Microsoft Azure Developer: Deploying and Managing Containers

INTRODUCING CONTAINERS ON AZURE

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Course Overview

What are Docker containers?

How can we deploy them to Azure?

How can we run containers locally?

How can we create and publish container images?

What are our options for hosting in Azure?

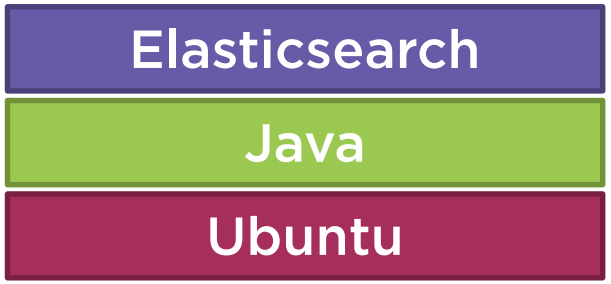
- Azure Container Instances
- Azure Web Apps for Containers
- Azure Service Fabric
- Azure Kubernetes Service (AKS)

Docker Basics

Images

Image = application + dependencies

Layered



Built from a dockerfile

Tagged - e.g. markheath/myapp:1.4

Publish to a "container registry"

- Docker Hub
- Azure Container Registry

Containers

An instance based on an image

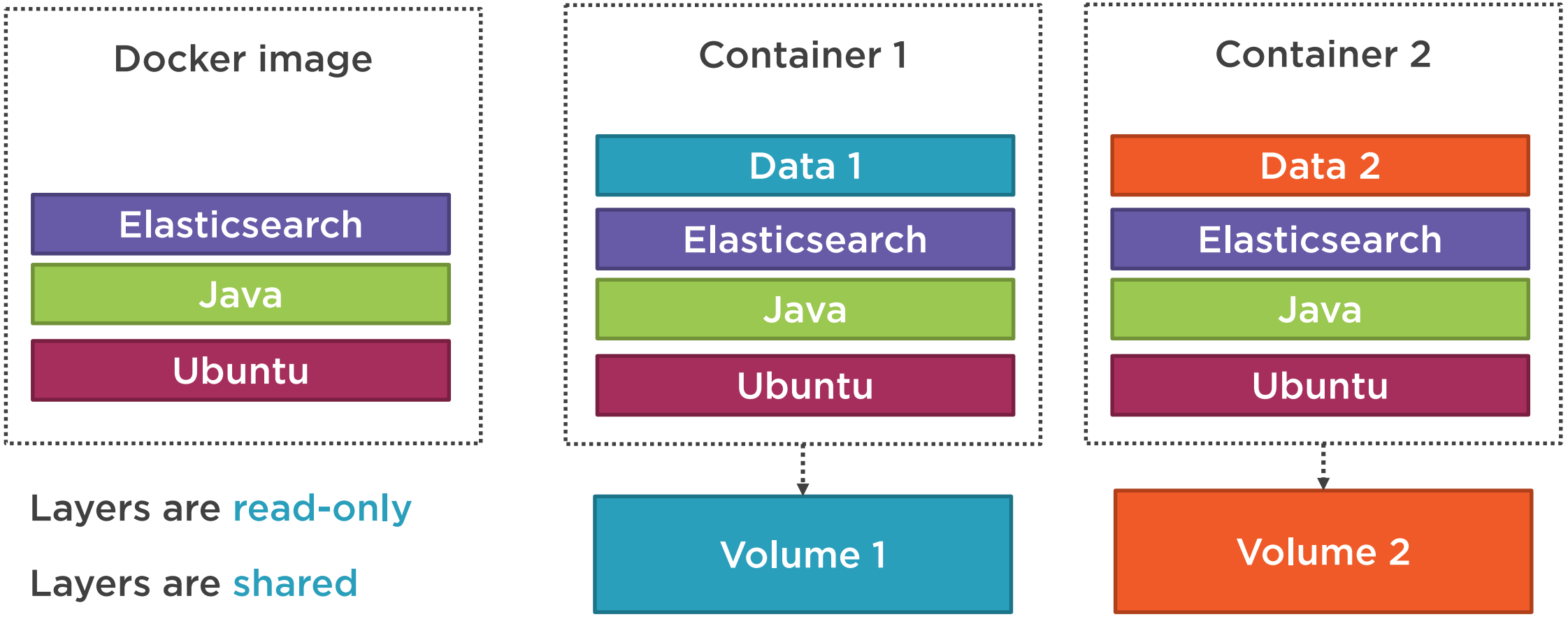
Run on a "Docker host"

- Works the same everywhere
- Provides memory and CPU
- Publish ports
- Disk access (image only)

Can be stopped and restarted

Multiple containers from a single image

Data Storage



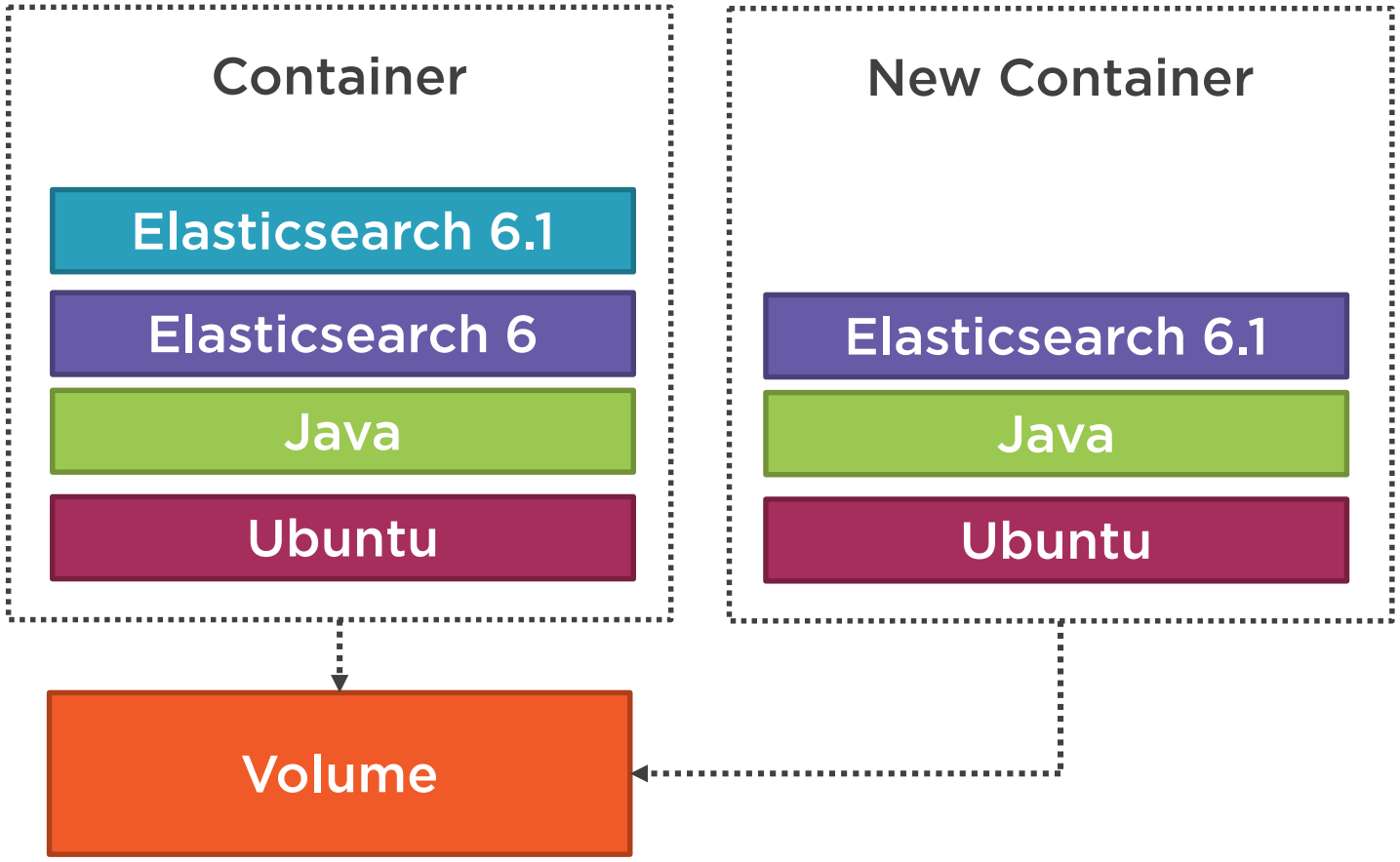
Layers are read-only

Layers are shared

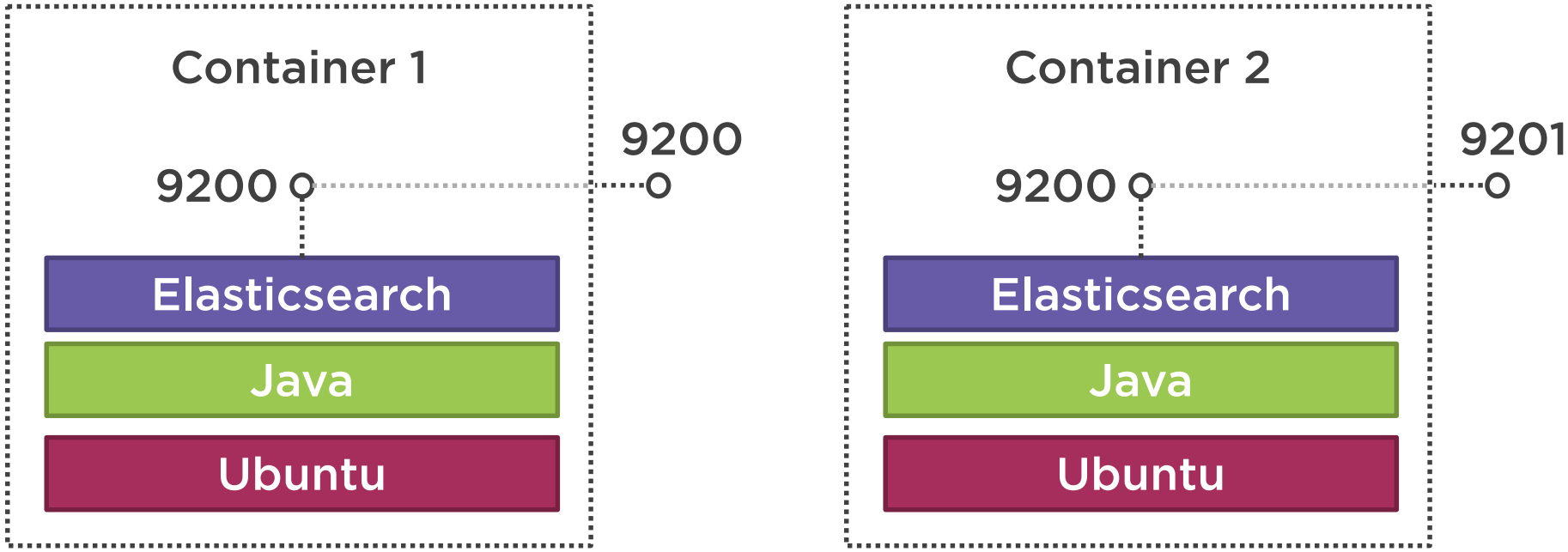
Use volumes to persist data

Mount volumes to a path in the container – e.g. /var/lib/mysql

Upgrades


Container
Elasticsearch 6.1
Elasticsearch 6
Java
Ubuntu
New Container
Elasticsearch 6.1
Java
Ubuntu
Volume

Network



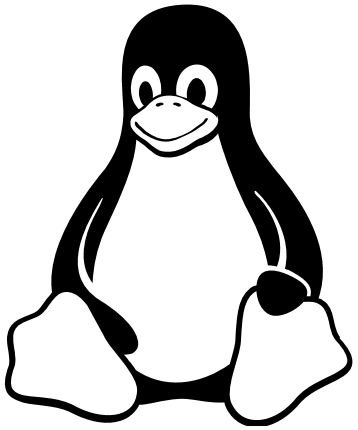
Containers can publish a port

Docker hosts can map a port

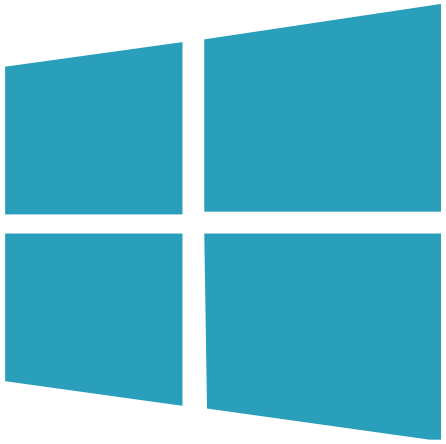
Environment Variables

Containers have their own environment variables

Linux



Windows



Windows Server 2016 supports Windows containers

Linux containers on Windows (LCOW)

Docker Benefits

Containers

- Isolation
- Portability
- Efficient
- Fast start
- Disposable
- Minimal attack surface area

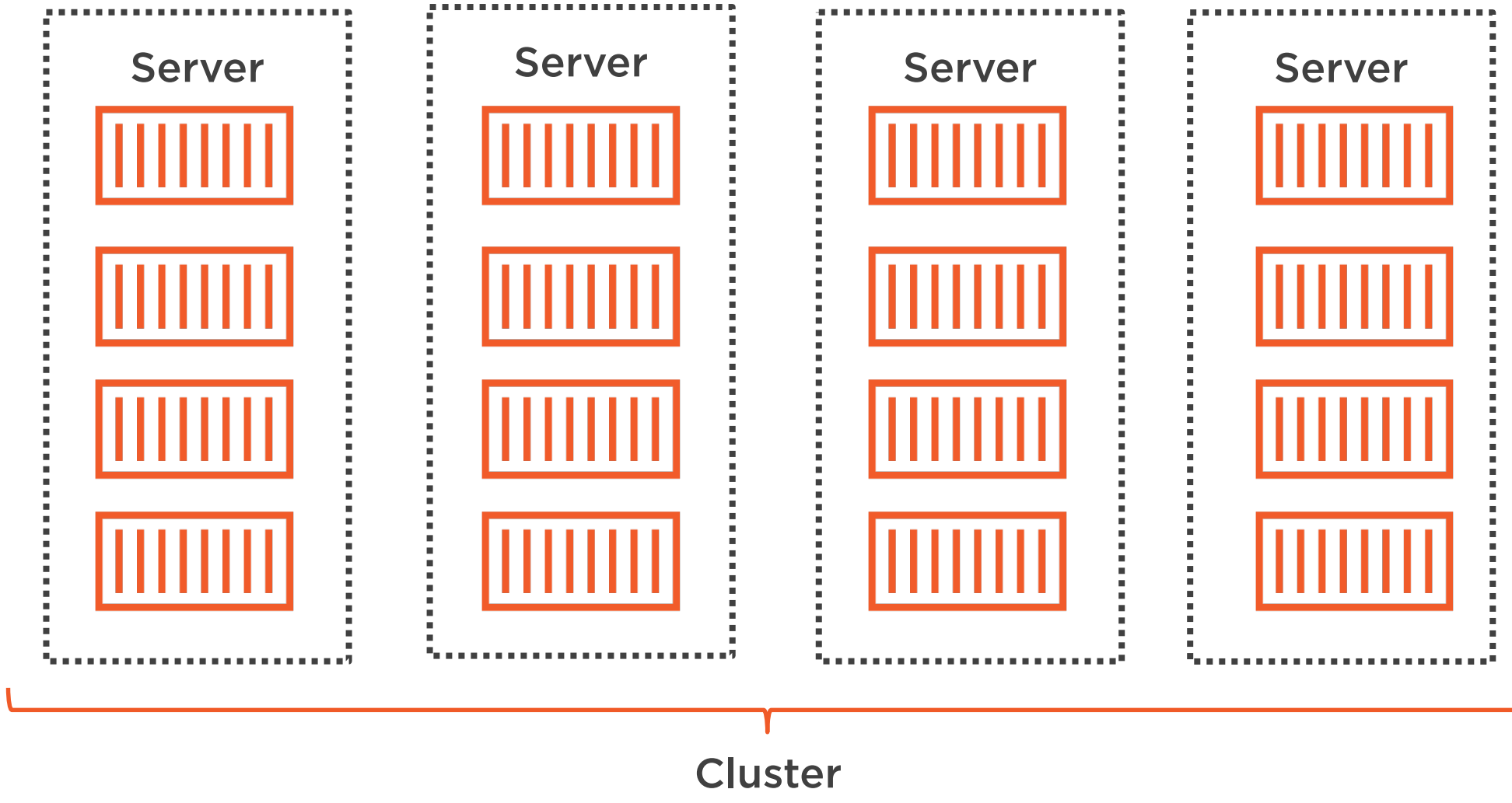
VMs

- Strong isolation
- Portability
- Resource hungry
- OS boot times
- Require patching
- OS needs hardening

Security

- Isolation
- Minimal attack surface area
- Vulnerability scanning
- Image signing

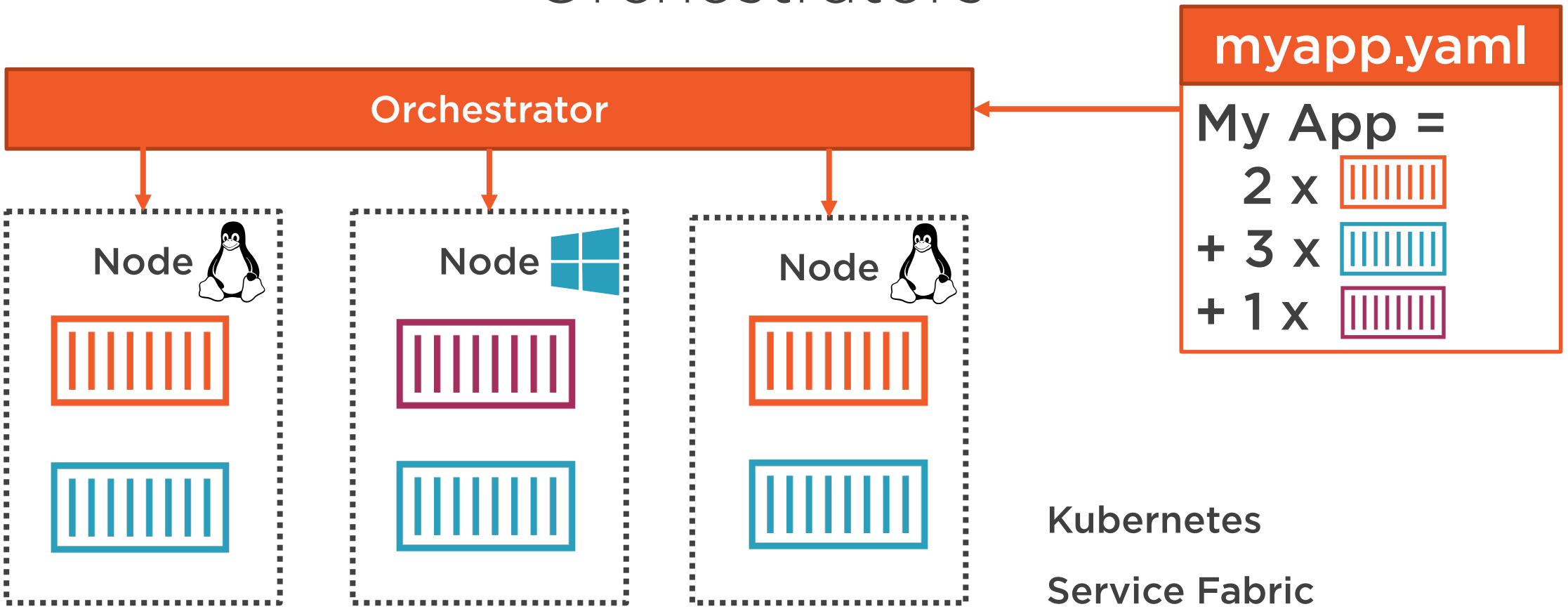
Managing Multiple Containers



Challenges:

- Deploying
- Scaling
- Monitoring
- Networking
- Upgrading
- Repairing

Orchestrators



Kubernetes

Service Fabric

Hosting Containers in Azure

Virtual Machines (IaaS)
Linux
Windows Server
Kubernetes

Azure Container Instances (ACI)
Serverless
Fast and easy
Per-second billing

Azure Web Apps for Containers
Great for web apps
Custom domains
Auto-scaling

Azure Service Fabric "Mesh"
Scalable orchestration platform
Powers key Azure services
Multiple programming models

Azure Kubernetes Service (AKS)
Managed Kubernetes cluster
Just specify node count
Open source tooling

Summary

Docker basics

- Containers
- Images
- Orchestrators

Docker benefits

- Isolation
- Efficiency
- Portability
- ...and more

Containers in Azure

- Azure Container Instances (ACI)
- Azure Web Apps for Containers
- Azure Service Fabric
- Azure Kubernetes Service (AKS)

Up next:
Running Containers Locally with Docker