

Cloudera Runtime 7.3.1

## Apache Kafka KRaft

Date published: 2023-06-27

Date modified: 2024-12-10

# CLOUdera

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# KRaft setup

Learn how you can set up Kafka KRaft in Cloudera Base on premises.

## About this task



**Note:** Kafka KRaft is available in this version of Cloudera but is not ready for production deployment. Cloudera encourages you to explore this technical preview feature in non-production environments and provide feedback on your experiences through the [Cloudera Community Forums](#). For more information regarding KRaft limitations and unsupported features, see [Known Issues in Apache Kafka](#).

Kafka KRaft in Cloudera is implemented in the form of a Kafka service role. The role is called KRaft Controller. KRaft mode can be set up for a Kafka service by provisioning KRaft Controller service roles for the Kafka service and configuring various Kafka service properties. This can be done when installing a new cluster or when adding the Kafka service to an existing cluster.

If you are installing a new cluster, you complete the following steps during *Step 8: Set Up a Cluster Using the Wizard* of the *Cloudera Base on premises Installation Guide*. Specifically, the KRaft Controller roles are added on the **Assign Roles** page, the properties are configured on the **Review Changes** page of the **Add Cluster - Configuration** wizard.

If you are adding a new Kafka service to an existing cluster, you complete the following steps while using the **Add a Service** wizard. KRaft Controller roles are added on the **Assign Roles** page, properties are configured on the **Review Changes** page of the wizard.



**Important:** Reconfiguring a Kafka service that uses ZooKeeper to use KRaft is not supported.

## Before you begin

Review the following notes and recommendations about deployment:

- KRaft requires an odd number of controllers to function. As a result, ensure that you always deploy an odd number of KRaft Controller service roles. Service setup fails if you try to deploy an even number of roles.
- KRaft can function with a single KRaft Controller role instance, but a minimum of three is recommended. Deploying a Kafka service with a single KRaft Controller is only recommended for development and testing purposes.
- Cloudera recommends that you deploy the KRaft Controller service roles on dedicated hosts.
- If deployment on dedicated hosts is not feasible, or if you are deploying a lightweight cluster where high availability is not a requirement, you can colocate the controllers on the same hosts as the brokers. In general, if your deployment can tolerate the simultaneous failure of two colocated nodes, then deploying the controllers and brokers on the same hosts is a viable option.
- The hardware and deployment recommendations that exist for ZooKeeper also hold true for KRaft Controllers. For more information, see [Performance considerations](#).

## Procedure

1. Deploy an odd number of KRaft Controller service roles on your hosts.
2. Clear the Enable Delegation Tokens Kafka property.  
Delegation token based authentication is not supported with KRaft and must be disabled.
3. Set the Kafka Metadata Store Service Kafka property to KRaft.

## Related Information

[Kafka KRaft Overview](#)

[Step 8: Set Up a Cluster Using the Wizard](#)

[Adding a Service](#)

## Extracting KRaft metadata

Learn how to extract Kafka metadata from the `__cluster_metadata` topic. Metadata extracted from this topic can be used for debugging and troubleshooting issues with a Kafka deployment running in KRaft mode.

## About this task



**Note:** Kafka KRaft is available in this version of Cloudera but is not ready for production deployment. Cloudera encourages you to explore this technical preview feature in non-production environments and provide feedback on your experiences through the [Cloudera Community Forums](#). For more information regarding KRaft limitations and unsupported features, see [Known Issues in Apache Kafka](#).

When Kafka is running in KRaft mode, metadata describing the state of the Kafka cluster is stored in the `__cluster_metadata` topic. This topic can be found in the `/var/local/kraft/data` directory on each KRaft Controller service role host.

In case you encounter any issues when running your deployment in KRaft mode, generally the first step is to print the contents of the `__cluster_metadata` topic. Reviewing the contents of the topic can help in identifying the issues with the cluster.

The contents of the `__cluster_metadata` topic can be printed using the `kafka-dump-log` command with the `--cluster-metadata-decoder` option.

## Procedure

1. Log in to one of your cluster hosts that has a KRaft service role (KRaft Controller) deployed on it.
2. Run the `kafka-dump-log` command with the `--cluster-metadata-decoder` option. For example:

```
kafka-dump-log --cluster-metadata-decoder --files /var/local/kraft/data/_cluster_metadata-0/00000000000000000000.log
```

# Securing KRaft

Learn about KRaft security and security configuration in Cloudera.



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When you deploy Kafka in KRaft mode a set of specialized broker roles, KRaft Controller roles, are deployed on your cluster. KRaft Controllers communicate with brokers to serve their requests and to manage Kafka's metadata. The connection between controllers and brokers can be secured using TLS/SSL encryption, TLS/SSL authentication, and/or Kerberos authentication.

By default KRaft Controllers inherit the security configuration of the parent Kafka service. For example, if TLS/SSL is enabled for Kafka, then Cloudera Manager automatically enables TLS/SSL for the KRaft Controllers in the cluster. As a result, if you configure security for the Kafka service, no additional configuration is required to secure KRaft Controllers.

However, if required, some security properties related to encryption and authentication can be configured separately for KRaft Controllers.

- TLS/SSL encryption and authentication

TLS/SSL configuration can be configured separately as the KRaft Controller role has its own set of TLS/SSL properties. You can enable or disable TLS/SSL as well as configure the key and truststore that the KRaft Controller roles use. For more information see, [Configuring TLS/SSL for KRaft Controllers](#) on page 6.

- Kerberos authentication

Kerberos cannot be enabled or disabled separately for KRaft Controllers. The default Kerberos principal for KRaft controllers, the kraft user, can be changed using the Role-Specific Kerberos Principal Kafka service property.



**Important:** Cloudera Manager configures Cloudera services to use the default Kerberos principal names. Cloudera recommends that you do not change the default Kerberos principal names. If it is unavoidable to do so, contact Cloudera Professional Services because it requires extensive additional custom configuration.

### Ranger authorization

In addition to encryption and authentication, the default principal that KRaft Controllers run as is integrated with Ranger. For more information on the default policies set up for the user, see [KRaft Ranger authorization](#) on page 7.

## Configuring TLS/SSL for KRaft Controllers

Learn how to configure TLS/SSL for KRaft Controllers.

### Procedure

1. In Cloudera Manager, select the Kafka service.
2. Go to Configuration.
3. Find and configure the following properties based on your cluster and requirements.

**Table 1: KRaft TLS/SSL configuration properties**

| Cloudera Manager Property                                                                    | Description                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable TLS/SSL for KRaft Controller<br>ssl_enabled                                           | Encrypt communication between clients and KRaft Controller using Transport Layer Security (TLS) (formerly known as Secure Socket Layer (SSL)).                                                                                                                                                                                                             |
| KRaft Controller TLS/SSL Server JKS Keystore File Location<br>ssl_server_keystore_location   | The path to the TLS/SSL keystore file containing the server certificate and private key used for TLS/SSL. Used when KRaft Controller is acting as a TLS/SSL server. The keystore must be in the format specified in Administration Settings Java Keystore Type .                                                                                           |
| KRaft Controller TLS/SSL Server JKS Keystore File Password<br>ssl_server_keystore_password   | The password for the KRaft Controller keystore file.                                                                                                                                                                                                                                                                                                       |
| KRaft Controller TLS/SSL Server JKS Keystore Key Password<br>ssl_server_keystore_keypassword | The password that protects the private key contained in the keystore used when KRaft Controller is acting as a TLS/SSL server.                                                                                                                                                                                                                             |
| KRaft Controller TLS/SSL Trust Store File<br>ssl_client_truststore_location                  | The location on disk of the trust store, in .jks format, used to confirm the authenticity of TLS/SSL servers that KRaft Controller might connect to. This trust store must contain the certificate(s) used to sign the service(s) connected to. If this parameter is not provided, the default list of well-known certificate authorities is used instead. |
| KRaft Controller TLS/SSL Trust Store Password<br>ssl_client_truststore_password              | The password for the KRaft Controller TLS/SSL Trust Store File. This password is not required to access the trust store; this field can be left blank. This password provides optional integrity checking of the file. The contents of trust stores are certificates, and certificates are public information.                                             |

| Cloudera Manager Property                    | Description                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SSL Client Authentication<br>ssl.client.auth | Client authentication mode for SSL connections. This configuration has three valid values, required, requested, and none. If set to required, client authentication is required. If set to requested, client authentication is requested and clients without certificates can still connect. If set to none, which is the default value, no client authentication is required. |

4. Click Save Changes.
5. Restart the Kafka service.

### What to do next

TLS/SSL encryption is configured for the KRaft Controller role.

## KRaft Ranger authorization

Learn how KRaft integrates with Ranger as well as the default policies and permissions set up for KRaft.



**Note:** If Ranger authorization is enabled, Kafka still connects to ZooKeeper for auditing. As a result, Kafka's JAAS configuration includes a client entry for ZooKeeper. Additionally, the `-Dzookeeper.sasl.client.username=***ZOOKEEPER PRINCIPAL SHORTNAME***` system property is set for the process. This is the result of Ranger's dependency on ZooKeeper. Even though Ranger makes this connection, Kafka does not require or use ZooKeeper for metadata management if it is running in KRaft mode.

KRaft in Cloudera uses the `KafkaRangerAuthorizer` to authorize requests coming from other entities. In KRaft mode, Kafka brokers forward requests to the controllers and the controllers authorize these requests.

Kraft Controllers run as the `kraft` user. By default, the Kafka resource-based service in Ranger includes a `kraft` internal - topic policy. This policy grants all permission on the `__cluster_metadata` topic for the `kraft` user as well as Describe, Describe Configs, and Consume permissions for the `kafka` user (default user for brokers). By default, other users do not have access to the `__cluster_metadata` topic.

Service Manager

cm\_kafka Policies

Policy Name

Policy La

topic

Descript

In addition, the kraft user is added to all default Kafka policies that grant all permissions on Kafka resources.

**Ranger**

 **Access Manager**

Service Manager

cm\_kafka Policies

List of Policies : cm\_kafka

 Search for your policy...

| Policy ID ▲ | Policy Name    |
|-------------|----------------|
| 26          | all - consumer |
| 27          | all - topic    |