Microsoft

Azure Container Service

Daniel Meixner

ALM Architekt

@danielmeixner

Technical Summit 2016

connecting.technologies.

#msts2016

Agenda

Container Basics

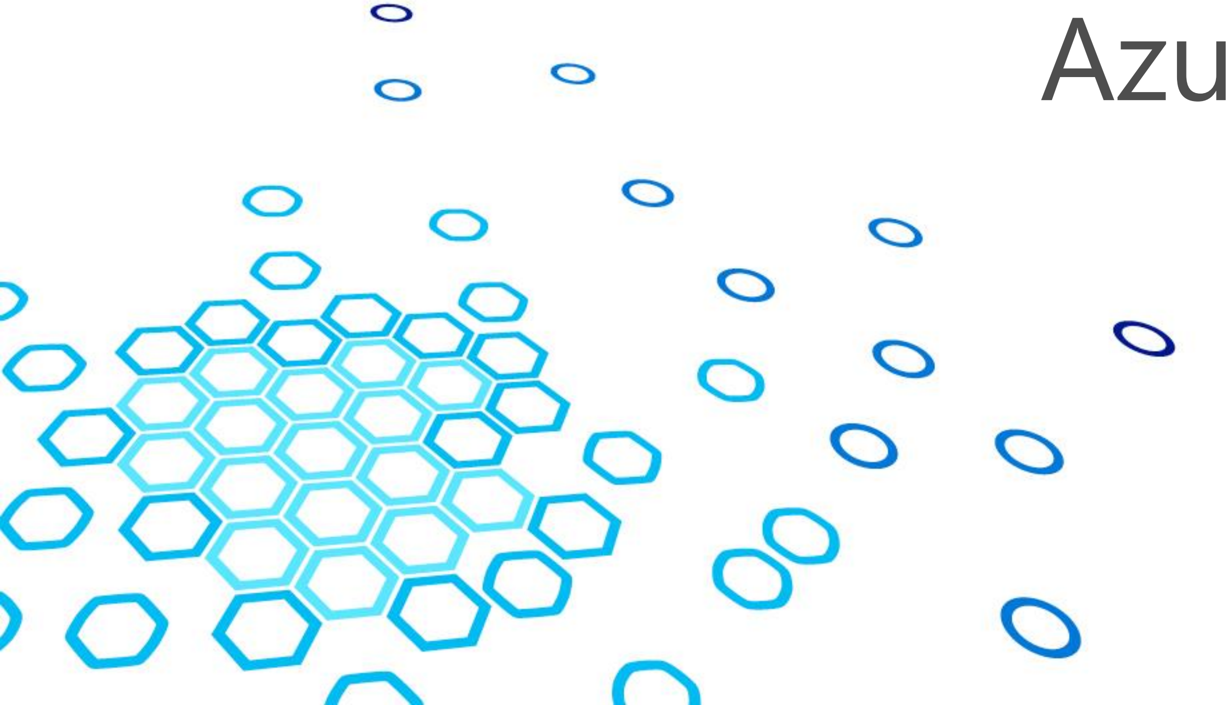
Why should we care?

Orchestrators

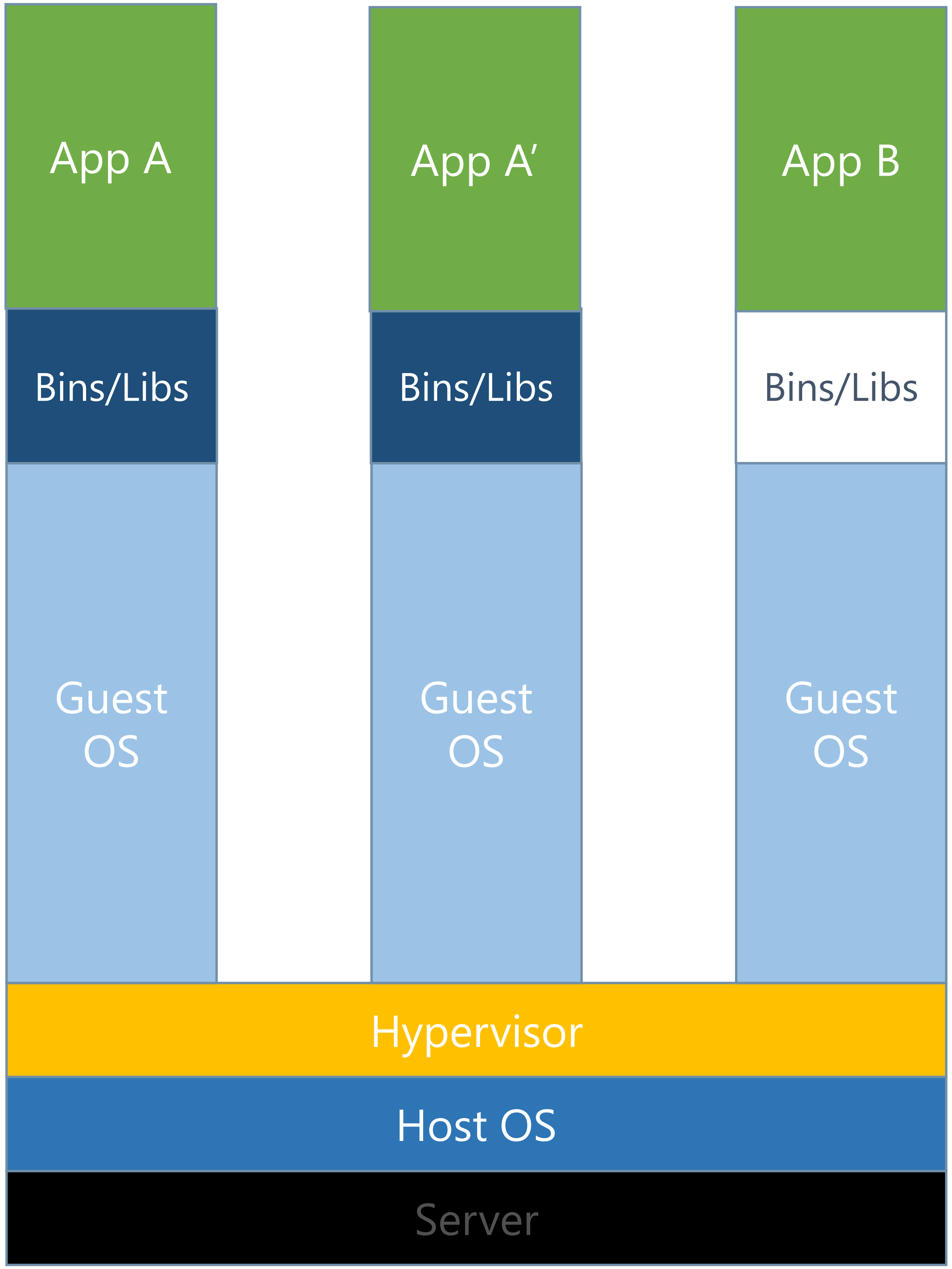
Azure Container Service

Azure Container Registry

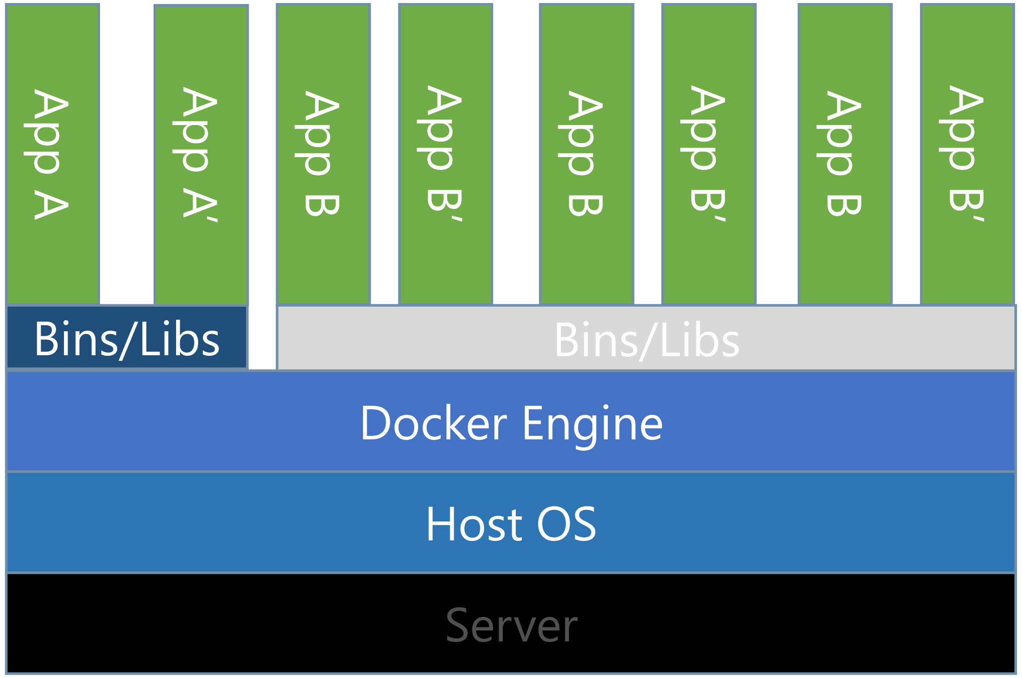
DevOps



Container Basics



Containers are isolated, but share OS and, where appropriate, bins/libraries



Density & Isolation levels

More isolated
More efficient

	PC	VM	Container	Process
Hardware	Not shared	Shared	Shared	Shared
Kernel	Not shared	Not shared	Shared*	Shared
System Resources (ex: File System)	Not shared	Not shared	Not shared	Shared

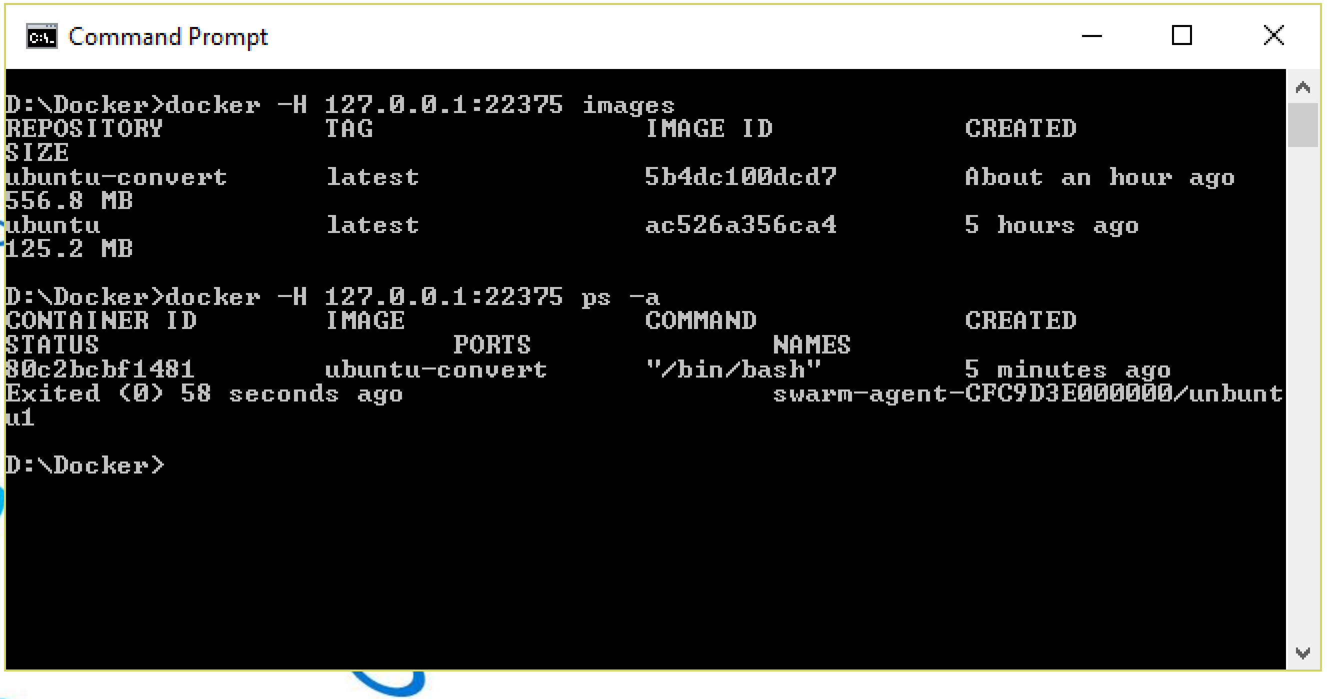
* Windows Hyper-V containers do not share a kernel

Docker, Docker, Docker

- Containers ≠ Docker
- Containers have been around for many years
- Docker Inc. did not invent them
  - created open source software to build and manage containers
- Docker makes containers easy
- Docker provides a container packaging format

Docker CLI

Command-line interface for Docker, available for Linux, OS X, and Windows (available separately or as part of Docker Toolbox)

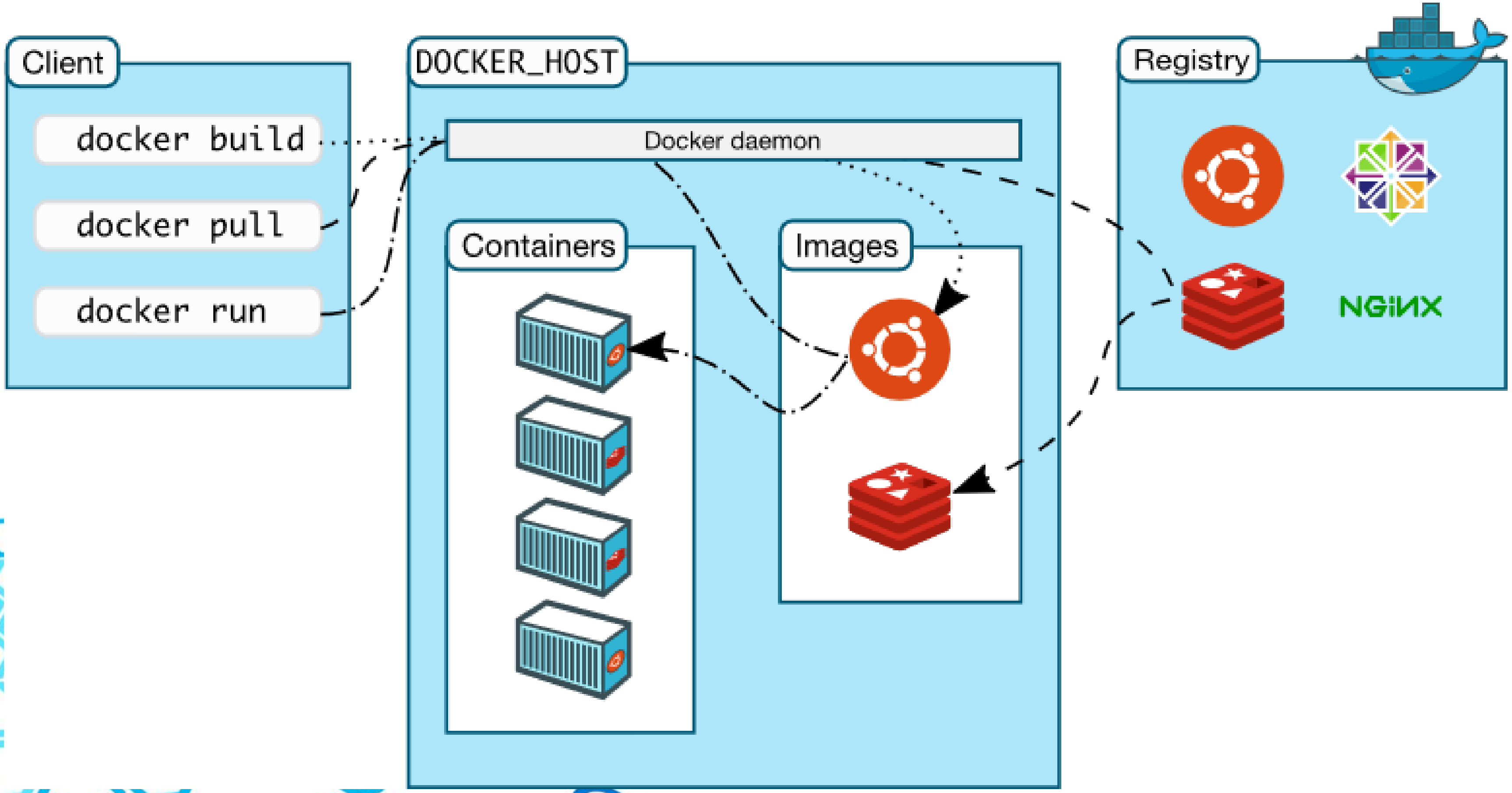


```
D:\Docker>docker -H 127.0.0.1:22375 images
REPOSITORY          TAG                 IMAGE ID            CREATED
SIZE
ubuntu-convert      latest              5b4dc100dcd7        About an hour ago
556.8 MB
ubuntu              latest              ac526a356ca4        5 hours ago
125.2 MB

D:\Docker>docker -H 127.0.0.1:22375 ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED
STATUS                      PORTS               NAMES
80c2bcbf1481        ubuntu-convert      "/bin/bash"         5 minutes ago
Exited (0) 58 seconds ago                       swarm-agent-CFC9D3E000000/unbunt
u1

D:\Docker>
```

Docker Terms

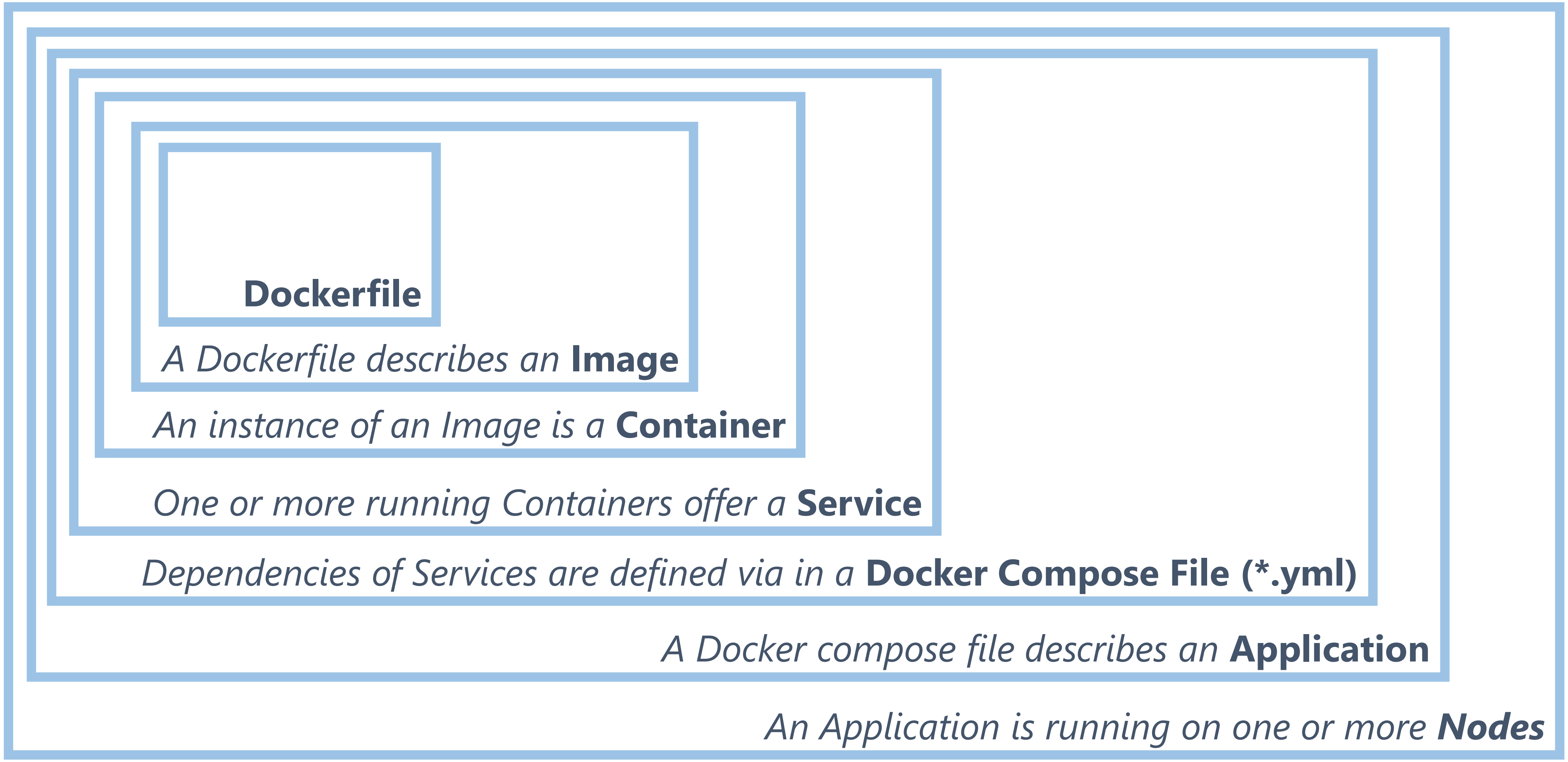
- Application = A combination of Services
- Service = provided by 1 or more containers
- Container = a running instance of an image
- Image = basis for a container, generated from Dockerfile
- Dockerfile = describes an image
- Container Registry = online portal for images

Docker Architecture



Microsoft

Docker - Boxes in Boxes



Dockerfile

A Dockerfile describes an **Image**

An instance of an Image is a **Container**

One or more running Containers offer a **Service**

Dependencies of Services are defined via in a **Docker Compose File (*.yml)**

A Docker compose file describes an **Application**

An Application is running on one or more ***Nodes***

Demo:
Docker Basics

Why should we care?

Container advantages in a nutshell

- It’s faster
- It’s more portable
- It improves the dev cycle
- It improves the ops cycle
- It promises to help make you more agile

Basis object oriented Concepts

Loose Coupling

- A change in one service does not require a change in another

High Cohesion

- Related behavior sits together, unrelated behavior sits separately

The challange

- Docker allows to spin up services easily

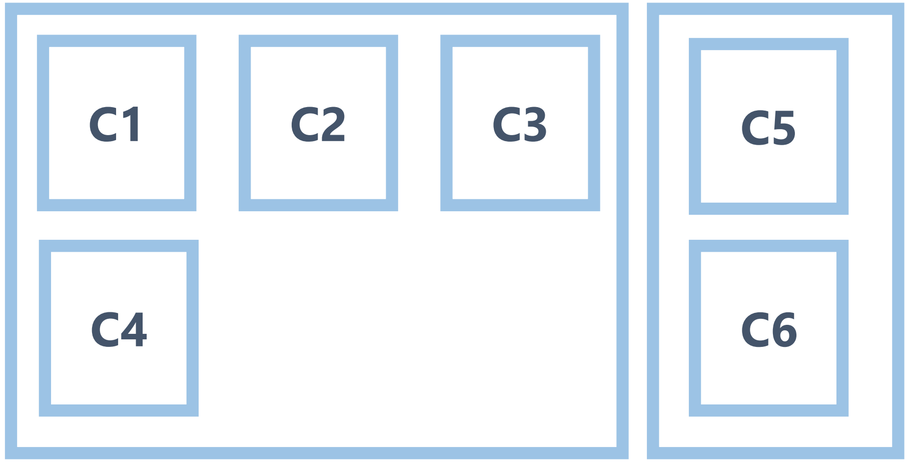
- Assumption:
  - ***Let's say I have a cluster of machines.***
  - ***Let's say I have my application split into components***

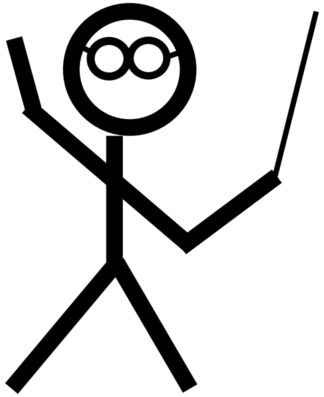
- *What machine should my containers run on?*
- *How many instances of a specific service do I need?*
- *How do they get to know each other?*

Orchestrators

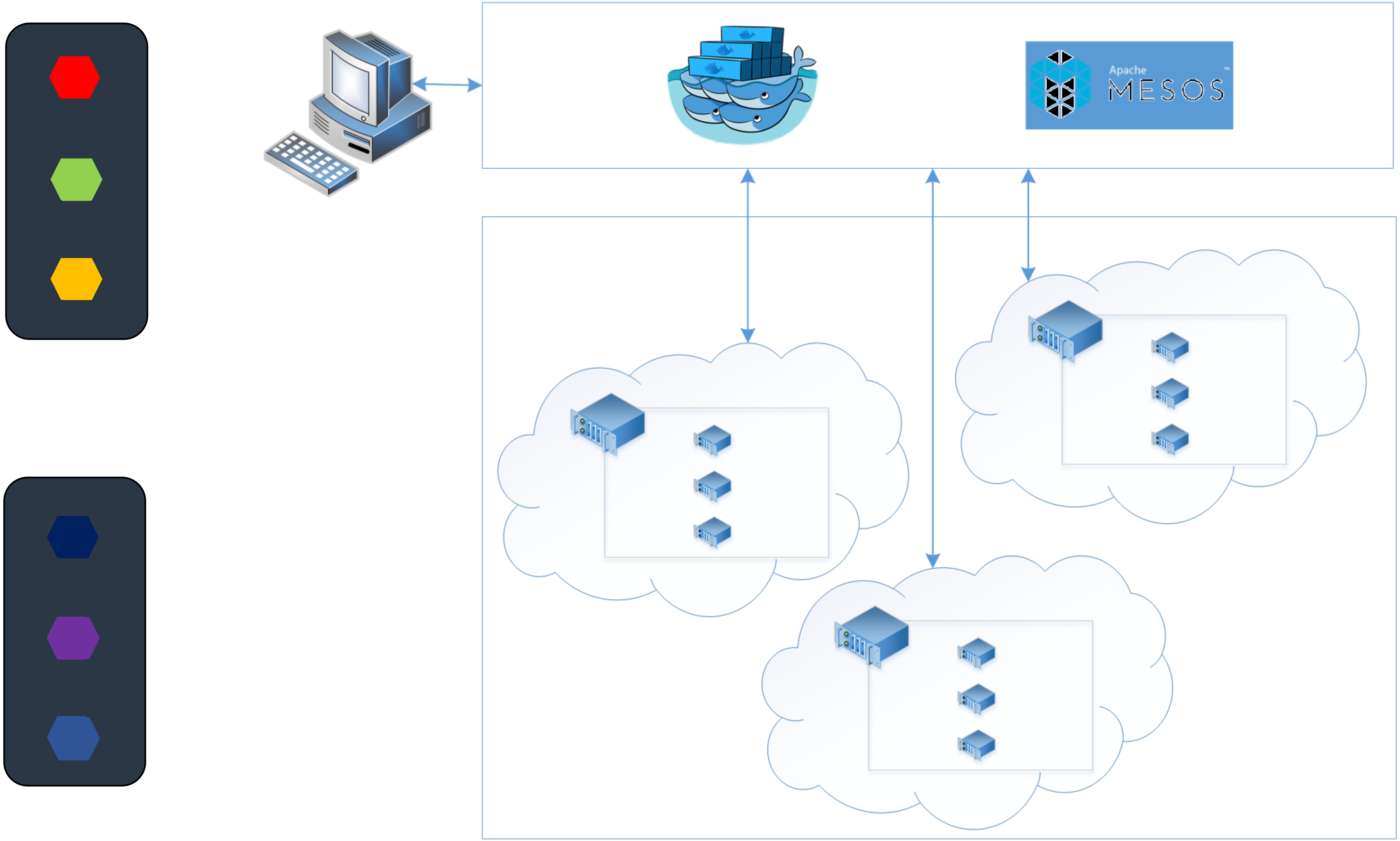
Orchestrators

- Kubernetes
- Docker Swarm
- Mesosphere DC/OS
- … and others

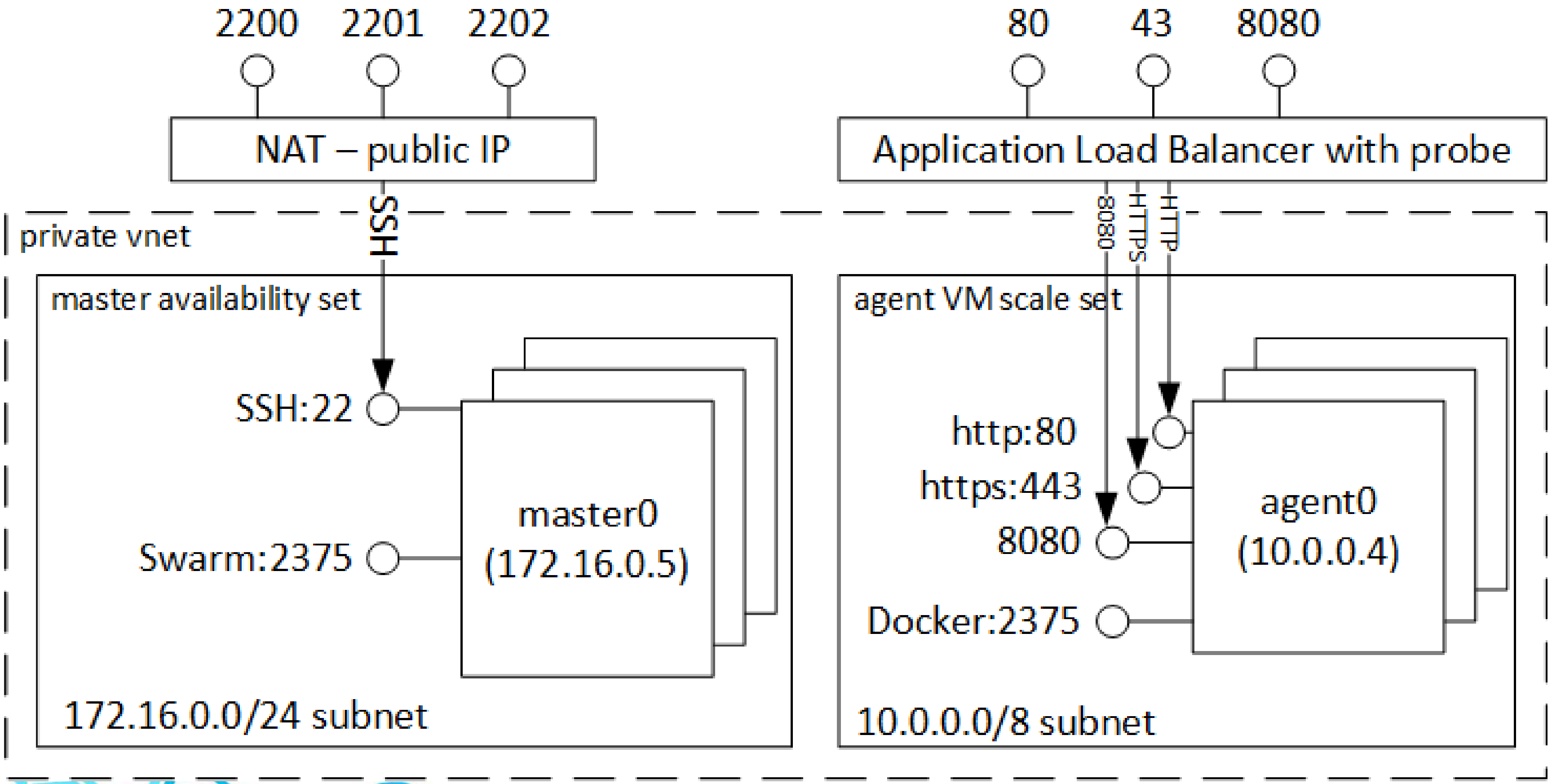




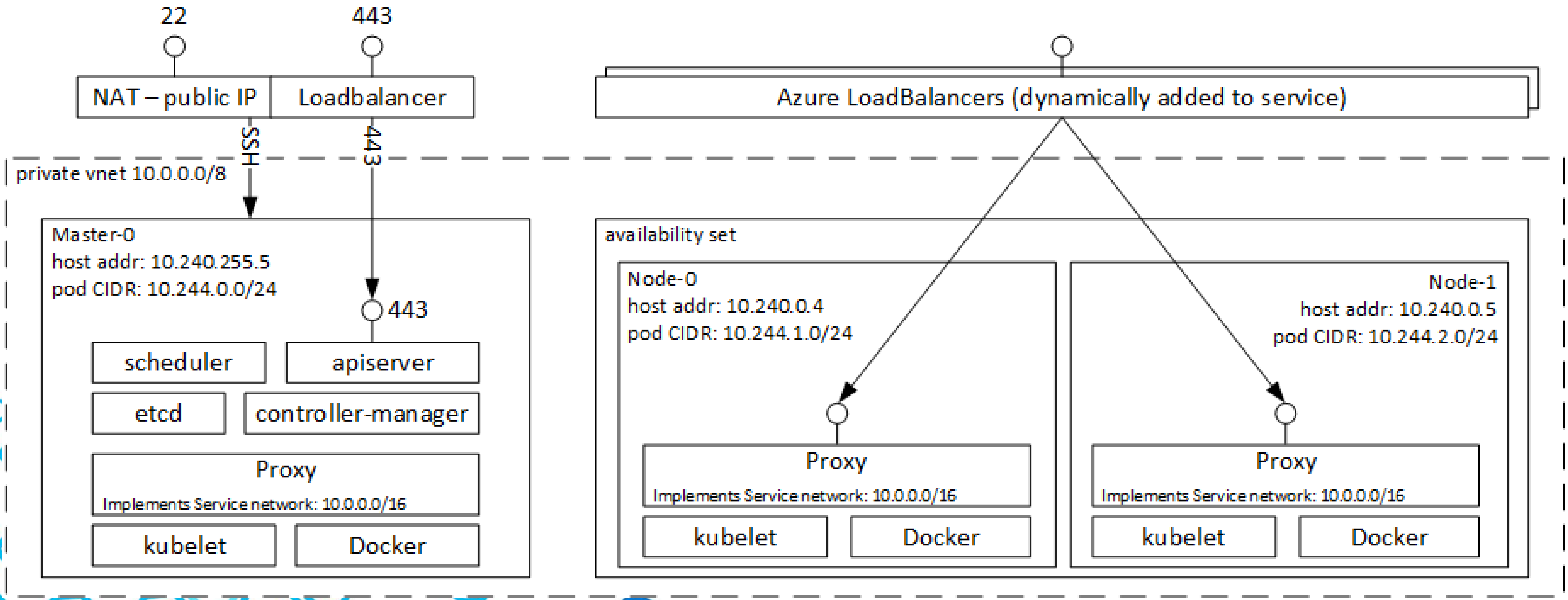
Azure Container Services



Clustering with Docker Swarm



Clustering with Kubernetes



22

443

NAT – public IP

Loadbalancer

Azure LoadBalancers (dynamically added to service)

SSH

443

private vnet 10.0.0.0/8

Master-0
host addr: 10.240.255.5
pod CIDR: 10.244.0.0/24

443

scheduler

apiserver

etcd

controller-manager

Proxy

Implements Service network: 10.0.0.0/16

kubelet

Docker

availability set

Node-0
host addr: 10.240.0.4
pod CIDR: 10.244.1.0/24

Proxy

Implements Service network: 10.0.0.0/16

kubelet

Docker

Node-1
host addr: 10.240.0.5
pod CIDR: 10.244.2.0/24

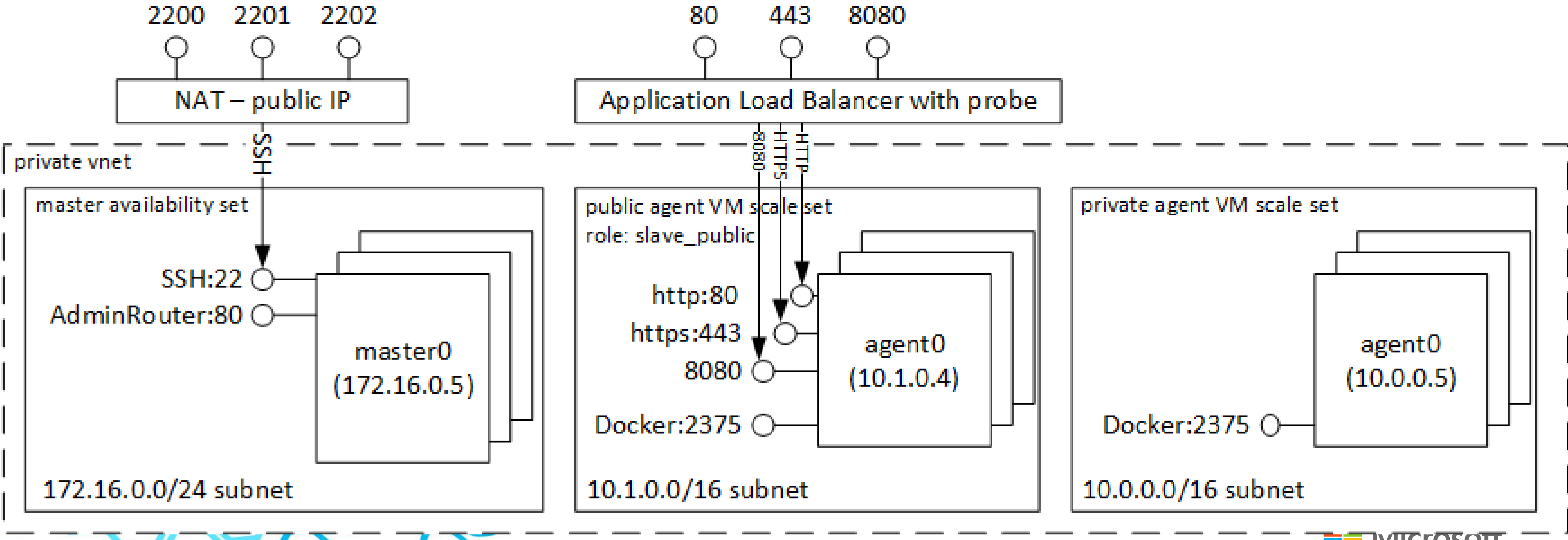
Proxy

Implements Service network: 10.0.0.0/16

kubelet

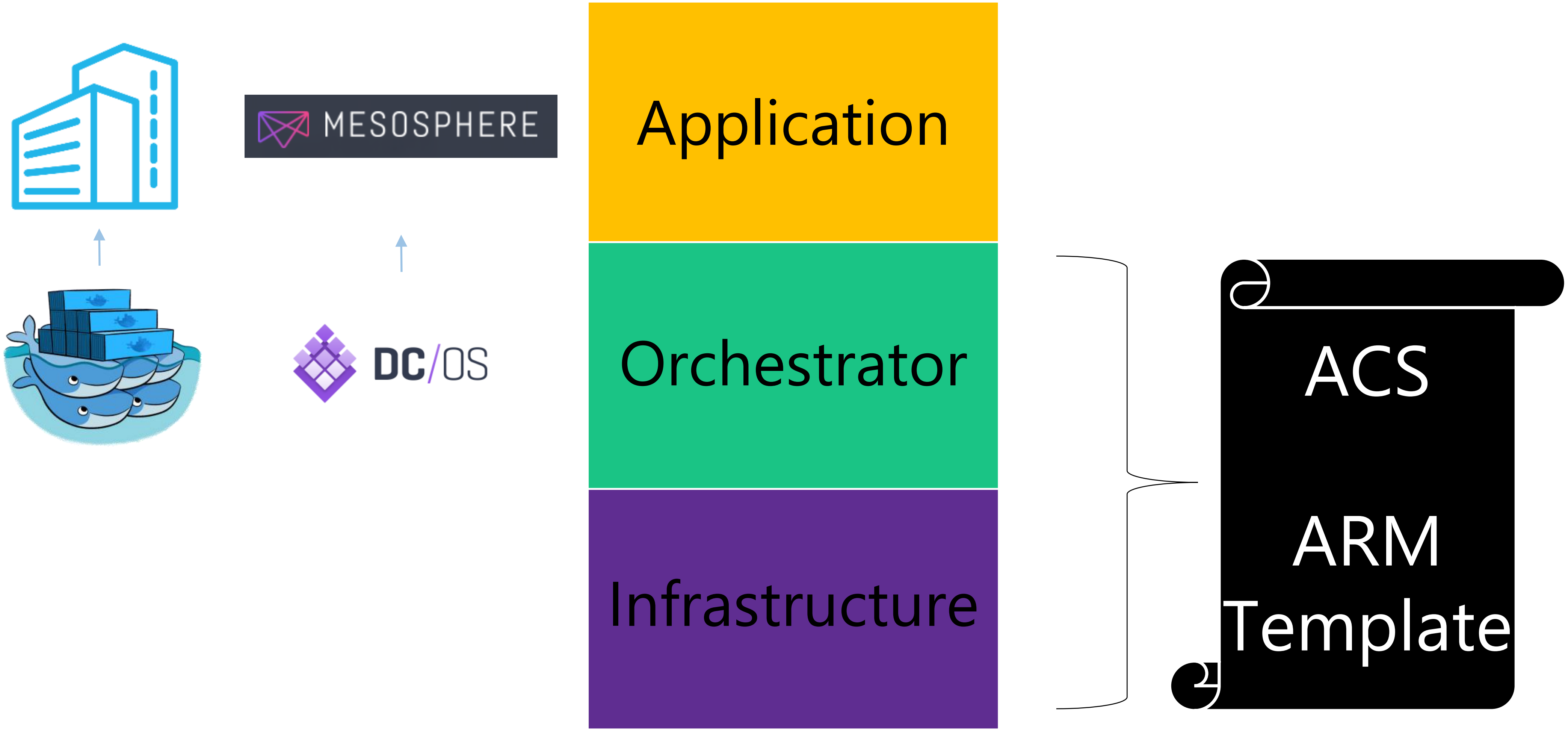
Docker

Clustering with DC/OS



Azure Container Services

Azure Container Service



Application

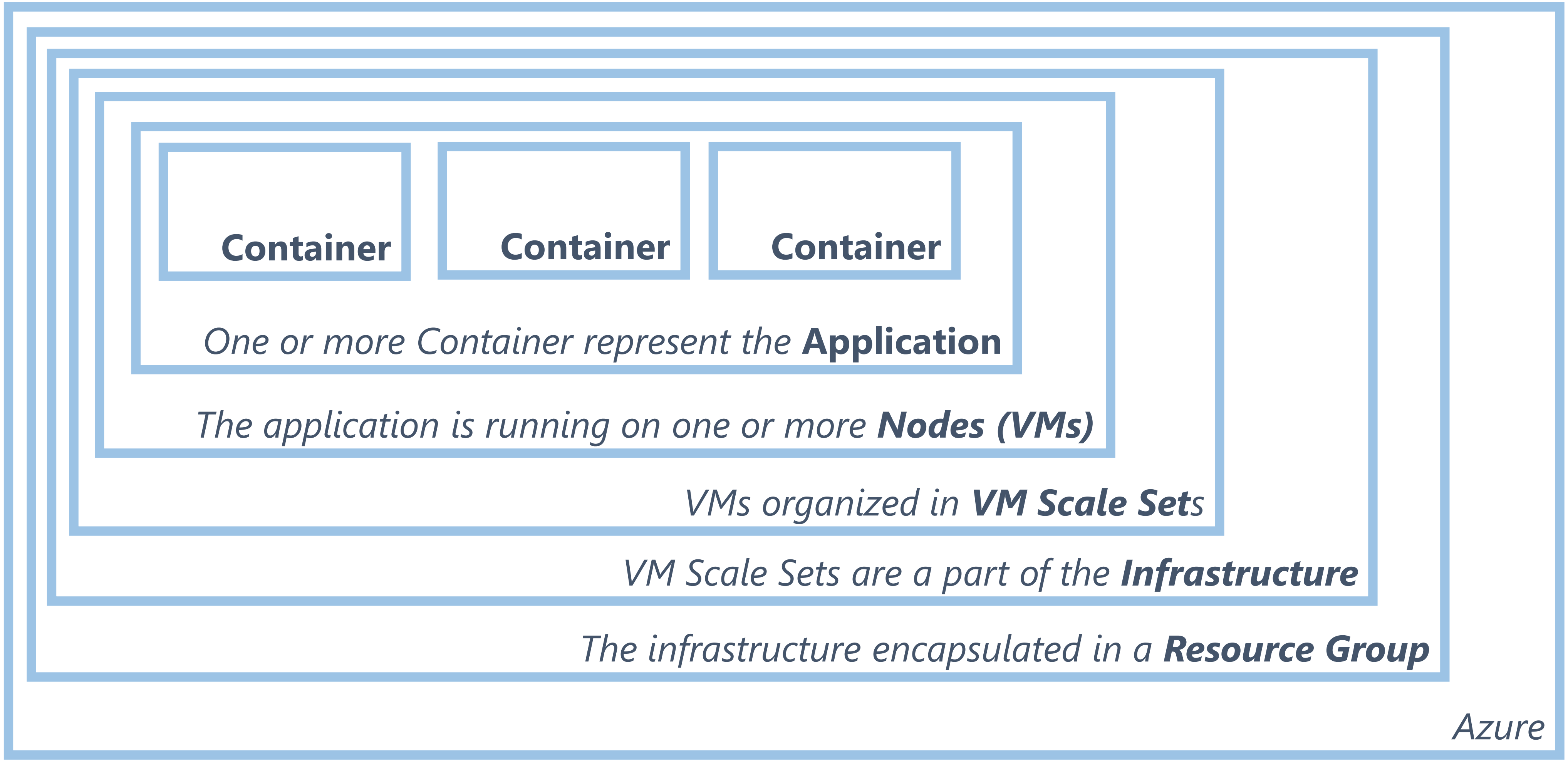
Orchestrator

Infrastructure

ACS

ARM Template

Azure Container Service - Boxes in Boxes



Container

Container

Container

One or more Container represent the **Application**

*The application is running on one or more **Nodes (VMs)***

*VMs organized in **VM Scale Set**s*

*VM Scale Sets are a part of the **Infrastructure***

*The infrastructure encapsulated in a **Resource Group***

Azure

Demo:

ACS Setup & Connect
Deploy an App
Scale Containers
Scale Infrastructure

ACS Scaling

- azure acs scale -g dmxtsacsswarm2 -n containerservice-dmxtsacsswarm2 -o 5

- azure acs show -g dmxtsacsswarm2 -n containerservice-dmxtsacsswarm2

- docker info

Azure Container Registry

Azure Container Registry

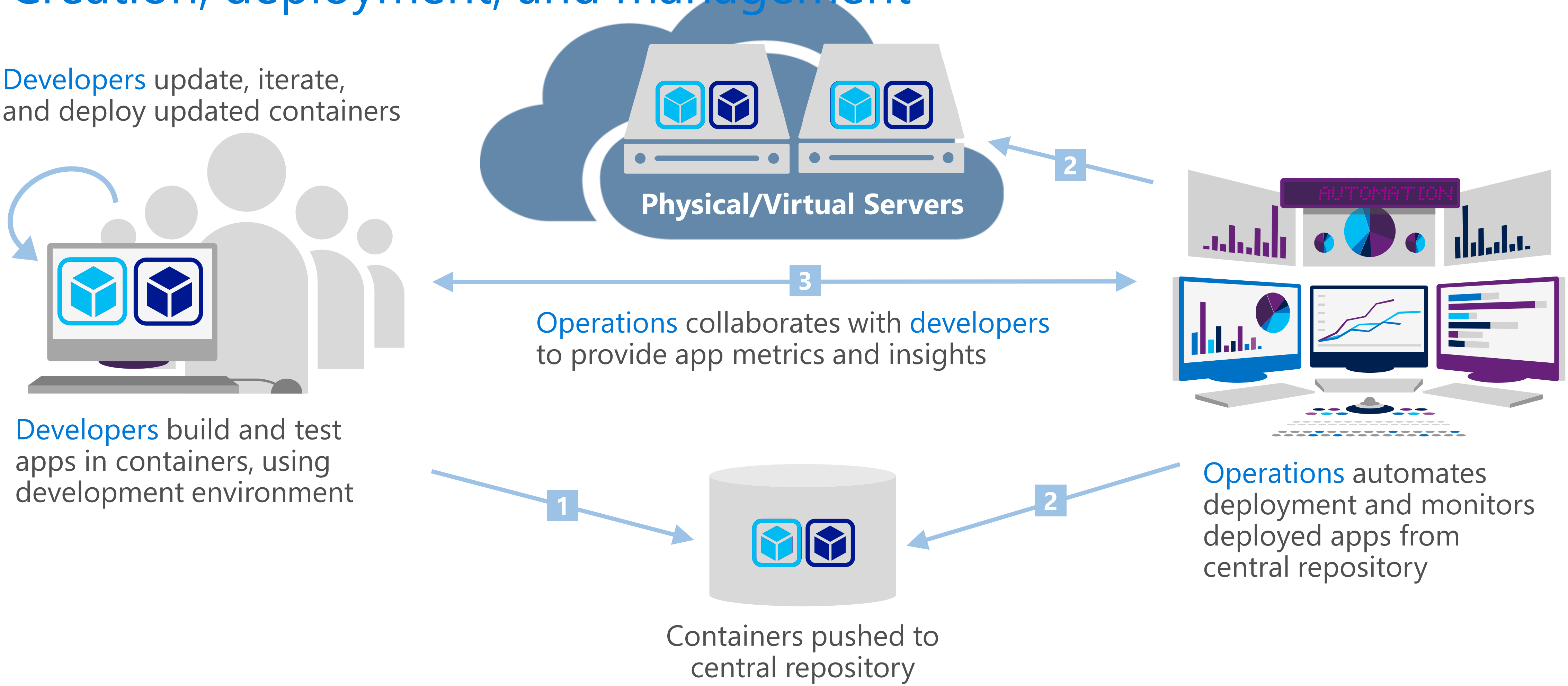
- Store and manage images for all types of container deployments
- Automated Container Builds, Testing and Security Scanning (via VSTS)
- Store your container image in local, network-close storage on Azure
- Docker CLI push/pull
- Azure AD Support
- Linux & Windows Container

Azure Container Service

… meets DevOps

Containers

Creation, deployment, and management



Developers update, iterate, and deploy updated containers

Developers build and test apps in containers, using development environment

Operations collaborates with developers to provide app metrics and insights

Operations automates deployment and monitors deployed apps from central repository

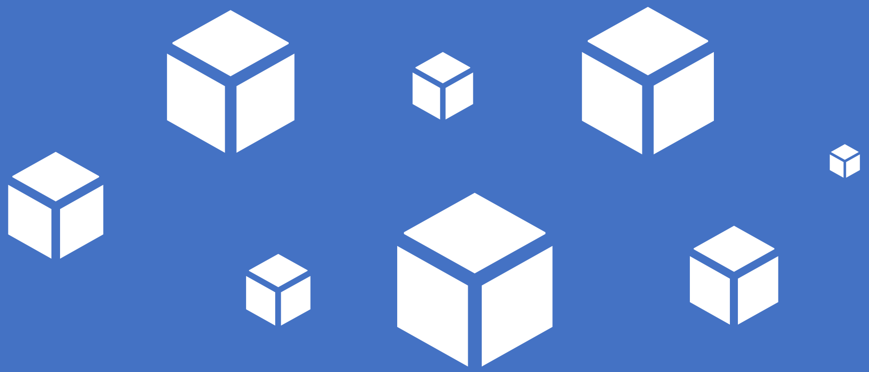
Containers pushed to central repository

The DevOps experience

Fast iteration

Rapid deploy

SysAdmin ease



How do you empower developers to create innovative applications at a competitive rate without disrupting IT’s ability to manage servers and maintain control?

Containers

Links

Azure Container Service

https://blogs.msdn.microsoft.com/dmx/2016/09/26/setting-up-port-forwarding-into-azure-container-services-with-ubuntu-bash-on-linux-subsystem-on-windows-10/

ACS Engine

https://github.com/Azure/acs-engine

DevOps with ACS

https://azure.microsoft.com/en-us/blog/continuous-integration-and-deployment-to-azure-container-service/
https://docs.microsoft.com/en-us/azure/container-service/container-service-setup-ci-cd

SSH into ACS with Bash On Windows

https://blogs.msdn.microsoft.com/dmx/2016/09/26/setting-up-port-forwarding-into-azure-container-services-with-ubuntu-bash-on-linux-subsystem-on-windows-10/

Azure Blog

https://azure.microsoft.com/en-us/blog/azure-container-service-the-cloud-s-most-open-option-for-containers/

Microsoft

Summary

Azure Container Service

- simplifies creation, configuration, management of container clusters
- uses open source technologies

Vielen Dank

Daniel Meixner

ALM Architekt

@danielmeixner

Microsoft