



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

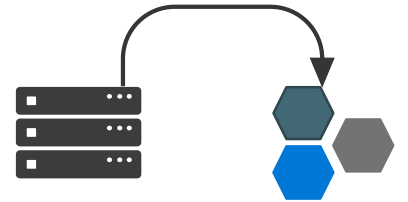
Lift and shift for portability and efficiency



2

Transform Legacy to Microservices

Look for shared services to transform



3

Accelerate New Applications

Greenfield innovation

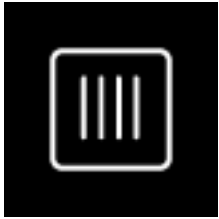


Some Docker vocabulary



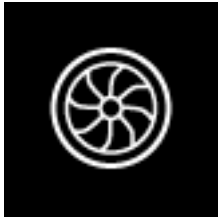
Docker Image

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

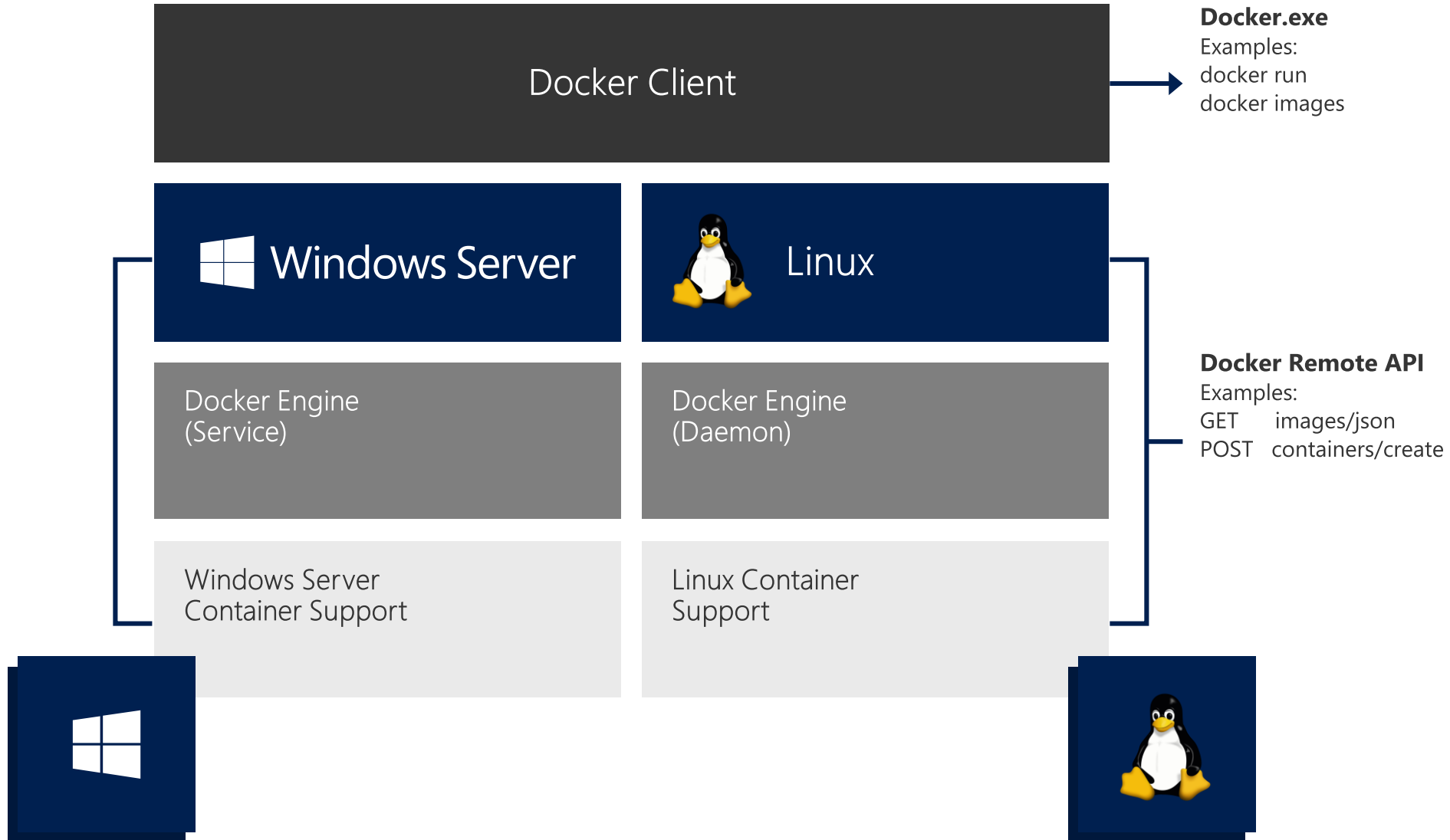
Creates, ships and runs Docker containers deployable on a physical or virtual, host locally, in a datacenter or cloud service provider



Registry Service

Cloud or server based storage and distribution service for your images

Windows & Linux



build



ship

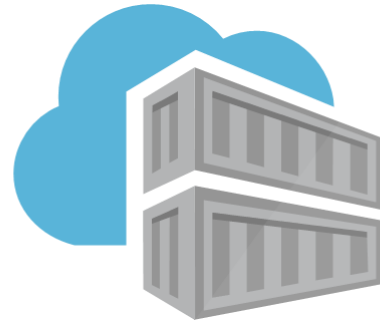


run

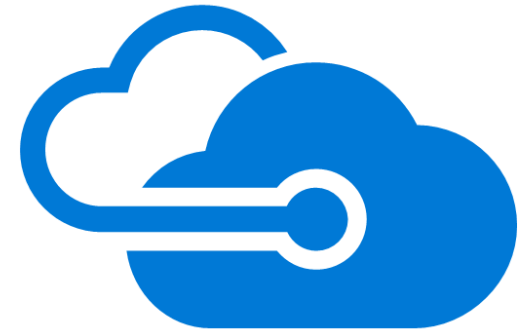


Developer's
Machine

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 required storage capacity and number of webhooks





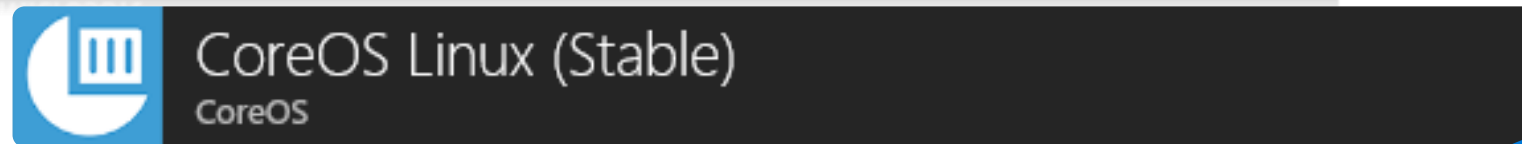
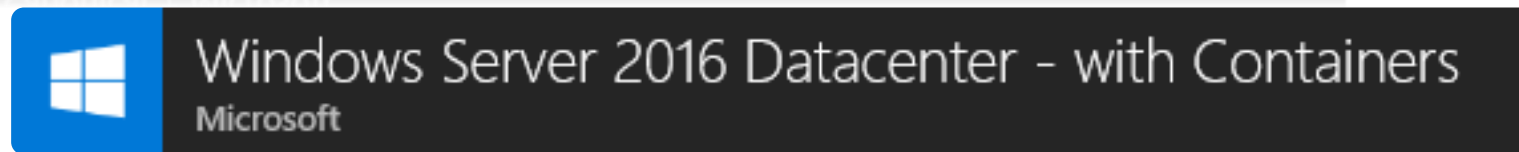
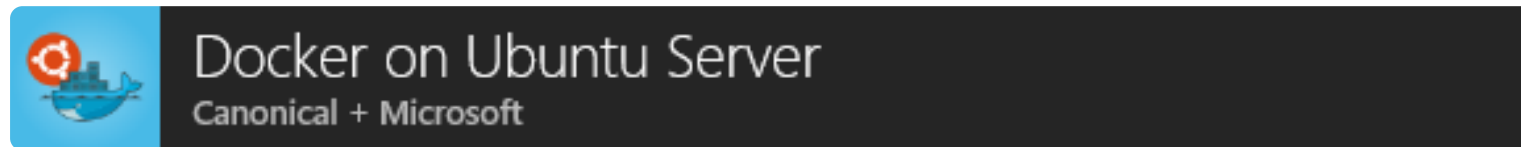
DEMO

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.



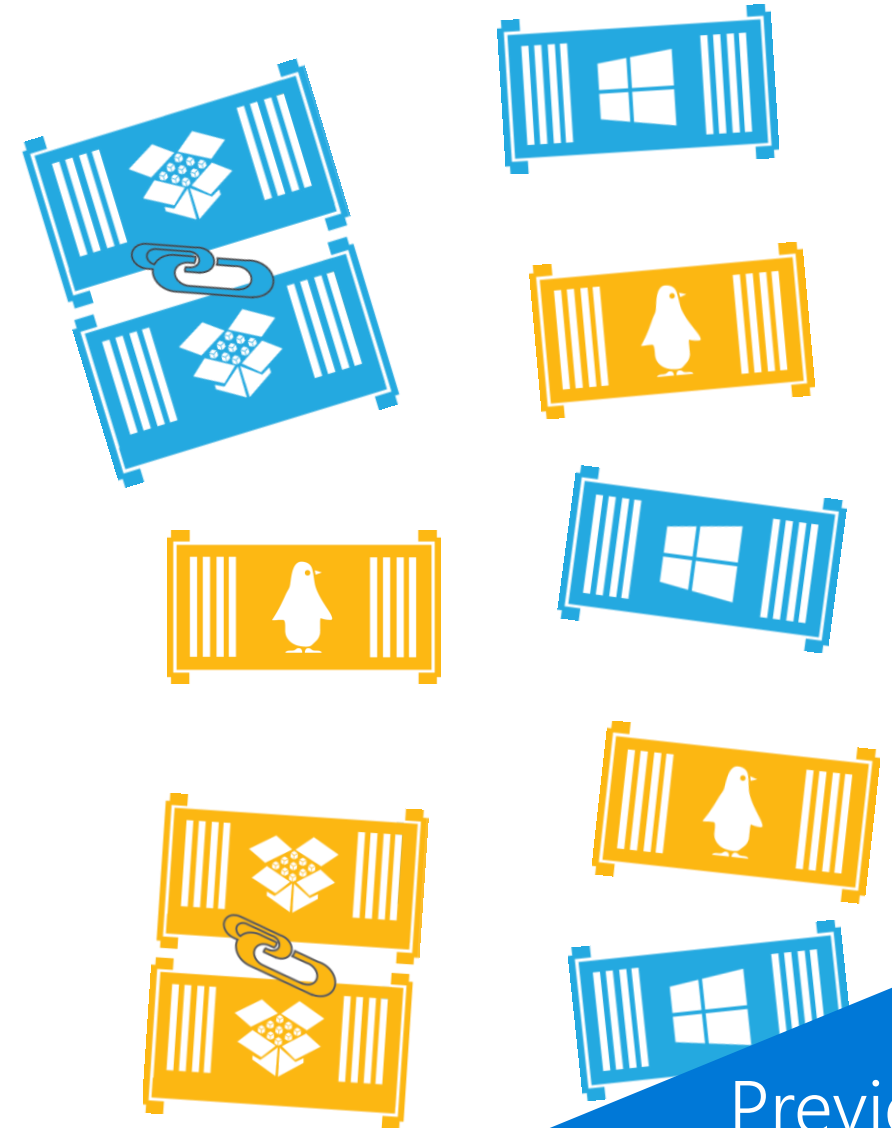
RancherOS
Rancher Labs

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

Azure Container Instances

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

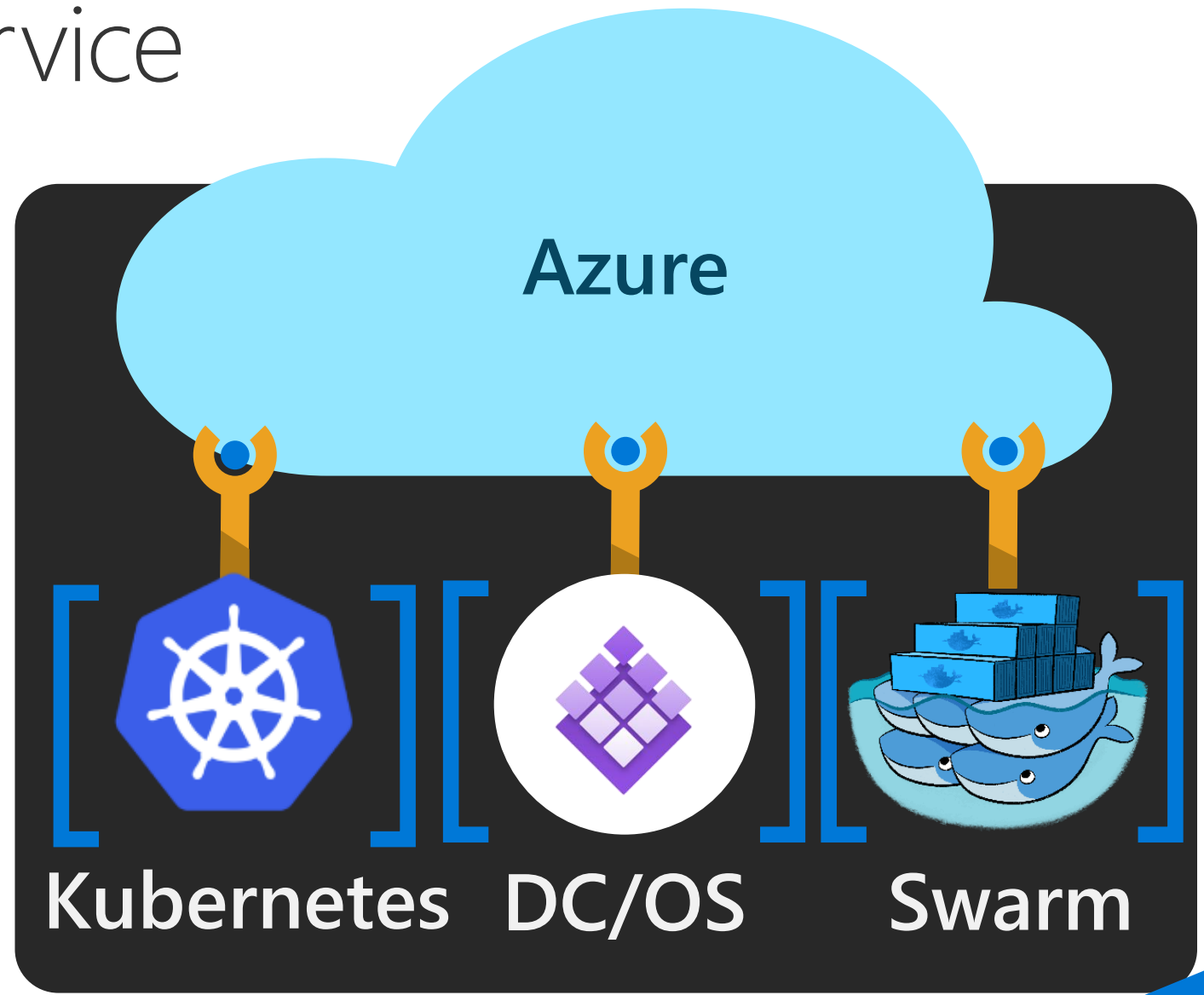
Azure Container Service

Standard Docker tooling
and API support

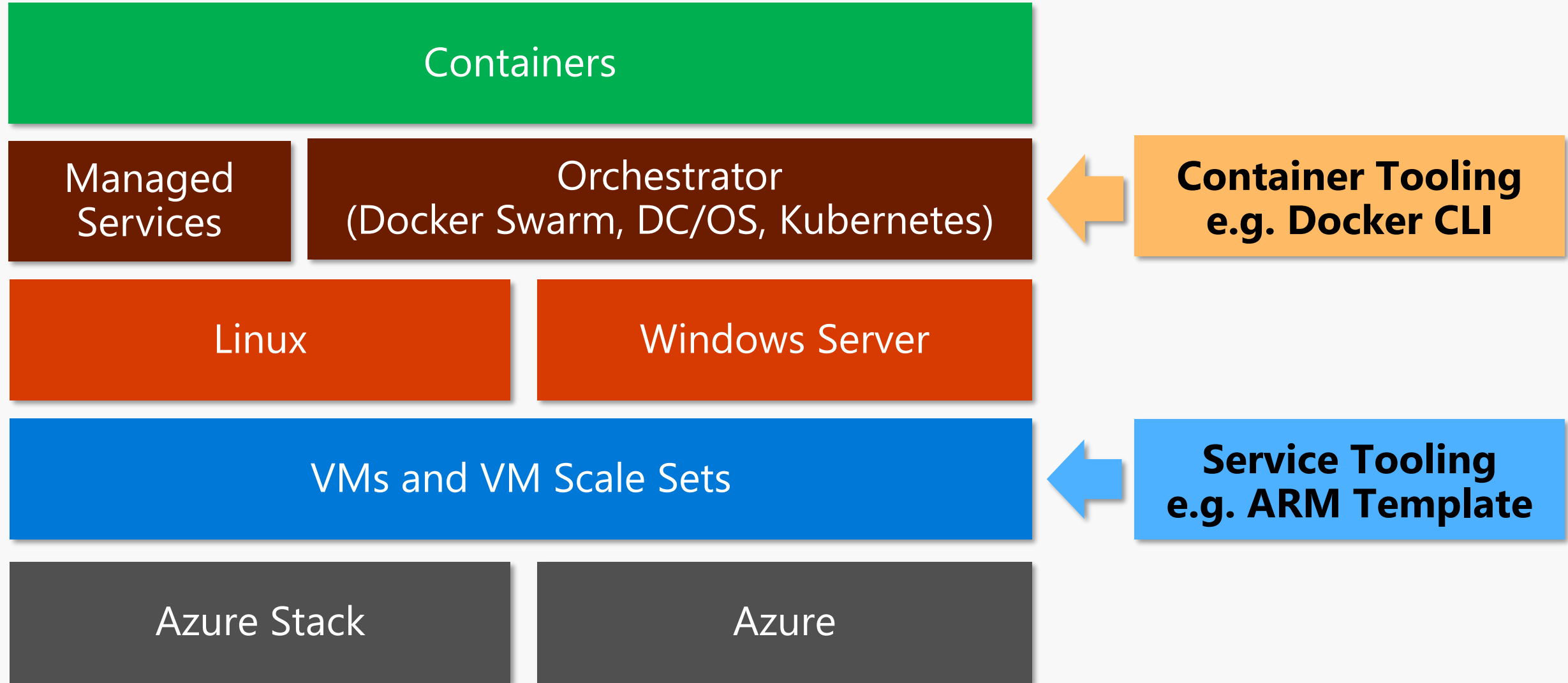
Provisioning of DC/OS,
Docker, and Kubernetes

Linux and Windows
Server containers

Billed for the compute
resource used



Azure Container Service





DEMO

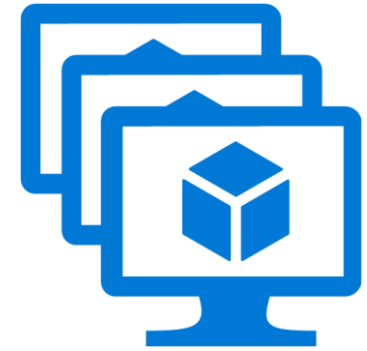
Deploying to Kubernetes on
Azure Container Services

Kubernetes and ACI

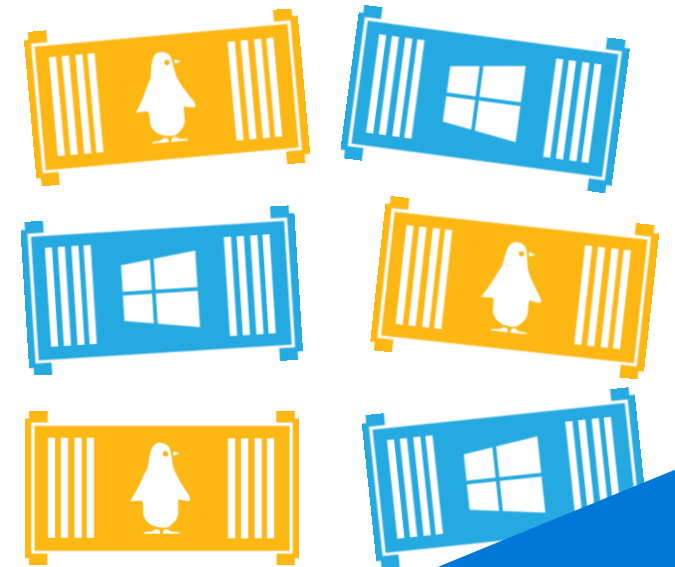
ACI Connector

- 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)

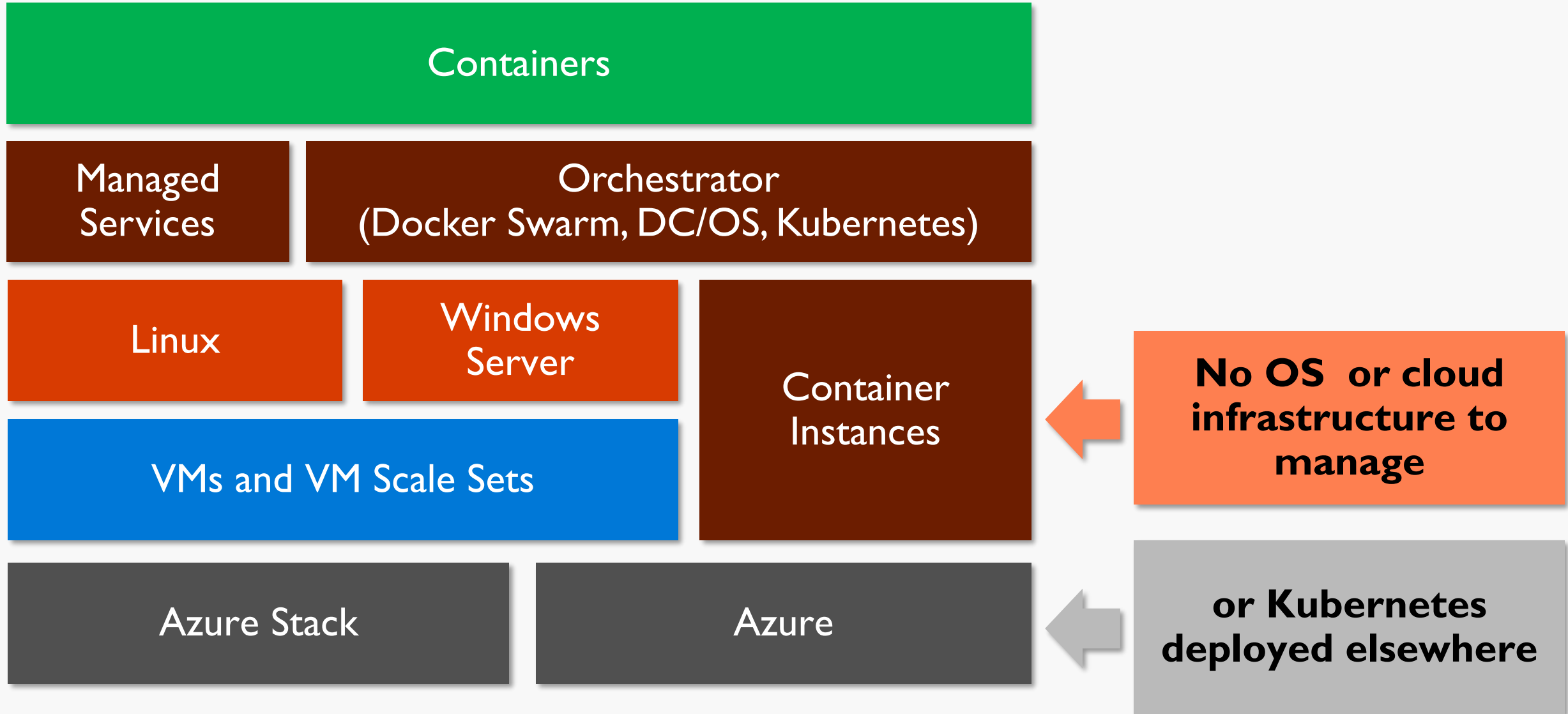


Azure Container Instances



Experimental

Azure Container Service with ACI





DEMO

Azure Container Instances
with Kubernetes on
Azure Container Services

Service Fabric

Services Powered by Service Fabric



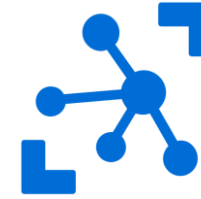
SQL Database

2.1 million DBs



Cosmos DB

Billions transactions/day



IoT Hub

Millions of messages



Event Hubs

60bn events/day

30% of Azure cores run Service Fabric



Skype
for Business

Skype



Cortana



Intune



Dynamics



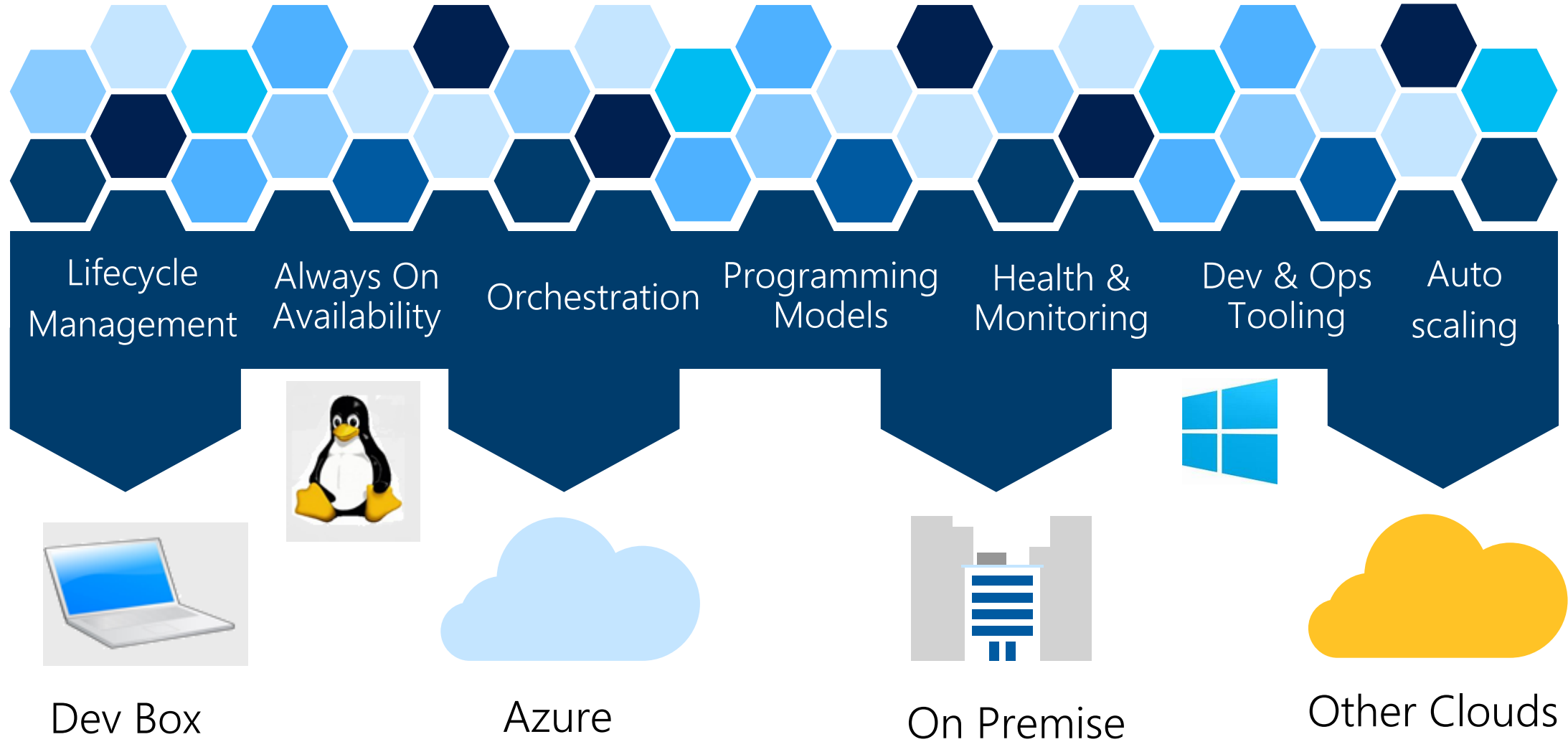
Power BI

Designed for mission critical tier 1 workloads

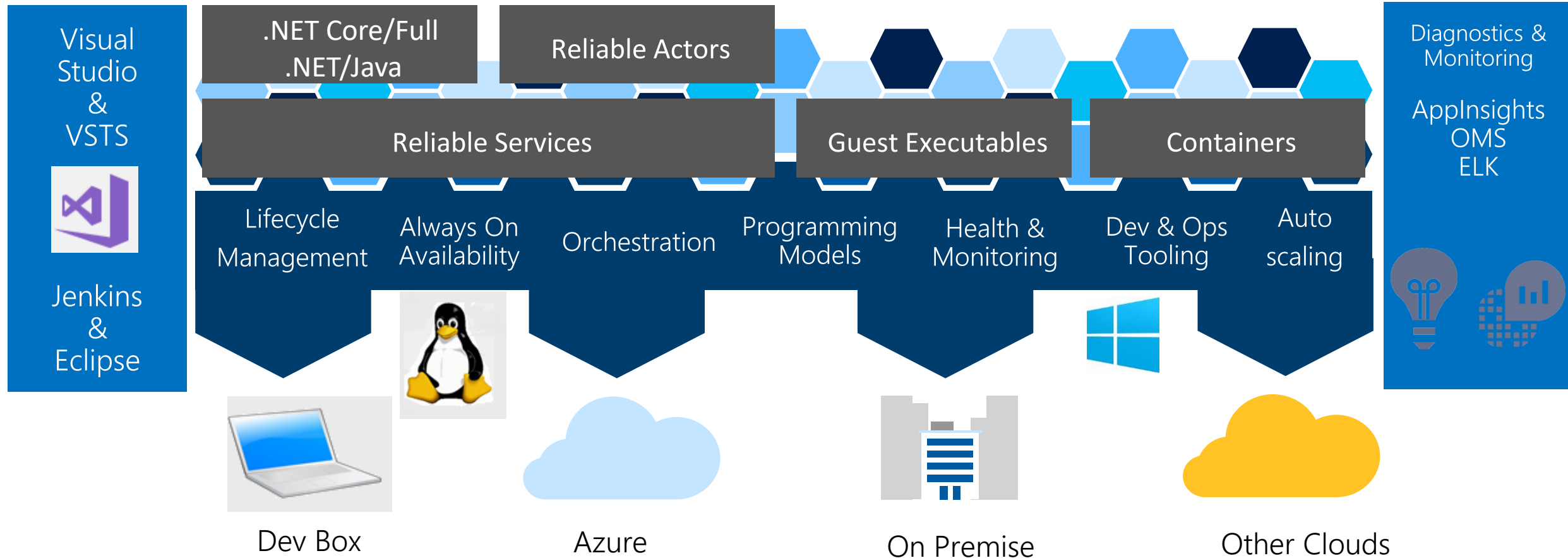
Windows: GA
Linux: Preview

Azure Service Fabric

Any OS, Any Cloud



Service Fabric Programming Models & CI/CD



Azure Web App for Containers

Azure Web App for Containers

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



Choose your container

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

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

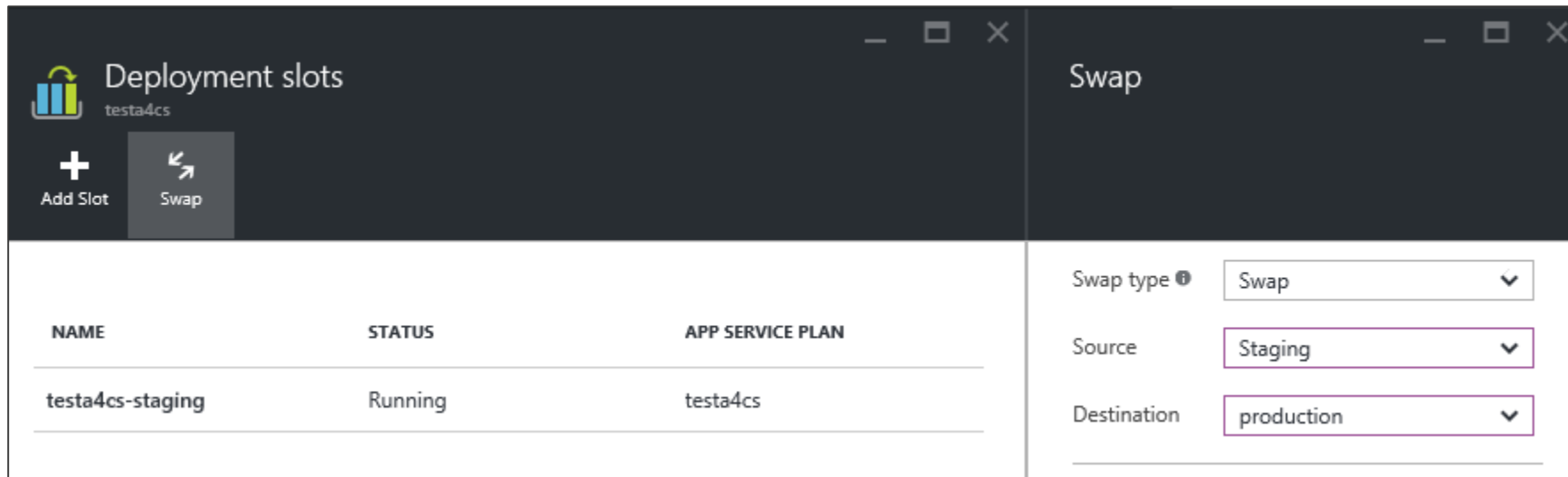
* Scale by

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 displays the 'Deployment slots' interface for an application named 'testa4cs'. It features a 'Swap' button and a table of deployment slots. The 'Swap' configuration panel on the right shows the swap type set to 'Swap', the source slot as 'Staging', and the destination slot as 'production'.

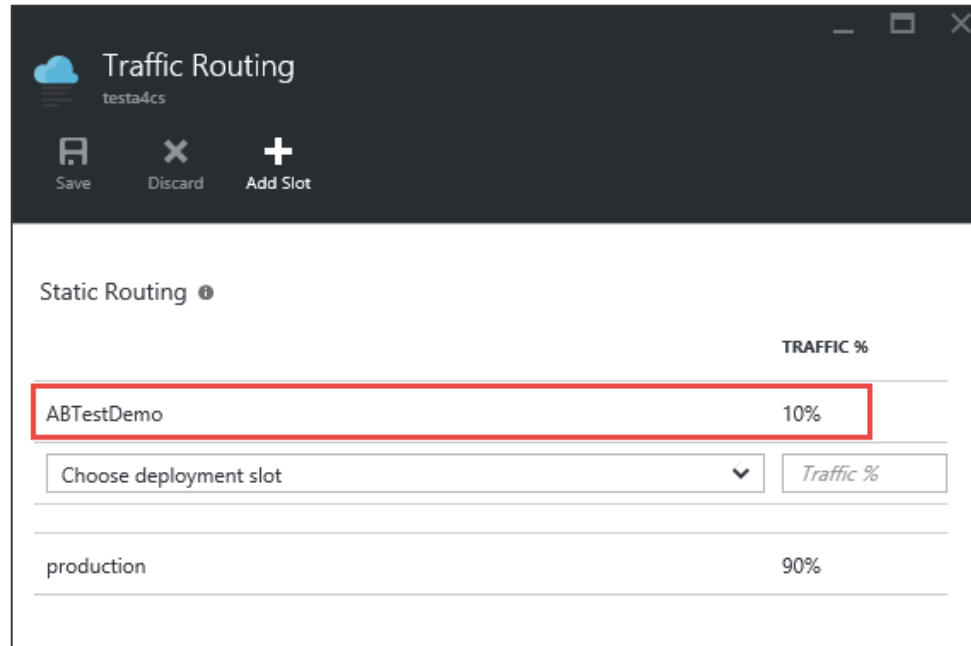
NAME	STATUS	APP SERVICE PLAN
testa4cs-staging	Running	testa4cs

Swap Configuration:

- 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 a web interface for "Traffic Routing" under the user "testa4cs". It features a dark header with "Save", "Discard", and "Add Slot" buttons. Below is a "Static Routing" section with a table. The table has two columns: the slot name and "TRAFFIC %". The first row, "ABTestDemo", is highlighted with a red border and shows 10% traffic. Below this is a form to "Choose deployment slot" with a dropdown arrow and a "Traffic %" input field. The second row, "production", shows 90% traffic.

	TRAFFIC %
ABTestDemo	10%
Choose deployment slot	Traffic %
production	90%

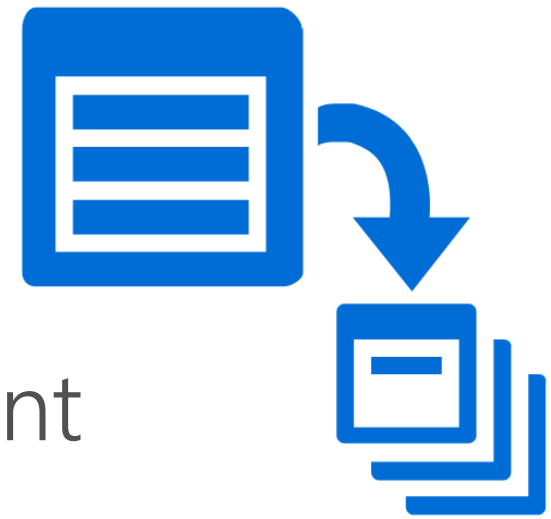


DEMO

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

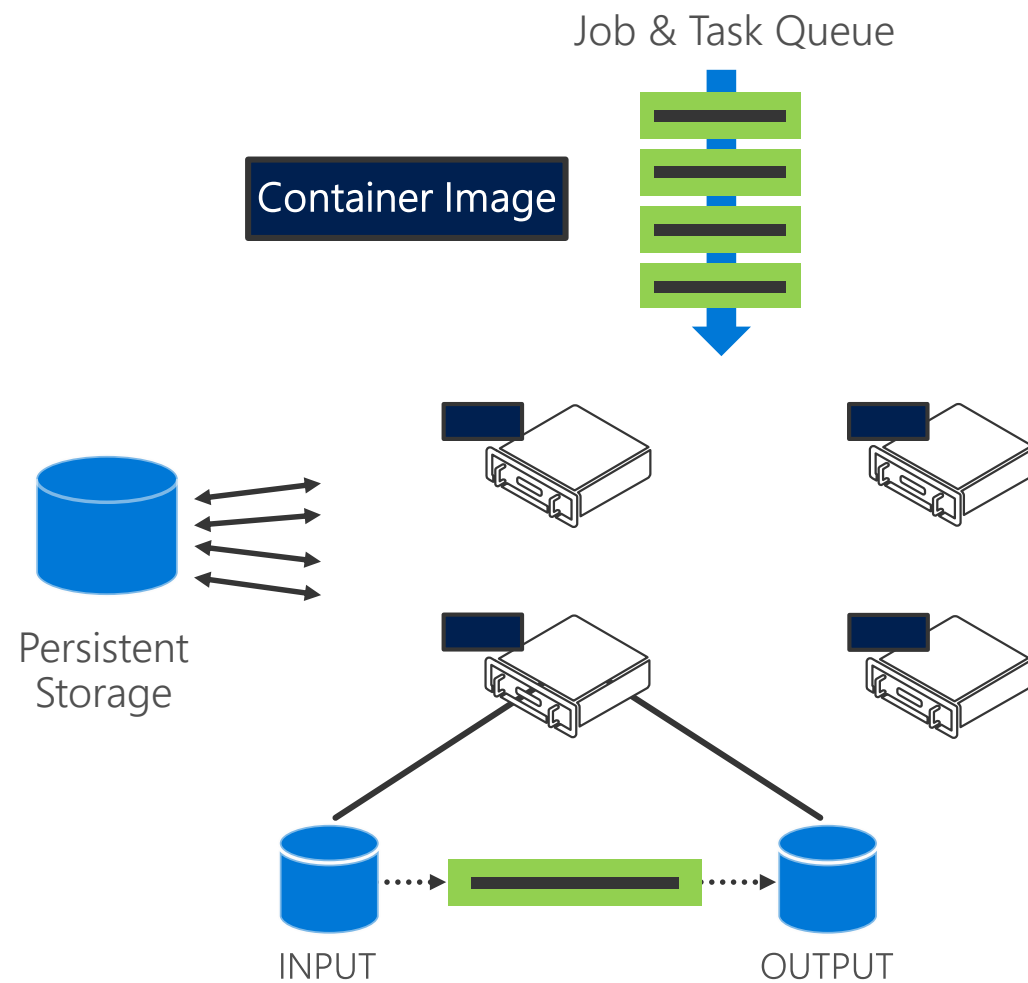
Some real-world Batch workloads

- 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





DEMO

Image processing with
Azure Batch

Summary

- IaaS and Partner Solutions
- Azure Container Instances
- Azure Container Service
- 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/>

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