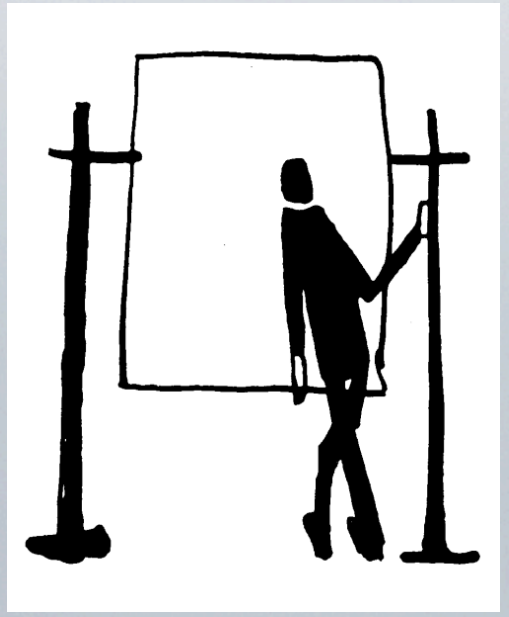


Kafka: a Distributed Messaging System for Log Processing

Jay Kreps, Neha Narkhede, Jun Rao
LinkedIn

AGENDA

- Kafka usage at LinkedIn
- Kafka design
- Kafka roadmap

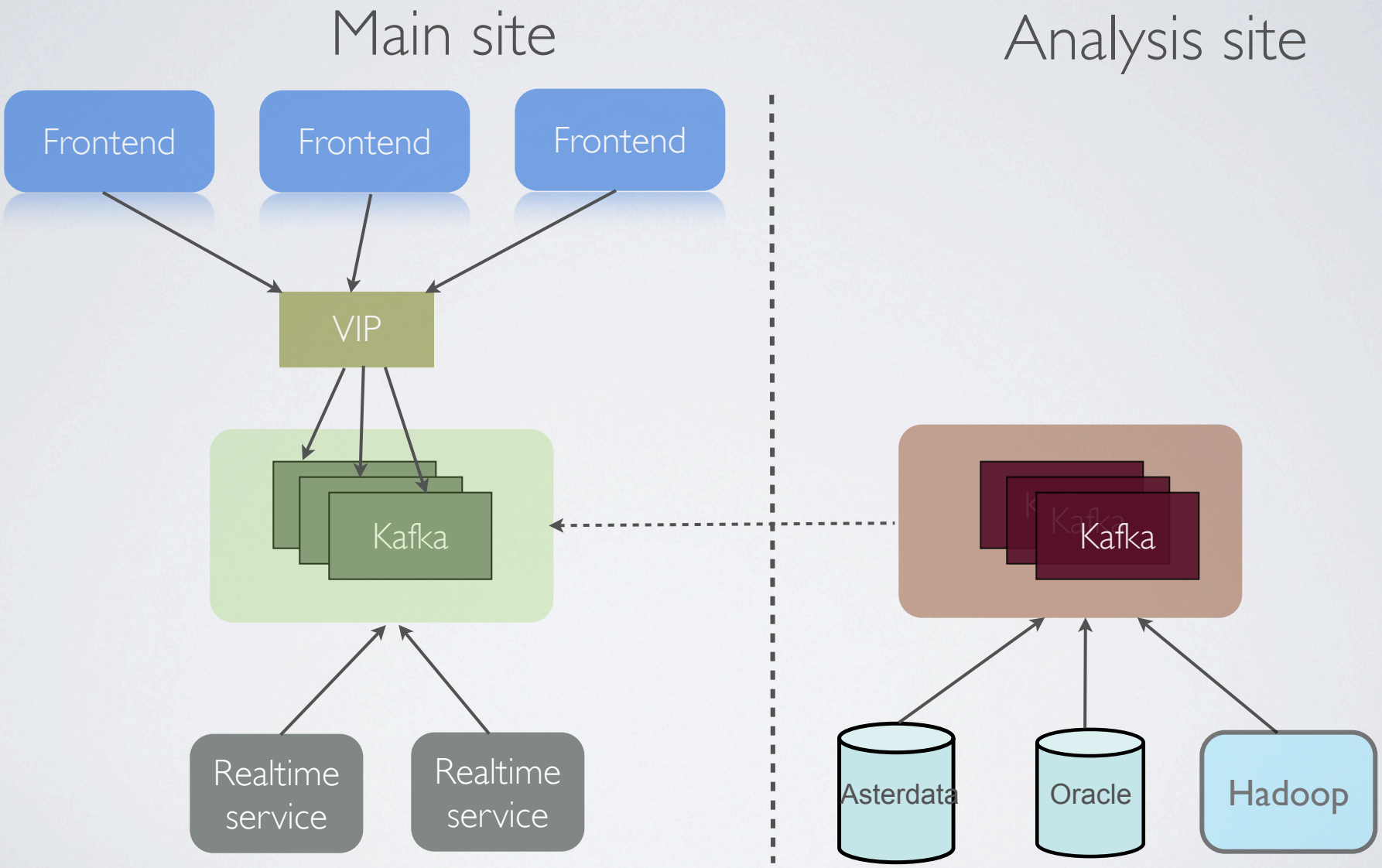
ABOUT LINKEDIN

- Professional social network platform
- top 50th largest site in the world (traffic)
- 100M+ members

LOGGING OVERVIEW

- Many types of events
  - user activity events: impression, search, ads, etc
  - operational events: call stack, service metrics, etc
- High volume: billions of events per day
- Both online and offline use case
  - reporting, batch analysis
  - security, news feeds, performance dashboard, ...

DEPLOYMENT


Main site
Analysis site
Frontend
Frontend
Frontend
VIP
Kafka
Kafka
Realtime service
Realtime service
Asterdata
Oracle
Hadoop

KAFKA DESIGN PRINCIPLES

- Simple API
- Efficient
- Distributed

PRODUCER API

```
void send(String topic, ByteBufferMessageSet messages)
```

```
producer = new KafkaProducer(…);
message = new Message(“test message str”.getBytes());
set = new ByteBufferMessageSet(message);
producer.send(“test”, set);
```

CONSUMER API

```
streams[] = Consumer.createMessageStreams(“test”, 1)

for(message: streams[0]) {
  bytes = message.payload()
  // do something with bytes
}
```

EFFICIENCY # 1: SIMPLE STORAGE

- Each topic has an evergrowing log
- A log == a list of files
- A message is addressed by a log offset

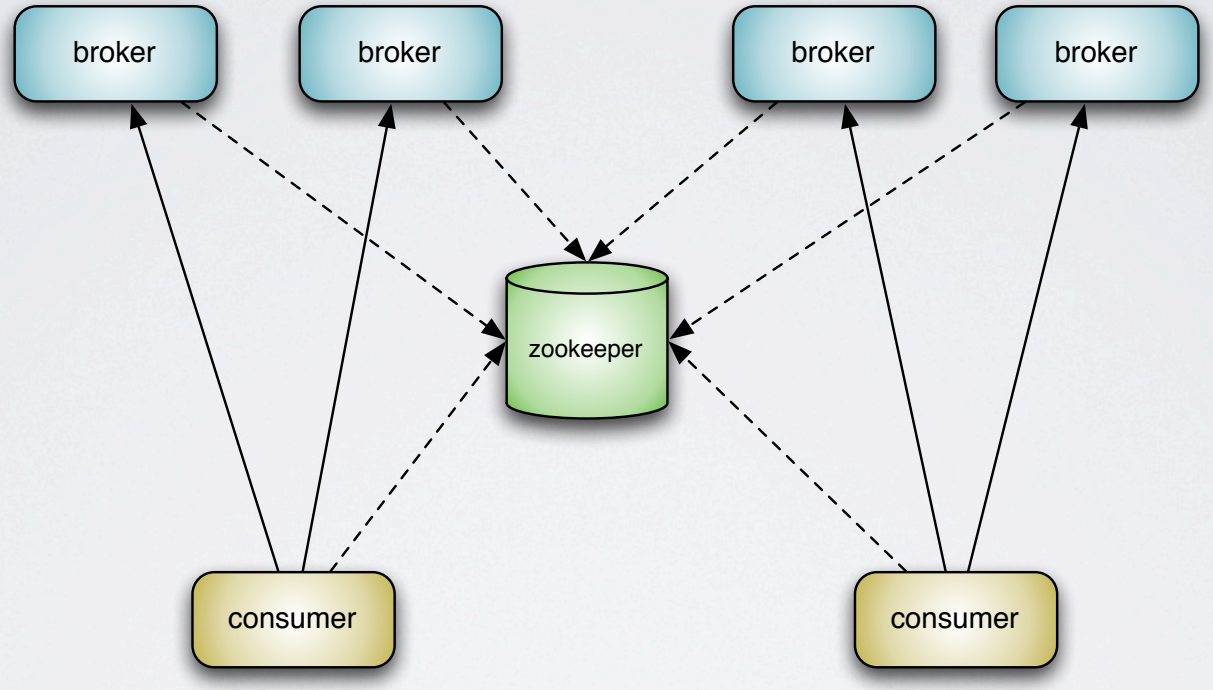
EFFICIENCY #2: CAREFUL TRANSFER

- Batch send and fetch
- No message caching in Kafka layer
- Rely on file system page cache
  - mostly, sequential access patterns
- Zero-copy transfer: file -> socket

EFFICIENCY #3: STATELESS BROKER

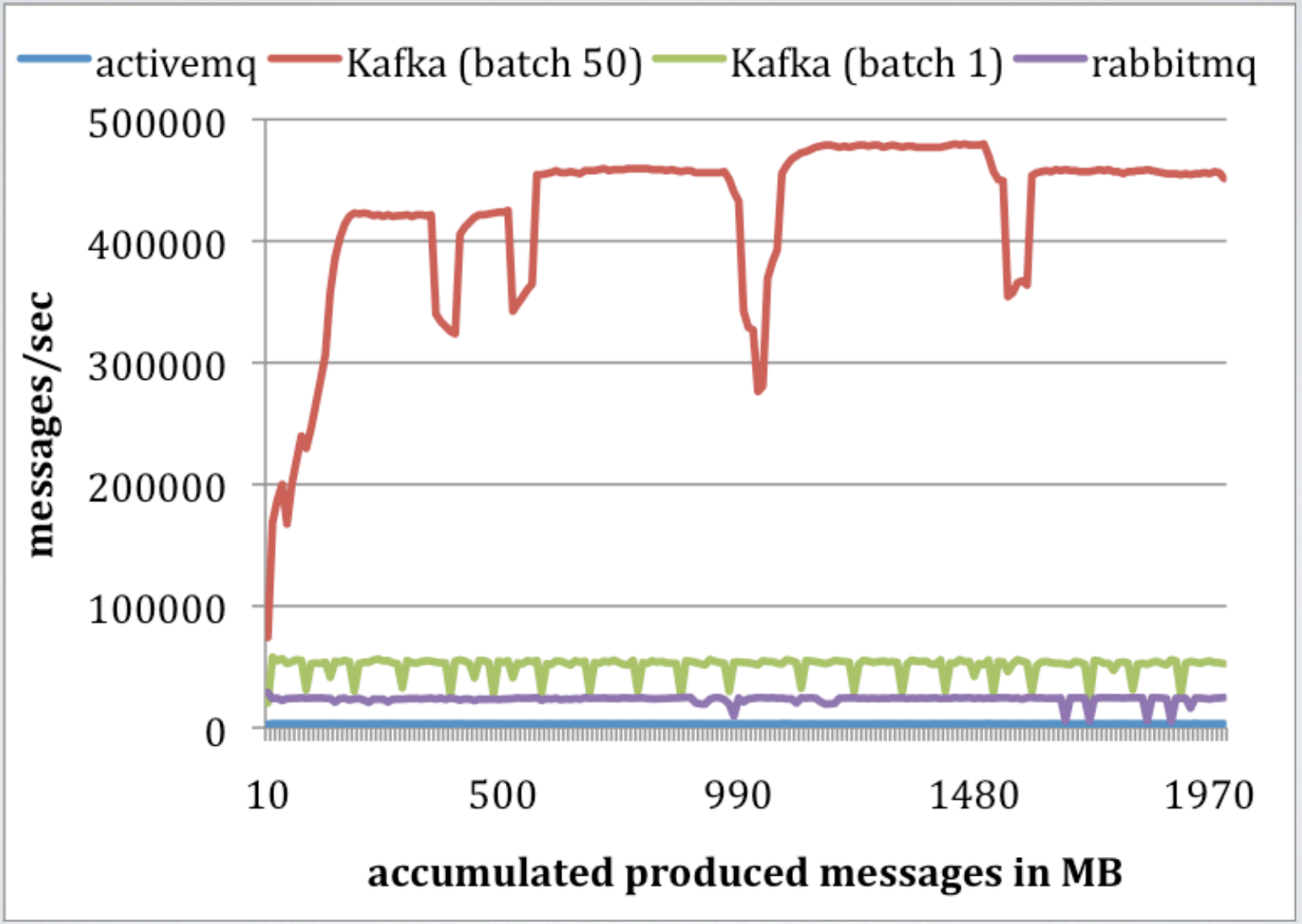
- Each consumer maintains its own state
- Message deletion driven by retention policy, not by tracking consumption
  - acceptable in practice
  - rewindable consumer

AUTO CONSUMER LOAD BALANCING

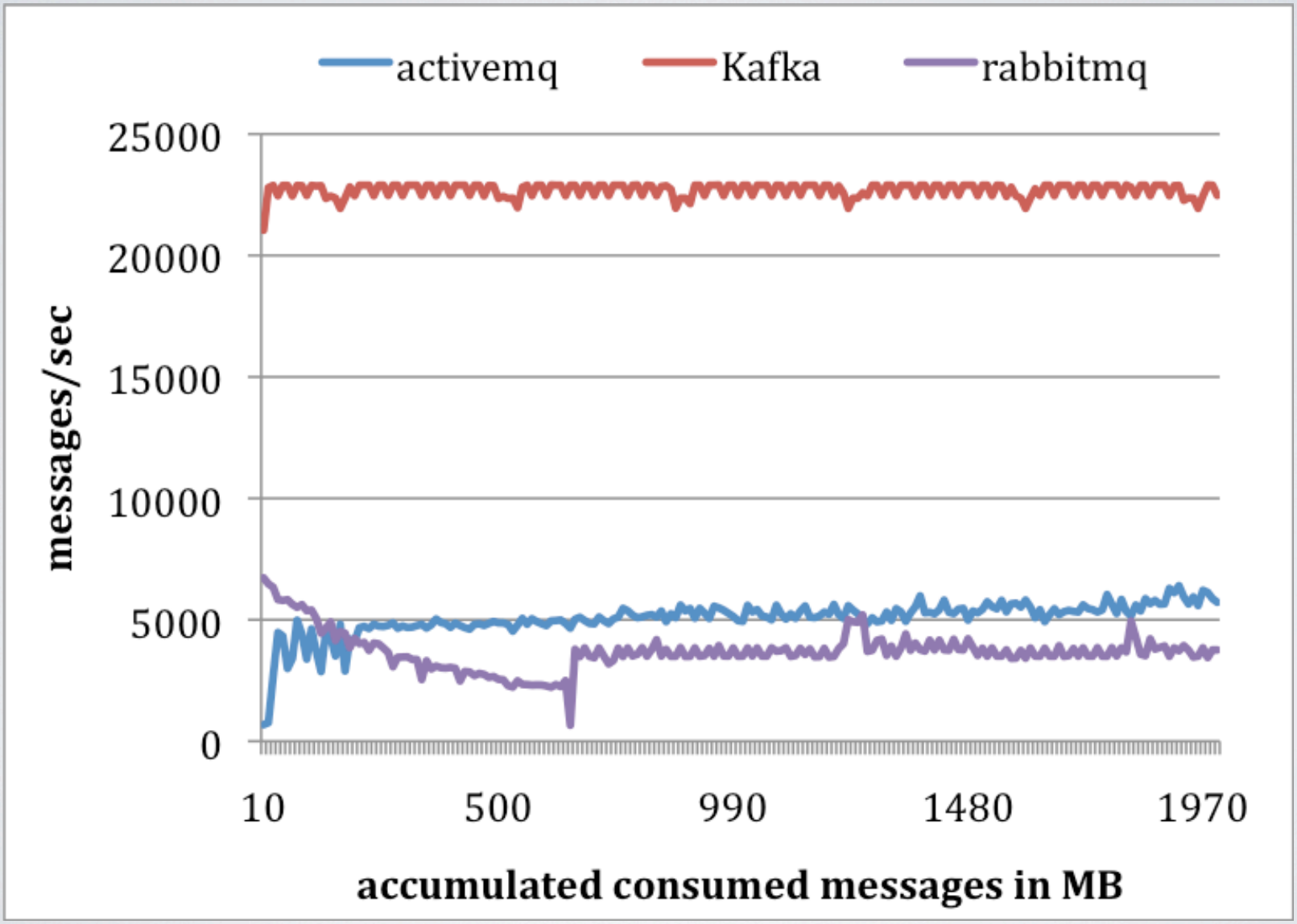


- brokers and consumers register in zookeeper
- consumers listen to broker and consumer changes
- each change triggers consumer rebalancing

PRODUCER PERFORMANCE



CONSUMER PERFORMANCE



ROADMAP

- New Kafka features
  - compression
  - replication
  - stream processing (online M/R)
- http://sna-projects.com/kafka/