A Container for your Code

Overview of some tools

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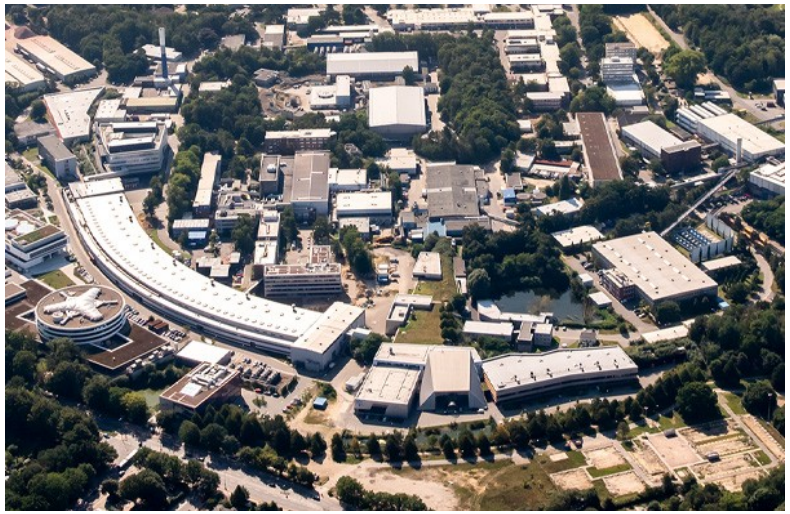
HELMHOLTZ

DESY.

About us

Holger Hees

- More than 25 years of experience in the IT environment
- Fullstack, Mobile Developer & Unix Administrator
- 15 years Freelancer & 10 years employee
  (Developer & Lead Architect)
- Since Oktober 2021 in DESY Zeuthen



Jan-Philipp Bolle

- More than 25 years of experience in software development
- System administration for several years
- Since August 2018 in DESY Zeuthen

Agenda

01 Container

- Basics and difference to the Virtual Machine
- Benefits of containerization

02 Batch vs Service

- Singularity | Apptainer
- Docker | Podman

03 Service hosting

- Single node workflow
- HA Kubernetes
- Kubernetes workflow

04

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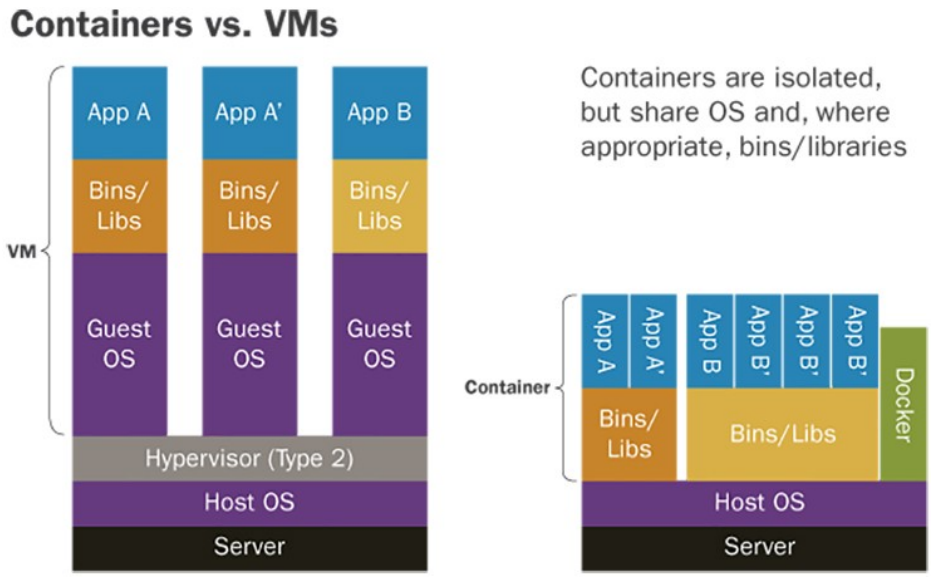
Container

Basics and difference to the Virtual Machine

- **Portables Environment**
- **Contains everything an application needs (binaries, dependencies & configurations)**
- **No full virtualization of the hardware**
- **Instead, abstraction to the underlying operating system**
- **This results in more efficient virtualization**
- **Can run in parallel and are only limited by the host's resources**



Container

Benefits of containerization

- **Portability**
- **Efficient**
- **Agility & Faster Delivery**
- **Increased security**
- **Fast startup**
- **Easier maintainability**
- **Flexibility**

Batch vs Service

Singularity | Apptainer

- Requirements for batch processing
  - Parallel file system for all Node
  - Container Image shouldn't need to be loaded remotely from one place
- Singularity in DESY
  - https://dvinfo.zeuthen.desy.de/Singularity
  - contact person: Goetz Waschk

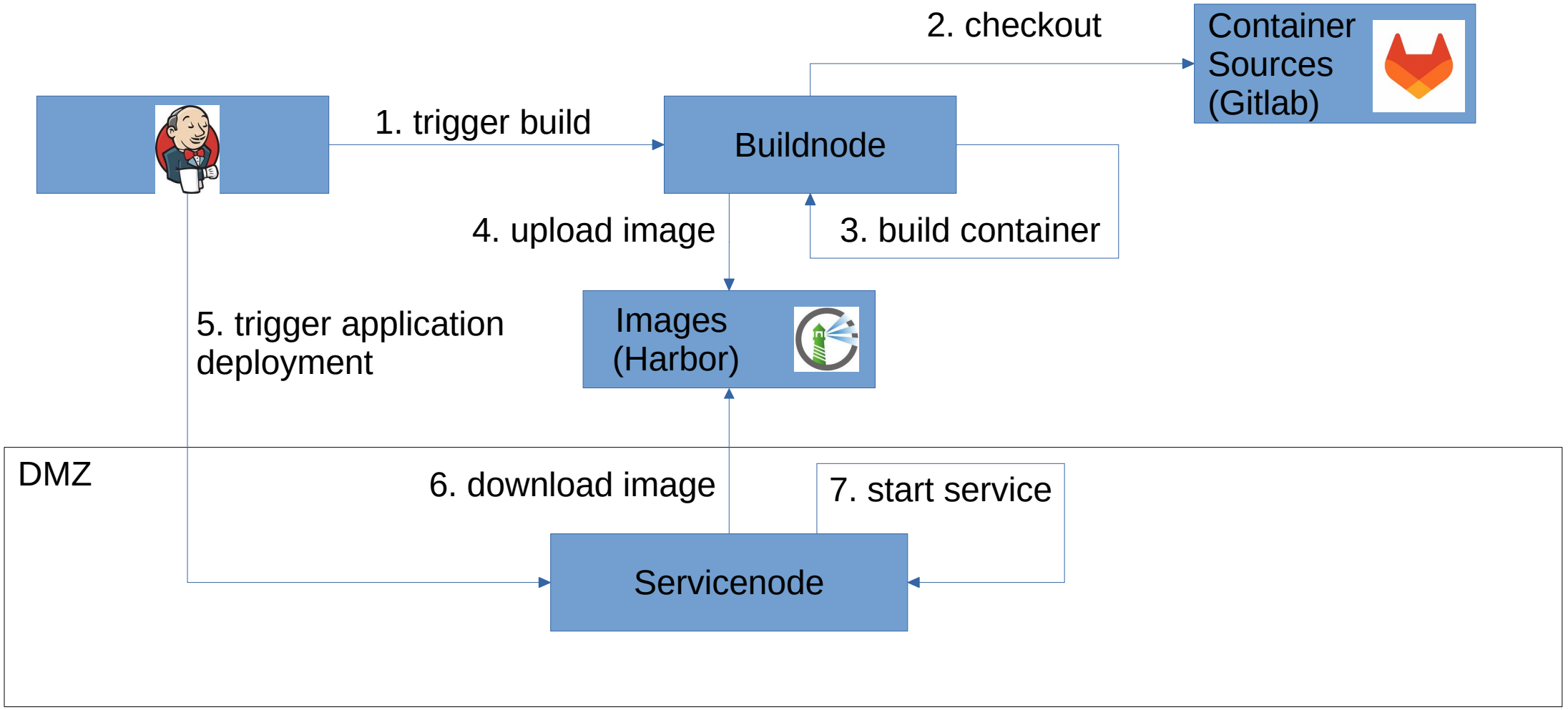
Batch vs Service

Docker | Podman

- Requirements for service environments
  - Leverage open standards and tools (OCI)
  - Available in all major distributions e.g. Red Hat or SuSE distributions
  - Usage of standardized or custom images (DockerHub,quay,..)
  - Container registry in DESY
    - Harbor
    - GitLab Container Registry
  - Exchange image across DMZ borders

Service Hosting

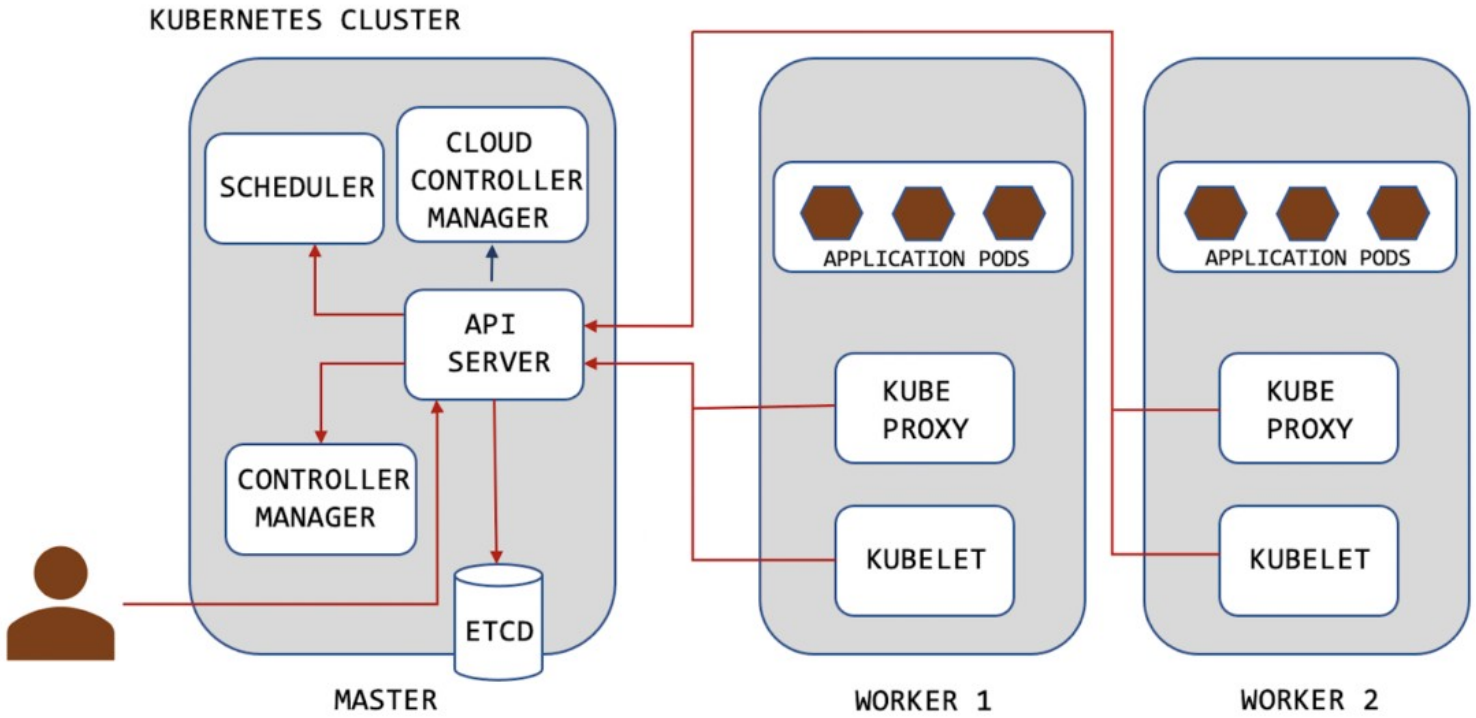
Singenode workflow - Example RNO-G



Service Hosting

HA Kubernetes

- Similar focus as Docker on microservices
- Gets the container images from a central repository
- Orchestrates the distributed lifecycle of containers (workers) across host or node boundaries



Service Hosting

Kubernetes workflow