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Openshift Installation und Administration

Openshift bei Heinlein

- Openshift Origin 3 (OKD)
- OKD 4
- RHOSCP – Openshift 4 (4.13)
- 4 Cluster

Tag 1

Einführung

Cluster Konzeption und Anforderungen

Installation

CLI und Console

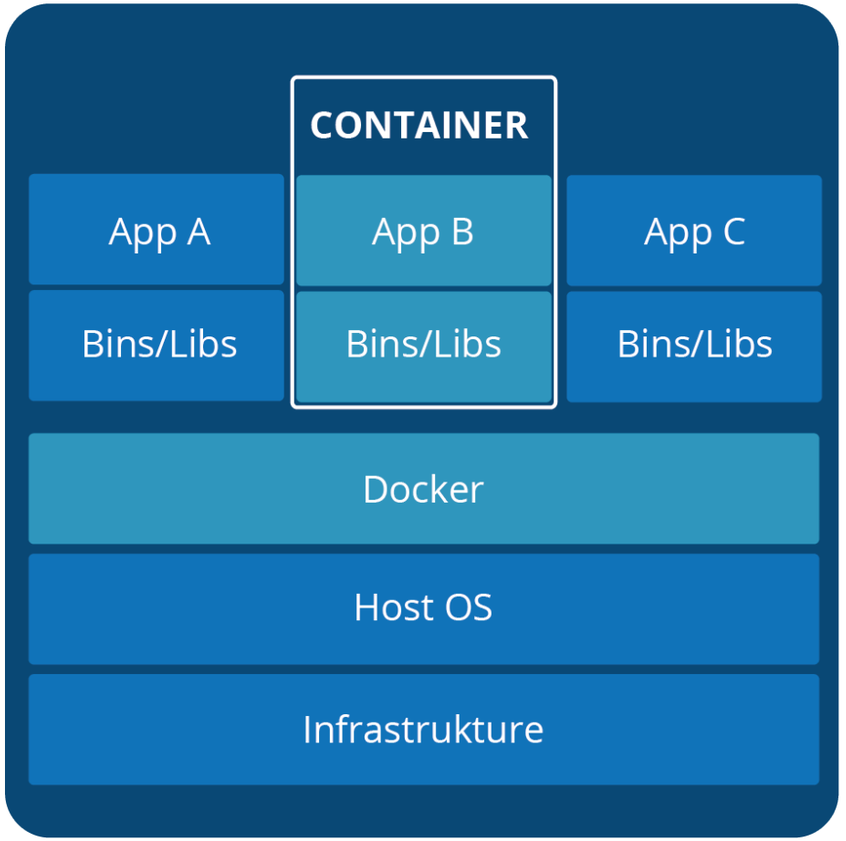
Cluster Updates

Eine kurze Geschichte der Container

- 1982 chroot
- 2000 FreeBSD Jails
- 2007 Linux Kernel cgroups
- 2008 Linux Containers LXC
- 2013 Docker
- 2018 Podman / Containerd

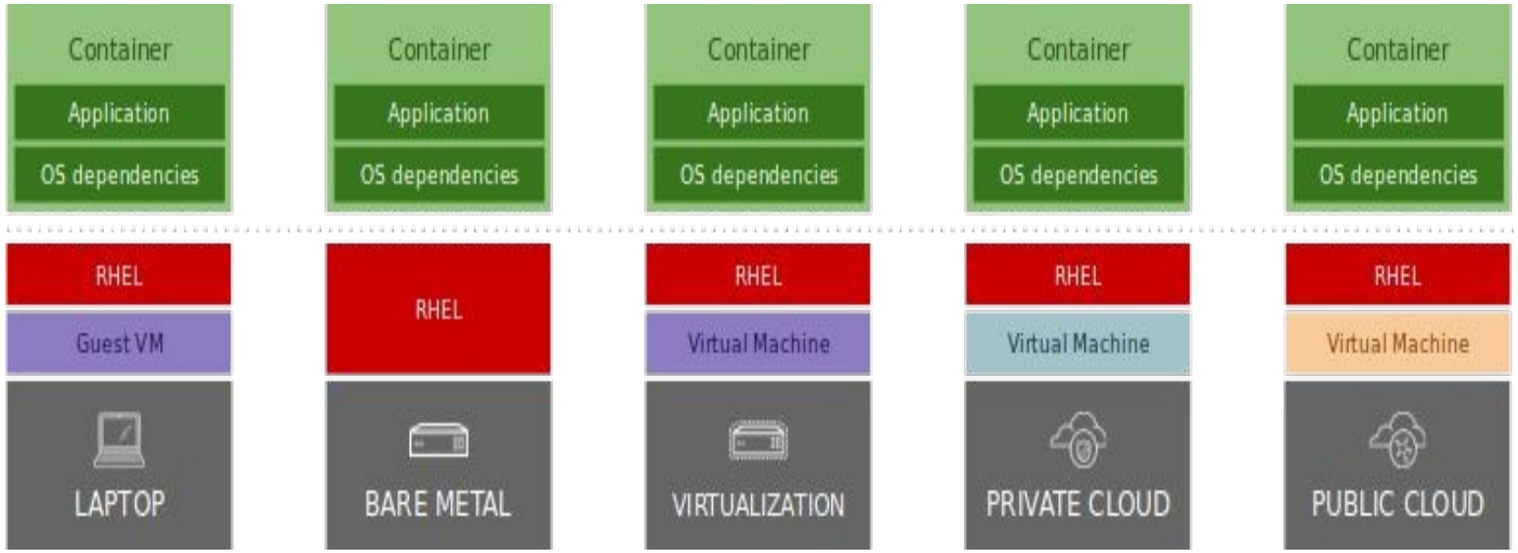
Was ist ein Container?

- Container Image
- **ein** Prozess
- cgroup Isolation
- bestimmter User



Und warum Container?

- Portabilität
- Isolation
- Skalierbarkeit
- schnelles Deployment
- Konsistenz
- Deklarativ
- DevOps



Container Orchestrierung

Automatisierung und Verwaltung von:

- Provisionierung und Deployment
- Konfiguration und Planung
- Ressourcenzuweisung
- Container-Verfügbarkeit
- Skalieren von Containern
- Load Balancing und Traffic Routing
- Überwachen des Containerzustands
- Sichern von Interaktionen zwischen Containern

Openshift - Kubernetes plus

- Routing
- Monitoring
- Logging
- Web Console (GUI)
- Image Builds
- Image Registry
- Built-in security
- Networking

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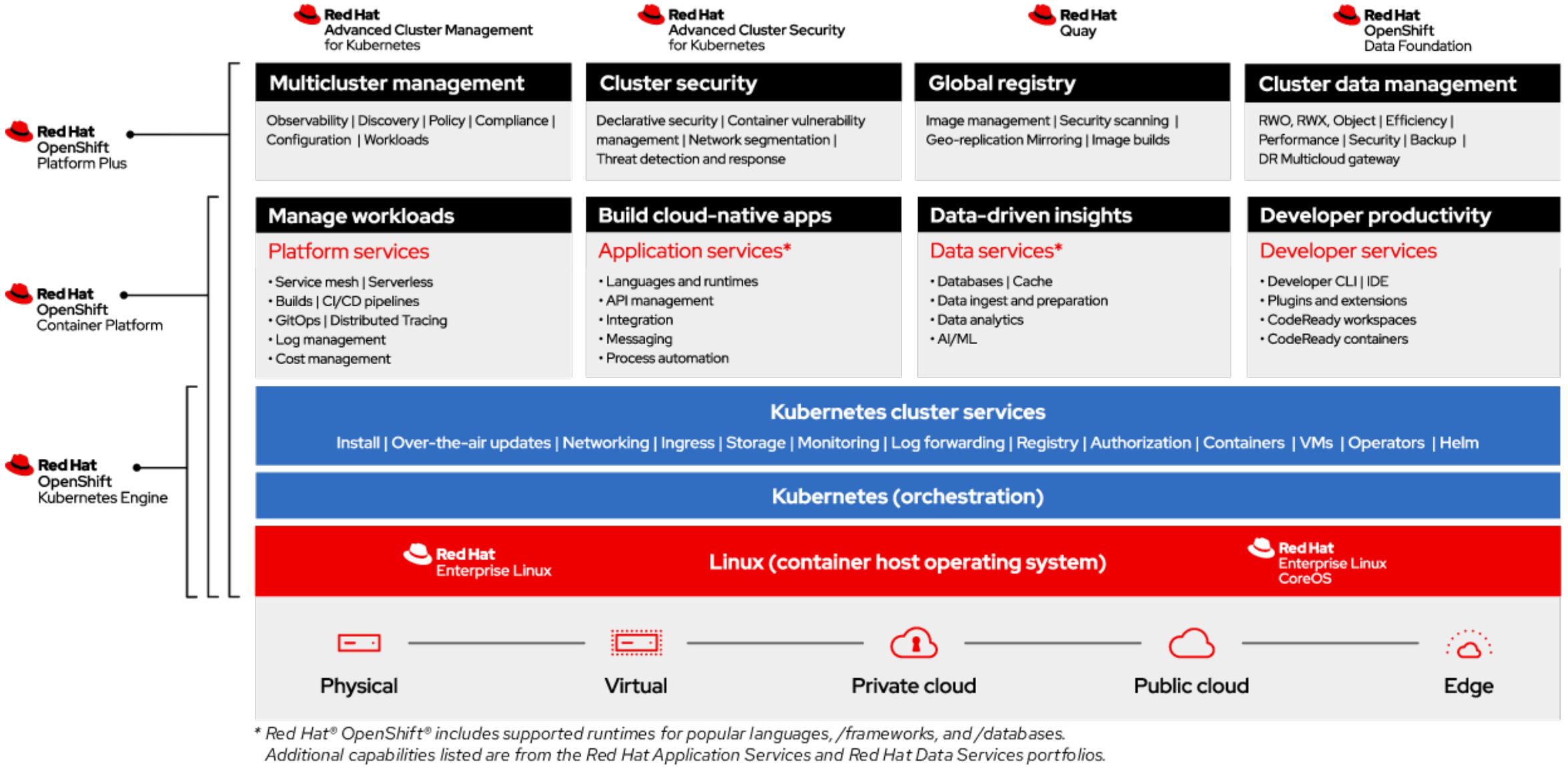


** Red Hat® OpenShift® includes supported runtimes for popular languages, /frameworks, and /databases.*
Additional capabilities listed are from the Red Hat Application Services and Red Hat Data Services portfolios.

Konzeption

Node Roles

Controlplane Nodes

- Kubernetes API
- Controller
- etcd
- Kubernetes Scheduler
- Openshift OAuth

Worker Nodes

- Compute Nodes
- User Workload
- Ingress Controller ?

Infra Nodes (optional)

- extra Label
- nicht in Subscriptions
- Cluster-Monitoring, Router, Registry

Number of worker nodes	Cluster-density (namespaces)	CPU cores	Memory (GB)
24	500	4	16
120	1000	8	32
252	4000	16, but 24 if using the OVN-Kubernetes network plug-in	64, but 128 if using the OVN-Kubernetes network plug-in
501, but untested with the OVN-Kubernetes network plug-in	4000	16	96

Empfohlene Anforderungen

Bootstrap Node:

- 4 vCPU
- 16 GB Memory
- 120 GB Storage

Master Nodes:

- 3 Nodes
- 4 vCPU
- 16 GB Memory
- 120 GB Storage

Worker Nodes:

- mind. 2 Nodes
- 4 vCPU
- 16 GB Memory
- 120 GB Storage

Und wirklich?

- erwarteter Workload / Anforderung der Applikationen
- Hochverfügbarkeit
- automatische Skalierung
- Cluster Updates
- Capacity Reserven

Installation

IPI Installation

- Maschinen werden vom Installer erstellt und gestartet

- Infrastruktur Automatisierung

- Vorbereitung → Doku!

- Automatiken aus dem Cluster über entsprechende API (Storage, Scaling, Health Checks etc)

UPI Installation

- manuelles Provisionieren aller Komponenten

- Installer generiert Ignition-Configs

- Nodes mit CoreOs Image starten

Installation Type

Interactive

- Assisted Installer
- Webbasiert
- connected

Automated

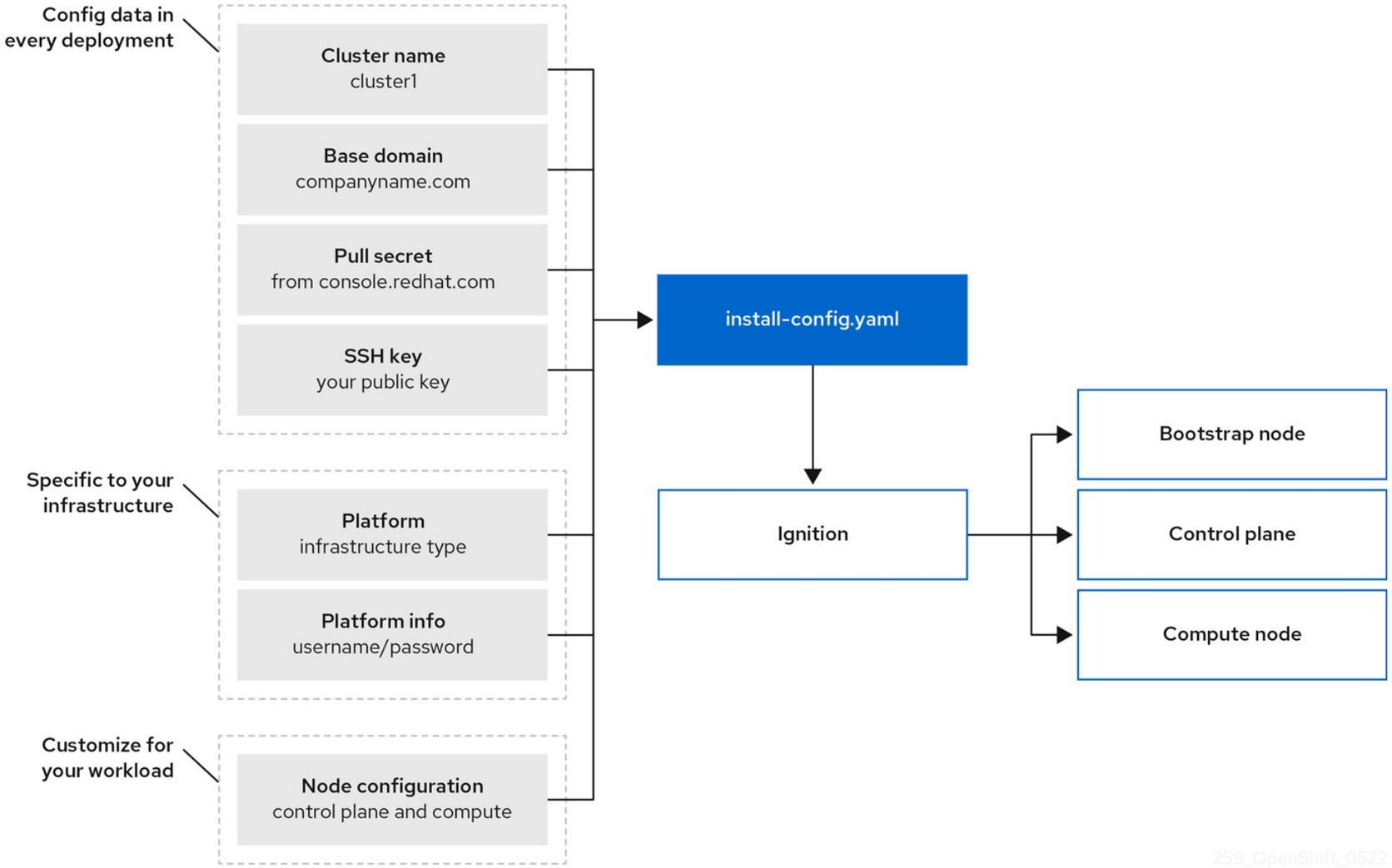
- Installer provisioned
- connected und disconnected Umgebungen

Local Agent-based

- Agent-based Installer
- ISO
- ideal für disconnected Umgebungen

Full Control

- User provisioned
- maximale Konfigurierbarkeit


Config data in every deployment
Cluster name
cluster1
Base domain
companyname.com
Pull secret
from console.redhat.com
SSH key
your public key
Specific to your infrastructure
Platform
infrastructure type
Platform info
username/password
Customize for your workload
Node configuration
control plane and compute
install-config.yaml
Ignition
Bootstrap node
Control plane
Compute node

```yaml
apiVersion: v1
baseDomain: example.com (1)
compute: (2)
  name: worker
  replicas: 3
  platform:
    vsphere: (3)
      cpus: 2
      coresPerSocket: 2
      memoryMB: 8192
      osDisk:
        diskSizeGB: 120
controlPlane: (2)
  name: master
  replicas: 3
  platform:
    vsphere: (3)
      cpus: 4
      coresPerSocket: 2
      memoryMB: 16384
      osDisk:
        diskSizeGB: 120
metadata:
  name: cluster (4)
platform:
  vsphere:
    vcenter: your.vcenter.server
    username: username
    password: password
    datacenter: datacenter
    defaultDatastore: datastore
    folder: folder
    resourcePool: resource_pool (5)
    diskType: thin (6)
    network: VM_Network
    cluster: vsphere_cluster_name (7)
    apiVIPs:
      - api_vip
    ingressVIPs:
      - ingress_vip
fips: false
pullSecret: '{"auths": ...}'
sshKey: 'ssh-ed25519 AAAA...'
```

Installer Commands

- openshift-install create cluster
- openshift-install create install-config
- openshift-install create manifests
- openshift-install create ignition-configs
- openshift-install wait-for bootstrap-complete
- openshift-install wait-for install-complete
- openshift-install destroy bootstrap
- openshift-install destroy cluster

Pitfalls

- Installation muss innerhalb von 24 Stunden nach Generierung der Ignition Configs erfolgen
- Der Cluster darf die ersten 24 Stunden nicht ausgeschaltet werden
- Installationskonfiguration wird vom Installer geschluckt
- zu kleine IP Range für Node Networks (hostPrefix)

Übung

- Cluster Installation

Doku: https://docs.openshift.com/container-platform/4.13

Web Console

CLI

Update

Update Channels

- stable
- fast
- candidate

Update Graph

Channel * fast-4.14

Architecture * x86_64

Include hotfix versions

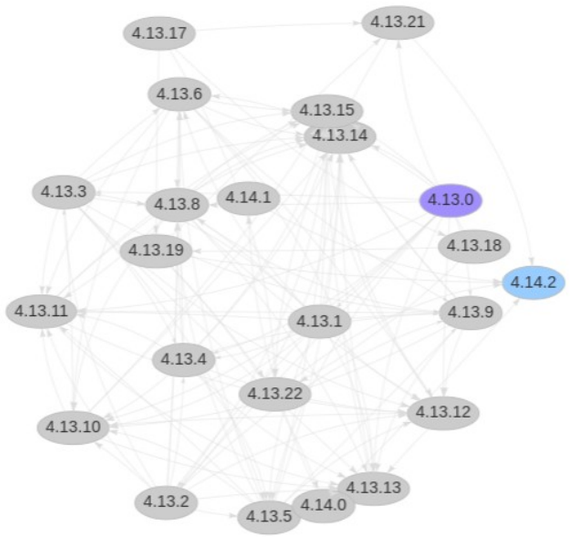
Note

Your cluster will warn you of any matched known issues.

fast-4.14

Legend

- Lowest version in the channel
- Highest version in the channel



Übung

- Cluster Update

Doku: https://docs.openshift.com/container-platform/4.13

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Operatoren

Cluster Operatoren

- apiserver-operator
- etcd-operator
- network-operator
- machine-config-operator

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User Operatoren