



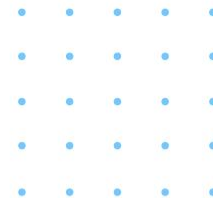
Giới thiệu về Message Queue

Introduction to Message Queue



Nội dung hôm nay

Content



● **Message Queue**

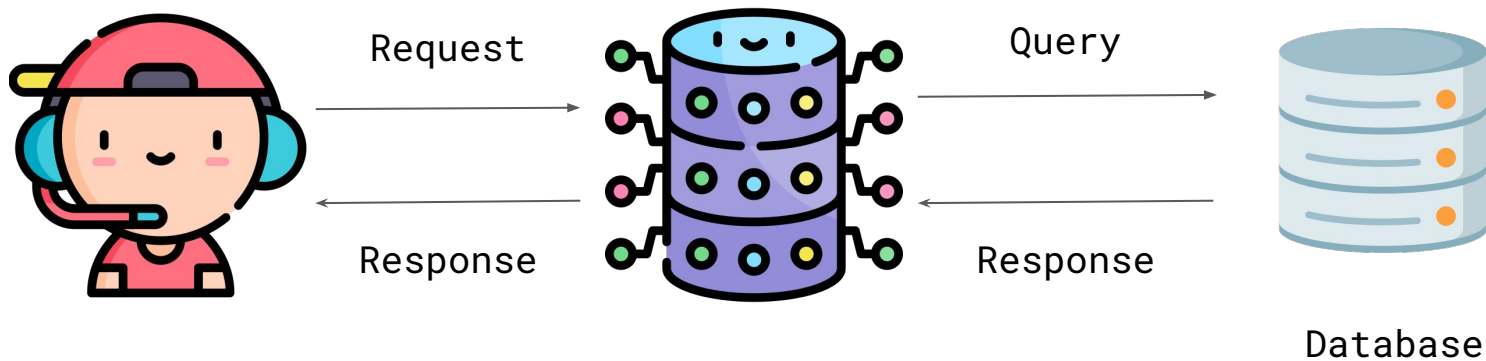
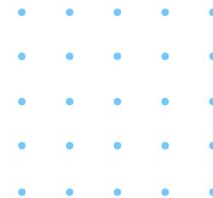
● **Apache Kafka**





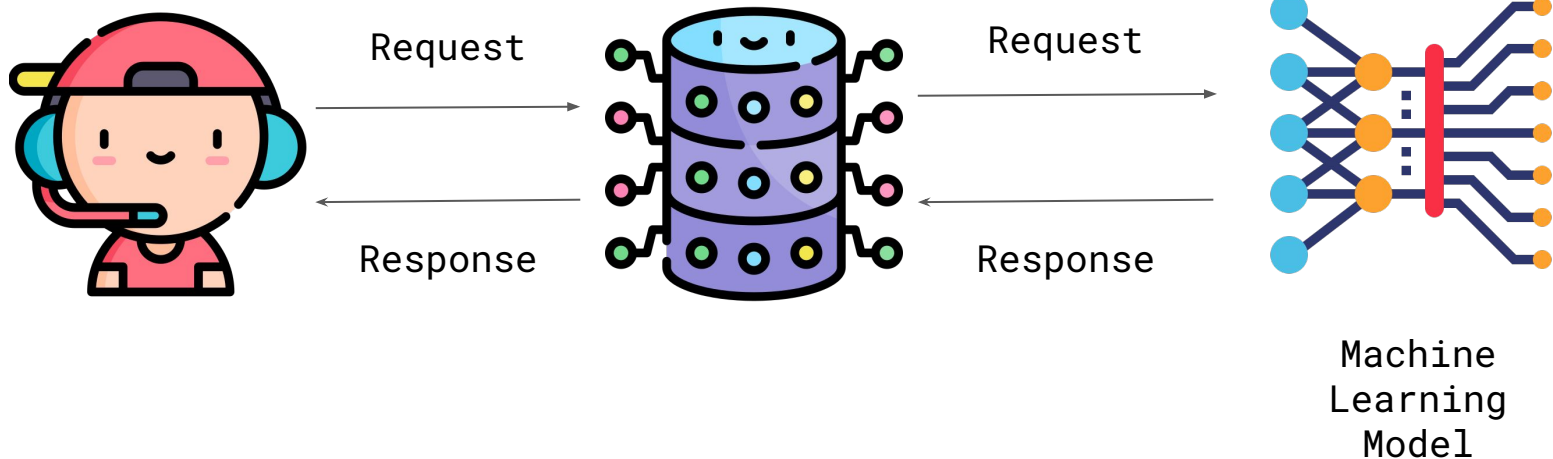
Message Queue



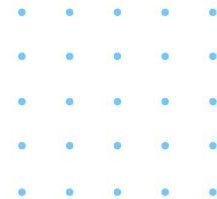


Độ trễ cỡ milliseconds





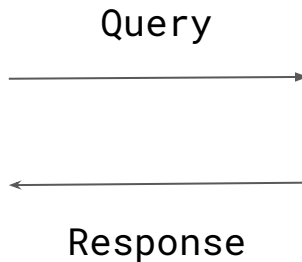
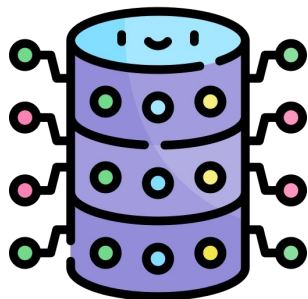
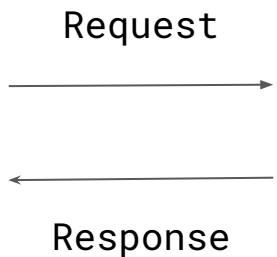
Độ trễ cỡ từ milliseconds tới vài phút



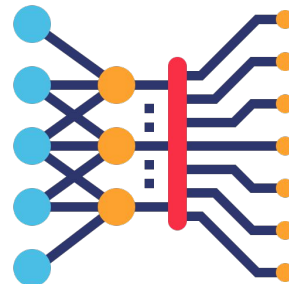
Timeout ?



X 1.000.000
Request



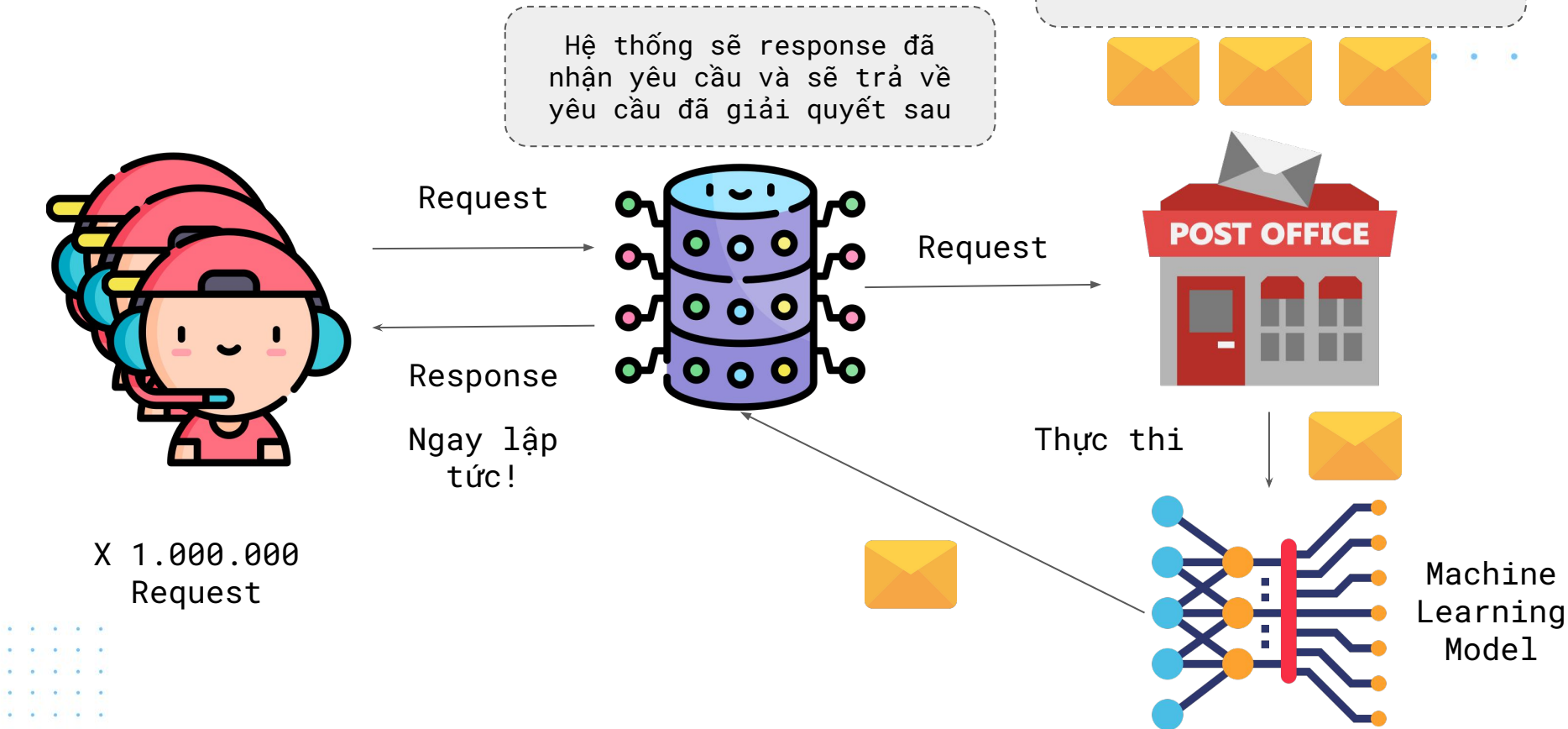
Nghẽn ?



Machine
Learning
Model

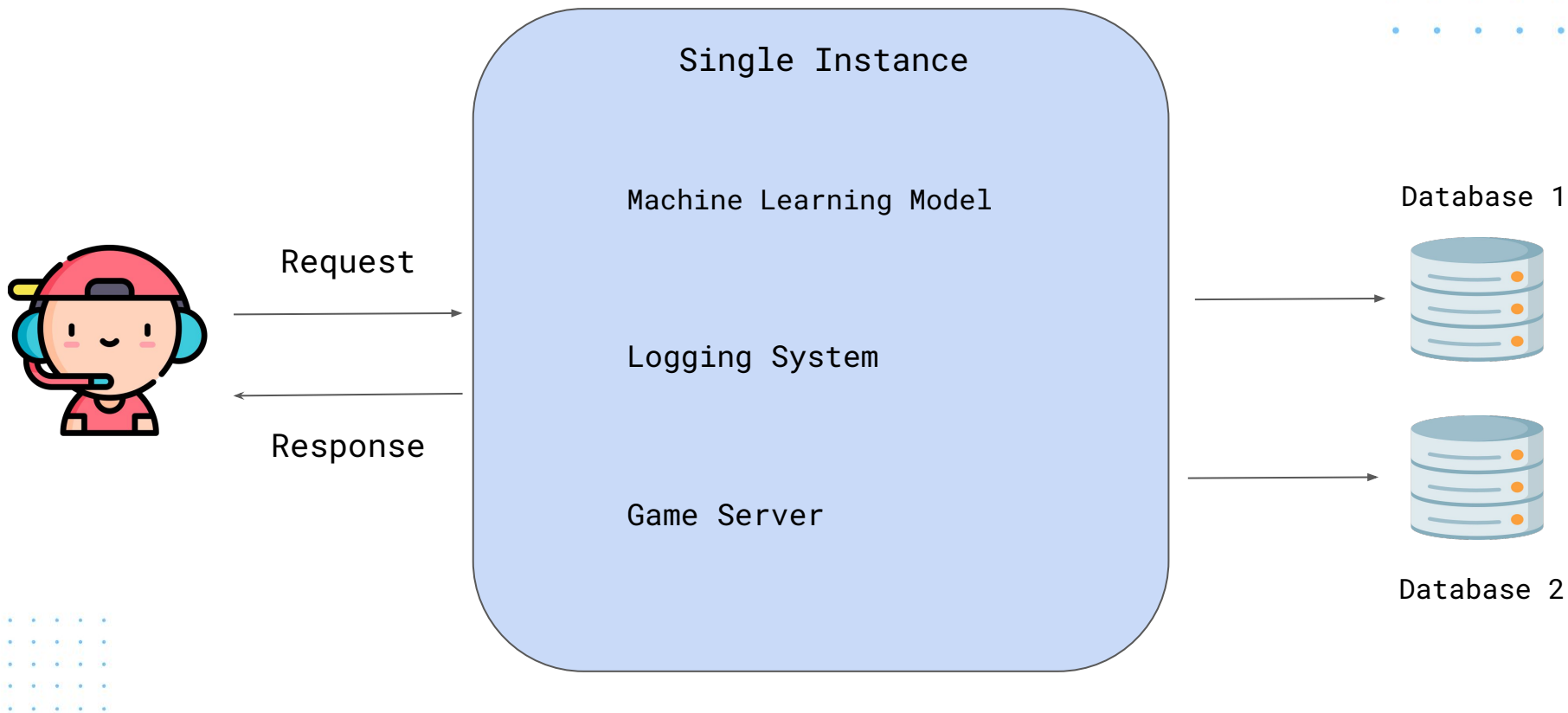
Message Queue

Message Queue



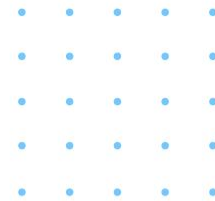
Kiến trúc Monolith

Monolith Architecture

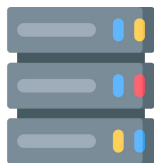


Kiến trúc Microservice

Microservice Architecture

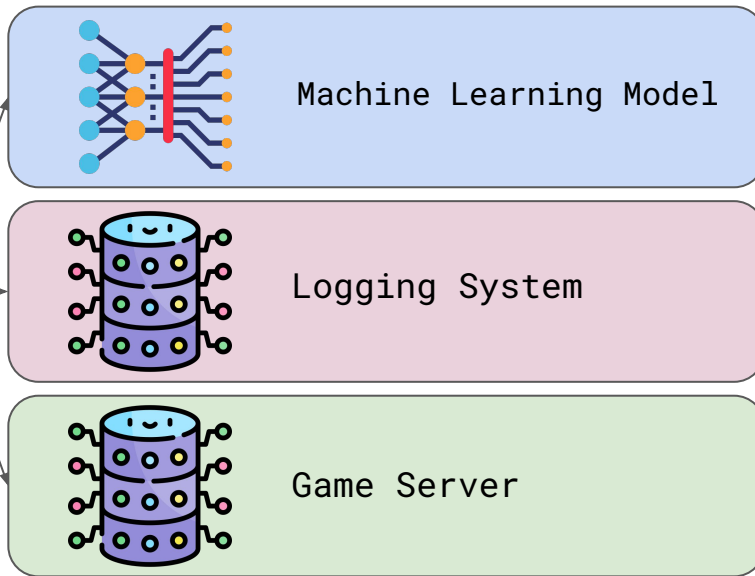


Request
Response



Reverse
Proxy

Multiple Instance



Database 1

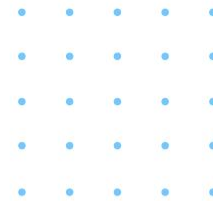


Database 2



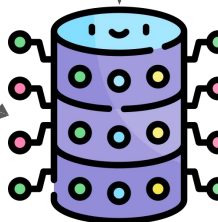
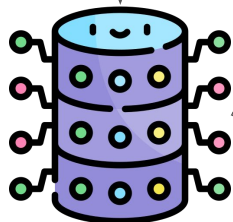
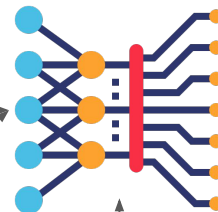
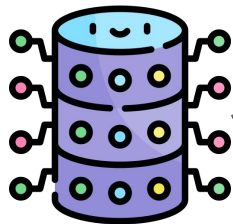
Kết nối trong Microservice

Connection in Microservice



Reverse Proxy

Machine Learning Model



Game Server

Logging System

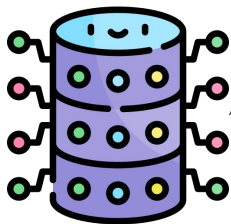
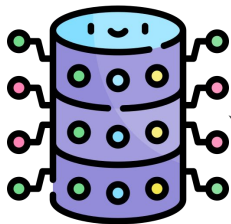
Cần có hệ thống để phân phối thông tin đến từng service



Message Queue trong Microservice

Message Queue in Microservice

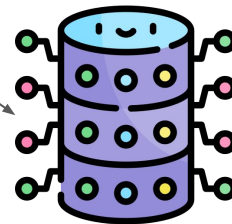
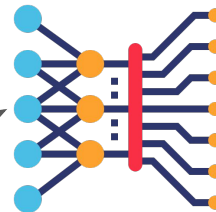
Reverse Proxy



Game Server



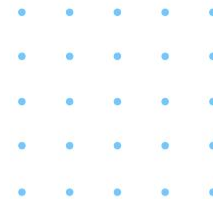
Machine Learning Model



Logging System

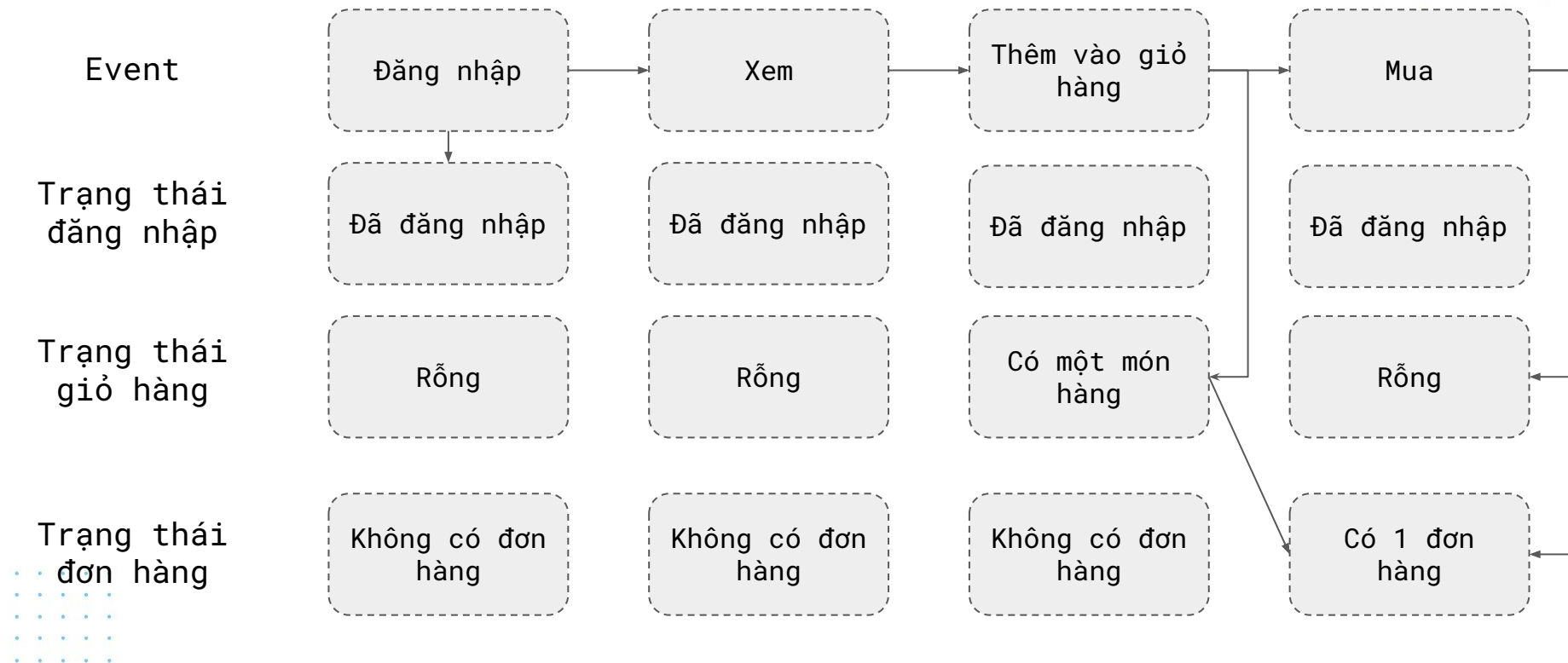
Event Streaming

Event Streaming



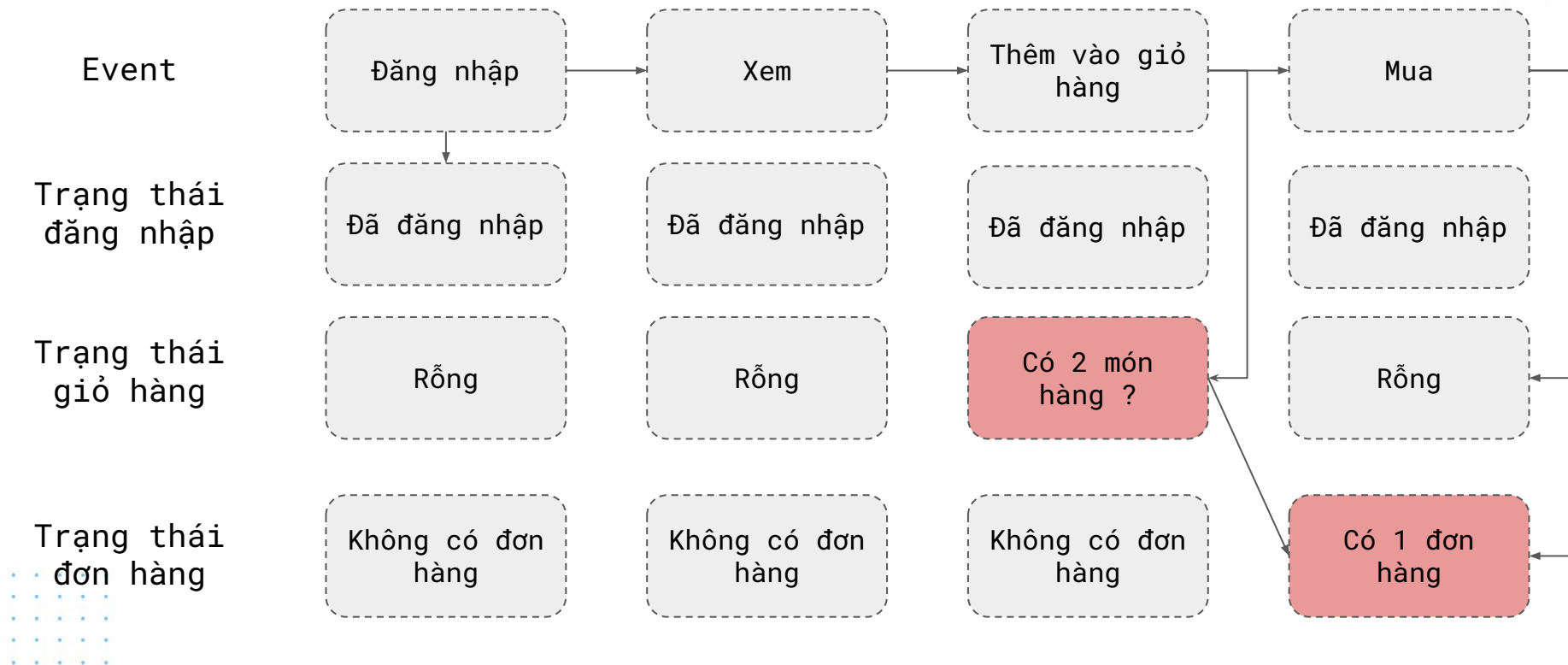
Event so với Trạng Thái

Event versus State



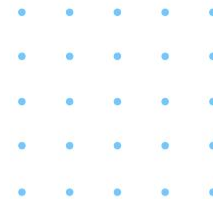
Lỗi vận hành

Operation failure



Giải quyết lỗi vận hành

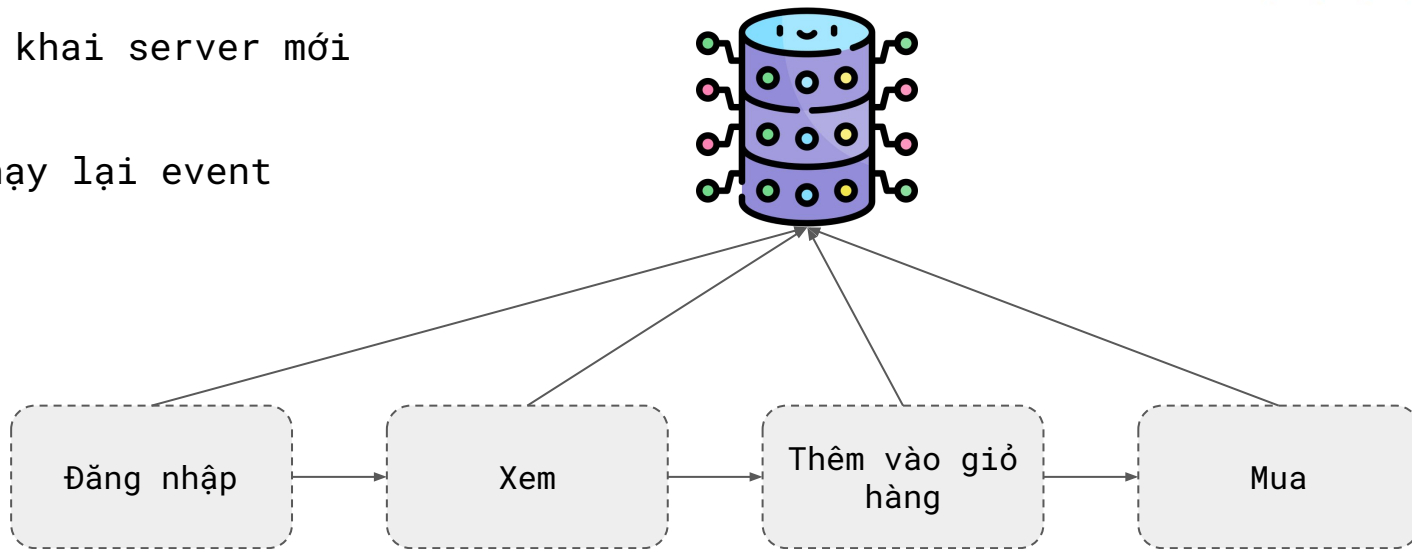
Result Operation Fault



Triển khai server mới

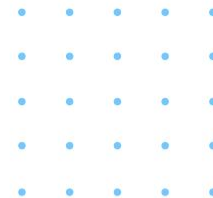
Chạy lại event

Event



Một số phần mềm Message Queue

Message Queue Applications



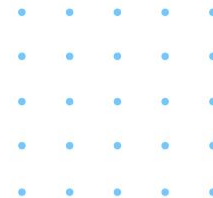


Apache Kafka



Kafka có thể làm gì ?

What can Kafka do ?

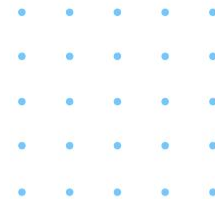


- **Kafka là một Message Queue**
- **Kafka có thể lưu trữ event**
- **Kafka có thể dùng để xử lý event**
- **Kafka dễ scale**



Các khái niệm trong Kafka

Kafka



● **Producer và Consumer**

● **Topic**

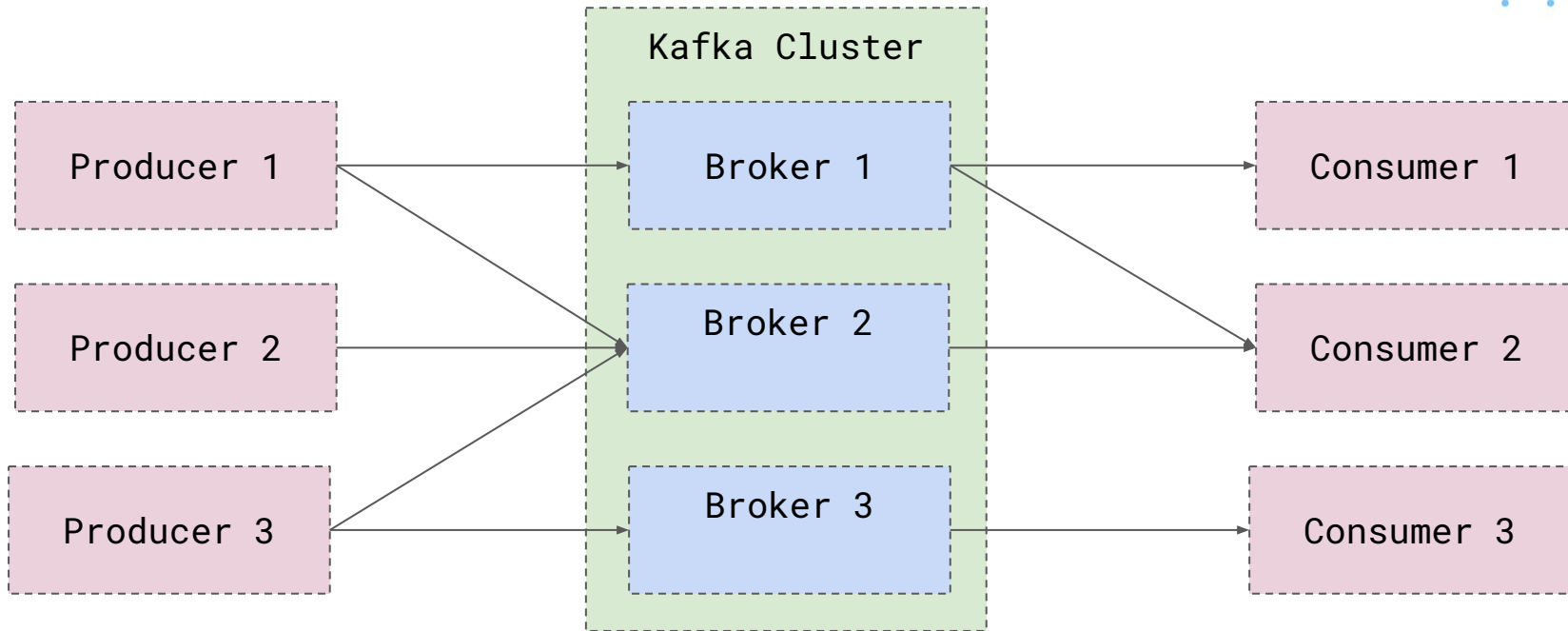
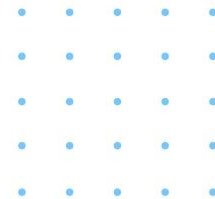
● **Partition**

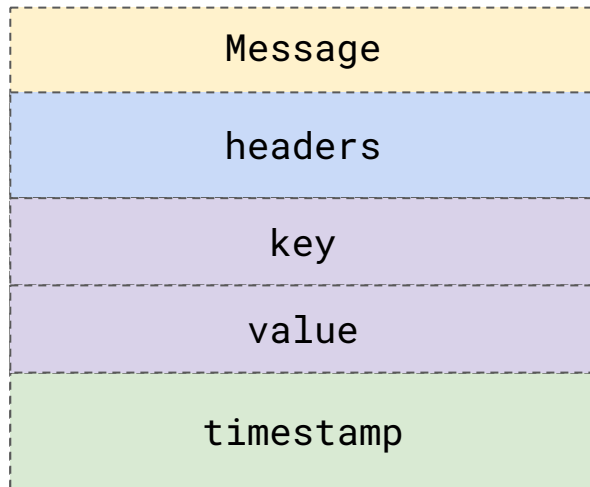
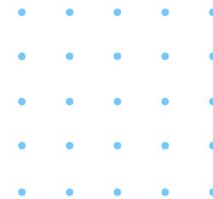
● **Offset**

● **Broker**

● **Consumer Group**





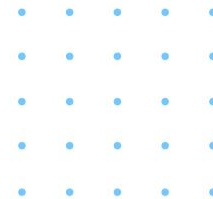


Dữ liệu cần tính toán sẽ
nằm trong key, value

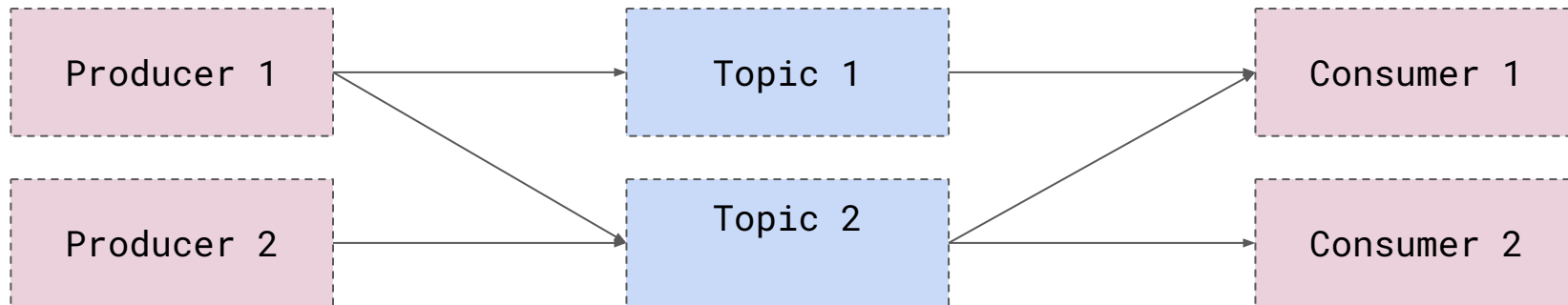
header tùy chọn

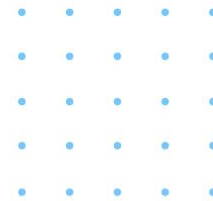
Thời gian message được
tạo hoặc nhận



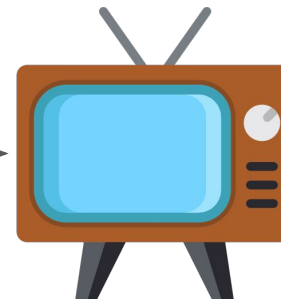
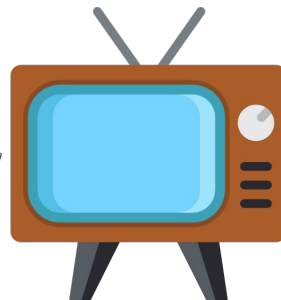


Một tập hợp các message
cùng 1 chủ đề.



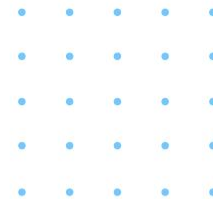


Disney Channel



Cartoon Network





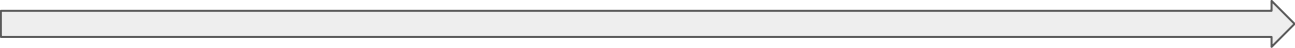
Offset là thứ tự ghi message trong partition

Partition 0

Offset 0	Offset 1	...	Offset 100
Message 0	Message 2		Message 200

Partition 1

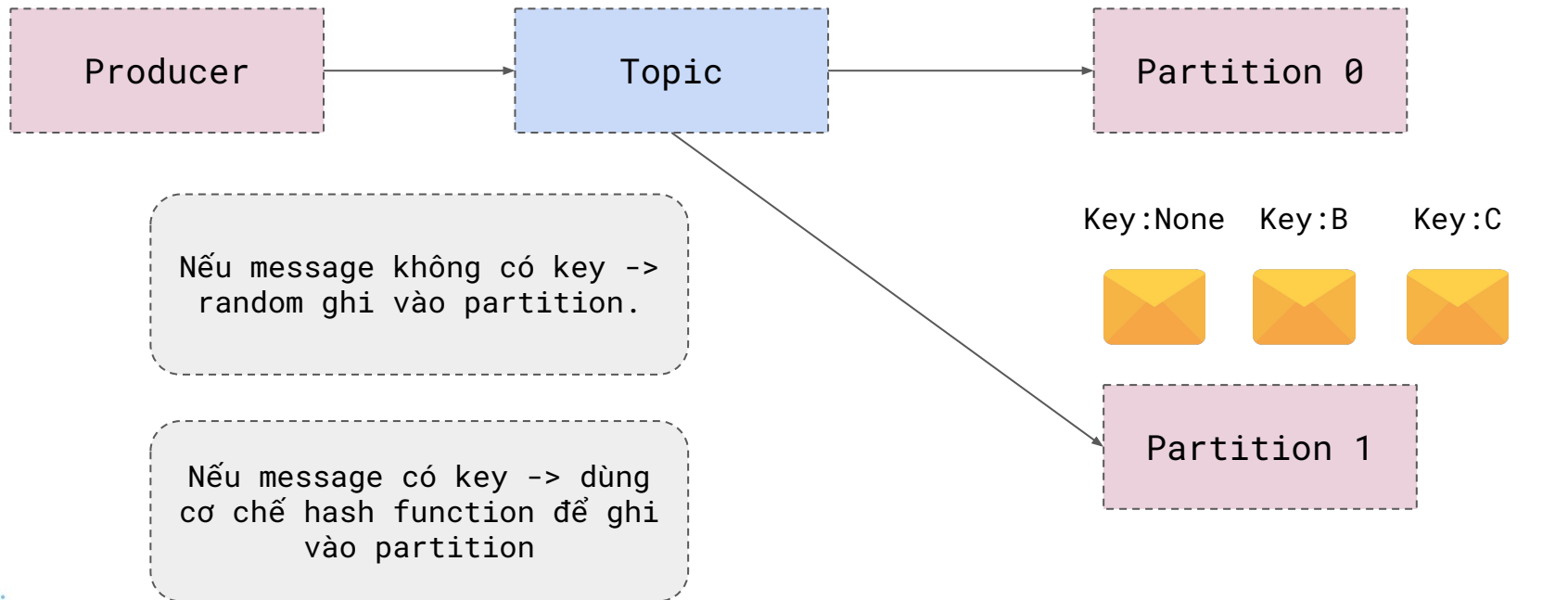
Offset 0	Offset 1	...	Offset 102
Message 1	Message 3		Message 190

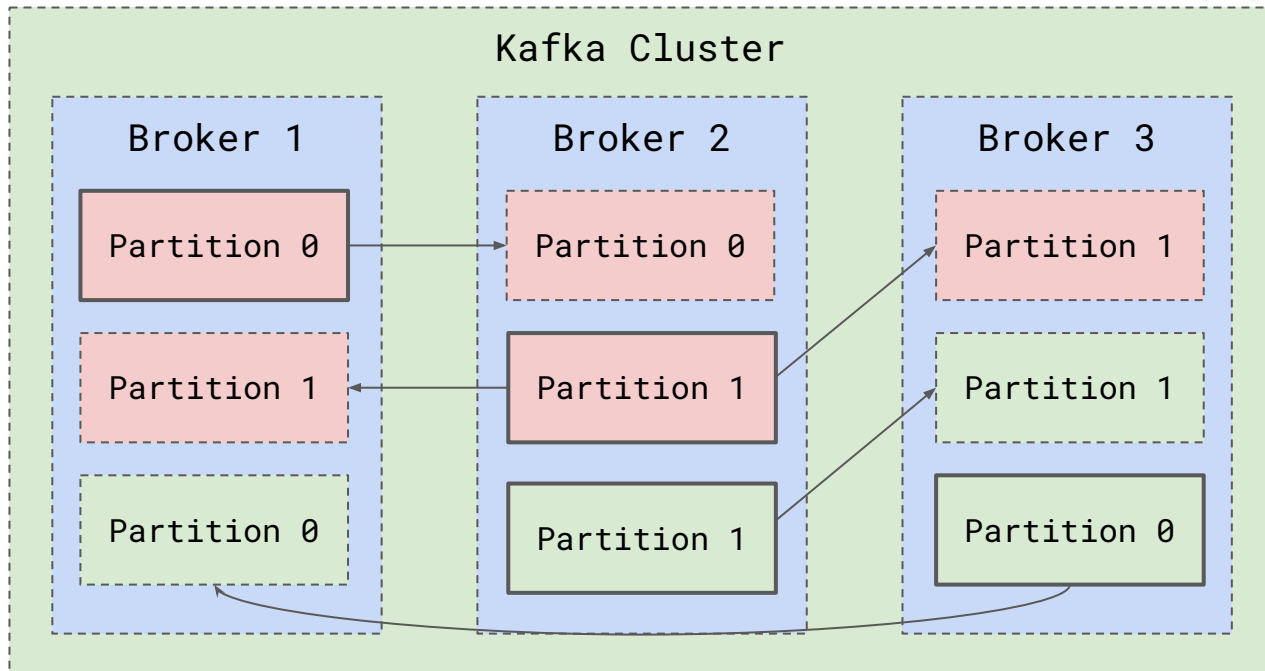
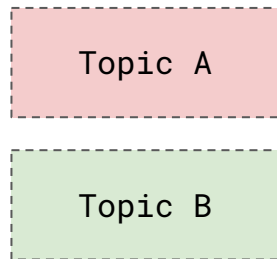
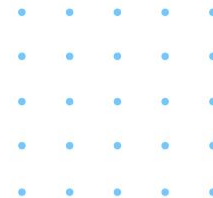


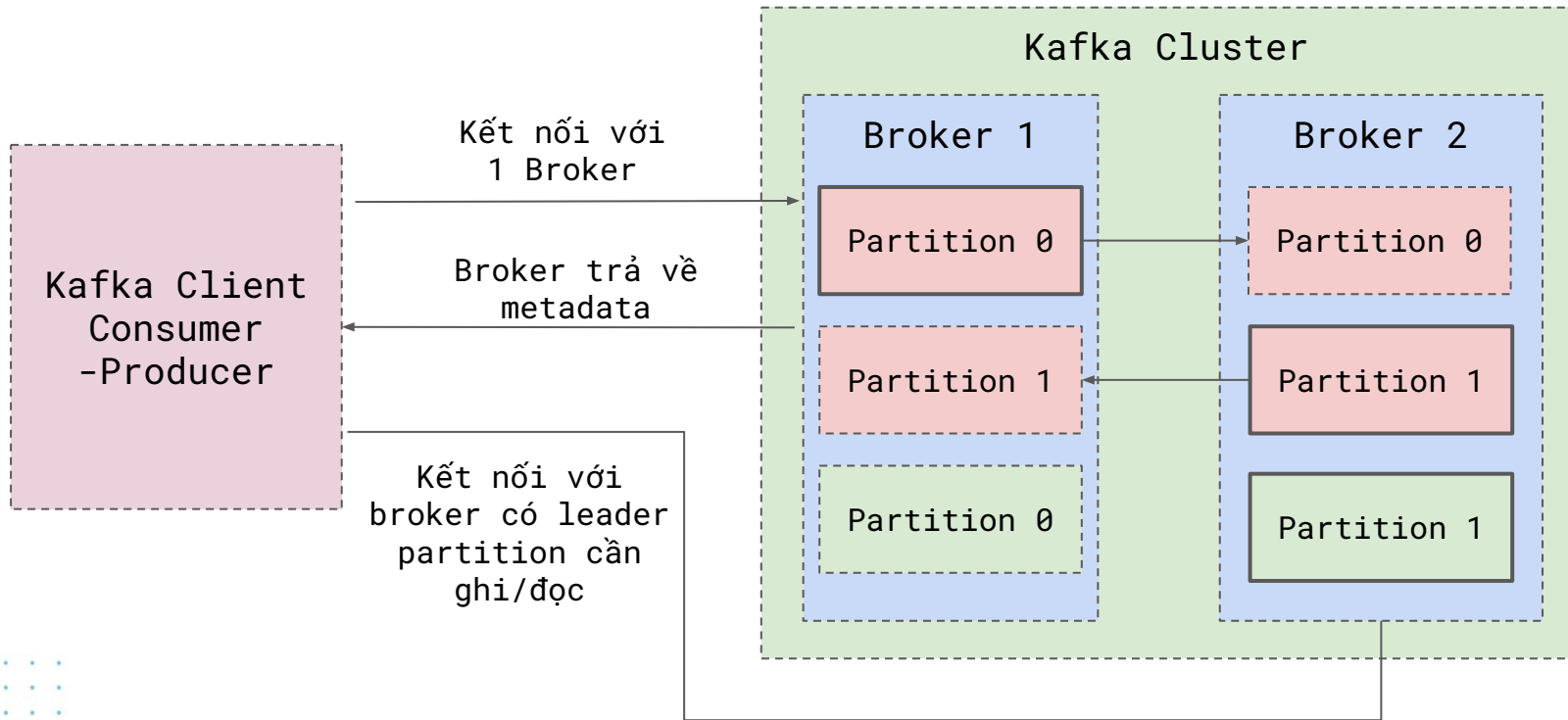
Thứ tự nhận message



Offset ở 2 partition khác nhau không thể hiện thứ tự nhận message của partition đó

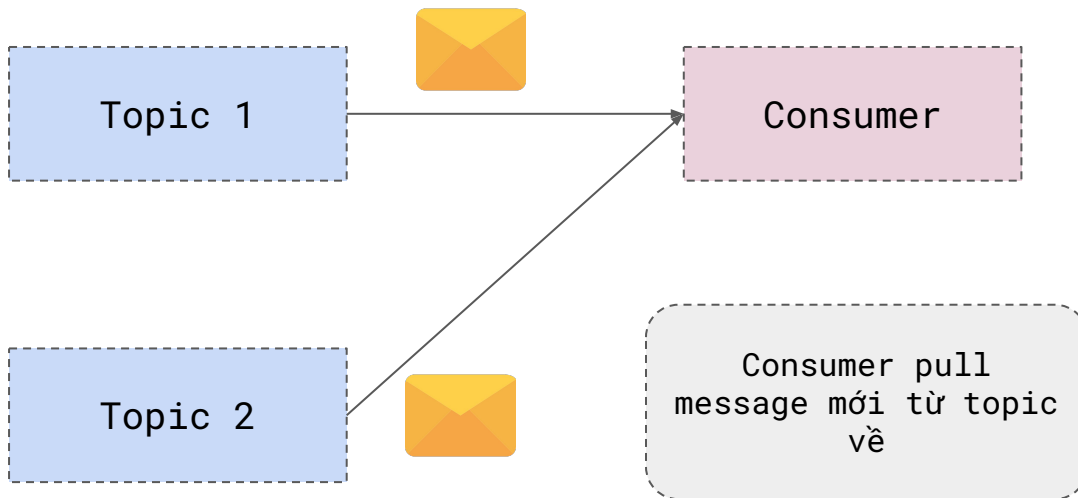
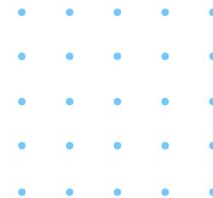


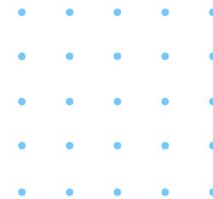




Consumer

Consumer

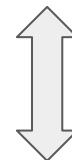




Partition 0

Offset 0	Offset 1	...	Offset 100	Offset 101
Message 0	Message 2		Message 200	Message 202

Consumer ghi nhớ
offset cuối cùng đã
đọc

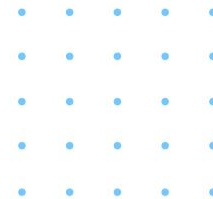


Message mới

Partition 1

Offset 0	Offset 1	...	Offset 102	Offset 101
Message 1	Message 3		Message 190	Message 201

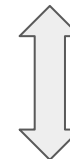




Partition 0

Offset 0	Offset 1	...	Offset 100	Offset 101
Message 0	Message 2		Message 200	Message 202

Consumer ghi nhớ
offset cuối cùng đã
đọc



Partition 1

Offset 0	Offset 1	...	Offset 102	Offset 101
Message 1	Message 3		Message 190	Message 201



Partition 0

Offset 0	Offset 1	...	Offset 100	Offset 101
Message 0	Message 2		Message 200	Message 202



Đọc từ đầu

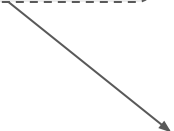


Đọc từ offset 1

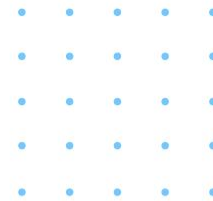


Mặc định

Message mới

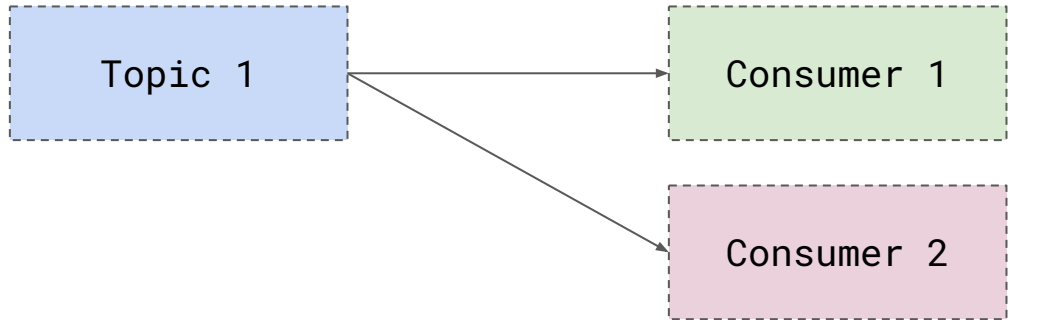


Tùy chỉnh vị trí
đọc offset khi bắt
đầu đọc topic

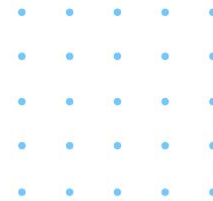


Consumer Group

Consumer Group



Kafka không quản lý consumer độc lập



Partition 0

Offset 0	Offset 1	...	Offset 100
Message 0	Message 2		Message 200



2 Consumer hoạt động độc lập và đọc cùng message



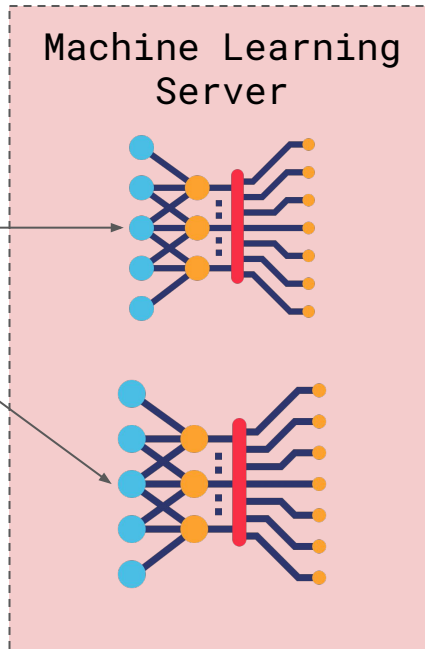
Consumer Group

Consumer Group

Hệ thống 2
instance ML
Chạy cùng 1 model



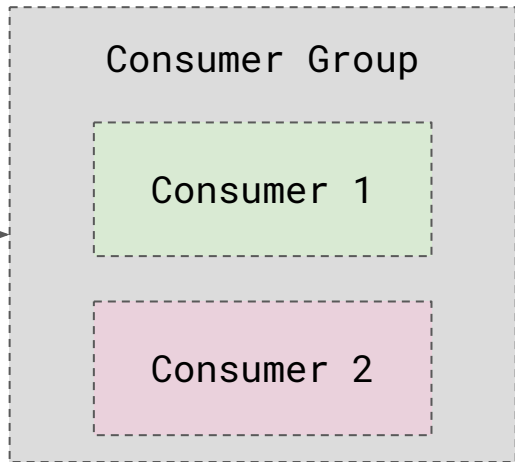
Yêu cầu cần đọc
message khác nhau
nhưng vẫn đủ thông
tin



Consumer Group

Consumer Group

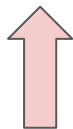
Topic
Recommendation



Kafka ghi nhớ message cuối cùng được đọc bởi consumer group

Partition 0

Offset 0	Offset 1	...	Offset 1000
Message 0 timestamp 1	Message 100 timestamp 1		Message 200

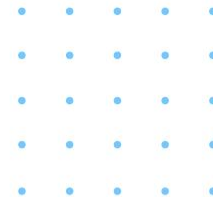


2 consumer hoạt động theo consumer group và đọc những message khác nhau cùng lúc



Cài đặt Kafka Client

Install Kafka Client



Python Lib

```
pip install confluent-kafka
```

CLI

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

UI Kafka

<https://github.com/provectus/kafka-ui>



Tạo topic

Create Topic

```
./kafka-topics.sh \  
  --bootstrap-server localhost:9094 \  
  --topic my-first-topic \  
  --create \  
  --partitions 3 \  
  --replication-factor 1
```

Địa chỉ Kafka server

Tên Topic

Số Partition

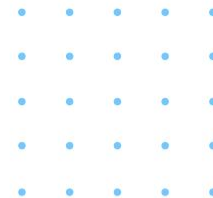
Số Replica

```
./kafka-topics.sh \  
  --bootstrap-server localhost:9094 \  
  --list
```

```
./kafka-topics.sh \  
  --bootstrap-server localhost:9094 \  
  --topic my-first-topic \  
  --describe
```

Gửi Message

Publish Message



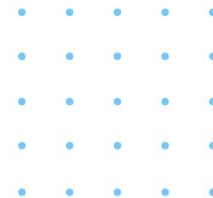
```
./kafka-console-producer.sh \  
  --bootstrap-server localhost:9094 \  
  --topic my-first-topic \  
  --property "parse.key=true" \  
  --property "key.separator=:"
```

Setting để gửi key:value



Đọc Message

Read Message



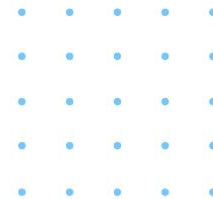
```
./kafka-console-consumer.sh \  
  --bootstrap-server localhost:9094 \  
  --topic my-first-topic \  
  --from-beginning \  
  --property "print.key=true" \  
  --property "key.separator=:"
```

Đọc từ đầu



Tạo Consumer Group

Create Consumer Group



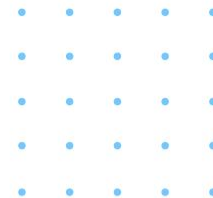
```
./kafka-console-consumer.sh \  
  --bootstrap-server localhost:9094 \  
  --topic my-first-topic \  
  --group my-first-group \  
  --from-beginning \  
  --property "print.key=true" \  
  --property "key.separator=:"
```

Tên group



Reset Offset Consumer Group

Reset Offset Consumer Group

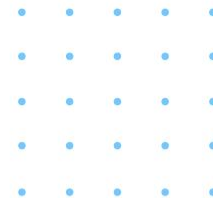


```
./kafka-consumer-groups.sh \  
  --bootstrap-server localhost:9094 \  
  --group my-first-group \  
  --topic my-first-topic \  
  --reset-offsets --to-earliest \  
  --execute
```



Triển khai Kafka trên gcloud

Deploy Kafka on gcloud



<https://docs.confluent.io/cloud/current/billing/ccloud-gcp-payg.html>

<https://console.cloud.google.com/marketplace/product/confluent-prod/apache-kafka-on-confluent-cloud>

