Modern DevOps with Kubernetes

www.valuelogic.one

Michal Wronski
https://twitter.com/mich_wronski

Wroclaw, 13.07.2017

Agenda

1) Why Kubernetes?
2) Basics
3) DevOps
4) Going into the Cloud
5) When to use it?


Why Kubernetes?
VALUE LOGIC
www.valuelogic.one

What’s Kubernetes?

- Cluster orchestration system

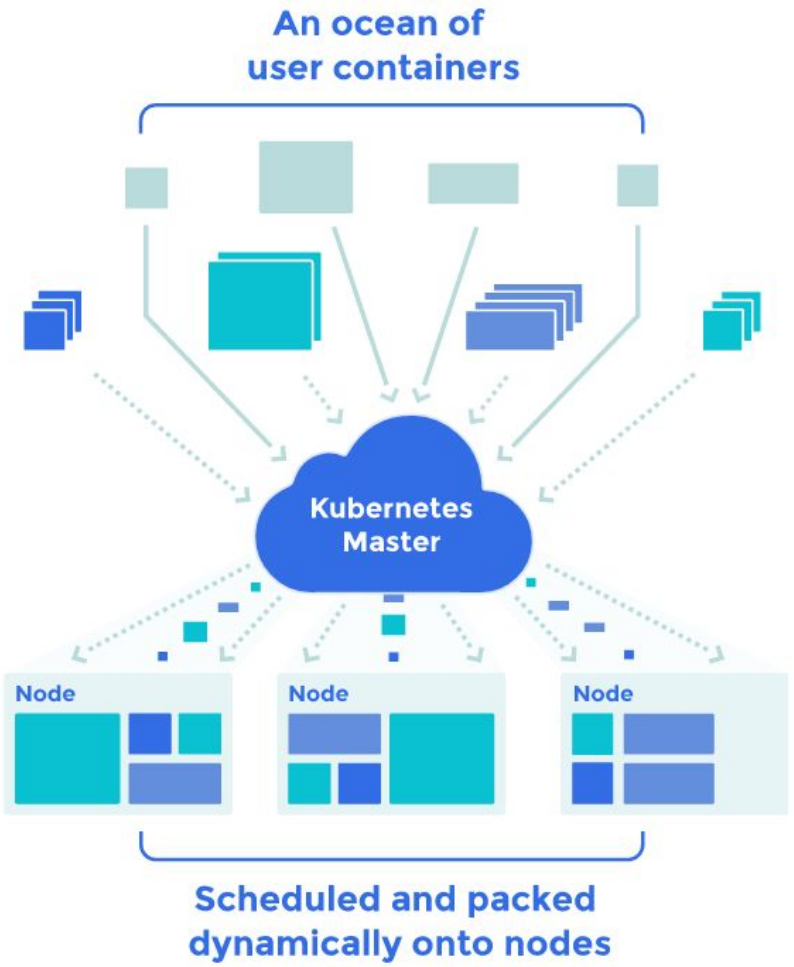
Micro-services

- Logging
- Monitoring
- Health-checks
- Continuous Delivery (automated infrastructure)
- Isolation (code, build mngt, resources)

… and more

Key features

- Deployment
- Scaling
- Load balancing
- Rolling updates
- Failure recovery
- Basic logging & monitoring



Why Kubernetes?

- Cluster orchestration system
- Cloud agnostic
- Not monolithic
- Application level
- Not all-inclusive PaaS

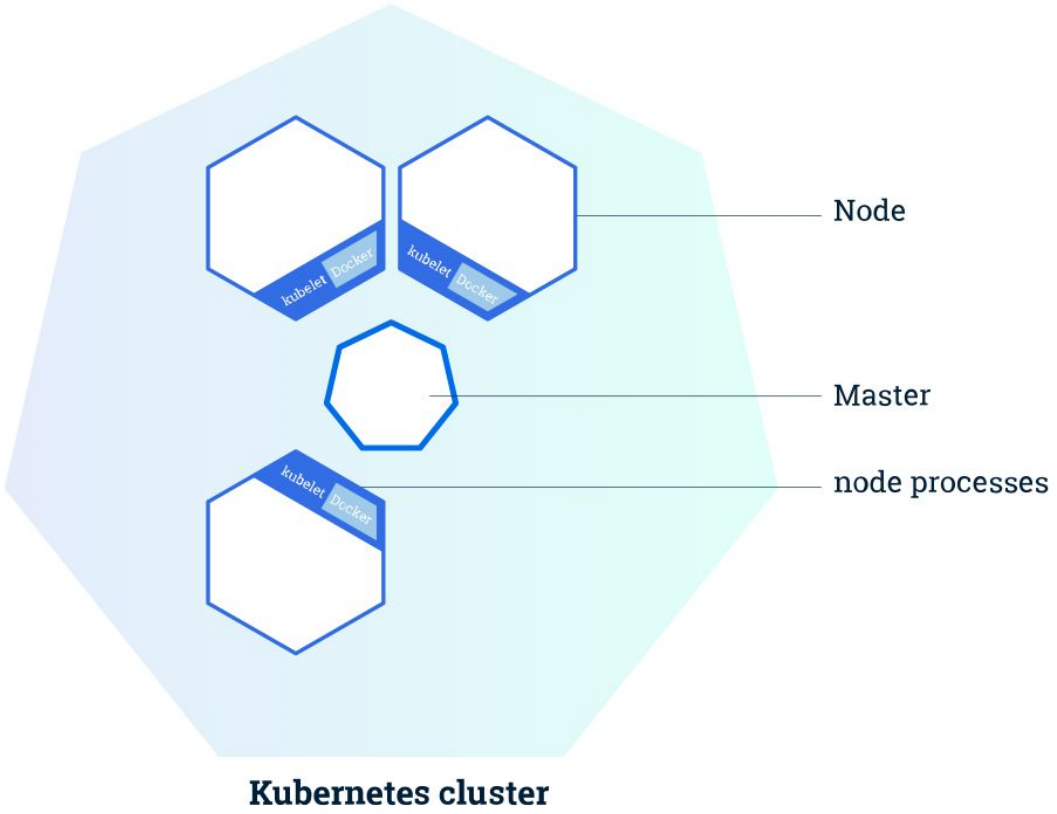
Basics

VALUE LOGIC

www.valuelogic.one

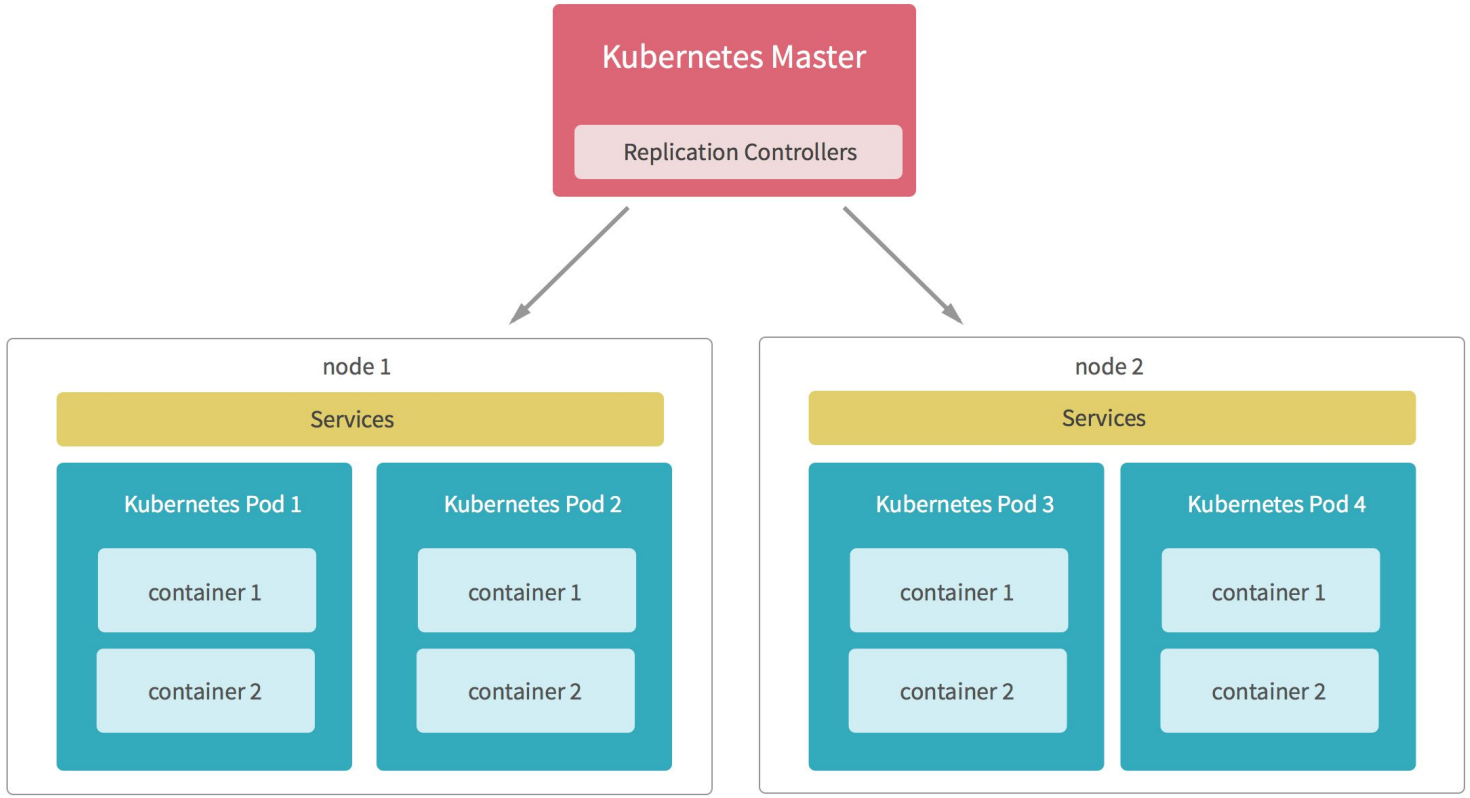
Overview

- Agent nodes = workers
- Master nodes
  - Scheduling
  - Maintaining state
  - Operations (scaling, rolling updates, etc.)
  - Minimum 3 nodes



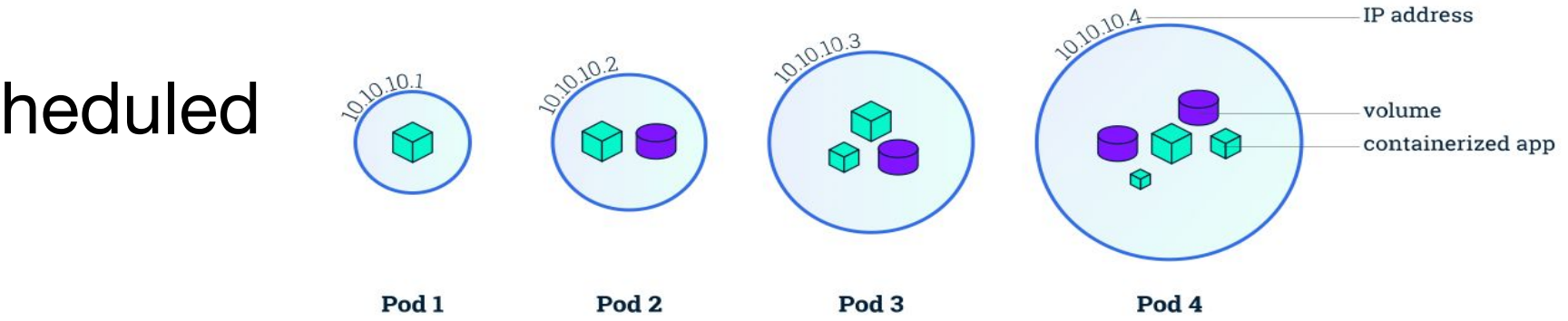
Basics

- Pod
- Deployment
- Service
- Ingress (Nginx)
- Config map
- Secrets



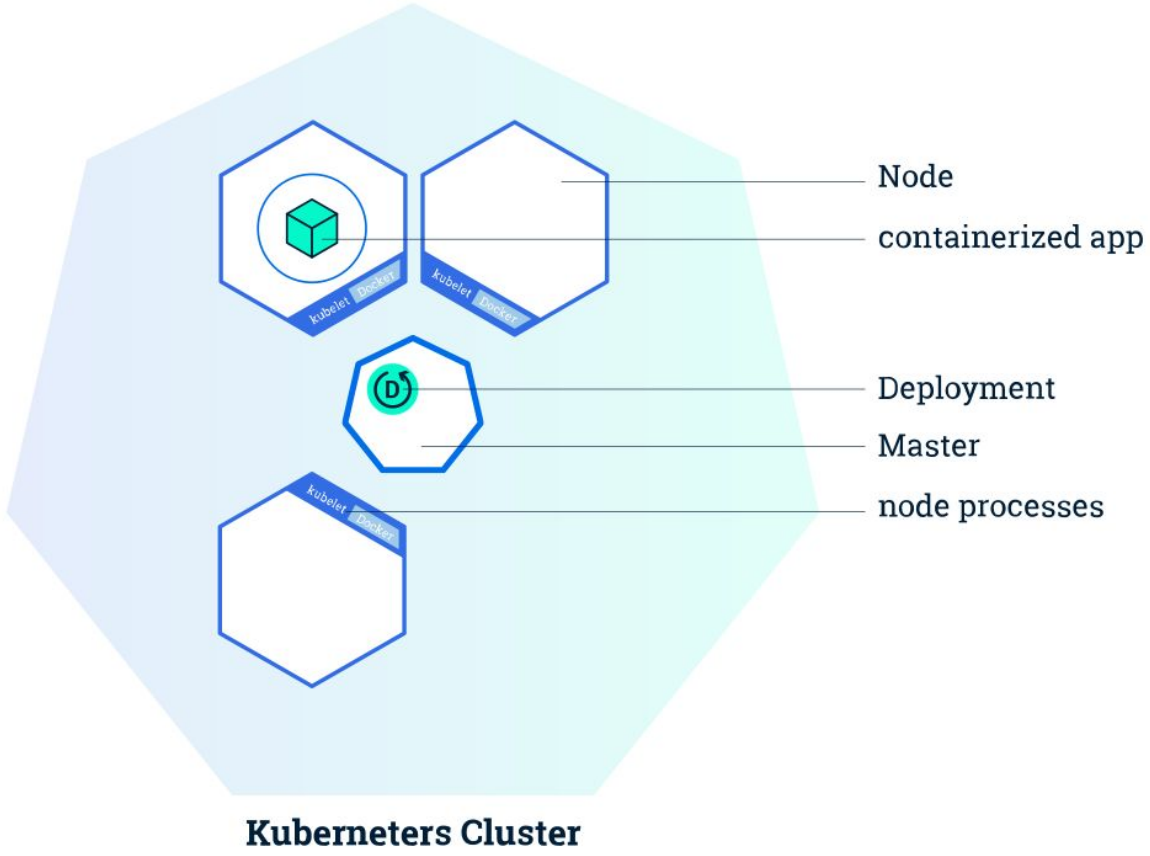
Pod

- Group of one or more contain
- Unit of deployment
- Co-located & co-scheduled
- Shared context
  - IP
  - Ports
  - Volumes



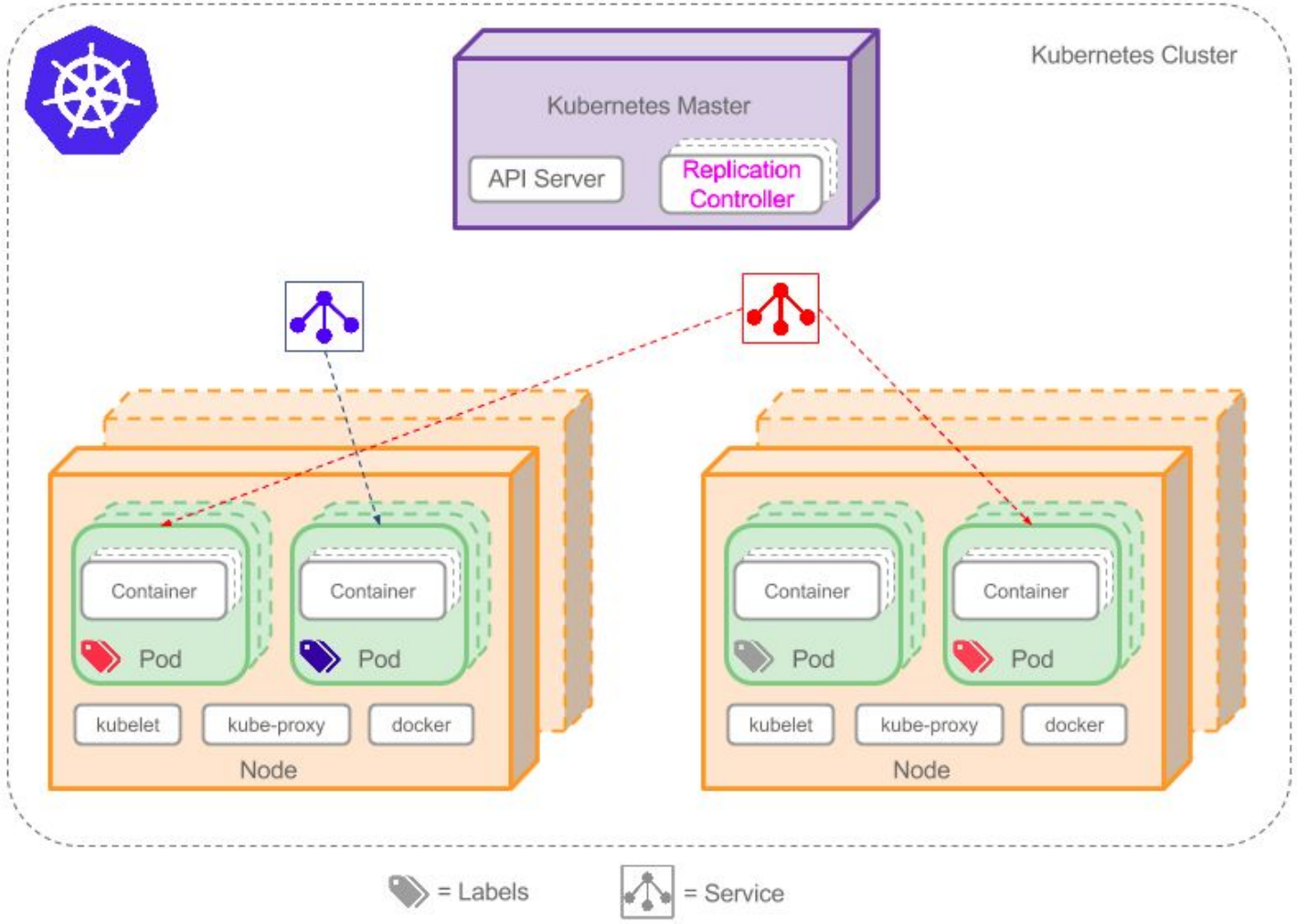
Deployment

- Describing pods & state
- Allowing:
  - Scaling
  - Failure Recovery
  - Rolling updates



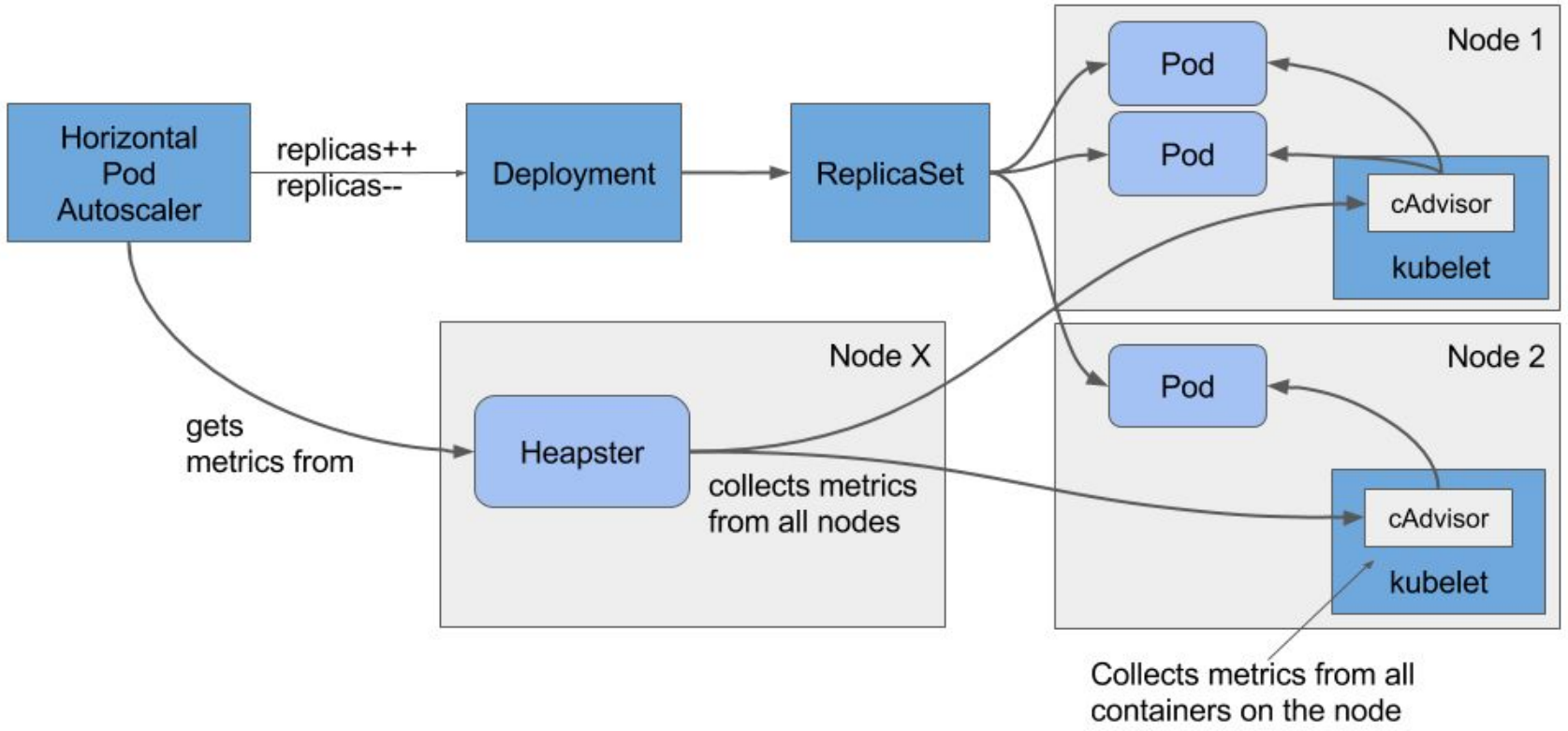
Replica sets & controllers

- Managing pods & state
- Rolling updates
- Horizontal Autoscaler
- Using health-checks



Auto scaling

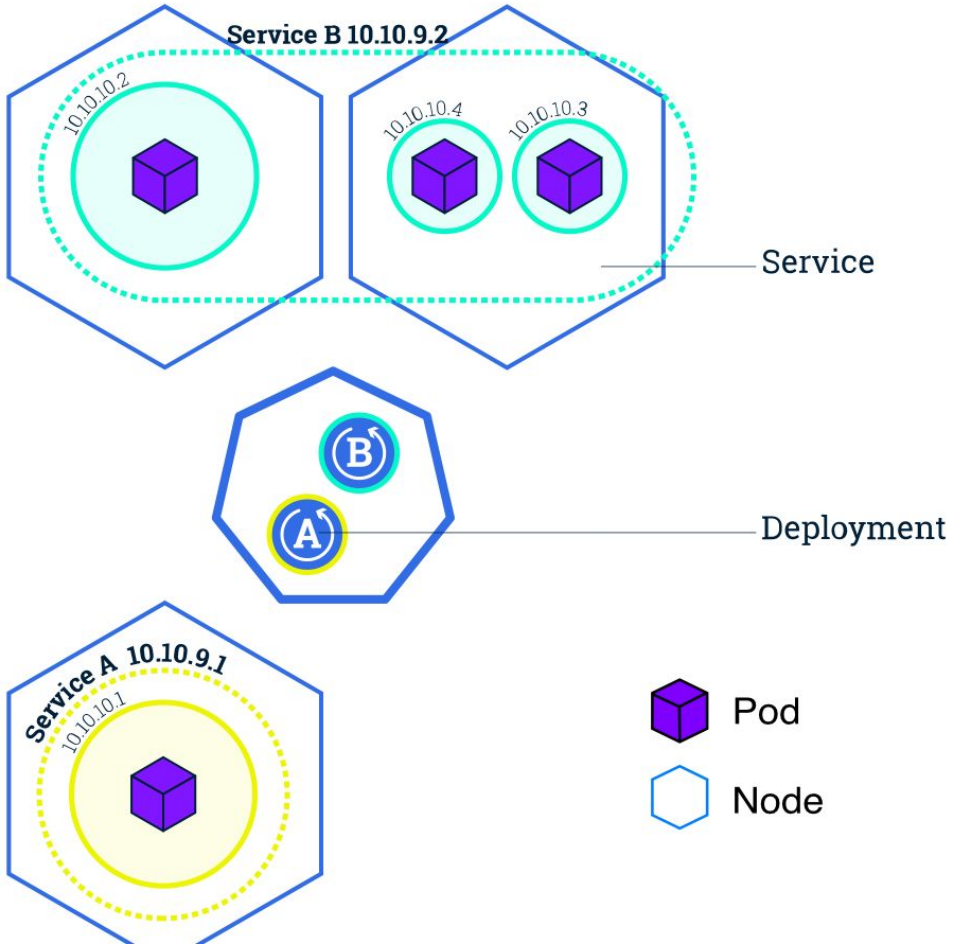
- System metrics
- Custom metrics



Services

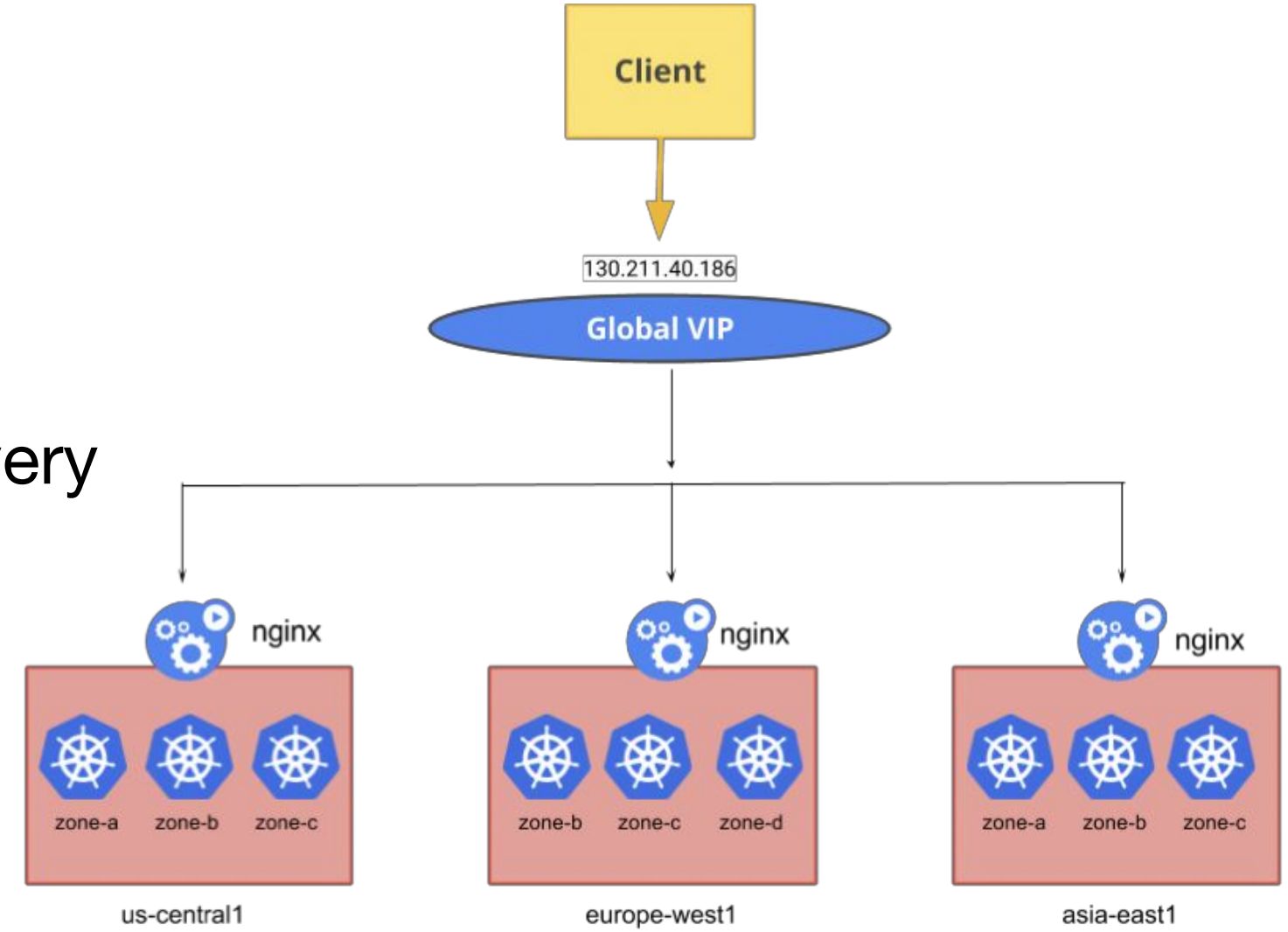
- Logical sets of pods
- Access policy
- Load balancer
- SSL possible (AWS)
- DNS
    - Reference inside cluster:

      ${service_name}.${name_space}



Ingress

- Entry point
- Cluster federation
- X-Cluster service discovery
- CDN



Config map & secrets

- Agnostic images
- Key-value
- Secrets for Sensitive info
- Auto-reload possible

```yaml
kind: ConfigMap
apiVersion: v1
metadata:
  creationTimestamp: 2016-02-18T19:14:38Z
  name: example-config
  namespace: default
data:
  # example of a simple property defined using --from-literal
  example.property.1: hello
  example.property.2: world
  # example of a complex property defined using --from-file
  example.property.file: |-
    property.1=value-1
    property.2=value-2
    property.3=value-3
```


DevOps
VALUE LOGIC
www.valuelogic.one

DevOps

- Idempotence
- Similar configs for all environments = easy verification
- Huge simplification & unification
- Standardization
- Scripts to minimum (bash,Ansible,Chef)
  - Deploy new version of image
  - Change service description (number of pods etc.)
- Easier local development


Going into the cloud
VALUE LOGIC
www.valuelogic.one

GCP

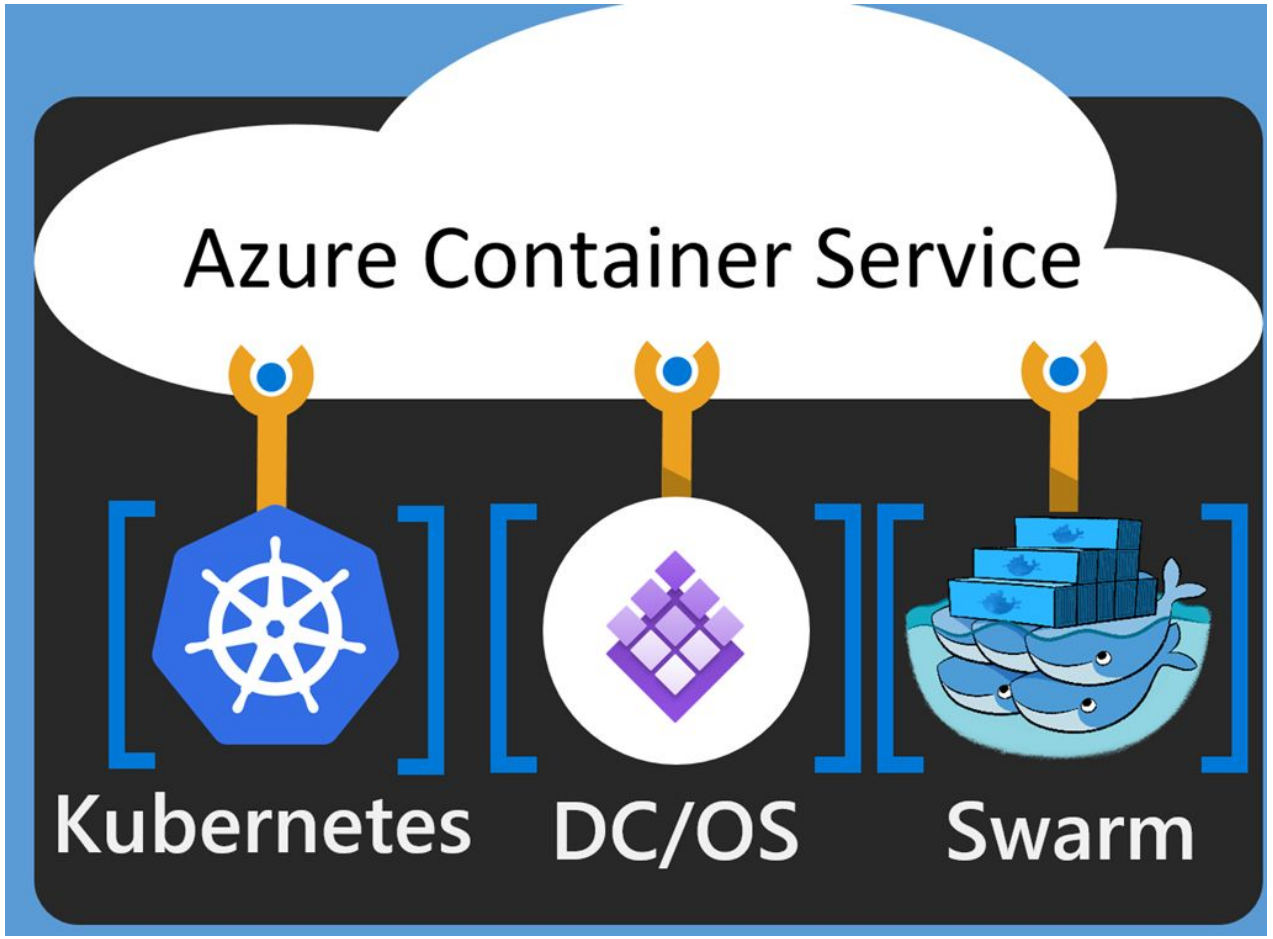
- The easiest way to learn
- Transparent updates
- No master costs
- Autoscaling

Google Cloud Platform

$gcloud container clusters create <name>

Azure

- ACS
- No autoscaling yet
- Azure Resource Manager



$az acs create
-g <MyResourceGroup>
-n <MyContainerService>
--orchestrator-type kubernetes
--generate-ssh-keys

AWS

- K8s != ECS
- Create using **Kops**
  - Automates provisioning
  - Support upgrades
- Autoscaling (plugin)

Going PRO

- Kubernetes Anywhere
  - GCP
  - Azure
  - vSphere
- Kubernetes The Hard Way
  - From scratch


When to use it?
VALUE LOGIC
www.valuelogic.one

- Many micro-services
- High resource utilization
- Multiple teams & projects
- Standard & easy DevOps
- Independence from cloud provider

Questions?

Michal Wronski

https://twitter.com/mich_wronski

Wroclaw, 13.07.2017

References

- Images related to Kubernetes:

  https://kubernetes.io/docs/tutorials/kubernetes-basics/

- Repository with sample service:

  https://github.com/valuelogic/kubernetes-sample