

Hortonworks Data Platform

Kafka Guide

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Hortonworks Data Platform: Kafka Guide

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Table of Contents

- 1. Introduction to Kafka 1
- 2. Installing and Configuring Kafka 4
 - 2.1. Supported File Systems 4

List of Tables

1.1. Kafka Components 1

1. Introduction to Kafka

Apache Kafka is a fast, scalable, durable, fault-tolerant publish-subscribe messaging system. Common use cases include:

- Messaging
- Website activity tracking
- Metrics collection and monitoring
- Log aggregation
- Stream processing
- Event sourcing
- Commit logs

Kafka works with Apache Storm and Apache Spark for real-time analysis and rendering of streaming data. The combination of messaging and processing technologies enables stream processing at linear scale.

For example, Apache Storm ships with support for Kafka as a data source using Storm's core API or the higher-level, micro-batching Trident API. Storm's Kafka integration also includes support for writing data to Kafka, which enables complex data flows between components in a Hadoop-based architecture. For more information about Apache Storm, see the [Storm User Guide](#).

Kafka operates on streams of messages. Four main components move messages in and out of Kafka:

Table 1.1. Kafka Components

Kafka Component	Description
Topic	A user-defined category (or feed name) to which messages are published.
Producer	A process that publishes messages to one or more topics.
Consumer	A process that subscribes to one or more topics and processes the feeds of messages from those topics.
Broker	A Kafka server that manages the persistence and replication of message data (i.e., the commit log).

Topics

Topics consist of one or more partitions. Kafka appends new messages to a partition in an ordered, immutable sequence. Each message in a topic is assigned a unique, sequential ID called an **offset**.



Producers

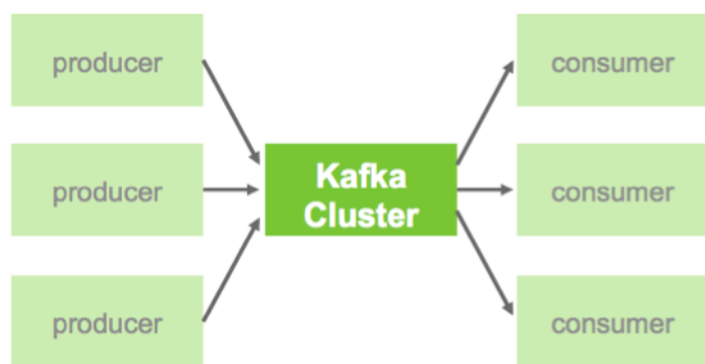
Kafka Producers publish messages to topics. The producer determines which message to assign to which partition within the topic. Assignment can be done in a round-robin fashion to balance load, or it can be based on a semantic partition function.

Consumers

Kafka Consumers keep track of which messages have already been consumed, or processed, by keeping track of an offset, a sequential id number that uniquely identifies a message within a partition. Because Kafka retains all messages on disk for a configurable amount of time, Consumers can rewind or skip to any point in a partition simply by supplying an offset value.

Brokers and Clusters

A Kafka Cluster consists of one or more Brokers (server processes). Producers send messages to the Kafka Cluster, which in turn serves them to Consumers.

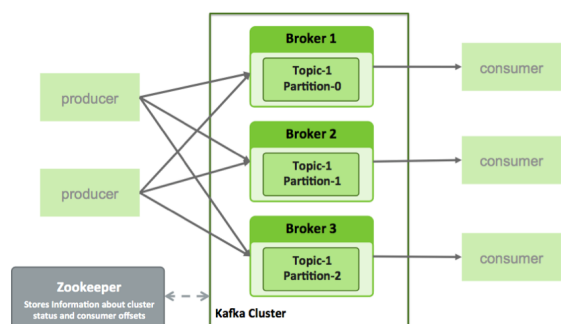


Performance

Partition support within topics provides parallelism within a topic. In addition, because writes to a partition are sequential, the number of hard disk seeks is minimized. This reduces latency and increases performance.

Kafka Brokers scale and perform well in part because Brokers are not responsible for keeping track of which messages have been consumed. The message Consumer is responsible for this. In traditional messaging systems such as JMS, the Broker bears this responsibility, which severely limits the system's ability to scale as the number of Consumers increase. Kafka's design eliminates the potential for back-pressure when consumers process messages at different rates.

For Kafka Consumers, keeping track of which messages have been consumed is simply a matter of keeping track of the offset – the sequential id that uniquely identifies a message within a partition. Because Kafka retains all messages on disk (for a configurable amount of time), Consumers can rewind or skip to any point in a partition simply by supplying an offset value.



Example

For an example that simulates the use of streaming geo-location information (using a previous version of Kafka), see [Simulating and Transporting the Real-Time Event Stream with Apache Kafka](#).

2. Installing and Configuring Kafka

Prerequisite: ZooKeeper must be installed and running before using Kafka.

To install Kafka using Ambari, see [Adding a Service to your Hadoop cluster](#) in the Ambari User's Guide.

To configure Kafka for Kerberos security on an Ambari-managed cluster, see [Configuring Kafka for Kerberos Over Ambari](#).

To install Kafka manually, see [Installing and Configuring Kafka](#) in the Non-Ambari Cluster Installation Guide.

To configure Ranger-based authorization for Kafka, see the Kafka section of the Ranger Ambari Installation Guide.



Note

HDP 2.3 supports JDK 1.7 for Kafka. HDP 2.2 supports JDK 1.6 for Kafka.

2.1. Supported File Systems

The following underlying file systems are supported for use with Kafka:

- EXT3: recommended
- EXT2
- EXT4: supported, but might have performance issues (see the "EXT4 Notes" section in [Apache production system notes](#)).



Caution

Encrypted file systems such as SafenetFS are not supported for Kafka. Index file corruption can occur.