



inovex

inovex classes

Kubernetes

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Macht Dinge in der Wolke

- Team ITO since 2014
- Kubernetes since 2014
- Certified Kubernetes Admin
- LF authorized Kubernetes Admin trainer
- Cloud technologies
- @johscheuer



Timo Heinrichs

Macht Dinge in der Wolke

- Team ITO since 2017
- Docker since v0.9
- Kubernetes since 2017
- Cloud technologies
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Agenda

- › Recap
- › Volumes and Configuration
- › Ingress
- › Monitoring (Prometheus)

- › Hands on part: [https://github.com/johscheuer/inovex classes](https://github.com/johscheuer/inovex_classes)

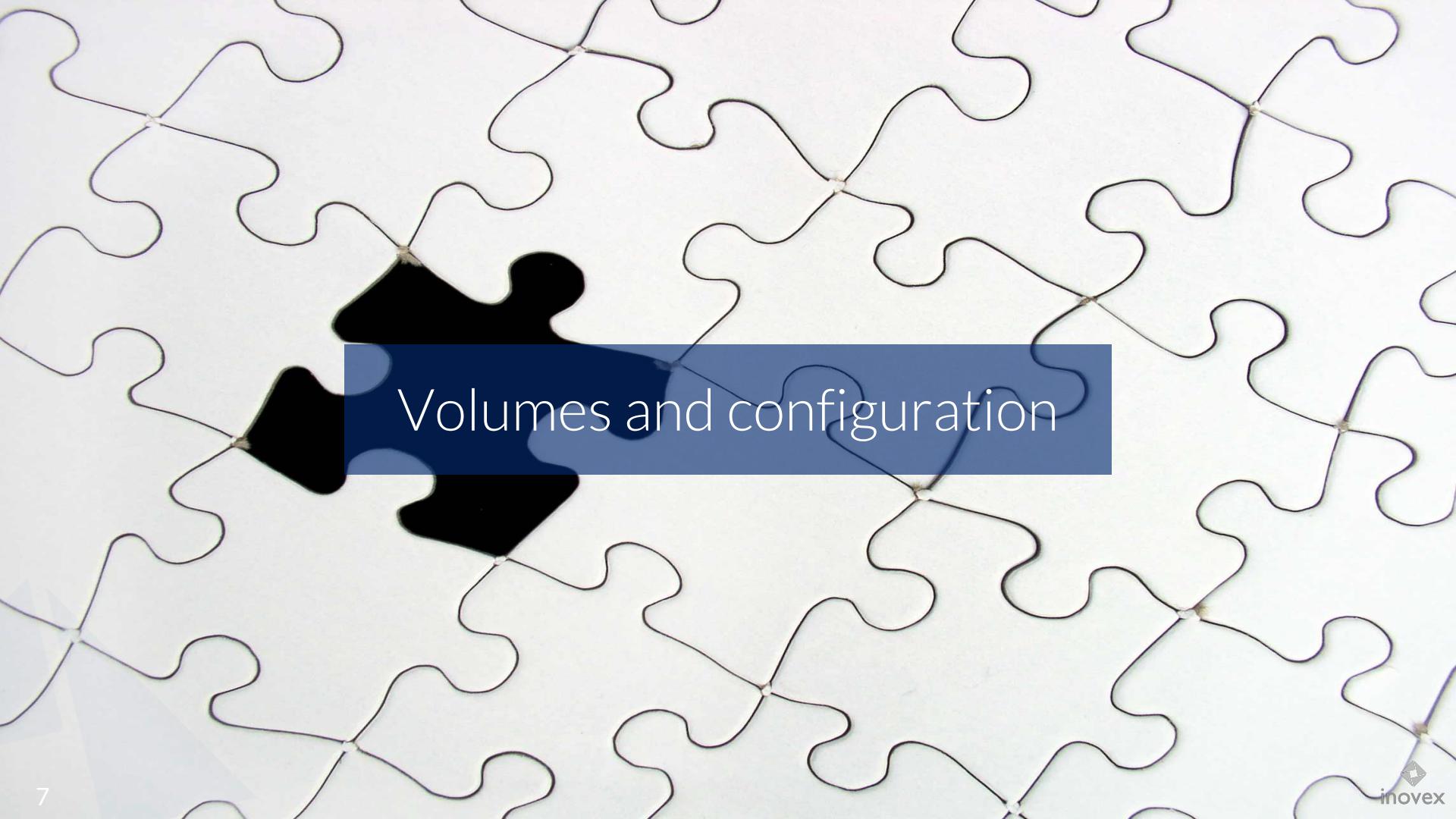
Feedback



What we did

- › Kubernetes Concepts
- › Kubernetes Metrics
- › Auto-scaling

- › Feedback
 - › Slack Channel
 - › Slides online

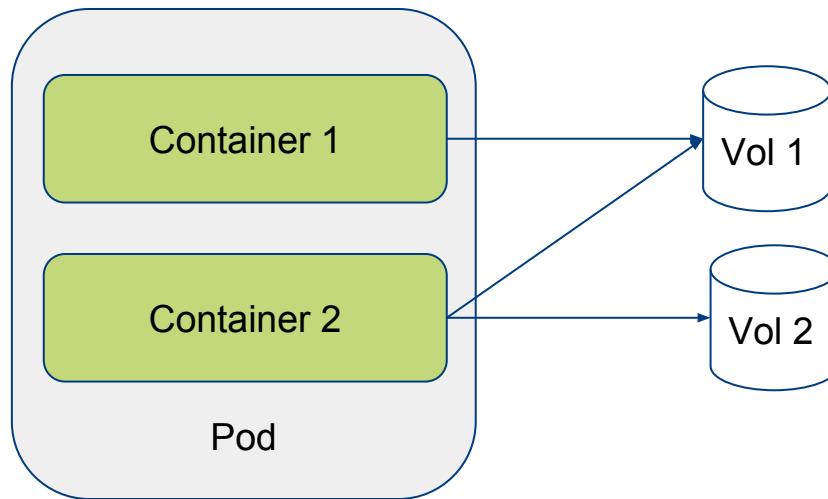


Volumes and configuration

Volumes and configuration

- › Secrets
- › ConfigMap
- › Persistent Volume
- › Persistent Volume Claims

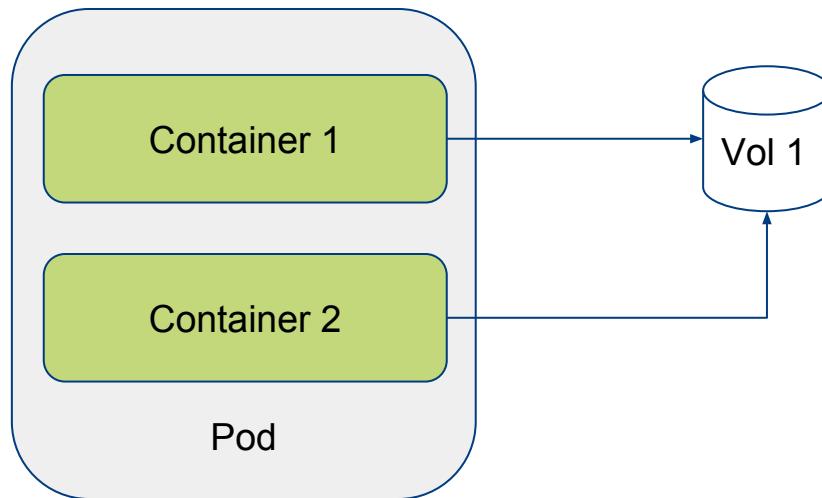
Volumes





Why Volumes?

Shared Volumes



Persistent Volumes (and Claims)

- › Storage abstraction
- › Storage resources are managed over API
- › Can be dynamically provisioned
- › No need for an admin to pre provision
- › Storage Class defines the volume plugin
- › Default Storage class depends on the cluster

“Secrets”

- › Base64 decoded
- › Decoded not encrypted!
- › Can be used as files or env. variables in the container
- › Encoding is done automatically by kubectl
- › Encryption at Rest is possible
- › The use of an KMS* is possible

*KMS = Key Management Service



Encryption

Data at rest vs. Data in transit?

ConfigMaps

- › 12factor -> <https://12factor.net/de/config>
- › Decouple configuration data from container image
- › Not encoded or encrypted
- › Can be consumed in different ways
- › Possibility to “hot reload”

Hands on Kubernetes Volumes



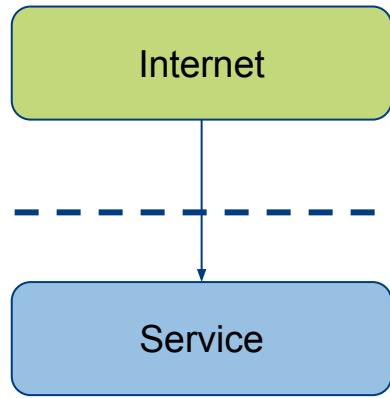
Ingress

We have Load Balancers
and NodePorts why do we need an
Ingress?

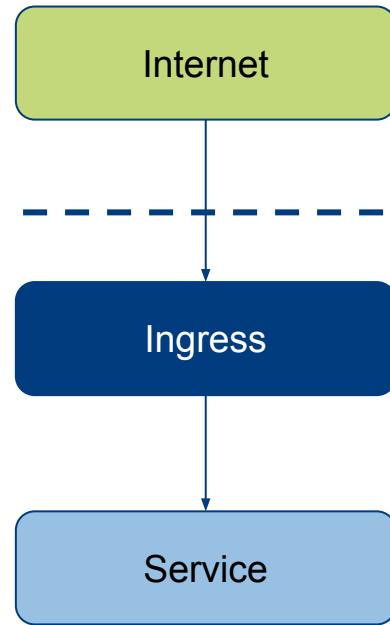
Ingress

- › Single Entrypoint to the cluster
- › Manages external access to the cluster
 - › HTTP(S)
 - › TLS termination
 - › Name-based virtual hosting
 - › Load-Balancing
- › Additional tooling is required
 - › e.g. <https://github.com/kubernetes/ingress-nginx>

Ingress



Cluster



Ingress

- › Uses annotation to select ingress controller
- › Bypasses kube-proxy for session-affinity
- › Ingress is an API resource
 - › Without an ingress controller these resources have no effect
 - › Needs a default HTTP backend (serves 404)

Hands on Ingress



Logins

172

Sign ups

263

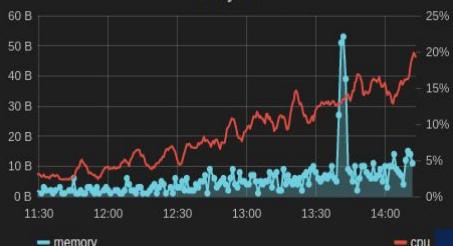
Sign outs

268

Support calls

80

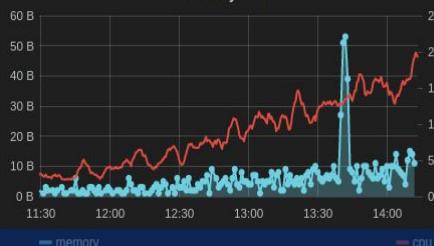
Memory / CPU



logins



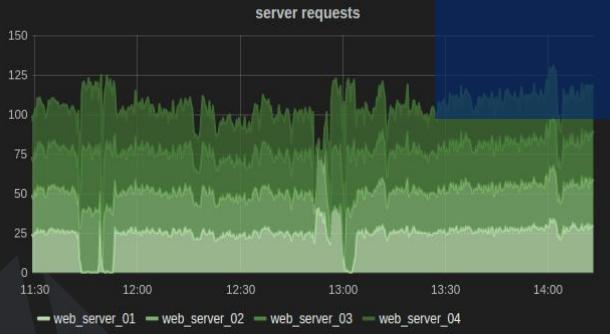
Memory / CPU



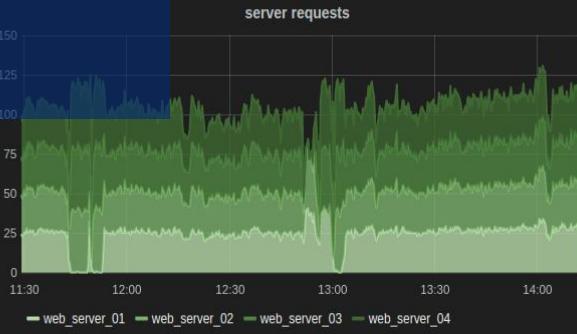
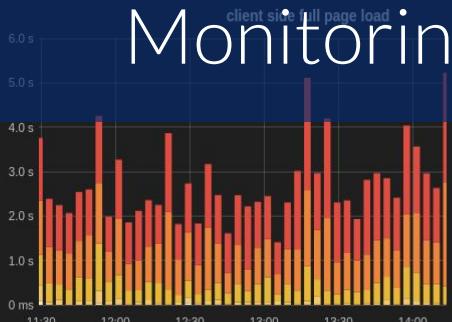
logins



server requests



Monitoring



Prometheus

- › Open Source Monitoring
- › Has multiple components
 - › Prometheus
 - › Alertmanager
 - › Exporters
- › Pull-based Monitoring
- › Internal TSDB

Prometheus

- › Has different service discovery mechanisms
 - › e.g. Kubernetes
 - › or AWS, GCP, Azure
- › Allows to do math on the collected metrics
- › Based on Queries Prometheus can fire alerts

Hands on Prometheus

Outlook

- › Build your own Microservice
- › Add metrics to your Microservice
- › Make it reliable

- › Next Week no class → 18.10.2018

Questions?

Vielen Dank

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Reading list

- › <https://kubernetes.io/docs/tasks/administer-cluster/encrypt-data/>
- › <https://kubernetes.io/docs/concepts/services-networking/ingress/>
- › <https://prometheus.io/>