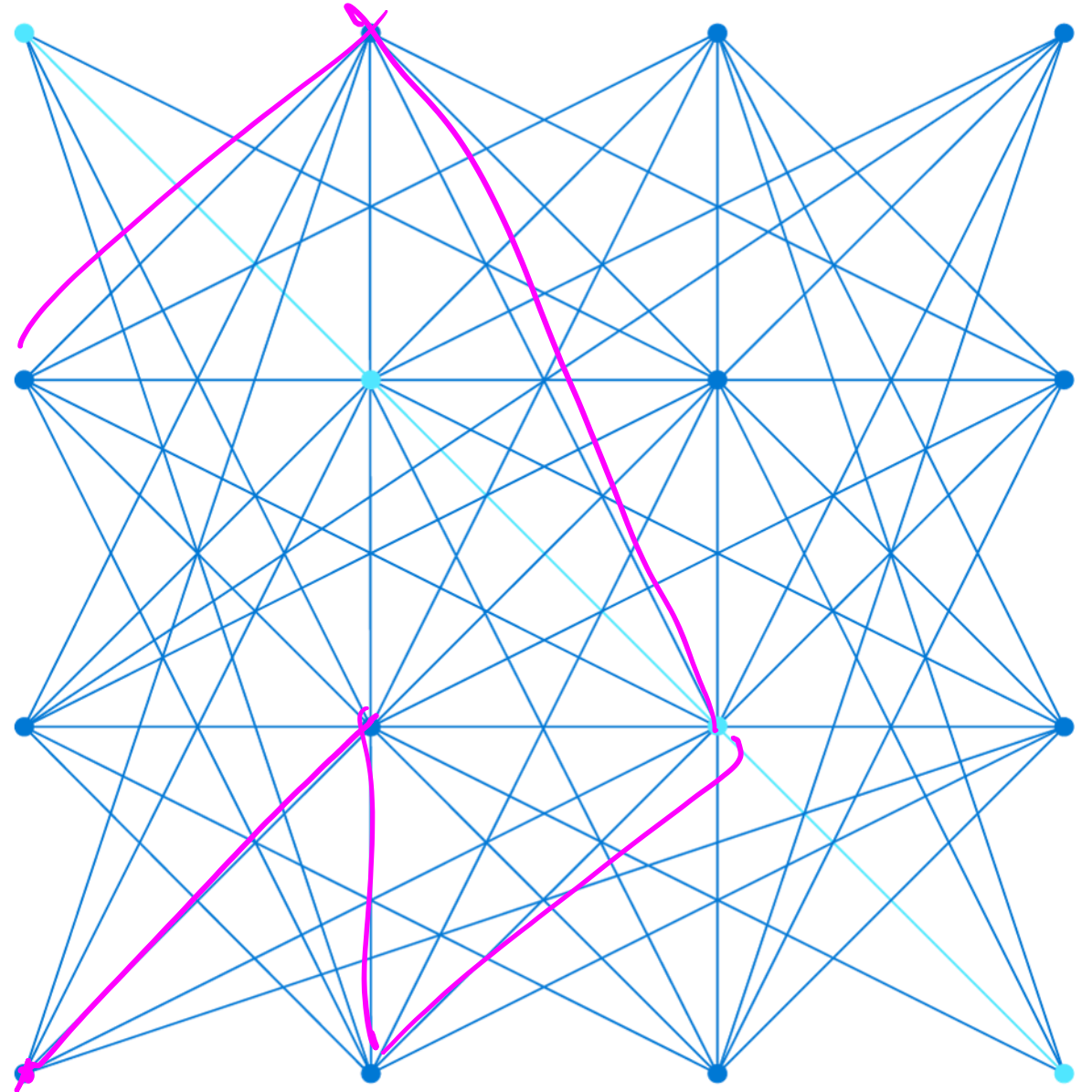Microsoft Azure

AZ-104

Tag 4

Administer PaaS
Compute Options

Guten Morgen!

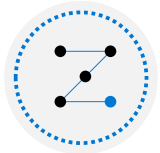# About this course: Course Outline

01: Administer Identity
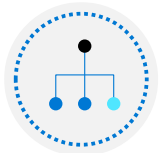
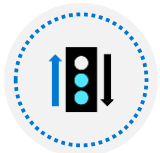02: Administer Governance and Compliance

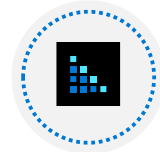03: Administer Azure Resources

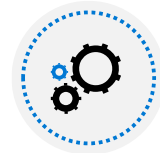04: Administer Virtual Networking

05: Administer Intersite Connectivity

06: Administer Network Traffic Management
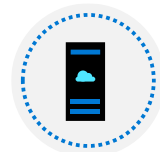
07: Administer Azure Storage

08: Administer Azure Virtual Machines

09: Administer PaaS Compute Options
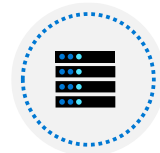
10: Administer Data Protection
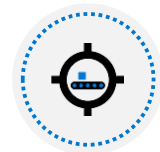
11: Administer Monitoring

Administer PaaS Compute Options Introduction

[Configure Azure App Service Plans](#)

[Configure Azure App Services](#)

[Configure Azure Container Instances](#)

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

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

Lab 09c – Implement Azure Container Apps

Handwritten annotations:

PaaS

App Service
- API
- mobile App
- web App

https://www.42.azurewebsite.net

.net ✓
php ✓
node ✓
java ✓
python ✓
go ✓
Fortran —

Administer PaaS Compute Options

- Describe the differences between containers and virtual machines.

- What is an App Service plan? Things to consider when selecting?

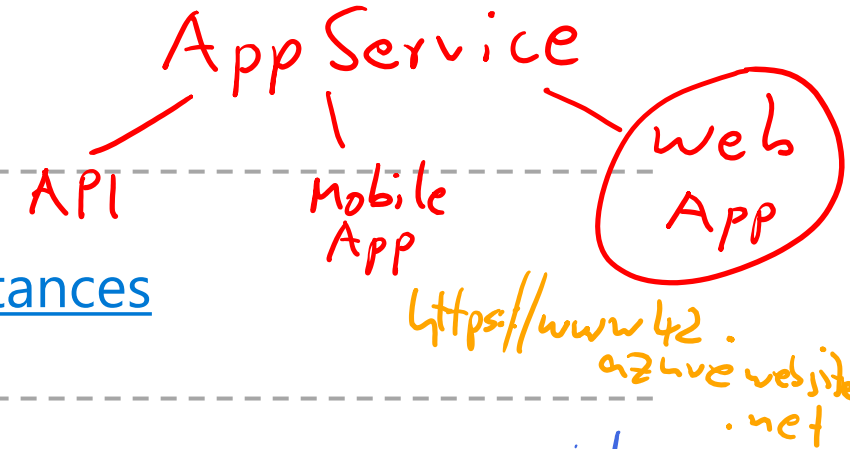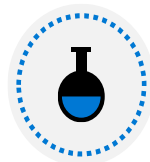- What are deployment slots? Usage cases for slots?

- List at least three admin tasks for web apps.

Full control? → Virtual Machine

No

Web apps, mobile app back ends? → Azure App Service

No

Container solutions? → Azure Container Instances

No

Simplified container orchestration? → Azure Container Apps

No

Advanced container orchestration? → Azure Kubernetes Service (AKS)
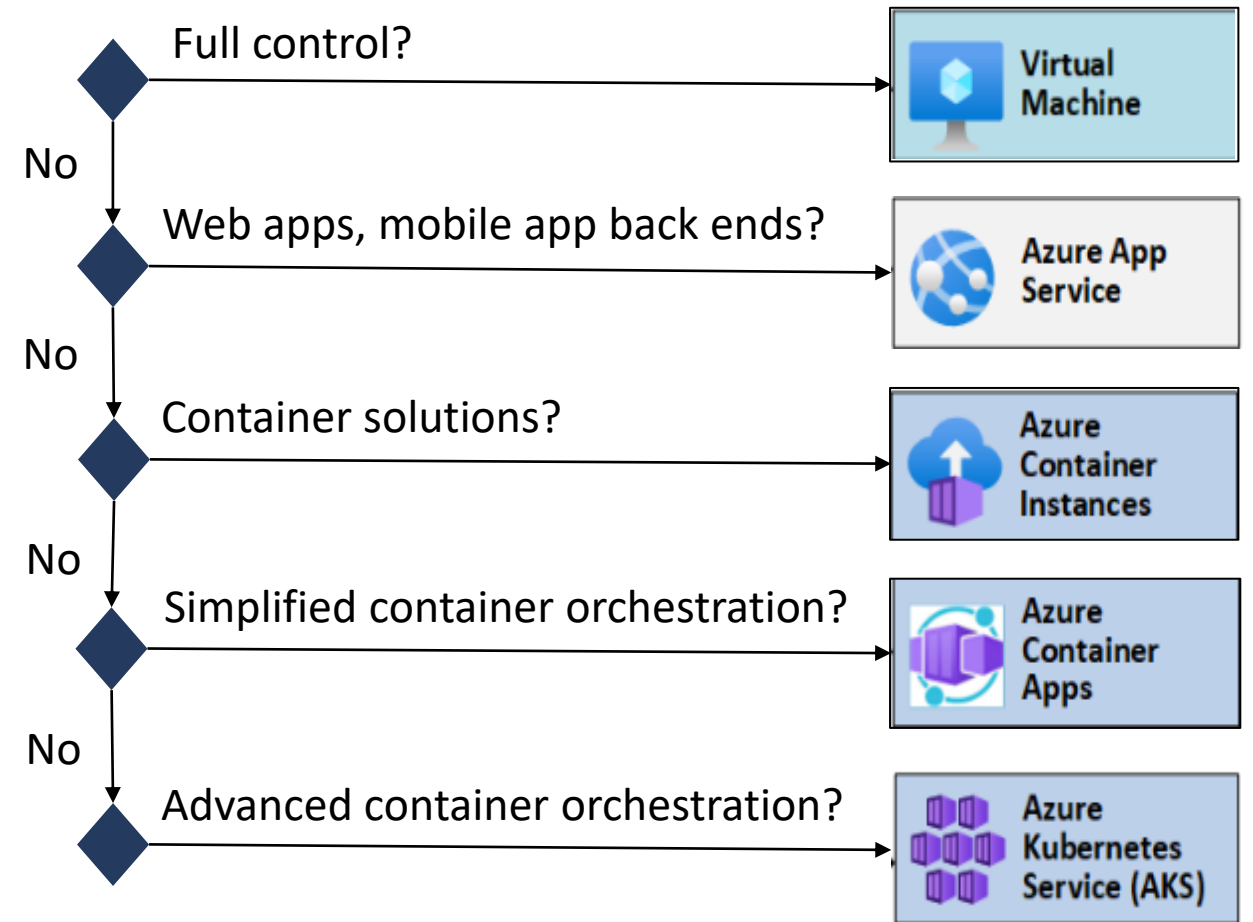
Configure Azure App Service Plans

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 – Configure Azure App Service Plans
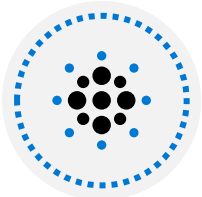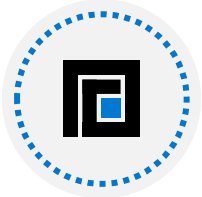- Summary and Resources

Implement Azure App Service Plans
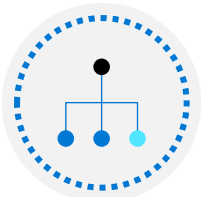
Define a set of compute resources for a web app to run

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 (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

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	ℹ️ 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 ⓘ
1	2	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 – Configure App Service plans

Create a simple App Service Plan in the Azure Portal

- -
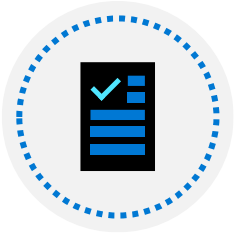
Configure scale-up and scale-out

- -

Summary and Resources – Configure Azure App Service Plans

Knowledge Check Questions	Microsoft Learn Modules (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

Code

.Net
Python
node

Container

Image ☰

Build   Kudu
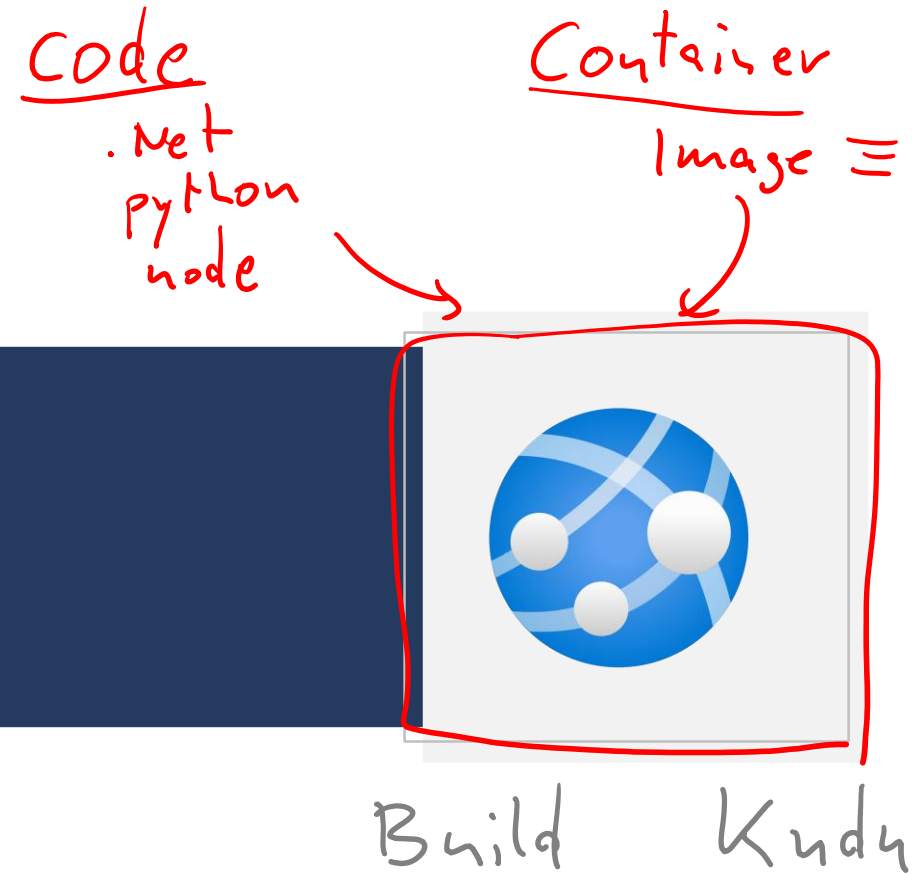
Configure Azure App Services Introduction

- 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 – Configure Azure App Services
- Summary and Resources

Implement Azure App Service

.NET Node.js PHP Java Python (on Linux) HTML Custom Windows/Linux Container

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

Instance Details

Name *
Web App name.
.azurewebsites.net

Publish * ● Code ○ Docker Container ○ Static Web App

Runtime stack *
Select a runtime stack ▼

Operating System ● Linux ○ Windows

Region *
East US ▼
ⓘ Not finding your App Service Plan? Try a different region or select your App Service Environment.

Pricing plans

Linux Plan (East US) * ⓘ
(New) ASP-ADSdemorg-a8f7 ▼
Create new

Pricing plan
Premium V3 P1V3 (195 minimum ACU/vCPU, 8 GB memory, 2 vCPU) ▼
Explore pricing plans

Zone redundancy

Zone redundancy
○ **Enabled:** Your App Service plan and the apps in it will be zone redundant. The minimum App Service plan instance count will be three.

● **Disabled:** Your App Service Plan and the apps in it will not be zone redundant. The minimum App Service plan instance count will be one.

Create Deployment Slots

Continuous Deployment with Stage Slot

Developer 1

GitHub

Staging → Swap ← Production

Developer 2
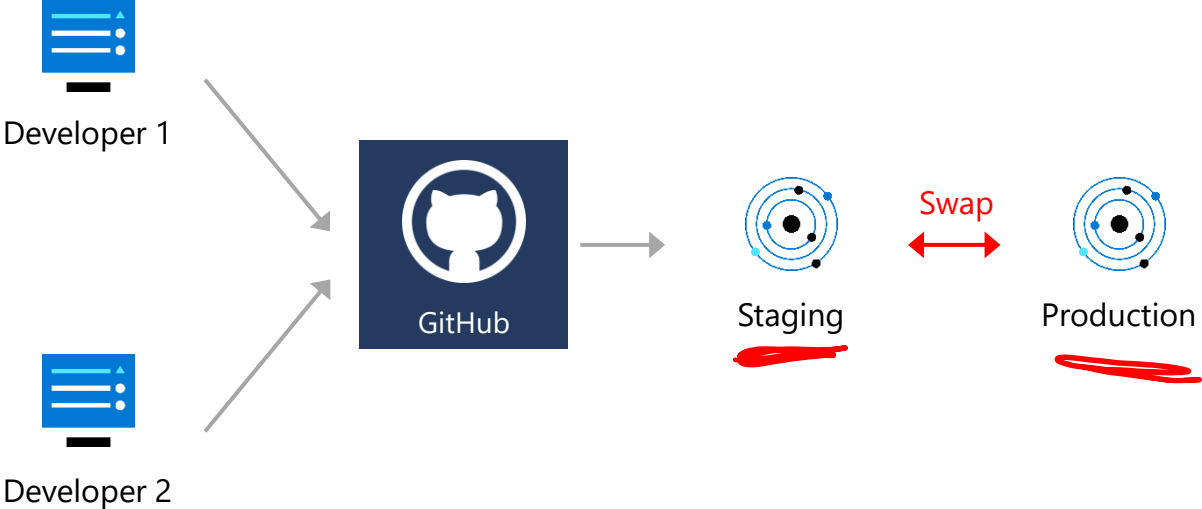
Service Plan	Slots
Free, Shared, Basic	0
Standard	Up to 5
Premium	Up to 20
Isolated	Up to 20

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
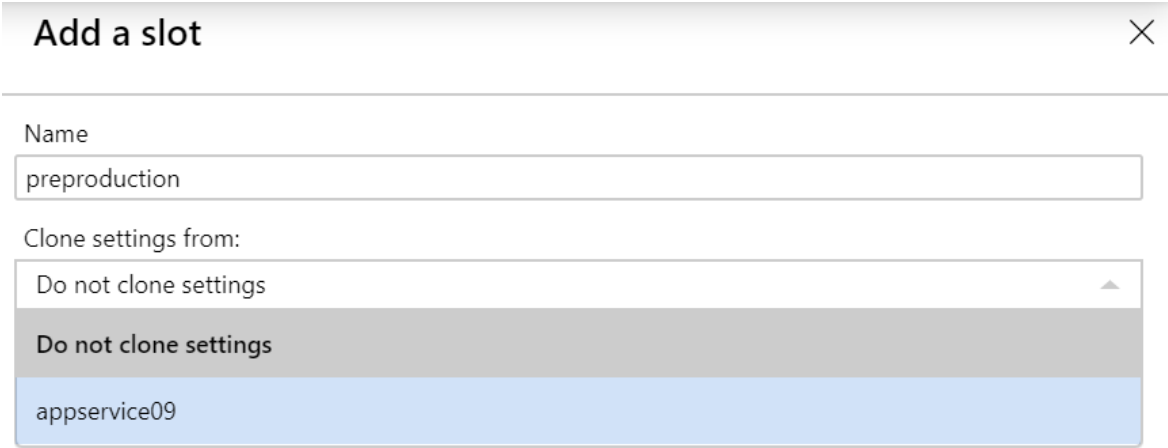
Select whether to clone an app configuration from another deployment slot

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

Add a slot ✕

Name

preproduction

Clone settings from:

Do not clone settings ▲

Do not clone settings

appservice09

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

Basics   Permissions

Choose an identity provider from the dropdown below to start.

Identity provider * | Select identity provider |

Microsoft
Sign in Microsoft and Azure AD identities and call Microsoft APIs

Facebook
Sign in Facebook users and call Facebook APIs

Google
Sign in Google users and call Google APIs

Twitter
Sign in Twitter users and call Twitter APIs
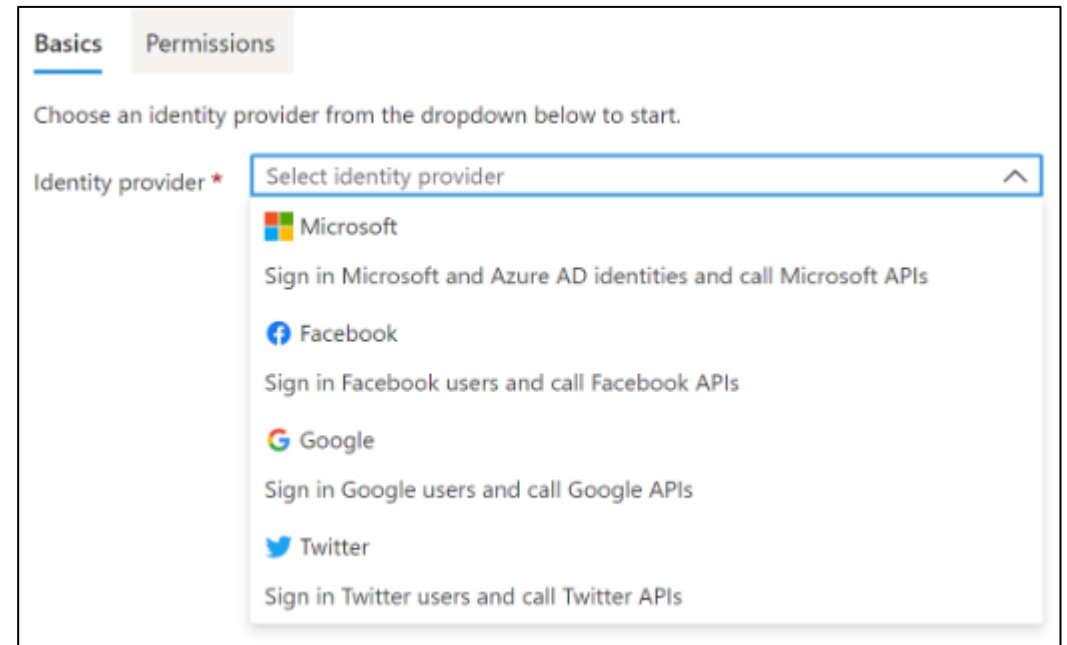
Create Custom Domain Names
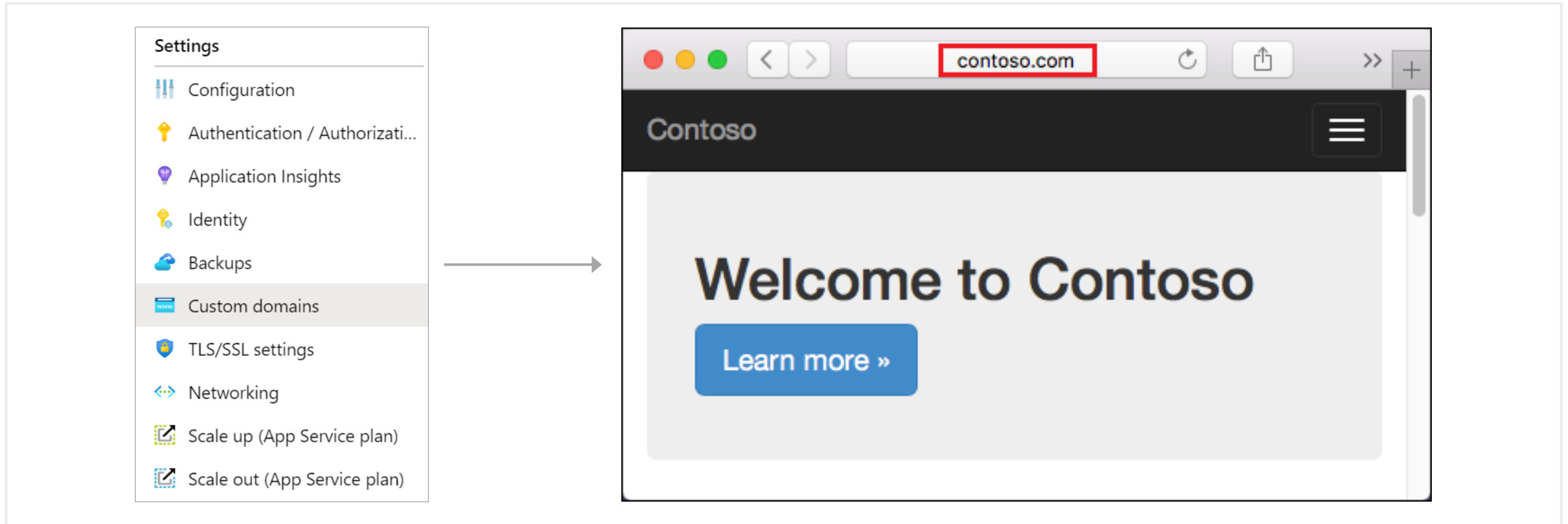
| Redirect the default web app URL | Validate the custom domain in Azure | Use the DNS registry for your domain provider – create a CNAME or A record with the mapping | Ensure App Service plan supports custom domains |

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)

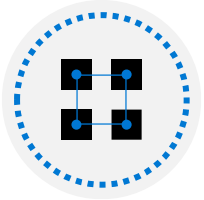# Demonstration – Configure Azure App Services

Create a Web App in the Azure Portal

Test the Web App

Explore deployment slots

Summary and Resources – Configure Azure App Services

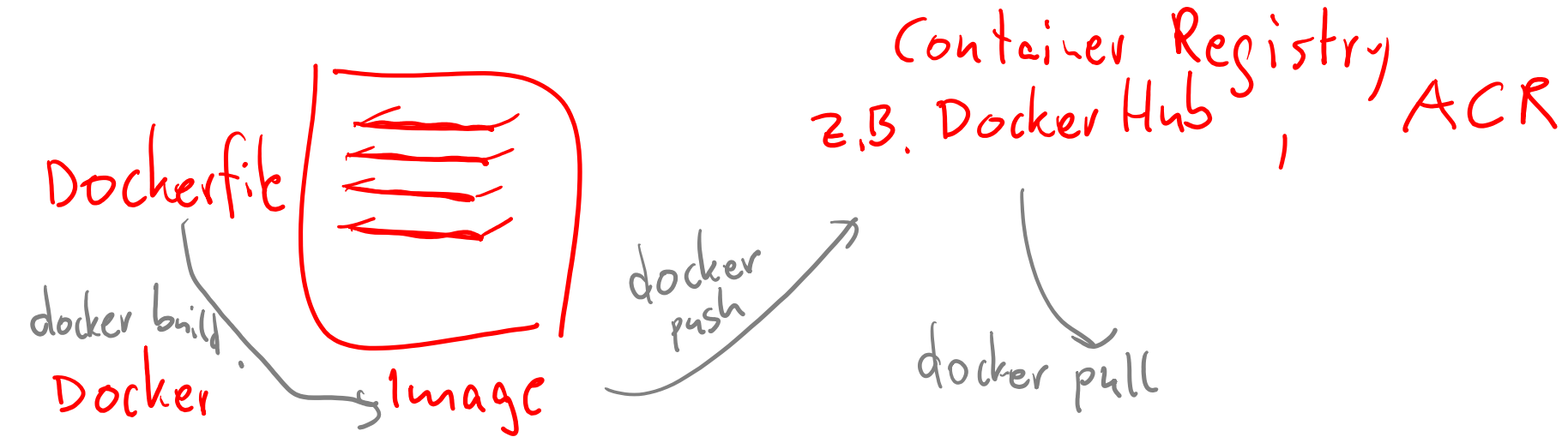| Knowledge Check Questions	Microsoft Learn Modules (docs.microsoft.com/Learn)
	[Host a web application with Azure App Service (Sandbox)](#)
	[Stage a web app deployment for testing and rollback by using App Service deployment slots](#)
	[Dynamically meet changing web app performance requirements with autoscale rules](#)

A *sandbox* indicates a hands-on exercise.

Docherfile

docker build
Docker . → Image

docker push →

Container Registry
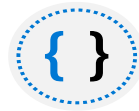z.B. Docker Hub , ACR

docker pull

Configure Azure Container Instances
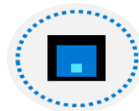
Configure Azure Container Instances Introduction

Compare Containers to Virtual Machines

Explore Azure Container Instances Benefits

Implement Container Groups

Understand the Docker Platform (optional)

Demonstration – Configure Azure Container Instances

Manage Containers with Azure Container Apps (new)

Demonstration – Configure Azure Container Apps

Summary and Resources

Compare Containers to Virtual Machines

λ

Azure Functions
"Serverless"

- Isolation

- Operating System

- Deployment

- Persistent storage

- Fault tolerance

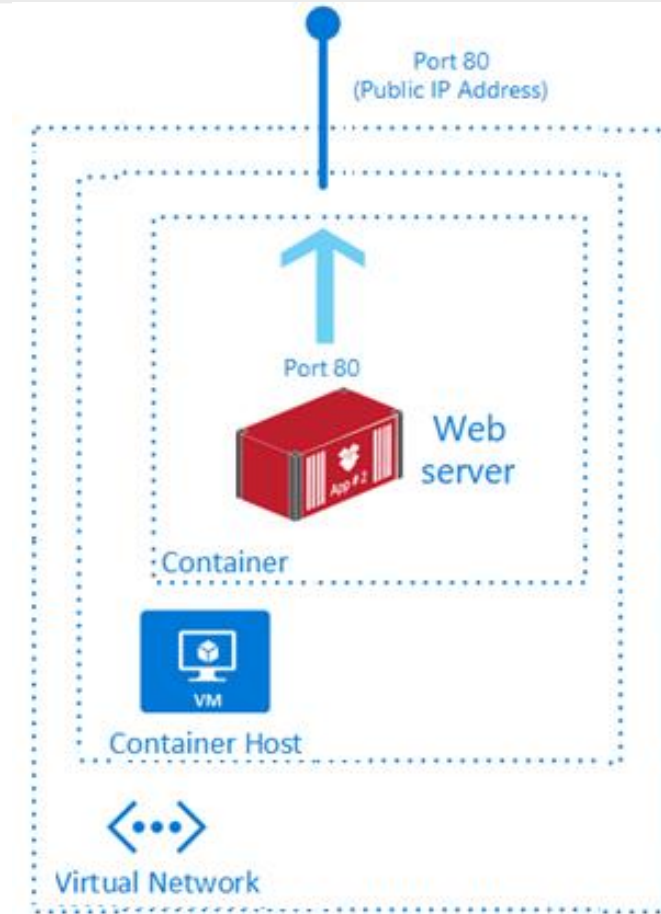| Container	Container	VM	VM
App A App A	App B App B	App A	App B
Bins/Libs	Bins/Libs	Bins/Libs	Bins/Libs
		Guest OS	Guest OS

| Docker Engine	Hypervisor

Host OS

Server

Explore Azure Container Instances Benefits

ACI
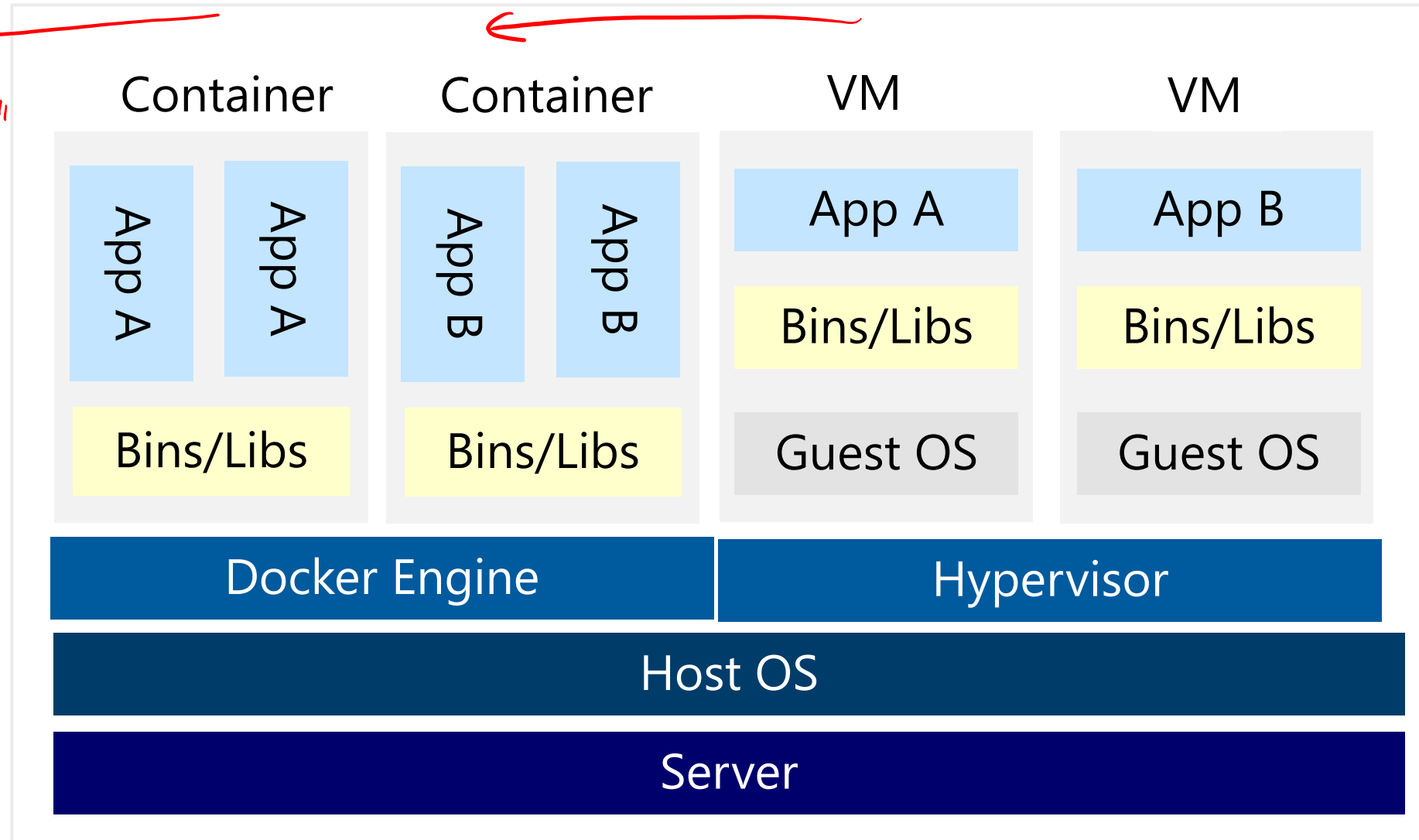
- PaaS Service

- 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

Port 80
(Public IP Address)

Port 80

Web server

Container

VM

Container Host

Virtual Network

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

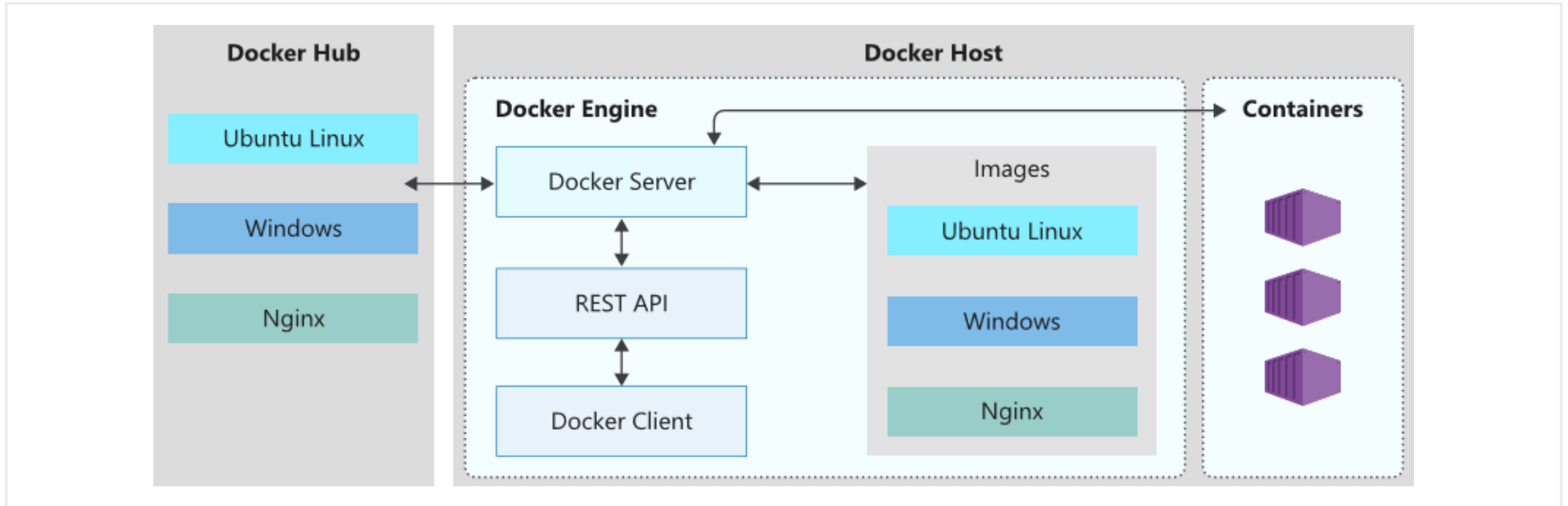# Implement Container Groups

Kubernetes
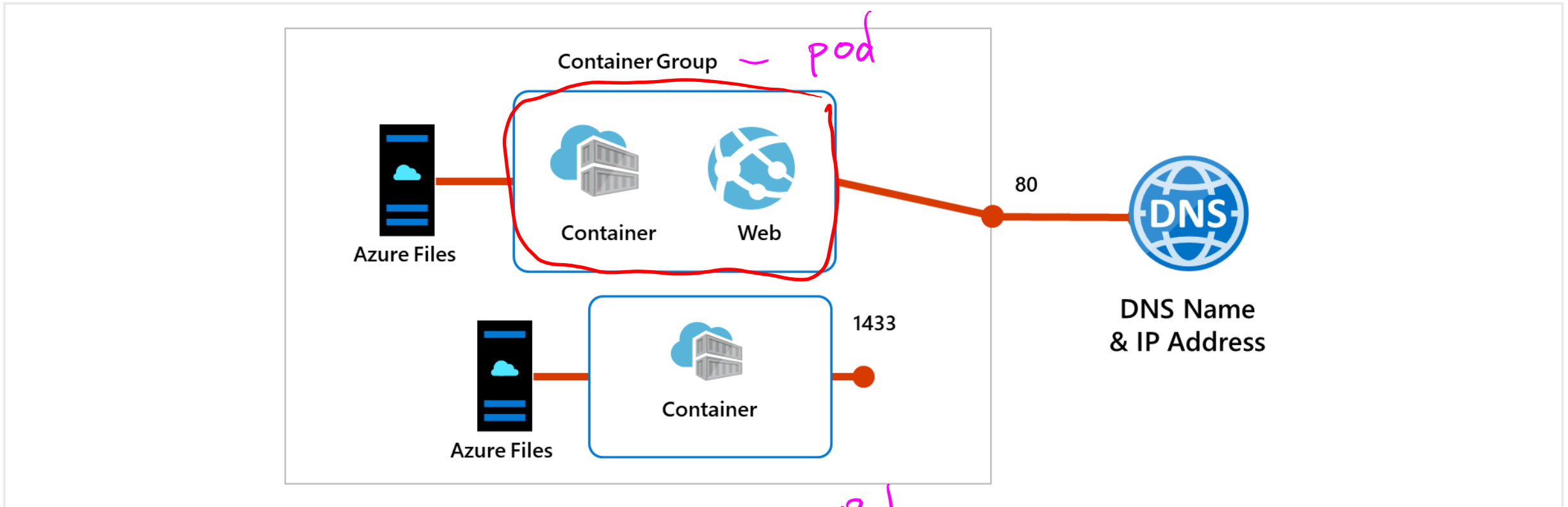
Top-level resource in Azure Container Instances

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 (optional)

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 - Configure Azure Container Instances
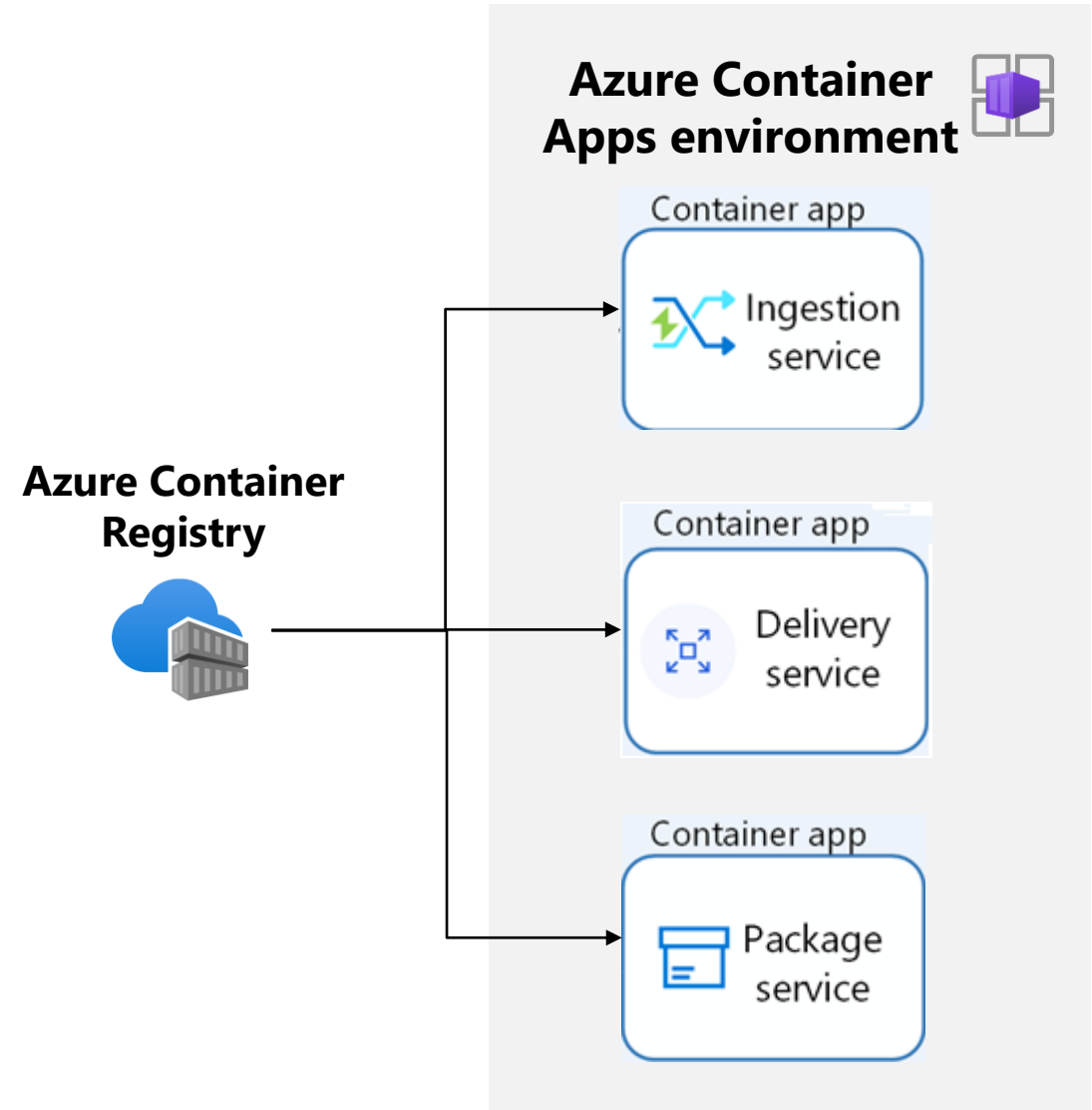
Create and configure a container instance

Verify deployment of the container instance

Manage Containers with Azure Container Apps (new)

- Alternative to Azure Kubernetes Service

- Integrates with Azure Container Registry

- Simplifies complex infrastructures

- Manages container orchestration

Azure Container Apps environment

Container app

Ingestion service

Azure Container Registry

Container app

Delivery service

Container app

Package service

Demonstration - Configure Azure Container Apps

Create and deploy a container app

Verify the application URL displays the welcome message

Summary and Resources – Configure Azure Container Instances

Knowledge Check Questions	Microsoft Learn Modules (docs.microsoft.com/Learn)

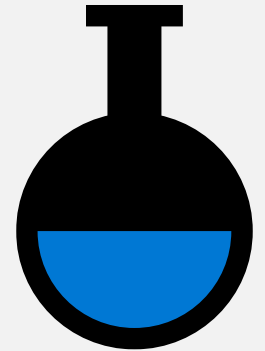Introduction to Docker containers

Build a containerized web application with Docker

Run Docker containers with Azure Container Instances

Implement Azure Container Apps

Lab 09a – Implement Web Apps *git*
Lab 09b – Implement Azure Container Instances *Hello*
Lab 09c – Implement Azure Container Apps

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 →
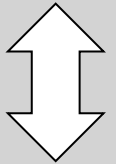
Lab 09a – Architecture diagram

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
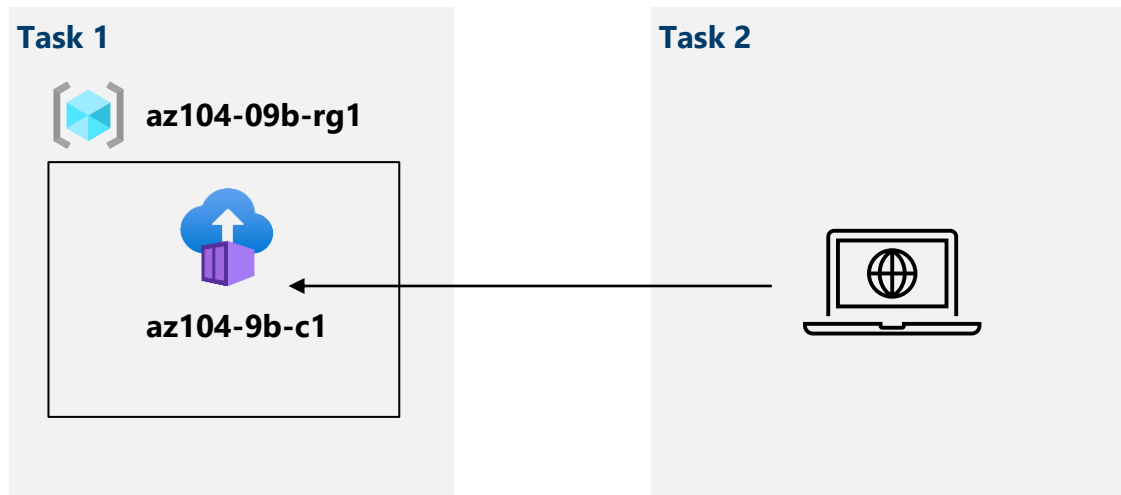
Objectives

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

Task 1

az104-09b-rg1

az104-9b-c1

Task 2

Lab 09c – Implement Azure Container Apps

Lab scenario

Azure Container Apps enables you to run microservices and containerized applications on a serverless platform. With Container Apps, you enjoy the benefits of running containers while leaving behind the concerns of manually configuring cloud infrastructure and complex container orchestrators.

Objectives

Task 1:
Create and configure the Azure Container App and environment

Task 2:
Deploy the Azure Container App

Task 3:
Test and verify the Azure Container App

End of presentation

Configure Azure Kubernetes Service

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

Understand AKS Terminology

Brendan Burns

Kubernetes | Service Fabric
K8s

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

Node

VM | VMSS

Deployment (YAML)

Pod

Container

Pod

Container

Node

Node