Realtime statistics using Java, Kafka and Graphite

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https://github.com/whatvn/saigonsfd2015

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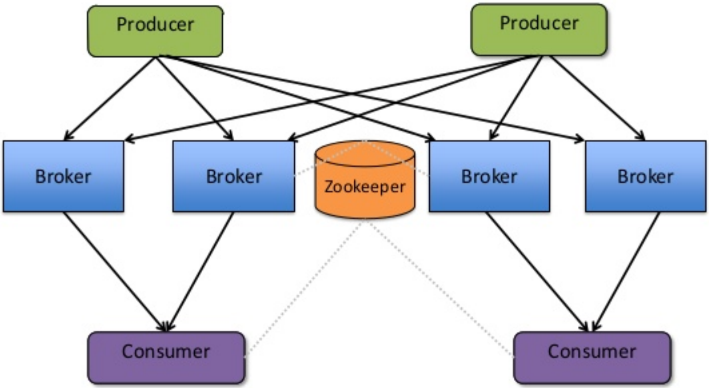
Overview

Kafka

Apache Kafka is an open-source message broker project developed by the Apache Software Foundation written in Scala. The project aims to provide a unified, high-throughput, low-latency platform for handling real-time data feeds. The design is heavily influenced by transaction logs.
from wikipedia

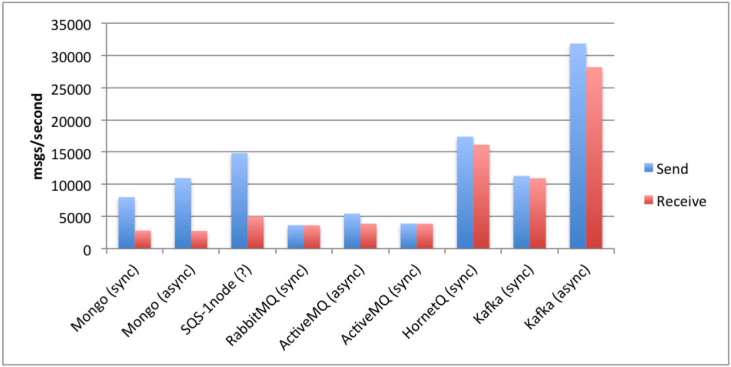
Kafka Architecture



Buzz words

- Uses Zookeeper for forming a cluster of nodes(producer/consumer/broker)
- Consumer Groups
- TTL persistence
- Sync/Async producer API
- Durable (?)
- Scalable
- Fast

How fast?



[1]

[1] https://softwaremill.com/mqperf/

Key features

- Producer
- Consumer
- Topic
- Partition
- Consumer fetcher
- Replication
- Offset

Kafka usage notes

- More Partitions Lead to Higher Throughput (but consume more memory) [2]
- Message size should be small (1kb), larger messages (for example, 10 MB to 100 MB) can decrease throughput and significantly impact operations.[3]
- A cluster should have at least 3 machines, otherwise, stay with standalone node instead (with SSD or multidisks for better performance).
- Use high level consumer with default(1) thread setting if possible.
- Use G1 Collector *-XX:+UseG1GC*

[2] http://www.cloudera.com/content/cloudera/en/documentation/cloudera-kafka/latest/topics/kafka$_p$*erformance.html*

[3] https://engineering.linkedin.com/kafka/benchmarking-apache-kafka-2-million-writes-second-three-cheap-machines

Scribe

Scribe is a server for aggregating log data that's streamed in real time from clients. It is designed to be scalable and reliable.
https://github.com/facebookarchive/scribe

Java

A programming language.

Grafana

An open source, feature rich metrics dashboard and graph editor for Graphite, InfluxDB, OpenTSDB.

http://grafana.org

Graphite

Scalable Realtime Graphing.

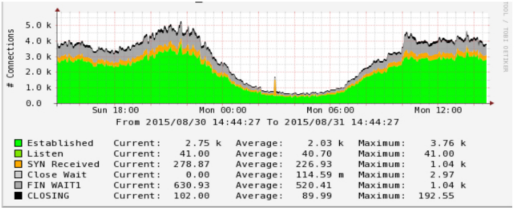
https://graphite.readthedocs.org/en/latest/

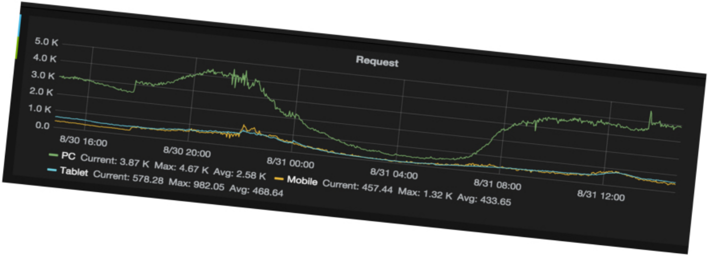
A monitoring application using Kafka

- Monitoring tools we used to use: Cacti, nagios, monin, ganglia...
- what it can do
  1. monitor processes, ports.
  2. monitor service health, response time...
  3. alert when bad things happen
- we do need another thing
  1. monitor at application/user views.
  2. have a deeper view at business logic, what's happening, what users are doing, how application is actually working.
  3. let other (not technical) people help you monitoring the system.

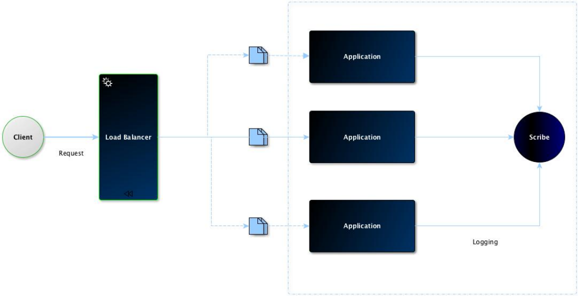
- Think about how stock exchange environment works.
- When system has problem, everyone can notify you.

- So we create a monitoring tool that:
  1. injects into current platform to get application logic.
  2. everyone can use.

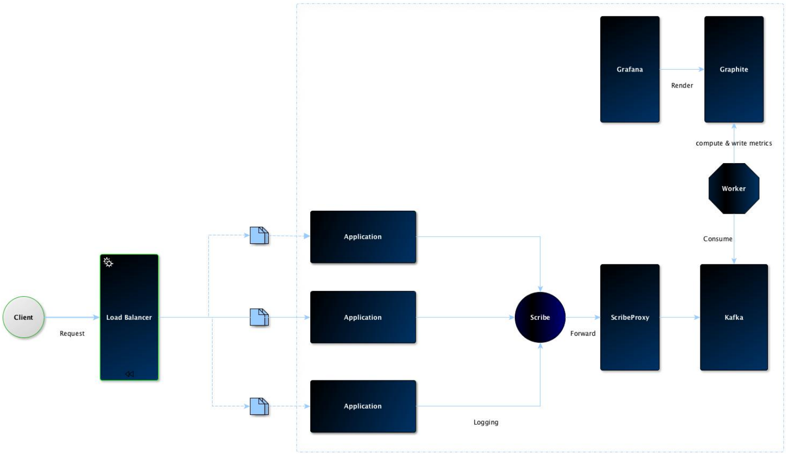




Original


Client
Request
Load Balancer
Application
Application
Application
Scribe
Logging

Customized


Grafana
Render
Graphite
compute & write metrics
Worker
Consume
Application
Application
Application
Client
Request
Load Balancer
Scribe
Forward
ScribeProxy
Kafka
Logging

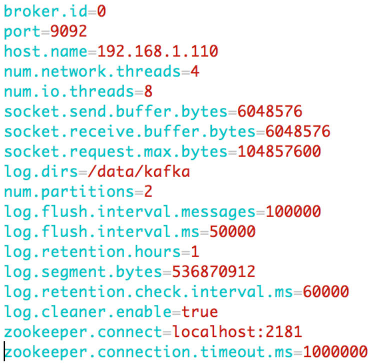
Scribe Proxy

1. A thrift server using Scribe Protocol.[4]
2. implement scribe Iface with some java code

[4] An excellent example thrift server implementation: https://github.com/m1ch1/mapkeeper

Kafka

1. Download
2. Decompress
3. Modify a little bit
4. Run



```
broker.id=0
port=9092
host.name=192.168.1.110
num.network.threads=4
num.io.threads=8
socket.send.buffer.bytes=6048576
socket.receive.buffer.bytes=6048576
socket.request.max.bytes=104857600
log.dirs=/data/kafka
num.partitions=2
log.flush.interval.messages=100000
log.flush.interval.ms=50000
log.retention.hours=1
log.segment.bytes=536870912
log.retention.check.interval.ms=60000
log.cleaner.enable=true
zookeeper.connect=localhost:2181
zookeeper.connection.timeout.ms=1000000
```

Worker

1. Using a counter

$$ConcurrentHashMap < String, AtomicLong > hashCounter;$$

   or

$$ConcurrentHashMap < String, AtomicDouble > hashSum;$$

2. increase or sum if needed
3. write metrics to graphite

$$metric\_path\ value\ timestamp\backslash n$$

Demo/Question