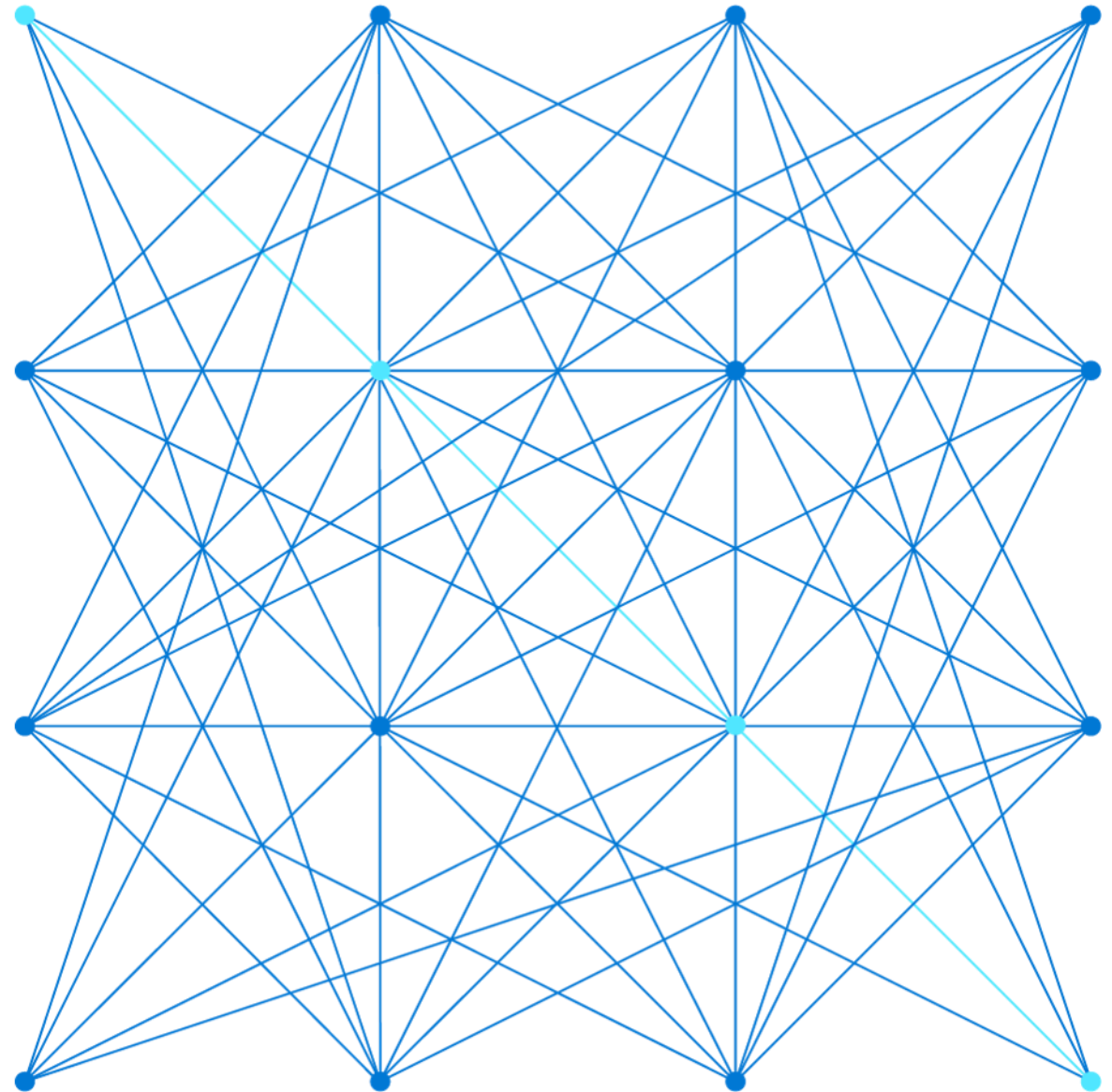


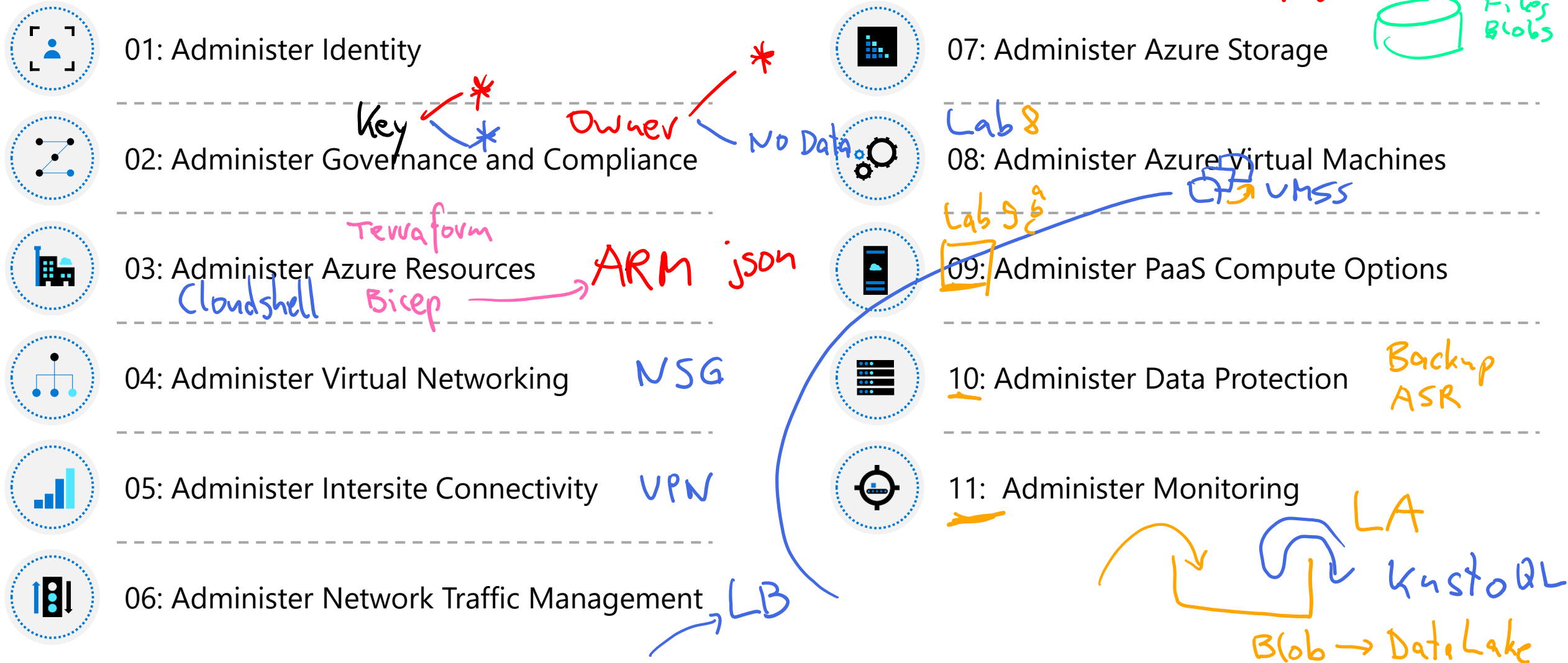
AZ-104 Tag 4

# Administer PaaS Compute Options

Guten Morgen!



# About this course: Course Outline



# Administer PaaS Compute Options Introduction



[Configure Azure App Service Plans](#)

---



[Configure Azure App Services](#)

---



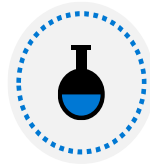
[Configure Azure Container Instances](#)

---



[Configure Azure Kubernetes Service](#)

---



[Lab 09a - Implement Web Apps](#)

[Lab 09b - Implement Azure Container Instances](#)

[Lab 09c - Implement Azure Kubernetes Service \(optional\)](#)

---

portable!

Docker Image



App Service

ACI Container

ACR Registry

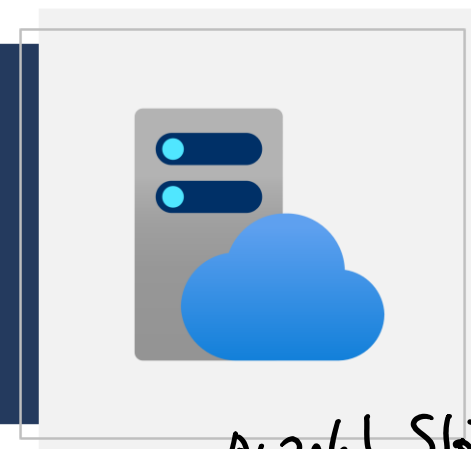
AKS Kubernetes

Tim Berners-Lee

www

404  
Cern

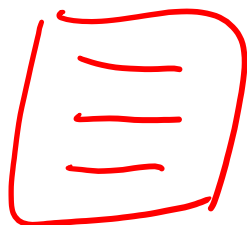
## Configure Azure App Service Plans



Rust Code App  
Rust Runtime

Docker Image

(Linux) OS



Docker Image

.Net 6.0  
PHP  
Ruby  
Go  
Windows  
IIS

(web) App Service

Node.js

swap

Linux  
Apache

Plan

Amount Slots  
Instance  
ACU 100

slot  
Prod

Code

GitHub

slot  
Staging

# Configure Azure App Service Plans Introduction



Implement Azure App Service Plans



Determine App Service Plan Pricing



Scale Up and Scale Out the App Service Plan



Configure App Service Plan Scaling



Demonstration – Create an App Service Plan



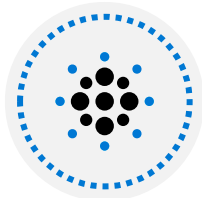
Summary and Resources

# Implement Azure App Service Plans



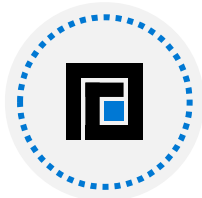
Define a set of compute resources for a web app to run

---



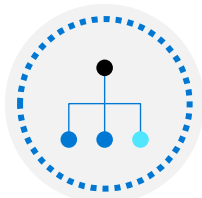
Determines performance, price, and features

---



One or more apps can be configured to run in the same App Service plan

---



Region where compute resources will be created

Number of virtual machine instances

Size of virtual machine instances

Pricing tier (next slide)

# Determine App Service Plan Pricing

Selected Features	Free	Shared (dev/test)	Basic (dedicated dev/test)	Standard (production workloads)	Premium (enhanced scale and performance)	Isolated (high-performance, security and isolation)
Web, mobile, or API apps	10	100	Unlimited	Unlimited	Unlimited	Unlimited
Disk space	1 GB	1 GB	10 GB	50 GB	250 GB	1 TB
Auto Scale	–	–	–	Supported	Supported	Supported
Deployment Slots	0	0	0	5	20	20
Max Instances	–	–	Up to 3	Up to 10	Up to 30	Up to 100

**Shared compute** *60min/24h*  
(Free and Shared). Run apps on the same Azure VM as other App Service apps, and the resources cannot scale out

**Dedicated compute**  
(Basic, Standard, Premium). Run apps in the same plan in dedicated Azure VMs

**Isolated.** Runs apps on dedicated Azure VMs in dedicated Azure virtual networks

# Scale Up and Scale Out the App Service Plan

The screenshot shows the Azure App Service Scale settings. On the left is a sidebar with navigation options: 'Diagnose and solve problems', 'Settings', 'Apps', 'File system storage', 'Networking', 'Scale up (App Service plan)', 'Scale out (App Service plan)' (which is highlighted), 'Resource explorer', and 'Properties'. The main area is titled 'Choose how to scale your resource' and contains two options: 'Manual scale' (selected with a blue radio button) and 'Custom autoscale' (unselected). Below these, the 'Manual scale' section is expanded, showing an 'Override condition' field and an 'Instance count' slider. The slider is currently set to 3, with a numeric input box to its right.

**Choose how to scale your resource**

**Manual scale** ☒ Maintain a fixed instance count

**Custom autoscale** ☐ Scale on any schedule, based on any metrics

Manual scale

Override condition

Instance count  3

## Scale up (change the App Service plan):

More hardware (CPU, memory, disk)

More features (dedicated virtual machines, staging slots, autoscaling)


## Scale out (increase the number of VM instances):


Manual (fixed number of instances)

Auto scale (based on predefined rules and schedules)




# Configure App Service Plan Scaling

**Default** Auto created scale condition 




Delete warning  The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode ☒ Scale based on a metric ☐ Scale to a specific instance count

Rules  No metric rules defined; click hyperlink [Add a rule](#) to scale out and scale in your instances based on rules. For example: 'Add a rule that increases instance count by 1 when CPU percentage is above 70%'.

[+ Add a rule](#)

Instance limits

Minimum 	Maximum 	Default 
<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="1"/>

Schedule **This scale condition is executed when none of the other scale condition(s) match**

Adjust available resources based on the current demand

Improves availability and fault tolerance

Scale based on a metric (CPU percentage, memory percentage, HTTP requests)

Scale according to a schedule (weekdays, weekends, times, holidays)

Can implement multiple rules – combine metrics and schedules

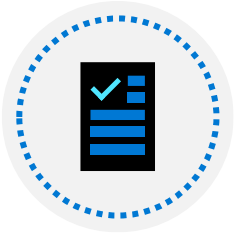
Don't forget to scale in

# Demonstration – Create an App Service plan



Create an App Service Plan in the Azure Portal

---



Review Pricing Tiers

---



Configure Autoscaling

# Summary and Resources – Configure Azure App Service Plans

Knowledge Check Questions

Microsoft Learn Modules ([docs.microsoft.com/Learn](https://docs.microsoft.com/Learn))

[Scale an App Service web app to efficiently meet demand with App Service scale up and scale out](#)










---



# Configure Azure App Services



# Configure Azure App Services Introduction

-  Implement Azure App Service
-  Create an App Service
-  Create Deployment Slots
-  Add Deployment Slots
-  Secure an App Service
-  Create Custom Domain Names
-  Backup an App Service
-  Demonstration – Create an App Service
-  Summary and Resources

# Implement Azure App Service



Includes Web Apps, API Apps, Mobile Apps, and Function Apps

Fully managed environment enabling high productivity development

Platform-as-a-service (PaaS) offering for building and deploying highly available cloud apps for web and mobile

Platform handles infrastructure so developers focus on core web apps and services

Developer productivity using .NET, .NET Core, Java, Python and a host of others

Provides enterprise-grade security and compliance

# Create an App Service

Name must be unique

Access using *azurewebsites.net* – can map to a custom domain

Publish Code (Runtime Stack)

Publish Docker Container

Linux or Windows

Region closest to your users

App Service Plan

### Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* ⓘ

Microsoft Azure Internal Consumption

Resource Group \* ⓘ

(New) rg1

Create new

### Instance Details

Name \*

your-app-name

.azurewebsites.net

Publish \*

Code Docker Container

Runtime stack \*

.NET Core 3.1 (LTS)

Operating System \*

Linux Windows

Region \*

East US

Not finding your App Service Plan? Try a different region.

### App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app.  
[Learn more](#)

Windows Plan (East US) \* ⓘ

(New) asp1

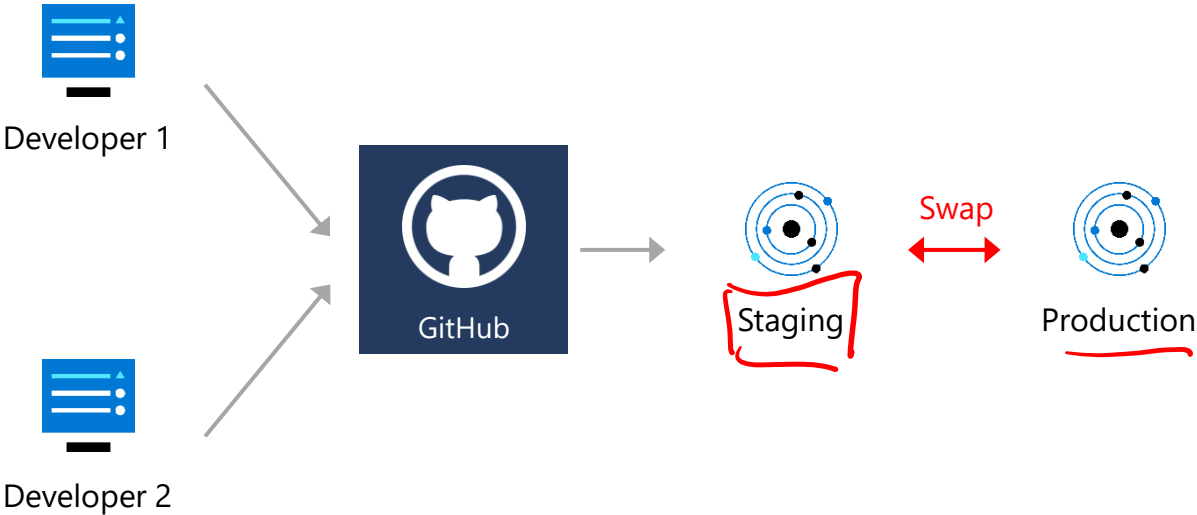
Create new

Sku and size \*

**Standard S1**  
100 total ACU, 1.75 GB memory  
[Change size](#)

# Create Deployment Slots

## Continuous Deployment with Stage Slot



Service Plan	Slots
Free, Shared, Basic	0
Standard	Up to <u>5</u>
Premium	Up to <u>20</u>
Isolated	Up to 20

- Deploy to a different deployment slots (depends on service plan)
- Validate changes before sending to production
- Deployment slots are live apps with their own hostnames
- Avoids a cold start – eliminates downtime
- Fallback to a last known good site
- Auto Swap when pre-swap validation is not needed



# Add Deployment Slots

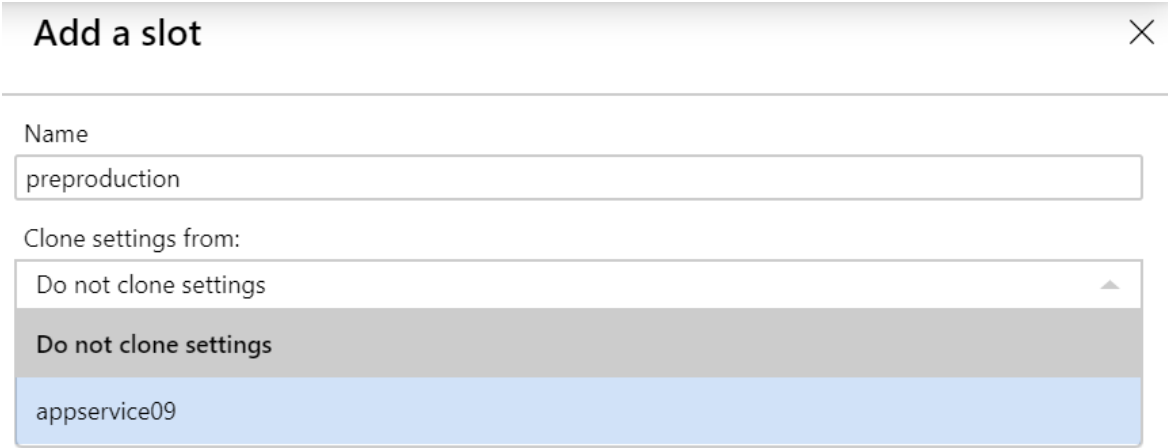
Select whether to clone an app configuration from another deployment slot

When you clone, pay attention to the settings:

- Slot-specific app settings and connection strings
- Continuous deployment settings
- App Service authentication settings

Not all settings are sticky (endpoints, custom domain names, SSL certificates, scaling)

Review and edit your settings before swapping



The screenshot shows a modal dialog titled "Add a slot" with a close button (X) in the top right corner. Inside the dialog, there is a "Name" label followed by a text input field containing the value "preproduction". Below this is a "Clone settings from:" label followed by a dropdown menu. The dropdown menu is open, showing three options: "Do not clone settings" (which is currently selected and highlighted in grey), "Do not clone settings" (a second, identical option), and "appservice09" (which is highlighted in blue).

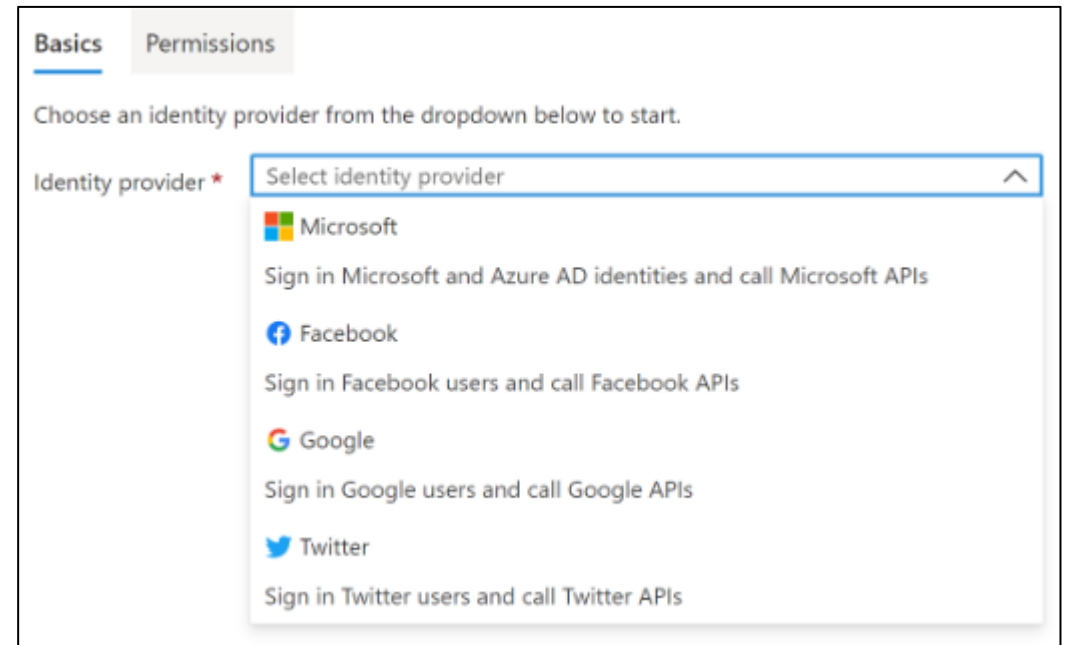
# Secure an App Service

## Authentication:

- Enable authentication – default anonymous
- Log in with a third-party identity provider

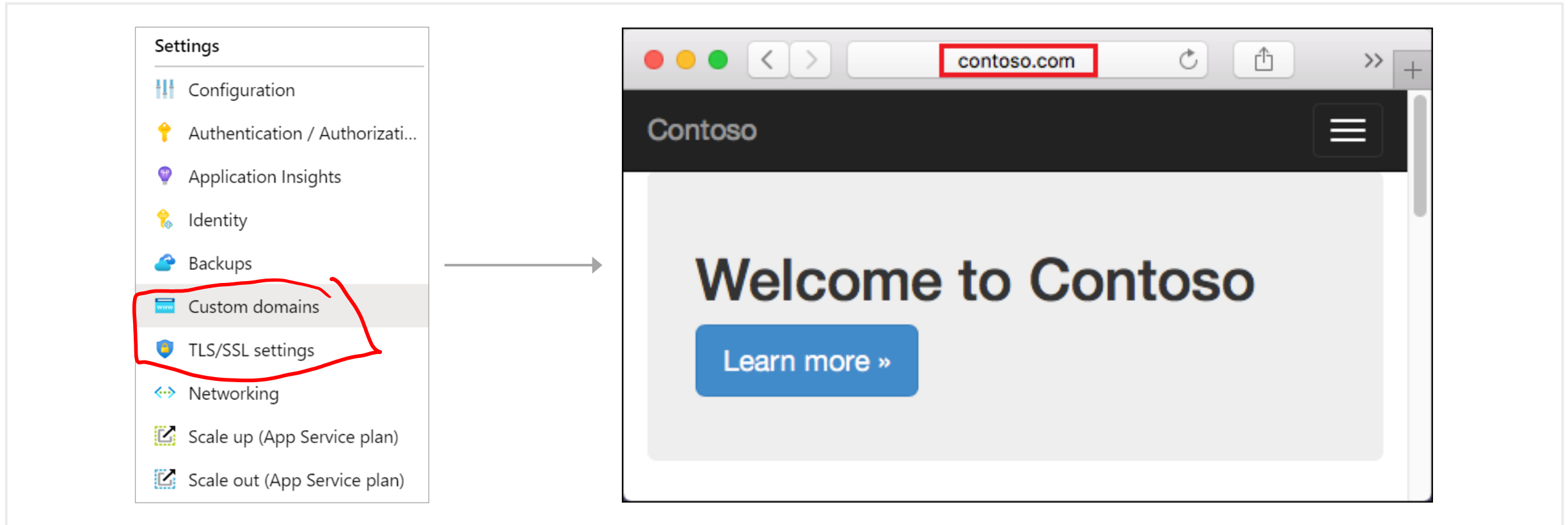
## Security:

- Troubleshoot with Diagnostic Logs – failed requests, app logging
- Add an SSL certificate – HTTPS
- Define a priority ordered allow/deny list to control network access to the app
- Store secrets in the Azure Key Vault



https:// www.azurewebsites.net

## Create Custom Domain Names



Redirect the default web app URL

Validate the custom domain in Azure

Use the DNS registry for your domain provider – create a CNAME or A record with the mapping

Ensure App Service plan supports custom domains

# Backup an App Service

Create app backups manually or on a schedule

Backup the configuration, file content, and database connected to the app

Requires Standard or Premium plan

Backups can be up to 10 GB of app and database content

Configure partial backups and exclude items from the backup

Restore your app on-demand to a previous state, or create a new app

## Settings



Configuration



Authentication / Authorizati...



Application Insights



Identity



Backups



Custom domains



TLS/SSL settings



Networking



Scale up (App Service plan)



Scale out (App Service plan)

# Demonstration – Create an App Service



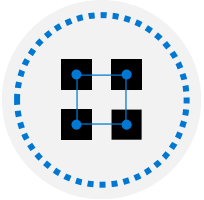
Create a Web App in the Azure Portal

---



Test the Web App

---



Configure Deployment Slots

---



Configure Backup

# Summary and Resources – Configure Azure App Services

Knowledge Check Questions

Microsoft Learn Modules ([docs.microsoft.com/Learn](https://docs.microsoft.com/Learn))



[Host a web application with Azure App Service \(Sandbox\)](#)

---

[Stage a web app deployment for testing and rollback by using App Service deployment slots](#)

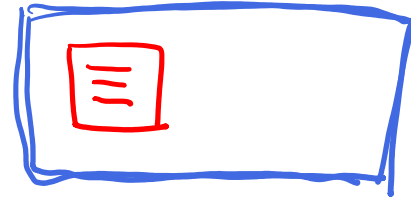
---

[Dynamically meet changing web app performance requirements with autoscale rules](#)

---

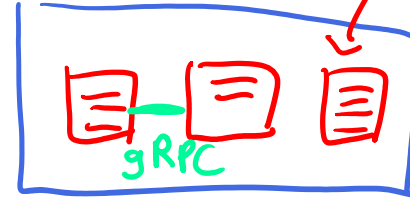
*A sandbox* indicates a hands-on exercise.

ACI  
Portal:



1 Image

Instance  
(Pod)



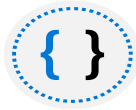
3 Images

Service mesh Istio  
ACI  
ARM Template

# Configure Azure Container Instances



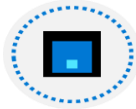
# Configure Azure Container Instances Introduction



Compare Containers to Virtual Machines



Explore Azure Container Instances Benefits



Implement Container Groups



Understand the Docker Platform



Demonstration – Deploy Azure Container Instances

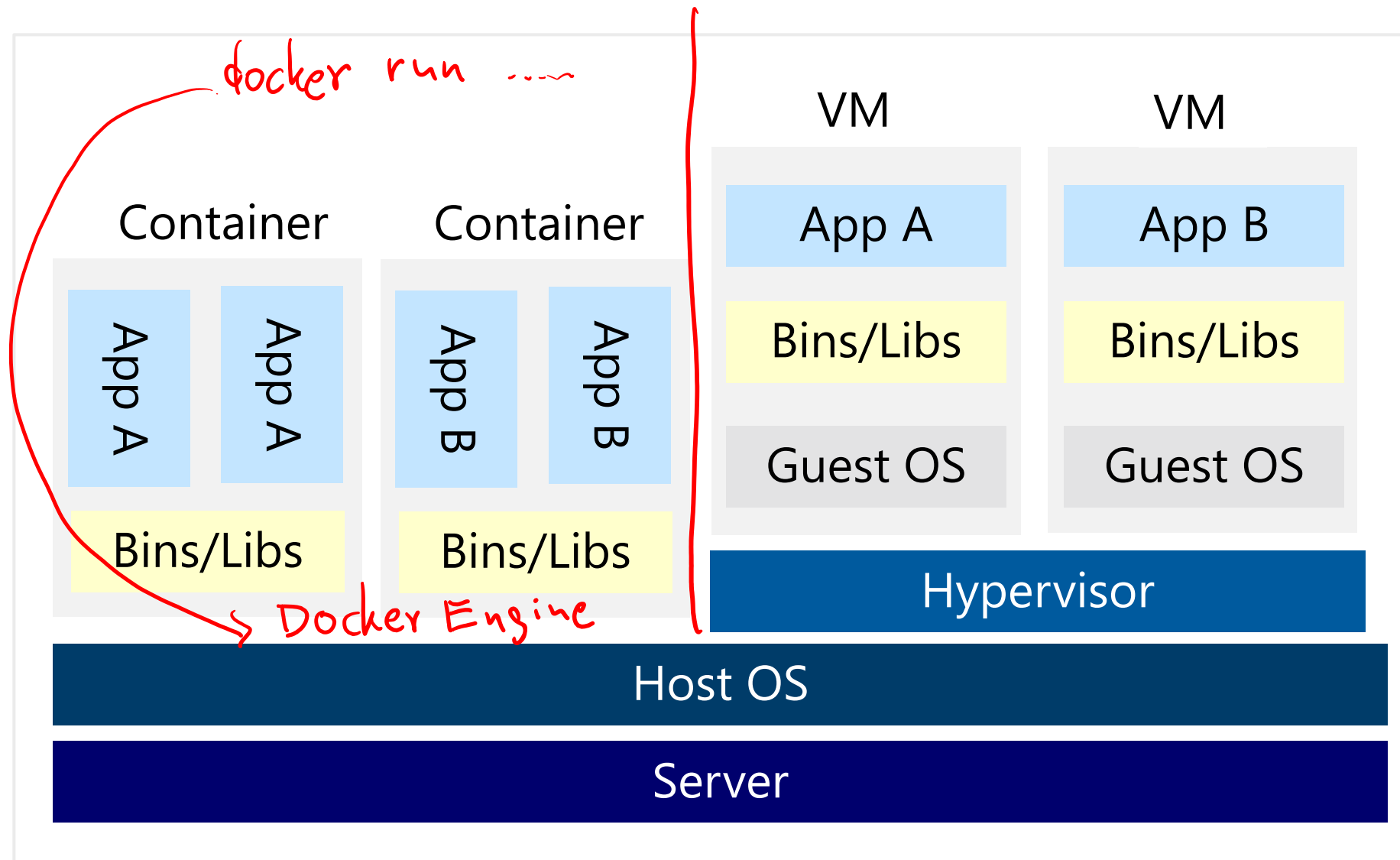


Summary and Resources



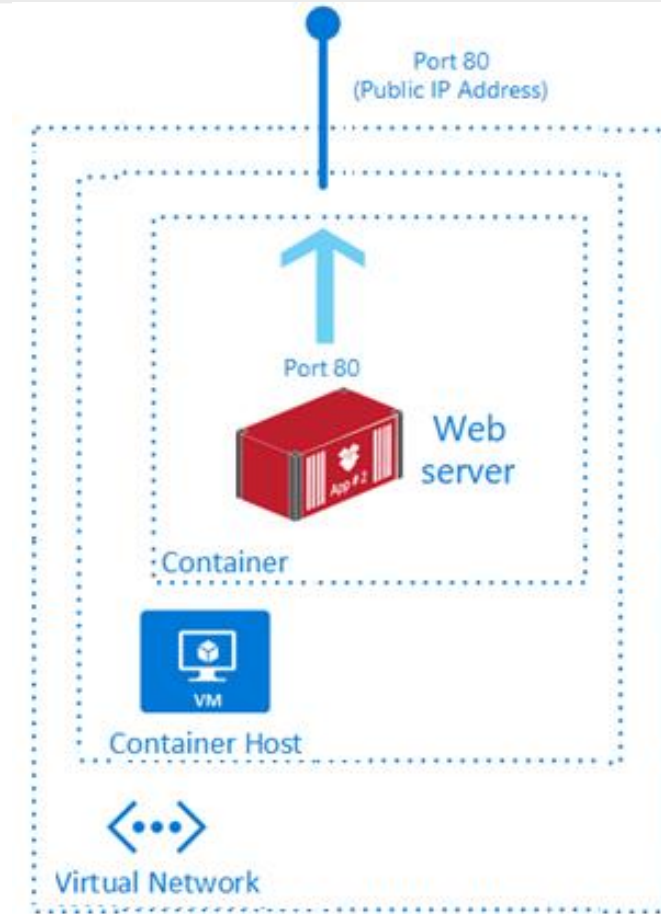
# Compare Containers to Virtual Machines

- Isolation
- Operating System
- Deployment
- Persistent storage
- Fault tolerance



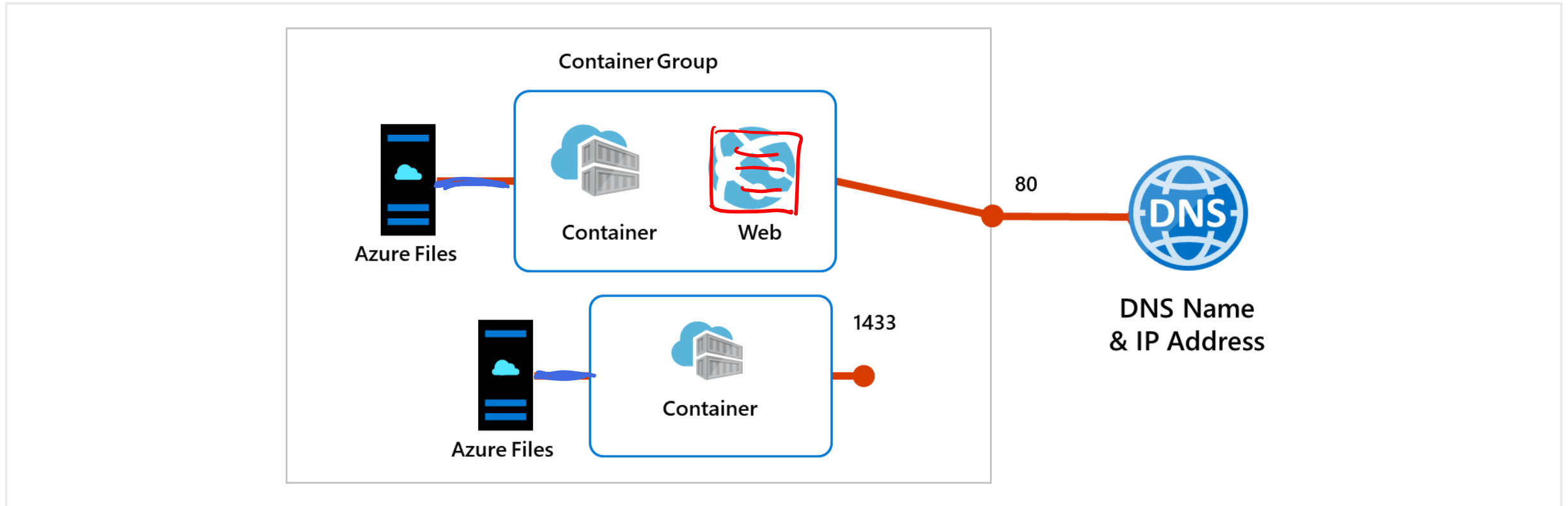
# Explore Azure Container Instances Benefits

- PaaS Service
- Fast startup times
- Public IP connectivity and DNS name
- Isolation features
- Custom sizes
- Persistent storage
- Linux and Windows Containers
- Co-scheduled Groups
- Virtual network Deployment



Fastest way to run a container in Azure without provisioning a VM

# Implement Container Groups

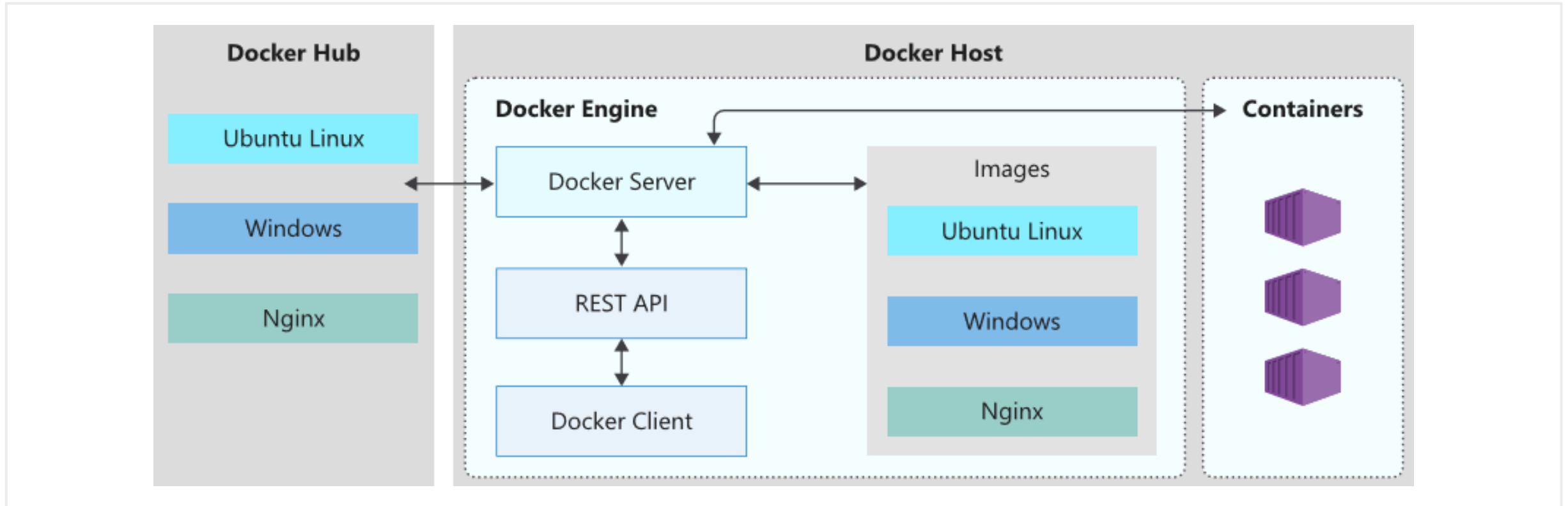


Top-level resource in Azure Container Instances

A collection of containers that get scheduled on the same host

The containers in the group share a lifecycle, resources, local network, and storage volumes

# Understand the Docker Platform



Enables developers to host applications within a container

A container is a standardized “unit of software” that contains everything required for an application to run

Available on both Linux and Windows and can be hosted on Azure

# Demonstration - Deploy Azure Container Instances



Create a container instance

---



Verify deployment of the container instance

---

# Summary and Resources – Configure Azure Container Instances

Knowledge Check Questions

Microsoft Learn Modules ([docs.microsoft.com/Learn](https://docs.microsoft.com/Learn))



[Run Docker containers with Azure Container Instances](#)

---

[Build a containerized web application with Docker](#)

---

Azure Portal

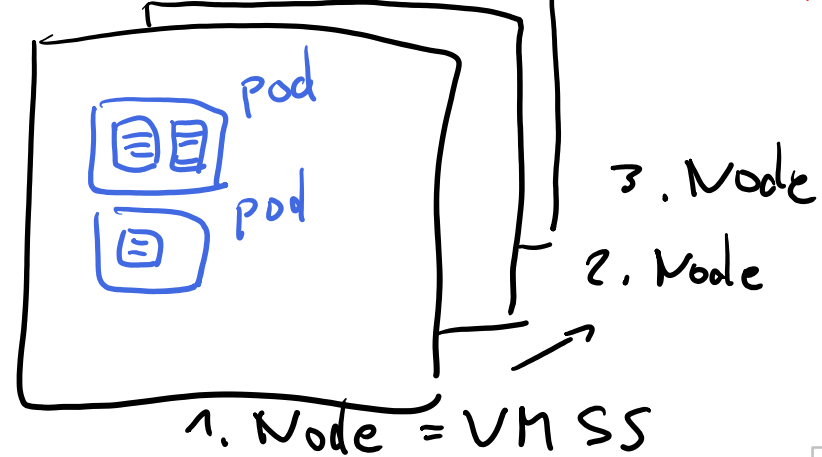
Power Shell

az Cli

kubectl



K8S Cluster











Microservices



# Configure Azure Kubernetes Service

yaml Manifest (wie json)

# Configure Azure Kubernetes Service Introduction

-  Understand AKS Terminology
-  Understand AKS Clusters and Nodes
-  Configure AKS Networking
-  Configure AKS Storage
-  Configure AKS Scaling
-  Configure AKS Scaling to ACI (optional)
-  Demonstration – Deploy Azure Kubernetes Service (optional)
-  Summary and Resources

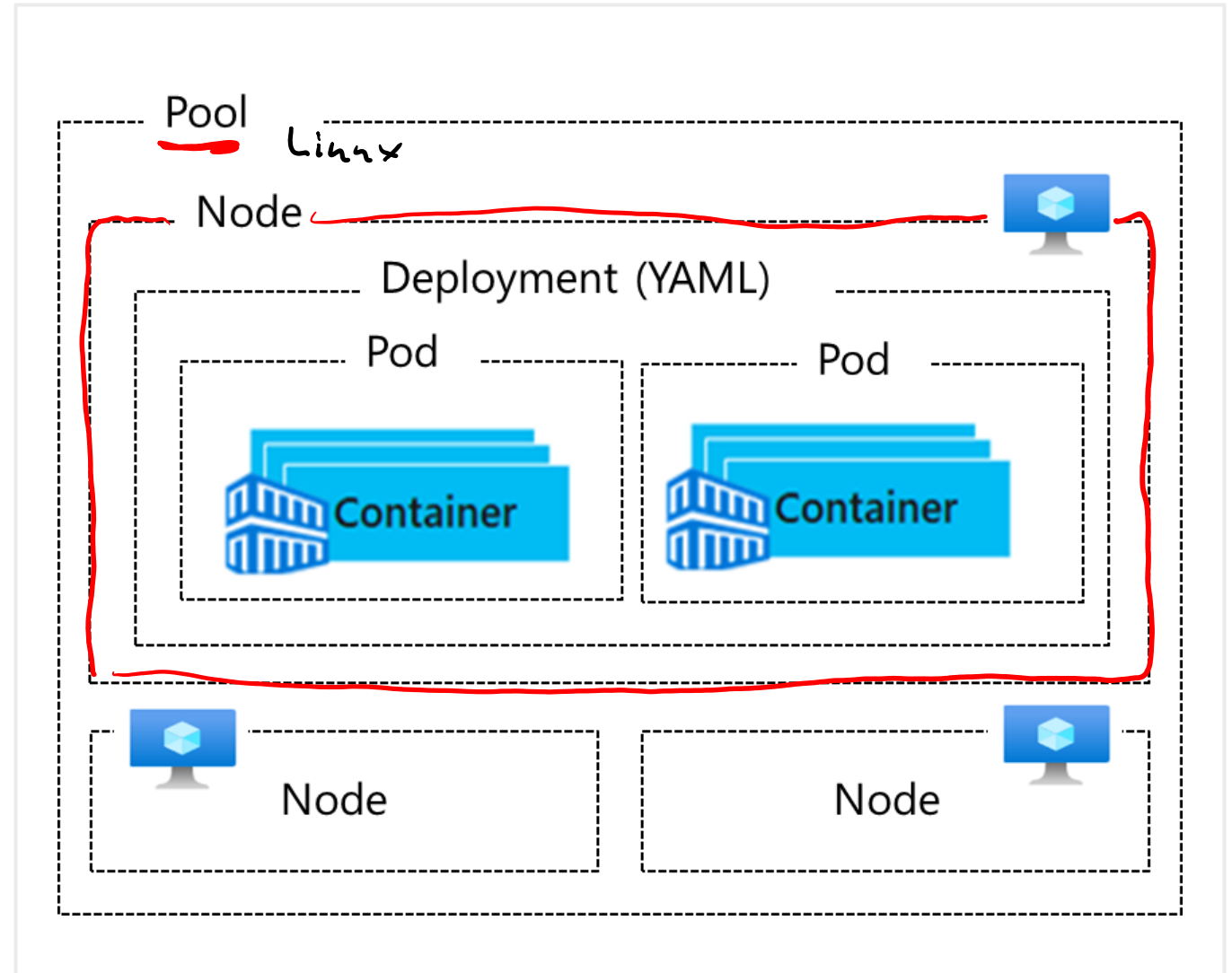


Brendan Burns

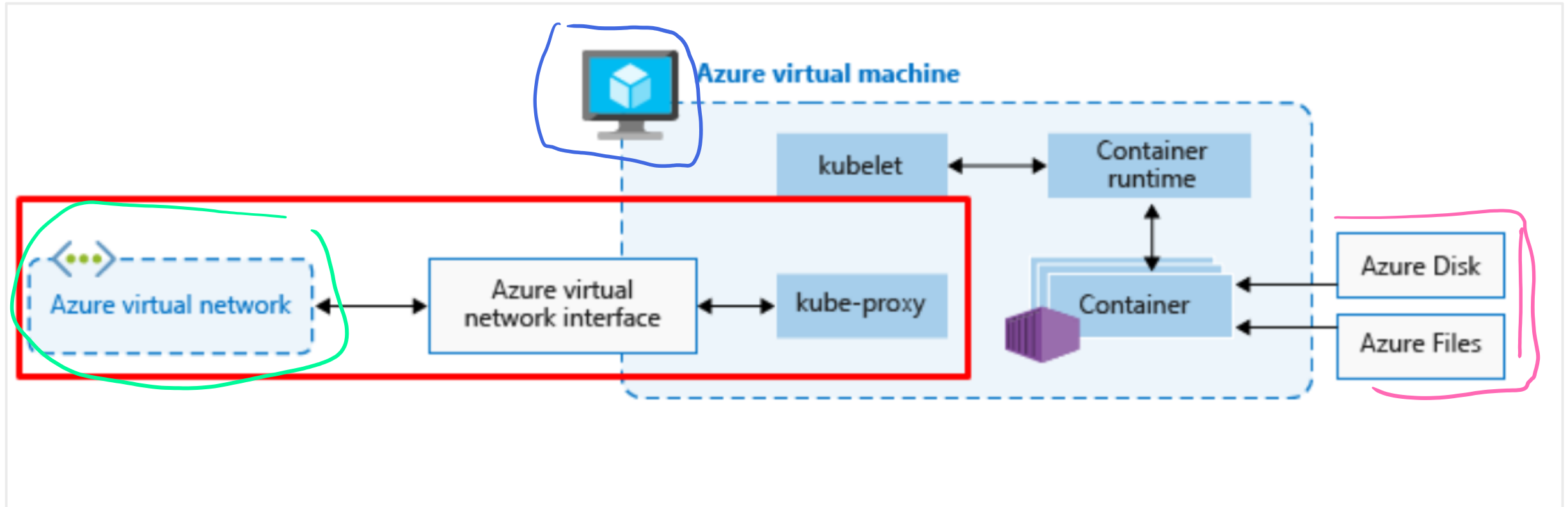
# Understand AKS Terminology

Term	Description
Pools	Groups of nodes with identical configurations
Nodes	Individual VMs running containerized applications
Pods	Single instance of an application. A pod can contain multiple containers
Deployment	One or more identical pods managed by Kubernetes
Manifest	YAML file describing a deployment

pool? windows



# Understand AKS Clusters and Nodes

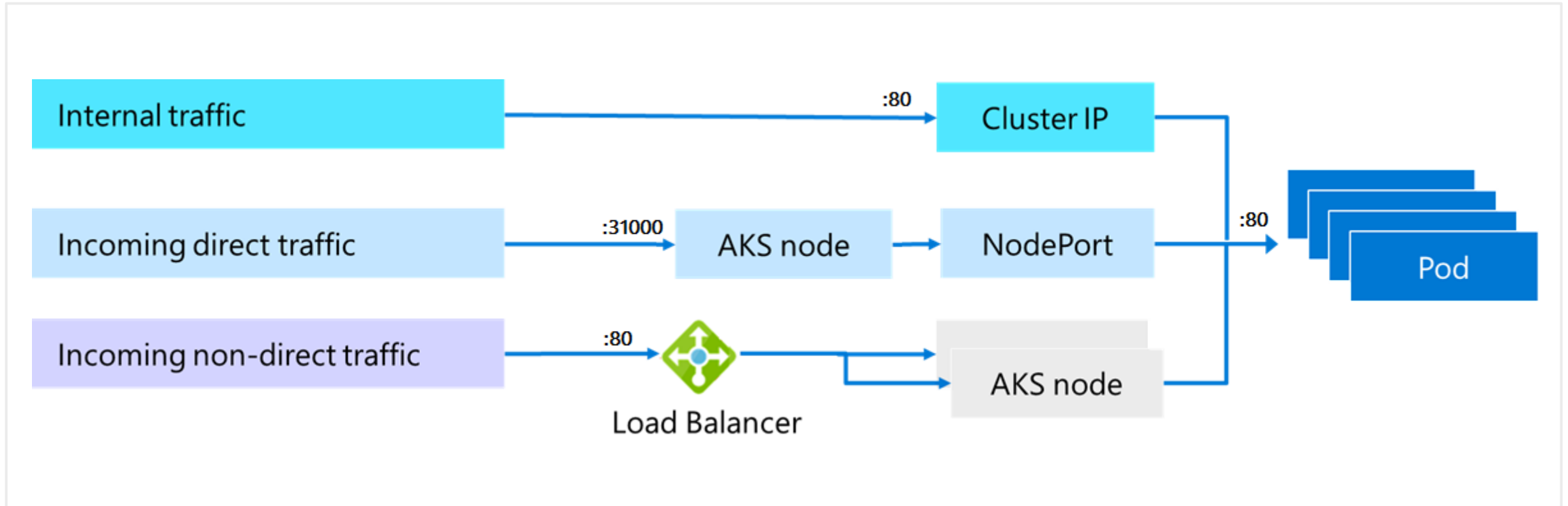


Azure-managed node provides core Kubernetes services and orchestration

Customer-managed nodes run applications and supporting services

Each individual node is an Azure virtual machine

# Configure AKS Networking



Pods run an instance of your application

Services group pods together to provide network connectivity

**ClusterIP** provides internal traffic access

**NodePort** provides mapping for incoming direct traffic

**LoadBalancer** has external IP address for incoming non-direct traffic

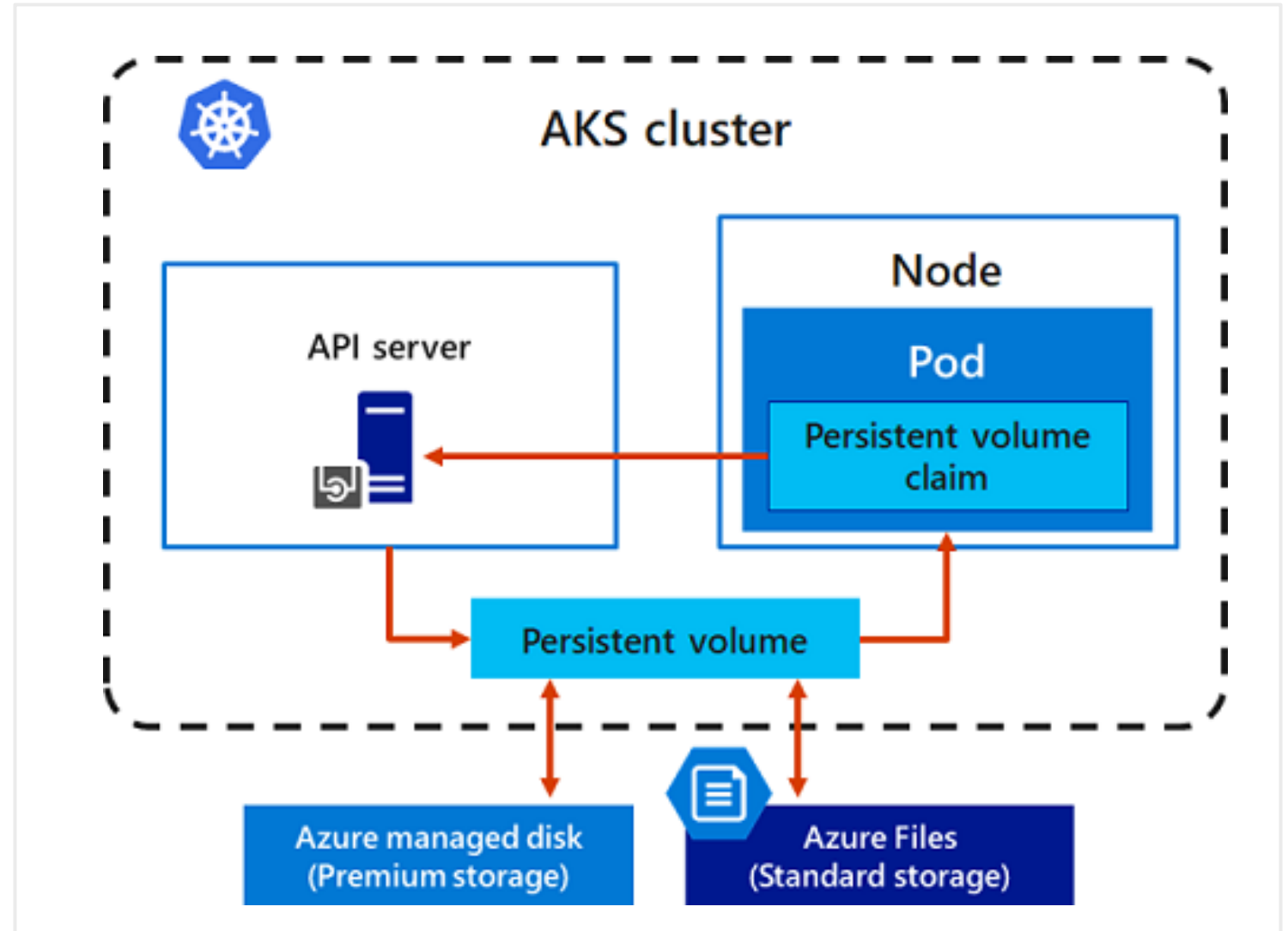
# Configure AKS Storage

Local storage on the node is fast and simple to use

Local storage might not be available after the pod is deleted

Multiple pods may share data volumes

Storage could potentially be reattached to another pod



# Configure AKS Scaling

Kubernetes  
k8s

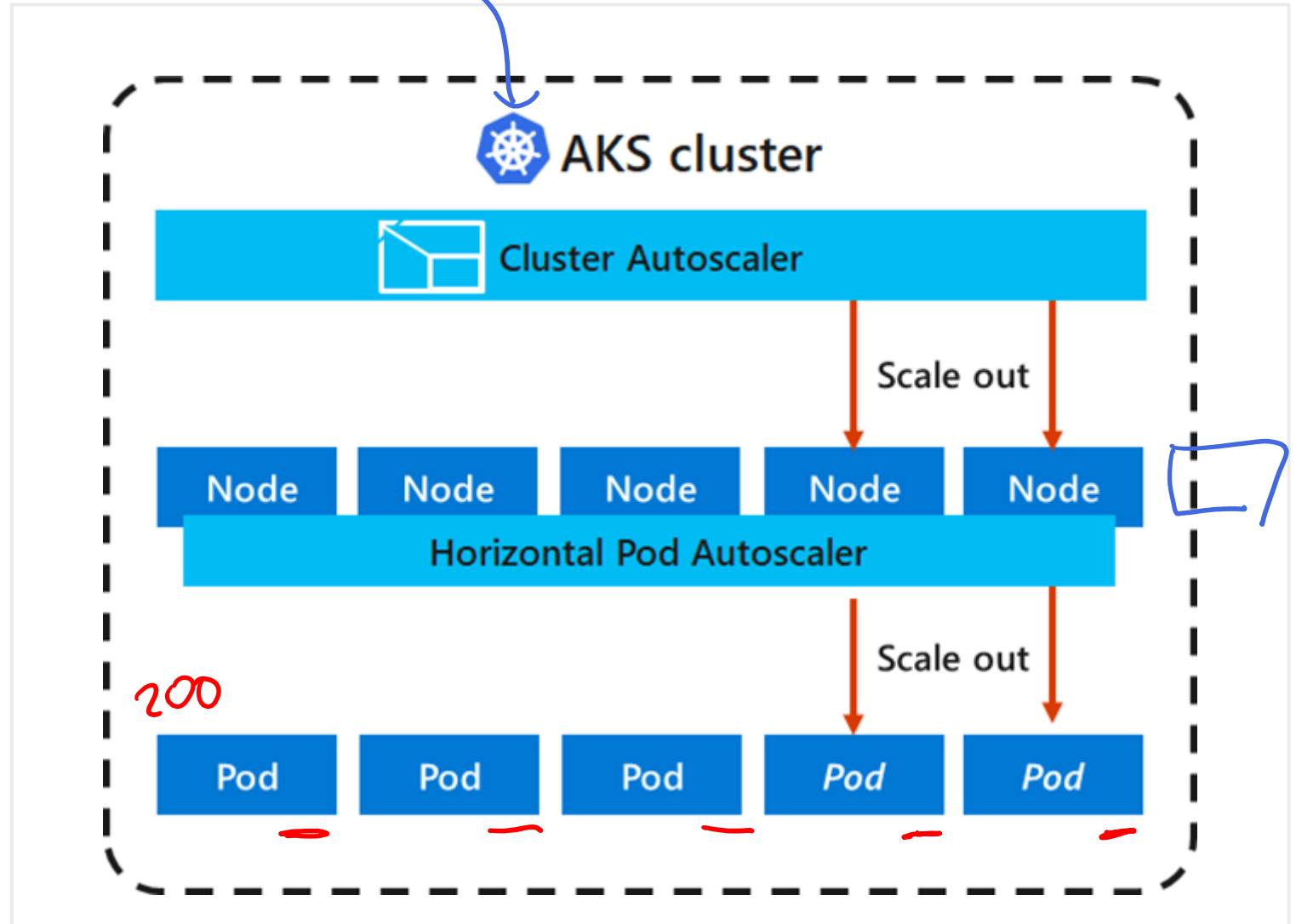
7 / 9

Applications might grow beyond the capacity of a single pod

Kubernetes has built-in autoscalers

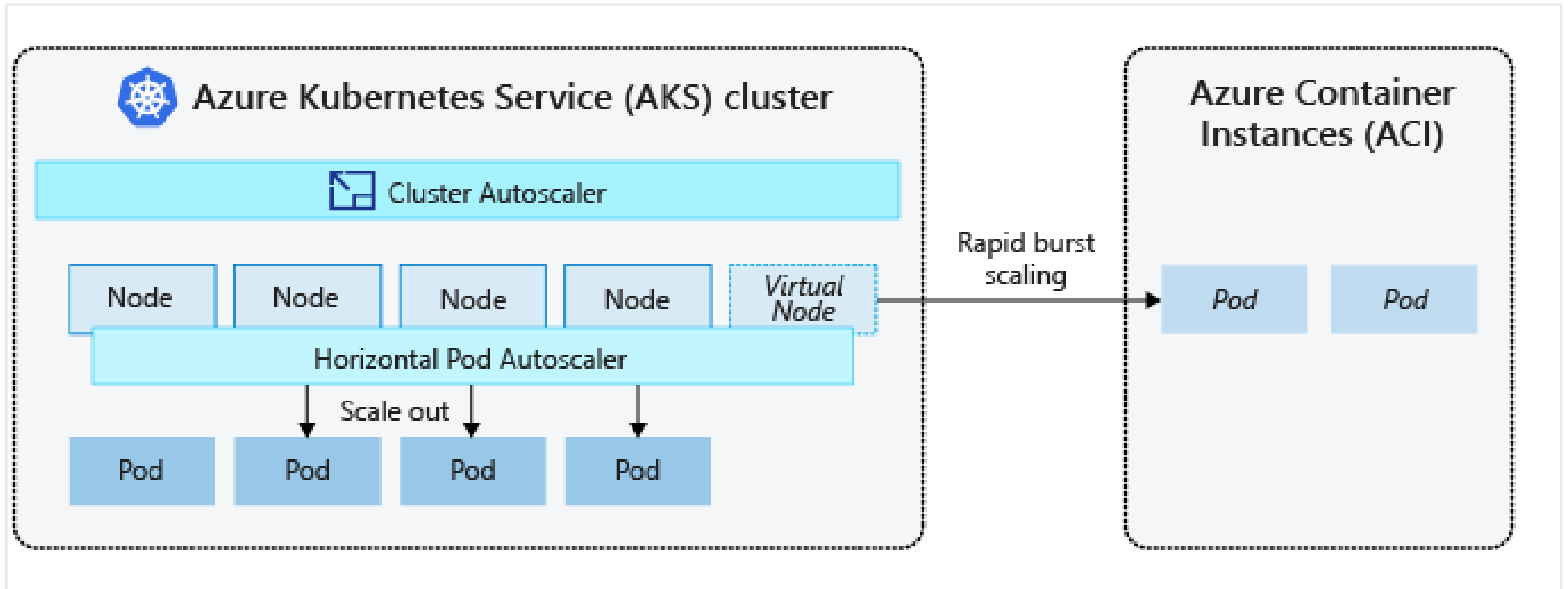
Cluster autoscaler scales based on compute resources

Horizontal pod autoscaler scales based on metrics



# Configure AKS Scaling to ACI (optional)

If you need to rapidly grow your AKS cluster, you can create new pods in Azure Container Instances

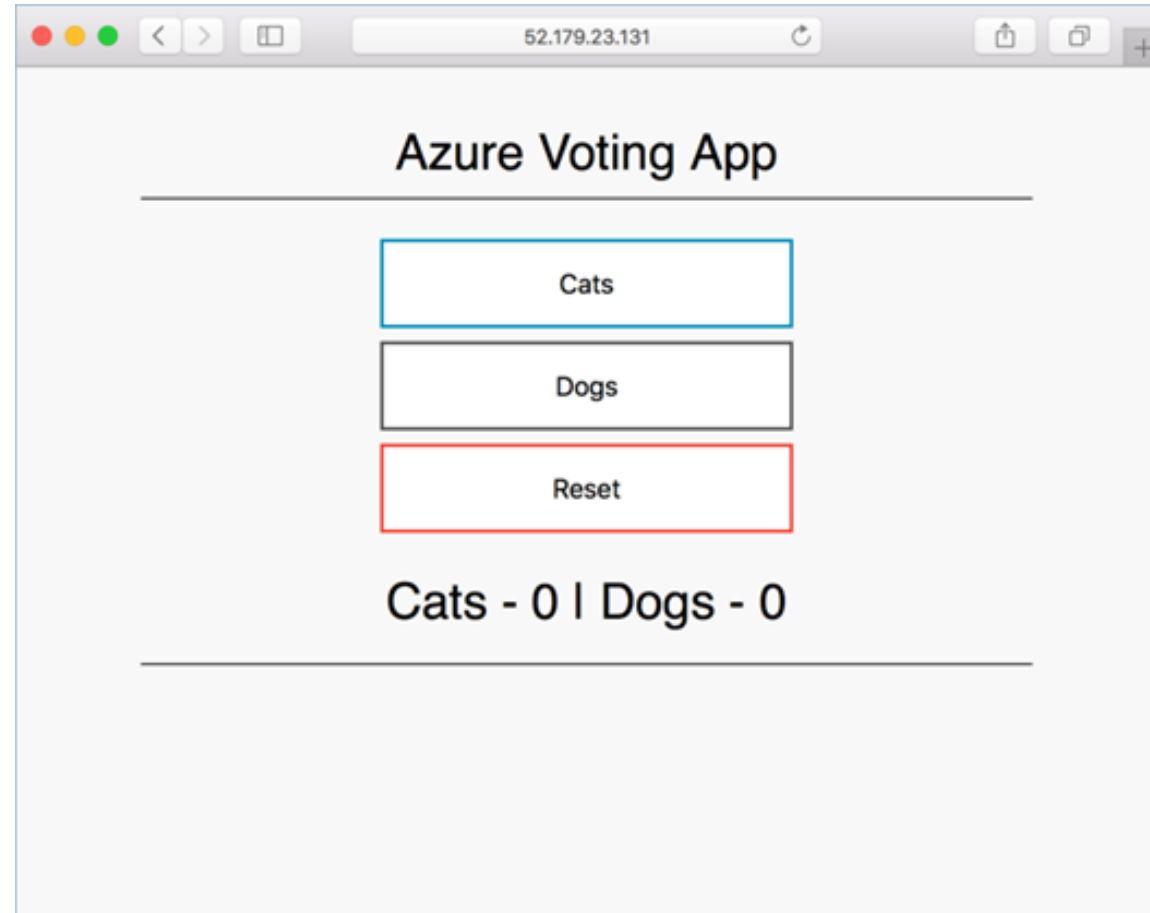


# Demonstration – Deploy Azure Kubernetes Service (optional)

Create a  
Kubernetes service

Connect  
to the cluster

Test the  
applications



# Summary and Resources – Configure Azure Kubernetes Service

Knowledge Check Questions

Microsoft Learn Modules ([docs.microsoft.com/Learn](https://docs.microsoft.com/Learn))



[Introduction to Azure Kubernetes Service](#)

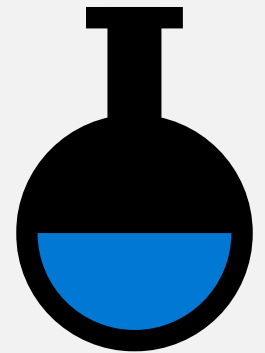
---

[Implement Azure Kubernetes Service \(AKS\)](#)

---



**Lab 09a - Implement Web Apps**  
**Lab 09b - Implement Azure Container Instances**  
**Lab 09c - Implement Azure Kubernetes Service (optional)**



# Lab 09a – Implement web apps

## Lab scenario

You need to evaluate the use of Azure Web apps for hosting Contoso's web sites, hosted currently in the company's on-premises data centers. The web sites are running on Windows servers using PHP runtime stack. You also need to determine how you can implement DevOps practices by leveraging Azure web apps deployment slots

## Objectives

### Task 1:

Create an Azure web app

### Task 2:

Create a staging deployment slot

### Task 3:

Configure web app deployment settings

### Task 4:

Deploy code to the staging deployment slot

### Task 5:

Swap the staging slots

### Task 6:

Configure and test autoscaling of the Azure web app

Next slide for an architecture diagram 

# Lab 09a – Architecture diagram

Git  
Linus Torvalds  
Linux Kernel

## Task 1

az104-09a-rg1



AppService



Production slot

PHP



AppServiceplan



## Task 6



Autoscale rule

## Task 5



Swap the staging slot

## Task 2



Staging slot



gitpull  
Pa55w0rd  
~234

git push ...

## Task 3



Local git

php-docs-hello-world  
code

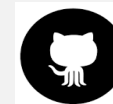
## Task 4



Cloudshell

git clone ...

php-docs-hello-world  
code



GitHub

Your App  
is running  
and waiting

Hello  
world

# Lab 09b – Implement Azure Container Instances

## Lab scenario

Contoso wants to find a new platform for its virtualized workloads. You identified several container images that can be leveraged to accomplish this objective. Since you want to minimize container management, you plan to evaluate the use of Azure Container Instances for deployment of Docker images

## Objectives

### Task 1:

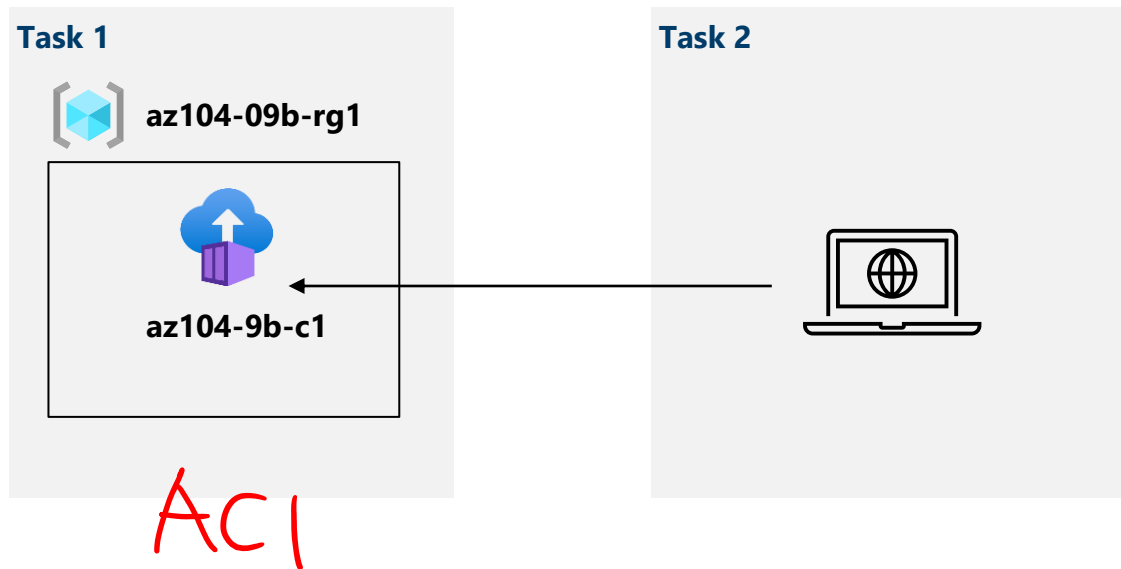
Deploy a Docker image by using the Azure Container Instance

### Task 2:

Review the functionality of the Azure Container Instance

Next slide for an architecture diagram 

# Lab 09b – Architecture diagram



# Lab 09c – Implement Azure Kubernetes service (optional)

## Lab scenario

Contoso has several multi-tier applications that are not suitable to run by using Azure Container Instances. To determine whether they can be run as containerized workloads, you want to evaluate using Kubernetes as the container orchestrator. To minimize management overhead, you want to test Azure Kubernetes Service, including its simplified deployment experience and scaling

## Objectives

### Task 1:

Deploy an Azure Kubernetes Service cluster

### Task 2:

Deploy pods into the Azure Kubernetes Service cluster

### Task 3:

Scale containerized workloads in the Azure Kubernetes service cluster

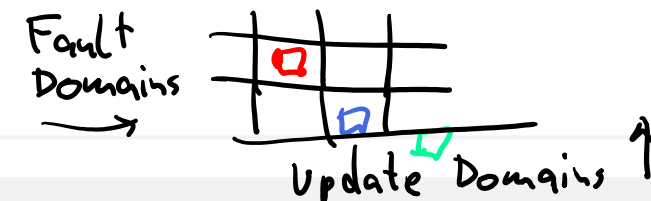
Next slide for an architecture diagram 

# Lab 09c – Architecture diagram

>

AKS

Scale Set



## Task 1

CloudShell



Register the Microsoft.Kubernetes and Microsoft.KubernetesConfiguration resource providers

kubectl get pods → API  
yaml

## Task 2

az104-09c-rg1



az104-09c-aks1

## Task 3



Nginx pod

## Task 4



Nginx pod scale

MC\_az104-09c-rg1\_az104-09c-aks1\_region



Public IP address



Route table



Kubernetes  
Load Balancer



NSG



Node Scale Set



AKS Vnet



Node



Node scale

# End of presentation

