alphadoop

Doflamingo

An light-weight monitoring system for Apache Hadoop

TITLE	**Kafka/ Zookeeper Monitoring Module built for Flamingo Ecosystem**
DURATION	**March 13, 2016 ~ June 8, 2016**
CLIENT	**EXEM**
PRESENTER	**ALPHADOOP**

CONTENTS

CONTENTS

_ WHAT WE WILL DO

Collect Performance Metrics,
Visualize it, and
Integrate it with Flamingo.

_ WHAT WE WILL DO

Is all system working properly?

hadoop

kafka

Doflamingo

Of Course!

Check this out!

_ HOW WE DO IT

Learn from other monitoring tools

Plenty of tools exists in the field – Learn from them and try to build up similar metrics

Build it into flamingo platform

There's flamingo's way of monitoring hadoop system. Add a new task into jobscheduler.

_ OBJECTIVES

SPRINT 1

O1: Set up an environment for Flamingo

O2: Define Kafka measurement metrics, visualization forms

SPRINT 2

O3: Implement API server which provides collected metrics

O4: Implement charts with Sencha

SPRINT 3

O5: Integrate with Flamingo Ecosystem

KAFKA MODULE **M1**

SPRINT 4

O6: Define Zookeeper measurement metric, visualization

O7: Implement a Zookeeper monitoring module on Flamingo

ZOOKEEPER MODULE **M2**

SPRINT 5

_ TECHNICAL CHALLENGES

Simulate distributed environment

Kafka and zookeeper can only be tested in multiple nodes. Need to mock clustering env.

REQUEST → EXEM

Can we have sample environment or at least a tutorial that we can follow to setup distributed system?

SOLVED

_ TECHNICAL CHALLENGES

Selecting the important metrics

New to monitoring job and hadoop so we don’t know what are the important metrics

HOW WE WILL SOLVE THE CHALLENGE

Survey other services: what they are monitoring and ordering of metrics which implicitly denotes im

Interview on developers – maybe

NEW RQ!

_ THE EFFECT OF OUR WORK

The ultimate control tower

Flamingo now monitors not only nodes,
but also modules that compose pipeline.

Opening up new possibility

The gathered metrics can be used for further
optimization or anomaly detection feature.

_ BEFORE START

WHY DO WE NEED MONITORING?

_ SAY HELLO TO MONITORING

Seeing is believing

Software is intangible; so, where can we find it?

_ SAY HELLO TO MONITORING

Seeing is believing

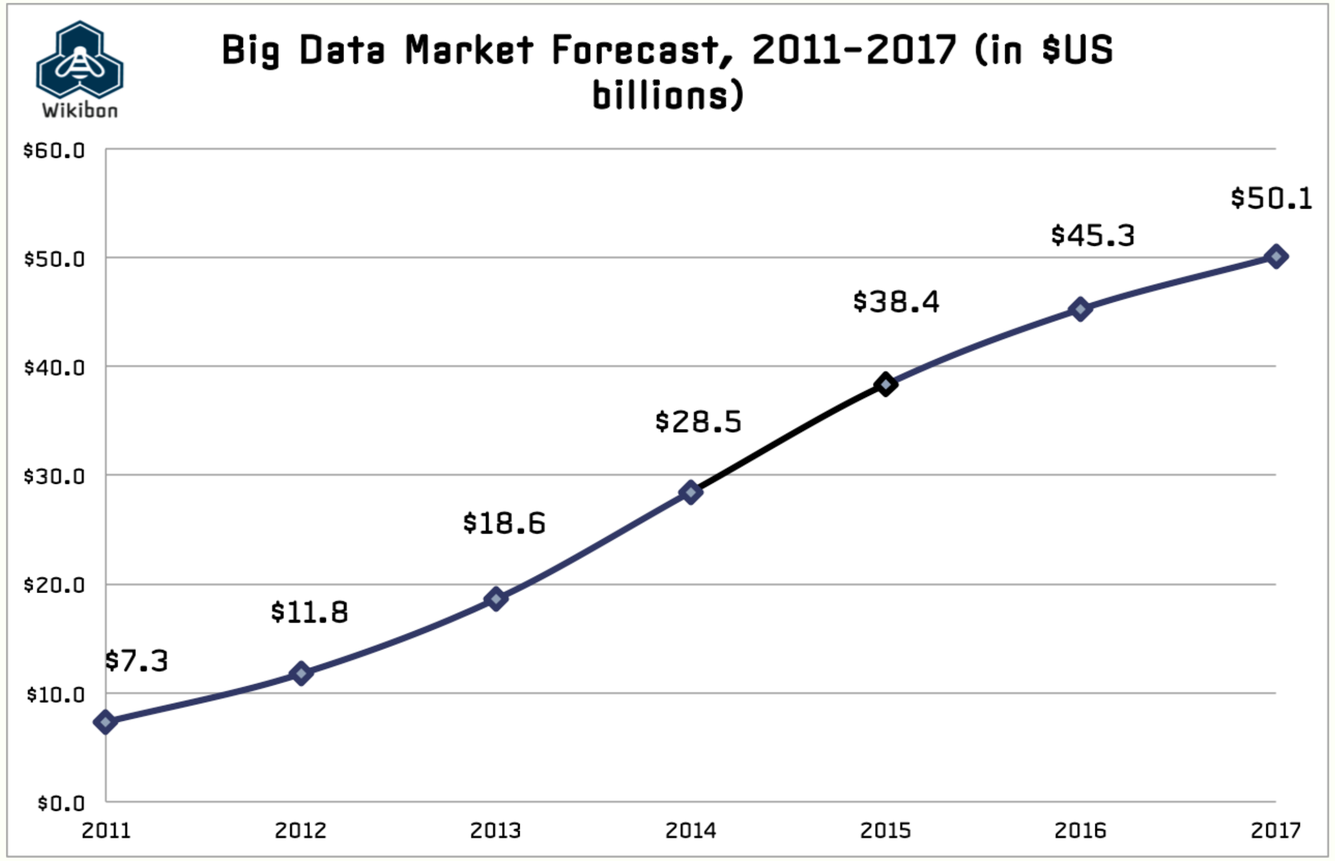
Software is intangible; so, where can we find it?

Bigdata: the buzz needs money

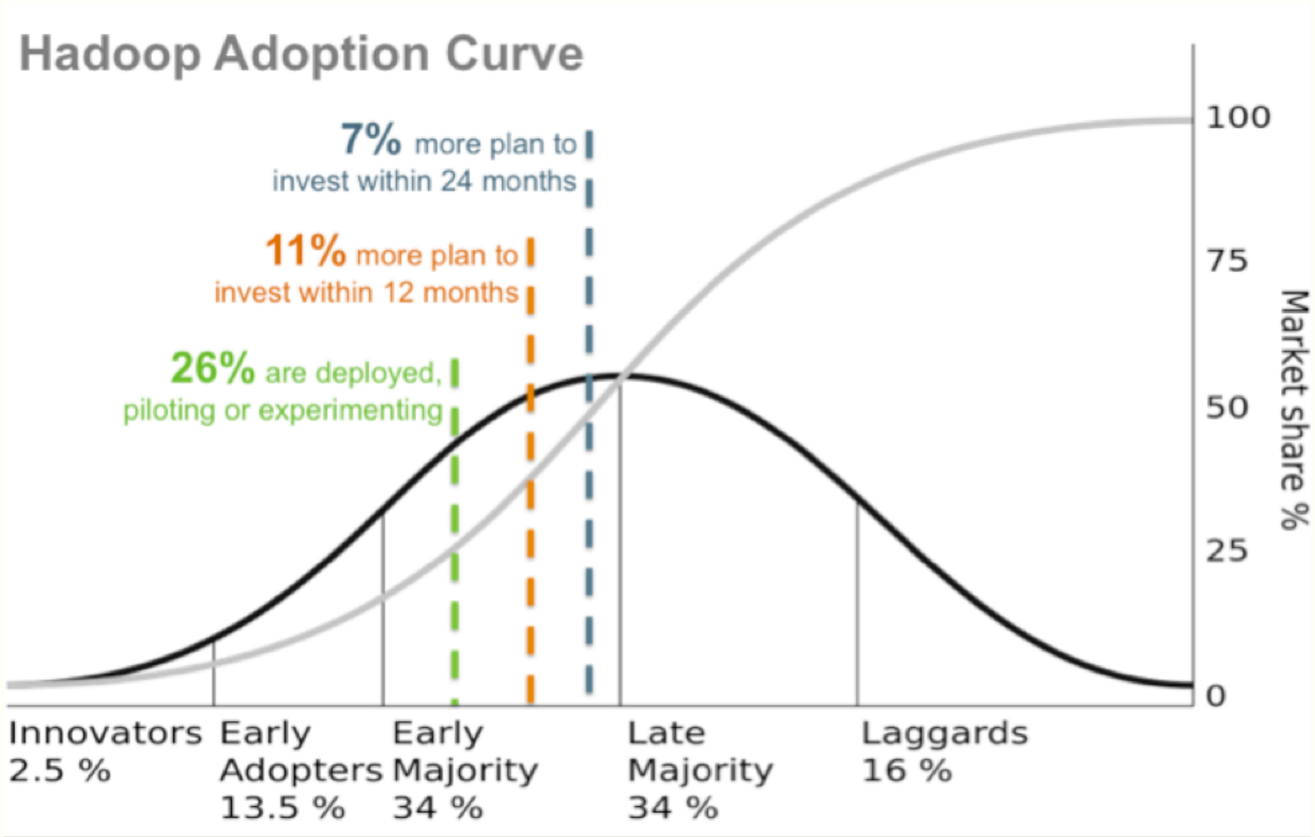
Hadoop is a money-eater:

10+ nodes, consulting, (expensive) engineers

_ SAY HELLO TO MONITORING



_ SAY HELLO TO MONITORING



_ TECHNICAL DETAILS

[A] WHAT IS KAFKA?

A high-throughput distributed messaging system

BENEFITS

- Scalable
- High-throughput
- Distributable
- Low response time
- Save on data disk

USED IN

- LinkedIn
- Twitter
- Netflix
- Tumblr
- Foursquare

_ TECHNICAL DETAILS

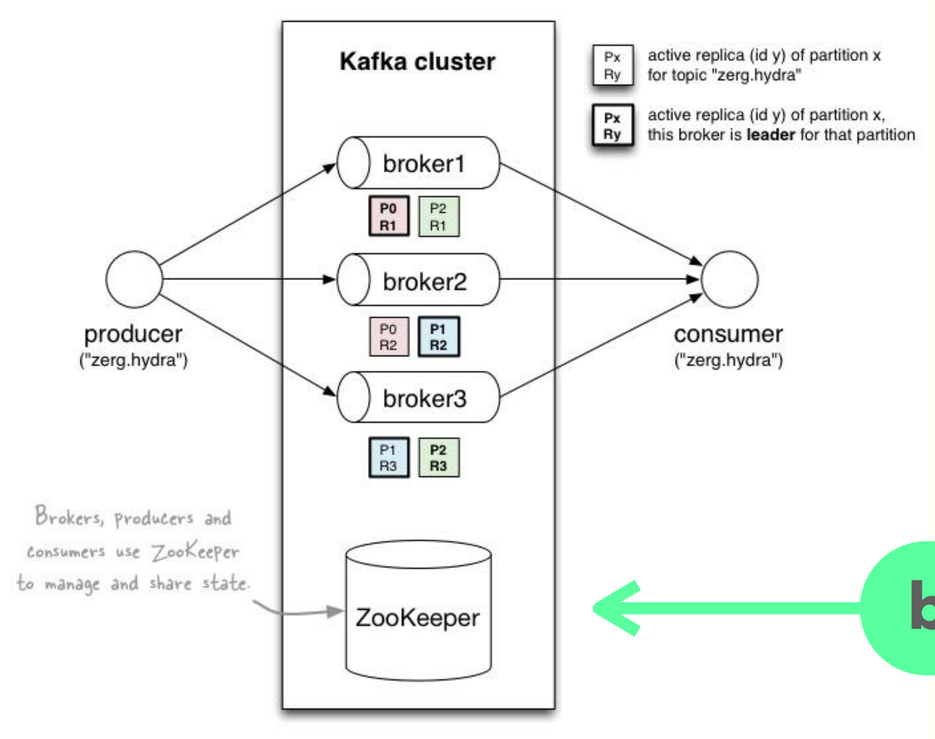
[A] WHAT IS KAFKA?

Kafka consists of producer, broker, and consumer, managed by **Zookeeper**

Producers send system messages to **brokers**
Brokers process them **distributively**
Consumers store the messages to their **disks**

_ TECHNICAL DETAILS

[A] WHAT IS KAFKA?



producer
generate message that fall into certain topics

consumer
subscribe specific topics & process the message

broker
stacks up logs based on topic

_ TECHNICAL DETAILS

[A] WHY KAFKA?

Store the messages in the **DISK**, not in the cache.

Consumers can rewind back to old data and re-consume them since they are in the disk for a certain period of time.

PULL model, not push model

consumer pull messages from broker without exceeding their limit; no drop occurs unlike producer-push model

_ TECHNICAL DETAILS

[B] WHAT IS ZOOKEEPER?

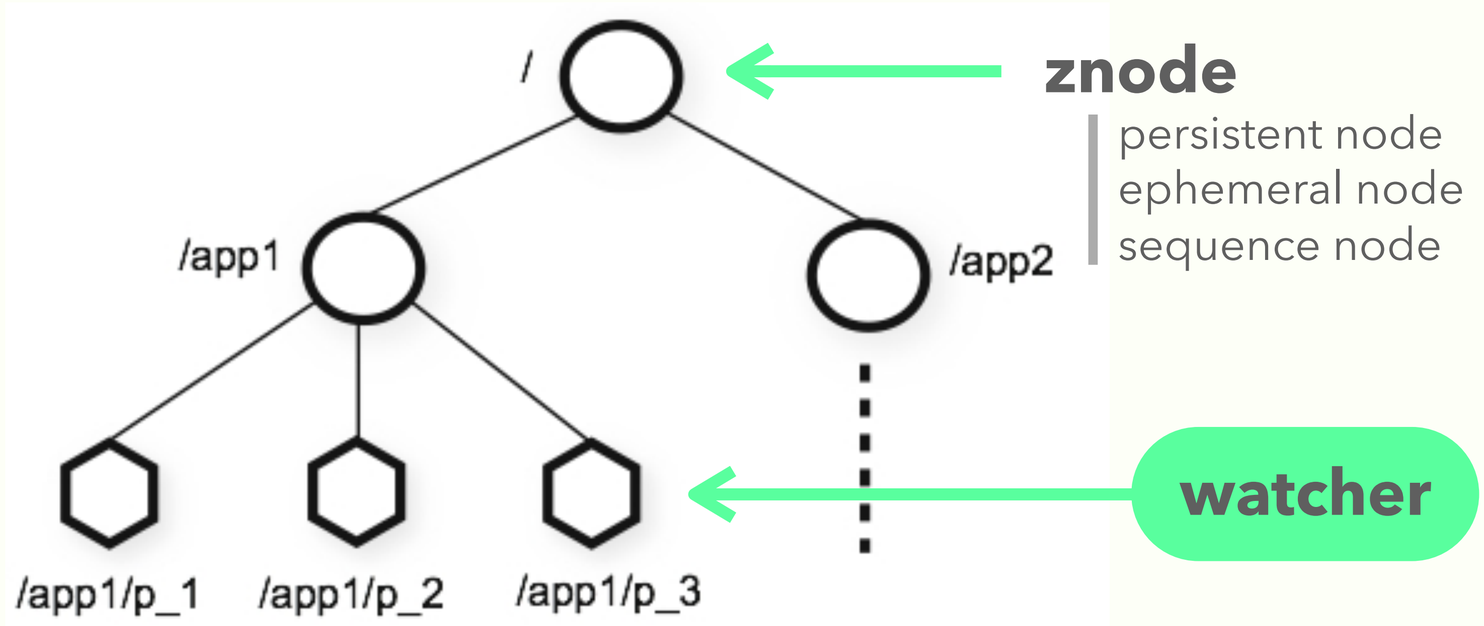
Handles various errors in distributed systems.

Four Features

Using name service to separate loads.
Using distributed lock to handle synchronization error
Error detection and recovery
Configuration management

_ TECHNICAL DETAILS

[B] WHAT IS ZOOKEEPER?



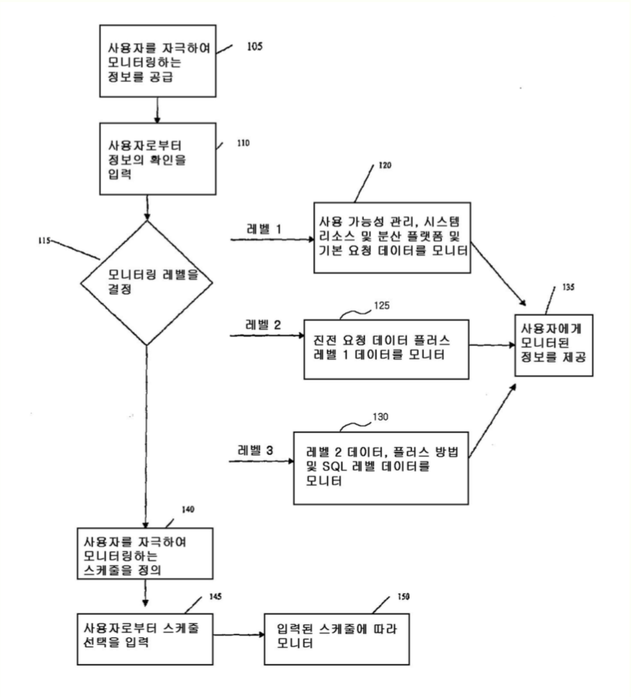
http://bcho.tistory.com/1016

_ PATENT RESEARCH

METHOD AND SYSTEM FOR MONITORING PERFORMANCE OF APPLICATIONS IN A DISTRIBUTED ENVIRONMENT

KR 0772999 B1

IBM
Assignee

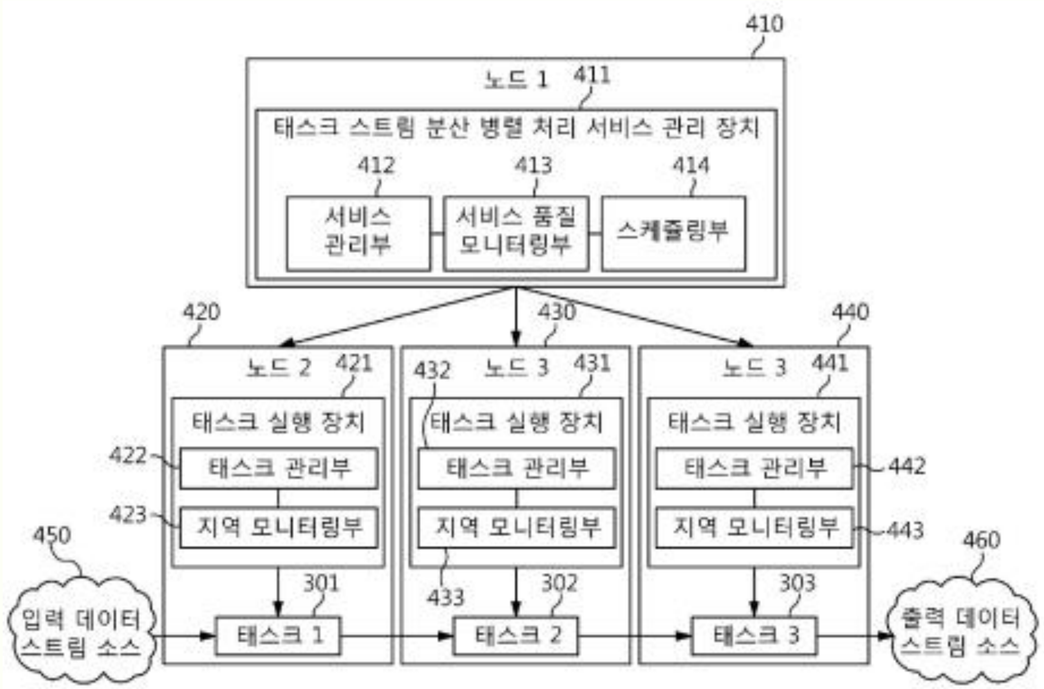


_ PATENT RESEARCH

APPARATUS AND METHOD FOR MANAGING DATA STREAM DISTRIBUTED PARALLEL PROCESSING SERVICE

KR 2013-0095910 A

ETRI
Assignee



_ PATENT RESEARCH

APPARATUS AND METHOD FOR ANALYZING BOTTLENECKS IN DATA DISTRIBUTED PROCESSING SYSTEM

KR 2015-0050689 A

SAMSUNG ELECTRONICS SEOUL NATIONAL UNIV.

Assignee

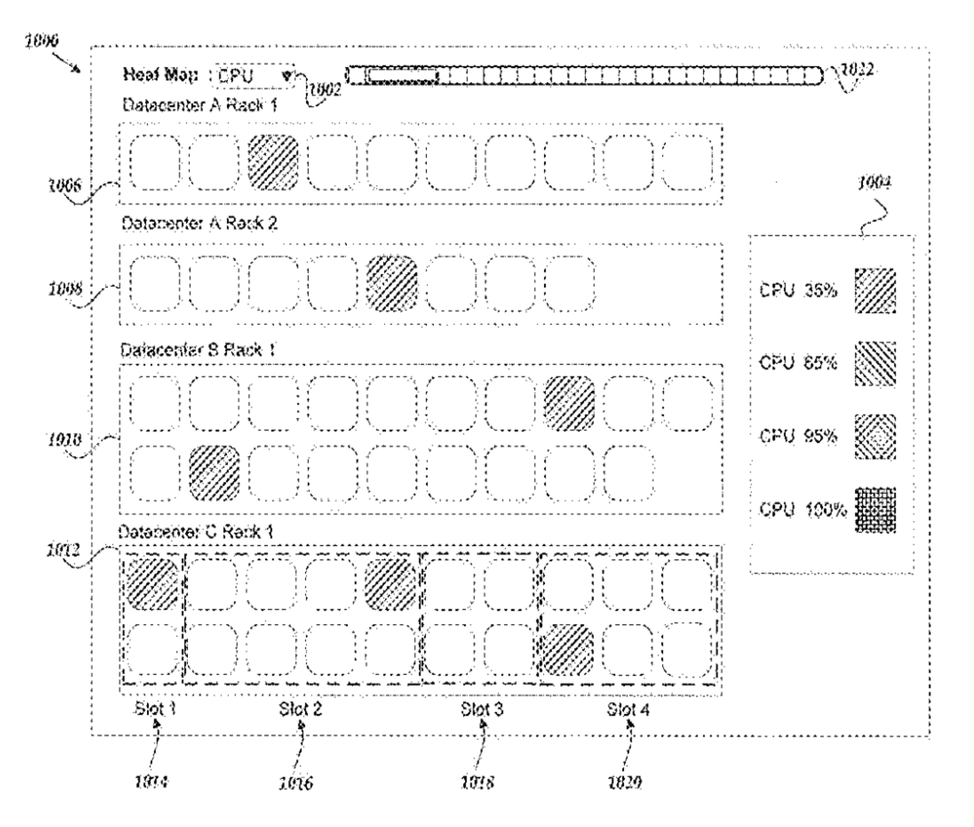
_ PATENT RESEARCH

CLUSTER PERFORMANCE MONITORING

US 9043332 B2

Splunk

Assignee



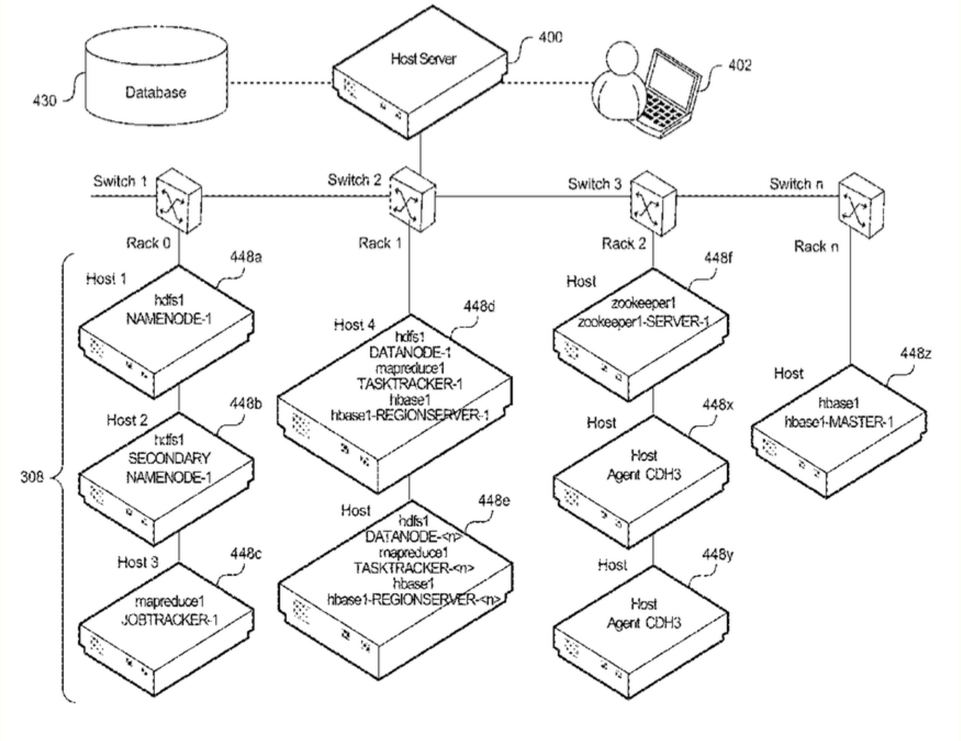
_ PATENT RESEARCH

CENTRALIZED CONFIGURATION AND MONITORING OF A DISTRIBUTED COMPUTING CLUSTER

US 9172608 B2

Cloudera

Assignee



_ COMMERCIAL PRODUCT

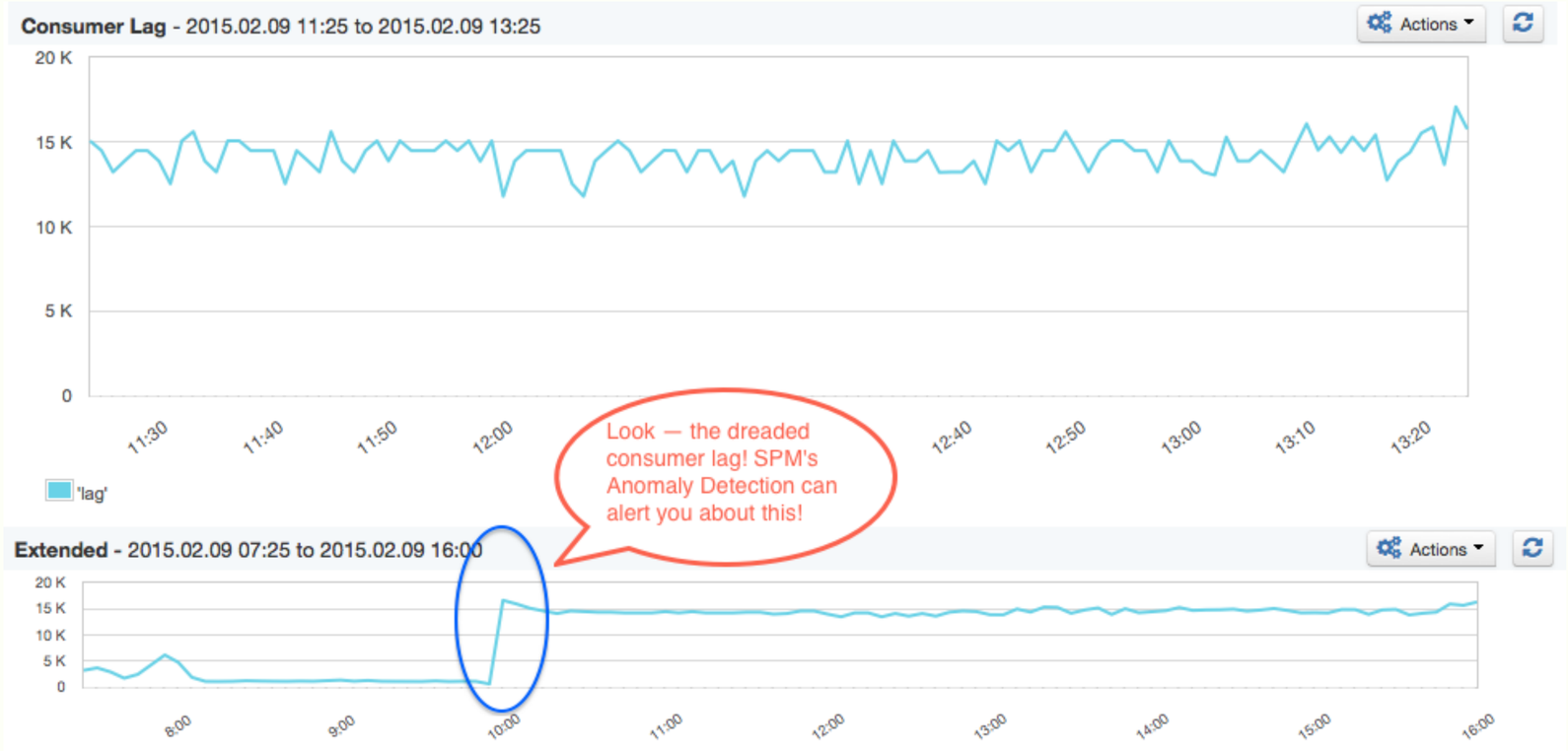
METRIC ANALYSIS

Metric	Meaning / Comments	Suggested Alert
Request Avg/Max Latency	Amount of time it takes for the server to respond to a client request (since the server was started).	When latency > 10 (Ticks).
Outstanding Requests	Number of queued requests in the server. This goes up when the server receives more requests than it can process.	When count > 10.
Received	Number of client requests (typically operations) received.	None
Sent	Number of client packets sent (responses and notifications).	None
File Descriptors	Number of file descriptors used over the limit.	When FD percentage > 85 %.
Mode	Serving mode: leader or follower, or standalone if not running in an ensemble.	None
Pending syncs	(Only exposed by the leader) number of pending syncs from the followers.	When pending > 10.
Followers	(Only exposed by the leader) number of followers within the ensemble. You can deduce the number of servers from the MBeam Quorum Size.	When followers != (number of ensemble servers -1).
Node count	Number of znodes in the Zookeeper namespace	None
Watch count	Number of watchers setup over Zookeeper nodes.	None
Heap Memory Usage	Memory allocated dynamically by the Java process, Zookeeper in this case.	None

https://blog.serverdensity.com/how-to-monitor-zookeeper/

_ COMMERCIAL PRODUCT

SPM KAFKA - CONSUMER LAG



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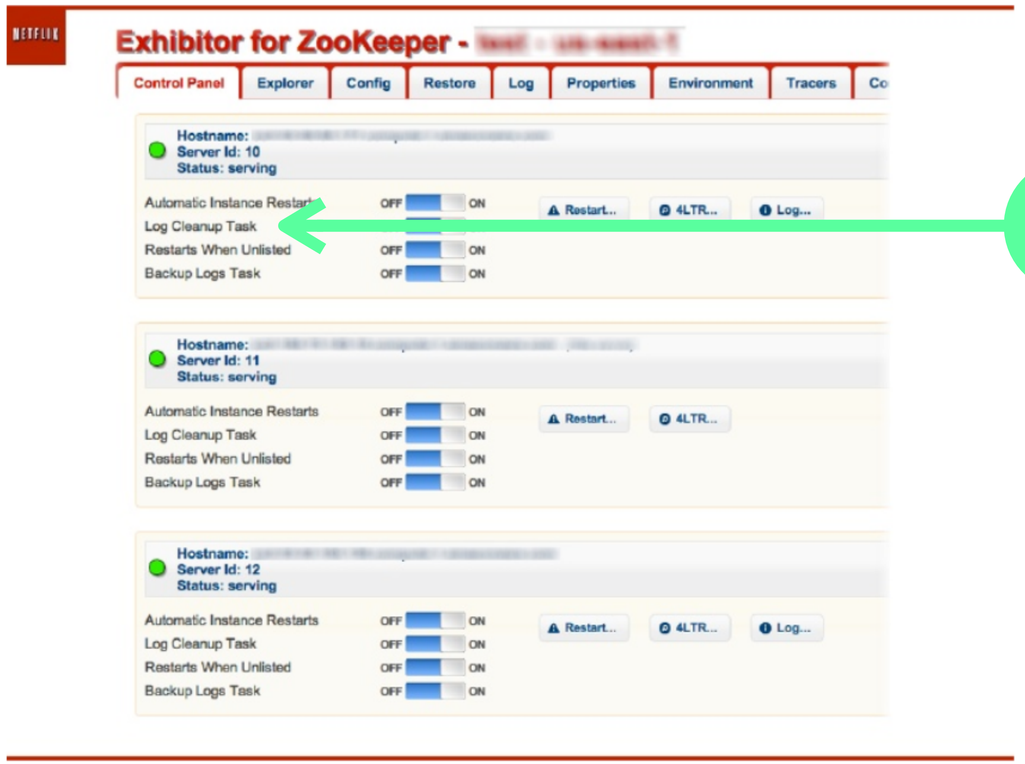
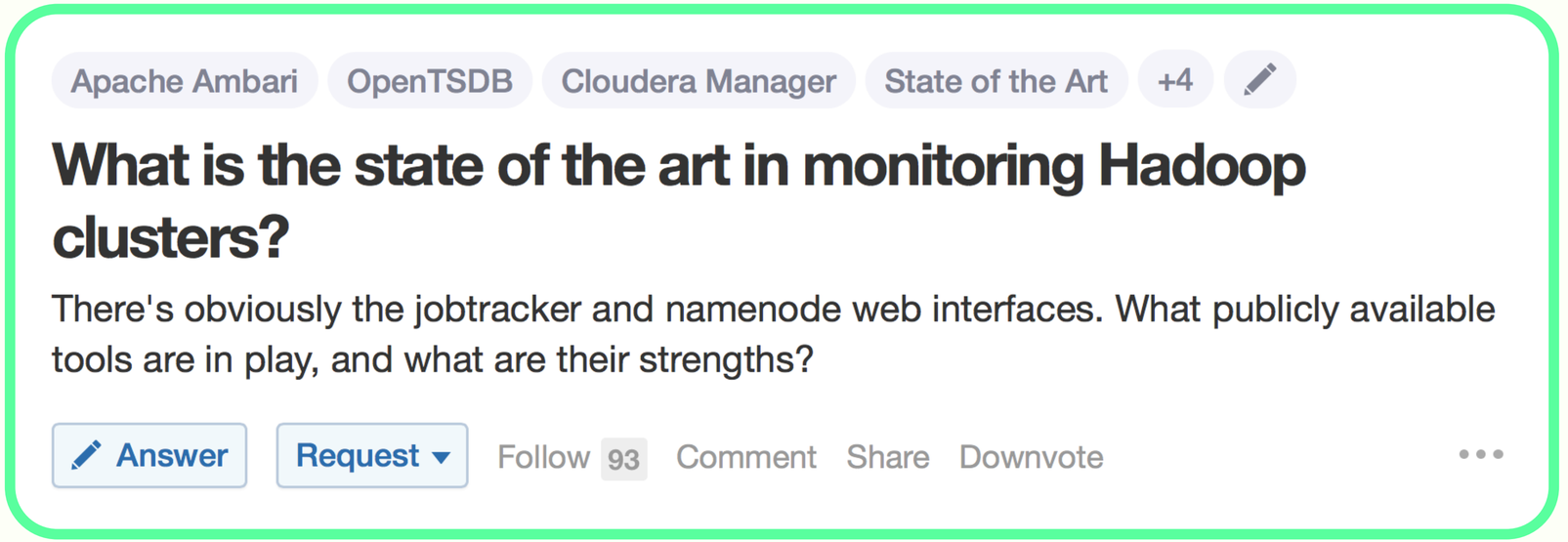
NETFLIX EXHIBITOR FOR ZOOKEEPER



log cleanup task

_ SO WHAT'S LEFT FOR US?



https://www.quora.com/What-is-the-state-of-the-art-in-monitoring-Hadoop-clusters

_ OUR DRAWINGS OF FUTURE

Established Programs

Finished product for sale
Difficult to modify or fool freely
Take a long time to supplement new functionality
Hard to come up with creative one

Flamingo

Open source
Easy to be fooled by developers
Developer-driven modules;
can freely build creative tools

END