KUBERNETES

Kubernetes is a portable, extensible, open source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation.[1]

INTRO TO K8S

- Open source **Container Orchestration Tool**
- Developed by Google
- Released 2014
- Manage containerized applications in different deployment environments
- Runs under Apache License 2.0
- Maintained by Cloud Native Computing Foundation (CNCF)

CONTAINER ORCHESTRATION

- Task Automation and management
- Resource allocation
- Scaling and removing containers
- Load balancing and traffic routing
- Monitoring container health

KUBERNETES FEATURES

- Horizontal Scalability
- Runs anywhere
- Zero downtime deployment
- Self Healing
- Load balancing
- Automated Rollouts

WORKER NODE COMPONENTS

- (Worker) Node
- Pod
- Ingress
- Service
- Deployment
- Statefulset
- Configmap
- Secret
- Volume

WORKER NODE INFRASTRUCTURE

Kubelet

- Manage nodes and containers
- Restarts failed containers with clean state and based on desired state stored in etcd

Kube-Proxy

- Network proxy
- Establish cluster network rules for internal and external communication between and to pods

Container Runtime

- Runs containers
- Integ. of external container runtimes possible
- Containerd

MASTER NODE COMPONENTS

Etcd

- Primary data storage

Kube-Scheduler

- Find best node for a pod
- Assign a new node to pod

Kube-Api-Server

- Heart of Kubernetes
- User interaction with cluster

Controller Manager

- Specifies pods according to deployment

NETWORKING

Internal

- Networking through services

External

- External services or Ingress

K8S SECURITY ASPECTS

Build-in Security

- Enable security measures on 3 levels: infrastructure, K8s platform and apps

Image scanning

- Scan container images for CVEs

Control Access

- Kubernetes components

Comunication Encryption

- Comunication between pods is unencrypted

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Paul Renkel & Dorothee Schilling & Laura Baus

[1] and other Resources: https://github.com/sebivenlo/esde_kubernetes_2022/blob/main/Resources.md