Suitability analysis of Kubernetes for Seznam.cz

Bc. Ondřej Šejvl

Department of Software Engineering
Faculty of Information Technology
Czech Technical University in Prague

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Content

1. About
2. Tarsier
3. Conclusion
4. Discussion

Assignment

- Make yourself familiar with the Kubernetes system.
- Compare Kubernetes in different environments.
- Design and implement a set of applications to simulate real traffic.
    - Load configuration files, SSL certificates and static resources.
    - Use persistent storage.
    - Raise controlled faults, deadlocks, segmentation faults.
    - Simulate heavy CPU and RAM load.
    - Log their own activity and reliably transfer the logs to the central log storage.

Technologies?

Kubernetes

is an open-source system for automating deployment, operations, and scaling of containerized applications. [1]

Figure: Kubernetes [2]

Docker

allows you to package an application with all of its dependencies into a standardized unit for software development. [3]

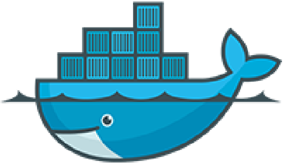


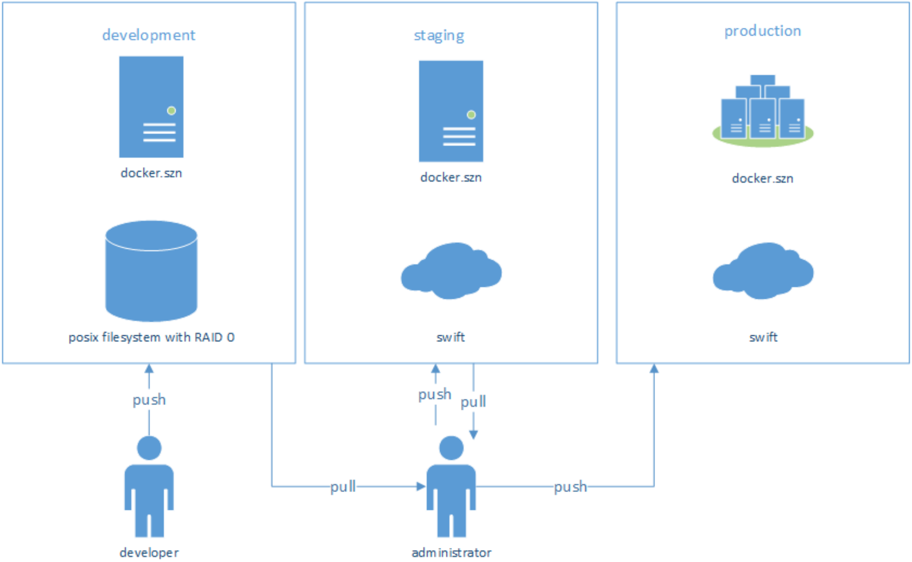
Figure: Docker [4]

Possible problems with Kubernetes in Seznam.cz

- Docker registry
- Secrets distribution
- Logging
- Security
- Monitoring
- Static content of websites

Figure: Krasty [5]

Docker registry



Logging I

Debug logs

- textual
- no need for 100% reliability

Business logs

- structured – Apache Avro [6]
- 100% reliability
- not part of the thesis

Third-party logs

- system logs
- third-party applications (nginx mostly, . . .)

Goal: One solution to rule them all.

Logging II

Kafkalog

- library for storing, rotating, compressing logs

Kafkafeeder

- wrapper around Heka [7]
- sending messages from Kafkalog to Kafka [8]
- with acknowledgement

Logging III

Debug logs

- Kafkalog handler to native loggers (Go Logrus [9])

Business logs

- additional library that uses Kafkalog
- not part of the thesis

Third-party logs

- simple application with various input interfaces (stdin, syslog, . . .)
- save to Kafkalog
- not part of the thesis

Logging IV

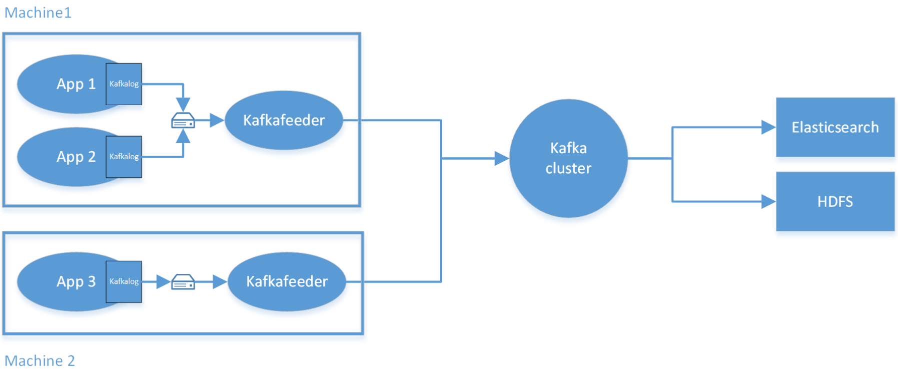


Figure: Logging flow

Tarsier I

- Testing application
- Modular
  - Heavy load – Gobble RAM, Spin CPU
  - Faults – Deadlock, Segfault
  - Net – Dial
  - Persistent storage – Open, Read, Write
  - Sleeping beauty – Sleep

Figure: Tarsier [10]

Tarsier II

```
curl -i -X POST -d '                      \
      command: "persistent_storage/write" \
      data:                               \
        amount: "100␣MB"                  \
        files: 10                         \
      wave:                               \
        remains: 3                        \
        buddies: 3                        \
' kubernetes.dev:6666/exec
```

Tarsier III

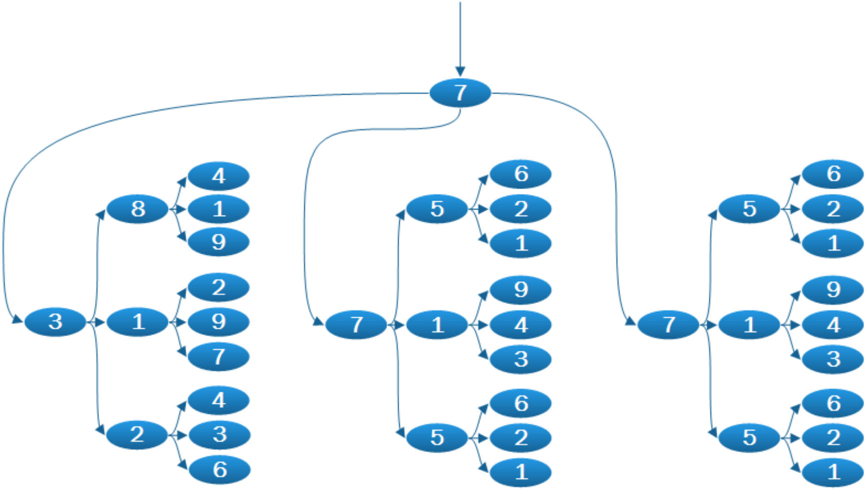


Figure: Tarsier wave

Output

`https://github.com/sejvlond/master-thesis`

Tarsier Application for testing Kubernetes cluster

Kafkafeeder Application that transfers logs to Kafka

Go kafkalog Apache Kafka log format implementation in Go

Kafkalog Logrus Kafkalog hook to logrus

Heka Some Heka adjustment for greater reliability

Heka Kafkalog Heka Splitter and Decored plugins that use go-kafkalog

Kubernetes testing Support scripts for testing Kubernetes

Go Ultimate server Simple Go server for benchmarking

Python Ultimate server Simple Python Tornado server for benchmarking

Benefits

1. Kubernetes
2. Docker
3. Golang
4. Kafka
5. Heka
6. Fluentd
7. Logstash

Acknowledgements

- Ing. Jan Baier
- Ing. Tomáš Kukrál
- David Bouček
- Martin Stružský
- Seznam.cz, a.s.

Figure: Krasty [5]

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- Docker, Inc. *Configure logging drivers*. [online] [cit. 2016-06-10]. Available from: `https://docs.docker.com/engine/admin/logging/overview/`

- Treasure Data, Inc. *Fluentd architecture*. [online] [cit. 2016-06-10]. Available from: `http://docs.fluentd.org/images/fluentd-architecture.png`

Thank you for your attention

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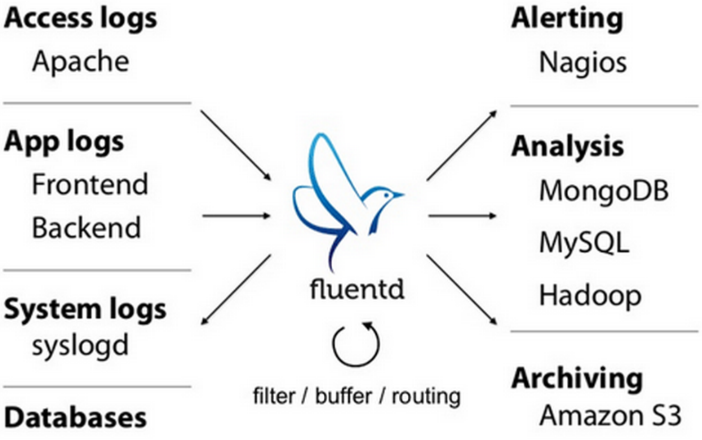

Access logs

Apache

App logs

Frontend

Backend

System logs

syslogd

Databases

fluentd

filter / buffer / routing

Alerting

Nagios

Analysis

MongoDB

MySQL

Hadoop

Archiving

Amazon S3

Figure: fluentd [12]

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