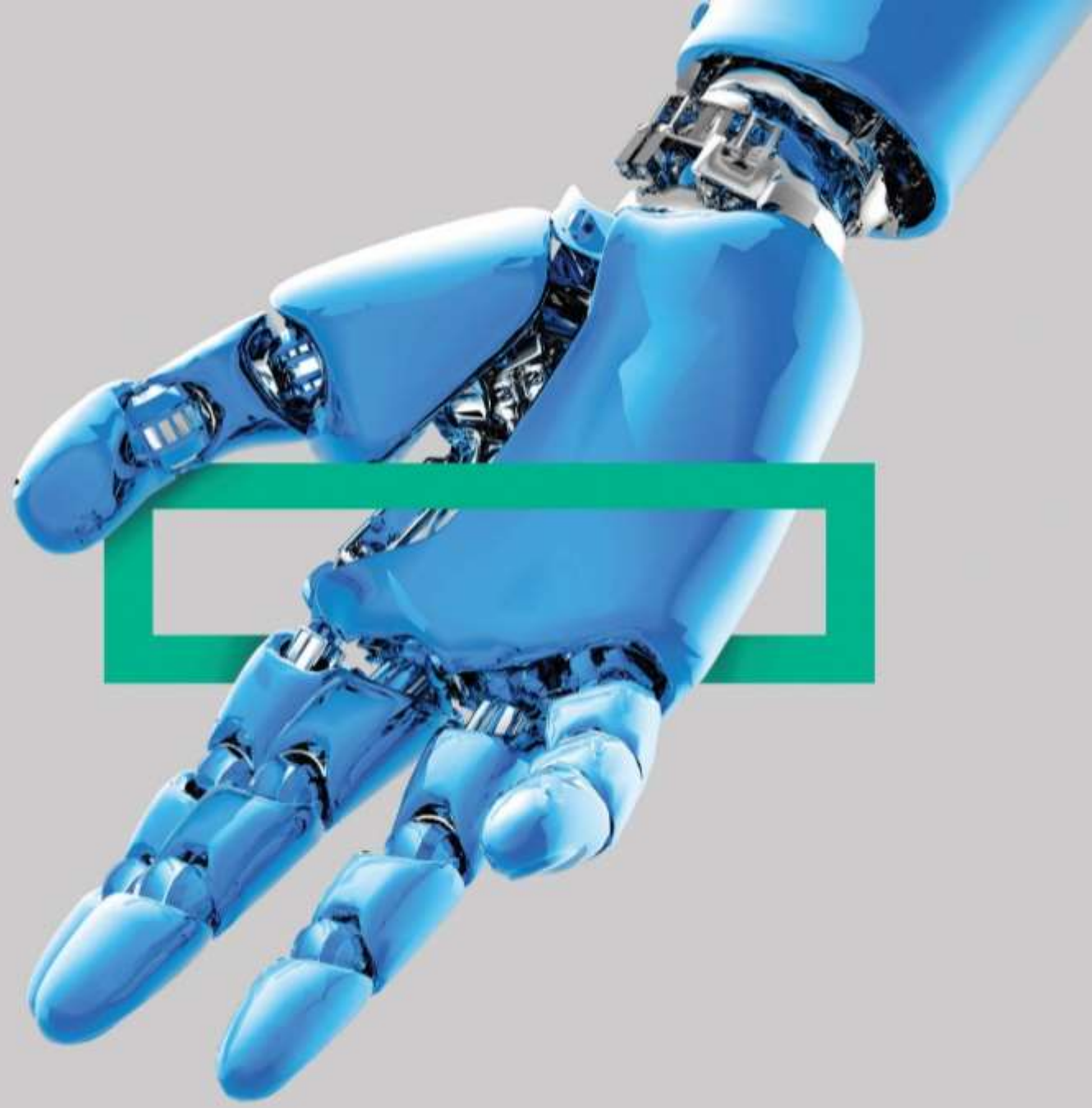
Hewlett Packard Enterprise



Die Basics von Containern

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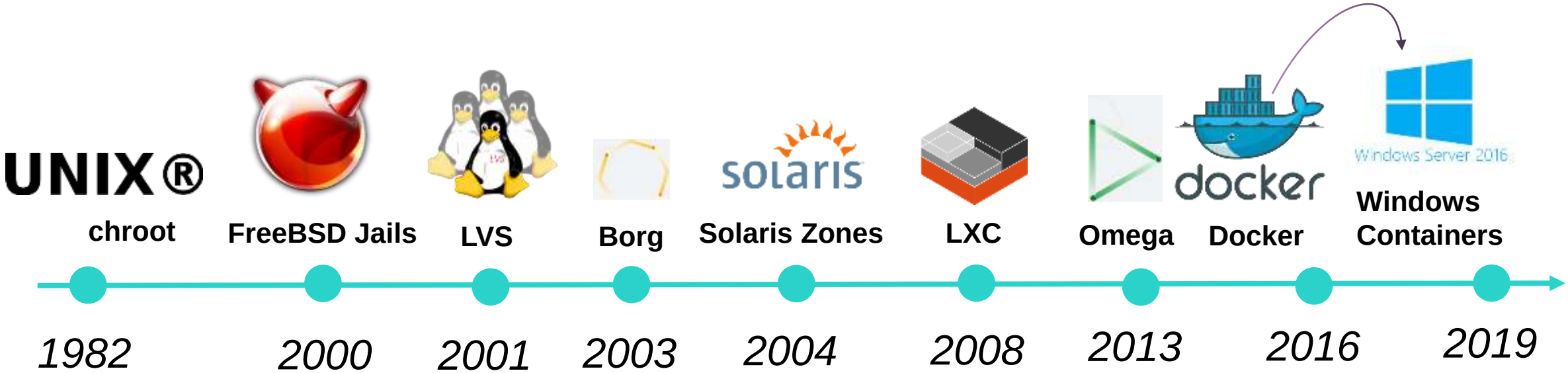
Software Defined Transformation Architect
Hewlett Packard Enterprise

22. Februar 2019

Einführung Container

Container history



OPENSHIFT

OPEN CONTAINER INITIATIVE

kubernetes

rkt

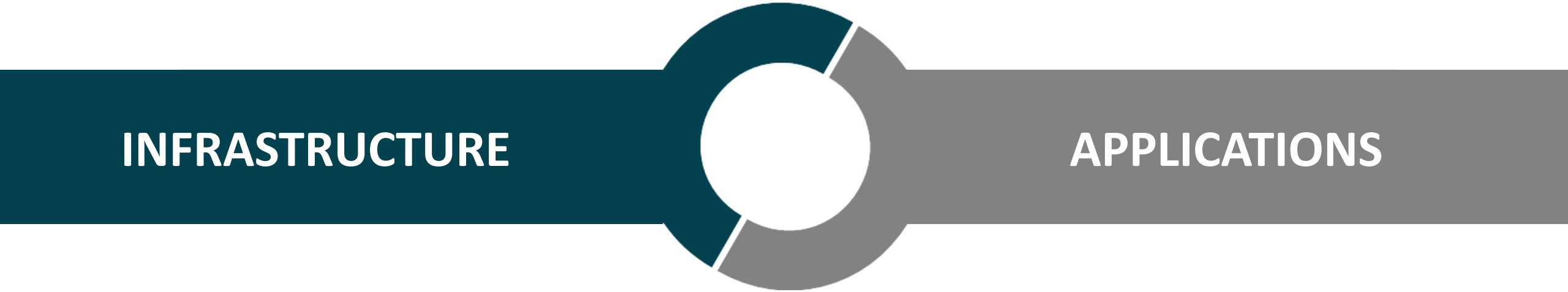
cri-o

containerd

katacontainers

Source: Wikipedia & History of K8S

WHAT ARE CONTAINERS?
It Depends Who You Ask

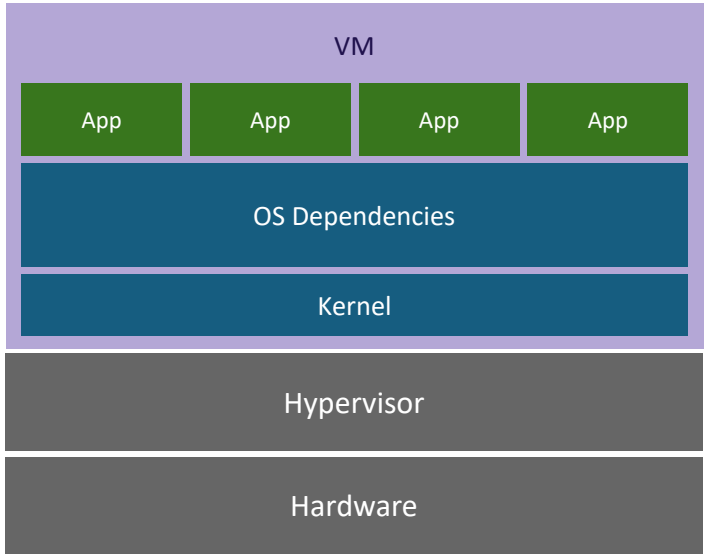


- Application processes on a shared kernel
- Simpler, lighter, and denser than VMs
- Portable across different environments

- Package apps with all dependencies
- Deploy to any environment in seconds
- Easily accessed and shared

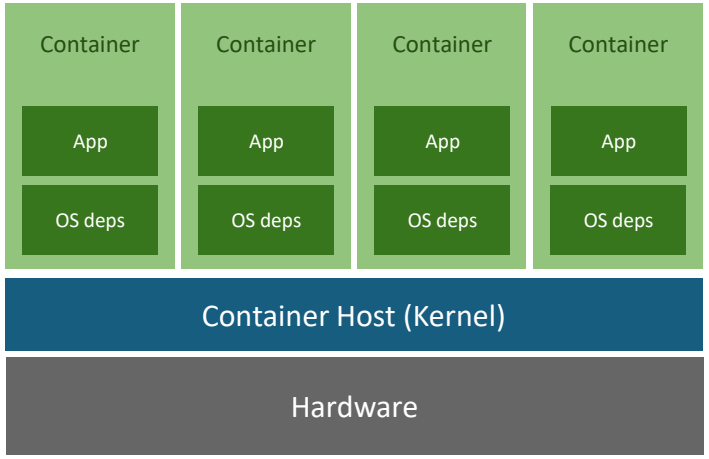
VIRTUAL MACHINES AND CONTAINERS

VIRTUAL MACHINES



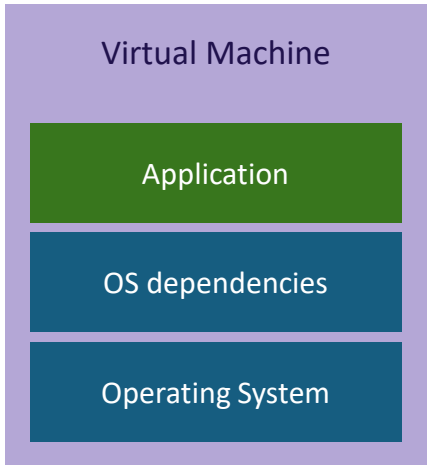
VM isolates the hardware

CONTAINERS

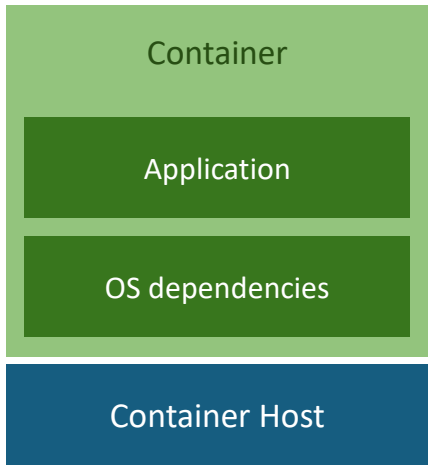


Container **isolates the process**

VIRTUAL MACHINES AND CONTAINERS



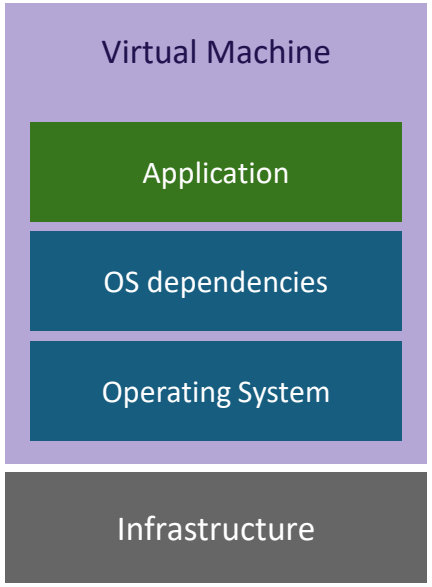
- ✚ VM Isolation
- ▬ Complete OS
- ▬ Static Compute
- ▬ Static Memory
- ▬ High Resource Usage



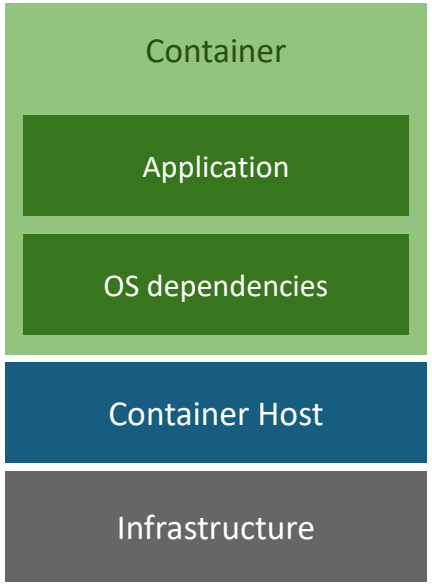
- ✚ Container Isolation
- ✚ Shared Kernel
- ✚ Burstable Compute
- ✚ Burstable Memory
- ✚ Low Resource Usage

VIRTUAL MACHINES AND CONTAINERS

IT Ops
(and Dev, sort of)



Clear ownership boundary between Dev and IT Ops drives DevOps adoption and fosters agility



Dev

IT Ops

Optimized for stability

Optimized for agility

The Basics - Glossary

Docker Basics

Docker Image

The basis of a Docker container

Docker Container

The standard unit in which the application service resides

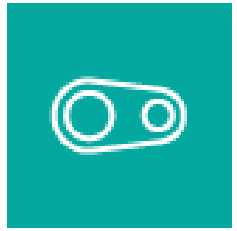
Docker Engine

Creates, ships and runs Docker containers deployable on physical or virtual host locally, in a datacenter or cloud service provider

Docker Trusted Registry / Docker Hub

For image storing and secure collaboration

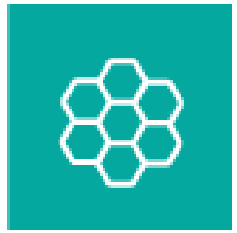
Docker Basics



Machine

Provisions Docker installed infrastructure onto servers and VPCs

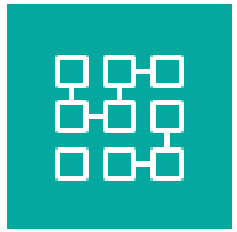
Has Drivers to integrate with infrastructure partners



Swarm & Kubernetes Manager

A powerful, scalable clustering solution for Docker engines

Tool can leverage all existing Docker APIs

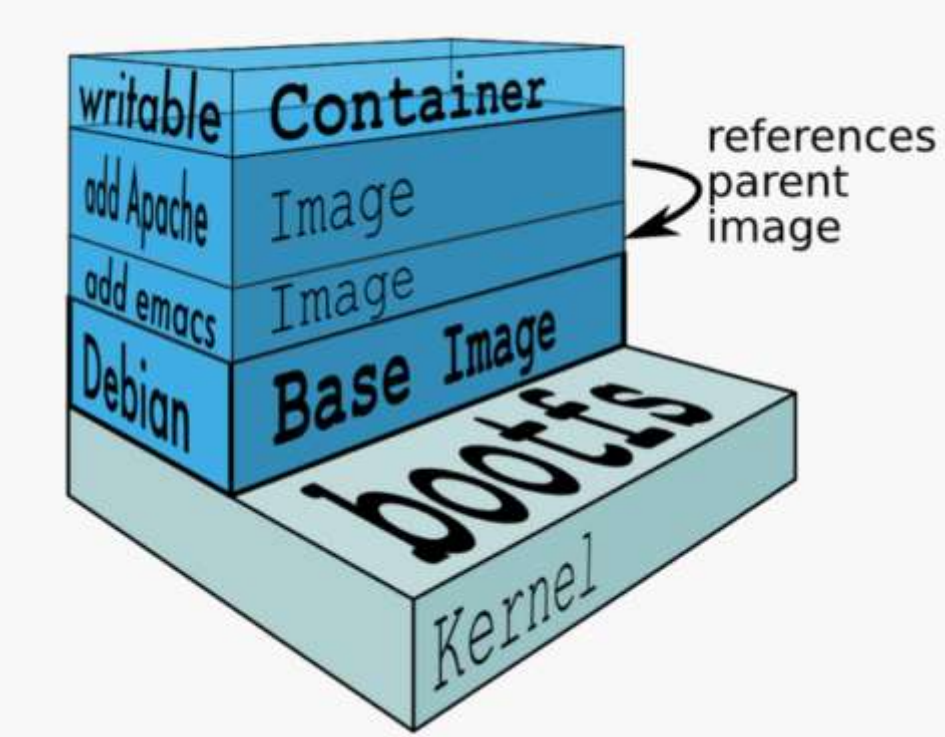


Docker Compose & Kubernetes YAML

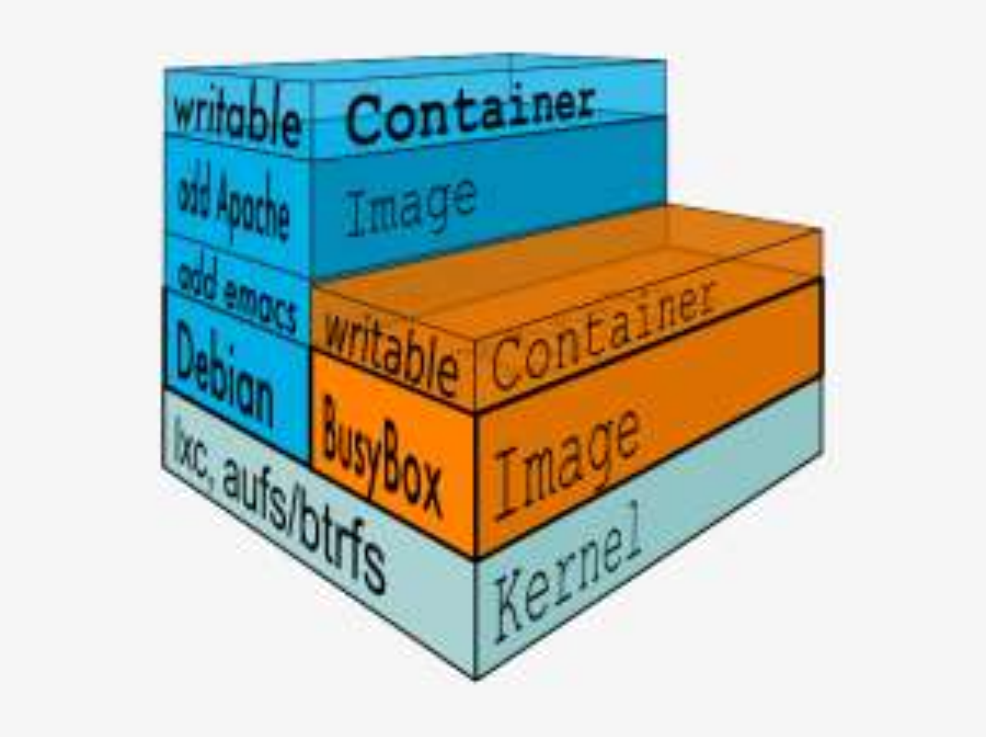
Allows users to deploy multi-container applications into any Dockerized environment.

Docker provides ultra agility using Image layers

1st Container



2nd Container



Container Solutions

Docker Enterprise Edition

Turnkey container as a service with Linux or/and Windows workers and built-in kubernetes & swarm orchestrators

- **Community Edition**
- **Enterprise Edition**

Red Hat OpenShift

Complete container platform as a service with self-service portal and App build & deploy automation

- **Openshift Origin (OKD)**
- **Openshift Container Platform**

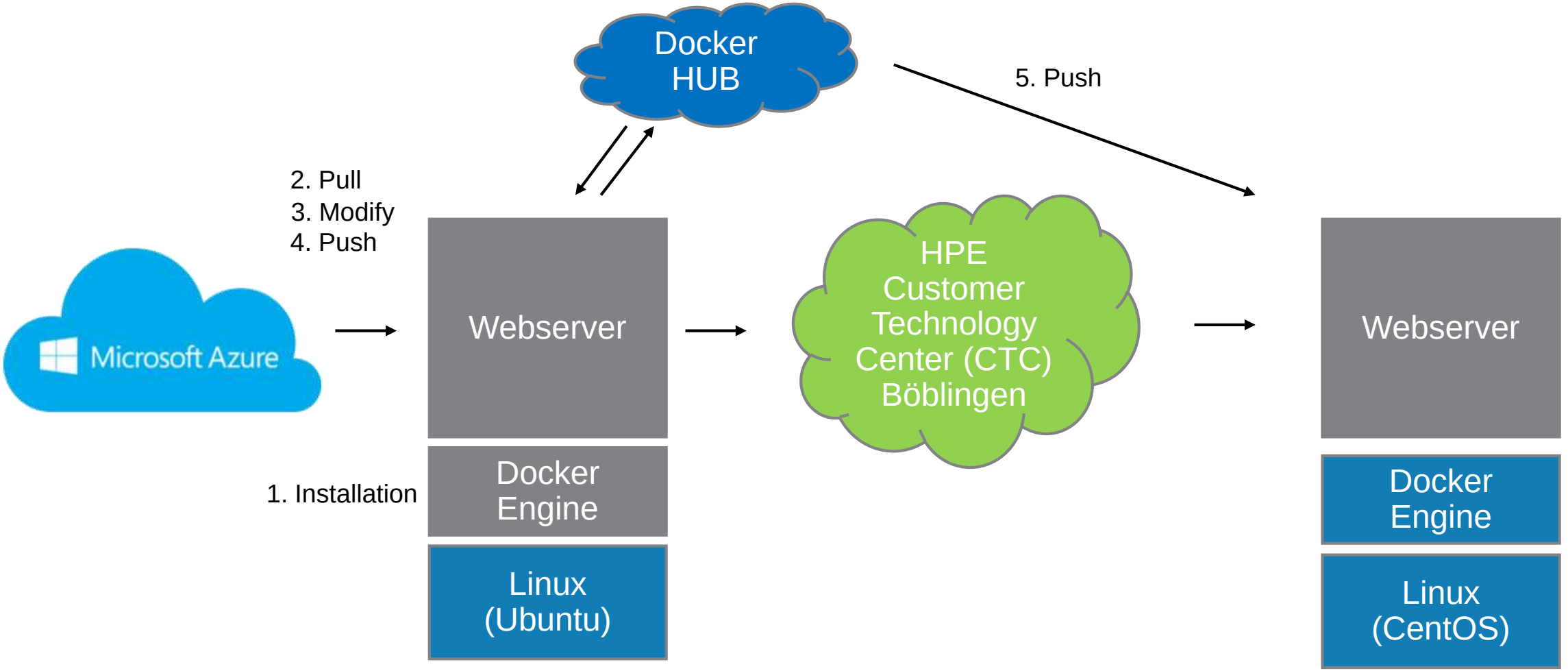
Kubernetes

Foundation approach for containers infrastructure as a service on bare metal

- ***Certified Kubernetes Distributions***

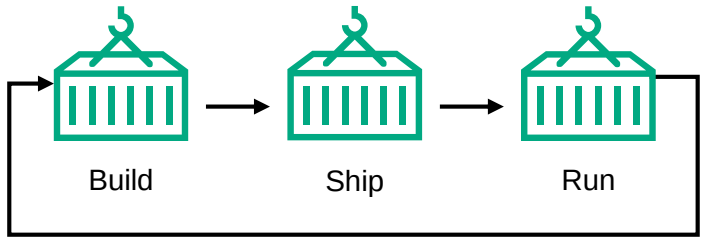
Live Demo

Live Demo


Docker HUB
5. Push
2. Pull
3. Modify
4. Push
Microsoft Azure
Webserver
HPE Customer Technology Center (CTC) Böblingen
Webserver
1. Installation
Docker Engine
Linux (Ubuntu)
Docker Engine
Linux (CentOS)

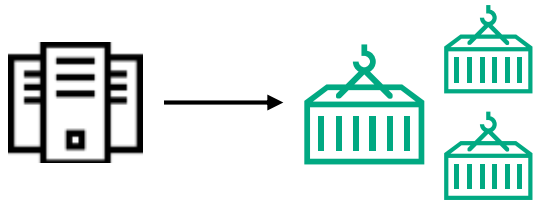
Typical Use cases with Containers

DevOps CI/CD pipelines



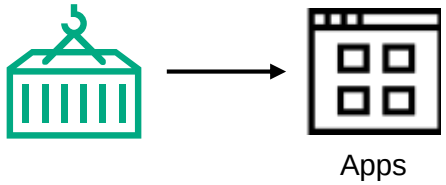
- Jenkins, Microsoft® VSTS, CircleCI
- Release more, faster, and better

Lift and shift



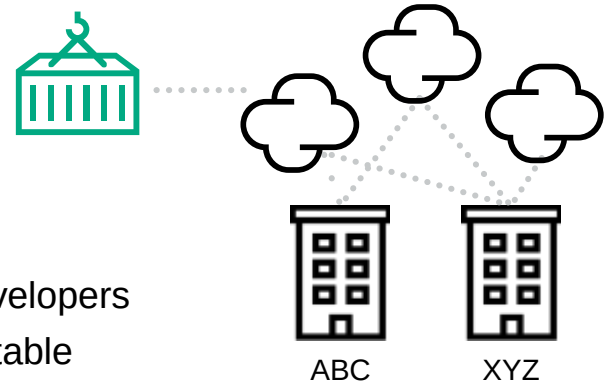
- LAMP apps, ERP systems
- From VMs or bare-metal

IT operations



- Atlassian Tools, ELK stack, LAMP apps
- Simplified security—easy to manage

CaaS



- Self-service for developers
- Secure and predictable

Produkte und Lösungen

Containers Solutions on HPE Composable Infrastructure

Docker Enterprise Edition	Red Hat OpenShift	Mesosphere Enterprise DC/OS	Kubernetes
Turnkey container as a service with Linux or/and Windows workers and built-in kubernetes & swarm orchestrators	**Complete** container platform as a service with self-service portal and App build & deploy automation	**Unified** platform with self service portal for container workloads & distributed data services apps like Spark, Kafka, Cassandra and more	**Foundation** approach for containers infrastructure as a service on bare metal

Comprehensive container security option with HPE technology partners aqua or sysdig

Fast implementation via HPE RA/RC automated deployment workflows & OS deployment plans

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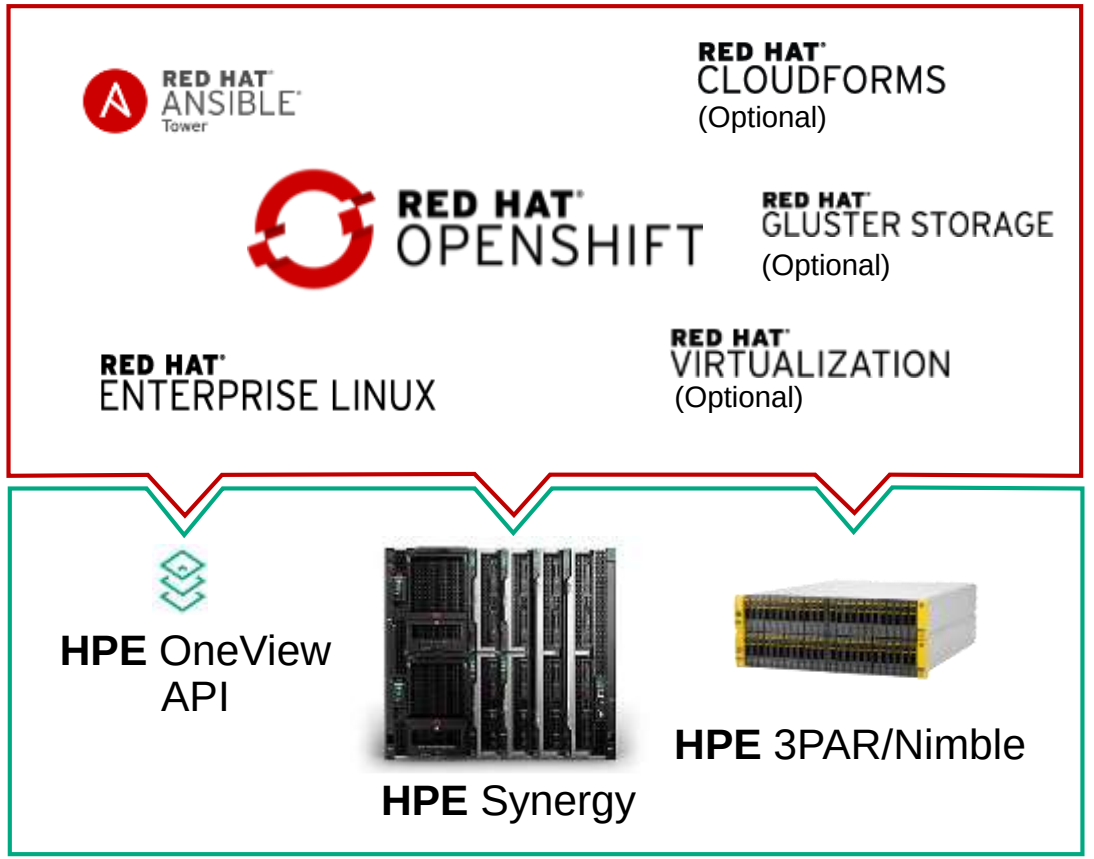
HPE Synergy Reference architecture/configuration links:

- Docker Enterprise Edition
- RedHat OpenShift
- Rapid Mesosphere DC/OS deployment
- Kubernetes

HPE Container Solution with Red Hat OpenShift
(example even available for Docker)

- Complete Solution, validated and tested by HPE
- Centralized Automation and Management
- Containers Apps Build and Deploy
- Composable Infrastructure
- Persistent Storage & Data Management



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HPE Synergy At a glance

The platform for Composable Infrastructure

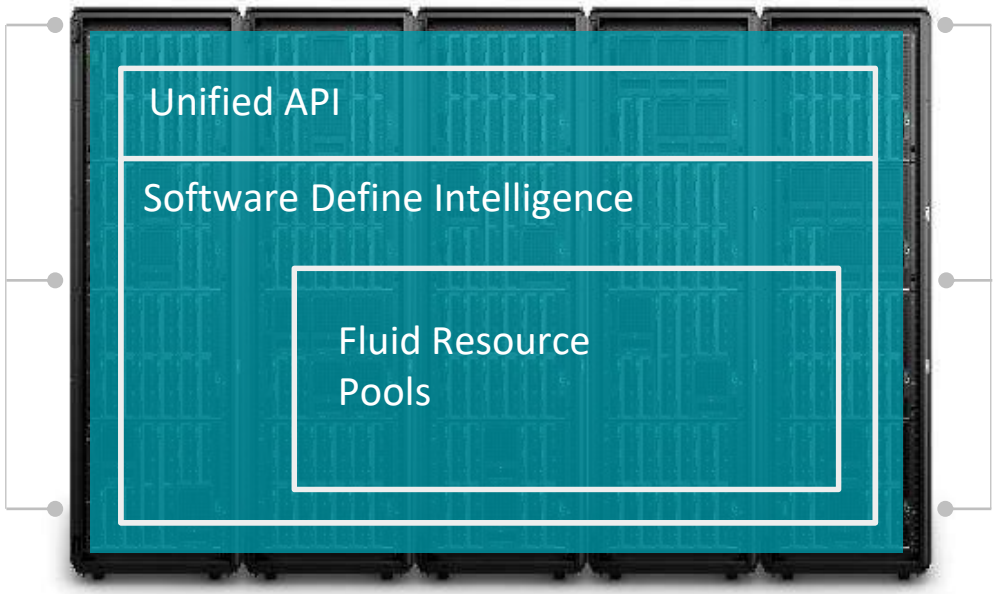
Synergy Composer
(Powered by OneView)

UI/API

Image Streamer
(Boot volumes streaming)

Composable Compute

Composable Frame



Composable Fabric

Composable Storage

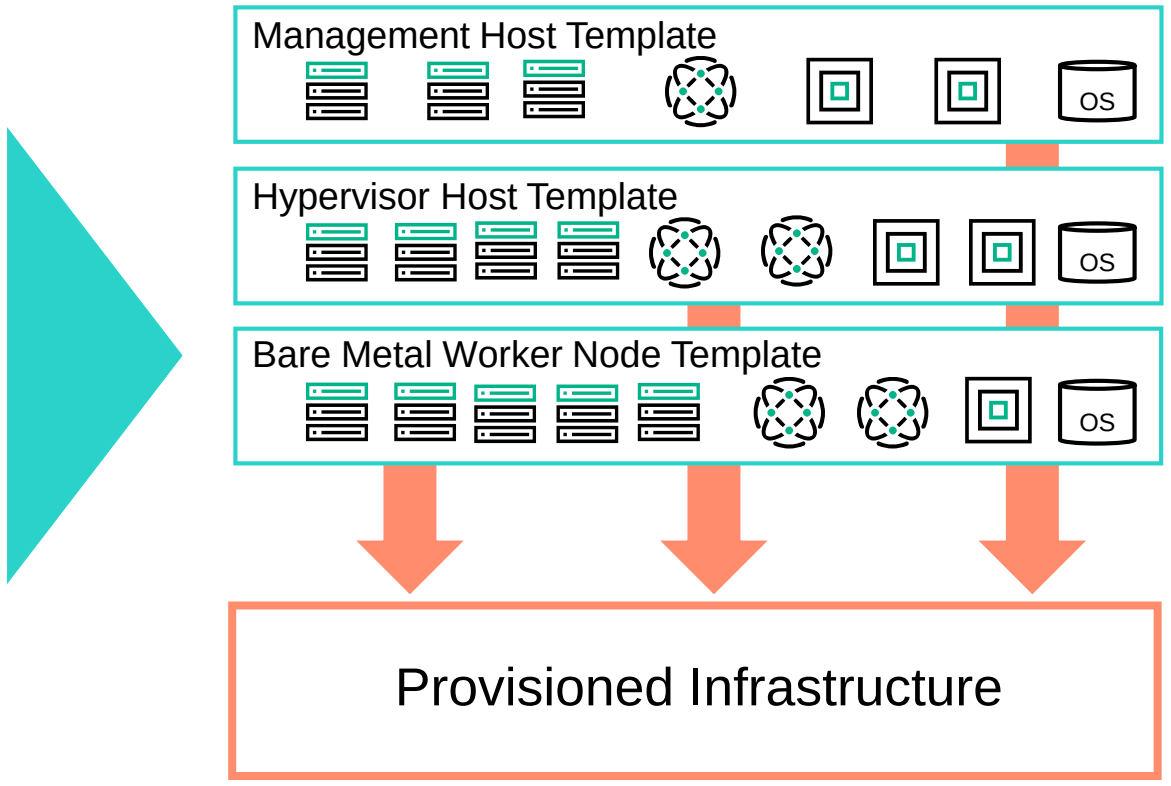
Hewlett Packard Enterprise

Deploy infrastructure with HPE Composable Software Defined Templates

Server Profile allows a suite of configuration parameters, to be templatized and applied programmatically to compute resources. These templates are the key to delivering the “infrastructure as code”.

Define re-usable HPE Composable Server Profile template settings

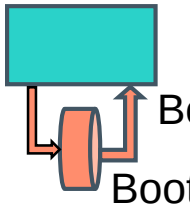
- Compute definitions and BIOS settings
- Firmware and drivers
- Local and External Volumes
- LAN and SAN networks
- Golden OS boot volume
- Role & Scope based access control



Templates ensure faster deployments with fewer errors whether it’s 1 system or 100

Accelerated infrastructure provisioning with HPE Synergy

Innovative provisioning with
Synergy Composer and Image Streamer



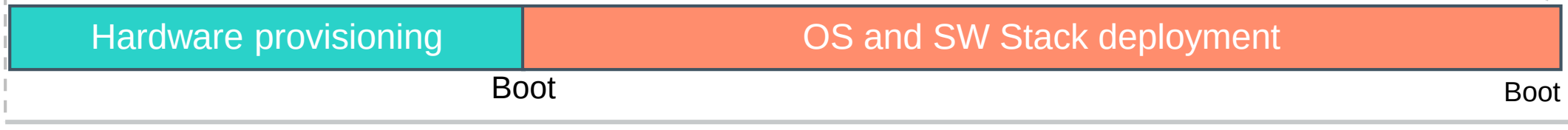
Up to 10X faster

Manage physical servers like virtual machines

Virtual machine operation	Physical server equivalent
Create VM template	Create server profile template
Deploy VM from template	Deploy server profile from template
Clone VM	Copy server profile
Move VM	Move server profile
Stop VM to release CPU/Memory	Unassign server from server profile
Completely Delete the VM	Delete server profile

Streamline provisioning with Synergy Composer templates

Typical provisioning process



Time

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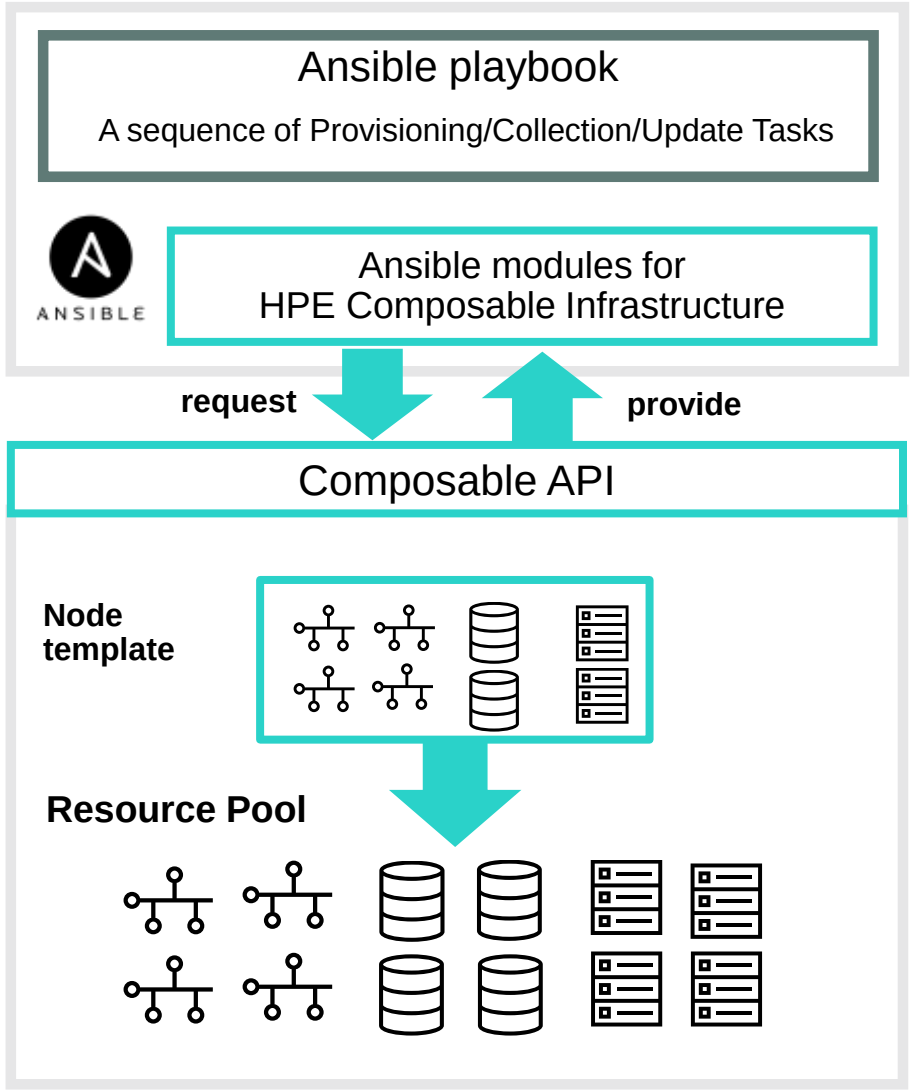
Automation Flow with Ansible and HPE Synergy

Ansible playbook (Consumer)

Automatically provision entire stack from bare metal through application in minutes

HPE Synergy Composer OneView API (Provider)

Provision and update bare metal with one line of code – in the same way as virtual and cloud resources



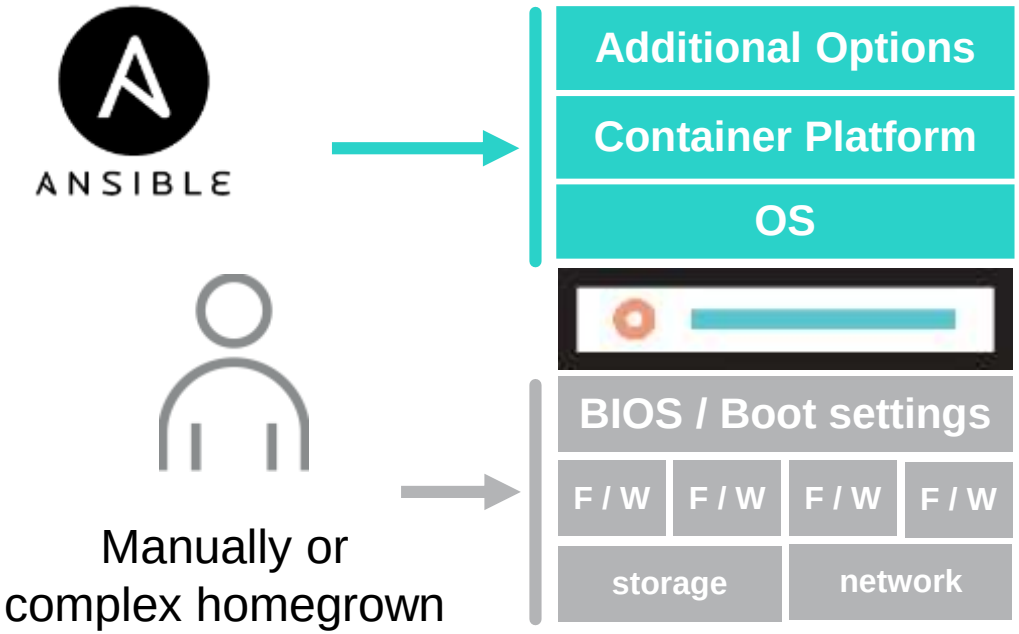
Modules Repository: https://github.com/HewlettPackard/oneview-ansible
Modules Documentation: https://github.com/HewlettPackard/oneview-ansible/blob/master/oneview-ansible.md

Infrastructure programmability

Conventional

– Initial setting is manual work

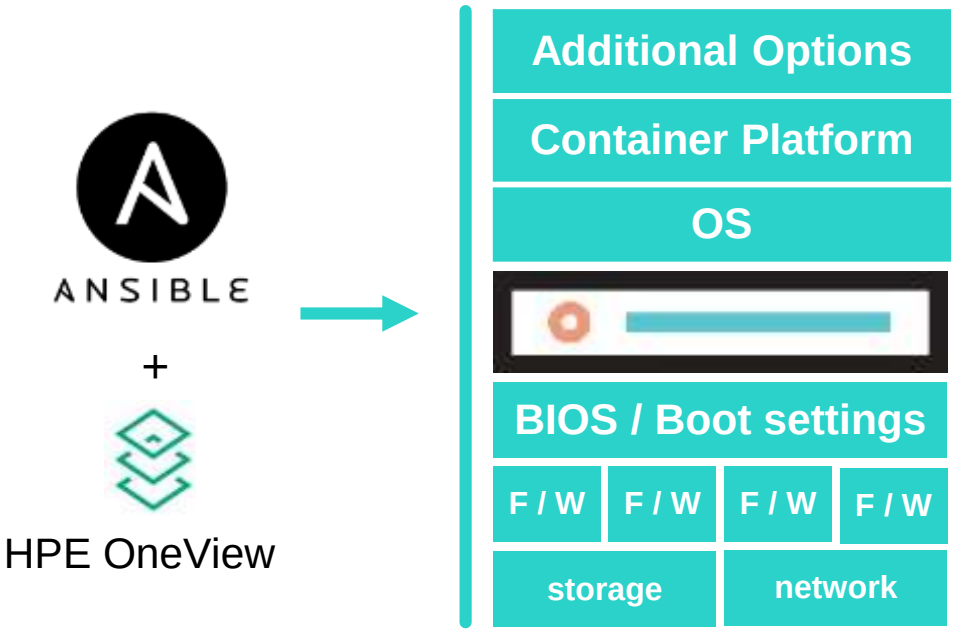
– Hardware LCM automation is manual work



Manually or complex homegrown modules & scripts

Next Level of Automation

Automate All



"With Composable infrastructure resources can be added quickly in minutes."

Hewlett Packard Enterprise

Reference Configuration for Red Hat OpenShift on HPE Synergy
Benefits

Rapid Deployment

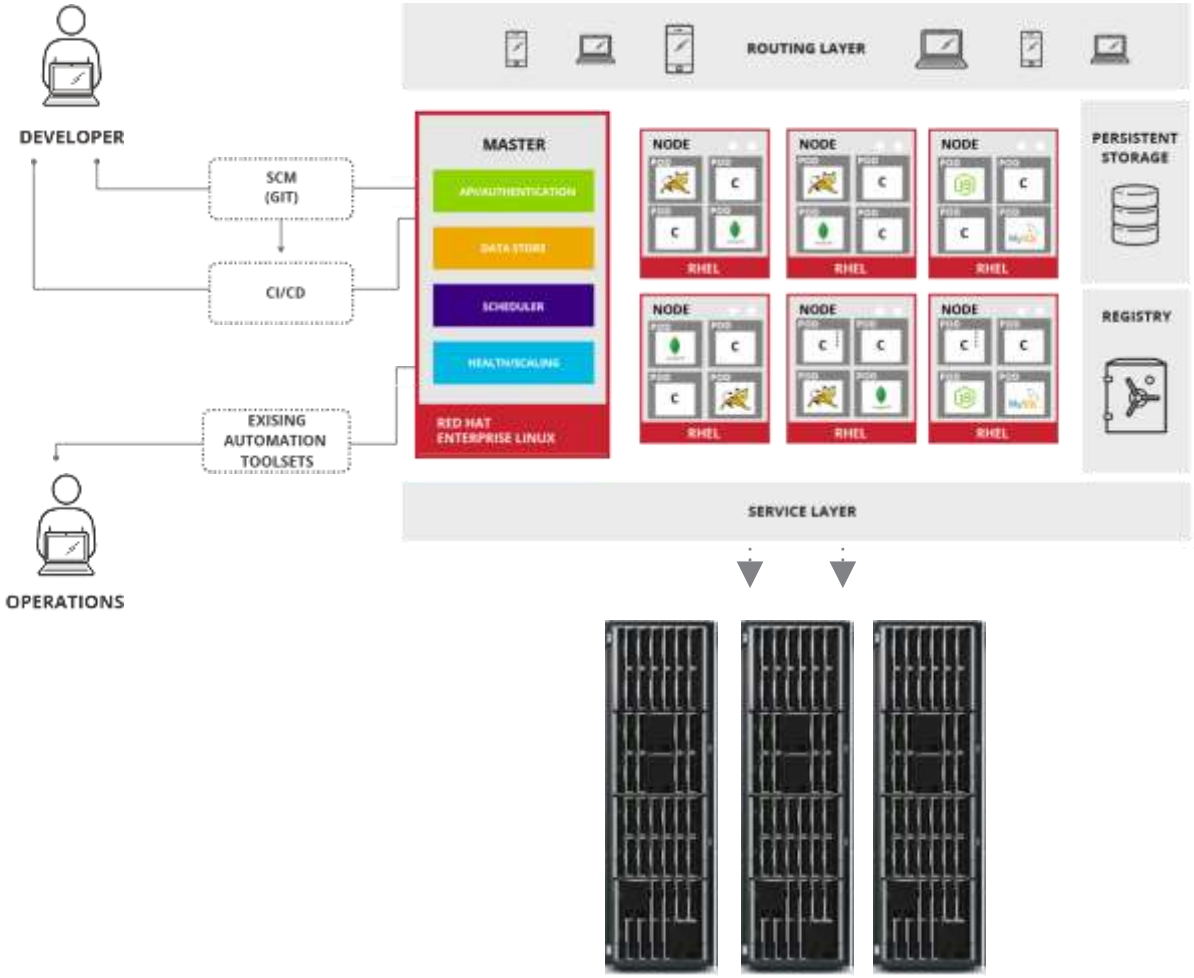
- One-Click full platform deployment
- Can easily be consumed in a CI/CD environment

Modular approach to swap in/out components

- Re-use provisioning bits, deploy e.g. OpenStack instead
- Easier to test in pieces vs. one monolithic playbook

Minimize the amount of required input

- Programmatically determine values when possible
- Min required variables per host



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HPE Storage Platforms for Containers

(https://github.com/hpe-storage/python-hpedockerplugin)

docker

OPENSHIFT

kubernetes

Docker

FlexVolume plugin

Windows*

Linux[1]

FlexVolume Driver

Provisioner

Platform APIs

HPE Storage Container plugins

HPE Nimble Storage

HPE 3PAR

HPE Cloud Volumes

amazon web services

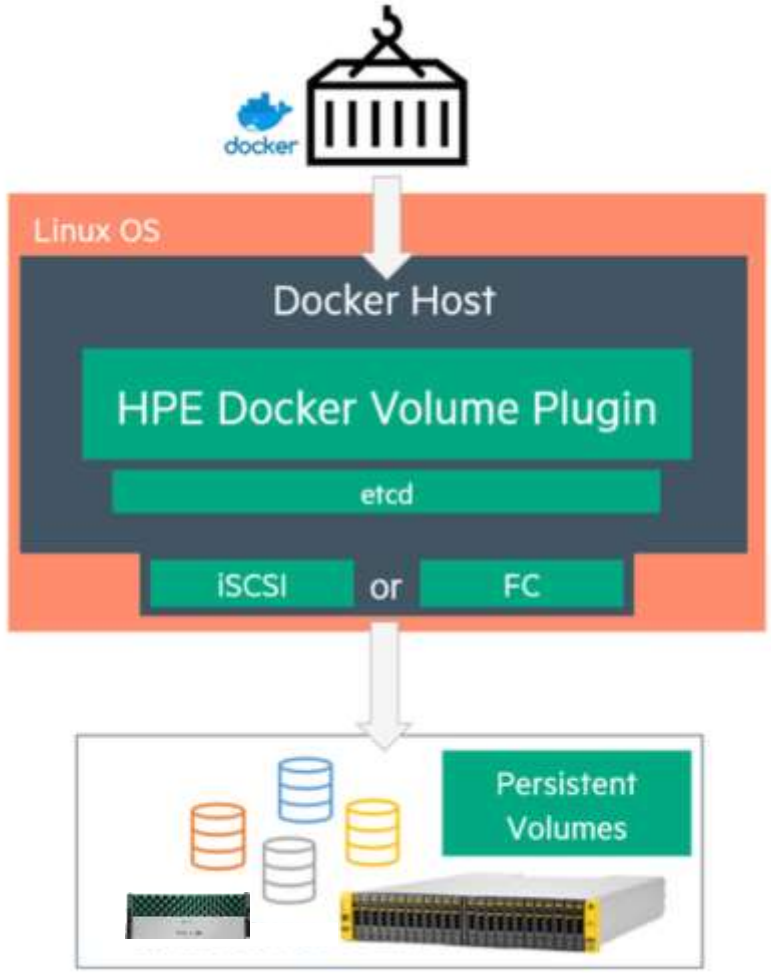
Microsoft Azure

* = Windows plugin only available for HPE Nimble Storage arrays with Docker Swarm

[1] = Docker Certified and standalone plugin available

Supported Features

- Fibre Channel & iSCSI support
- Secure/Unsecure etcd cluster for fault tolerance
- Advanced volume features
    - thin
    - dedup
    - full
    - compression
    - snapshots
    - clones
    - QoS
    - snapshot mount
    - mount_conflict_delay
    - concurrent volume access
    - replication
    - snapshot schedule
    - file system permissions and ownership
    - multiple backends



Example Docker, even available for K8S, OpenShift.

HPE Produkte & Lösungen - Summary

Reference Architecture / Reference Configuration
https://www.github.com/HewlettPackard

- Docker – Simplifity
- Docker – Synergy
- Kubernetes – Synergy
- OpenShift on HPE Synergy and Nimble Storage
- Openshift on HPE and HPE 3PAR StoreServ Storage

Storage PlugIns
https://github.com/hpe-storage/

- Docker – 3PAR
- Kubernetes – 3PAR
- OpenShift – 3PAR
- Docker – Nimble
- Kubernetes – Nimble
- Openshift – Nimble

You can see it live: https://github.com/dderichswei

DANKE !!!!

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