Kafka Connect

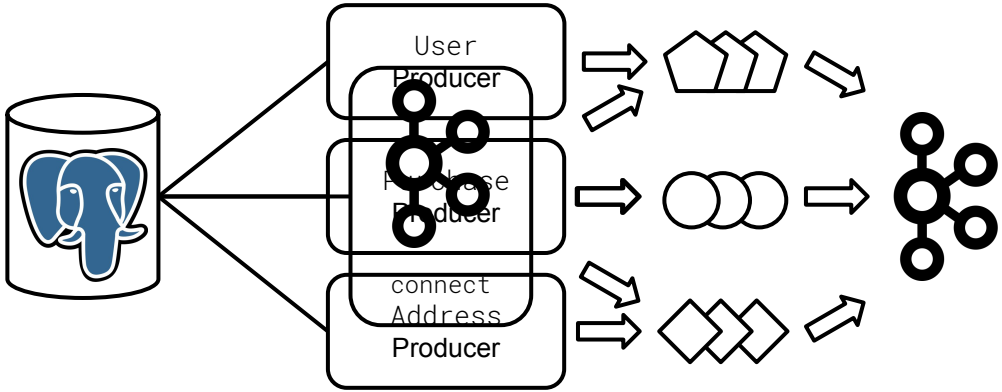
Kafka Connect

A **framework** and **web server** for reusable producers and consumers

- Built at Confluent, now with Apache Foundation
- Built in Java and Scala, runs on the JVM
- Can help promote reusability and keep code simple
- May not even need Kafka Client with Kafka Connect

Kafka Connect

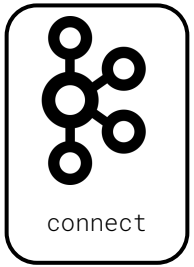
Example: Connect's SQL functionality can save significant effort



Kafka Connect Architecture

How Kafka Connect Works

Kafka Connect, both webserver and framework, are built on the JVM



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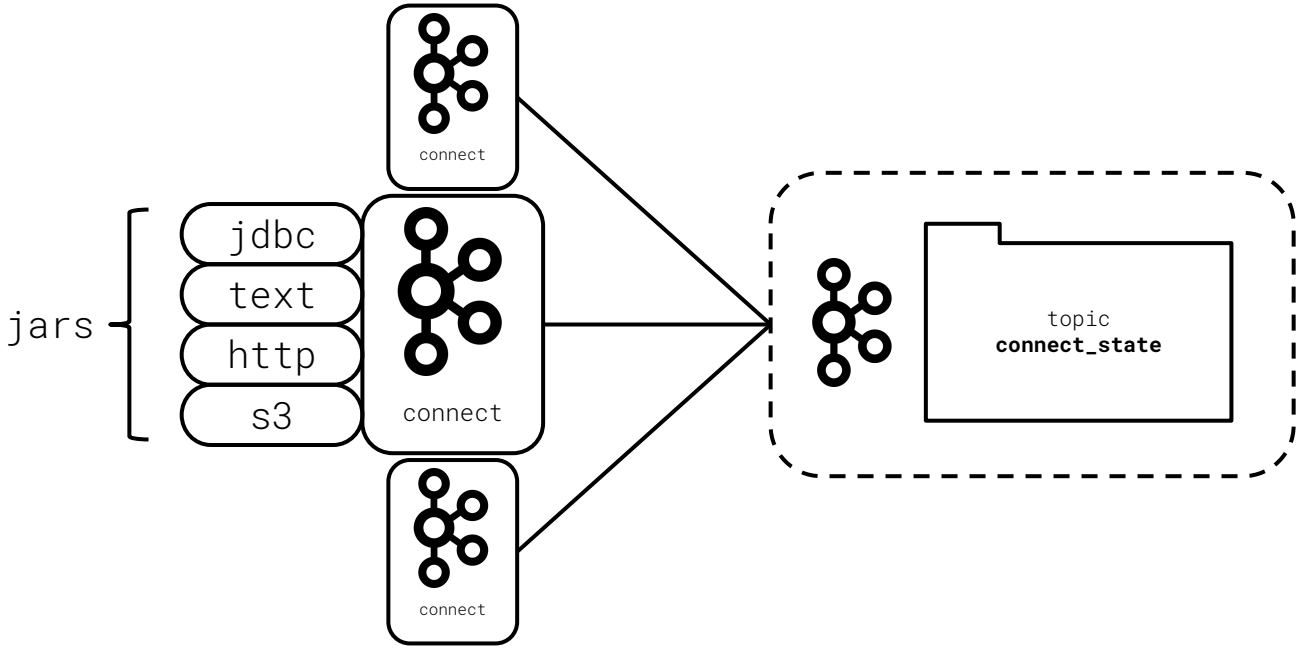


The Connect Framework

Components

- **Connectors** are abstractions for managing tasks
- **Tasks** contain the production or consumption code
- Kafka and target systems often have different formats
- **Converters** map data formats to and from Connect

Kafka Connect Connectors

Kafka Connect Connectors

Kafka Connect Connectors

Common Connectors

- **Local file source/sink**, ex: useful for logs
- **Cloud Key Value Store source/sink**, ex: AWS S3
- **JDBC source/sink**, ex: PostgreSQL, MySQL
- **HDFS source/sink**, ex: Interacting with Hadoop
- Visit Confluent's web repository for many more!

The Kafka Connect API

Kafka Connect API

API Capabilities

- Connect is entirely managed through a REST API
- Supports Create, Update, Delete, Read on Connectors
- Can add or remove plugins while server is running
- API aids in monitoring Connectors
- Does not surface logs or metrics

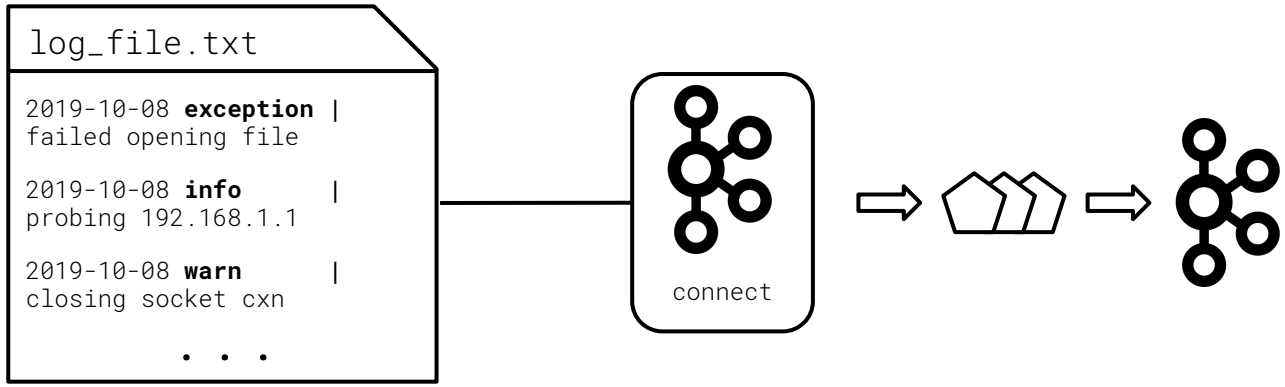
Working with the Kafka Connect API

Demo: Connect API

Key Connectors

Kafka Connect FileStream Source

FileStream Source connector **sends logs** as events to Kafka



Demo: Kafka Connect FileStream

JDBC Source/Sink

Overview

- Uses standard Java SQL Interface (JDBC)
- JDBC Source puts data from a DB *into* Kafka
- JDBC sink takes data *out of* Kafka and into a DB
- Supports table whitelists, blacklists, custom queries
- Commonly used to publish model updates as events
- Commonly used to store Kafka events long term

Demo: Kafka Connect JDBC Source

Kafka REST Proxy

REST Proxy

Overview

- Web server written in Java and Scala, runs on JVM
- May run as one instance or in a cluster
- Allows publish/consumption to Kafka over HTTP REST
- Cannot create topics, may only GET topic metadata
- Can be integrated with Schema Registry and use Avro
- Best in scenarios where you can't use a client library

Demo: Fetching Cluster Metadata from REST Proxy

Using REST Proxy

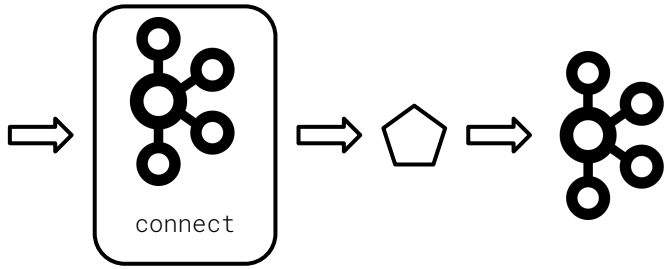
Producing Data with REST Proxy

POST data to Kafka REST Proxy to produce data

```
POST /topics/<topic_name>
```

```
Content-Type:
application/vnd.kafka.json.v2+json
```

```
{
  “records”: [
    {“value”: {“user”: “123”},
    {“value”: {“user”: “456”},
  ]
}
```



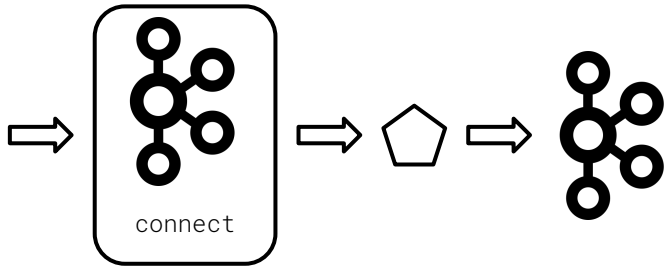
Producing Data with REST Proxy

Avro data may be published but you must always **include the schema**

```
POST /topics/<topic_name>
```

```
Content-Type:
application/vnd.kafka.avro.v2+json
```

```
{
  “value_schema”: “{\"type\": \”r...",
  “records”: [
    {“value”: {“user”: 123},
    {“value”: {“user”: 456},
  ]
}
```



Producing Data with REST Proxy

Always make sure you have the right Content-Type Header!

Data Serialization Format	Content-Type Header
Binary (Base64-encoded String, etc)	`application/vnd.kafka.`**`binary`**`.v2+json`
JSON	`application/vnd.kafka.`**`json`**`.v2+json`
Avro	`application/vnd.kafka.`**`avro`**`.v2+json`

Demo: Producing JSON Data with REST Proxy

Demo: Producing Avro Data with REST Proxy

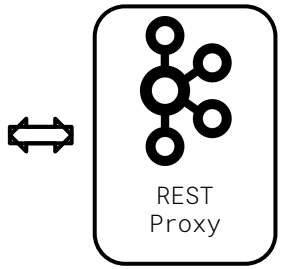
Consuming Data with REST Proxy

Consumption begins with a POST to create a Consumer Group

```
POST /consumers/<group_name>
HTTP 1.1 200 OK
```

```
Content-Type:
application/vnd.kafka.v2+json
```

```
{
  “instance_id”: “<consumer_name>”,
  “base_uri”: “http://<rest_uri>”
{
}
  “name”: “<consumer_name>”,
  “format”: “<binary/json/avro>”,
}
```



Consuming Data with REST Proxy

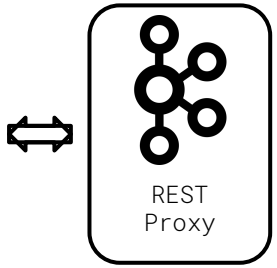
Next, POST to the subscribe endpoint

```
POST /consumers/<group_name>/instances/<instance_id>/subscription

Content-Type: application/vnd.kafka.v2+json

{
  "topics":[
    "<topic_0>",
    "<topic_1>",
    ... ,
    "<topic_n>"
  ]
}
```

```
HTTP 1.1 204 No Content
```



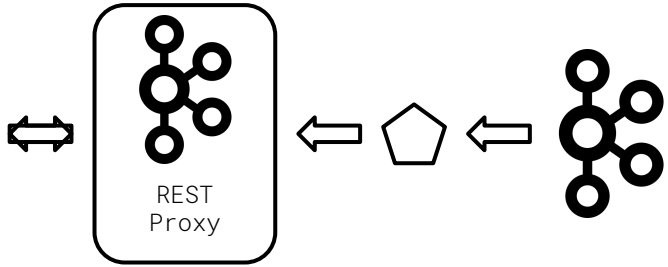
Consuming Data with REST Proxy

Once the consumer is subscribed, we can use HTTP GET to fetch records

```
GET /consumers/<group_name>/instances/<instance_id>/records
Accept: application/vnd.kafka.json.v2+json
```

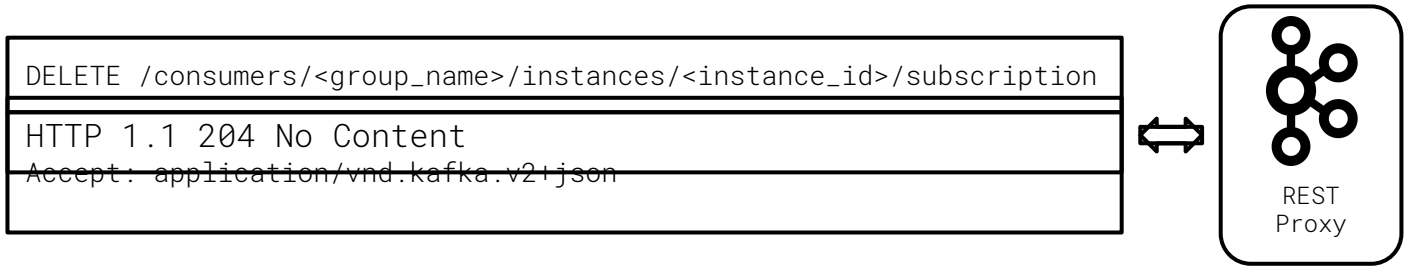
```
HTTP 1.1 200 OK

[
  {
    "topic": <topic_name>,
    "key": "<key>",
    "value": "<value>",
    "partition": <partition>,
    "offset": <offset>
  }, {
    ...
  }
]
```



Consuming Data with REST Proxy

DELETE your consumer subscription when shutting down



Demo: Consuming JSON Data with REST Proxy

Demo: Consuming Avro Data with REST Proxy

Summary