

# Redis Enterprise Kafka Connector

Julien Ruaux <julien@redis.com>

Version 0.5.0

# Table of Contents

Introduction.....	1
Install.....	2
Connect to Redis Enterprise.....	3
Sink Connector Guide .....	4
Source Connector Guide .....	9
Quick Start with Docker .....	11
Resources .....	13

# Introduction

The Redis Enterprise Kafka Connector is used to import and export data between Apache Kafka and Redis Enterprise.

This guide provides documentation and usage information across the following topics:

- [Install](#)
- [Connect to Redis Enterprise](#)
- [Sink Connector](#)
- [Source Connector](#)
- [Docker Example](#)
- [Resources](#)

# Install

## Download

Download the latest release archive from [here](#).

### IMPORTANT

#### *Confluent Platform Version*

Download the connector archive that matches your version of Confluent Platform:

- Confluent Platform 5.0+: [redis-enterprise-kafka-cp5-0.5.0.zip](#)
- Confluent Platform 6.0+: [redis-enterprise-kafka-cp6-0.5.0.zip](#)

## Install using Confluent Hub

1. Install the [Confluent Hub Client](#)
2. Install the Redis Enterprise Kafka Connector using the Confluent Hub Client

## Install Manually

Follow the instructions in [Manually Installing Community Connectors](#)

# Connect to Redis Enterprise

This section provides information on configuring the Redis Enterprise Kafka Source or Sink Connector to connect to Redis Enterprise.

## Configuration

Specify the Redis URI in the `redis.uri` property, for example:

```
redis.uri=redis://redis-12000.redis.com:12000
```

Details on the [Redis URI syntax](#) can be found in the Lettuce project [wiki](#).

TLS connection URIs start with `rediss://`. To disable certificate verification for TLS connections use the following property:

```
redis.insecure=true
```

# Sink Connector Guide

The Redis Enterprise Kafka Sink Connector consumes records from a Kafka topic and writes the data to a Redis Enterprise database.

## Features

The Redis Enterprise Kafka Sink Connector includes the following features:

- [At least once delivery](#)
- [Multiple tasks](#)
- [Supported Data Formats](#)
- [Redis Data Structures](#)

### At least once delivery

The Redis Enterprise Kafka Sink Connector guarantees that records from the Kafka topic are delivered at least once.

### Multiples tasks

The Redis Enterprise Kafka Sink Connector supports running one or more tasks. You can specify the number of tasks with the `tasks.max` configuration property.

### Data Formats

The Redis Enterprise Kafka Sink Connector supports different data formats for record keys and values depending on the target Redis data structure.

#### Kafka Record Keys

The Redis Enterprise Kafka Sink Connector expects Kafka record keys in a specific format depending on the configured target [Redis data structure](#):

Target	Record Key	Assigned To
Stream	Any	None
Hash	String	Key
String	<a href="#">String</a> or <a href="#">bytes</a>	Key
List	<a href="#">String</a> or <a href="#">bytes</a>	Member
Set	<a href="#">String</a> or <a href="#">bytes</a>	Member
Sorted Set	<a href="#">String</a> or <a href="#">bytes</a>	Member

## StringConverter

If record keys are already serialized as strings use the StringConverter:

```
key.converter=org.apache.kafka.connect.storage.StringConverter
```

## ByteArrayConverter

Use the byte array converter to use the binary serialized form of the Kafka record keys:

```
key.converter=org.apache.kafka.connect.converters.ByteArrayConverter
```

## Kafka Record Values

Multiple data formats are supported for Kafka record values depending on the configured target [Redis data structure](#). Each data structure expects a specific format. If your data in Kafka is not in the format expected for a given data structure, consider using [Single Message Transformations](#) to convert to a byte array, string, Struct, or map before it is written to Redis.

Target	Record Value	Assigned To
Stream	<a href="#">Avro</a> or <a href="#">JSON</a>	Message body
Hash	<a href="#">Avro</a> or <a href="#">JSON</a>	Fields
String	<a href="#">String</a> or <a href="#">bytes</a>	Value
List	Any	Removal if null
Set	Any	Removal if null
Sorted Set	Float64	Score or removal if null

## StringConverter

If record values are already serialized as strings, use the StringConverter to store values in Redis as strings:

```
value.converter=org.apache.kafka.connect.storage.StringConverter
```

## ByteArrayConverter

Use the byte array converter to store the binary serialized form (for example, JSON, Avro, Strings, etc.) of the Kafka record values in Redis as byte arrays:

```
value.converter=org.apache.kafka.connect.converters.ByteArrayConverter
```

## Avro

```
value.converter=io.confluent.connect.avro.AvroConverter  
value.converter.schema.registry.url=http://localhost:8081
```

## JSON

```
value.converter=org.apache.kafka.connect.json.JsonConverter  
value.converter.schemas.enable=<true|false> ①
```

① Set to **true** if the JSON record structure has an attached schema

## Redis Data Structures

Record keys and values have different roles depending on the target data structure:

For collections (stream, list, set, sorted set) a single key is used which is independent of the record key. Use the **redis.key** configuration property (default: **\${topic}**) to specify a format string for the destination collection, which may contain **\${topic}** as a placeholder for the originating topic name. For example **kafka\_\${topic}** for the topic **orders** will map to the Redis key **kafka\_orders**

### Stream

Use the following properties to store Kafka records as Redis stream messages:

```
redis.type=STREAM  
redis.key=<stream key> ①  
value.converter=<Avro or JSON> ②
```

① **Stream key**

② **Avro or JSON**

### Hash

Use the following properties to write Kafka records as Redis hashes:

```
redis.type=HASH  
key.converter=<string or bytes> ①  
value.converter=<Avro or JSON> ②
```

① **String or bytes**

② **Avro or JSON**. If value is null the key is **deleted**.

### String

Use the following properties to write Kafka records as Redis strings:



```
redis.type=STRING  
key.converter=<string or bytes> ①  
value.converter=<string or bytes> ②
```

① [String](#) or [bytes](#)

② [String](#) or [bytes](#). If value is null the key is [deleted](#).

## List

Use the following properties to add Kafka record keys to a Redis list:

```
redis.type=LIST  
redis.key=<key name> ①  
key.converter=<string or bytes> ②  
redis.push.direction=<LEFT or RIGHT> ③
```

① [List key](#)

② [String](#) or [bytes](#): Kafka record keys to push to the list

③ [LEFT](#): LPUSH (default), [RIGHT](#): RPUSH

The Kafka record value can be any format. If a value is null then the member is removed from the list (instead of pushed to the list).

## Set

Use the following properties to add Kafka record keys to a Redis set:

```
redis.type=SET  
redis.key=<key name> ①  
key.converter=<string or bytes> ②
```

① [Set key](#)

② [String](#) or [bytes](#): Kafka record keys to add to the set

The Kafka record value can be any format. If a value is null then the member is removed from the set (instead of added to the set).

## Sorted Set

Use the following properties to add Kafka record keys to a Redis sorted set:

```
redis.type=ZSET  
redis.key=<key name> ①  
key.converter=<string or bytes> ②
```

① [Sorted set key](#)

② `String` or `bytes`: Kafka record keys to add to the set

The Kafka record value should be `Float64` and is used for the score. If the score is null then the member is removed from the sorted set (instead of added to the sorted set).

# Source Connector Guide

The Redis Enterprise Kafka Source Connector reads from a Redis Enterprise stream and publishes messages to a Kafka topic.

## Features

The Redis Enterprise Kafka Source Connector includes the following features:

- [At least once delivery](#)
- [Multiple tasks](#)
- [Stream Reader](#)

### At least once delivery

The Redis Enterprise Kafka Source Connector guarantees that records from the Kafka topic are delivered at least once.

### Multiple Tasks

Use configuration property `tasks.max` to have the change stream handled by multiple tasks. The connector splits the work based on the number of configured key patterns. When the number of tasks is greater than the number of patterns, the number of patterns will be used instead.

### Stream Reader

The Redis Enterprise Kafka Source Connector reads messages from a stream and publishes to a Kafka topic. Reading is done through a consumer group so that [multiple instances](#) of the connector configured via the `tasks.max` can consume messages in a round-robin fashion.

### Stream Message Schema

#### Key Schema

Keys are of type String and contain the stream message id.

#### Value Schema

The value schema defines the following fields:

Name	Schema	Description
id	STRING	Stream message ID
stream	STRING	Stream key
body	Map of STRING	Stream message body

## Configuration

```
redis.stream.name=<name> ①  
redis.stream.offset=<offset> ②  
redis.stream.block=<millis> ③  
redis.stream.consumer.group=<group> ④  
redis.stream.consumer.name=<name> ⑤  
topic=<name> ⑥
```

- ① Name of the stream to read from.
- ② **Message ID** to start reading from (default: `0-0`).
- ③ Maximum **XREAD** wait duration in milliseconds (default: `100`).
- ④ Name of the stream consumer group (default: `kafka-consumer-group`).
- ⑤ Name of the stream consumer (default: `consumer-${task}`). May contain `${task}` as a placeholder for the task id. For example, `foo${task}` and task `123` ⇒ consumer `foo123`.
- ⑥ Destination topic (default: `${stream}`). May contain `${stream}` as a placeholder for the originating stream name. For example, `redis_${stream}` and stream `orders` ⇒ topic `redis_orders`.

# Quick Start with Docker

This guide provides a hands-on look at the functionality of the Redis Enterprise Kafka Source and Sink Connectors:

- The **redis-enterprise-sink** connector reads data from a Kafka topic and writes it to a Redis stream
- The **redis-enterprise-source** connector reads data from a Redis stream and writes it to a Kafka topic

## Requirements

[Docker](#)

## Run the example

Clone the [redis-enterprise-kafka](#) repository and execute `run.sh` in `docker` directory:

```
git clone https://github.com/redis-field-engineering/redis-enterprise-kafka.git
cd redis-enterprise-kafka/docker
./run.sh
```

This will:

- Run `docker-compose up`
- Wait for Redis, Kafka, and Kafka Connect to be ready
- Register the Confluent Datagen Connector
- Register the Redis Enterprise Kafka Sink Connector
- Register the Redis Enterprise Kafka Source Connector
- Publish some events to Kafka via the Datagen connector
- Write the events to Redis
- Send messages to a Redis stream
- Write the Redis stream messages back into Kafka

Once running, examine the topics in the Kafka control center: <http://localhost:9021/>

- The `pageviews` topic should contain the 10 simple documents added, each similar to:

```
{
  "viewtime": {
    "$numberLong": "81"
  },
  "pageid": "Page_1",
  "userid": "User_8"
}
```

- The **pageviews** stream should contain the 10 change events.

Examine the stream in Redis:

```
docker-compose exec redis /usr/local/bin/redis-cli
xread COUNT 10 STREAMS pageviews 0
```

Messages added to the **mystream** stream will show up in the **mystream** topic

# Resources

## Kafka

### What is Apache Kafka?

<https://youtu.be/06iRM1Ghr1k>

### Should You Put Several Event Types in the Same Kafka Topic?

<https://www.confluent.io/blog/put-several-event-types-kafka-topic/>

### Kafka Quickstart

<https://kafka.apache.org/quickstart>

### Console Producer and Consumer Basics

<https://kafka-tutorials.confluent.io/kafka-console-consumer-producer-basics/kafka.html>

## Kafka Connect

### Introduction to Kafka Connectors

<https://www.baeldung.com/kafka-connectors-guide>

### Kafka Connect Documentation

<https://docs.confluent.io/platform/current/connect/index.html>

## Redis

### Redis

<https://redis.io/topics/introduction>

### Redis Streams

<https://redis.io/topics/streams-intro>

### Redis Enterprise Advantages

<https://redis.com/redis-enterprise/advantages/>