Microsoft

@techdiction
#FutureDecoded

Bring your own container (BYOC) - Running your containers on Microsoft Azure

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Slides and demo scripts available at:
https://github.com/marrobi/Microsoft-and-Containers

Containers deliver speed, flexibility, and savings

Availability

62%

Report reduction in MTTR

10X

Cost reduction in maintaining existing applications

Hyper-scale

41%

Move workloads across private/public clouds

Eliminate

"works on my machine" issues

Agility

13X

More software releases

65%

Reduction in developer onboarding time

State of App development Survey: Q1 2016, Cornell University case study

One platform delivers one journey for all applications

1

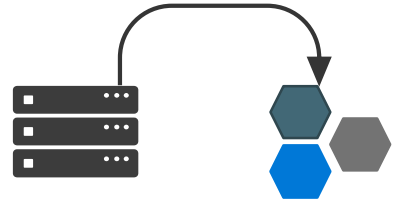
Containerize Legacy Applications

Lift and shift for portability and efficiency

2

Transform Legacy to Microservices

Look for shared services to transform



3

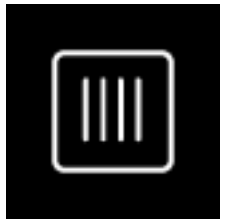
Accelerate New Applications

Greenfield innovation

Some Docker vocabulary

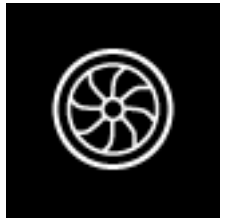
Docker Image

The basis of a Docker container. Represents a full application



Docker Container

The standard unit in which the application service resides and executes



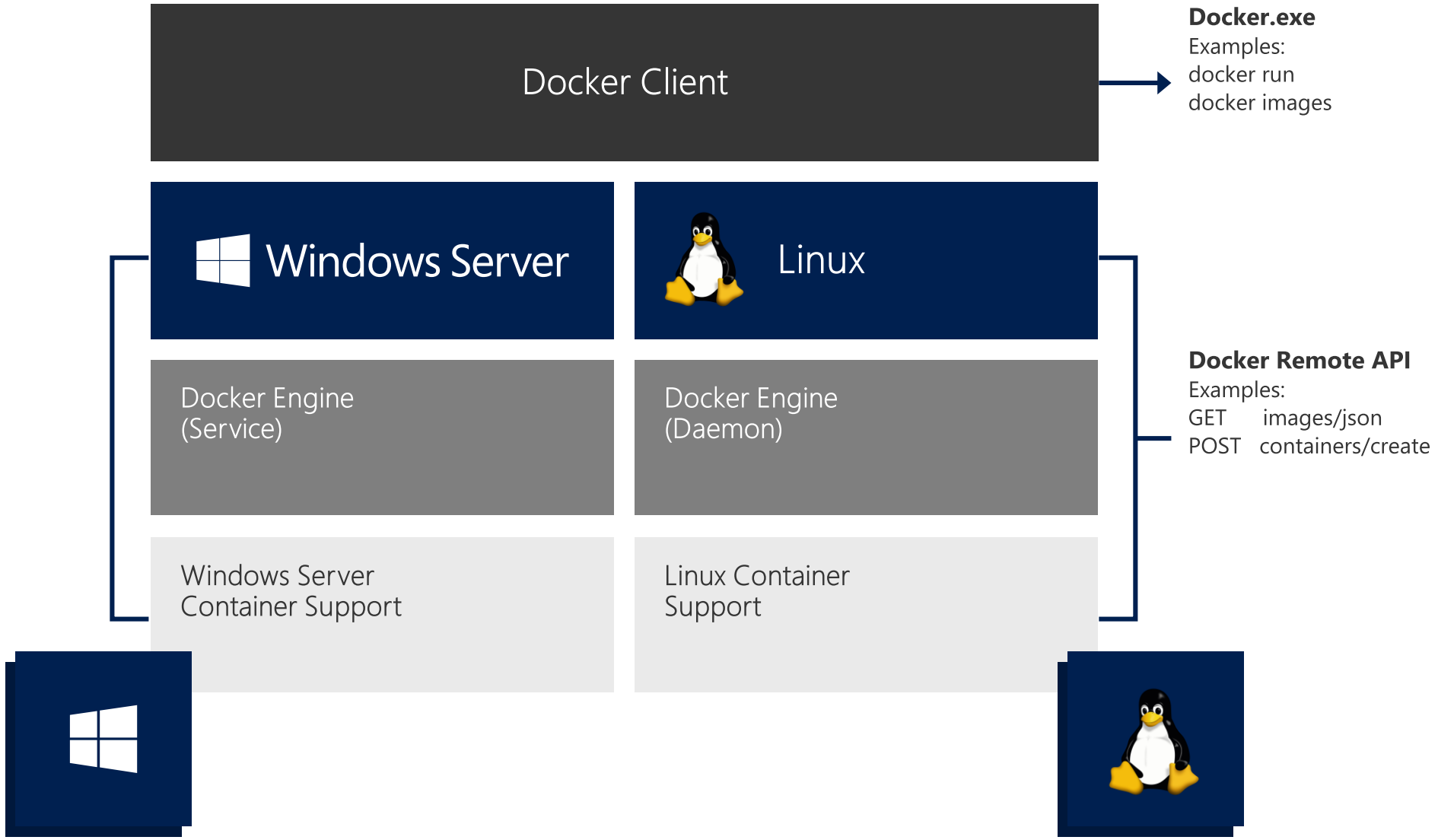
Docker Engine

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

Registry Service

Cloud or server based storage and distribution service for your images

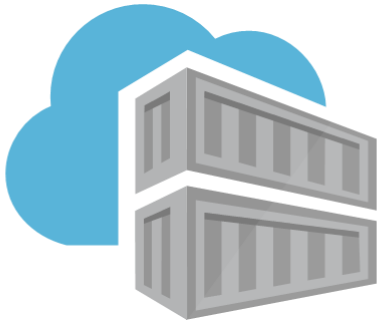
Windows & Linux



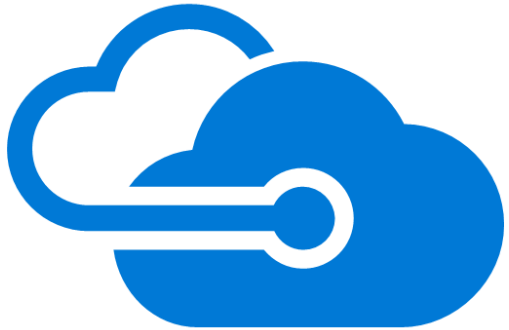
build → ship → run

Developer's Machine

CI/CD



Azure Container Registry



- Container Instances
- Container Service
- Service Fabric
- Partner Solutions
- Batch
- Web App for Containers

Azure Container Registry

- Private Docker Registry on Azure
- Authentication with Azure Active Directory
- Webhook integration
  - Trigger events on image push (update) or delete
- Charged per day dependant on plan
- Geo-replication in preview on premium SKU

Classic: GA
Managed: GA

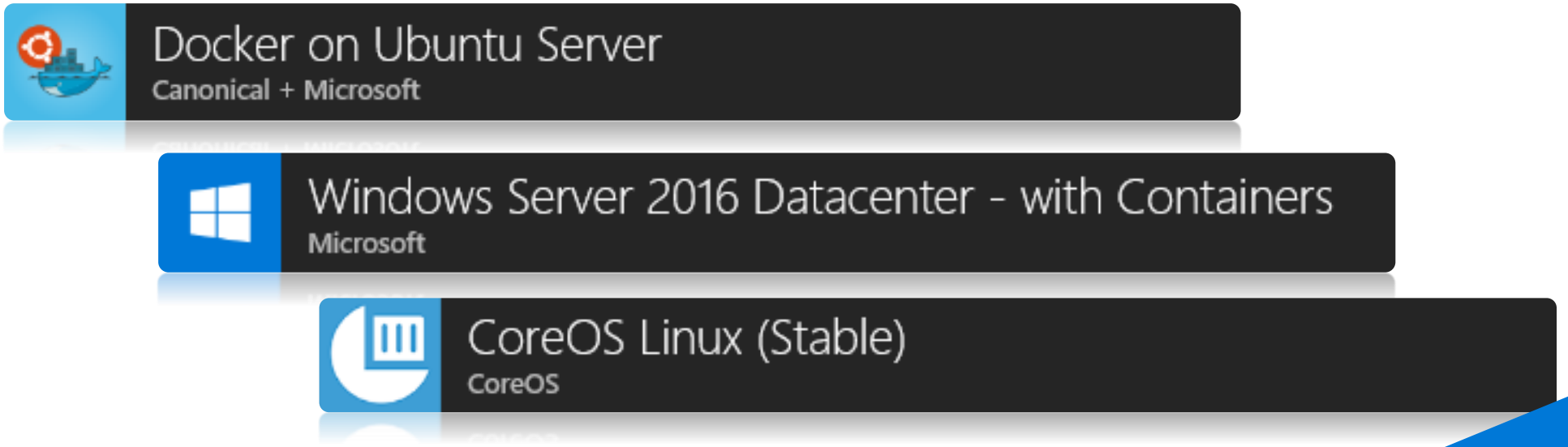

DEMO
Build & Ship to
Azure Container Registry

Infrastructure As A Service

Virtual Machines

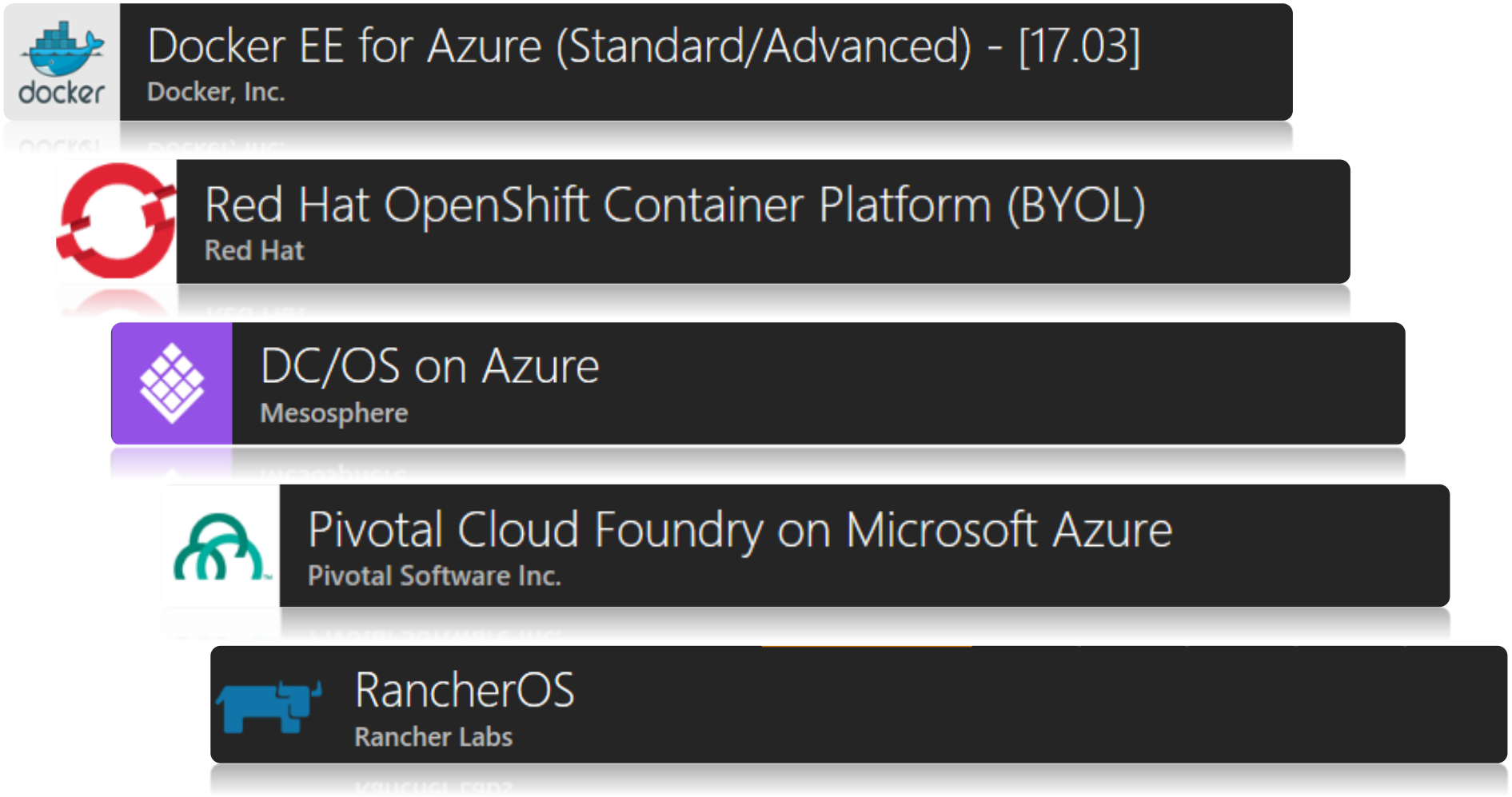
Virtual Machines on Azure

- Windows and Linux images available in the Azure Marketplace with Docker preinstalled
- Great for Dev & Test scenarios
- Need to support OS and manage the infrastructure
- Billed for the compute resource used by the minute



Windows: GA
Linux: GA

Partner solutions using IaaS



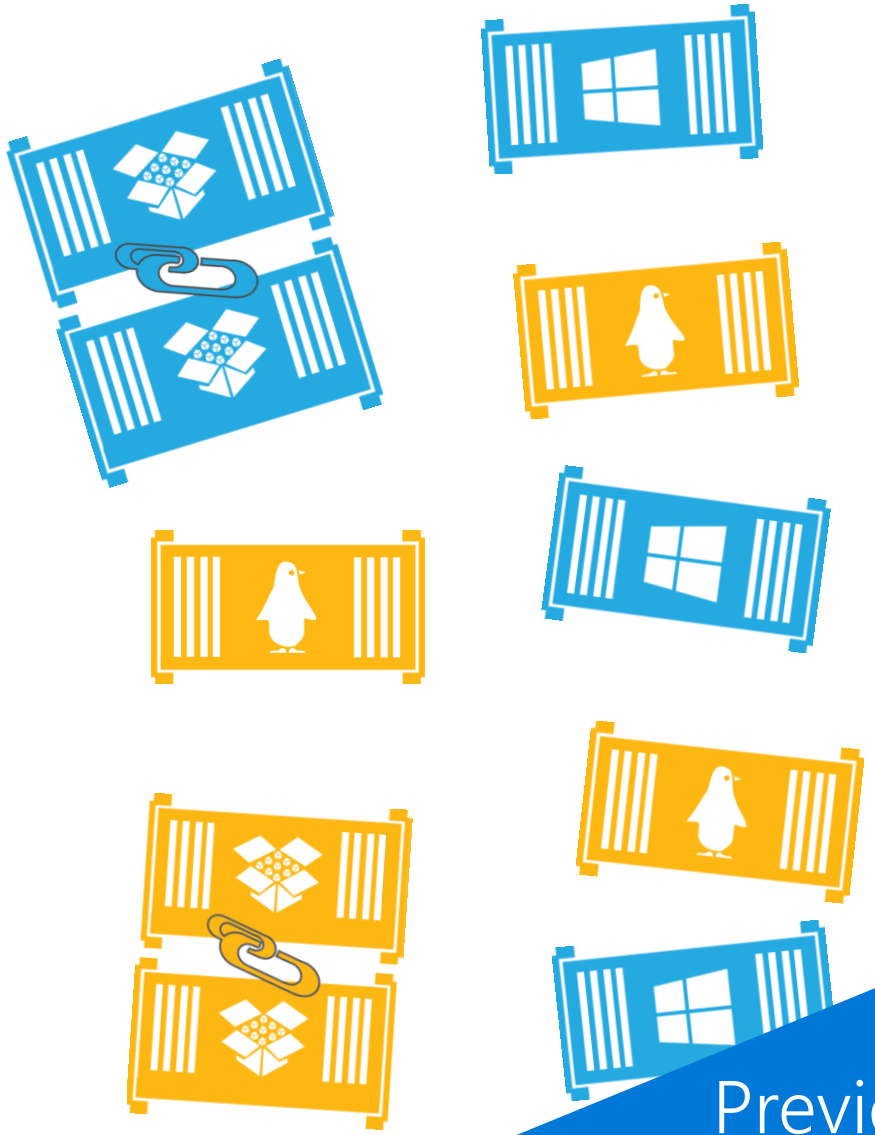
and more at https://azuremarketplace.microsoft.com/en-us/marketplace/

Azure Container Instances

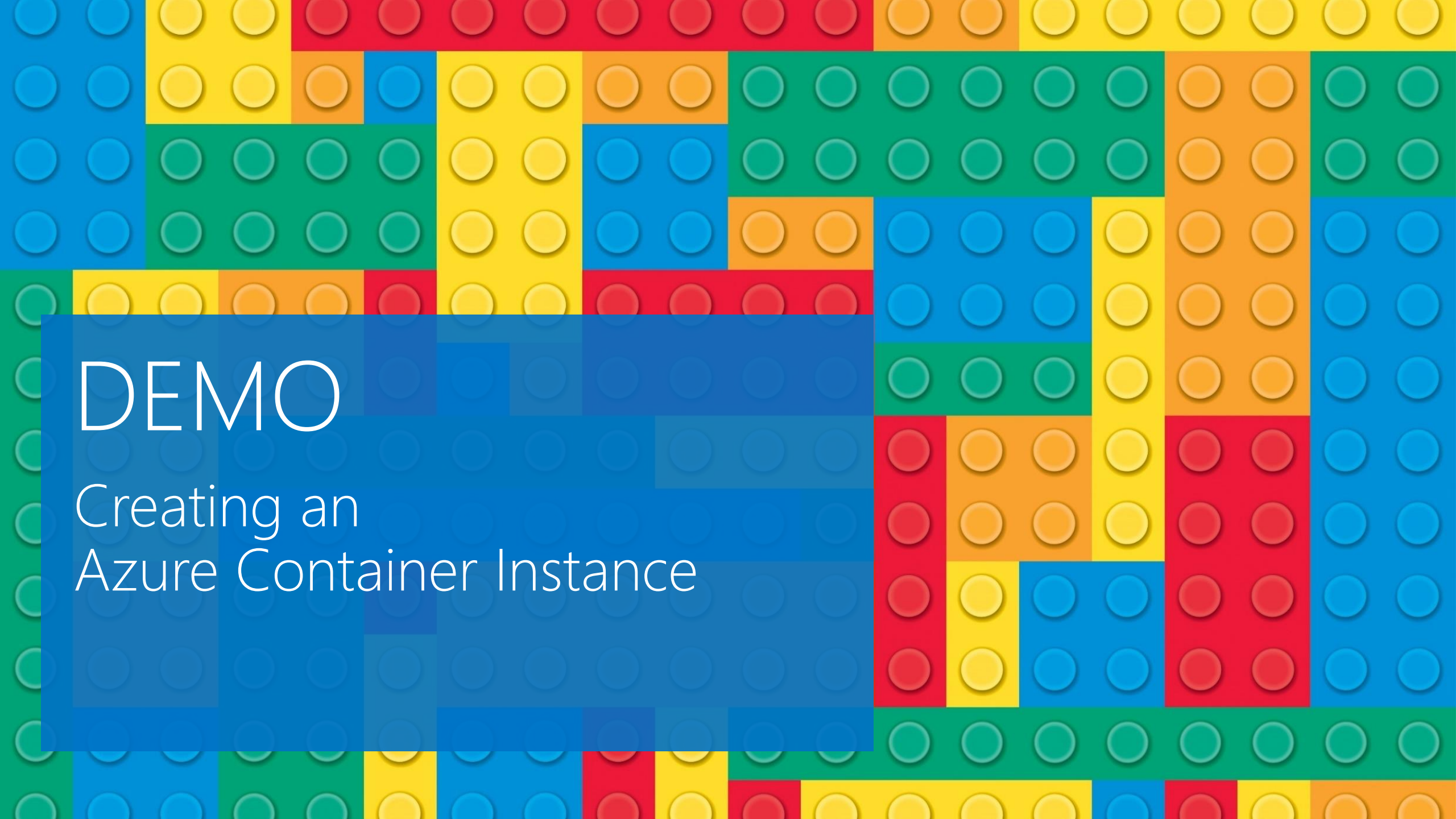
Containers without Servers

Azure Container Instances

- Just containers – **no host VM**
- Can deploy containers that are always deployed together into Container Groups
- Can be used stand alone, but more likely be utilised by other services
- Billed for instance creation and by the second for CPU and memory usage



Preview

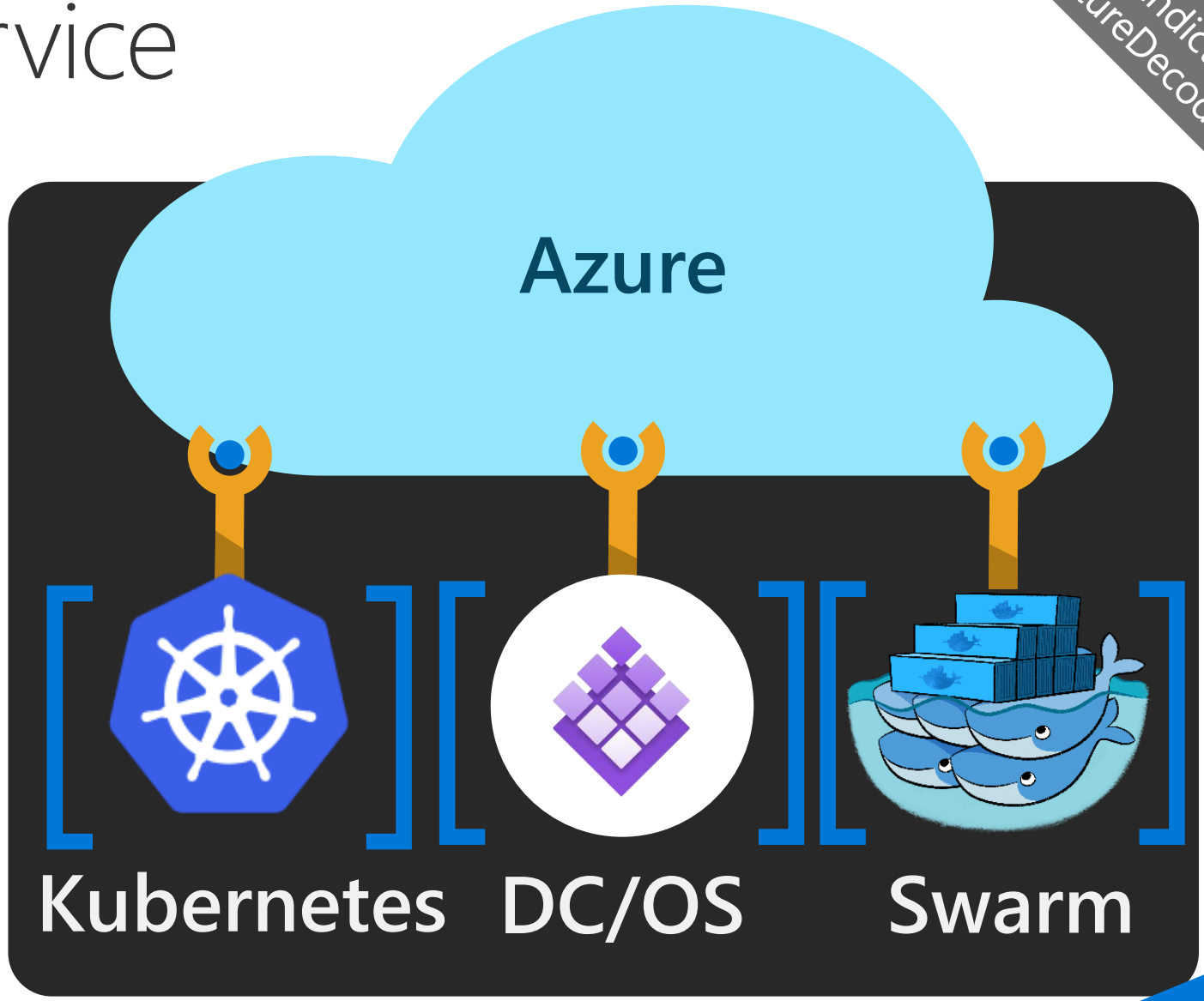

DEMO
Creating an
Azure Container Instance

Azure Container Service

Orchestration & Microservices

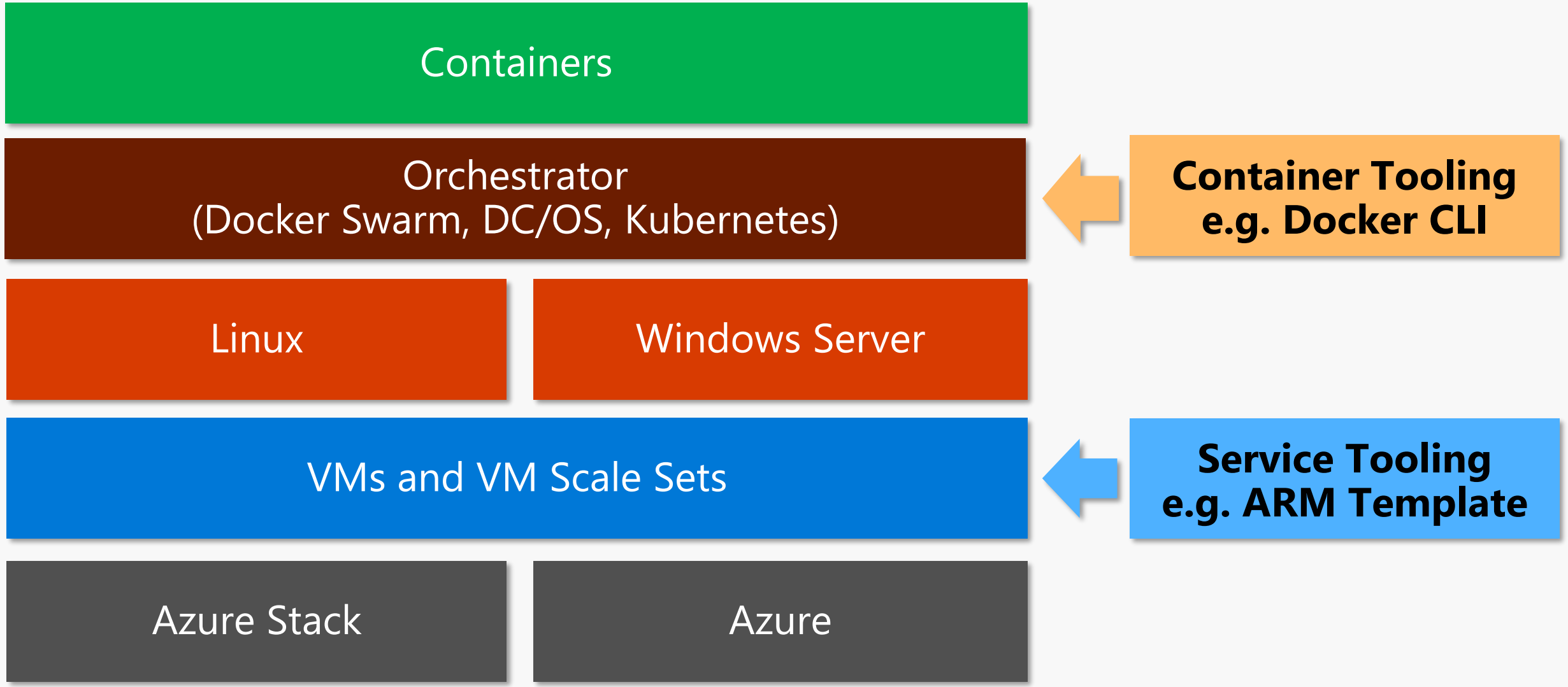
Azure Container Service

- Provisioning of DC/OS, Docker, and Kubernetes
- Standard Docker tooling and API support
- Linux and Windows Server containers
- Billed for the compute resource used



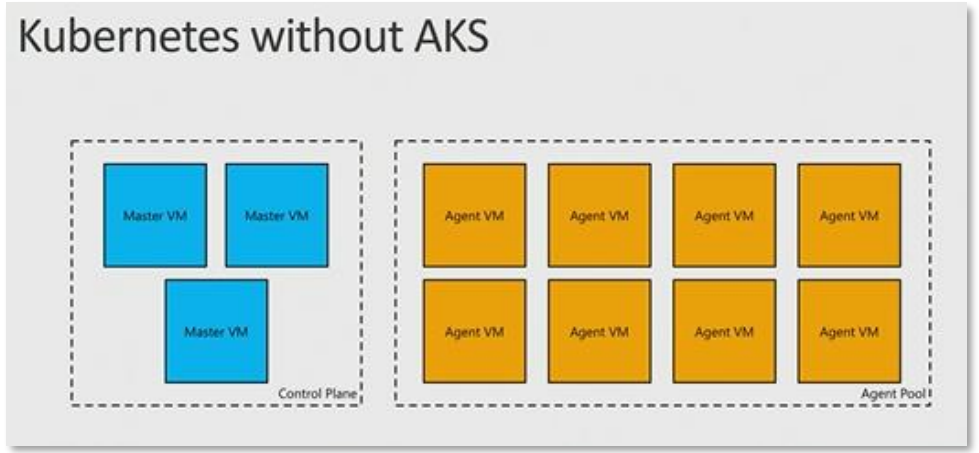
Linux: GA
Windows: Preview

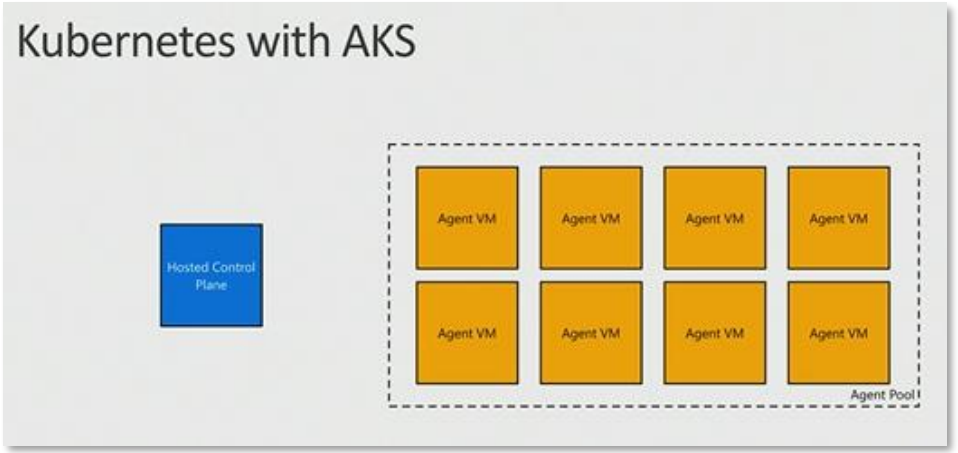
Azure Container Service



AKS: Managed Kubernetes

- Azure-hosted control plane
  - No master nodes to manage or pay for
- Automated upgrades and patching
  - Easily upgrade control plane and worker nodes to new versions of Kubernetes
- Scale agent pool to increase or decrease capacity





Linux: Preview
Windows: Not yet

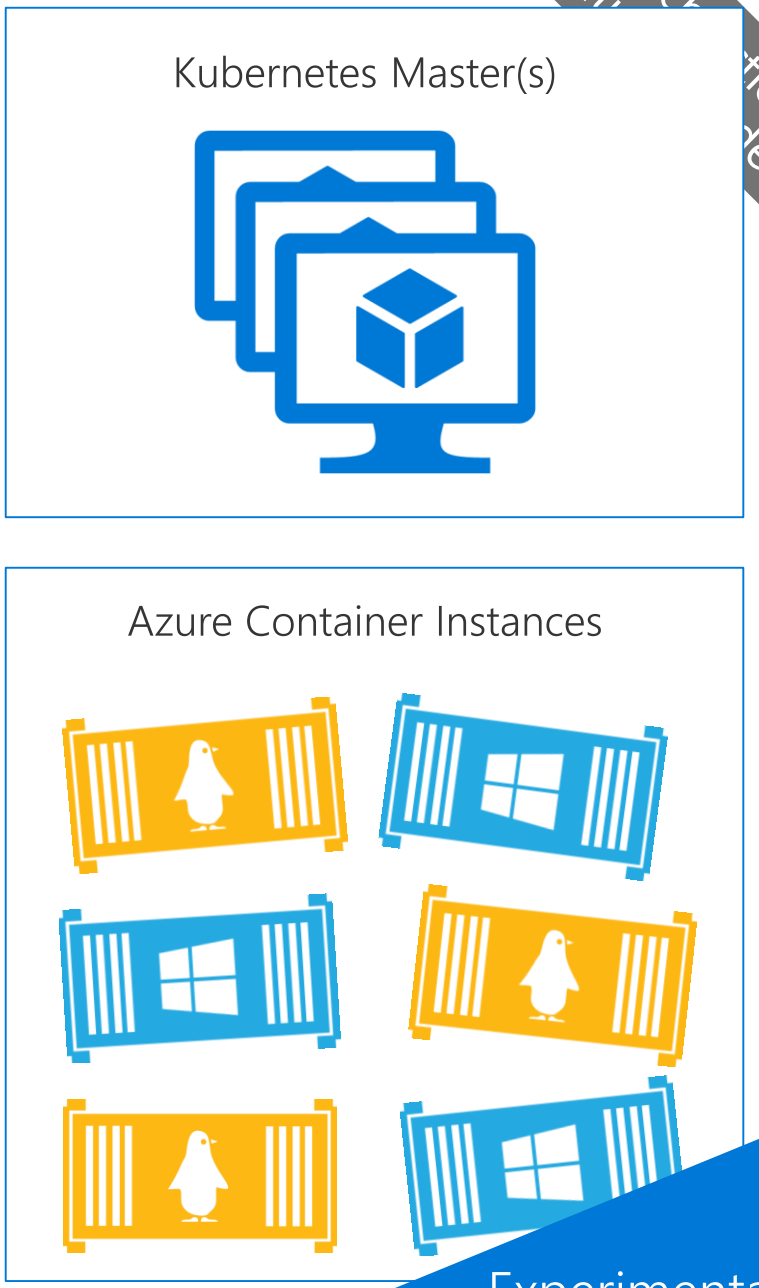

DEMO
Deploying to Kubernetes on AKS

Kubernetes and ACI

Bringing ACS/AKS + ACI together

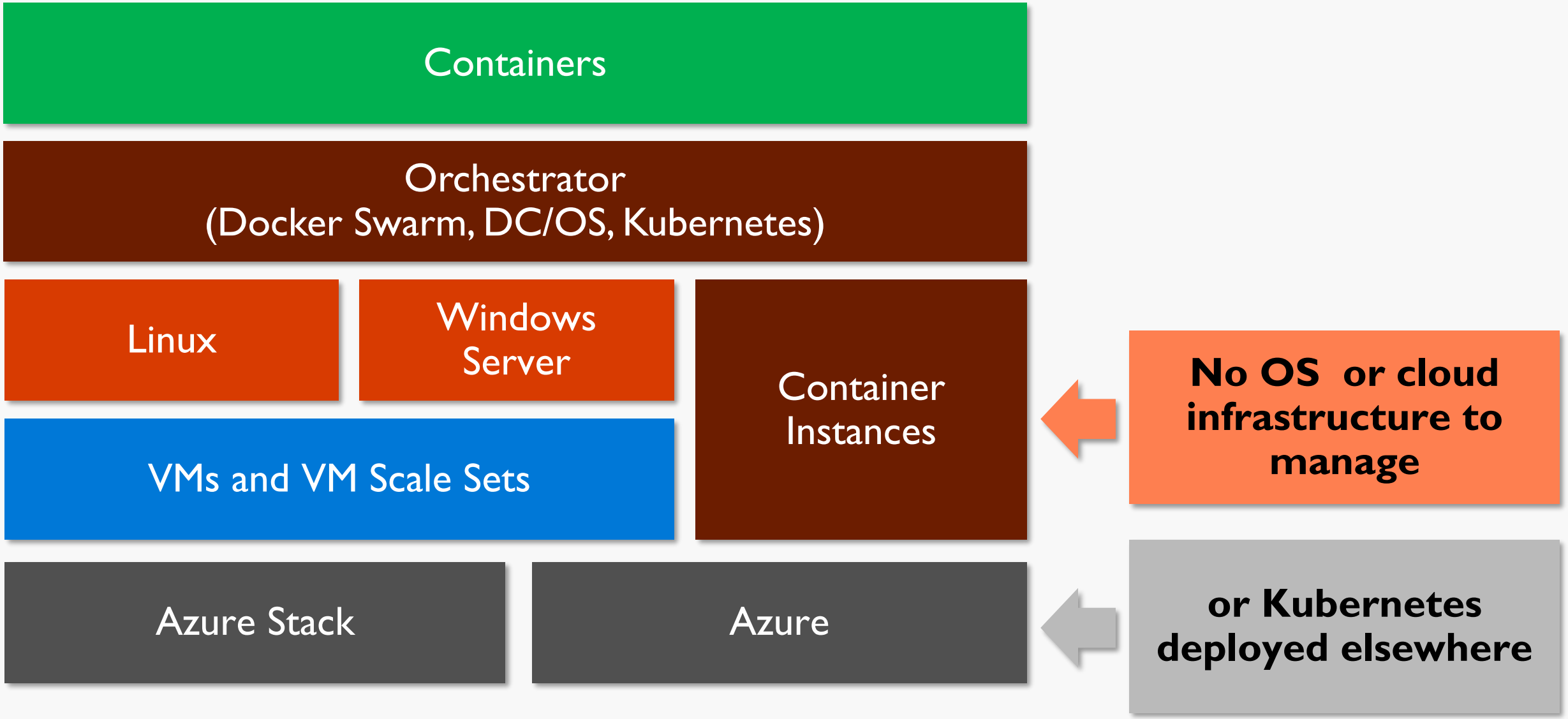
ACI Connector

- Allows Kubernetes clusters to deploy Azure Container Instances.
- Registers into the Kubernetes as a Node with unlimited capacity
- On-demand and near instantaneous container compute
- Unlimited capacity with zero infrastructure to manage
- Utilize both VMs and container instances simultaneously in the same cluster



Experimental

Azure Container Service with ACI




DEMO
Azure Container Instances
with Kubernetes on
Azure Container Services

Service Fabric

Orchestration, microservices, programming models

Services Powered by Service Fabric

SQL Database

2.1 million DBs

Cosmos DB

Billions transactions/day

IoT Hub

Millions of messages

Event Hubs

60bn events/day

Skype

Cortana

Intune

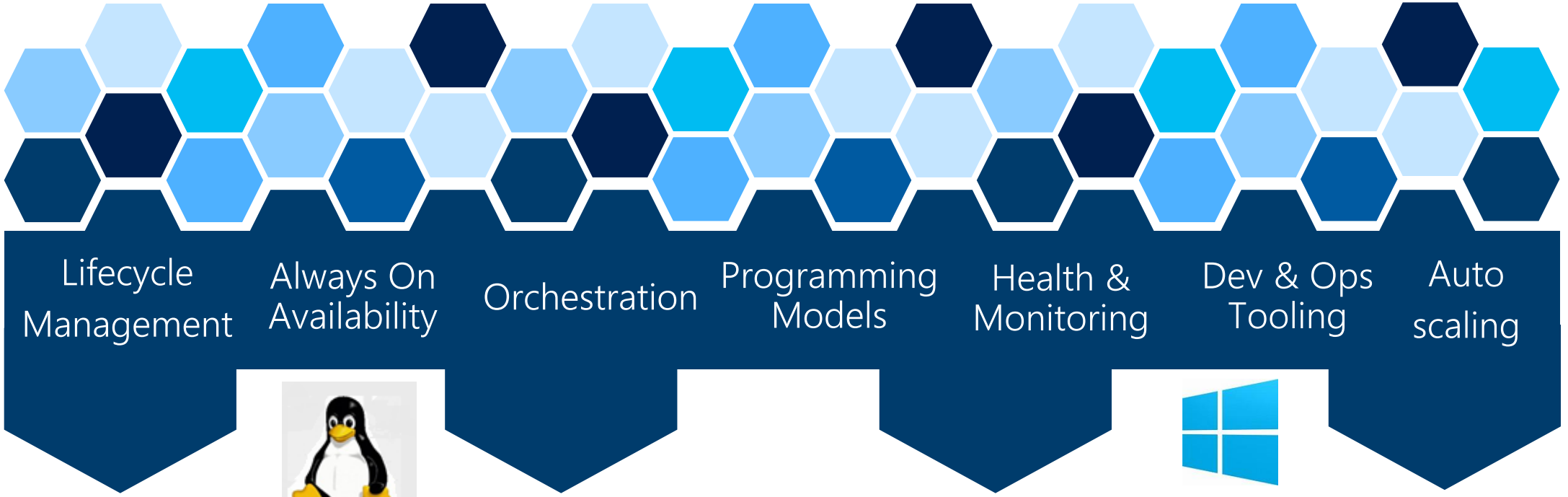
Dynamics

Power BI

Windows: GA
Linux: Preview

Azure Service Fabric

Any OS, Any Cloud



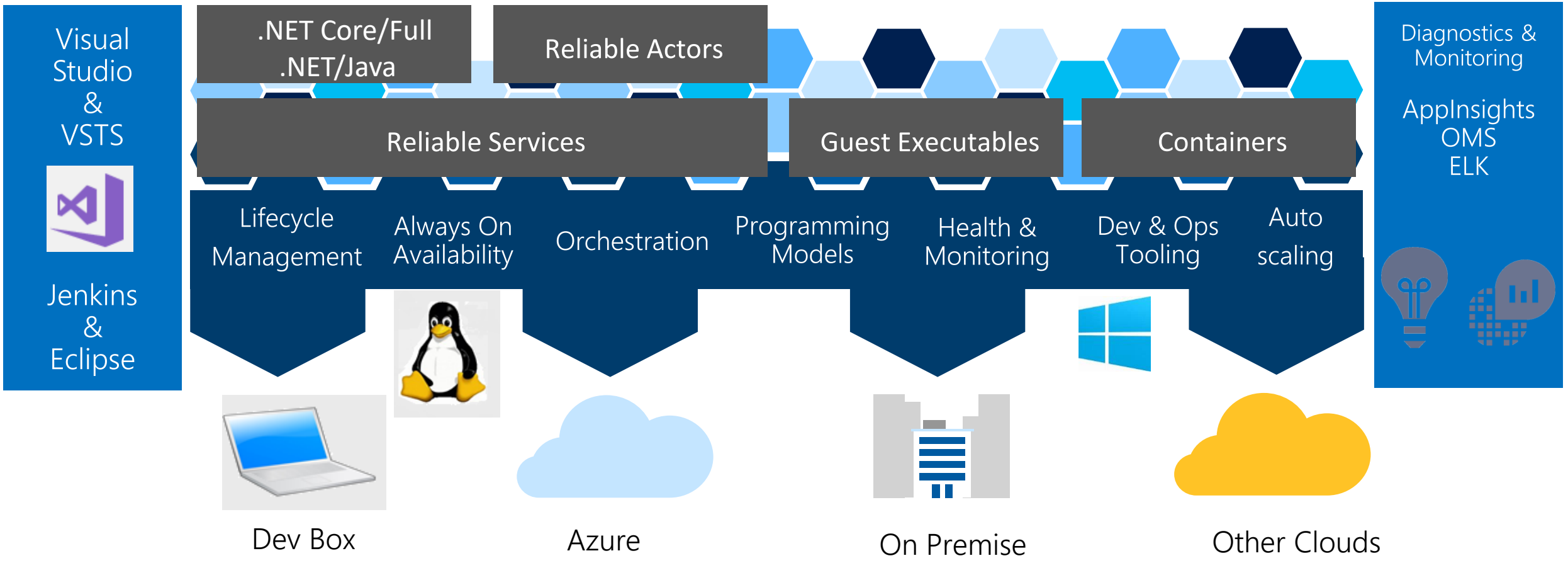
Dev Box

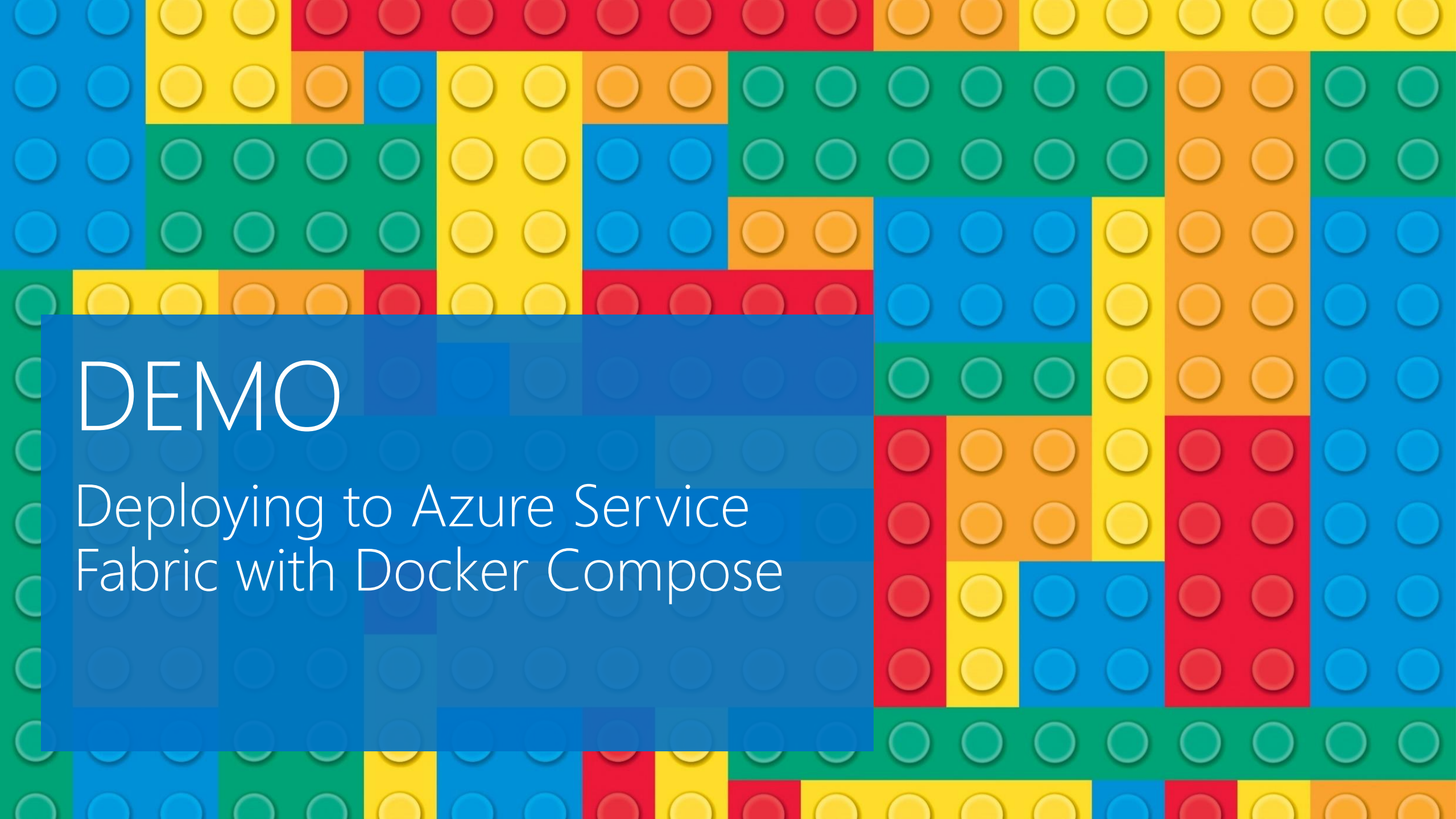
Azure

On Premise

Other Clouds

Service Fabric Programming Models & CI/CD




DEMO
Deploying to Azure Service Fabric with Docker Compose

Azure Web App for Containers

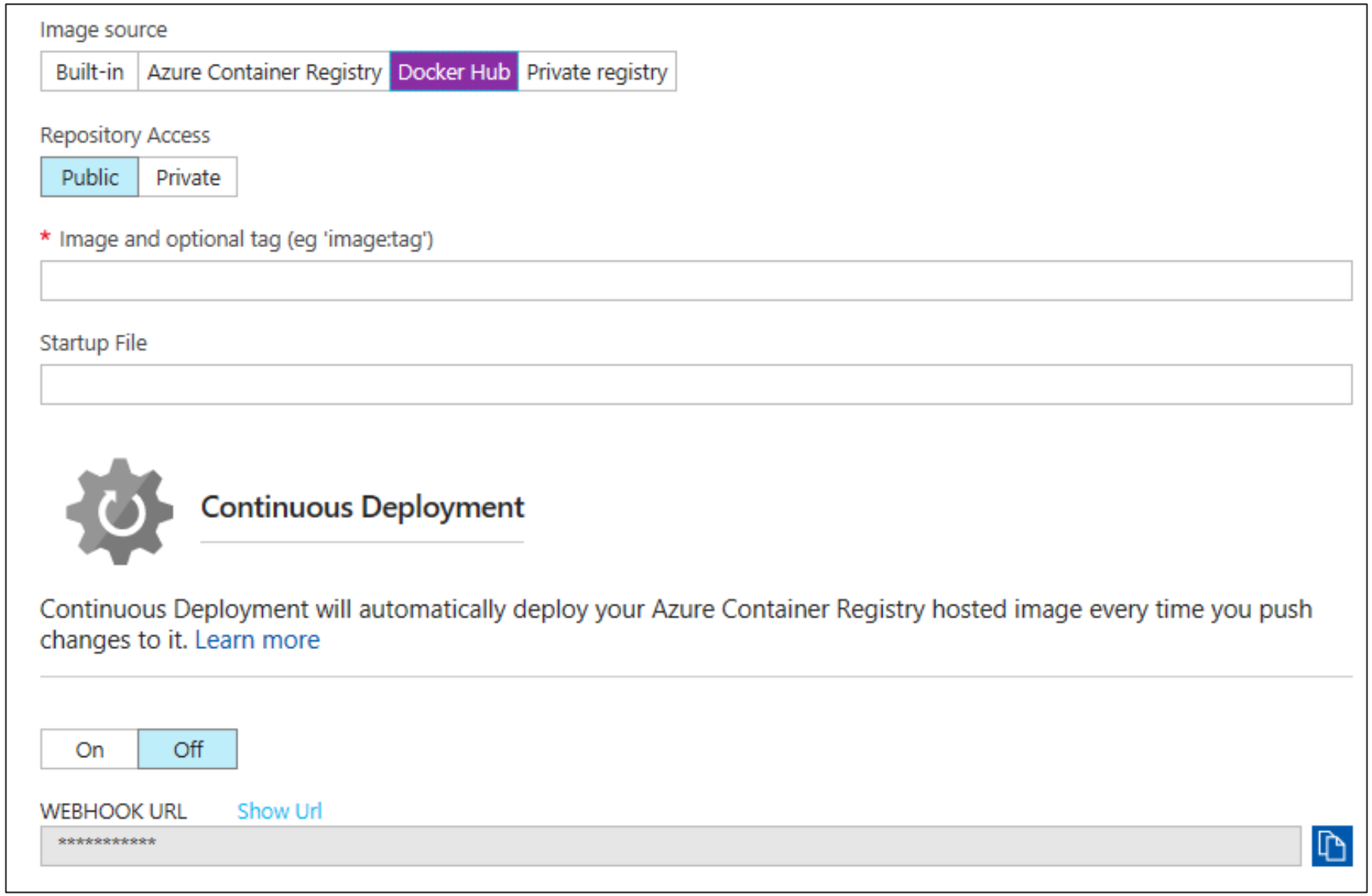
Web sites, web applications – no servers

Azure Web App for Containers

- Deploy Linux container-based **web apps** in seconds
- **Fully managed infrastructure** with auto scaling and load balancing
- **Built-in features to enable DevOps practices** including staging slots; rollback; testing-in-production; monitoring; and performance testing
- Integrated CI/CD capabilities with Docker Hub, Azure Container Registry, and VSTS
- Billed by the minute based on App Service Plan tier and number of instances

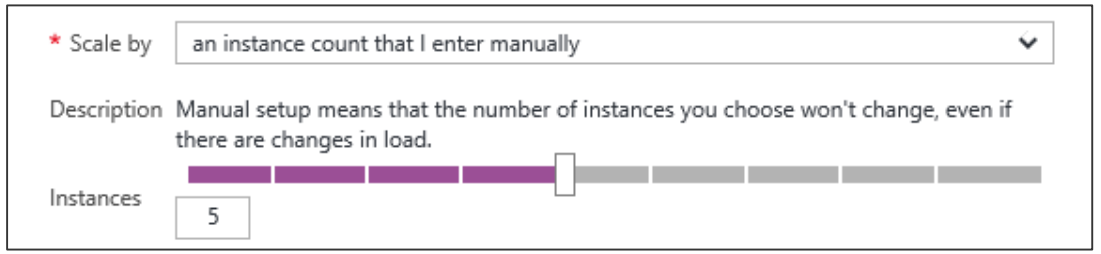
Linux: GA
Windows: N/A

Choose your container

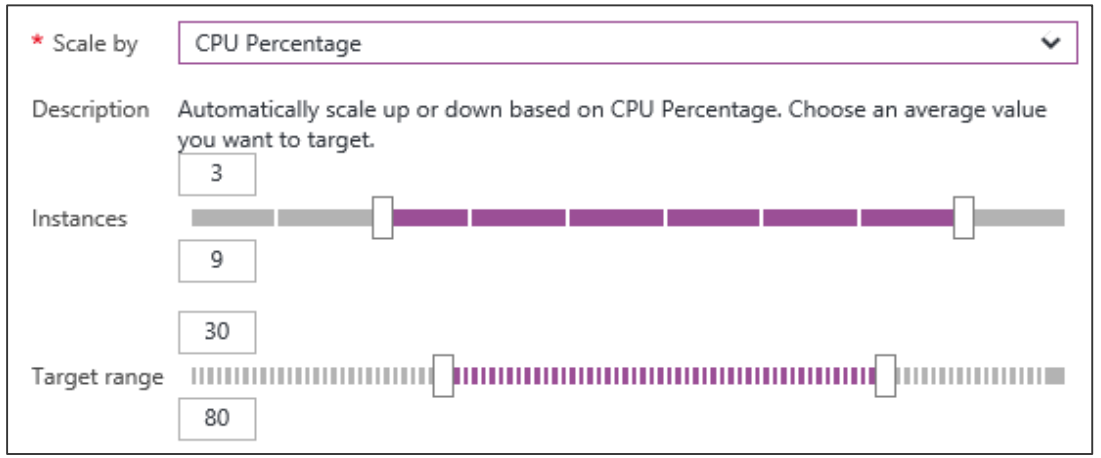


Manual Scaling & Auto-Scaling

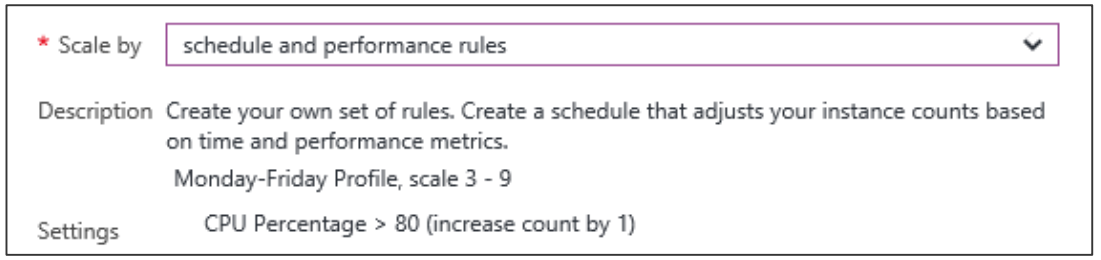
Manual – Scale via portal or scripts



Auto – CPU Percentage

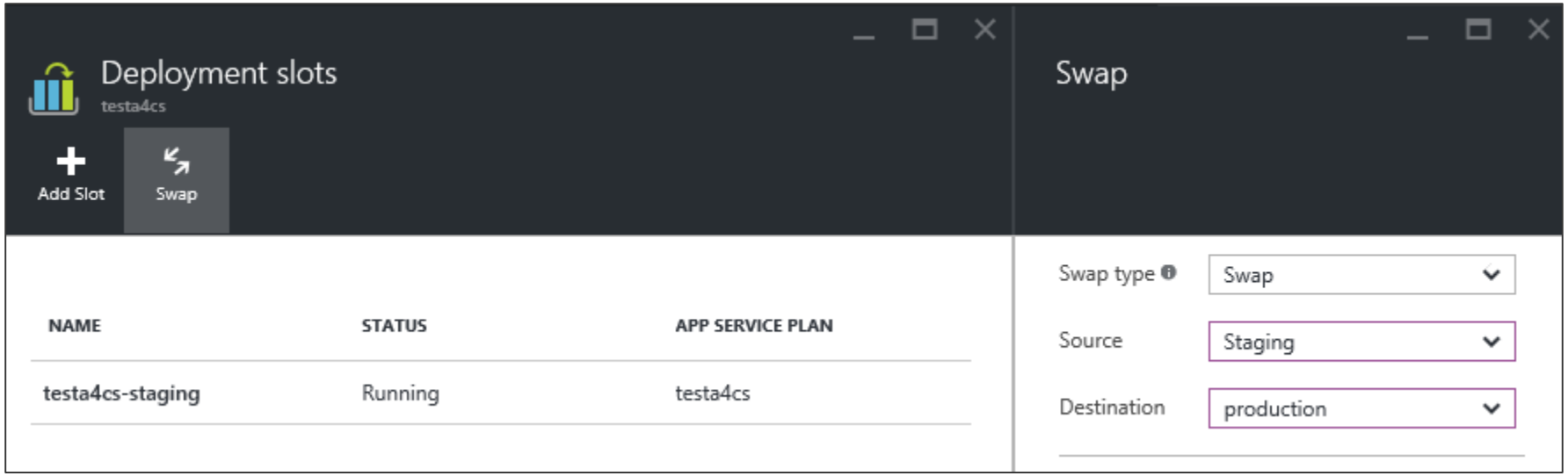


Auto – Schedule & Performance Rules



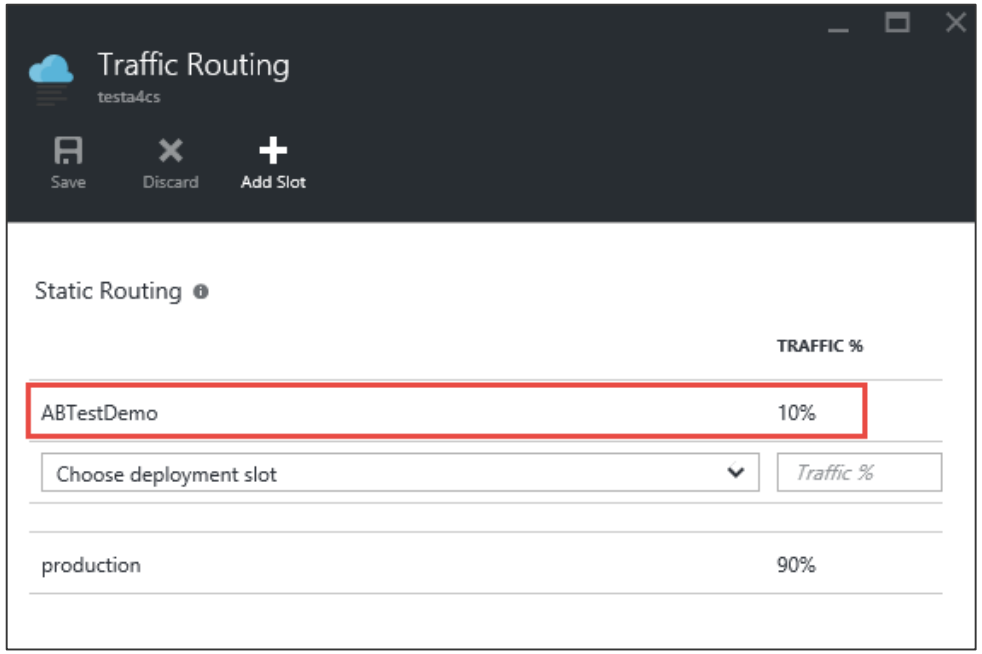
Deployment Slots

- Use a Deploy-Confirm-Promote workflow
  - Promote via "swap" through Azure portal
- http://sitename-slotname.azurewebsites.net



Traffic Routing

- Test changes or scenarios by routing requests to different deployment slots
- Use Traffic Routing to direct % of traffic to alternate slots

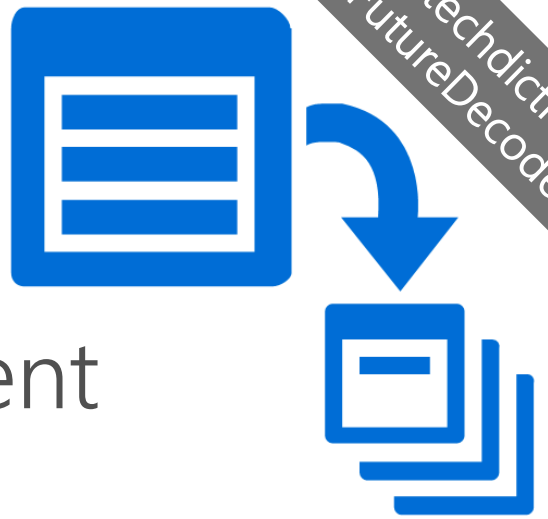



DEMO
Azure Web App for Containers

Azure Batch

Parallel processing

Azure Batch



Job scheduling and cluster management service, allowing applications or algorithms to run in **parallel** at scale

- Capacity on demand; run jobs on demand
- Scale - 1 to 10,000's VMs for a cluster according to load; 1 to millions of tasks
- Choice of hardware and OS – Any VM size; Windows or Linux
- No charge for Batch, pay for used resources by the minute; no head-node

Linux: GA
Windows: GA

Some real-world Batch workloads

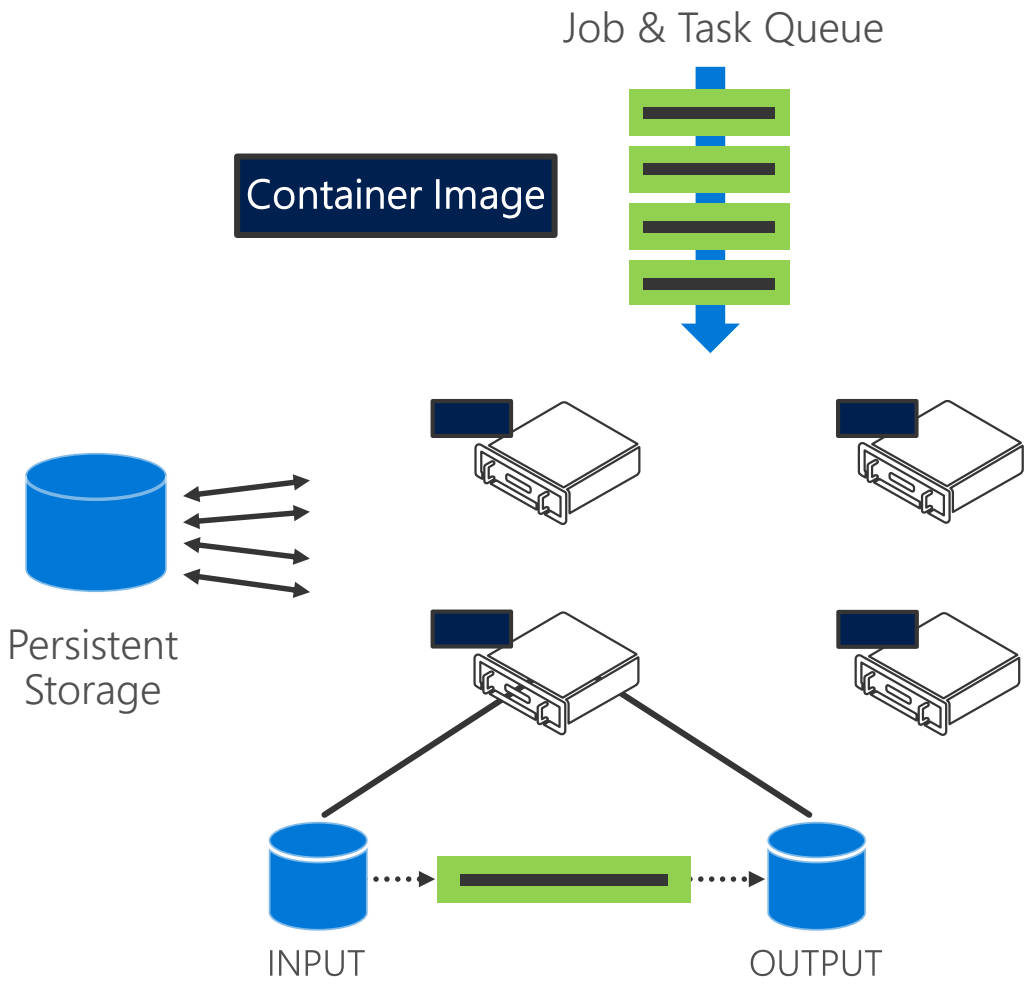
- Media transcoding & pre-/post-processing
- Rendering
- Test execution
- Monte Carlo simulations
- Genomics
- Deep Learning
- OCR
- Data ingestion, processing, ETL
- R at scale
- Compiled MATLAB
- Engineering simulations
- Image analysis & processing

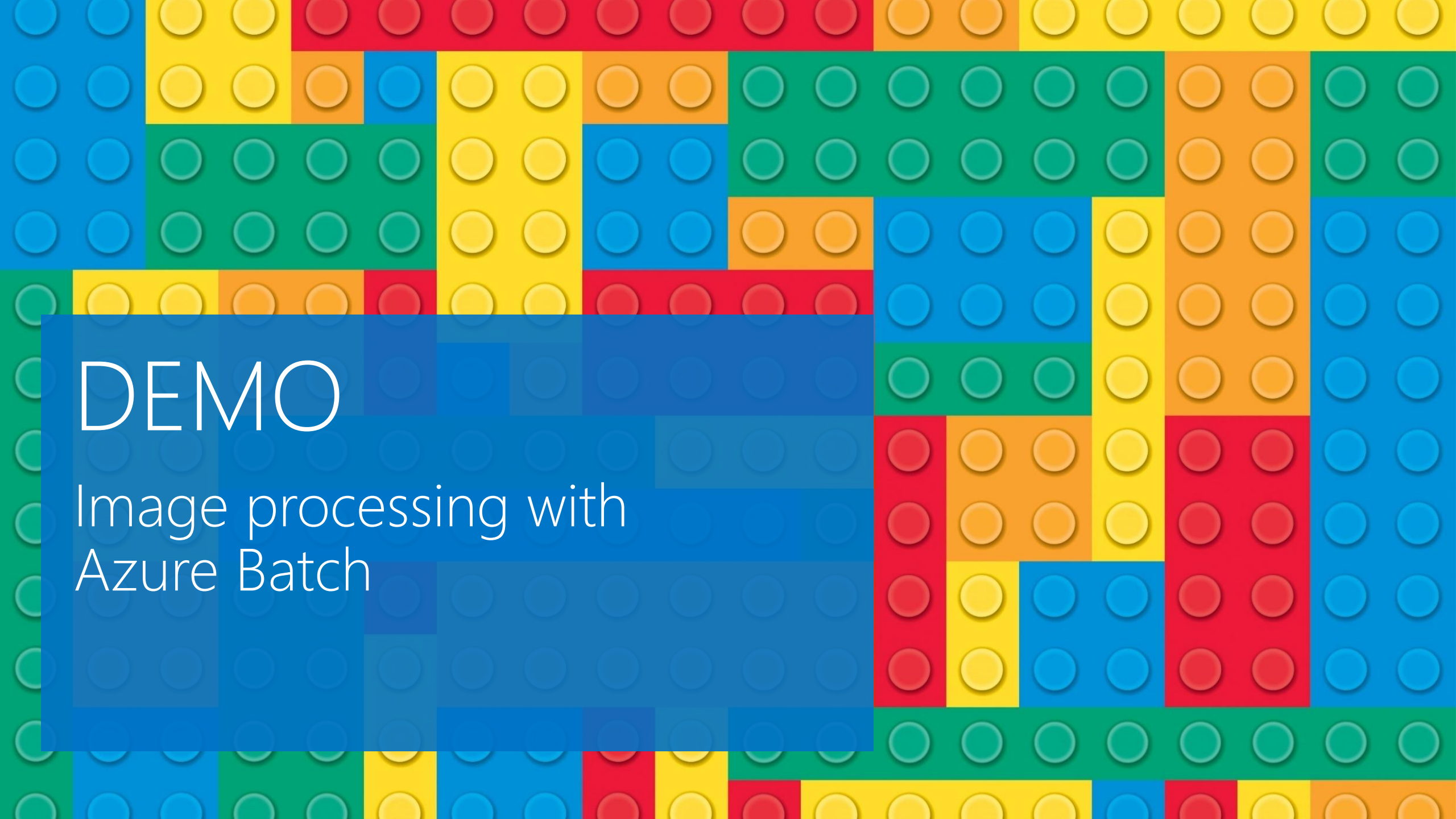
Batch + Containers = Batch Shipyard

- Make it easier to run Docker apps using Python tooling
- Deploys Docker engine to nodes and deploys required container images to nodes
- Can deploy GlusterFS for use by pool nodes and install required GPU and RDMA drivers
- Create a Recipe – Number of JSON configuration files
- Large number of pre-supplied recipes in GitHub; e.g. CNTK, TensorFlow, Caffe

https://github.com/Azure/batch-shipyard

Batch Shipyard




DEMO
Image processing with
Azure Batch

Summary

- IaaS and Partner Solutions
- Azure Container Instances
- Azure Container Service + AKS
- Azure Service Fabric
- Azure Web App for Containers
- Azure Batch

Additional resources:

- Azure.com service overviews
  https://aka.ms/containersonazure
- Microsoft Docs - Documentation for container related services
  https://aka.ms/containerdocs
- MSDN Channel 9 – Videos covering Azure and Containers
  https://channel9.msdn.com/
- Microsoft Virtual academy – online training courses
  https://mva.microsoft.com/

Slides and demo scripts available at:
https://github.com/marrobi/Microsoft-and-Containers