

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

One platform
delivers one
journey for all
applications

1

Containerize Legacy Applications

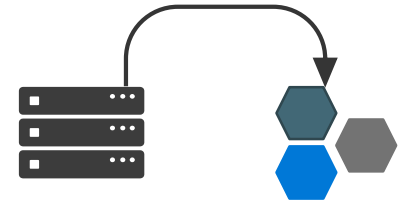
Lift and shift for portability and efficiency



2

Transform Legacy to Microservices

Look for shared services to transform



3

Accelerate New Applications

Greenfield innovation



Some Docker vocabulary

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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

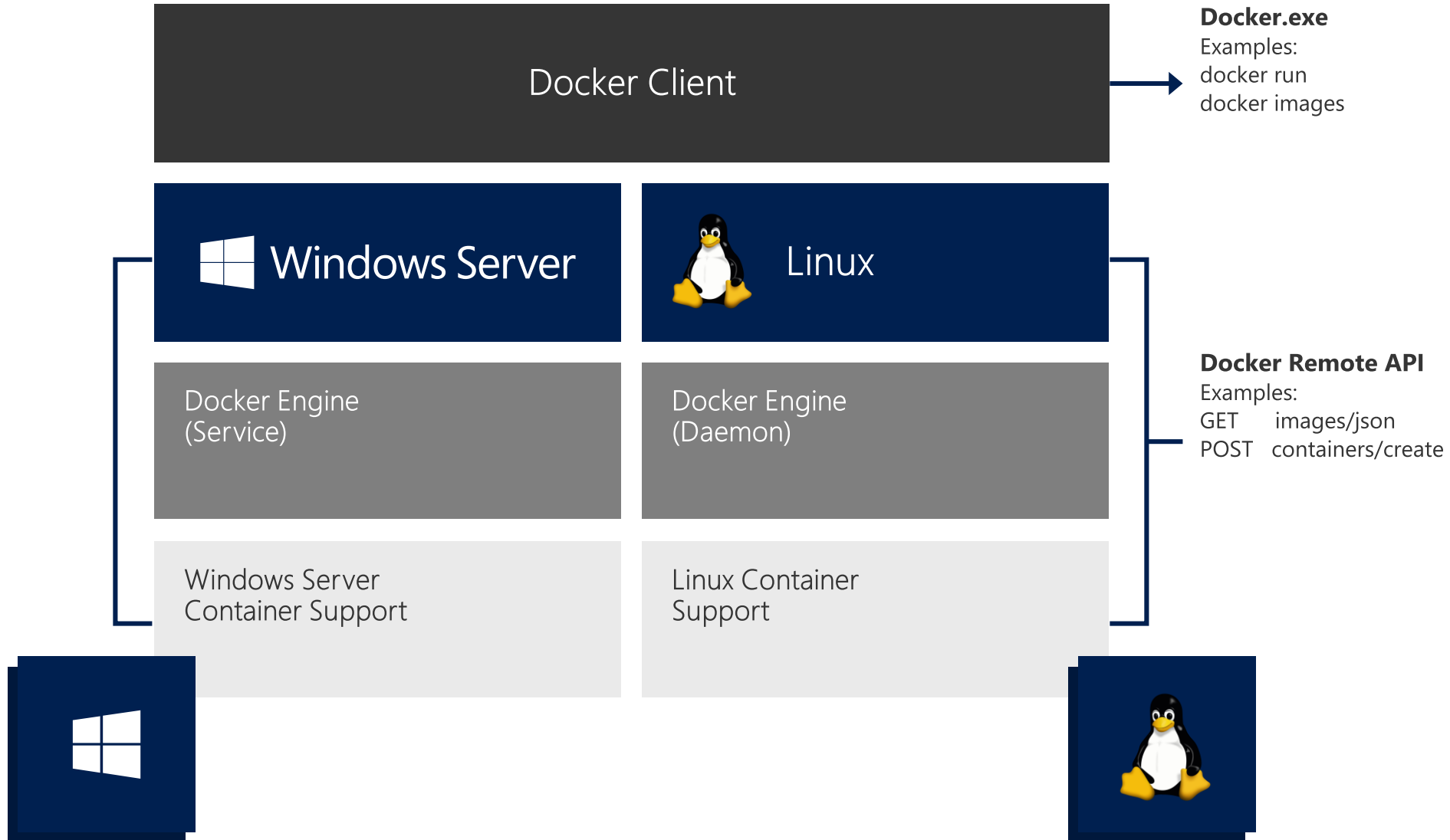


Registry Service

Cloud or server based storage and distribution service for your images

Windows & Linux

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build



ship



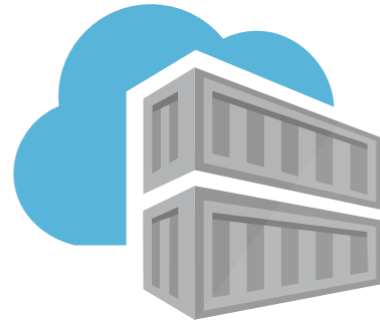
run



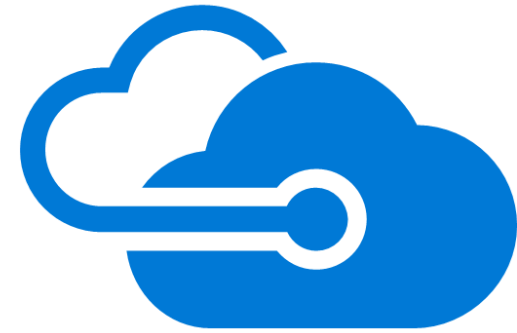
Developer's
Machine



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





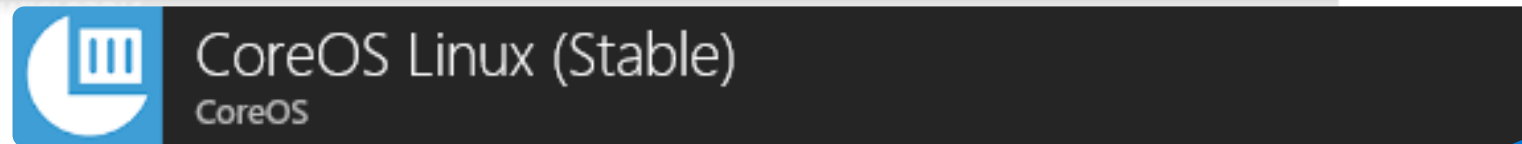
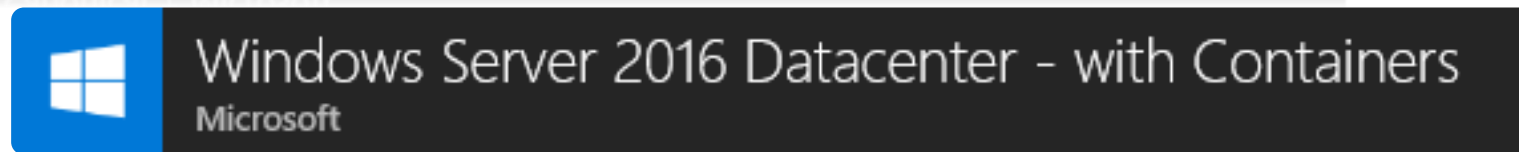
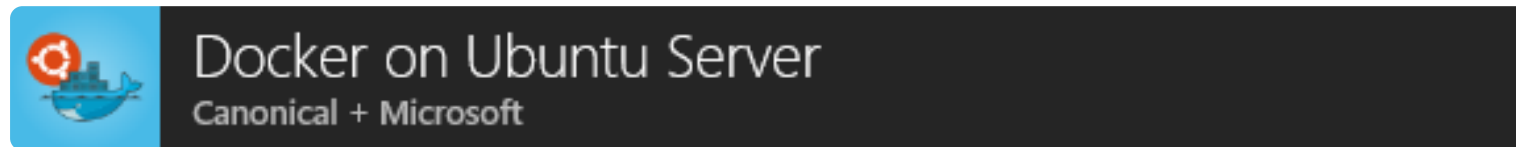
DEMO

Build & Ship to
Azure Container Registry

Infrastructure As A Service

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



Partner solutions using IaaS



Docker EE for Azure (Standard/Advanced) - [17.03]
Docker, Inc.



Red Hat OpenShift Container Platform (BYOL)
Red Hat



DC/OS on Azure
Mesosphere



Pivotal Cloud Foundry on Microsoft Azure
Pivotal Software Inc.



RancherOS
Rancher Labs

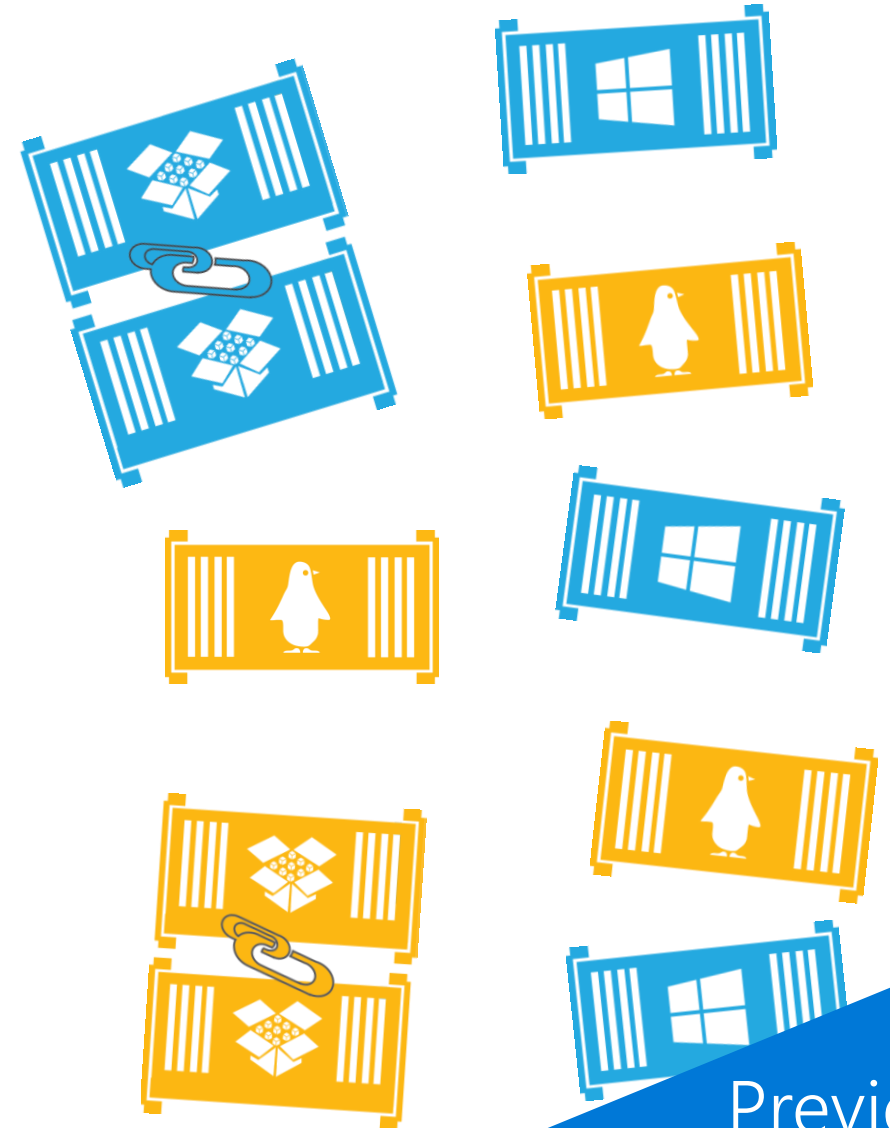
and more at <https://azuremarketplace.microsoft.com/en-us/marketplace/>

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





DEMO

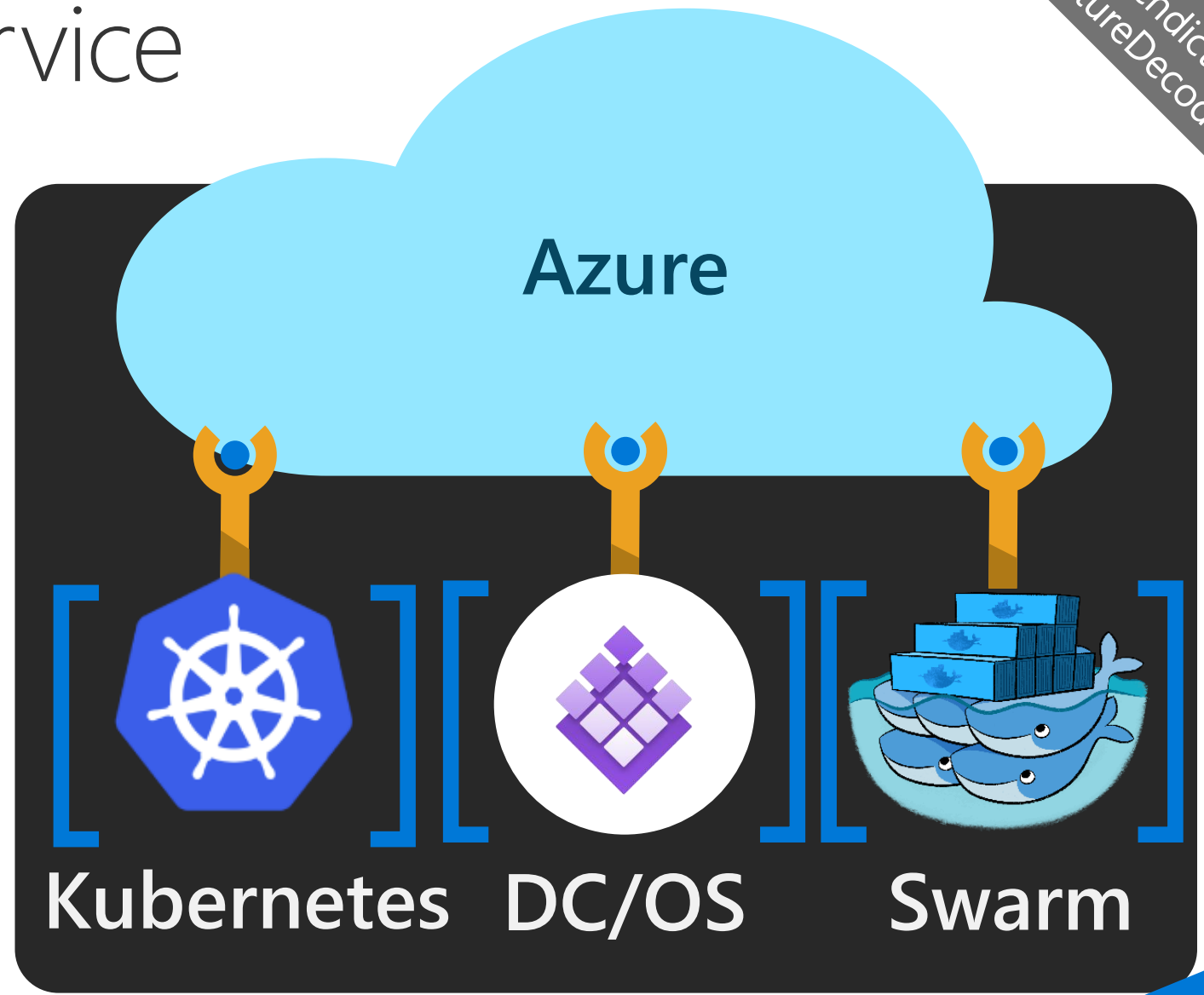
Creating an
Azure Container Instance

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



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Azure Container Service

Containers

Orchestrator
(Docker Swarm, DC/OS, Kubernetes)

Container Tooling
e.g. Docker CLI

Linux

Windows Server

VMs and VM Scale Sets

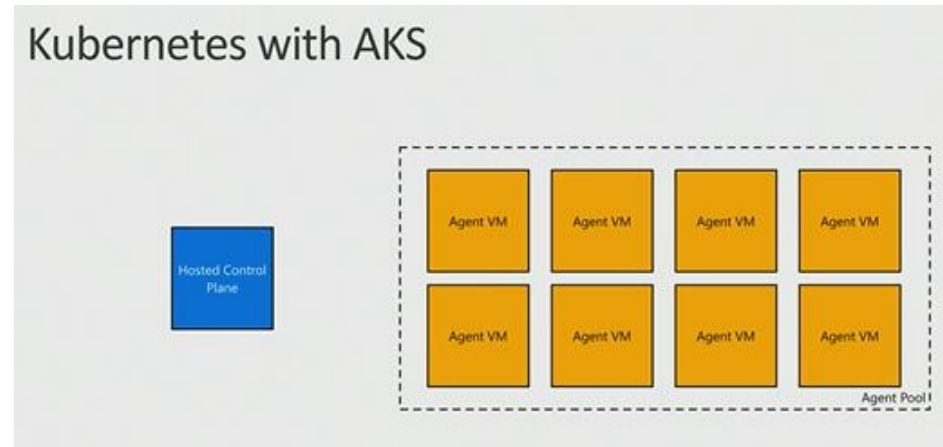
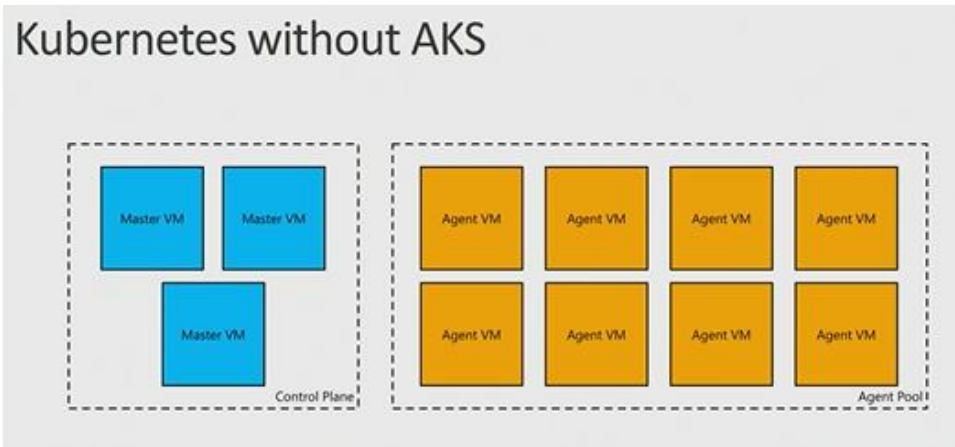
Service Tooling
e.g. ARM Template

Azure Stack

Azure

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





DEMO

Deploying to Kubernetes on
AKS

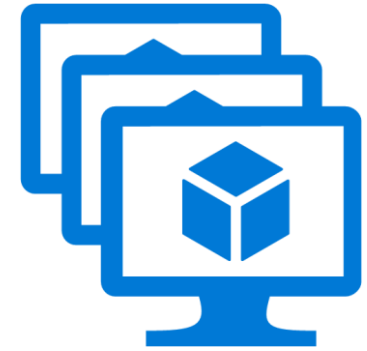
Kubernetes and ACI

Bringing ACS/AKS + ACI together

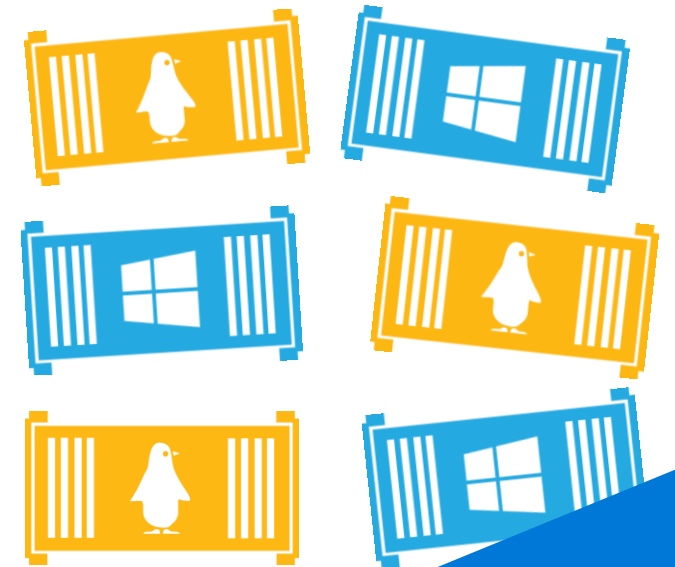
ACI Connector

- 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

Kubernetes Master(s)

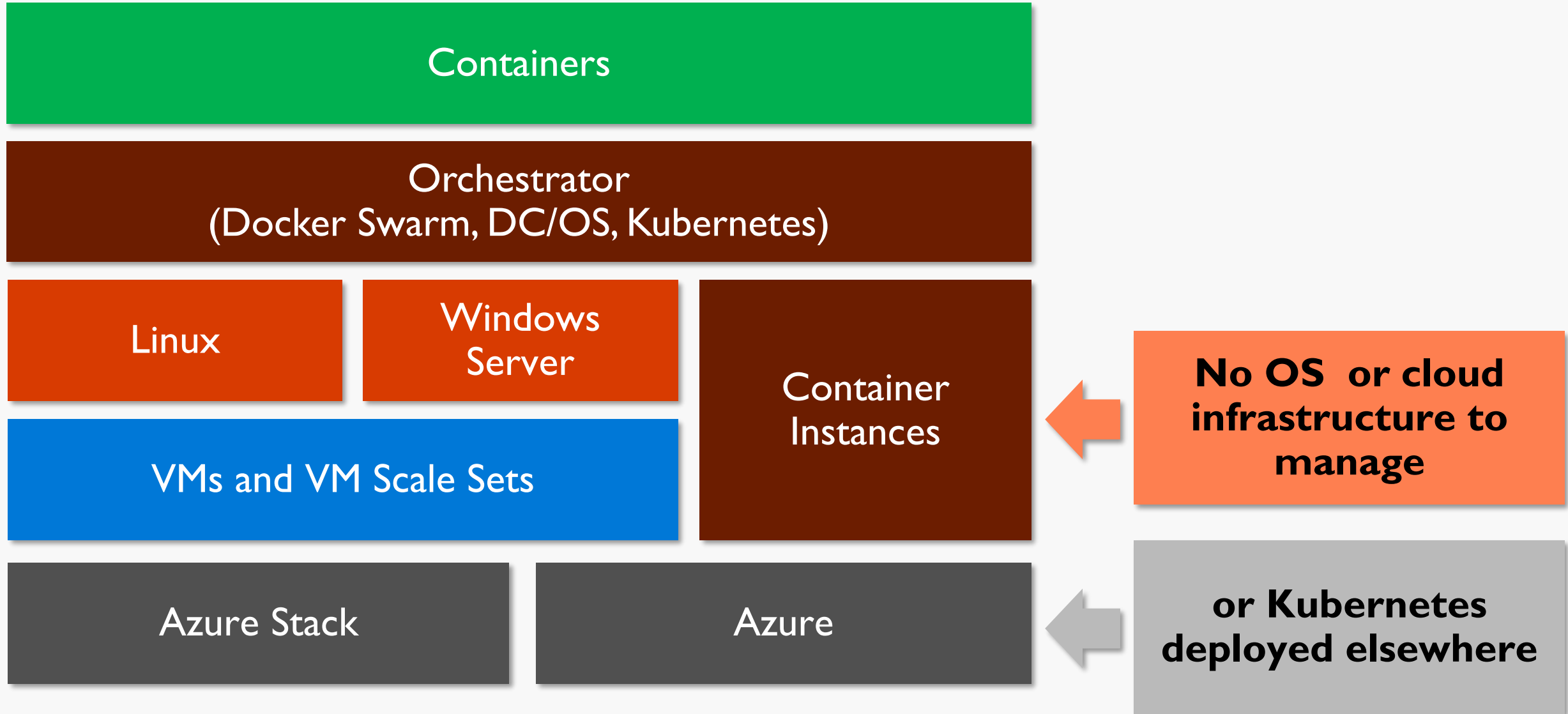


Azure Container Instances



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

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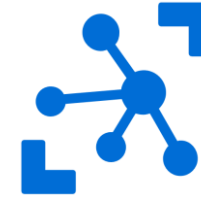
SQL Database

2.1 million DBs



Cosmos DB

Billions transactions/day



IoT Hub

Millions of messages



Event Hubs

60bn events/day



Skype
for Business

Skype



Cortana



Intune



Dynamics



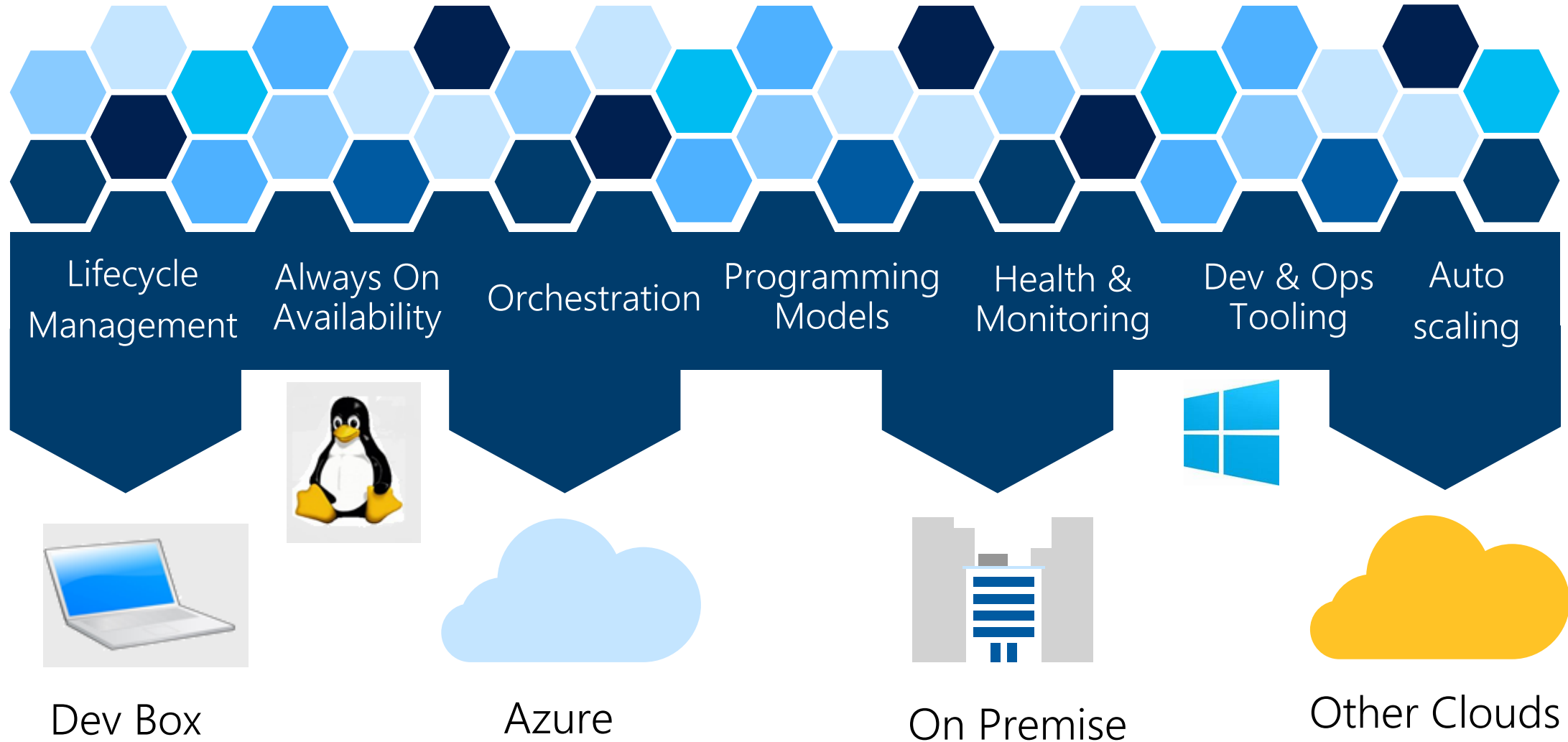
Power BI

Windows: GA
Linux: Preview

Azure Service Fabric

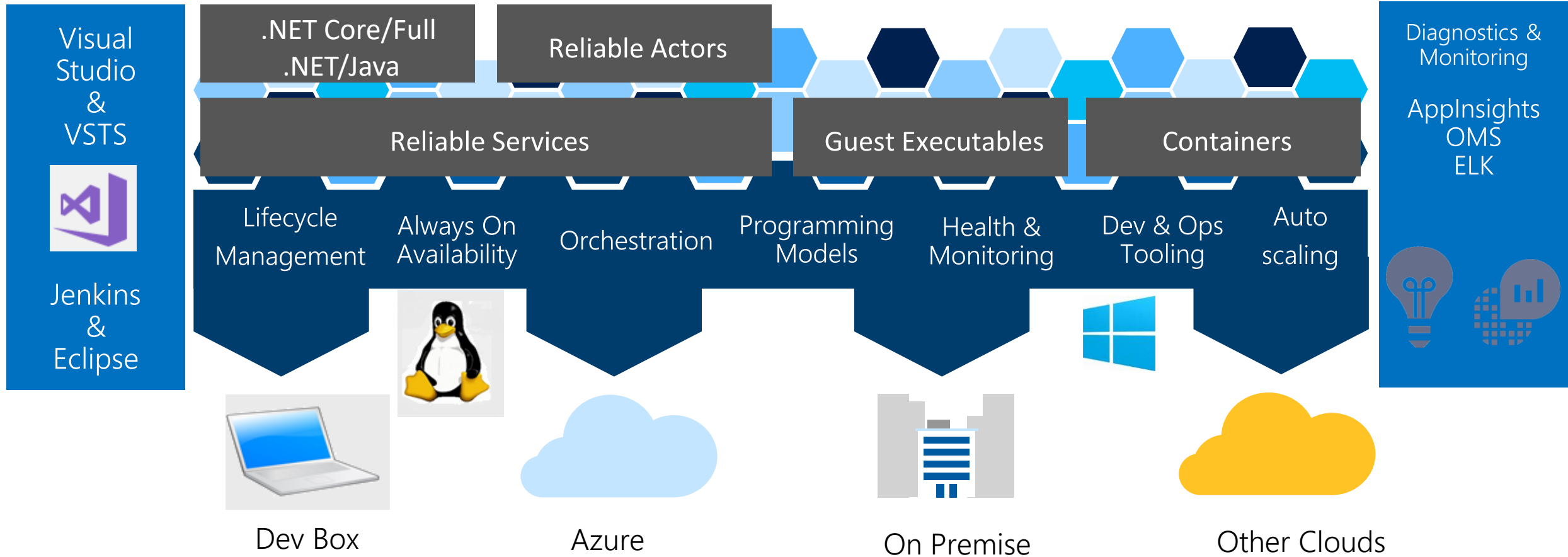
Any OS, Any Cloud

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Service Fabric Programming Models & CI/CD

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DEMO

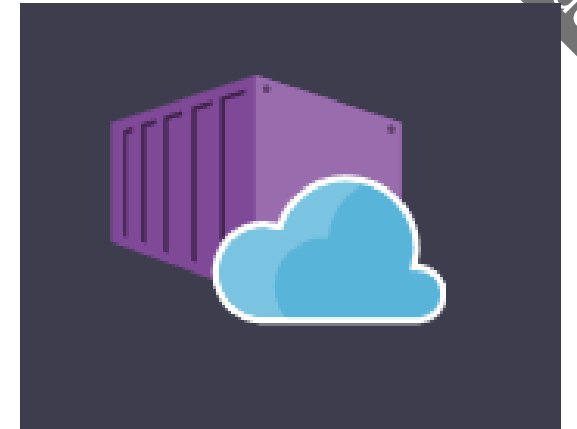
Deploying to Azure Service
Fabric with Docker Compose

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



Choose your container

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Image source

Built-in

Azure Container Registry

Docker Hub

Private registry


Repository Access

Public

Private

* Image and optional tag (eg 'image:tag')

Startup File



Continuous Deployment


Continuous Deployment will automatically deploy your Azure Container Registry hosted image every time you push changes to it. [Learn more](#)

On

Off

WEBHOOK URL

[Show Url](#)




Manual Scaling & Auto-Scaling

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Manual – Scale via
portal or scripts

* Scale by


Description Manual setup means that the number of instances you choose won't change, even if there are changes in load.


Instances 

Auto – CPU Percentage

* Scale by

Description Automatically scale up or down based on CPU Percentage. Choose an average value you want to target.

Instances


Target range


Auto – Schedule &
Performance Rules

* Scale by

Description Create your own set of rules. Create a schedule that adjusts your instance counts based on time and performance metrics.
Monday-Friday Profile, scale 3 - 9

Settings CPU Percentage > 80 (increase count by 1)

Deployment Slots

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

The screenshot shows the 'Deployment slots' page for an application named 'testa4cs'. On the left, there are buttons for 'Add Slot' and 'Swap'. The main area contains a table with the following data:

NAME	STATUS	APP SERVICE PLAN
testa4cs-staging	Running	testa4cs

On the right, the 'Swap' configuration panel is visible, showing the following settings:

- Swap type: Swap
- Source: Staging
- Destination: production

Traffic Routing

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

The screenshot shows the 'Traffic Routing' interface for a resource named 'testa4cs'. At the top, there are three buttons: 'Save', 'Discard', and 'Add Slot'. Below these, the 'Static Routing' section is active, indicated by an information icon. A table lists the routing rules:

	TRAFFIC %
ABTestDemo	10%
production	90%

Below the table, there is a dropdown menu labeled 'Choose deployment slot' with a downward arrow, and a text input field labeled 'Traffic %'.

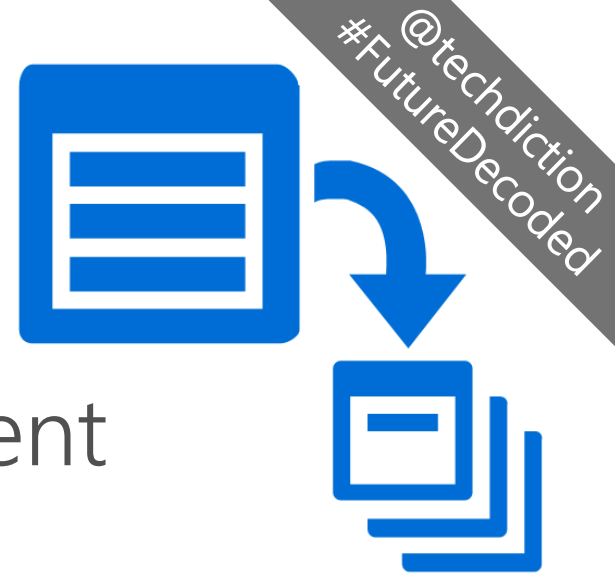


DEMO

Azure Web App for Containers

Azure Batch

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

Some real-world Batch workloads

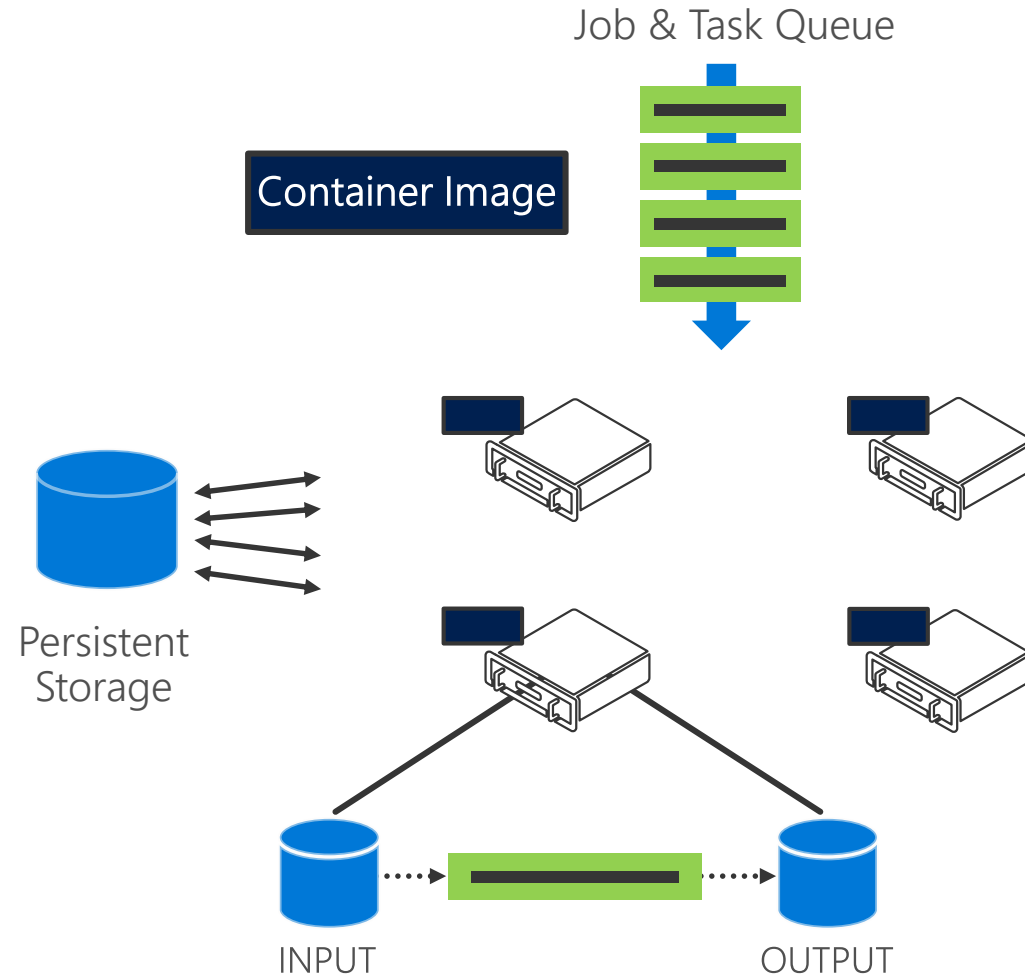
- Media transcoding & pre-/post-processing
- Rendering
- Test execution
- Monte Carlo simulations
- Genomics
- Deep Learning
- OCR
- Data ingestion, processing, ETL
- R at scale
- Compiled MATLAB
- Engineering simulations
- Image analysis & processing

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

Batch Shipyard

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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/containeronazure>
- 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>