. SSH in to the machine on which you have installed the Knox gateway.
2. Change directory to the following:

   /usr/hdp/current/knox-server/data/services/das/1.4.5/
3. Create the following two configuration files with the given content:

   rewrite.xml

```
<!--
   Licensed to the Apache Software Foundation (ASF) under one or more
   contributor license agreements.  See the NOTICE file distributed with
   this work for additional information regarding copyright ownership.
   The ASF licenses this file to You under the Apache License, Version 2.0
   (the "License"); you may not use this file except in compliance with
   the License.  You may obtain a copy of the License at

     http://www.apache.org/licenses/LICENSE-2.0
   Unless required by applicable law or agreed to in writing, software
   distributed under the License is distributed on an "AS IS" BASIS,
   WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or impl
ied.
   See the License for the specific language governing permissions and
   limitations under the License.
-->
<rules>
  <rule dir="IN" name="DAS/das/inbound/root" pattern="*://*:*/**/das/">
    <rewrite template="{$serviceUrl[DAS]}/"/>
  </rule>
  <rule dir="IN" name="DAS/das/inbound/path" pattern="*://*:*/**/das/{**}"
>
    <rewrite template="{$serviceUrl[DAS]}/{**}"/>
  </rule>
  <rule dir="IN" name="DAS/das/inbound/pathqp" pattern="*://*:*/**/das/{**
}?{**}">
    <rewrite template="{$serviceUrl[DAS]}/{**}?{**}"/>
  </rule>
  <rule dir="OUT" name="DAS/das/outbound/assets" pattern="assets/{**}">
    <rewrite template="{$frontend[path]}/das/assets/{**}"/>
  </rule>
  <rule dir="OUT" name="DAS/das/outbound/rooturl">
    <rewrite template="{$frontend[path]}/das/"/>
  </rule>
  <filter name="DAS/das/outbound/dasrooturl">
    <content type="application/javascript">
      <apply path="/dasroot/.." rule="DAS/das/outbound/rooturl"/>
    </content>
  </filter>
</rules>
```

service.xml

```
<!--
   Licensed to the Apache Software Foundation (ASF) under one or more
   contributor license agreements.  See the NOTICE file distributed with
   this work for additional information regarding copyright ownership.
   The ASF licenses this file to You under the Apache License, Version 2.0
   (the "License"); you may not use this file except in compliance with
   the License.  You may obtain a copy of the License at

     http://www.apache.org/licenses/LICENSE-2.0
   Unless required by applicable law or agreed to in writing, software
   distributed under the License is distributed on an "AS IS" BASIS,
   WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or impl
ied.
   See the License for the specific language governing permissions and
   limitations under the License.
-->
<service role="DAS" name="das" version="1.4.5">
  <routes>
    <route path="/das" />
    <route path="/das/**" />
    <route path="/das/**/hivestudio*.js">
      <rewrite apply="DAS/das/outbound/dasrooturl" to="response.body"/>
    </route>
  </routes>
</service>
```

If you have more than one Knox servers in a high availability configuration, then you need to create these files on every machine.

4. Restart the Knox server.
5. Sign in to the Knox Admin UI. From Ambari, go to Knox Quick Links and click Knox Admin UI.
6. Create or use an existing Provider Configuration with the following configuration:
   a) (Required) Authentication provider: It provides authentication mechanism for Knox. For example, ShiroProvider. ShiroProvider integrates with LDAP.
   b) (Required) Identity Assertion provider: It authenticates the user name requesting access to DAS through SPNEGO.
   c) (Optional) Add any other provider as per your organization’s requirements, such as Acls or WebAppSec.
7. Create a new descriptor for the DAS service with the Provider Configuration that you created earlier. If a descriptor is already present with the required Provider Configuration, then you can edit it.
   a) Add a new service named DAS.
   b) Under Descriptor Detail Services DAS , add the DAS Webapp URL in the URLs field and save the changes.
8. If not done already, specify KNOX_PROXY in the user_authentication field under Ambari Data Analytics Studio Config .

9. Next, go to Ambari Data Analytics Studio CONFIGS Advanced data_analytics_studio-security-site and configure the following fields:
   a) das_knox_user: It specifies the Knox service user, and is picked up automatically.
   b) das_knox_doas_param_name: Specify the parameter name that you specified under the Params field in the Knox Admin UI. However, if you have selected the default Identity Assertion provider, then the das_knox_doas_param_name name is doAs, and is configured automatically.
   c) knox_ssout_url: Specify the KnoxSSOUT URL in the following format:

      https://{host}:{port}/{cluster-name}/{knox-sso-out-topo}/api/v1/webssout

      This step requires you to have a KnoxSSO out topology present in your Knox server. To create the Knox SSO out topology, see Enabling logout option for secure clusters.
   d) Add the list of users in the admin_users field who need admin access to DAS.

      You can specify * (asterisk) in the admin_users field to make all users the admin users.

      You can also specify an admin group in the admin_groups field.

      Note: Only admin users have access to all the queries. Non-admin users can access only their queries.

10. Restart the DAS service.

Configuring user authentication using SPNEGO

SPNEGO uses a Kerberized environment for user authentication. To use SPNEGO to authenticate users, specify SPNEGO in the user_authentication field.

Procedure

1. From the Ambari UI, go to Data Analytics Studio CONFIGS Advanced data_analytics_studio-security-site .
2. Specify SPNEGO in the user_authentication field.
3. Configure the das_spnego_name_rules field if you have specific name mapping rules for your cluster.
4. Save the changes and restart DAS.

Enabling logout option for secure clusters

To sign out from the application (DAS Webapp) and the identity provider on secure clusters, you need to create a KnoxSSO out topology in the Ambari console and configure the knox_ssout_url through the Ambari UI.

About this task

This section can be used to configure the Knox SSO logout URL for both HA and non-HA clusters.

Procedure

1. SSH in to the Ambari console on which you have configured Knox as a root user.
2. If you are configuring KnoxSSOUT for the first time, then you need to create a KnoxSSO out topology called knoxssout.xml in the /etc/knox/x.x.x.x-xx/0/topologies directory.

   If you have already configured KnoxSSOUT, then you can skip this step.

   Add the following lines in the knoxssout.xml file:

```
<?xml version="1.0"?>
<topology>
  <gateway>
    <provider>
      <role>hostmap</role>
      <name>static</name>
      <enabled>true</enabled>
    </provider>
  </gateway>
  <service>
    <role>KNOXSSOUT</role>
  </service>
</topology>
```

Note: If you have configured Knox SSO for HA clusters, then you must create the KnoxSSO out topology on all the Knox hosts.

3. On the Ambari UI, go to Data Analytics Studio Config Advanced data_analytics_studio-security-site and specify the Knox SSO logout URL in the knox_ssout_url field in the following format:

   ```
   https://{host}:{port}/{cluster-name}/{knox-sso-out-topo}/api/v1/webssout
   ```

   Where, knox-sso-out-topo is the name of the KnoxSSO out topology xml file that you created earlier. In this case, it is knoxssout.

   The host and the port that you specify here should be the same as those specified in the knox_sso_url field.

   To obtain the cluster_name, on the Ambari UI, click admin Manage Ambari Cluster Information and note the value from the Cluster Name field.

   If you have HA clusters, then specify the host and the port of the load balancer pointing to the Knox instance.
4. Click Save and click through the confirmation pop-ups.
5. Restart DAS and any services that require restart by clicking Actions Restart All Required .

Troubleshooting DAS installation

This section provides you a list of possible causes and solutions to debug and resolve issues that you might face while using DAS on a Cloudera Private Cloud Base cluster managed through Ambari.

Problem area: Queries page

Issues related to queries can arise mostly because of misconfigured Hive or Tez hooks. You may also experience trouble viewing your queries if you are a non-admin user. Non-admin users can view only their queries.

Your queries are not appearing on the Queries page

Check the role that you have been assigned. If you are not an administrator, then you can only view the queries that you have run. Only administrators can view queries and data of other users.

- To enlist yourself as the admin user, go to Ambari Data Analytics Studio Config Advanced data_analytics_studio-security-site , and add your user name in the admin_users field. For example, hive,admin1, admin2.

  You can also specify * (asterisk) in the admin_users field to make all users administrators.

  You can also specify an admin group in the admin_groups field.
- Check the configuration settings for Hive and Tez in the Ambari UI. See Check cluster configuration for Hive and Tez on page 233.

- Verify whether the logs are added to the paths specified in the hive.hook.proto.base-directory and the tez.history.logging.proto-base-dir directory configurations.

  Use the following commands to get the paths to the logs for Hive and Tez. If you have not run any queries, then the log directories may be empty.

  For Hive:

  hdfs dfs -ls /warehouse/tablespace/external/hive/sys.db/query_data

  For Tez:

  hdfs dfs -ls /warehouse/tablespace/external/hive/sys.db/dag_data

  hdfs dfs -ls /warehouse/tablespace/external/hive/sys.db/dag_meta

  hdfs dfs -ls /warehouse/tablespace/external/hive/sys.db/app_data
- Verify whether the following proto directory configurations are present in the /etc/das/conf/das-event-processor.json file: hive.hook.proto.base-directory and tez.history.logging.proto-base-dir. If these configurations are not present in the /etc/das/conf/das-event-processor.json file, then do not edit the das-event-processor.json file - because they will be overwritten by the configurations specified in Ambari.

  At this stage, restart the DAS service and recheck. If this doesn't fix the problem, then you might be using multiple configuration groups in Hive and Tez.

  If you are using different or multiple configuration groups in Hive or Tez, then make sure that you specify the same paths in all the configuration groups. Presently, DAS does not support multiple configuration groups.
- Verify whether you have the required access and permission to directories specified in the hive.hook.proto.base-directory and tez.history.logging.proto-base-dir directory configurations by checking errors from EventProcessorPipeline in the /var/log/das/event-processor.log file.
- Make sure that the DAS services are running as the hive service user.
- If you have a large number of users running Hive queries simultaneously using DAS, the connections from Hive can get exhausted. This sends the query to a queue in Hive which takes a long time to start running. This can result in the following:

  - If query is fired from DAS, it does not return any log or indicate that the query has been queued.
  - The query does not appear on the UI, because no event is received by DAS.

  Evaluate your cluster usage. You may need to add more machines to the clusters to resolve this issue.

Query column is empty, yet you can see the DAG ID and Application ID

- Check the configuration settings for Hive and Tez in the Ambari UI. See Check cluster configuration for Hive and Tez on page 233.
- Check whether Hive has access to write in to the directory specified by the following proto directory configuration: hive.hook.proto.base-directory.
- Check whether Hive can write in to the directory specified by the following proto directory configuration: hive.hook.proto.base-directory.
- Check whether Hive has access to read from the directory specified by the following proto directory configuration: hive.hook.proto.base-directory.

Query column is not empty, but you cannot see the DAG ID and Application ID

- Check the configuration settings for Hive and Tez in the Ambari UI. See Check cluster configuration for Hive and Tez on page 233.
- Check whether the Tez job has access to write in to the directory specified by the following proto directory configuration: tez.history.logging.proto-base-dir.
- Check whether the data is being written in to the following subdirectories of the directory specified in the tez.history.logging.proto-base-dir directory configuration: app_data, dag_data, and dag_meta.
- Check whether das has access to read from the following subdirectories of the directory specified in the tez.history.logging.proto-base-dir directory configuration: app_data, dag_data, and dag_meta.

You cannot view queries from other users

If you need to view queries and data of other users, then assign admin role to the user by going to Ambari Data Analytics Studio Config Advanced data_analytics_studio-security-site , and specifying the user in the admin_users field. For example, hive,admin1,admin2.

You can also specify * (asterisk) in the admin_users field to make all users administrators.

You can also specify an admin group in the admin_groups field.

Problem area: Compose page

Misconfigured repl in Hive can affect the query compose page on the DAS UI. Issues can also occur if HSI or HS2 is not running.

You cannot see your databases or the query editor is missing

- Verify whether HSI or HS2 services are running by going to Ambari Hive Summary .
- If you are not running llap, then go to Ambari Data Analytics Studio Config Advanced data_analytics_studio-properties Data Analytics Studio config file template and set the use.hive.interactive.mode parameter to false.
- Verify whether the Hive configuration parameter hive.metastore.transactional.event.listeners is set to org.apache.hive.hcatalog.listener.DbNotificationListener by going to Ambari Hive Configs Advanced Advanced hive-site .
- DAS event processor runs the `repl dump` command as a hive service user. The hive service user can run the `repl dump` command if the user has repl admin privileges.
- Verify whether DAS can read the repl root directory permissions - if das and hive are running as different service users.

  There may be exceptions in the /var/log/das/event-processor.log file with repl dump failures because of read errors.

  Note: If the das services cannot read the repl root directory permissions, then it can cause a number of repl directories to be created, but not deleted.

You cannot view new databases and tables, or cannot see changes to existing databases or tables

- Verify whether the hive configuration parameter hive.metastore.transactional.event.listeners is set to org.apache.hive.hcatalog.listener.DbNotificationListener by going to Ambari Hive Configs Advanced Advanced hive-site .
- Verify whether HSI or HS2 services are running by going to Ambari Hive Summary .
- This can also happen if the Hive metadata replication fails. To troubleshoot replication-related failures, see Replication failure in the DAS Event Processor on page 243.

Replication failure in the DAS Event Processor

DAS uses replication as a way to copy database and table metadata information from Hive to DAS Postgres database. If the replication fails, then you may not be able to see database or table information in DAS.

The Hive metadata replication process occours in the following two phases:

- Bootstrap dump
- Incremental dump

When the DAS Event Processor is started for the first time, the entire Hive database and table metadata is copied in to DAS. This is known as the bootstrap dump. After this phase, only the differences are copied in to DAS at one-minute intervals, from the time the last successful dump was run. This is known as an incremental dump.

If the bootstrap dump never succeeded, then you may not see any database or table information in DAS. If the bootstrap dump fails, then the information regarding the failure is captured in the most recent Event Processor log.

If an incremental dump fails, then you may not see any new changes to the databases and tables in DAS. The incremental dump relies on events stored in the Hive metastore, because these events take up a lot of space and are only used for replicating data. The events are removed from Hive metastore daily, which can affect DAS.

Fixing incremental dump failures

Note: You must be an admin user to complete this task.

If you see the message “Notification events are missing in the meta store”, then reset the Postgres database using the following command:

```
curl -H 'X-Requested-By: das' -H 'Cookie: JSESSIONID=<session id cookie>' ht
tp(s)://<hostname>:<port>/api/replicationDump/reset
```

Where:

- *SESSION ID COOKIE* is the cookie value which you have to get for an admin user on the DAS UI, from the browser
- *HOSTNAME* is the DAS Webapp hostname
- *PORT* is the DAS Webapp port

Note:

The error message "Notification events are missing in the meta store" is a symptom and not the cause of an issue, at most times. You can usually fix this by resetting the database. However, to determine the actual cause of the failure, we need to look at the first repl dump failure. Older Event Processor logs may contain the information about the actual cause, but they are purged from the system at a set frequency. Therefore, if you hit this issue, we recommend that you first copy all the Event Processor logs that are available; else it might be too late to diagnose the actual issue.

If the first exception that you hit is an SQLException, then it is a Hive-side failure. Save the HiveServer and the Hive Metastore logs for the time when the exception occoured.

File a bug with Cloudera Support along with the above-mentioned logs.

Problem area: Reports page

Only the admin users can view the **Reports** page. If you are a non-admin user, then you lack the privileges to view the **Reports** page.

DAS service installation fails with the “python files missing” message

The installation might fail while you are adding the DAS service through the Ambari UI with an error such as the following: Python files are missing.

Procedure

1. SSH in to the Ambari host as a root user.
2. Set the agent.auto.cache.update property to true in the /etc/ambari-server/conf/ambari.properties file.
3. Restart ambari using the following command:

   ```
   ambari-server restart
   ```

DAS does not log me out as expected, or I stay logged in longer than the time specified in the Ambari configuration

The login session timeout factor in DAS is governed by the following two properties:

- Session timeout in seconds (data_analytics_studio_session_timeout) under Ambari Data Analytics Studio CONFIGS Advanced data_analytics_studio-webapp-properties
- knoxsso.token.ttl under Ambari Knox CONFIG Advanced knoxsso-topology

The data_analytics_studio_session_timeout property is a DAS-specific configuration which is used to define the time period for which you want DAS to keep you logged in. This, particularly, comes in handy when you have a long running query. If a user is running a query which runs for a long time, say more than 24 hours, and if the user gets logged out before the query execution finishes, the user may lose the query results. To prevent this issue, you (the DAS admin) must configure the time period in the Session timeout in seconds field accordingly. By default, DAS does not log you out for 24 hours or 86400 seconds after you log in.

The knoxsso.token.ttl property is cluster-wide configuration which applies to all the services in the cluster that use Knox SSO. The logout time is given in milliseconds.

If the user is actively accessing DAS, then he will not be logged out. However, if the user is inactive, then the session timeout is equal to the value specified in either the Session timeout in seconds field in Ambari or in the knoxsso.toke n.ttl property - whichever is higher.

For example, if you have set 5 minutes in the knoxsso.token.ttl property and 86400 seconds (24 hours) in the Session timeout in seconds field, then the user will remain logged into DAS for 24 hours, or until the user is actively using DAS.

Getting a 401 - Unauthorized access error message while accessing DAS

You get an “Unauthorized access” error when you click Data Analytics Studio UI from Ambari Data Analytics Studio Quick Links . This can happen in case your cluster is secured with Knox proxy.

To fix this issue, you must replace the contents of the quicklink.json file which is present in the /var/lib/ambari-server/resources/mpacks/data-analytics-studio-mpack-<VERSION>/hdp-addon-services/DATA_ANALYTICS_STUDIO/<VERSION>/quicklinks/ directory with the template provided in Setting up quick links for the DAS UI.

Setting up quick links for the DAS UI

To use the DAS UI quick link from Ambari in case of Knox proxy clusters, you (the admin user) need to paste the following quicklink.json file in the Ambari server machine.

Procedure

1. Create the quicklink.json file as per the following template:

```
{
  "name": "default",
  "description": "default quick links configuration",
  "configuration": {
    "protocol":
    {
      "type": "HTTPS_ONLY"
    },
    "links": [
      {
        "name": "data_analytics_studio_ui",
        "label": "Data Analytics Studio UI",
        "requires_user_name": "false",
        "component_name": "KNOX_GATEWAY",
        "url": "%@://%@:%@/gateway/<DAS_UI_TOPOLOGY_NAME>/das/",
        "port": {
          "https_property": "gateway.port",
          "https_default_port": "8443",
          "regex": "^(\\d+)$",
          "site": "gateway-site"
        }
      }
    ]
  }
}
```

   Replace the *DAS_UI_TOPOLOGY_NAME* with the actual DAS UI topology.

2. Change to the following directory:

   /var/lib/ambari-server/resources/mpacks/data-analytics-studio-mpack-<VERSION>/hdp-addon-services/DATA_ANALYTICS_STUDIO/<VERSION>/quicklinks/

   Replace the <VERSION> with the version of the DAS distribution that you have installed.
3. Replace the existing quicklink.json file with the file that you created in step 1.

   Verify that you have correctly replaced the quicklink.json file.
4. Restart Ambari by using the following command:

   ```
   ambari-server restart
   ```

Installing DAS on CDP Private Cloud Base using Cloudera Manager

You can install Data Analytics Studio (DAS) using Cloudera Manager if you have transitioned from an Ambari-managed CDP Private Cloud Base cluster to a Cloudera Manager-managed cluster using the AM2CM tool, or if you were using Ambari Views on HDP 2.6.5 or DAS on HDP 3.1.5 and have upgraded to CDP Private Cloud Base 7.x.

Before you begin

Attention: This task is applicable only if you are upgrading to CDP Private Cloud Base 7.1.8 or lower. Starting with the 7.1.9 release, Hue replaces DAS.

Make sure that you have created a PostgreSQL database version 9.6, 10, or 12 to use with DAS. If you have an existing Postgres database that you used with DAS on HDP 3.1.5, then you can point DAS to the same database during the database setup stage, so that you do not lose saved queries and query history.

Procedure

1. Log in to Cloudera Manager as an Administrator.
2. From the Cloudera Manager homepage, go to the Status tab, click the more options icon on your $Cluster Name click Add Service.
3. On the **Select Services** page, select Data Analytics Studio and click Continue.
4. On the **Select Dependencies** page, select the dependencies that you want to set up with DAS and click Next.
5. On the **Assign Roles** page, select role assignments for your dependencies and click Continue.
6. On the **Setup Database** page, specify the Postgres database name, database host, username, and password.

   Click Test Connection to validate the settings and click Continue.

   If the connection is successful, a green checkmark and the word Successful appears next to the service name. If there are any problems, an error is reported indicating that the service failed to connect.
7. The **Review Changes** page lists default and suggested settings for several configuration parameters, including data directories.

   Select user authentication mode as None.

   Note: SPNEGO as the default mode of authentication. If you do not want to use SPNEGO, then select None as the user authentication mode.

   Review and make any necessary changes, and then click Continue. The **Command Details** page is displayed.
8. The **Command Details** page shows the status of your operation. After completion, you can view the installation logs under the standard output (stdout).

   After the First Run command completes, click Continue to go to the **Summary** page.

9. The **Summary** page reports the success or failure of the setup wizard. Click Finish to complete the wizard. The installation is complete.

   If the DAS WebApp fails to start with the following error message, then specify the latest activated CDH 7.1.x parcel directory in the DAS WebApp Advanced Configuration Snippet:

   ```
   Error: Could not find or load main class org.apache.ranger.credentialapi
   .buildks.
   ```

   For more information, see Unable to start DAS after installing the GPL Extras parcel.

What to do next

Cloudera recommends that you change the default password as soon as possible by clicking the logged-in username at the top right of the home screen and clicking Change Password.

Adding Hue service with Cloudera Manager

Hue is a web-based interactive query editor that enables you to interact with databases and data warehouses. Data architects, SQL developers, and data engineers can use Hue to create data models, clean data to prepare it for analysis, and to build and test SQL scripts for applications.

To add the Hue service with Cloudera Manager, complete the following steps:

1. Install and configure MySQL database on page 247
2. Add the Hue service using Cloudera Manager on page 247
3. Enable Kerberos for authentication on page 249
4. Integrate Hue with Knox on page 250
5. Grant Ranger permissions to new users or groups on page 252

Install and configure MySQL database

Hue requires a SQL database such as MySQL, PostgreSQL, or Oracle to store small amounts of data, including user account information, query history, and permissions. The instructions in this topic are for installing the MySQL database.

Before you begin

Install MySQL on a host within your cluster. For instructions, refer to the *MySQL Installation Guide*.

About this task

To configure Hue to store data in the MySQL database:

Procedure

1. SSH into the host on which you have installed MySQL.
2. Create a new database in MySQL as follows:

   ```
   mysql> create database hue;
   ```

3. Run the following command to grant privileges to a Hue user to manage the database:

   ```
   mysql> grant all on hue.* to ‘hue’@‘localhost’ identified by ‘secretpass
   word’;
   ```

Add the Hue service using Cloudera Manager

After you have installed and configured the MySQL database for Hue, add the Hue service using Cloudera Manager.

Procedure

1. Sign in to Cloudera Manager as an Administrator.
2. Go to Clusters Actions and click Add Service.

   The **Add Service to Cluster** wizard is displayed.
3. Select Hue as the Service Type and click Continue.

   The **Select Dependencies** page is displayed.
4. On the **Select Dependencies** page, select the optional dependencies that are required for your cluster and click Continue.

   The required dependency is selected by default.

   Note:

   In CDH 6 and earlier, the Hive service included the Hive Metastore and HiveServer2. In Cloudera Runtime 7.0 and later, this service only includes the Hive Metastore. HiveServer2 and other components of the Hive execution engines are part of the HIVE_ON_TEZ service.

   If you need to run Hive queries, then select an optional dependency containing the HIVE_ON_TEZ service.

   If you need to run only Impala queries, then the HIVE_ON_TEZ service is not required.
5. On the **Assign Roles** page, you can perform one of the following actions:

   - To accept the default role assignments, click Continue in the lower right corner of the page. To view the default role assignments by host, click View By Host.
   - To customize role assignments, click the field below Hue Server and Load Balancer roles. This launches a dialog box where you can select hosts where you want to add the role. Click OK after making your selection.

     The wizard evaluates host hardware configurations to determine the best hosts for each role. All worker roles are automatically assigned to the same set of hosts as the HDFS DataNode. You can reassign if necessary. Specify hostnames by IP address, rack name, or by range:

Range Definition	Matching Hosts
10.1.1.[1-4]	10.1.1.1, 10.1.1.2, 10.1.1.3, 10.1.1.4
host[1-3].company.com	host1.company.com, host2.company.com, host3.company.com
host[07-10].company.com	host07.company.com, host08.company.com, host09.company.com, host10.company.com

6. On the **Setup Database** page:

   a) Select a database vendor from the Type field and specify the Database Hostname, Database Name, Username, and Password.

   b) Click Test Connection, and when the success message appears, click Continue and Cloudera Manager starts the Hue service.
7. Review your configurations on the **Review Changes** page and click Continue.
8. On the **Command Details** page, expand the running commands to view the details of any step, including log files and command output. You can filter the view by selecting Show All Steps, Show Only Failed Steps, or Show Only Running Steps.

   After the First Run command completes, click Continue to go to the **Summary** page.
9. After the service is started, click Continue and then click Finish.

   If your cluster uses Kerberos, Cloudera Manager automatically adds a Hue Kerberos Ticket Renewer role to each host where you assigned the Hue Server role instance. See "Enabling Kerberos Authentication" for more information.

Enable Kerberos for authentication

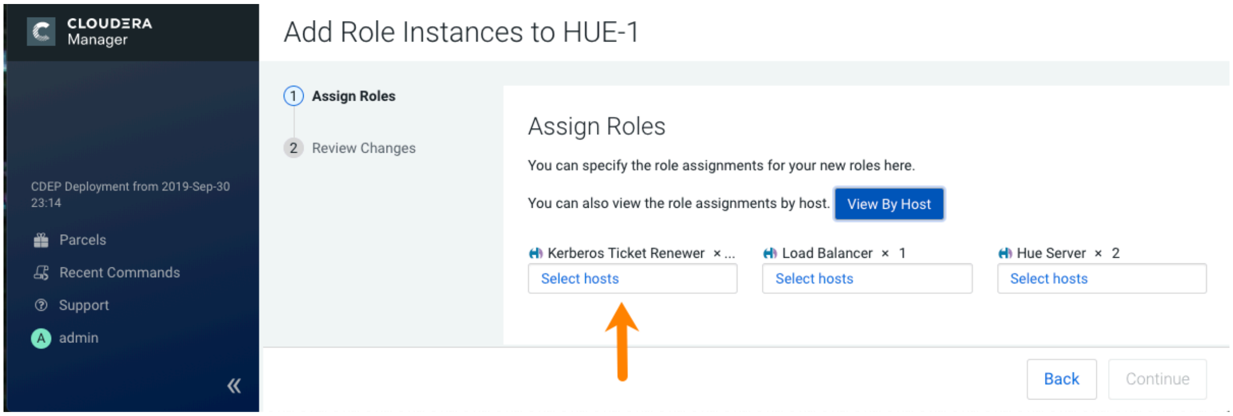
For Hue to work properly with a CDP cluster that uses Kerberos for authentication, the Kerberos Ticket Renewer role must be added to the Hue service. After you have added the Hue service to your cluster, renew the Kerberos ticket for Hue and enable Kerberos for authentication.

About this task

Use the Cloudera Manager Admin Console to add the Kerberos Ticket Renewer role to each host with a Hue Server role instance. The Hue Kerberos Ticket Renewer renews only those tickets created for the Hue service principal: hue/*HOSTNAME@REALM-NAME*. The Hue principal impersonates other users for applications within Hue such as the Job Browser, File Browser, and so on. Other services, such as HDFS and MapReduce, do not use the Hue Kerberos Ticket Renewer. Instead these other services handle ticket renewal as needed by using their own mechanisms.

Procedure

1. On the Cloudera Manager home page, select the Hue service.
2. On the Hue service page, click the Instances tab.
3. On the Instances page, click Add Role Instances on the right side of the page. This launches the Add Role Instances wizard.
4. To add a Kerberos Ticket Renewer role instance to the same host that has the Hue server on your CDP cluster, click Select hosts under Kerberos Ticket Renewer:



Add Role Instances to HUE-1

Assign Roles

You can specify the role assignments for your new roles here.

You can also view the role assignments by host.

To check which host has the Hue Server role instance, click View By Host, which launches a table that lists all the hosts in your CDP cluster and shows all the roles each host already has.

5. In the host selection dialog box, after selecting the host where you want to add the Kerberos Ticket Renewer role instance, click OK, and Cloudera Manager adds the role instance.
6. After processing the request to add the role instance, Cloudera Manager returns you to the Instances page and prompts you to restart the service. Click the Restart the service (or the instance)... link so the configuration change can take effect.
7. After the services have restarted, click Finish to return to the Instances page.

   Repeat these steps for each Hue Server role on your cluster.

What to do next

Troubleshooting the Kerberos Ticket Renewer:

If the Hue Kerberos Ticket Renewer does not start, check the configuration of your Kerberos Key Distribution Center (KDC). Look at the ticket renewal property, maxrenewlife, to ensure that the principals, hue/<*HOST_NAME*> and krbtgt, are renewable. If these principals are not renewable, run the following commands on the KDC to enable them:

```
kadmin.local: modprinc -maxrenewlife 90day krbtgt/<YOUR_REALM.COM>
kadmin.local: modprinc -maxrenewlife 90day +allow_renewable hue/
<HOST_NAME>@<YOUR_REALM>
```

Integrate Hue with Knox

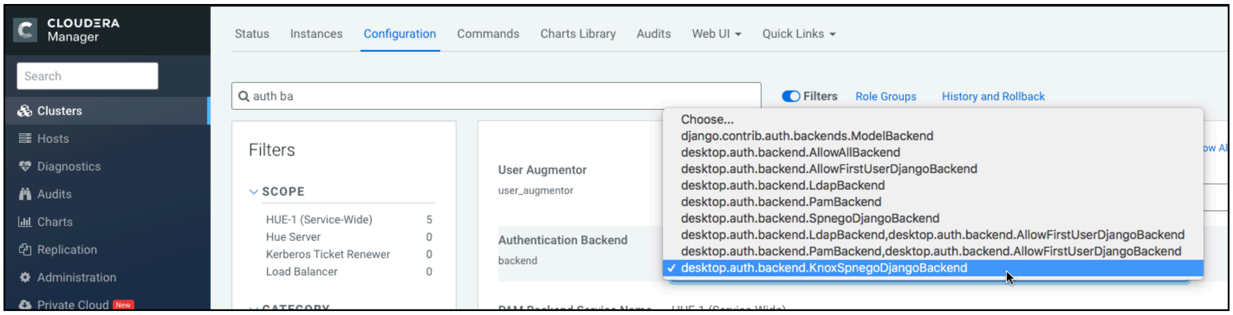
You can use the Apache Knox Gateway to interact with Hue REST APIs and the Hue user interface, along with other CDP components and services. To set up Knox Single Sign-on (SSO) to authenticate users, you must configure the KnoxSpnegoDjangoBackend property using Cloudera Manager.

Before you begin

To authenticate users using Knox SSO, you must have Knox installed on your CDP cluster, also known as a secure cluster.

Procedure

1. Sign in to Cloudera Manager as an Administrator.
2. Go to Clusters $Hue service Configurations and search for the Authentication Backend field.
3. Select desktop.auth.backend.KnoxSpnegoDjangoBackend from the dropdown.



User Augmentor
user_augmentor

Authentication Backend
backend

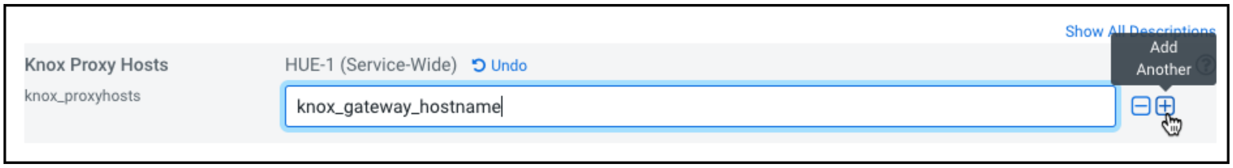
Choose...
django.contrib.auth.backends.ModelBackend
desktop.auth.backend.AllowAllBackend
desktop.auth.backend.AllowFirstUserDjangoBackend
desktop.auth.backend.LdapBackend
desktop.auth.backend.PamBackend
desktop.auth.backend.SpnegoDjangoBackend
desktop.auth.backend.LdapBackend,desktop.auth.backend.AllowFirstUserDjangoBackend
desktop.auth.backend.PamBackend,desktop.auth.backend.AllowFirstUserDjangoBackend
✓ desktop.auth.backend.KnoxSpnegoDjangoBackend

4. Click Save Changes.
5. Go to Clusters $Knox service Instances and note down the hostnames of the Knox Gateways.

   You must provide these details in the next step.

   If you have set up Knox in High-Availablity (HA) mode, then you can see more than one Knox Gateways listed on the Instances tab.
6. Go back to Clusters $Hue service Configurations and search for the Knox Proxy Hosts field.
7. Enter the hostname of the Knox Gateway that you noted earlier.

   If you have set up Knox HA, then click + to add another hostname.



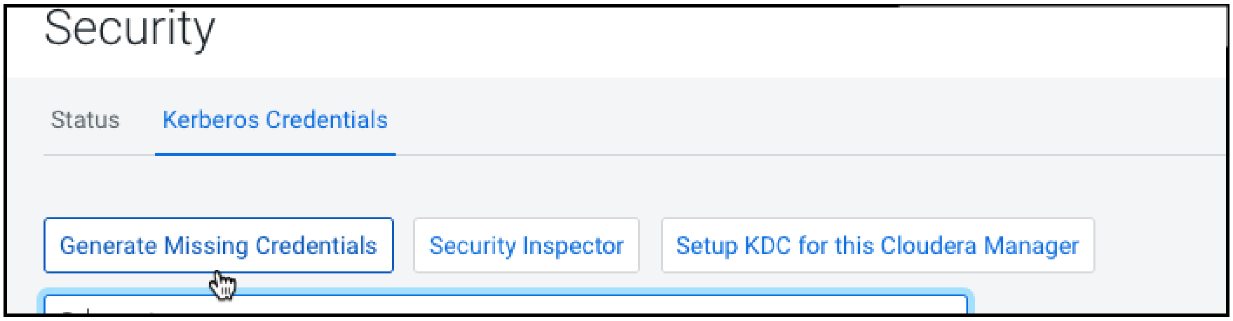
Knox Proxy Hosts
knox_proxyhosts
HUE-1 (Service-Wide)
knox_gateway_hostname

8. When integrating Hue with Knox, it is essential to deploy a Hue Load Balancer. After deployment, specify the Load Balancer hostname in the Knox Proxy Hosts field by clicking the + icon.
9. Click Save Changes.

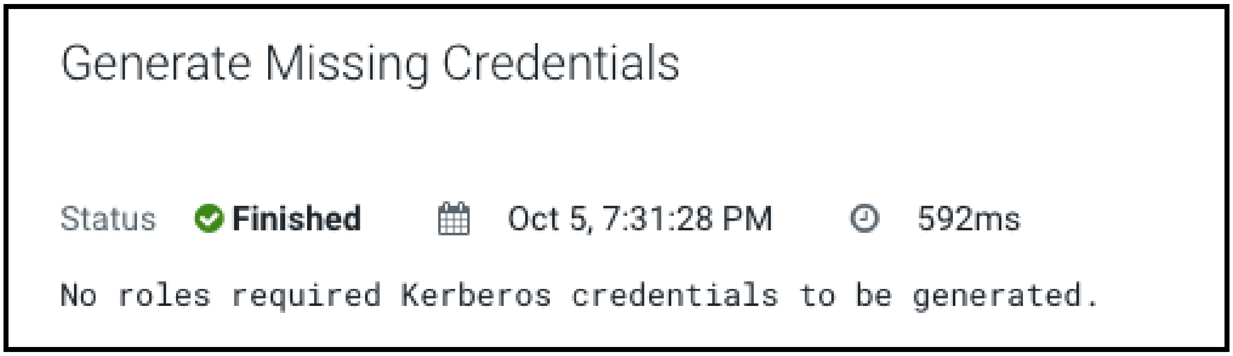
   You would see the following warning:

   ```
   Role is missing Kerberos keytab. Go to the Kerberos Credentials page and
    click the Generate Missing Credentials button.
   ```
10. Click Administration on the Cloudera Manager left navigation panel and select Security.

11. Go to the Kerberos Credentials tab and click Generate Missing Credentials.


Security
Status
Kerberos Credentials
Generate Missing Credentials
Security Inspector
Setup KDC for this Cloudera Manager

A pop-up showing the status is displayed.

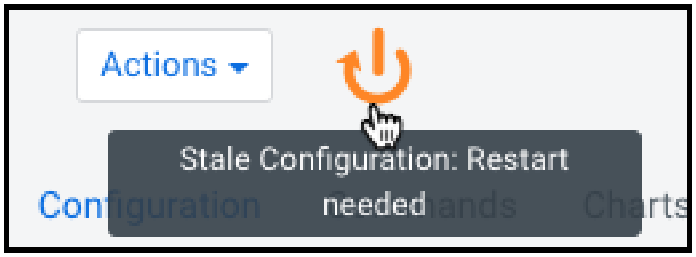


Generate Missing Credentials

Status ✓ Finished Oct 5, 7:31:28 PM 592ms

```
No roles required Kerberos credentials to be generated.
```

12. Go to Clusters $Hue service and click Restart next to Actions.



13. On the **Stale Configurations** page, click Restart Stale Services.

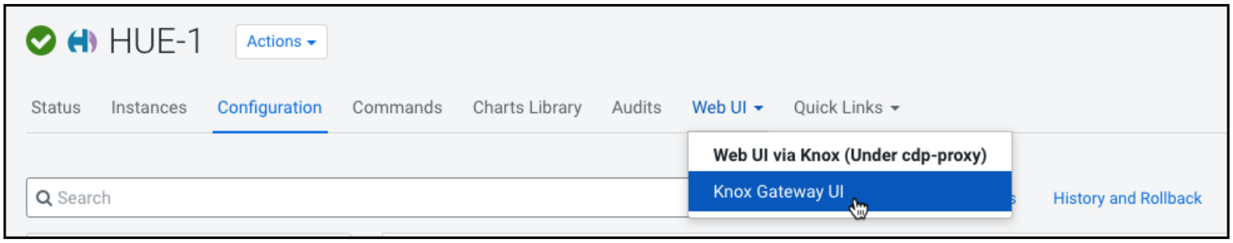
The **Restart Stale Services** wizard is displayed.

14. On the Review Changes page, select Redeploy client configuration, and click Restart Now.

The **Command Details** page shows the live status as the service restarts.

When all the steps are complete, click Finish.

15. From the Hue service page, click Web UI Knox Gateway UI .

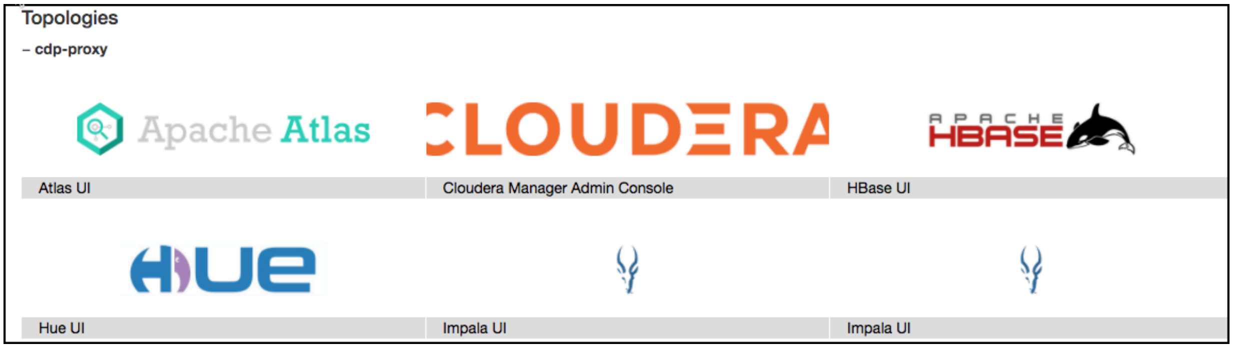


The Knox Gateway UI is displayed.

16. On the **General Proxy Information** page, expand the CDP Proxy topology by clicking + cdp-proxy under Topologies.

The list of services that are configured with the cdp-proxy topology is displayed.

17. Click on the Hue logo.



You should be able to log in to the Hue web UI.

You can also log into Hue using the following URL:

```
https://[***HOSTNAME***]:[***PORT***]/gateway/cdp-proxy/hue/
```

Grant Ranger permissions to new users or groups

If you have secured your cluster using Ranger, then you must grant proper permissions to your users and groups from the Ranger web interface. If your users do not have proper permissions, then they may not be able to access certain databases or tables from the Hue editor.

About this task

To grant permissions to a new user or group:

Procedure

1. Log into Cloudera Manager as an Administrator.
2. Go to Clusters $Ranger service Instances tab and note down the hostname corresponding to the “Ranger Usersync” role type.
3. Open the Ranger UI by clicking Ranger Admin Web UI.
4. SSH into the Ranger Usersync host that you noted in step 2 and add the user or the group as follows:

```
ssh root@example.domain.site useradd [***USERNAME/GROUP-NAME***] passwd
[***PASSWORD***]
```

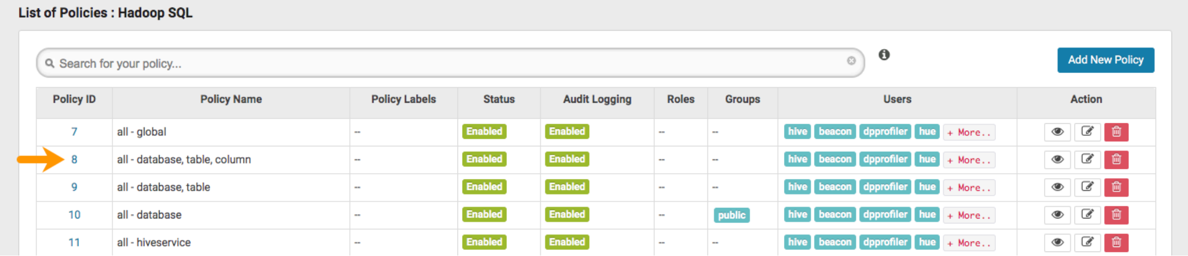
5. On the Ranger web UI, click Hadoop SQL listed under the HADOOP SQL service.

   The **Hadoop SQL Policies** page is displayed.

6. On the **Hadoop SQL Policies** page, you can grant the new user access to all the databases or to specific databases by adding a new policy.

   To grant the permission on all databases:

   a. Click the policy ID corresponding to "all - database, table, column".



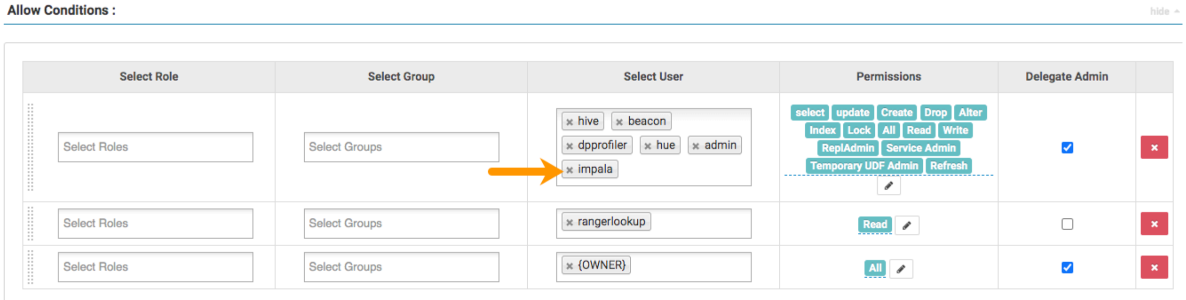
List of Policies : Hadoop SQL

Search for your policy...

Add New Policy

Policy ID	Policy Name	Policy Labels	Status	Audit Logging	Roles	Groups	Users	Action
7	all - global	--	Enabled	Enabled	--	--	hive beacon dpprofiler hue + More..	
8	all - database, table, column	--	Enabled	Enabled	--	--	hive beacon dpprofiler hue + More..	
9	all - database, table	--	Enabled	Enabled	--	--	hive beacon dpprofiler hue + More..	
10	all - database	--	Enabled	Enabled	--	public	hive beacon dpprofiler hue + More..	
11	all - hiveservice	--	Enabled	Enabled	--	--	hive beacon dpprofiler hue + More..	

   b. On the **Edit Policy** page, add the user whom you want to grant the permission in the Select User field under the Allow Conditions section as shown in the following image:



Allow Conditions :

Select Role	Select Group	Select User	Permissions	Delegate Admin	
Select Roles	Select Groups	hive beacon dpprofiler hue admin impala	select update Create Drop Alter Index Lock All Read Write ReplAdmin Service Admin Temporary UDF Admin Refresh	☑	×
Select Roles	Select Groups	rangerlookup	Read	☐	×
Select Roles	Select Groups	{OWNER}	All	☑	×

   To grant permissions to a group, enter the group name in the Select Group field.

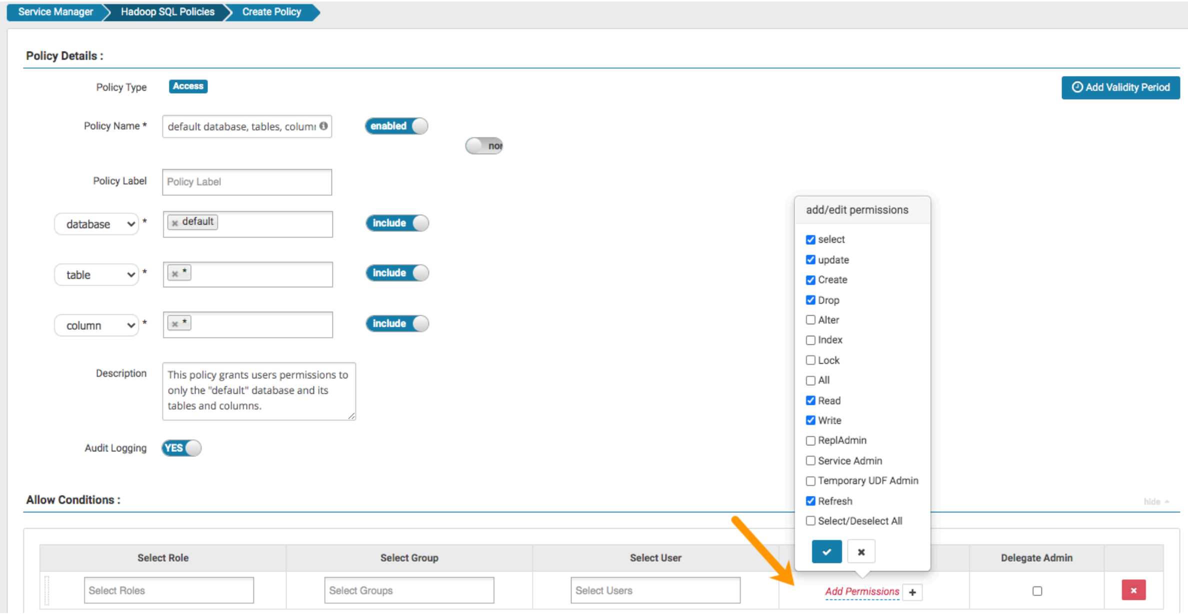
   c. Click Save.

   To grant permission on specific database:

   a. Click Add New Policy.

      The **Create Policy** page is displayed.

   b. Under the Policy Details section, specify the policy name and select the database, table, and column that you want your user to access as shown in the following image:



Policy Details :

Policy Type: Access

Add Validity Period

Policy Name *: default database, tables, columı (enabled)

Policy Label: Policy Label

database *: default (include)

table *: * (include)

column *: * (include)

Description: This policy grants users permissions to only the "default" database and its tables and columns.

Audit Logging: YES

add/edit permissions

☑ select
☑ update
☑ Create
☑ Drop
☐ Alter
☐ Index
☐ Lock
☐ All
☑ Read
☑ Write
☐ ReplAdmin
☐ Service Admin
☐ Temporary UDF Admin
☑ Refresh
☐ Select/Deselect All

Allow Conditions :

Select Role	Select Group	Select User		Delegate Admin	
Select Roles	Select Groups	Select Users	Add Permissions +	☐	×

   c. Under the Allow Conditions section, enter the username in the Select User field and click Add Permissions and select the permissions that your user must have.

      To grant permissions to a group, enter the group name in the Select Group field.
   d. Click Add.
7. Start the Hue service from Cloudera Manager.

Results

The user or the group should be able to run any query on any entities as defined in the policy.

Adding Query Processor service to a cluster

The Query Processor service indexes Hive and Tez events and provides APIs to access them. It is required if you want to view the Queries tab (query history and query details) on the Hue Job Browser. You must install the Query Processor service on your clusters manually.

About this task

⚠ **Attention:** This task is applicable only if you are upgrading to 7.1.8 and higher. If you are upgrading to 7.1.7 SP2, 7.1.7 SP1, 7.1.7, or lower, then you can skip this task.

Note: The Query Process service supports only MySQL.

You can either install the Query Processor service as a dependency while adding the Hue service or after adding the Hue service.

Before you begin

This task assumes that you already have a database installed on a host in your cluster. On , Hue Query Processor supports PostgreSQL, MySQL, and Oracle databases. The supported PostgreSQL database version for Hue Query Processor is 9.6 and higher.

Next, you need to create a database for the Query Processor service with the required roles. To create the Query Processor database:

1. SSH into your database host as a root user.
2. Start the psql terminal by entering the following command:

```
sudo -u postgres psql
```

3. Run the following statement while specifying the username, password, and a database name for the Query Processor:

```
CREATE ROLE [***QP-USER***] WITH LOGIN PASSWORD '[***QP-PASSWORD***]';
ALTER ROLE [***QP-USER***] CREATEDB;
CREATE DATABASE [***QP-DATABASE***];
GRANT ALL PRIVILEGES ON DATABASE [***QP-DATABASE***] TO [***QP-USER***];
```

Procedure

1. Log in to as an Administrator.
2. Go to Clusters ⋮ Add Service .
3. Select Query Processor on the **Add Service to Cluster** page and click Continue.

   The required dependencies are automatically selected.

4. Select the host on which you want to install the Query Processor by clicking View By Host. Then click Continue.
5. Select the database type, and specify the database hostname, database name, and username and password to access the database on the **Setup Database** page and click Test Connection.

   After the connection is verified, click Continue.
6. On the **Review Changes** page, accept the default settings and click Continue.

   The **Command Details** page is displayed, which shows the status of the installation and configuration.
7. Click Continue if the operation is successful.
8. Click Finish on the **Summary** page.

Results

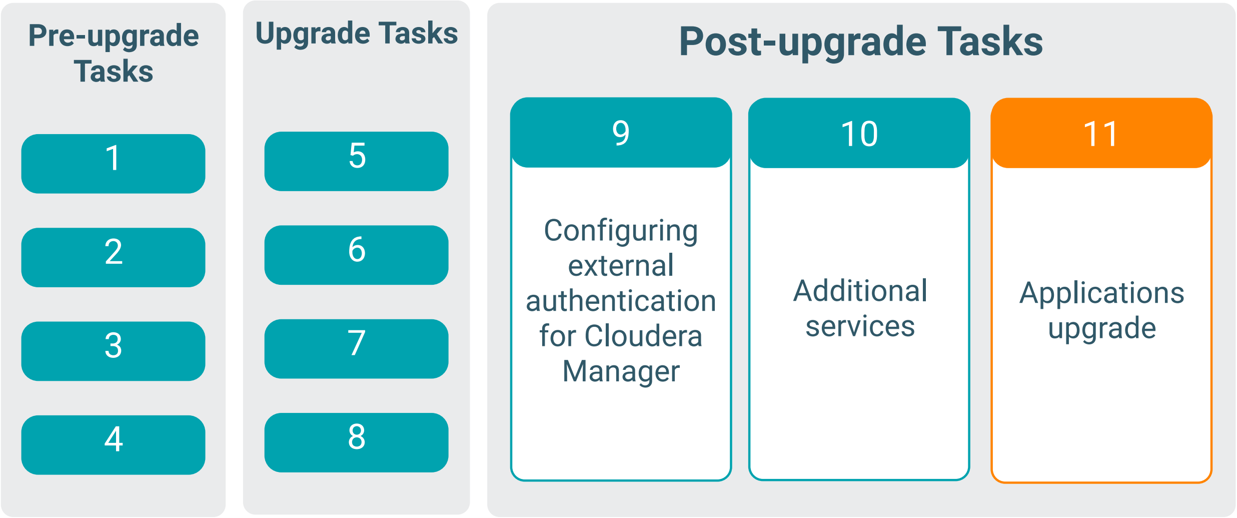
You are redirected to the home page. You can now see the Query Processor service listed within your cluster.

What to do next

(Optional) To view the **Queries** tab on the **Job Browser** page in Hue, you must enable the Query Processor Service option in Hue configurations using .

Applications Upgrade

After you upgrade, you must test all the services that run on your platform.



Ideally, you should have an indicative subset of jobs from your workloads. These are the tasks that you should have identified and run before the upgrade allowing you to compare pre-upgrade versus post-upgrade test results. These tests should also include any parts of the application that required code changes due to the changes in the platform. For example, to cater for changes in Hive managed versus external tables. The tests should also include a performance test. This can help to highlight missed or wrong configuration settings or point to other issues with the upgrade. Depending on your environment, perform these steps.

1. Update application code with changes required by the upgraded platform
2. Restart applications
3. Test the applications and verify they are functioning and performing as they were prior to upgrade

Note: After successfully upgrading from HDP to CDP, you can remove the HDP bits from the CDP cluster using the yum commands. Otherwise, when you run any security tool or security scanner for CVE detection, the HDP bits on the CDP cluster are detected as CVEs.

Procedure to Rollback from CDP Private Cloud Base 7.1.7 SP1 to CDP Private Cloud Base 7.1.7

You can rollback from the CDP Private Cloud Base 7.1.7 SP1 to CDP Private Cloud Base 7.1.7. To rollback to CDP Private Cloud Base 7.1.7:

Procedure

1. Log in to the Admin Console.
2. Click Parcels from the left menu.
3. Click Parcel Repositories & Network Settings.

   Note: If the 7.1.7 URL is available in the parcel repository, then you can skip to step 8. If not, then proceed with step 4.

4. In the Remote Parcel Repository URLs section, click the "+" icon and add the 7.1.7 URL for your Parcel repository.
5. Click Save & Verify Configuration. A message with the status of the verification appears above the Remote Parcel Repository URLs section. If the URL is not valid, check the URL and enter the correct URL.
6. After the URL is verified, click Close.
7. Locate the row in the table that contains the new parcel and click the Download button.
8. After the download of the new parcel is complete, click the Distribute button.

   Wait for the parcel to be distributed and unpacked before continuing. displays the status of the parcel distribution. Click on the status display to view detailed status for each host.
9. Click Activate. parcels are activated on the cluster.
10. When the parcel is activated, click the logo to return to the home page.
    The cluster is now rolled back to the CDP Private Cloud Base 7.1.7 version.
11. When the parcel is activated, click the Actions menu next to the cluster name and select Post Cloudera Runtime Upgrade.
12. Restart the cluster: Click the Actions menu and select Restart.