

Cloudera Runtime 7.3.2

Use cases for Streams Replication Manager in Cloudera on cloud

Date published: 2019-08-22

Date modified: 2026-03-31

CLouDERA

<https://docs.cloudera.com/>

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Using Streams Replication Manager in Cloudera on cloud overview

Learn about the deployment options, prerequisites, and use cases for Streams Replication Manager in a cloud-based context.

Starting with the December 2020 release of Cloudera on cloud, Streams Replication Manager is included in the default Streams Messaging cluster definitions. As a result, you can deploy Streams Replication Manager in a Cloudera Data Hub cluster and use it to replicate Kafka data between all types of Cloudera clusters. This includes replicating Kafka data to or from clusters deployed on either Cloudera on cloud or Cloudera on premises.

The following sections provide information on how you can deploy Streams Replication Manager in a Cloudera Data Hub cluster, what prerequisites you must meet before using Streams Replication Manager, and the common use cases where you can use Streams Replication Manager in a cloud-based context.

Differences between light and heavy deployments

In Cloudera on cloud, you can deploy Streams Replication Manager in Cloudera Data Hub clusters with both the light and heavy duty variants of the Streams Messaging cluster definition. However, there are significant differences in how Streams Replication Manager is deployed with each definition.

Light duty definition:

In the light duty definition, Streams Replication Manager is deployed by default on the broker and master hosts of the cluster. This means that Streams Replication Manager is available for use by default in a Cloudera Data Hub cluster provisioned with the light duty definition.

Heavy duty definition

In the heavy duty definition, Streams Replication Manager has its own host group. However, by default, the Streams Replication Manager host group is not provisioned. When creating a cluster with the heavy duty definition, you must set the instance count of the Srm nodes host group to at least one. Otherwise, Streams Replication Manager is not deployed on the cluster.

For more information on cluster provisioning, see *Creating your first Streams Messaging cluster*. For more information on the default cluster definitions and cluster layouts, see *Streams Messaging cluster layout*.



Note: Deploying Streams Replication Manager in a Cloudera Data Hub cluster requires Cloudera Runtime 7.2.6 or higher.

Prerequisites for using Streams Replication Manager

Streams Replication Manager can be used to replicate Kafka data between all types of Cloudera clusters. However, the following conditions must be met for all deployments and use cases:

- Streams Replication Manager must be able to access the Kafka hosts of the source and target cluster through the network.
- Streams Replication Manager must trust the TLS certificates of the brokers in the source and target clusters.

This is required so that Streams Replication Manager can establish a trusted connection.

- Streams Replication Manager must have access to credentials that it can use to authenticate itself in both the source and target clusters.
- Streams Replication Manager must use a principal that is authorized to access Kafka resources (topics) on both source and target clusters.

Cloud-based use cases for Streams Replication Manager

There are three common use cases when using Streams Replication Manager in a cloud-based context. These are as follows.

Replicating data from on premises to cloud with Streams Replication Manager on premises

In this use case you replicate data from a Cloudera Private Cloud Base cluster to a Cloudera Data Hub cluster with Streams Replication Manager running in the Cloudera Private Cloud Base cluster.



Note: Although in this use case Streams Replication Manager is not deployed in a Cloudera Data Hub cluster, it is still considered a cloud-based use case. This is because the source or the destination of the replicated data is a Cloudera Data Hub cluster.

Replicating data from on premises to cloud with Streams Replication Manager in the cloud

In this use case you replicate data from a Cloudera Private Cloud Base cluster to a Cloudera Data Hub cluster with Streams Replication Manager running in the Cloudera Data Hub cluster.

Replicating data between cloud clusters with Streams Replication Manager in the cloud

In this use case you replicate data between Cloudera Data Hub clusters with Streams Replication Manager running in a Cloudera Data Hub cluster.

Related Information

[Setting up your Streams Messaging cluster](#)

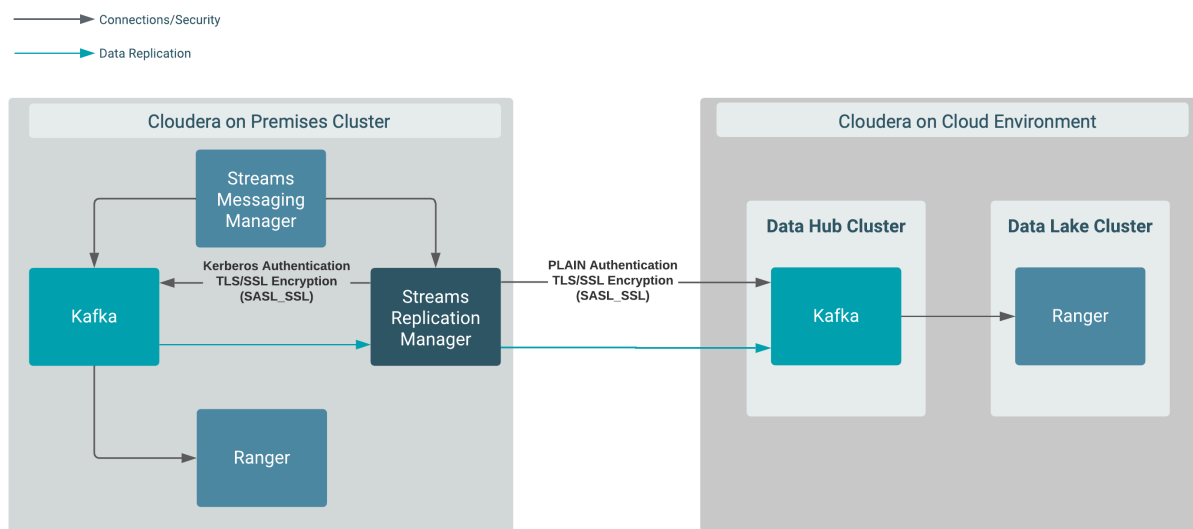
[Streams Messaging cluster layout](#)

Replicating data from on premises to cloud with Streams Replication Manager on premises

You can set up and configure an instance of Streams Replication Manager running in a Cloudera Private Cloud Base cluster to replicate data between the Cloudera Private Cloud Base cluster and a Cloudera Data Hub cluster. In addition, you can use Streams Messaging Manager to monitor the replication process.

About this task

Consider the following replication scenario.



In this scenario, data is replicated from a Cloudera Private Cloud Base cluster that has Kafka, Streams Replication Manager, and Streams Messaging Manager deployed on it. This is a secure cluster that has TLS/SSL encryption and Kerberos authentication enabled. In addition, it uses Ranger for authorization.

Data is being replicated from this cluster by Streams Replication Manager deployed in this cluster to a Cloudera Data Hub cluster.

The Cloudera Data Hub cluster is provisioned with one of the default Streams Messaging cluster definitions.

Before you begin

This example scenario does not go into detail on how to set up the clusters and assumes the following.

- A Cloudera Data Hub provisioned with the Streams Messaging Light Duty or Heavy Duty cluster definition is available.

For more information, see [Setting up your Streams Messaging cluster](#) in the CDF for Data Hub library. Alternatively, you can also review the cloud provider specific cluster creation instructions available in the [Cloudera Data Hub library](#).

- A Cloudera Private Cloud Base Base cluster with Kafka, Streams Replication Manager, and Streams Messaging Manager is available. This cluster is TLS/SSL and Kerberos enabled. In addition, it uses Ranger for authorization.

For more information, see the [Cloudera Private Cloud Base Installation Guide](#).

- Network connectivity and DNS resolution are established between the clusters.
- This example scenario demonstrates the configuration required to enable replication monitoring of the Cloudera Data Hub cluster with Streams Messaging Manager. This can be done by configuring the Streams Replication Manager Service role to target (monitor) the Cloudera Data Hub cluster. This is done as the last step in the following list of steps and is marked optional. This is because enabling replication monitoring of the Cloudera Data Hub cluster results in a number of caveats. The caveats are the following.

- The Streams Replication Manager Service role will generate additional cloud traffic.

Any extra traffic you might have in your cloud deployment can lead to additional cloud costs.

- The replications tab in Streams Messaging Manager will display all replications targeting the Cloudera Data Hub cluster.

Although this is expected, you must understand that all other pages in Streams Messaging Manager will display information regarding the Cloudera Private Cloud Base cluster. A setup like this might lead to confusion or mislead users on what this specific instance of Streams Messaging Manager is monitoring.

- You will lose the ability to monitor the replications targeting the Cloudera Private Cloud Base cluster.

This is only critical if you have any existing replications that are targeting the Cloudera Private Cloud Base cluster and you are monitoring these replications with the Streams Messaging Manager instance running in the Cloudera Private Cloud Base cluster.



Important: In the following scenario, a new Cloudera machine user is created and set up specifically for Streams Replication Manager. Alternatively, it is also possible to use an existing machine user and skip steps 1 through 3, but this can only be done if the following requirements are met.

- The existing machine user has access to your Cloudera environment.
- The existing machine user has the correct Ranger permissions assigned to it.
- You have access to the existing machine user's credentials.

Procedure

1. Create a machine user for Streams Replication Manager in Cloudera Management Console.

A machine user is required so that Streams Replication Manager has credentials that it can use to connect to the Kafka service in the Cloudera Data Hub cluster.

- a) Navigate to Management Console User Management.
- b) Click Actions Create Machine User .
- c) Enter a unique name for the user and click Create.

For example: srm

After the user is created, you are presented with a page that displays the user details.



Note:

The Workload User Name (srv_srm), is different from the actual machine user name (srm). The Workload User Name is the identifier you use to configure Streams Replication Manager.

- d) Click Set Workload Password.
- e) Type a password in the Password and Confirm Password fields. Leave the Environment field blank.
- f) Click Set Workload Password.

A message appears on successful password creation.

2. Grant the machine user access to your environment.

You must grant the machine user access to your environment for Streams Replication Manager to connect to the Kafka service with this user.

- a) Navigate to Management Console Environments , and select the environment where your Kafka cluster is located.
- b) Click Actions Manage Access .

Use the search box to find and select the machine user you want to use.

A list of **Resource Roles** appears.

- c) Select the EnvironmentUser role and click Update Roles.
- d) Go back to the **Environment Details** page and click Actions Synchronize Users to FreeIPA .
- e) On the **Synchronize Users** page, click Synchronize Users.

Synchronizing users ensures that the role assignment is in effect for the environment.



Important: Wait until this process is completed. Otherwise, you will not be able to continue with the next step.

3. Add Ranger permissions for the user you created for Streams Replication Manager in the Cloudera Data Hub cluster.

You must to grant the necessary privileges to the user so that the user can access Kafka resources. This is configured through Ranger policies.

- a) Navigate to Management Console Environments , and select the environment where your Kafka cluster is located.
- b) Click the Ranger link on the **Environment Details** page.
- c) Select the resource-based service corresponding to the Kafka resource in the Cloudera Data Hub cluster.
- d) Add the Workload User Name of the user you created for Streams Replication Manager to the following Ranger policies.

- All - consumergroup
- All - topic
- All - transactionalid
- All - cluster
- All - delegationtoken

4. Ensure that Ranger permissions exist for the streamsrepmgr user in the Cloudera Private Cloud Base cluster.
 - a) Access the Cloudera Manager instance of your Cloudera Private Cloud Base cluster.
 - b) Go to Ranger Ranger Admin Web UI .
 - c) Log in to the Ranger Console (Ranger Admin Web UI).
 - d) Ensure that the streamsrepmgr user is added to all required policies.

If the user is missing, add it. The required policies are as follows.

- All - consumergroup
- All - topic
- All - transactionalid
- All - cluster
- All - delegationtoken

5. Create a truststore on the Cloudera Private Cloud Base cluster.

A truststore is required so that the Streams Replication Manager instance running in the Cloudera Private Cloud Base cluster can trust the secure Cloudera Data Hub cluster. To do this, you extract the FreeIPA certificate from the Cloudera environment, create a truststore that includes the certificate, and copy the truststore to all hosts on the Cloudera Private Cloud Base cluster.

- a) Navigate to Management Console Environments , and select the environment where your Kafka cluster is located.
- b) Go to the FreeIPA tab.
- c) Click Get FreeIPA Certificate.
The FreeIPA certificate file, [***ENVIRONMENT NAME***].crt, is downloaded to your computer.
- d) Run the following command to create the truststore.

```
keytool \
  -importcert \
  -storetype JKS \
  -noprompt \
  -keystore datahub-truststore.jks \
  -storepass [***PASSWORD***] \
  -alias freeipa-ca \
  -file [***PATH TO FREEIPA CERTIFICATE***]
```

- e) Copy the datahub-truststore.jks file to a common location on all the hosts in your Cloudera Private Cloud Base cluster.

Cloudera recommends that you use the following location: /opt/cloudera/security/datahub-truststore.jks.

- f) Set the correct file permissions.

Use 751 for the directory and 444 for the truststore file.

6. Access the Cloudera Manager instance of your Cloudera Private Cloud Base cluster.

7. Define the external Kafka cluster (the Cloudera Data Hub cluster).

- a) Go to Administration External Accounts .
- b) Go to the Kafka Credentials tab.

On this tab you will create a credential for each external cluster taking part in the replication process.

- c) Click Add Kafka credentials.
- d) Configure the Kafka credentials.

In the case of this example, you must create a single credential representing the Cloudera Data Hub cluster. For example:

```
Name=datahub
Bootstrap servers=[***MY-CLOUDERA-DATA-HUB-CLUSTER-
HOST-1.COM:9093***],[***MY-CLOUDERA-DATA-HUB-CLUSTER-HOST-1.COM:9093***]
Security Protocol=SASL_SSL
JAAS Secret 1=[***WORKLOAD USER NAME***]
JAAS Secret 2=[***MACHINE USER PASSWORD***]
```

```
JAAS Template=org.apache.kafka.common.security.plain.PlainLoginModule r
equired username="##JAAS_SECRET_1##" password="##JAAS_SECRET_2##";
SASL Mechanism=PLAIN
Truststore Password=[***PASSWORD***]
Truststore Path=/OPT/CLLOUDERA/SECURITY/DATAHUB-TRUSTSTORE.JKS
Truststore type=JKS
```

- e) Click Add.

If credential creation is successful, a new entry corresponding to the Kafka credential you specified appears on the page.

8. Define the co-located Kafka cluster (the Cloudera Private Cloud Base cluster).

- a) In Cloudera Manager, go to Clusters and select the Streams Replication Manager service.
- b) Go to Configuration.
- c) Find and enable the Kafka Service property.
- d) Find and configure the Streams Replication Manager Co-located Kafka Cluster Alias property.

The alias you configure represents the co-located cluster. Enter an alias that is unique and easily identifiable. For example:

```
cdppvc
```

- e) Enable relevant security feature toggles.

Because the Cloudera Private Cloud Base cluster is both TLS/SSL and Kerberos enabled, you must enable all feature toggles for both the Streams Replication Manager Driver and Service roles. The feature toggles are the following.

- Enable TLS/SSL for SRM Driver
- Enable TLS/SSL for SRM Service
- Enable Kerberos Authentication

9. Add both clusters to the configuration of Streams Replication Manager.

- a) Find and configure the External Kafka Accounts property.

Add the name of all Kafka credentials you created to this property. This can be done by clicking the add button to add a new line to the property and then entering the name of the Kafka credential. For example:

```
datahub
```

- b) Find and configure the Streams Replication Manager Cluster alias property.

Add all cluster aliases to this property. This includes the aliases present in both the External Kafka Accounts and Streams Replication Manager Co-located Kafka Cluster Alias properties. Delimit the aliases with commas. For example:

```
datahub,cdppvc
```

10. Configure replications.

In this example data is replicated unidirectionally. As a result, only a single replication must be configured.

- a) Find the Streams Replication Manager's Replication Configs property.
- b) Click the add button and add new lines for each unique replication you want to add and enable.
- c) Add and enable your replications. For example:

```
cdppvc->datahub.enabled=true
```

11. Configure Streams Replication Manager Driver and Service role targets.

- a) Find and configure the Streams Replication Manager Service Target Cluster property.

Add the co-located cluster's alias to the property. For example:

```
cdppvc
```

Setting this property to `cdppvc` does not enable you to monitor the replications targeting the Cloudera Data Hub cluster. It is possible to add the Cloudera Data Hub cluster alias to this property and as a result monitor the Cloudera Data Hub cluster. However, this can lead to unwanted behaviour. See the *Before you begin* section for more information.

- b) Find and configure the Streams Replication Manager Driver Target Cluster property.

For example:

```
datahub, cdppvc
```



Note: This property must either contain all aliases or left blank. Leaving the property blank has the same effect as adding all aliases.

12. Configure the srm-control tool.

- a) Click Gateway in the **Filters** pane.

- b) Find and configure the following properties.

- SRM Client's Secure Storage Password: [***PASSWORD***]
- Environment Variable Holding SRM Client's Secure Storage Password: SECURESTOREPASS
- Gateway TLS/SSL Trust Store File: [***CLOUDERA PRIVATE CLOUD BASE GLOBAL TRUSTSTORE LOCATION***]
- Gateway TLS/SSL Truststore Password: [***CLOUDERA PRIVATE CLOUD BASE GLOBAL TRUSTSTORE PASSWORD***]
- SRM Client's Kerberos Principal Name: [***MY KERBEROS PRINCIPAL****]
- SRM Client's Kerberos Keytab Location: [***PATH TO KEYTAB FILE***]

Take note of the password you configure in SRM Client's Secure Storage Password and the name you configure in Environment Variable Holding SRM Client's Secure Storage Password. You will need to provide both of these in your CLI session before running the tool.

- c) Click Save Changes.
- d) Restart the Streams Replication Manager service.
- e) Deploy client configuration for Streams Replication Manager.

13. Start the replication process using the srm-control tool.

- a) SSH as an administrator to any of the Streams Replication Manager hosts in the Cloudera Private Cloud Base cluster.

```
ssh [***USER***]@[***MY-CLOUDERA-PRIVATE-CLOUD-BASE-CLUSTER.COM***]
```

- b) Set the secure storage password as an environment variable.

```
export [***SECURE STORAGE ENV VAR***]="[***SECURE STORAGE PASSWORD***]"
```

Replace `[***SECURE STORAGE ENV VAR***]` with the name of the environment variable you specified in Environment Variable Holding SRM Client's Secure Storage Password. Replace `[***SECURE STORAGE PASSWORD***]` with the password you specified in SRM Client's Secure Storage Password. For example:

```
export SECURESTOREPASS="mypassword"
```

- c) Use the srm-control tool with the topics subcommand to add topics to the allow list.

```
srm-control topics --source cdppvc --target datahub --add [***TOPIC  
NAME***]
```

- d) Use the srm-control tool with the groups subcommand to add groups to the allow list.

```
srm-control groups --source cdppvc --target datahub --add ".*"
```

14. Configure replication monitoring of the Cloudera Data Hub cluster.

- a) Access the Cloudera Manager instance of your Cloudera Private Cloud Base cluster.
- b) In Cloudera Manager, go to Clusters and select the Streams Replication Manager service.
- c) Go to Configuration.
- d) Find and configure the Streams Replication Manager Service Target Cluster property.

Replace the alias set in the property with the Cloudera Data Hub cluster's alias. For example:

```
datahub
```

- e) Click Save Changes.
- f) Restart the Streams Replication Manager service.
- g) Access the Streams Messaging Manager UI in the Cloudera Private Cloud Base cluster and go to the Cluster Replications page.

The replications you set up will be visible on this page.



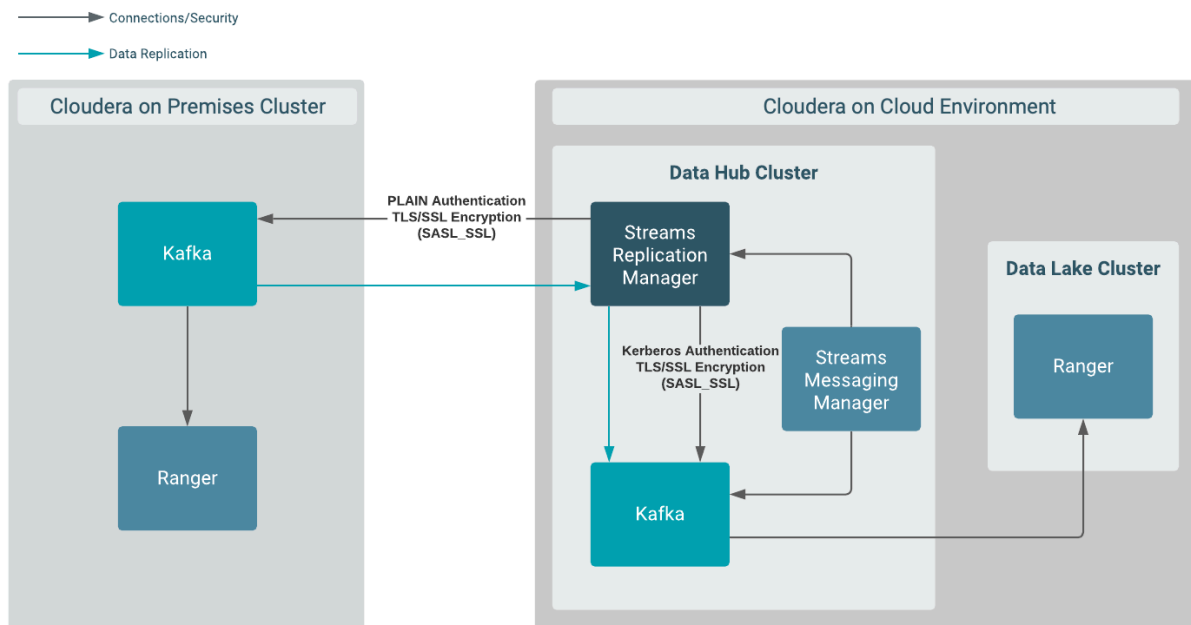
Note: If the topics or groups you added for replication are newly created, they might not be immediately visible. This is due to how frequently Streams Replication Manager checks for newly created topics and consumer groups. By default, this is set to 10 minutes, but can be configured with the Refresh Topics Interval Seconds and Refresh Groups Interval Seconds Streams Replication Manager properties. If at first your topics do not appear, wait a few minutes and refresh the page.

Replicating data from on premises to cloud with Streams Replication Manager in the cloud

You can set up and configure an instance of Streams Replication Manager running in a Cloudera Data Hub cluster to replicate data between the Cloudera Data Hub cluster and a Cloudera Private Cloud Base Base cluster. In addition, you can use Streams Messaging Manager to monitor the replication process.

About this task

Consider the following replication scenario.



In this scenario, data is replicated from a Cloudera Private Cloud Base cluster to a Cloudera Data Hub cluster by a Streams Replication Manager instance that is deployed in the Cloudera Data Hub cluster.

The Cloudera Private Cloud Base cluster has Kafka deployed on it. It is a secure cluster that has TLS/SSL encryption enabled and uses PLAIN authentication. In addition, it uses Ranger for authorization.

The Cloudera Data Hub cluster is provisioned with the one of the default Streams Messaging cluster definitions.

Before you begin

This example scenario does not go into detail on how to set up the clusters and assumes the following.

- A Cloudera Data Hub provisioned with the Streams Messaging Light Duty or Heavy Duty cluster definition is available.

For more information, see [Setting up your Streams Messaging cluster](#) in the CDF for Data Hub library.

Alternatively, you can also review the cloud provider specific cluster creation instructions available in the [Cloudera Data Hub library](#).

- A Cloudera Private Cloud Base cluster with Kafka is available. This cluster has TLS/SSL encryption enabled, uses PLAIN authentication, and has Ranger for authorization. For more information, see the [CDP Private Cloud Base Installation Guide](#).
- Network connectivity and DNS resolution are established between the clusters.

Procedure**1. Obtain PLAIN credentials for Streams Replication Manager.**

The credentials of a PLAIN user that can access the Cloudera Private Cloud Base cluster are required. These credentials are supplied to Streams Replication Manager in a later step. In this example [***PLAIN USER***] and [***PLAIN USER PASSWORD***] is used to refer to these credentials.



Note: Typically, Kerberos cannot be easily configured to span across an on-premise and a public cloud environment. Therefore, these instructions assume that these environments use authentication methods that are easy to interoperate in such hybrid environments like LDAP or PAM authentication. For more information on how you can configure your Kafka service to use LDAP or PAM, see *Kafka Authentication*.

2. Add Ranger permissions for the PLAIN user in the Cloudera Private Cloud Base cluster.

You must ensure that the PLAIN user you obtained has correct permissions assigned to it in Ranger. Otherwise, Streams Replication Manager will not be able to access Kafka resources on the Cloudera Private Cloud Base cluster.

- a) Access the Cloudera Manager instance of your Cloudera Private Cloud Base cluster.
- b) Go to Ranger Ranger Admin Web UI .
- c) Log in to the Ranger Console (Ranger Admin Web UI).
- d) Add the [***PLAIN USER***] to the following policies.

- All - consumergroup
- All - topic
- All - transactionalid
- All - cluster
- All - delegationtoken

3. Acquire the Cloudera Private Cloud Base cluster truststore and add it to the Cloudera Data Hub cluster.

The actions you need to take differ depending on how TLS is set up in the Cloudera Private Cloud Base cluster.

For Auto TLS**a. Obtain the certificate of the Cloudera Manager root Certificate Authority and its password.**

The Certificate Authority certificate and its password can be obtained using the Cloudera Manager API. The following steps describe how you can retrieve the certificate and password using the Cloudera Manager API Explorer. Alternatively, you can also retrieve the certificate and password by calling the appropriate endpoints in your browser window or using curl.

1. Access the Cloudera Manager instance of your Cloudera Private Cloud Base cluster.
2. Go to Support API Explorer .
3. Find CertManagerResource.
4. Select the /certs/truststore GET operation and click Try it out.
5. Enter the truststore type.
6. Click Execute.
7. Click Download file under Responses.

The downloaded file is your certificate.

8. Select the /certs/truststorePassword GET operation and click Try it out.
9. Click Execute.

The password is displayed under Responses.

b. Run the following command to create the truststore:

```
keytool \  
-importcert \  
-storetype JKS \  
-noprompt \  

```

```
-keystore cdppvc-truststore.jks \  
-storepass ***PASSWORD*** \  
-alias cdppvc-cm-ca \  
-file ***PATH TO CM CA CERTIFICATE***
```

Note down the password, it is needed in a later step.

- c. Copy the cdppvc-truststore.jks file to a common location on all the hosts in your Cloudera Data Hub cluster. Cloudera recommends that you use the following location: /opt/cloudera/security/cdppvc-truststore.jks.

- d. Set the correct file permissions.

Use 751 for the directory and 444 for the truststore file.

For Manual TLS

- a. Note down the truststore location and password of the Cloudera Private Cloud Base cluster. These should be known to you.

- b. Copy the truststore file to a common location on all the hosts in your Cloudera Data Hub cluster.

Cloudera recommends that you use the following location: /opt/cloudera/security/truststore.jks.

- c. Set the correct file permissions.

Use 751 for the directory and 444 for the truststore file.

4. Access the Cloudera Manager instance of your Cloudera Data Hub cluster.
5. Define the external Kafka cluster (the Cloudera Private Cloud Base cluster).

- a) Go to Administration External Accounts .
- b) Go to the Kafka Credentials tab.

On this tab you will create a credential for each external cluster taking part in the replication process.

- c) Click Add Kafka credentials
- d) Configure the Kafka credentials.

In the case of this example, you must create a single credential representing the Cloudera Private Cloud Base cluster. For example:

```
Name=cdppvc  
Bootstrap servers=[***MY-CLOUDARE-PRIVATE-CLOUD-BASE-CLUSTER-  
HOST-1.COM:9093***],[***MY-CLOUDERA-PRIVATE-CLOUD-BASE-CLUSTER-  
HOST-2:9093***]  
Security Protocol=SASL_SSL  
JAAS Secret 1=[***PLAIN USER***]  
JAAS Secret 2=[***PLAIN USER PASSWORD***]  
JAAS Template=org.apache.kafka.common.security.plain.PlainLoginModule r  
equired username="##JAAS_SECRET_1##" password="##JAAS_SECRET_2##";  
SASL Mechanism=PLAIN  
Truststore Password=[***PASSWORD***]  
Truststore Path=/OPT/CLLOUDERA/SECURITY/CDPPVC-TRUSTSTORE.JKS  
Truststore type=JKS
```



Note: The properties you specify for the Kafka credential depend on the security configuration of the Cloudera Private Cloud Base cluster. This specific example is for a cluster that has TLS/SSL encryption and PLAIN authentication enabled. You must change these configurations based on the setup of your Cloudera Private Cloud Base cluster.

- e) Click Add.

If credential creation is successful, a new entry corresponding to the Kafka credential you specified appears on the page.

6. Define the co-located Kafka cluster (the Cloudera Data Hub cluster).

Note: Some of the following properties might already be configured by automation.

- a) In Cloudera Manager, go to Clusters and select the Streams Replication Manager service.
- b) Go to Configuration.
- c) Find and enable the Kafka Service property.
- d) Find and configure the Streams Replication Manager Co-located Kafka Cluster Alias property.
The alias you configure represents the co-located cluster. Enter an alias that is unique and easily identifiable.
For example:

```
datahub
```

- e) Enable relevant security feature toggles.
Because the Cloudera Data Hub cluster is both TLS/SSL and Kerberos enabled, you must enable all feature toggles for both the Streams Replication Manager Driver and Service roles. The feature toggles are the following.
 - Enable TLS/SSL for SRM Driver
 - Enable TLS/SSL for SRM Service
 - Enable Kerberos Authentication

7. Add both clusters to the configuration of Streams Replication Manager.

- a) Find and configure the External Kafka Accounts property.
Add the name of all Kafka credentials you created to this property. This can be done by clicking the add button to add a new line to the property and then entering the name of the Kafka credential. For example:

```
cdppvc
```

- b) Find and configure the Streams Replication Manager Cluster alias property.
Add all cluster aliases to this property. This includes the aliases present in both the External Kafka Accounts and Streams Replication Manager Co-located Kafka Cluster Alias properties. Delimit the aliases with commas.
For example:

```
datahub,cdppvc
```

8. Configure replications.

In this example data is replicated unidirectionally. As a result, only a single replication must be configured.

- a) Find the Streams Replication Manager's Replication Configs property.
- b) Click the add button and add new lines for each unique replication you want to add and enable.
- c) Add and enable your replications. For example:

```
cdppvc->datahub.enabled=true
```

9. Configure Streams Replication Manager Driver and Service role targets.

- a) Find and configure the Streams Replication Manager Service Target Cluster property.

Add the co-located cluster's alias to the property. For example:

```
datahub
```

- b) Find and configure the Streams Replication Manager Driver Target Cluster property.

For example:

```
datahub,cdppvc
```



Important: If you have another Streams Replication Manager instance configured with the same clusters and is targeting the Cloudera Private Cloud Base cluster, the `cdppvc` alias should not be configured as a target for this instance of Streams Replication Manager.



Note: This property must either contain all aliases or left blank. Leaving the property blank has the same effect as adding all aliases.

10. Configure the `srm-control` tool.

- a) Click Gateway in the
- Filters**
- pane.

- b) Find and configure the following properties.

- SRM Client's Secure Storage Password: [***PASSWORD***]
- Environment Variable Holding SRM Client's Secure Storage Password: `SECURESTOREPASS`
- Gateway TLS/SSL Trust Store File: `/OPT/CLOUDERA/SECURITY/DATAHUB-TRUSTSTORE.JKS`
- Gateway TLS/SSL Truststore Password: [***PASSWORD***]
- SRM Client's Kerberos Principal Name: [***MY KERBEROS PRINCIPAL****]
- SRM Client's Kerberos Keytab Location: [***PATH TO KEYTAB FILE***]

Take note of the password you configure in SRM Client's Secure Storage Password and the name you configure in Environment Variable Holding SRM Client's Secure Storage Password. You will need to provide both of these in your CLI session before running the tool.

- c) Click Save Changes.
- d) Restart the Streams Replication Manager service.
- e) Deploy client configuration for Streams Replication Manager.

11. Start the replication process using the srm-control tool.

- a) SSH as an administrator to any of the Streams Replication Manager hosts in the Cloudera Data Hub cluster.

```
ssh [***USER***]@[***MY-CLOUDERA-DATA-HUB-CLUSTER.COM***]
```

- b) Set the secure storage password as an environment variable.

```
export [***SECURE STORAGE ENV VAR***]="[***SECURE STORAGE PASSWORD***]"
```

Replace `[***SECURE STORAGE ENV VAR***]` with the name of the environment variable you specified in Environment Variable Holding SRM Client's Secure Storage Password. Replace `[***SECURE STORAGE PASSWORD***]` with the password you specified in SRM Client's Secure Storage Password. For example:

```
export SECURESTOREPASS="mypassword"
```

- c) Use the srm-control tool with the topics subcommand to add topics to the allow list.

```
srm-control topics --source cdppvc --target datahub --add [***TOPIC NAME***]
```

- d) Use the srm-control tool with the groups subcommand to add groups to the allow list.

```
srm-control groups --source cdppvc --target datahub --add ".*"
```

12. Monitor the replication process.

Access the Streams Messaging Manager UI in the Cloudera Data Hub cluster, and go to the Cluster Replications page. The replications you set up will be visible on this page.



Note: If the topics or groups you added for replication are newly created, they might not be immediately visible. This is due to how frequently Streams Replication Manager checks for newly created topics and consumer groups. By default, this is set to 10 minutes, but can be configured with the Refresh Topics Interval Seconds and Refresh Groups Interval Seconds Streams Replication Manager properties. If at first your topics do not appear, wait a few minutes and refresh the page.

Related Information

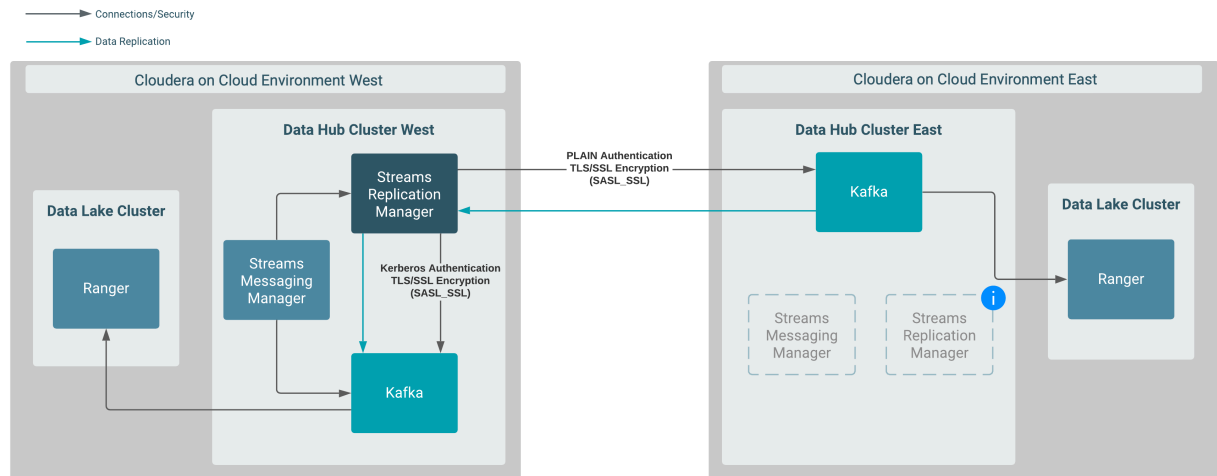
[Kafka Authentication](#)

Replicating data between cloud clusters with Streams Replication Manager in the cloud

You can set up and configure an instance of Streams Replication Manager in a Cloudera Data Hub cluster to replicate data between Cloudera Data Hub clusters. In addition, you can use Streams Messaging Manager to monitor the replication process.

About this task

Consider the following replication scenario.



In this scenario, data is replicated between two Cloudera Data Hub clusters that are provisioned in different Cloudera on cloud environments. More specifically, data in Cloudera Data Hub East is replicated to Cloudera Data Hub West by an instance of Streams Replication Manager running in Cloudera Data Hub West.

Both Cloudera Data Hub clusters are provisioned with the default Streams Messaging cluster definitions.

Streams Replication Manager and Streams Messaging Manager are available in both clusters, but the instances in Cloudera Data Hub East are not utilized in this scenario.

Before you begin

This example scenario does not go into detail on how to set up the clusters and assumes the following.

- Two Data Hub clusters provisioned with the Streams Messaging Light Duty or Heavy Duty cluster definition are available.

For more information, see [Setting up your Streams Messaging cluster](#) in the CDF for Data Hub library. Alternatively, you can also review the cloud provider specific cluster creation instructions available in the [Cloudera Data Hub library](#).

- Network connectivity and DNS resolution are established between the clusters.



Important: In the following scenario, a new Cloudera machine user is created and set up specifically for Streams Replication Manager. Alternatively, it is also possible to use an existing machine user and skip steps 1 through 3, but this can only be done if the following requirements are met.

- The existing machine user has access to your Cloudera environment.
- The existing machine user has the correct Ranger permissions assigned to it.
- You have access to the existing machine user's credentials.

Procedure

1. Create a machine user for Streams Replication Manager in Cloudera Management Console.

A machine user is required so that Streams Replication Manager has credentials that it can use to connect to the Kafka service in the Cloudera Data Hub cluster. This step is only required in the environment where Streams Replication Manager is not running. In the case of this example, this is the Cloudera on cloud East environment.

- a) Navigate to Management Console User Management.
- b) Click Actions Create Machine User .
- c) Enter a unique name for the user and click Create.

For example: srm

After the user is created, you are presented with a page that displays the user details.



Note:

The Workload User Name (srv_srm), is different from the actual machine user name (srm). The Workload User Name is the identifier you use to configure Streams Replication Manager.

- d) Click Set Workload Password.
 - e) Type a password in the Password and Confirm Password fields. Leave the Environment field blank.
 - f) Click Set Workload Password.
- A message appears on successful password creation.

2. Grant the machine user access to your environment.

You must to grant the machine user access in your environments, otherwise Streams Replication Manager will not be able to connect to the Kafka service with this user. This step is only required in the environments where Streams Replication Manager is not running. In the case of this example this is the Cloudera on cloud East environment.

- a) Navigate to Management Console Environments , and select the environment where your Kafka cluster is located.
 - b) Click Actions Manage Access .
- Use the search box to find and select the machine user you want to use.
- A list of **Resource Roles** appears.
- c) Select the EnvironmentUser role and click Update Roles.
 - d) Go back to the **Environment Details** page and click Actions Synchronize Users to FreeIPA .
 - e) On the **Synchronize Users** page, click Synchronize Users.

Synchronizing users ensures that the role assignment is in effect for the environment.



Important: Wait until this process is completed. Otherwise, you will not be able to continue with the next step.

3. Add Ranger permissions for the user you created for Streams Replication Manager.

This step is only required in the environment where Streams Replication Manager is not running. In the case of this example, this is the Cloudera on cloud East environment.

- a) Navigate to Management Console Environments , and select the environment where your Kafka cluster is located.
- b) Click the Ranger link on the **Environment Details** page.
- c) Select the resource-based service corresponding to the Kafka resource in the Cloudera Data Hub cluster.
- d) Add the Workload User Name of the user you created for Streams Replication Manager to the following Ranger policies.
 - All - consumergroup
 - All - topic
 - All - transactionalid
 - All - cluster
 - All - delegationtoken

4. Establish trust between the clusters.

A truststore is needed so that the Streams Replication Manager instance running in Cloudera Data Hub West can trust Cloudera Data Hub East. To do this, you extract the FreeIPA certificate from the Cloudera on cloud East environment, create a truststore that includes the certificate, and copy the truststore to all hosts on Cloudera Data Hub West.

- a) Navigate to Management Console Environments , and select Cloudera on cloud East.
- b) Go to the FreeIPA tab.
- c) Click Get FreeIPA Certificate.
The FreeIPA certificate file, [***ENVIRONMENT NAME***].crt, is downloaded to your computer.
- d) Run the following command to create the truststore.

```
keytool \
  -importcert \
  -storetype JKS \
  -noprompt \
  -keystore truststore-east.jks \
  -storepass [***PASSWORD***] \
  -alias freeipa-east-ca \
  -file [***PATH TO FREEIPA CERTIFICATE***]
```

- e) Copy the truststore-east.jks file to a common location on all the hosts in your Cloudera Data Hub West cluster. Cloudera recommends that you use the following location: /opt/cloudera/security/truststore-east.jks.
- f) Set the correct file permissions.
Use 751 for the directory and 444 for the truststore file.

5. Access the Cloudera Manager instance of the Cloudera Data Hub West cluster.**6. Define the external Kafka cluster (the Cloudera Data Hub East cluster).**

- a) Go to Administration External Accounts .
- b) Go to the Kafka Credentials tab.
On this tab you will create a credential for each external cluster taking part in the replication process.
- c) Click Add Kafka credentials
- d) Configure the Kafka credentials.

In the case of this example, you must create a single credential representing the Cloudera Data Hub East cluster. For example:

```
Name=dheast
Bootstrap servers=[***MY-CLOUDERA-DATA-HUB-EAST-CLUSTER-
HOST-1.COM:9093***],[***MY-CLOUDERA-DATA-HUB-EAST-CLUSTER-
HOST-2:9093***]
Security Protocol=SASL_SSL
JAAS Secret 1=[***WORKLOAD USER NAME***]
JAAS Secret 2=[***MACHINE USER PASSWORD***]
JAAS Template=org.apache.kafka.common.security.plain.PlainLoginModule r
equired username="##JAAS_SECRET_1##" password="##JAAS_SECRET_2##";
SASL Mechanism=PLAIN
Truststore Password=[***PASSWORD***]
Truststore Path=/OPT/CLLOUDERA/SECURITY/TRUSTSTORE-EAST.JKS
Truststore type=JKS
```

- e) Click Add.

If credential creation is successful, a new entry corresponding to the Kafka credential you specified appears on the page.

7. Define the co-located Kafka cluster (the Cloudera Data Hub West cluster).

Note: Some of the following properties might already be configured by automation.

- a) In Cloudera Manager, go to Clusters and select the Streams Replication Manager service.
- b) Go to Configuration.
- c) Find and enable the Kafka Service property.
- d) Find and configure the Streams Replication Manager Co-located Kafka Cluster Alias property.

The alias you configure represents the co-located cluster. Enter an alias that is unique and easily identifiable. For example:

```
dhwest
```

- e) Enable relevant security feature toggles.

Because the Cloudera Data Hub cluster is both TLS/SSL and Kerberos enabled, you must enable all feature toggles for both the Streams Replication Manager Driver and Service roles. The feature toggles are the following.

- Enable TLS/SSL for SRM Driver
- Enable TLS/SSL for SRM Service
- Enable Kerberos Authentication

8. Add both clusters to the configuration of Streams Replication Manager.

- a) Find and configure the External Kafka Accounts property.

Add the name of all Kafka credentials you created to this property. This can be done by clicking the add button to add a new line to the property and then entering the name of the Kafka credential. For example:

```
dheast
```

- b) Find and configure the Streams Replication Manager Cluster alias property.

Add all cluster aliases to this property. This includes the aliases present in both the External Kafka Accounts and Streams Replication Manager Co-located Kafka Cluster Alias properties. Delimit the aliases with commas. For example:

```
dheast , dhwest
```

9. Configure replications.

In this example data is replicated unidirectionally. As a result, only a single replication must be configured.

- a) Find the Streams Replication Manager's Replication Configs property.
- b) Click the add button and add new lines for each unique replication you want to add and enable.
- c) Add and enable your replications. For example:

```
dheast->dhwest.enabled=true
```

10. Configure Streams Replication Manager Driver and Service role targets.

- a) Find and configure the Streams Replication Manager Service Target Cluster property.
Add the co-located cluster's alias to the property. For example:

```
dhwest
```

- b) Find and configure the Streams Replication Manager Driver Target Cluster property.
For example:

```
dheast , dhwest
```



Important: If you have another Streams Replication Manager instance configured with the same clusters and is targeting Cloudera Data Hub East, the dheast alias should not be configured as a target for this instance of Streams Replication Manager.



Note: This property must either contain all aliases or left blank. Leaving the property blank has the same effect as adding all aliases.

11. Configure the srm-control tool.

- a) Click Gateway in the **Filters** pane.
- b) Find and configure the following properties.



Note: Some of the following properties might already be configured by automation.

- SRM Client's Secure Storage Password: [***PASSWORD***]
- Environment Variable Holding SRM Client's Secure Storage Password: SECURESTOREPASS
- Gateway TLS/SSL Trust Store File: /OPT/CLOUDERA/SECURITY/TRUSTSTORE-WEST.JKS
- Gateway TLS/SSL Truststore Password: [***PASSWORD***]
- SRM Client's Kerberos Principal Name: [***MY KERBEROS PRINCIPAL***]
- SRM Client's Kerberos Keytab Location: [***PATH TO KEYTAB FILE***]

Take note of the password you configure in SRM Client's Secure Storage Password and the name you configure in Environment Variable Holding SRM Client's Secure Storage Password. You will need to provide both of these in your CLI session before running the tool.

- c) Click Save Changes.
- d) Restart the Streams Replication Manager service.
- e) Deploy client configuration for Streams Replication Manager.

12. Start the replication process using the srm-control tool.

- a) SSH as an administrator to any of the Streams Replication Manager hosts in the Cloudera Data Hub West cluster.

```
ssh [***USER***]@[***MY-CLOUDERA-DATA-HUB-WEST-CLUSTER-HOST-1.COM***]
```

- b) Set the secure storage password as an environment variable.

```
export [***SECURE STORAGE ENV VAR***]="[***SECURE STORAGE PASSWORD***]"
```

Replace [***SECURE STORAGE ENV VAR***] with the name of the environment variable you specified in Environment Variable Holding SRM Client's Secure Storage Password. Replace [***SECURE STORAGE PASSWORD***] with the password you specified in SRM Client's Secure Storage Password. For example:

```
export SECURESTOREPASS="mypassword"
```

- c) Use the srm-control tool with the topics subcommand to add topics to the allow list.

```
srm-control topics --source dheast --target dhwest --add [***TOPIC  
NAME***]
```

- d) Use the srm-control tool with the groups subcommand to add groups to the allow list.

```
srm-control groups --source dheast --target dhwest --add ".*"
```

13. Monitor the replication process.

Access the Streams Messaging Manager UI in the Cloudera Data Hub West cluster and go to the Cluster Replications page. The replications you set up will be visible on this page.



Note: If the topics or groups you added for replication are newly created, they might not be immediately visible. This is due to how frequently Streams Replication Manager checks for newly created topics and consumer groups. By default, this is set to 10 minutes, but can be configured with the Refresh Topics Interval Seconds and Refresh Groups Interval Seconds Streams Replication Manager properties. If at first your topics do not appear, wait a few minutes and refresh the page.