Microsoft

@techdiction
#NorthAzureUserGroup

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

Marcus Robinson
Technical Program Manager
Commercial Software Engineering
marcus.robinson@microsoft.com
@techdiction

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

Containers deliver speed, flexibility, and savings

@techdiction
#NorthAzureUserGroup

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

@techdiction
#NorthAzureUserGroup

1

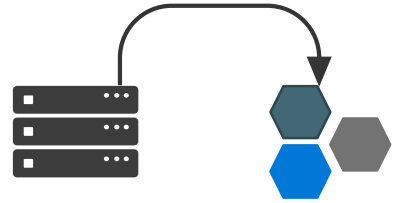
Containerize Legacy Applications

Lift and shift for portability and efficiency

2

Transform Legacy to Microservices

Look for shared services to transform



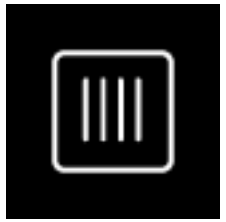
3

Accelerate New Applications

Greenfield innovation

Some Container vocabulary

@techdiction
#NorthAzureUserGroup

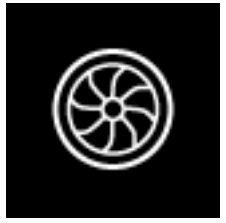


Container

The standard unit in which the processes reside and execute

Image

A packaged application. A container is created from an image.



Container Runtime

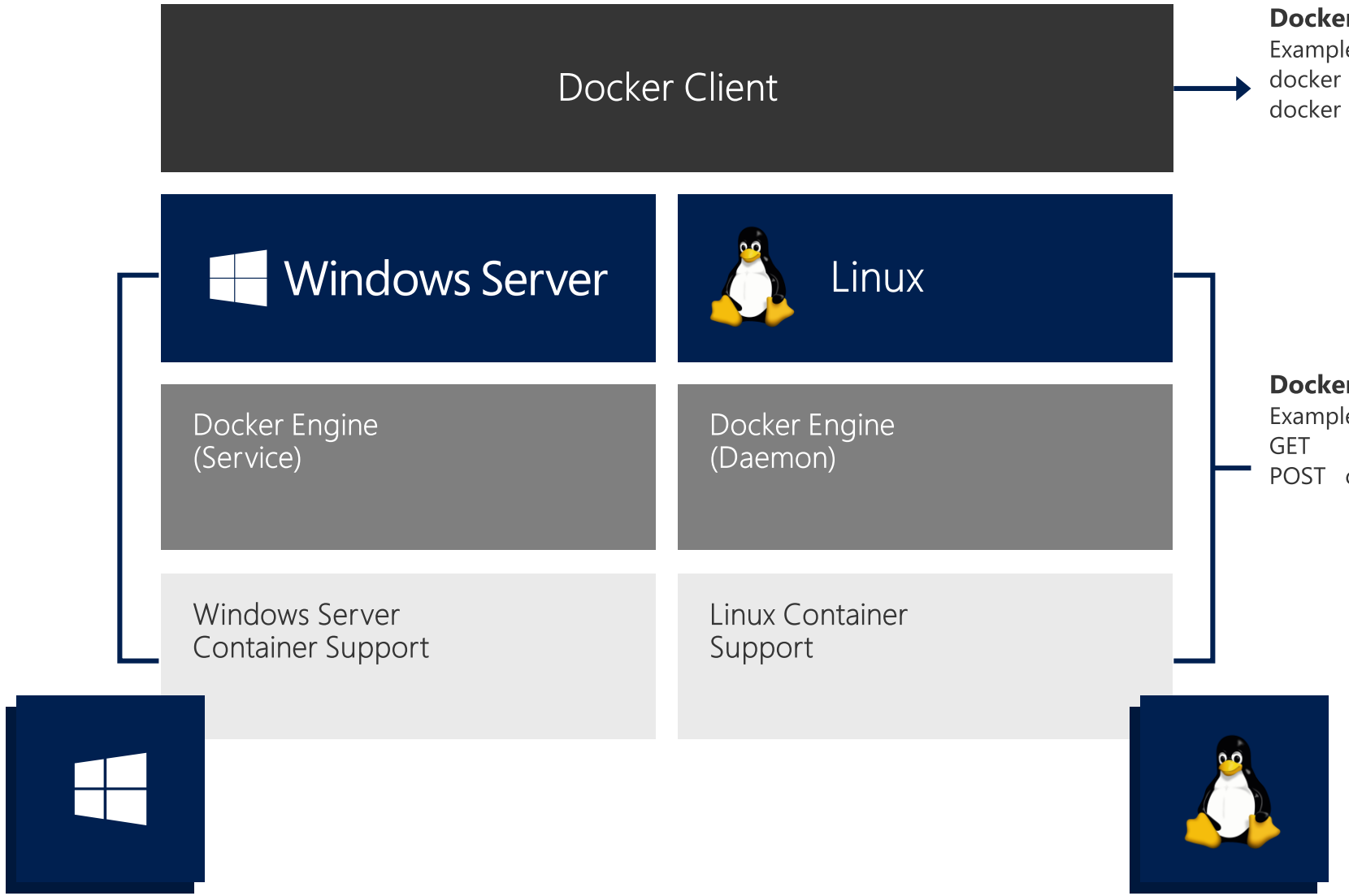
Creates, ships and runs containers deployable on a physical or virtual, host locally, in a datacenter or cloud service provider

Container Registry

Cloud or server based storage and distribution service for your images

Windows & Linux

@techdiction
#NorthAzureUserGroup

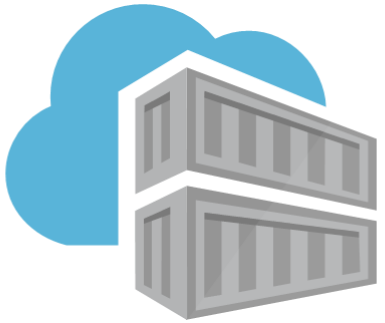


@techdiction
#NorthAzureUserGroup

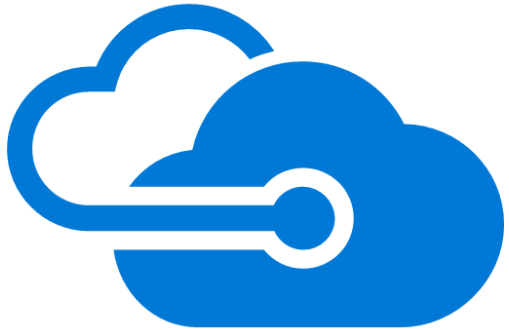
build → ship → run

Developer's Machine

CI/CD



Azure Container Registry



- IaaS
- Container Instances
- Kubernetes 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
- Geo-replication
- Preview: Build container images – build + ship! Can build from git commit.

@techdiction
#NorthAzureUserGroup


DEMO
Build & Ship to
Azure Container Registry

@techdiction
#NorthAzureUserGroup

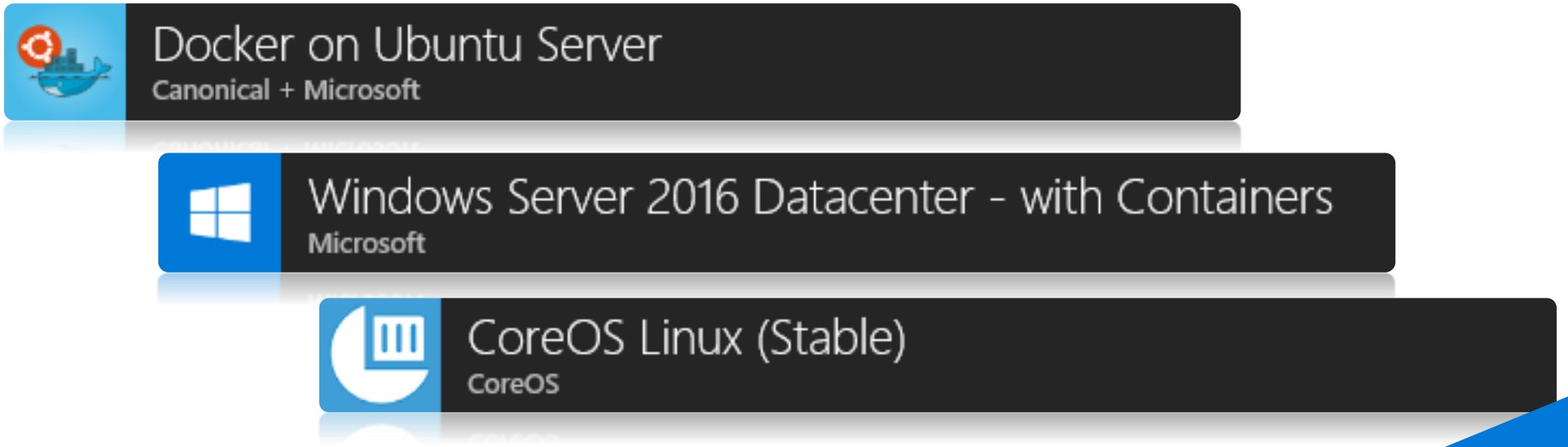
Infrastructure As A Service

Virtual Machines

Virtual Machines on Azure

@techdiction
#NorthAzureUserGroup

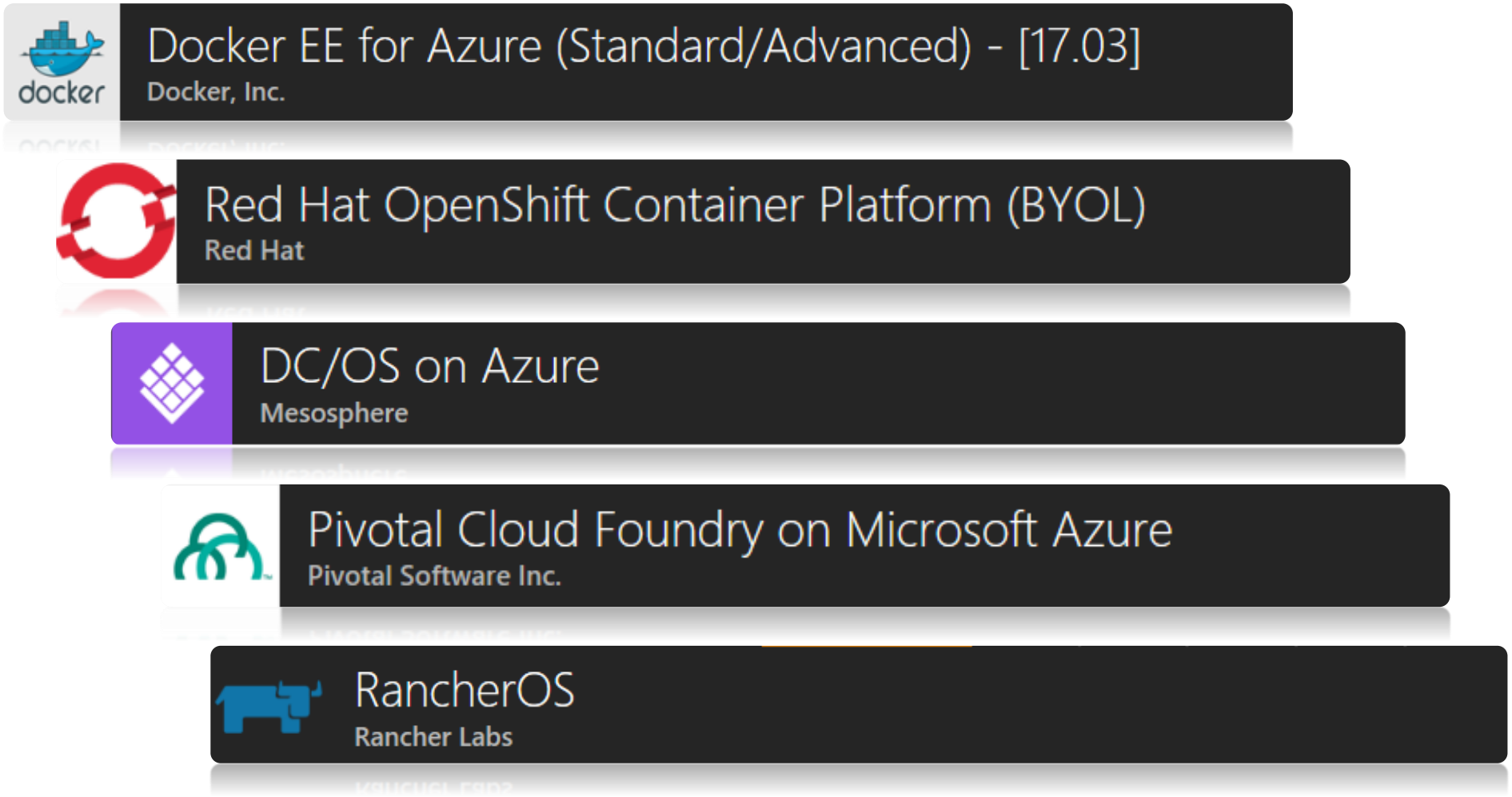
- Windows and Linux images available in the Azure Marketplace with Docker preinstalled
- Great for Dev & Test scenarios
- Need to support OS and manage the infrastructure
- Billed for the compute resource used by the minute



Windows: GA
Linux: GA

@techdiction
#NorthAzureUserGroup

Partner solutions using IaaS



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

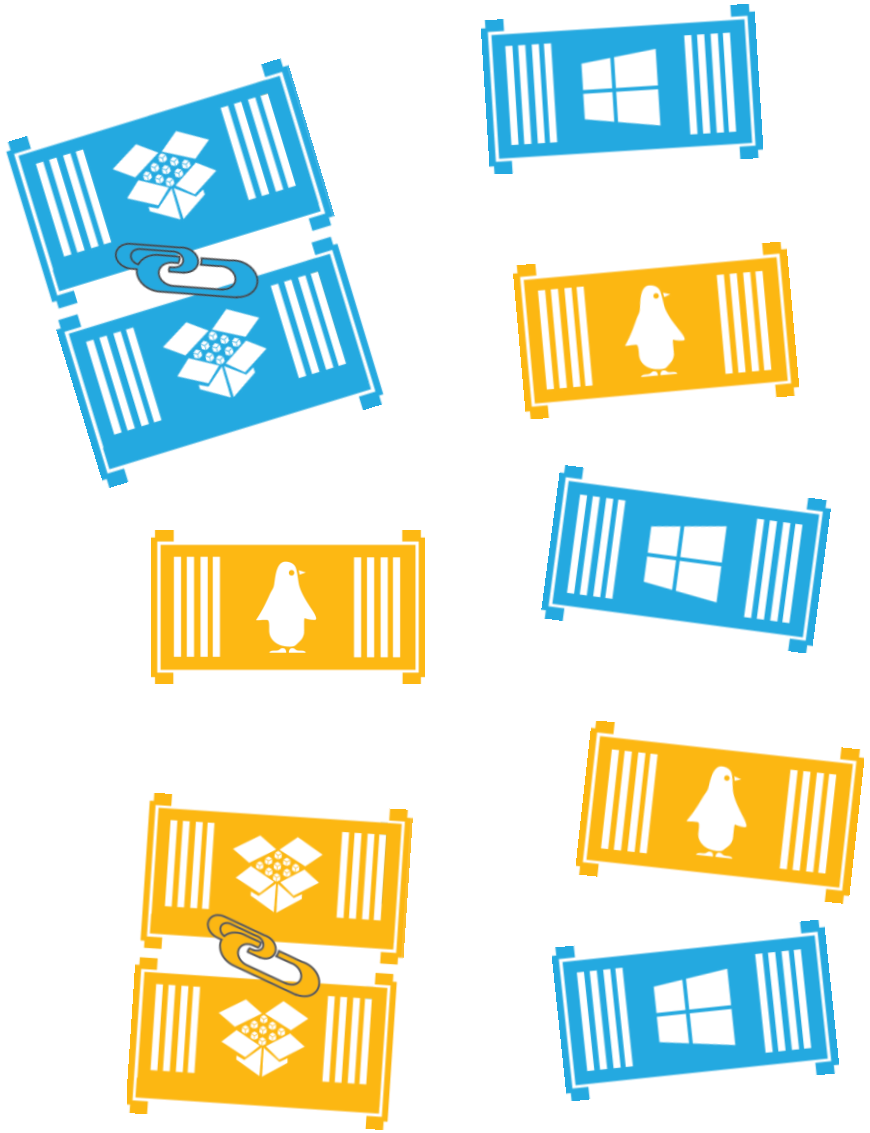
@techdiction
#NorthAzureUserGroup

Azure Container Instances

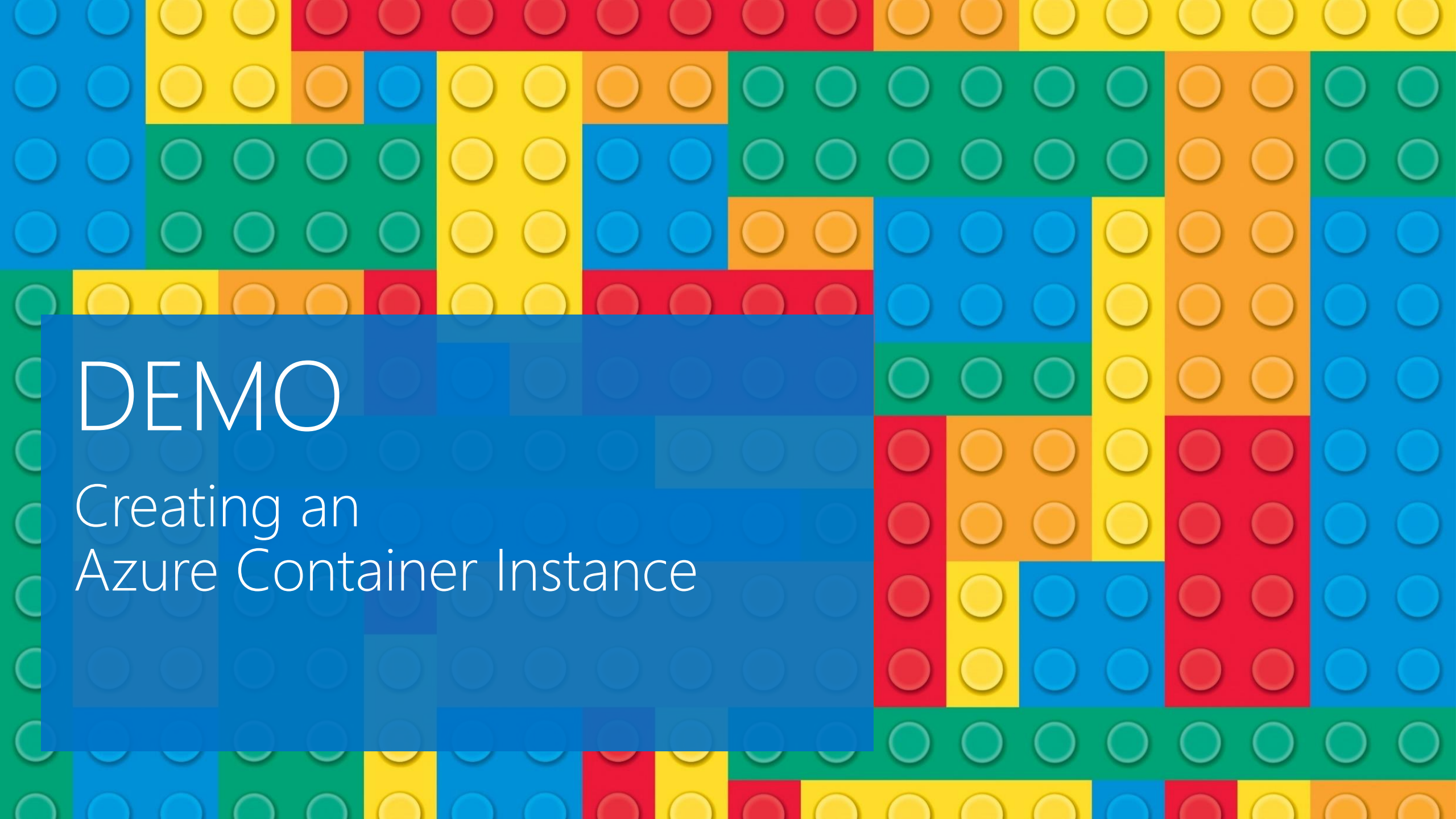
Containers without Servers

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 by the second for CPU and memory usage



@techdiction
#NorthAzureUserGroup


DEMO
Creating an
Azure Container Instance

@techdiction
#NorthAzureUserGroup

Azure Kubernetes Service

Orchestration & Microservices

@techdiction
#NorthAzureUserGroup

Kubernetes: the de-facto orchestrator

Portable

Public, private, hybrid, multi-cloud

Extensible

Modular, pluggable, hookable, composable

Self-healing

Auto-placement, auto-restart, auto-replication, auto-scaling

@techdiction
#NorthAzureUserGroup

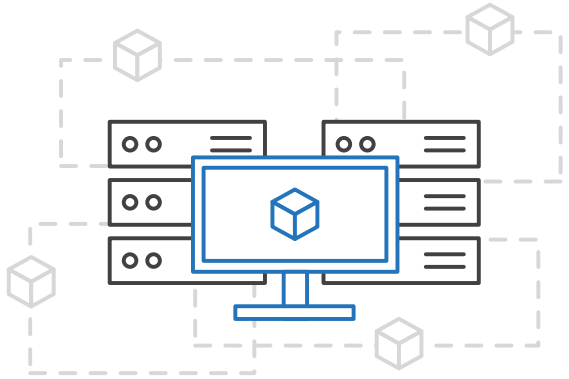
Kubernetes: empowering you to do more

- Deploy your applications quickly and predictably
- Scale your applications on the fly
- Roll out new features seamlessly
- Limit hardware usage to required resources only

@techdiction
#NorthAzureUserGroup

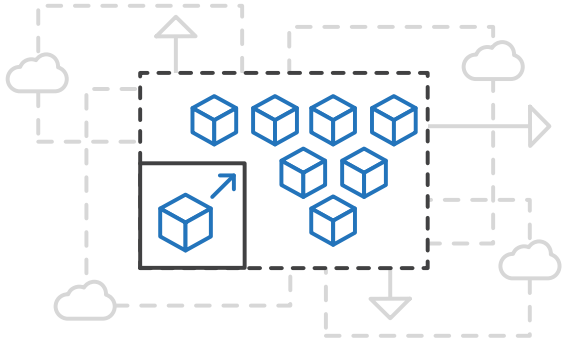
Azure Container Service (AKS)

Simplify the deployment, management, and operations of Kubernetes



Focus on your containers not the infrastructure

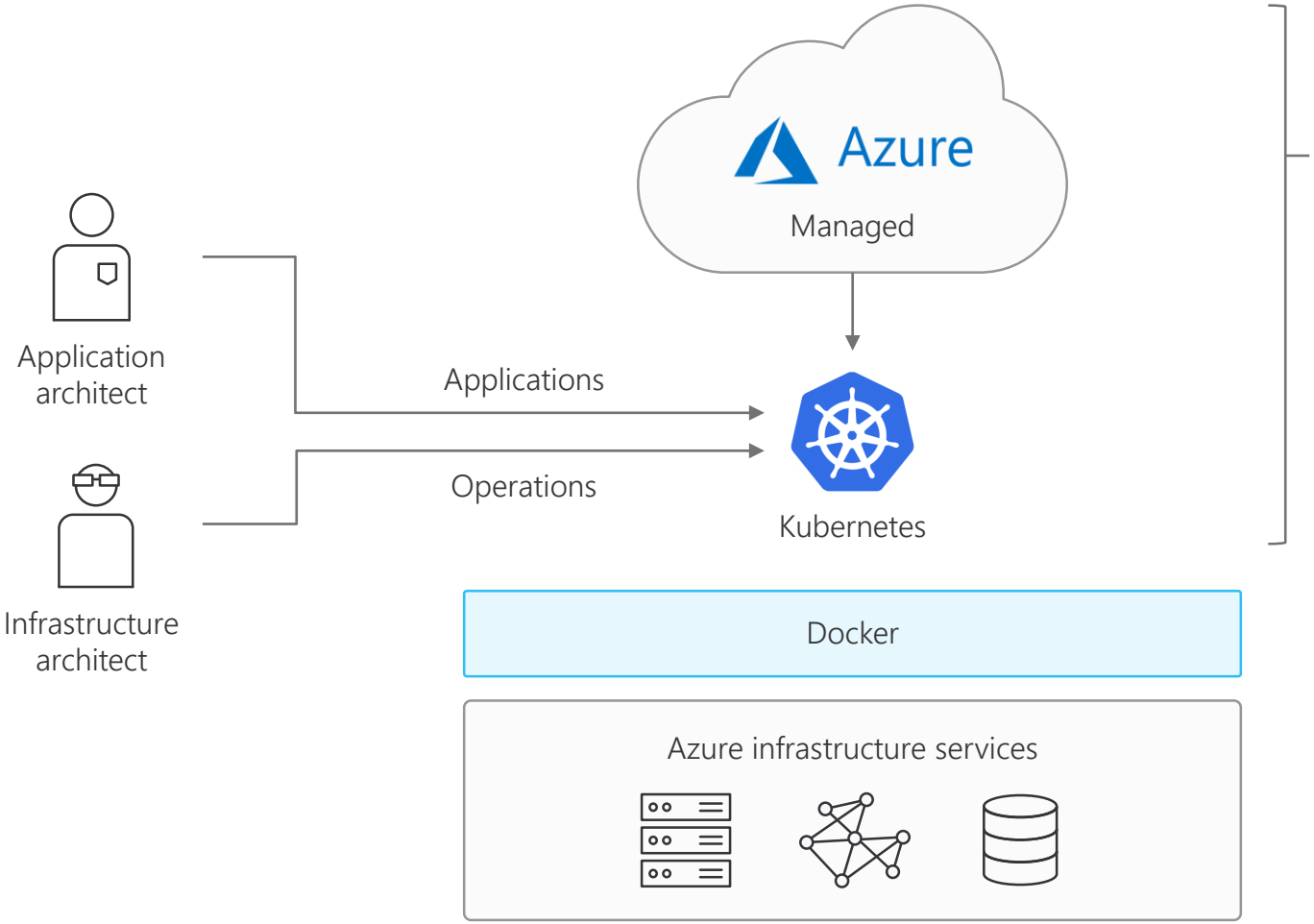
Work how you want with open-source APIs



Scale and run applications with confidence

A fully managed Kubernetes cluster

@techdiction
#NorthAzureUserGroup



- Managed control pane
- Automated upgrades, patches
- Easy cluster scaling
- Self-healing
- Cost savings


DEMO
Deploying to Kubernetes on AKS

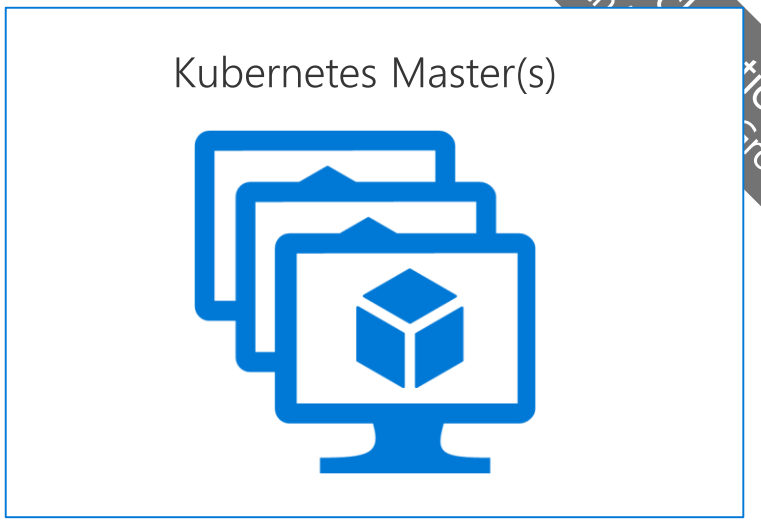
@techdiction
#NorthAzureUserGroup

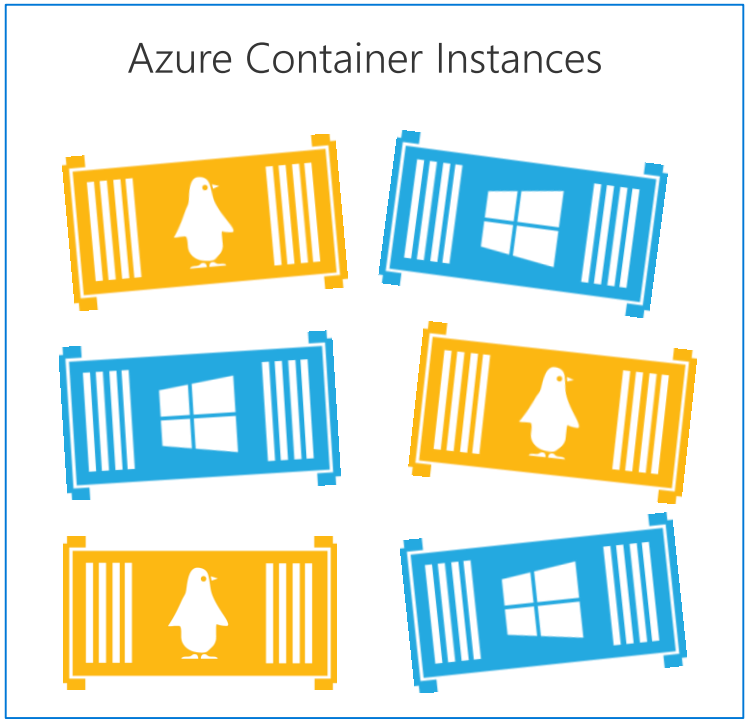
Kubernetes and ACI

Bringing ACS/AKS + ACI together

ACI Connector PREVIEW

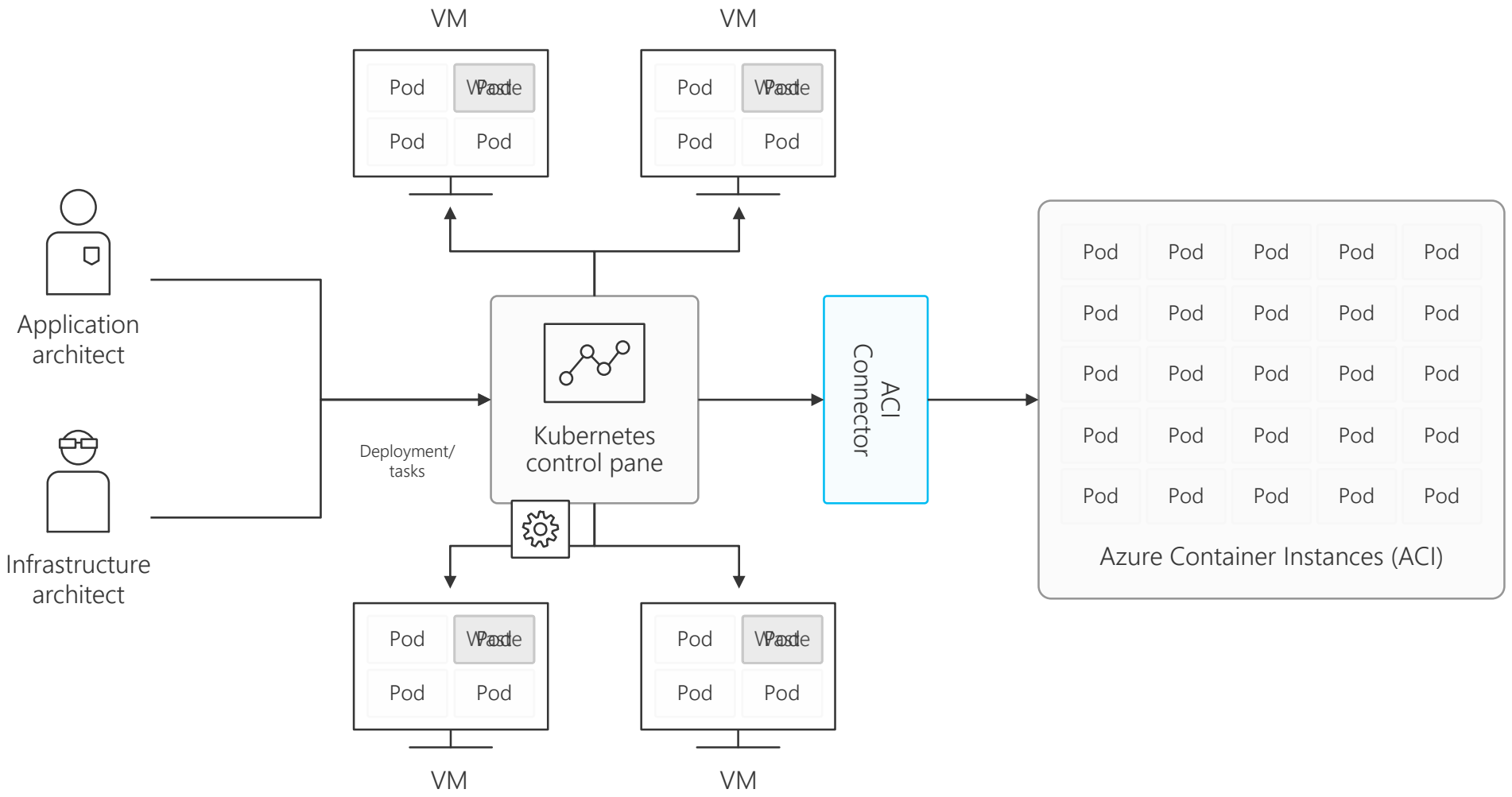
- Allows Kubernetes clusters to deploy Azure Container Instances.
- Registers into the Kubernetes as a Node with unlimited capacity
- On-demand and near instantaneous container compute
- Unlimited capacity with zero infrastructure to manage
- Utilize both VMs and container instances simultaneously in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





Bursting with the ACI Connector

@techdiction
#NorthAzureUserGroup




DEMO
Azure Container Instances
with Kubernetes on
Azure Container Services

@techdiction
#NorthAzureUserGroup

Service Fabric

Orchestration, microservices, programming models

Services Powered by Service Fabric

@techdiction
#NorthAzureUserGroup

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

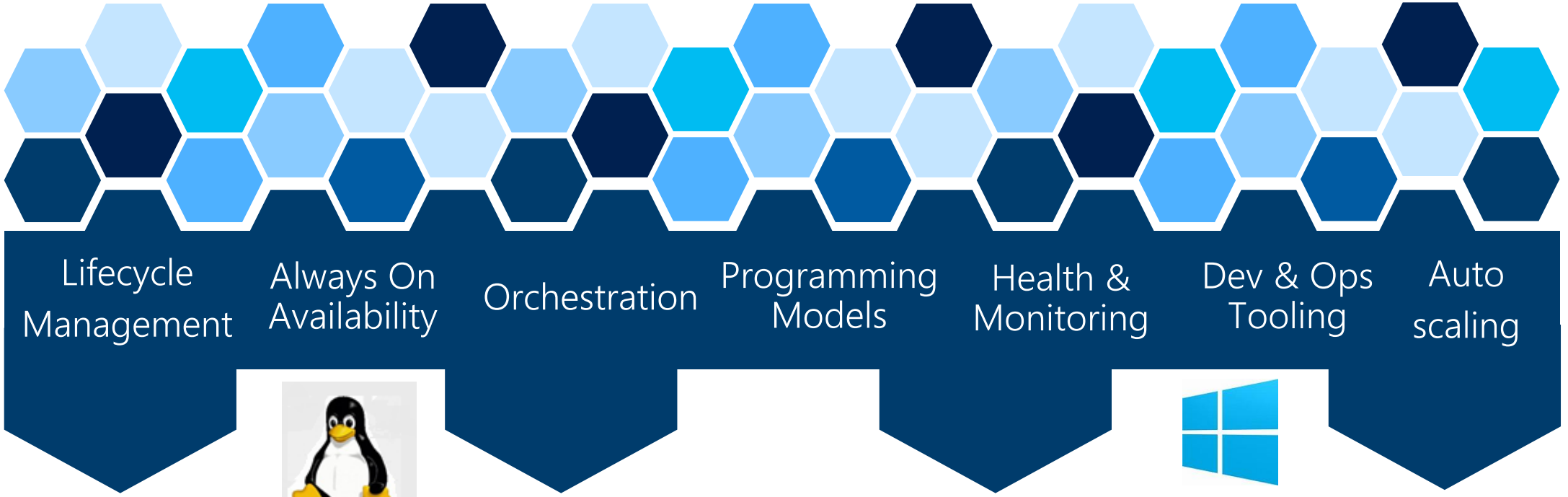
Power BI

Windows: GA
Linux: Preview

Azure Service Fabric

Any OS, Any Cloud

@techdiction
#NorthAzureUserGroup



Dev Box

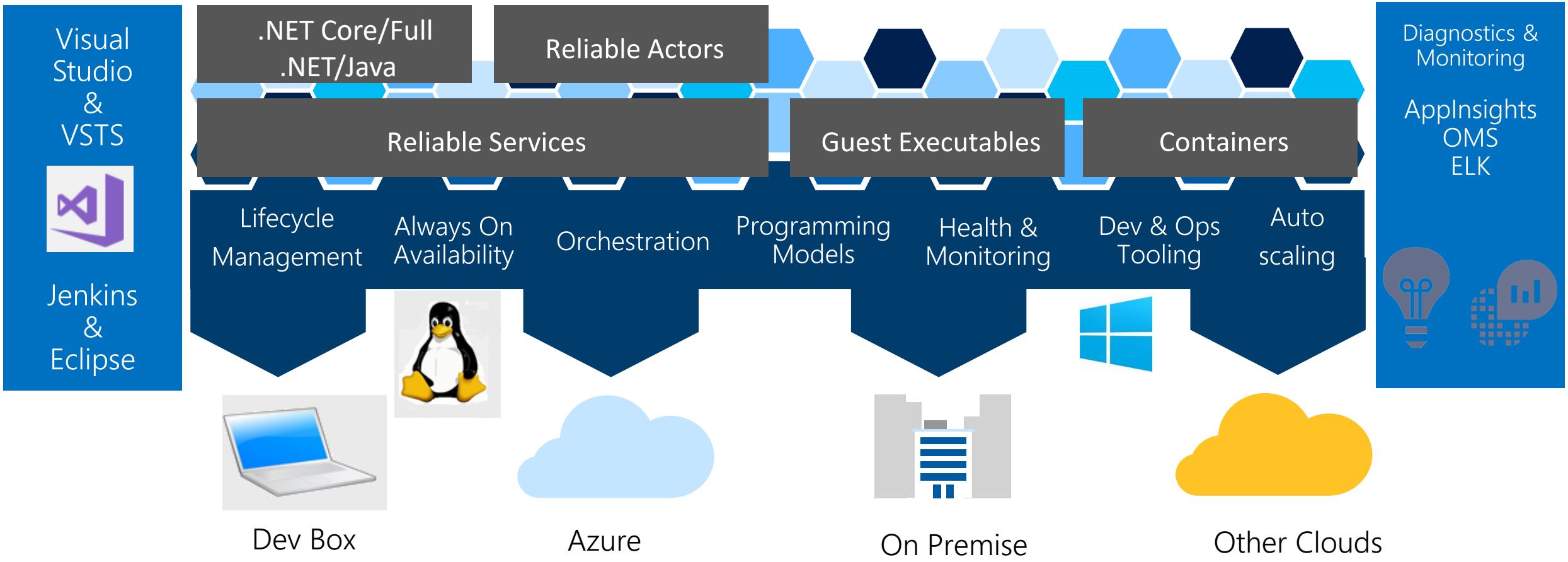
Azure

On Premise

Other Clouds

Service Fabric Programming Models & CI/CD

@techdiction
#NorthAzureUserGroup



@techdiction
#NorthAzureUserGroup

Azure Web App for Containers

Web sites, web applications – no servers

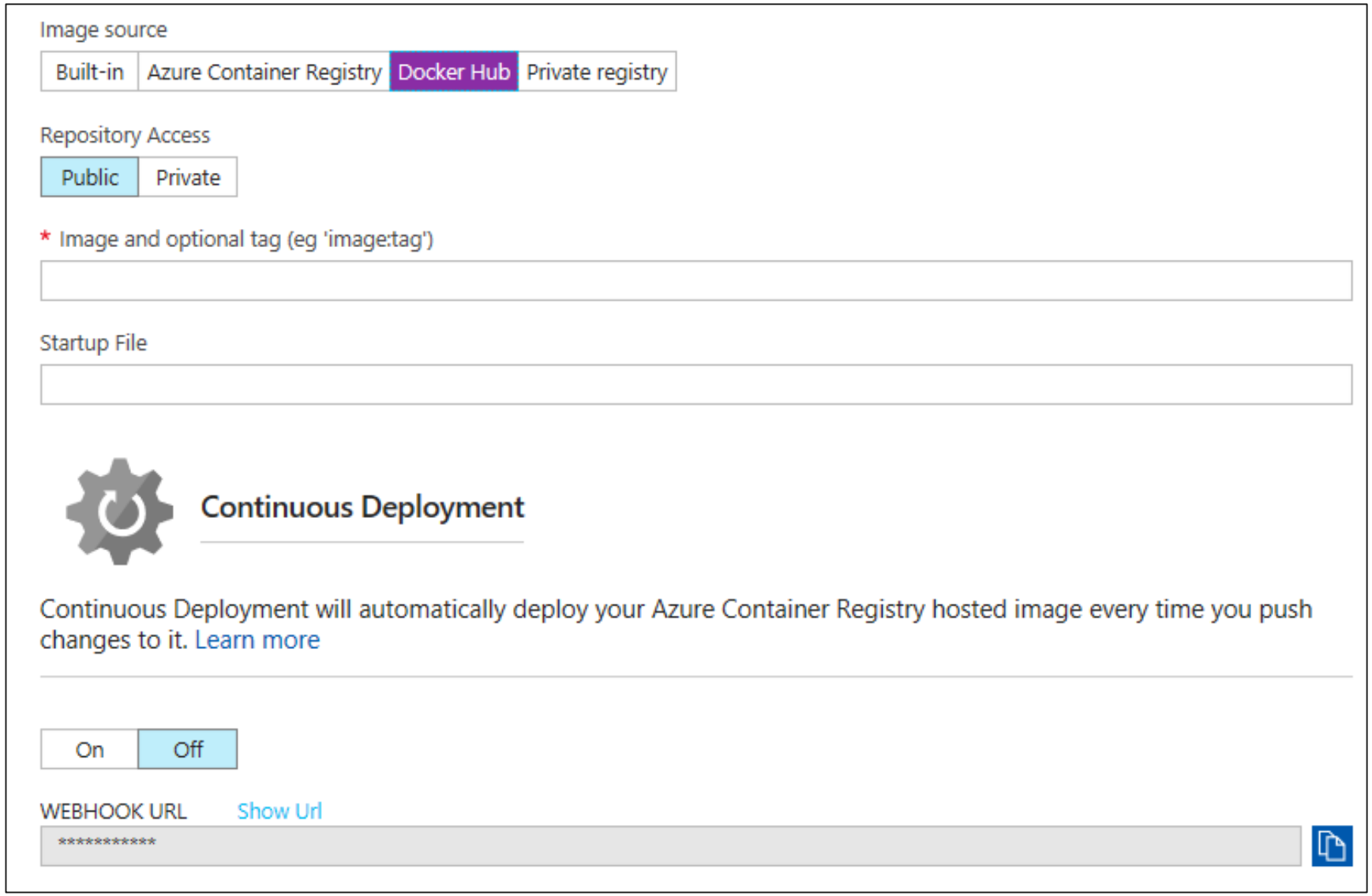
@techdiction
#NorthAzureUserGroup

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

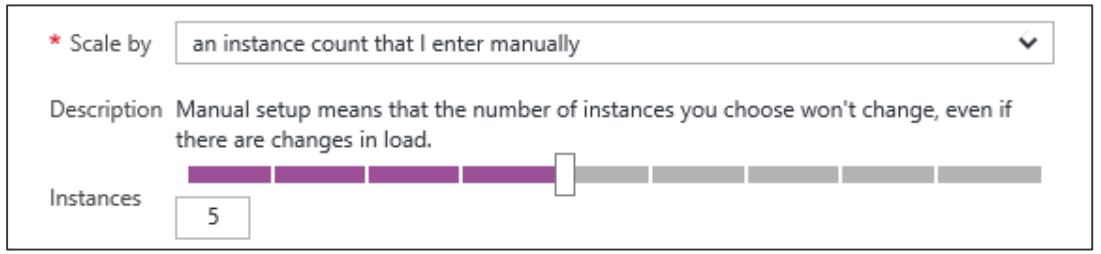
@techdiction
#NorthAzureUserGroup



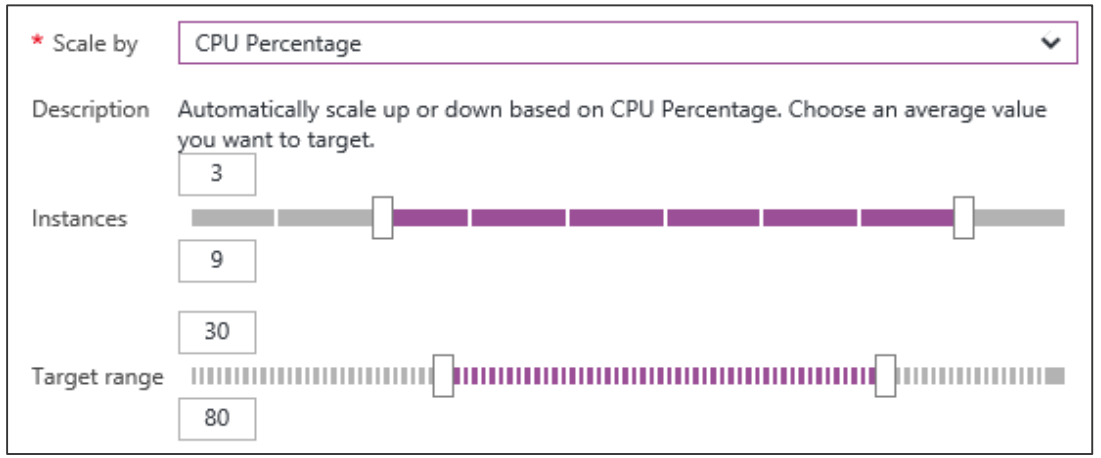
Manual Scaling & Auto-Scaling

@techdiction
#NorthAzureUserGroup

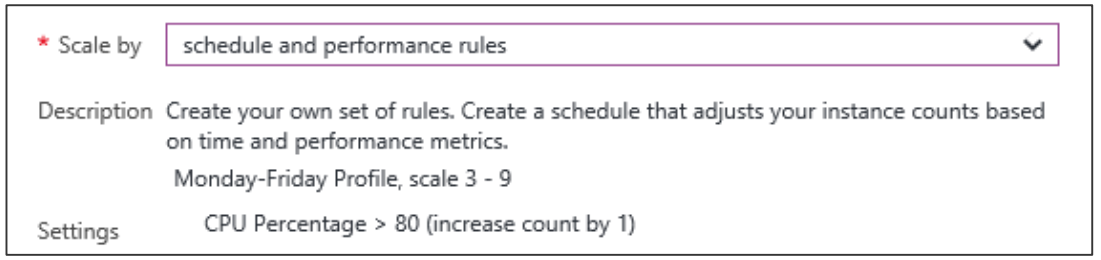
Manual – Scale via portal or scripts



Auto – CPU Percentage



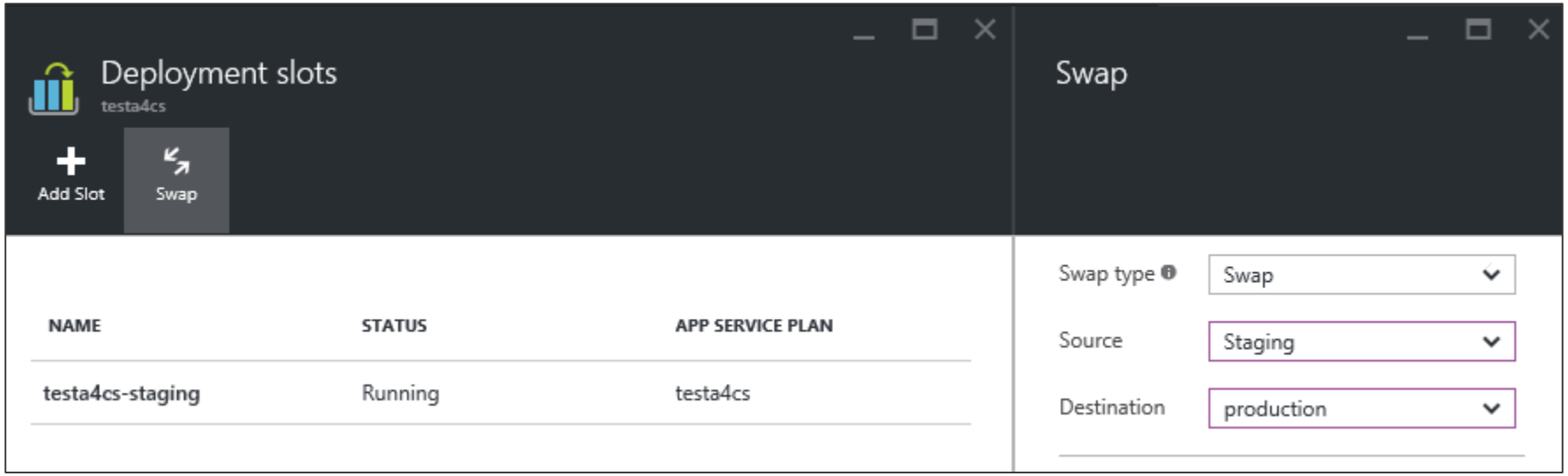
Auto – Schedule & Performance Rules



@techdiction
#NorthAzureUserGroup

Deployment Slots

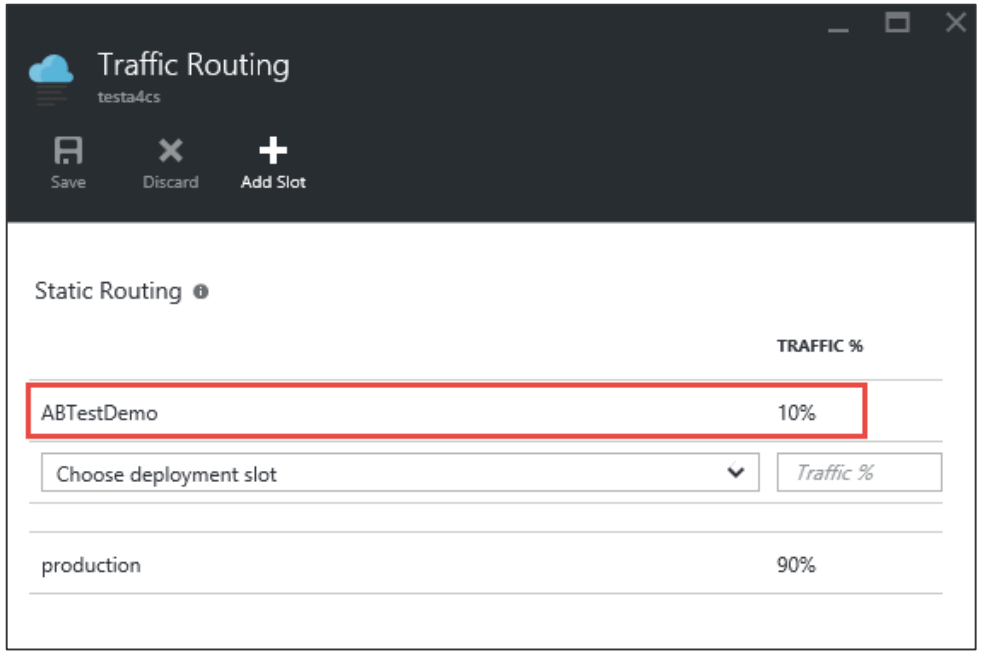
- Use a Deploy-Confirm-Promote workflow
  - Promote via "swap" through Azure portal
- http://sitename-slotname.azurewebsites.net



@techdiction
#NorthAzureUserGroup

Traffic Routing

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



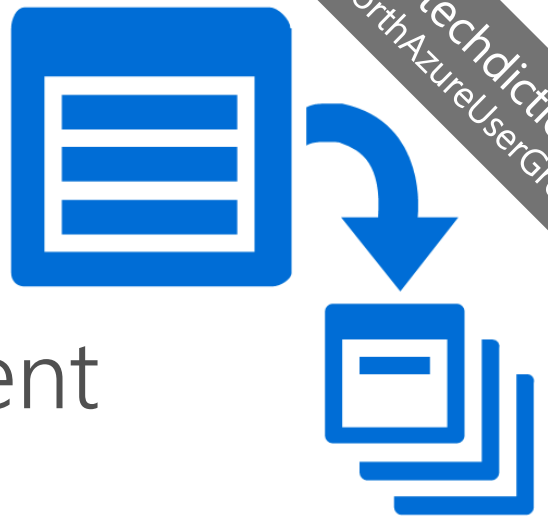

DEMO
Azure Web App for Containers

@techdiction
#NorthAzureUserGroup

Azure Batch

Parallel processing

Azure Batch



@techdiction
#NorthAzureUserGroup

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

@techdiction
#NorthAzureUserGroup

@techdiction
#NorthAzureUserGroup

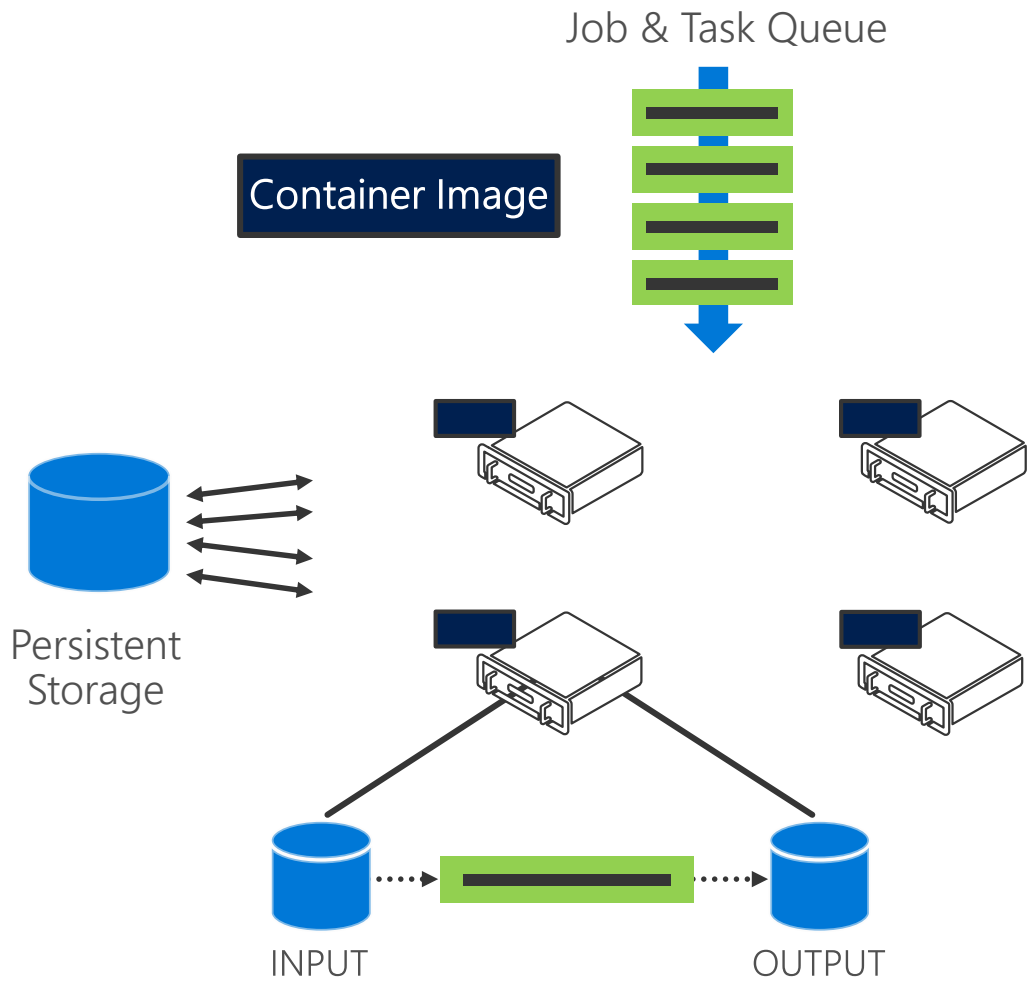
Batch + Containers = Batch Shipyard

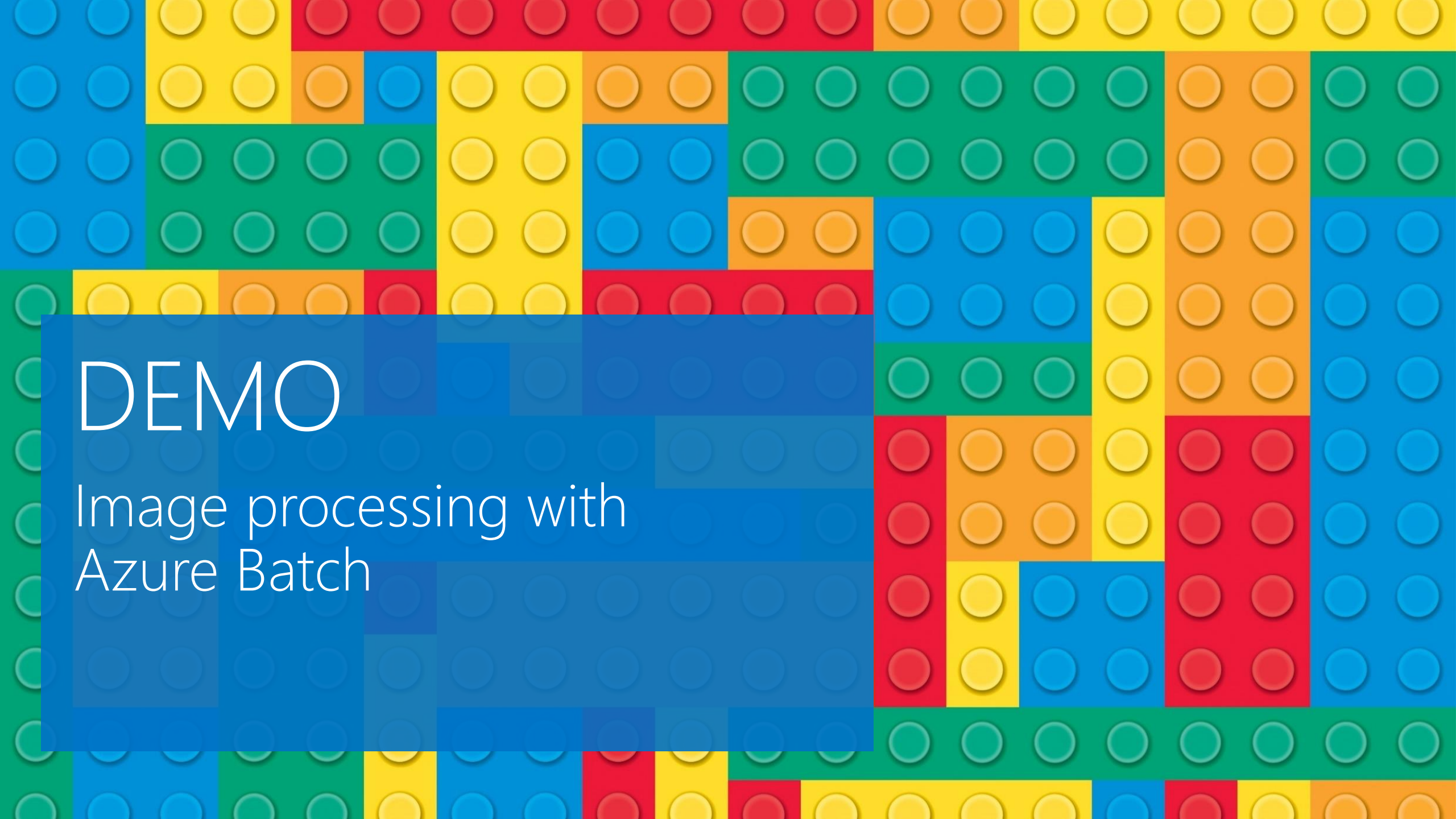
- Make it easier to run Docker apps using Python tooling
- Deploys Docker engine to nodes and deploys required container images to nodes
- Can deploy GlusterFS for use by pool nodes and install required GPU and RDMA drivers
- Create a Recipe – Number of JSON configuration files
- Large number of pre-supplied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

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

Batch Shipyard

@techdiction
#NorthAzureUserGroup




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

@techdiction
#NorthAzureUserGroup

@techdiction
#NorthAzureUserGroup

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