

4. Tag

AZ-104

Administer PaaS Compute Options



AZ-104 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

ASR

30 Tage | LAW
OE EE

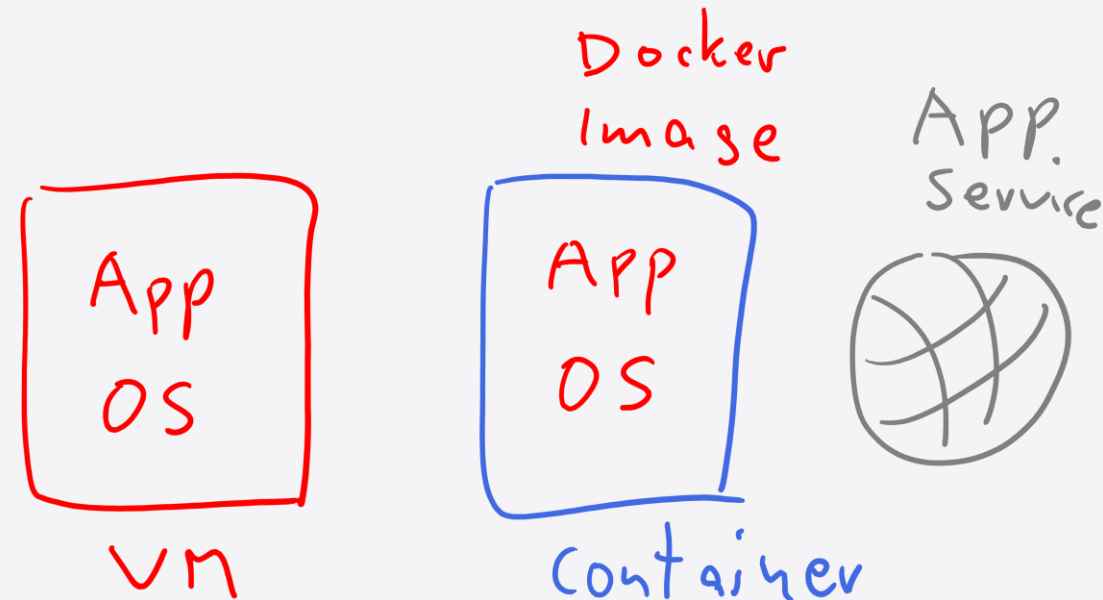
KQL Kusto

www
404
CERN
Tim Berners-Lee

Cloud native?
Microservices
7/9. Kubernetes
K8S
Brendan Burns + 2

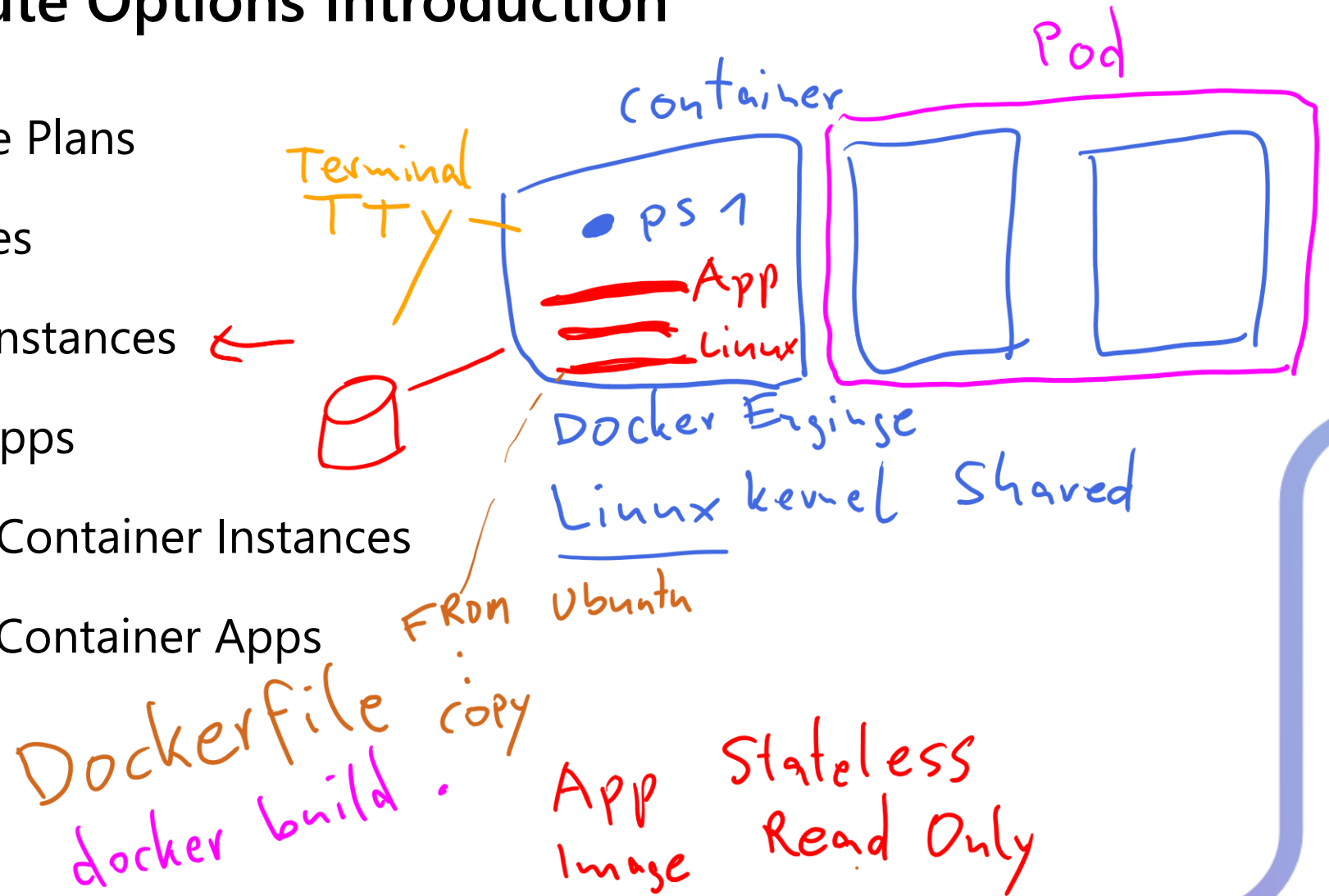
AZ-104 Course Outline

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Administer PaaS Compute Options Introduction

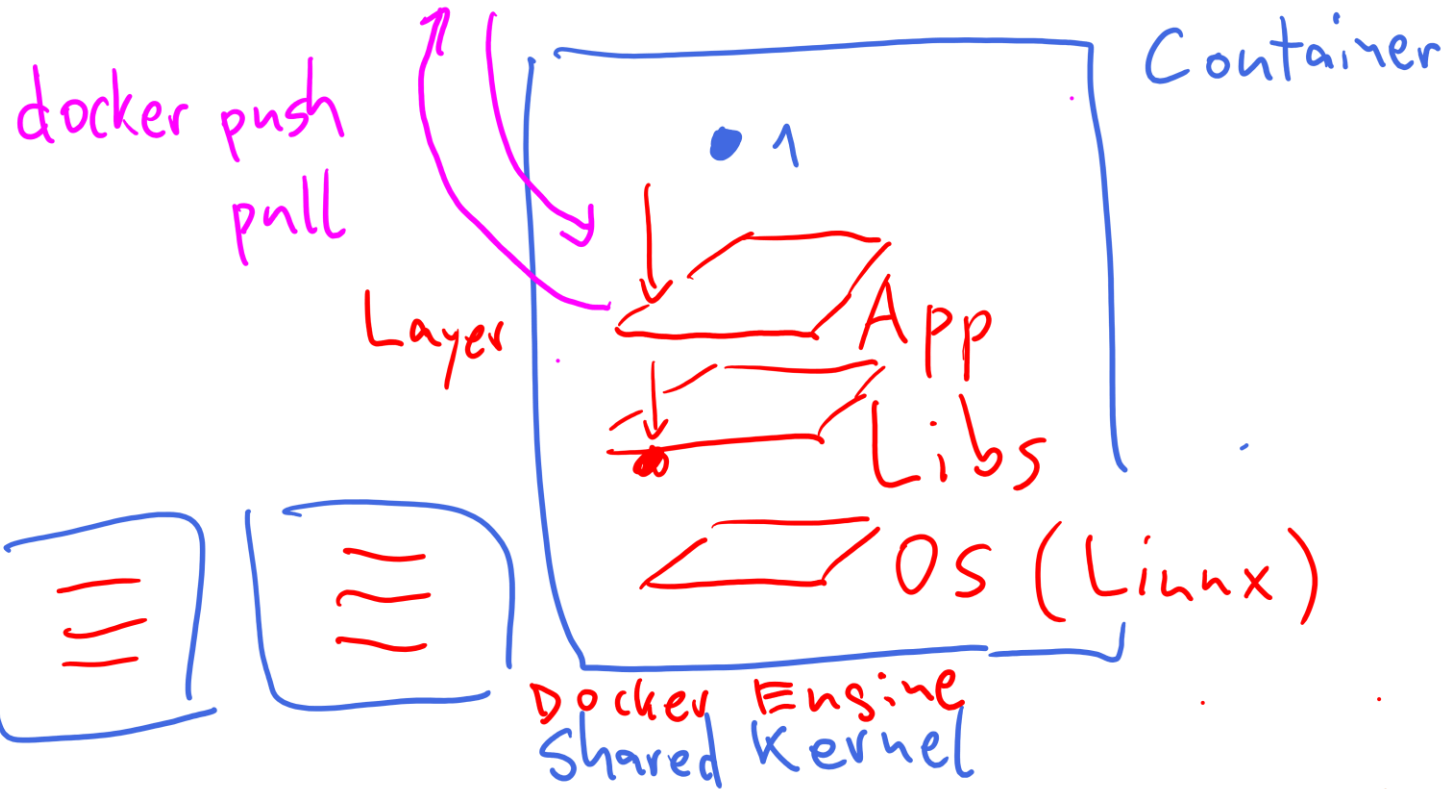
- Configure Azure App Service Plans
- Configure Azure App Services
- Configure Azure Container Instances
- Lab 09a - Implement Web Apps
- Lab 09b - Implement Azure Container Instances
- Lab 09c - Implement Azure Container Apps



Container Registry
Docker Hub
Azure ACR

docker run

stateless!



Docker Desktop
Azure ACI
AWS
...

Docker Image
UnionFS

portable!
Read only!

Configure Azure App Service Plans



Implement Azure App Service Plans

- Determines performance, price, and features
- Defines a set of compute resources for a web app to run
 - Region where compute resources will be created
 - Number of virtual machine instances
 - Size of virtual machine instances
 - Pricing tier (next slide)
- One or more apps can be configured to run in the same App Service plan



Determine App Service Plan Pricing S1

| 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

ACU

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

horizontal

The screenshot shows the Azure App Service Scale settings. On the left is a sidebar with navigation links: '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' (with a red radio button). 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, which is also displayed in a small box on the right.

Diagnose and solve problems

Settings

- Apps
- File system storage
- Networking
- Scale up (App Service plan)
- Scale out (App Service plan)**
- Resource explorer
- Properties

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

vertical

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

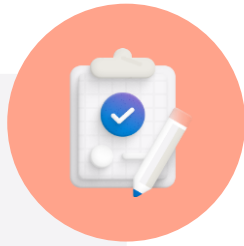
Scale based on a metric (CPU percentage, memory percentage, HTTP requests)

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

Can implement multiple rules – combine metrics and schedules

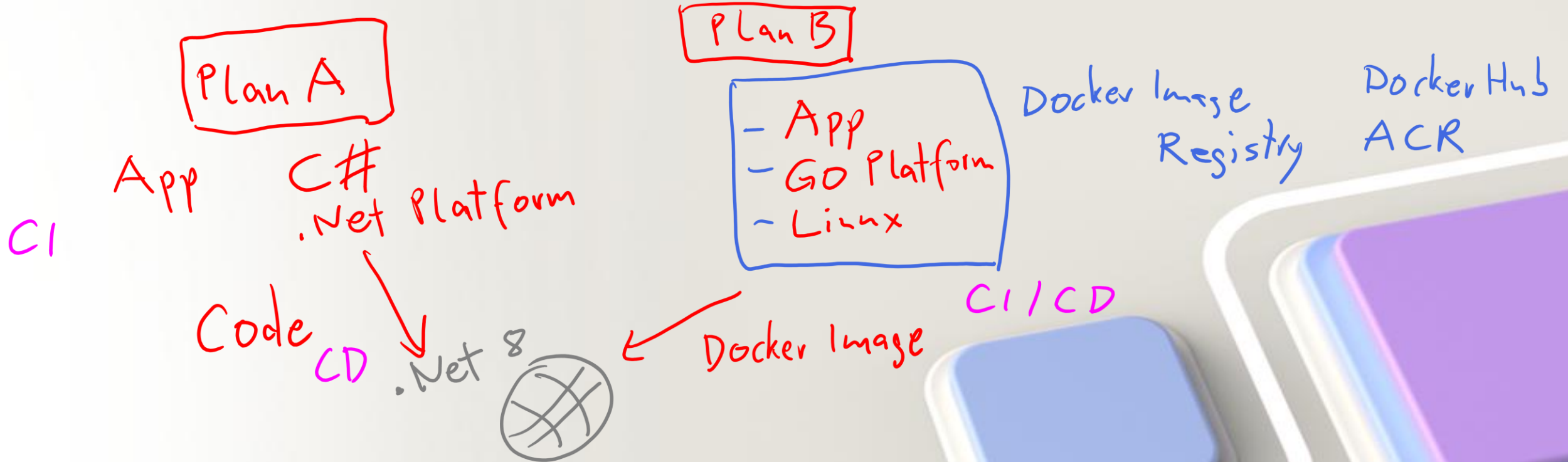
Don't forget to scale in

Learning Recap – Configure Azure App Service Plans



Check your
knowledge
questions and
additional
study

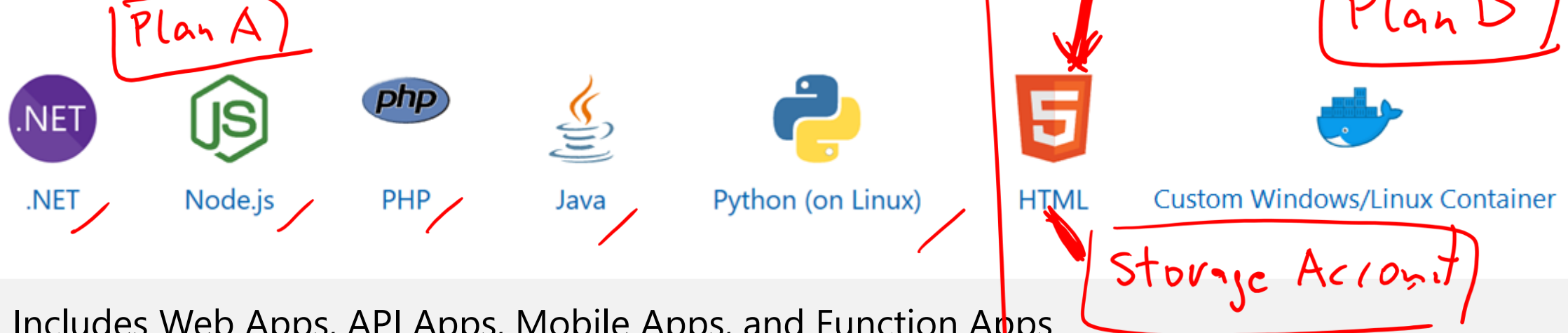
- Scale an App Service web app to efficiently meet demand with App Service scale up and scale out



Configure Azure App Services

Build Service: Kudu

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

Instance Details

Name * .azurewebsites.net

Publish * ☒ Code ☐ Docker Container ☐ Static Web App

Runtime stack * ▼

Operating System ☒ Linux ☐ Windows

Region * ▼

📘 Not finding your App Service Plan? Try a different region or select your App Service Environment.

Pricing plans

Linux Plan (East US) * ⓘ ▼

[Create new](#)

Pricing plan ▼

[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.

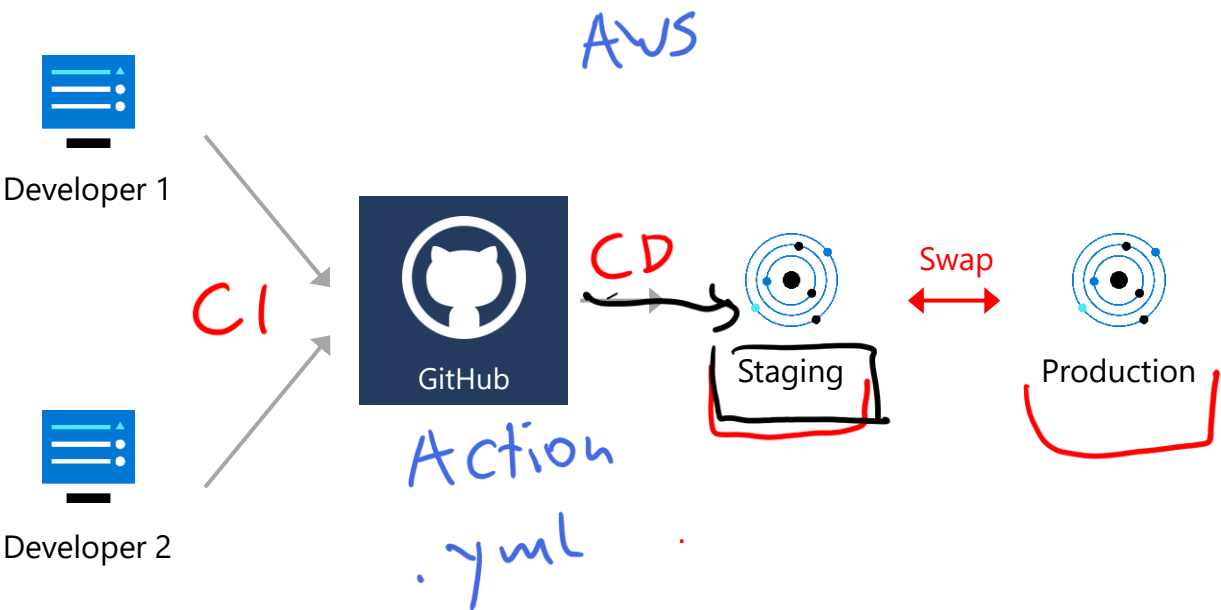
☒ **Disabled:** Your App Service Plan and the apps in it will not be zone redundant. The minimum App Service plan instance count will be one.

Create Deployment Slots

New MS Learn:
GH-300 Fund.
GH-200 Admin

json ↔ yaml
yml
kvp

Continuous Deployment with Stage Slot



| 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







Add an identity provider ...

Basics Permissions

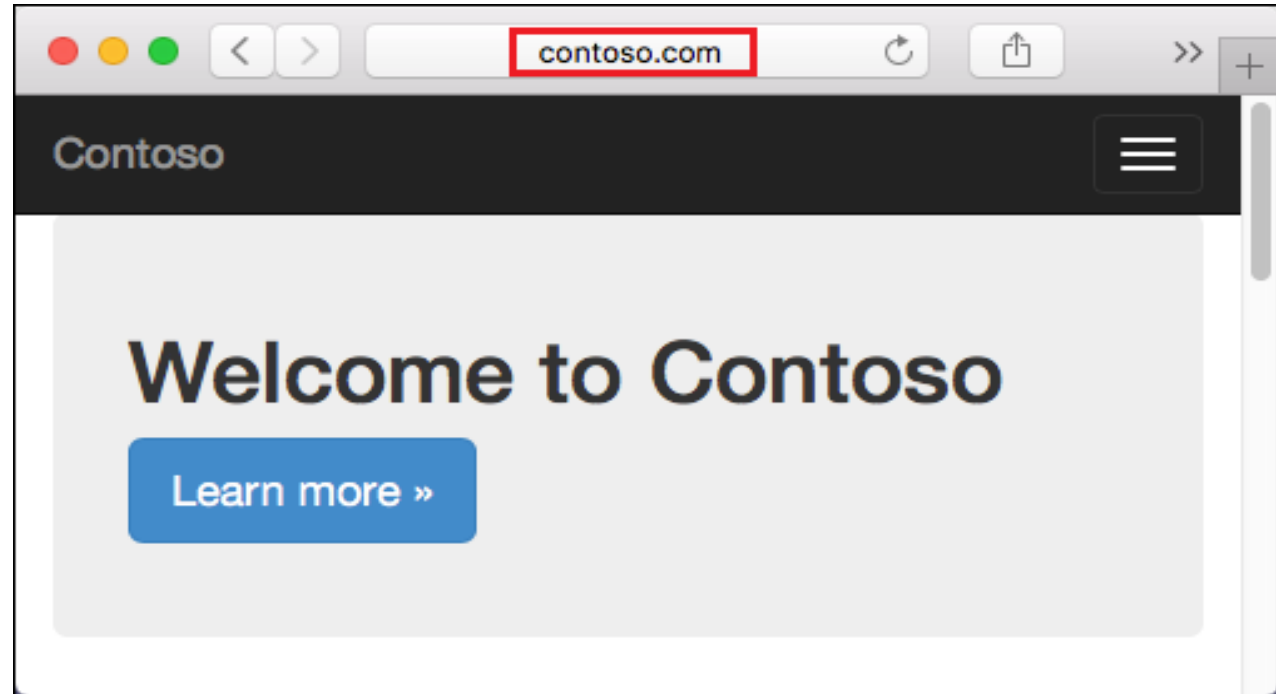
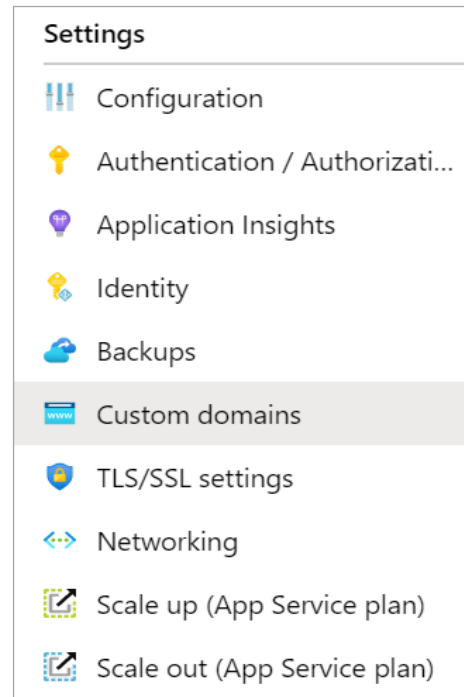
Choose an identity provider from the dropdown below to start.

Identity provider ¹

Select identity provider

-  Microsoft
Sign in Microsoft and Microsoft Entra identities and call Microsoft APIs
-  Apple ✓
Sign in Apple users and call Apple APIs
-  Facebook
Sign in Facebook users and call Facebook APIs
-  GitHub
Sign in GitHub users and call GitHub APIs
-  Google
Sign in Google users and call Google APIs
-  Twitter ✗
Sign in Twitter users and call Twitter APIs
- OpenID Connect
Sign in users with OpenID Connect

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)



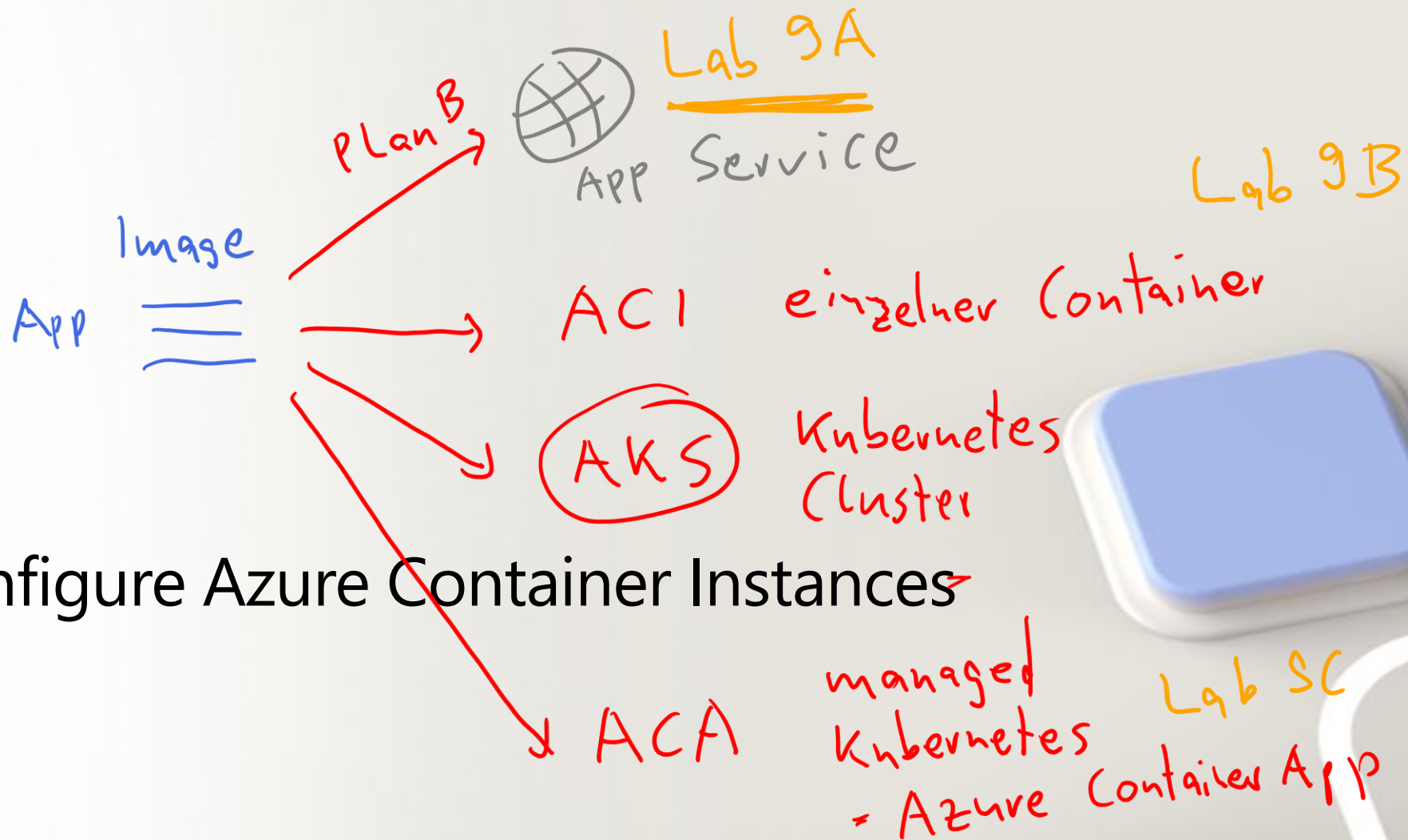
Scale out (App Service plan)

Learning Recap – Configure Azure App Services



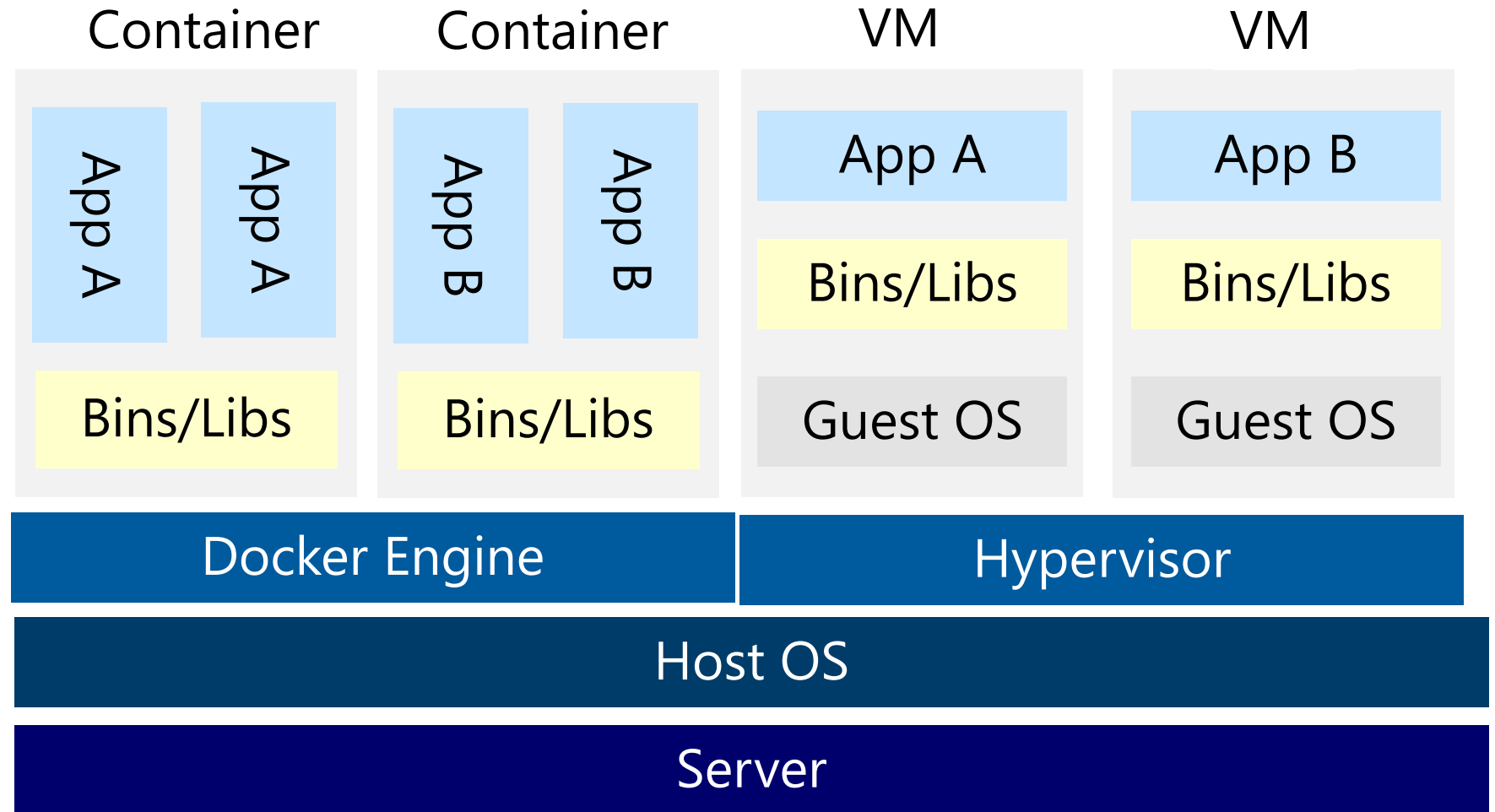
**Check your
knowledge
questions and
additional
study**

- Host a web application with Azure App Service
- 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

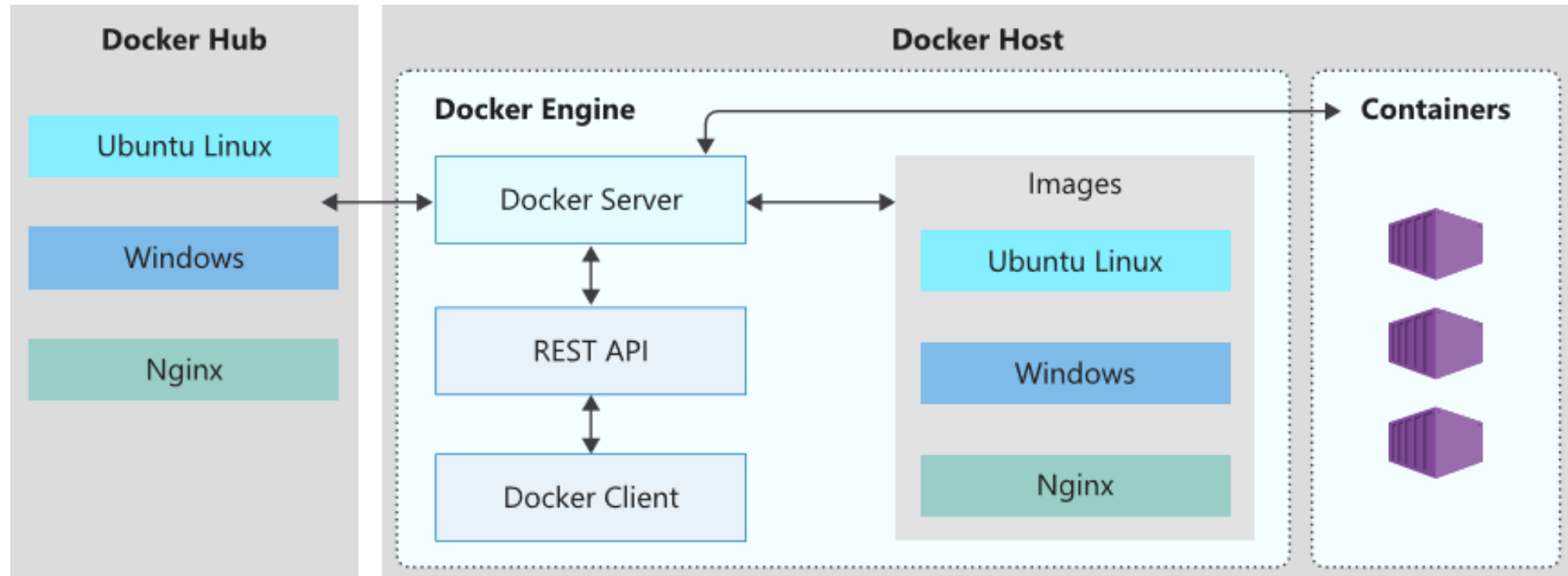


Compare Containers to Virtual Machines

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



Understand the Docker Platform (optional)



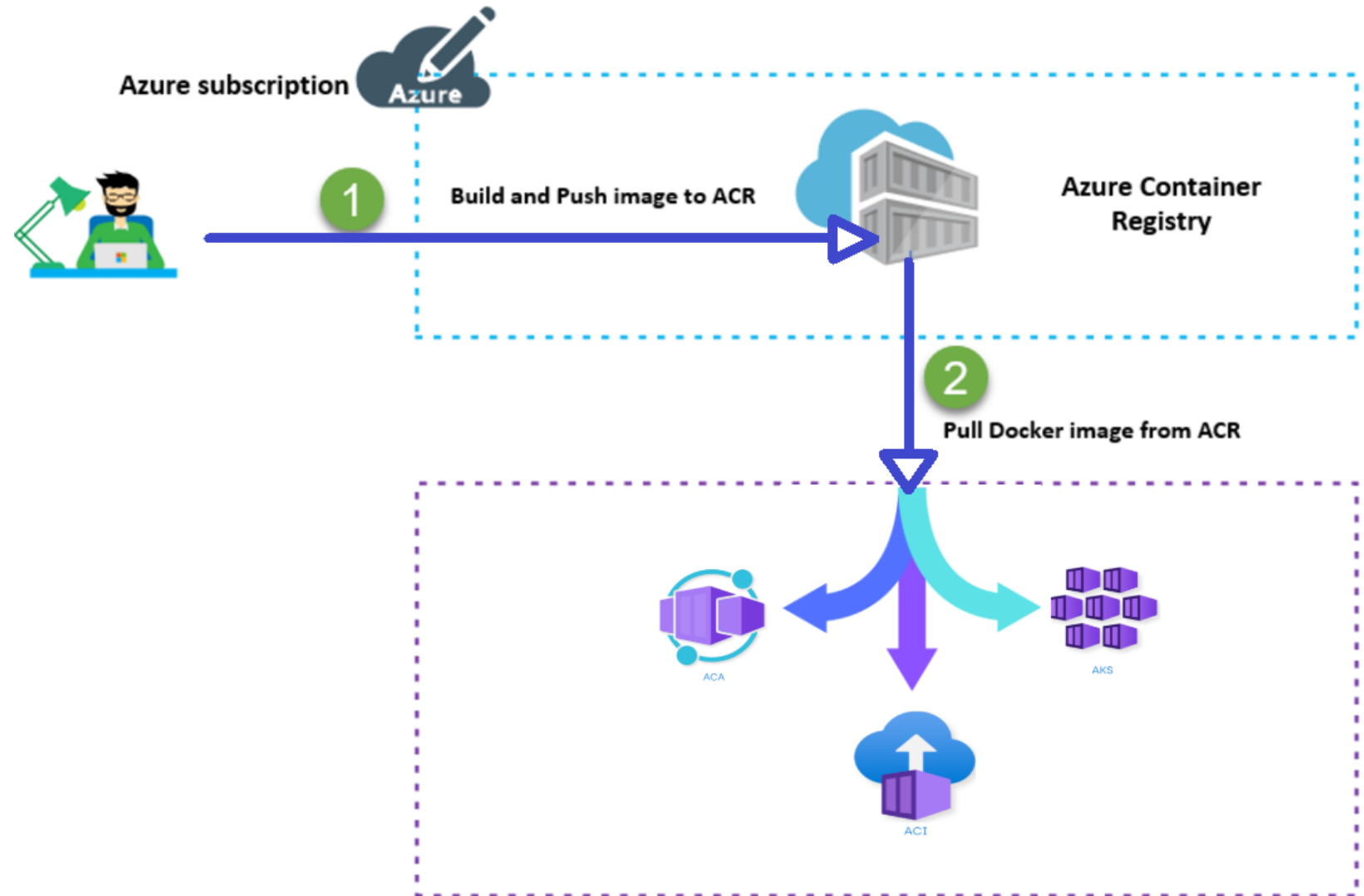
Enables developers to host applications within a container

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

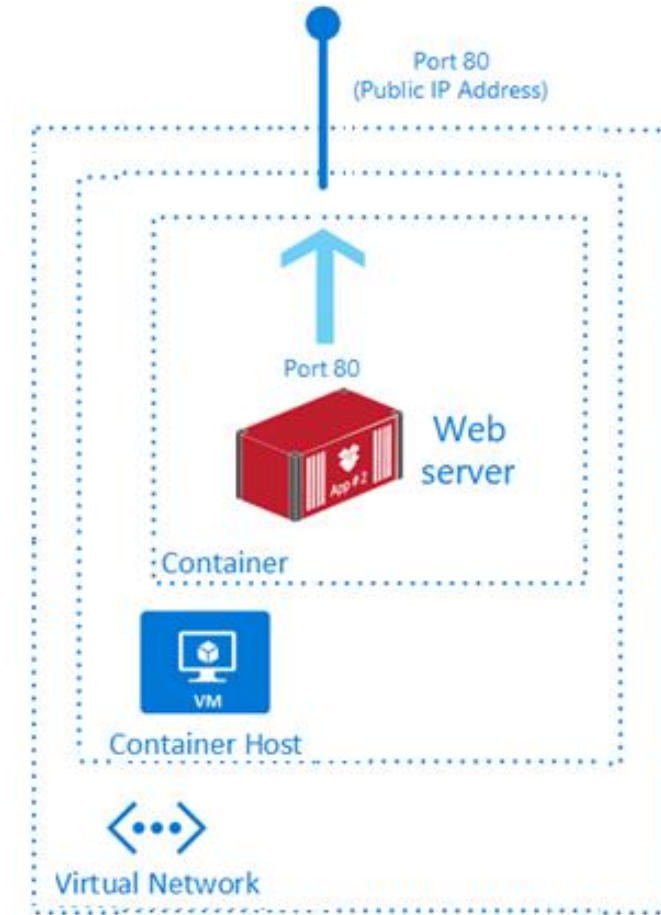
Understand Container Images

A container image is a lightweight, standalone, executable package of software that encapsulates everything needed to run an application.



Review Azure Container Instances

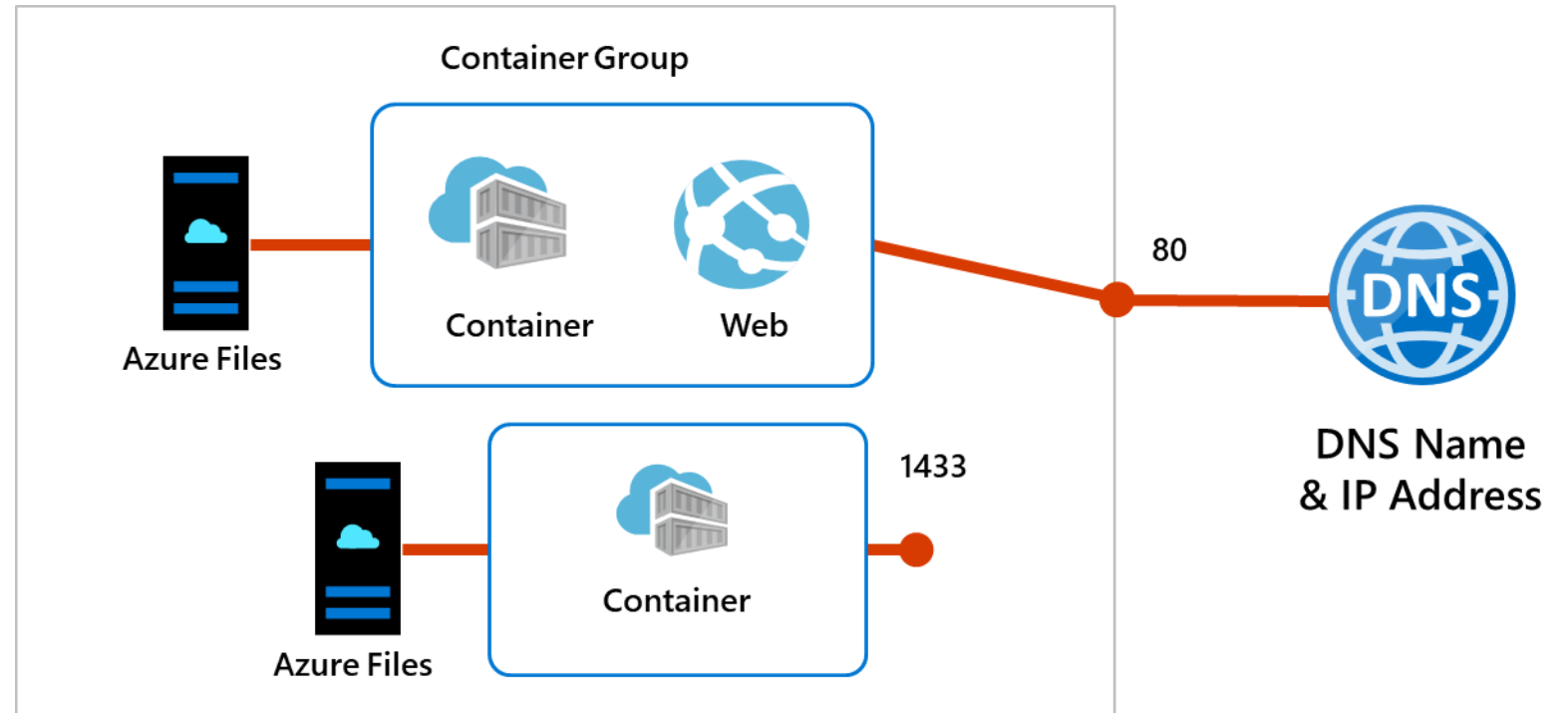
- PaaS Service
- Fast startup times
- Public IP connectivity and DNS name
- Isolation features
- Custom sizes
- Persistent storage
- Linux and Windows Containers
- Co-scheduled Groups
- Virtual network Deployment



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

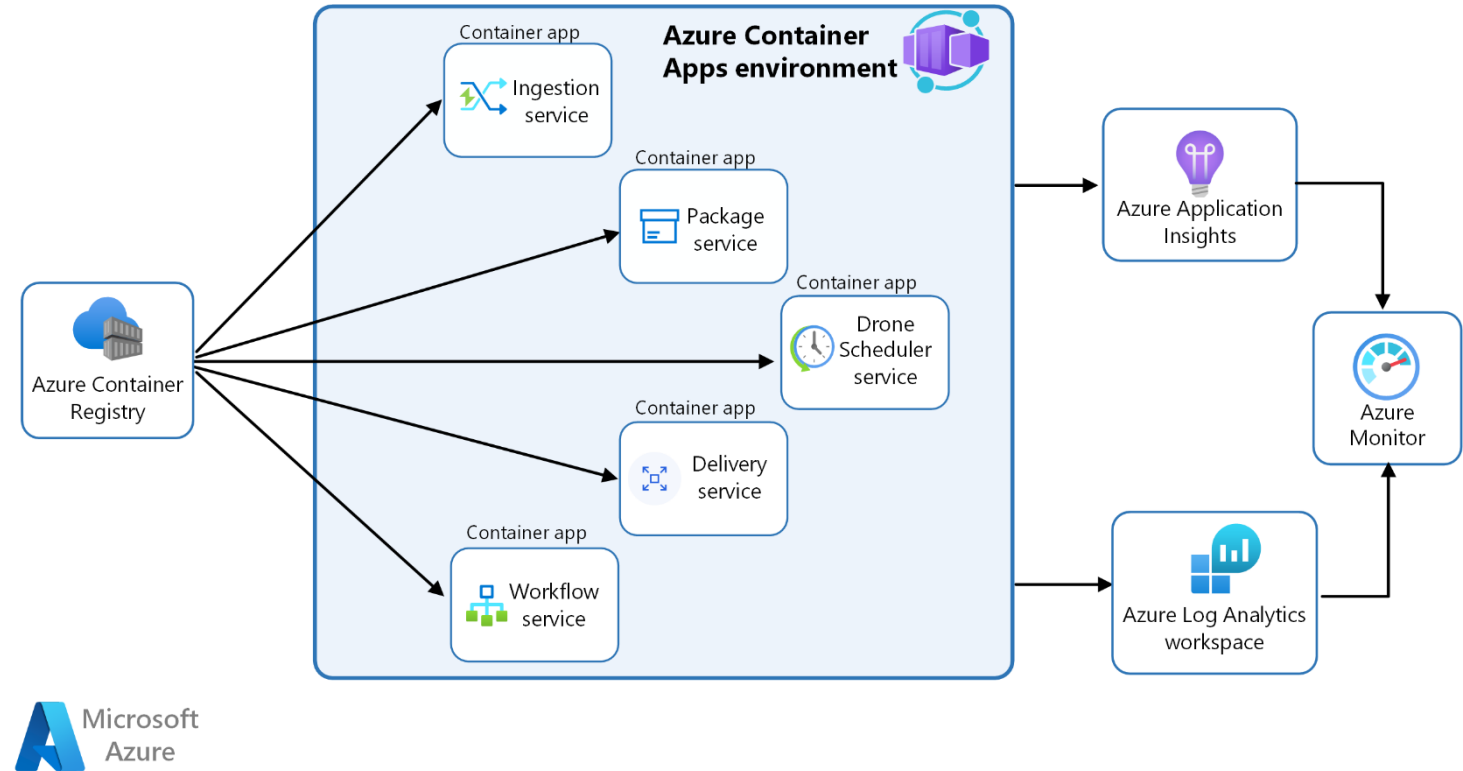


Compare container management solutions

| | Azure Container Apps | Azure Kubernetes Service |
|--------------------|---|---|
| Overview | Simplifies the deployment and management of microservices-based applications by abstracting away the underlying infrastructure. | Simplifies deploying a managed Kubernetes cluster in Azure by offloading the operational overhead to Azure. |
| Deployment | PaaS experience. | Offers more control and customization. |
| Management | Fully managed by Azure. | Partially managed by Azure (control plane). |
| Scalability | HTTP-based autoscaling and event-driven scaling. | Horizontal pod autoscaling and cluster autoscaling. |
| Use Cases | Rapid scaling and simplified management. | Complex, long-running applications that require full Kubernetes features. |
| Integration | Azure Logic Apps, Functions, and Event Grid for event-driven architecture. | Azure Policy for Kubernetes, Azure Monitor for containers, and Azure Defender for Kubernetes for comprehensive security and governance. |

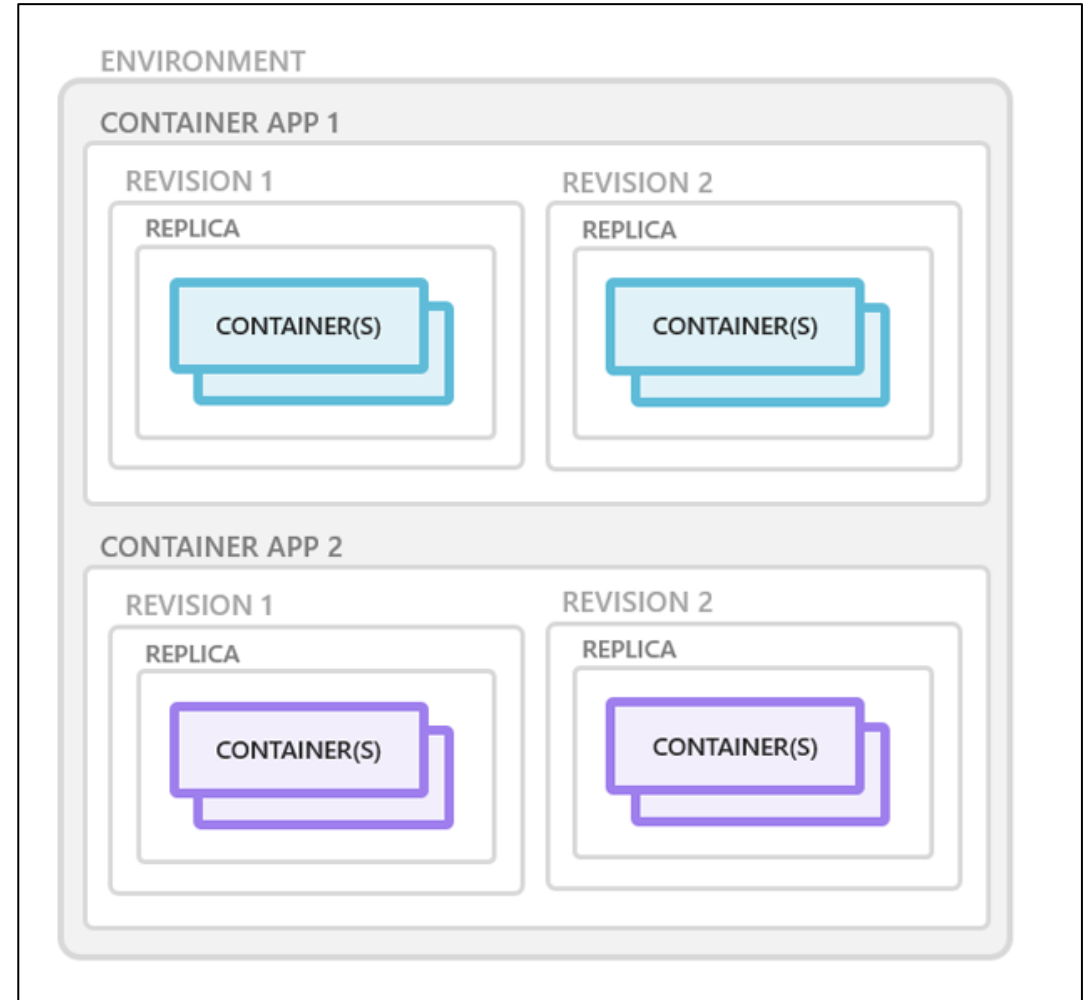
Manage Containers with Azure Container Apps

- Alternative to Azure Kubernetes Service – manages container orchestration
- The Container App environment creates a secure boundary around the apps and jobs
- The Container App runtime manages the environment (OS upgrades, scaling, versioning, and failover)



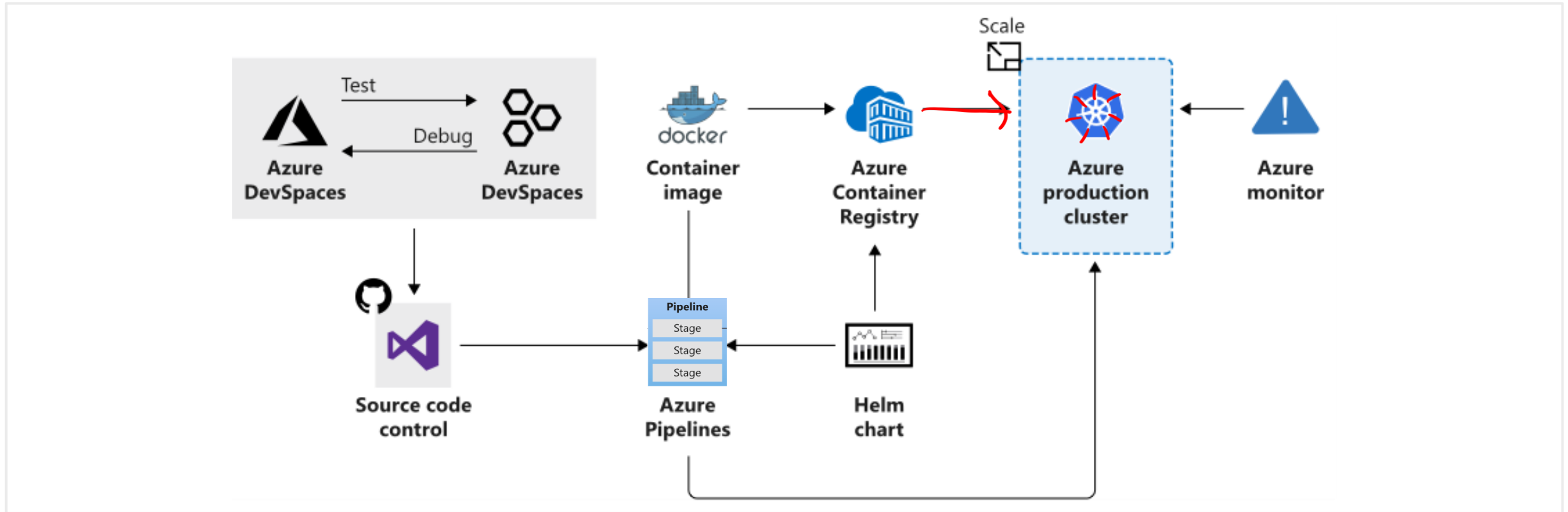
Explore containers in Azure Container Apps

- Containers for an Azure Container App are grouped together in pods inside revision snapshots.
- Can define multiple containers in a single container app to implement the sidecar pattern.
- Deploy images hosted on private registries by providing credentials in the Container Apps configuration.



Azure Kubernetes Service

7/9



Manages health monitoring and maintenance

Performs simple cluster scaling

Enables nodes to be fully managed by Microsoft

You're responsible only for managing the agent nodes

You pay only for the agent nodes

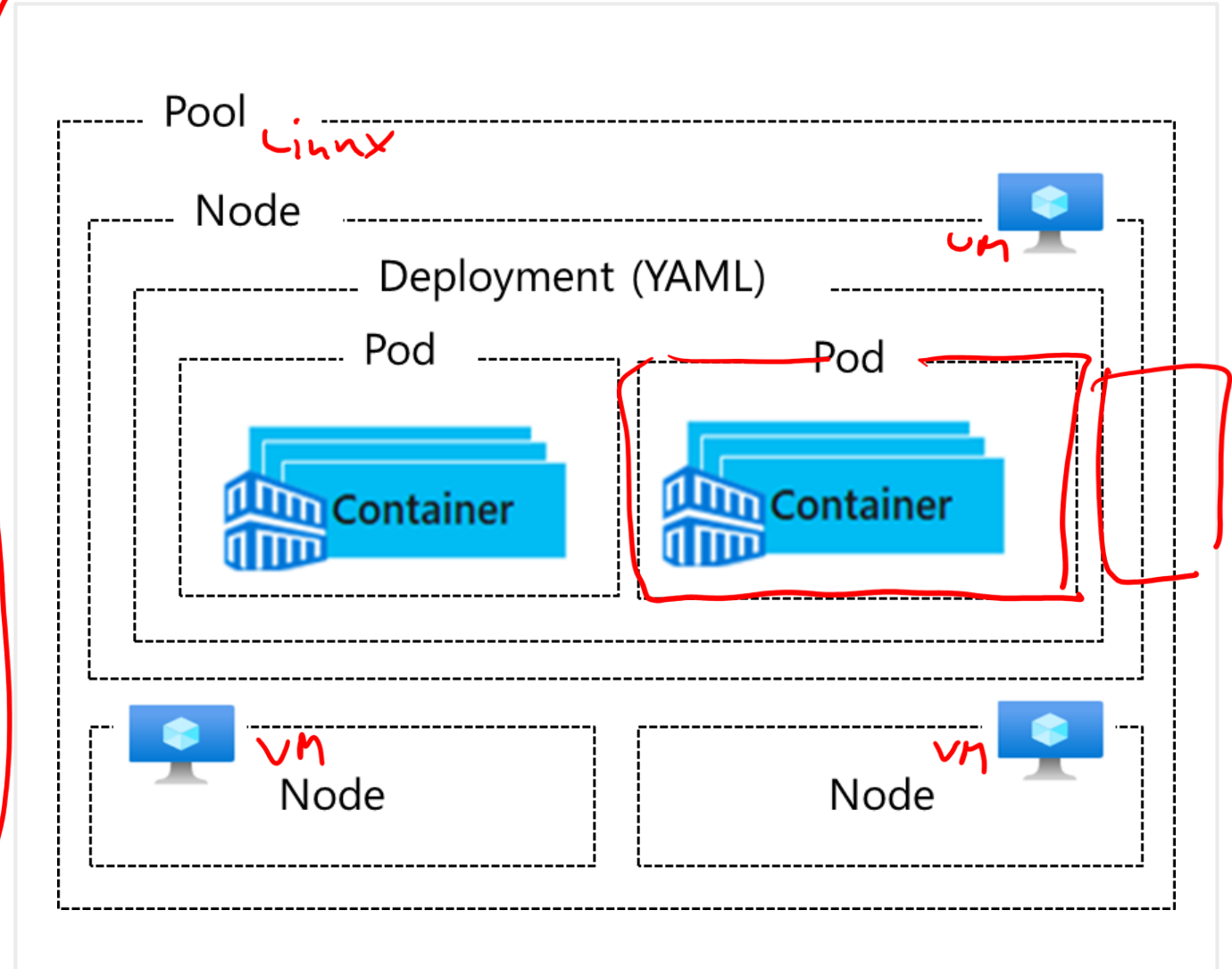
kubectl

Understand AKS Terminology

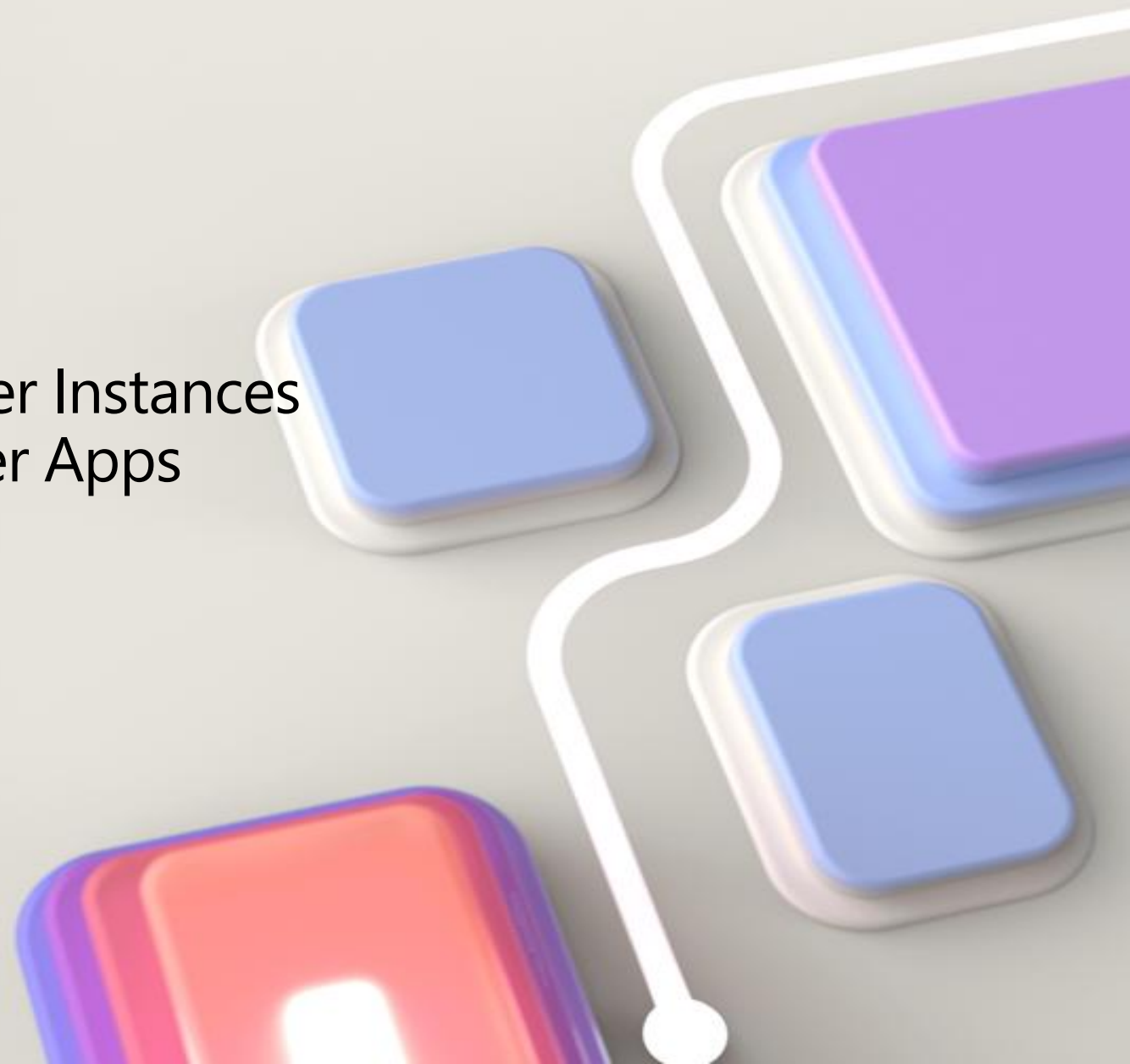
| Term | Description |
|------------|--|
| Pools | Groups of nodes with identical configurations |
| Nodes | Individual VMs running containerized applications |
| Pods | Single instance of an application. A pod can contain multiple containers |
| Deployment | One or more identical pods managed by Kubernetes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

API

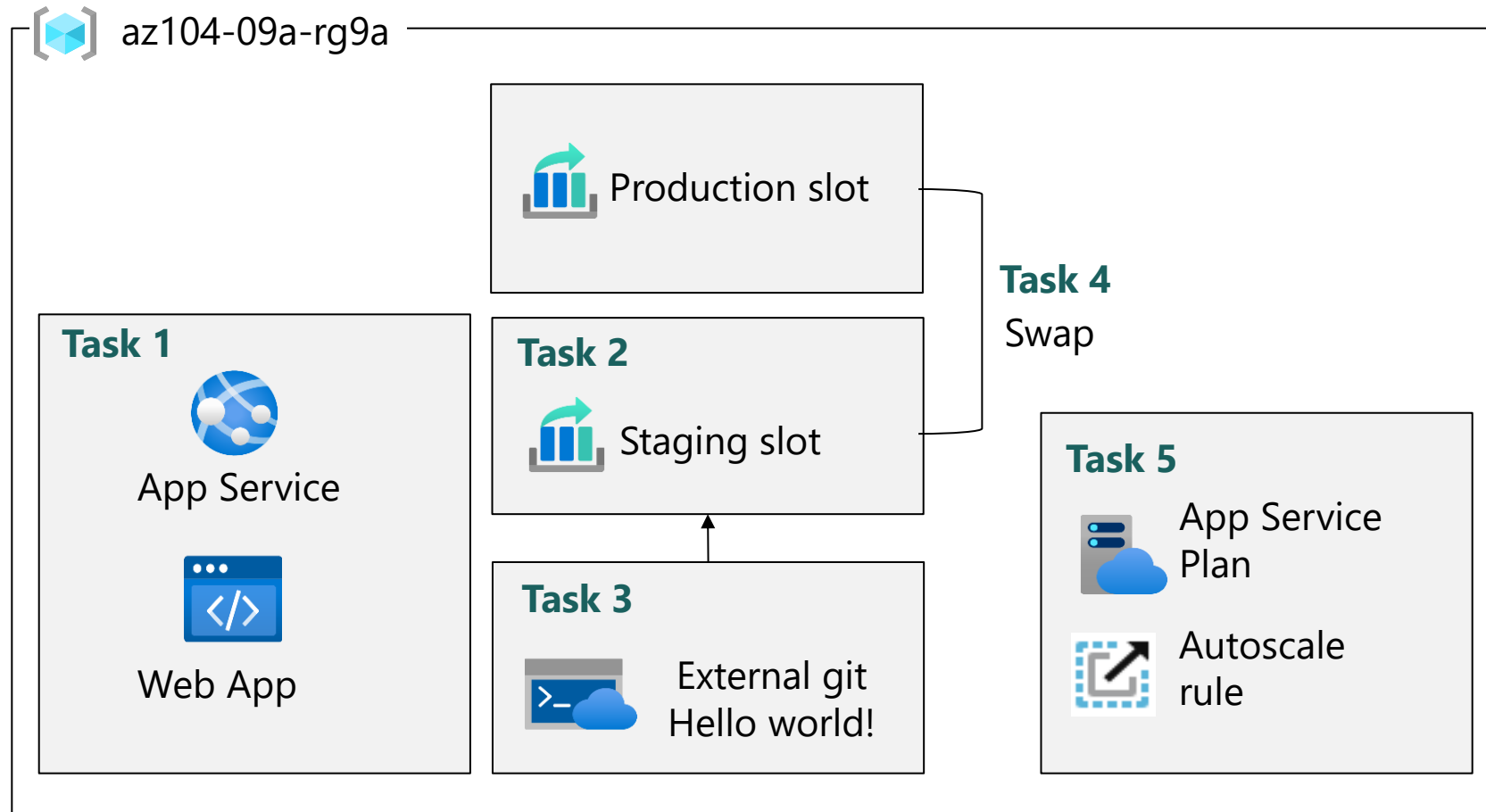
Master (Azure managed)



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



Lab 09a – Web App Architecture Diagram



Lab 09b – Implement Azure Container Instances



In this lab, you learn how to implement Azure Container Instances.

You learn to deploy an Azure Container Instance to display a Hello World app.

Job Skills

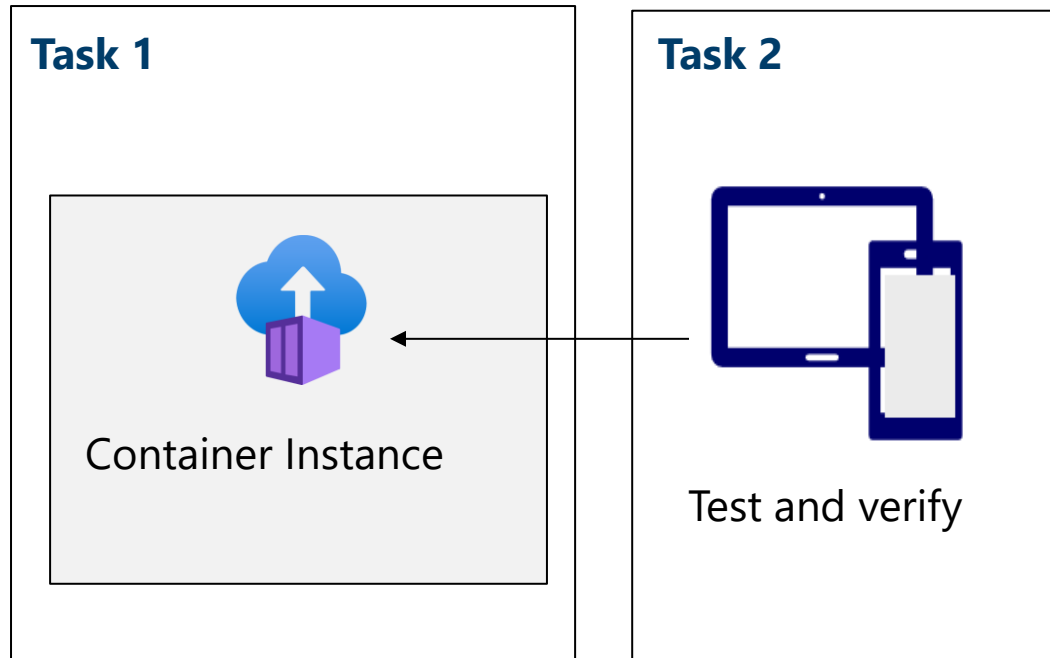
Task 1: Deploy an Azure Container Instance using a Docker image.

Task 2: Test and verify deployment of an Azure Container Instance.

Next slide for an architecture diagram 

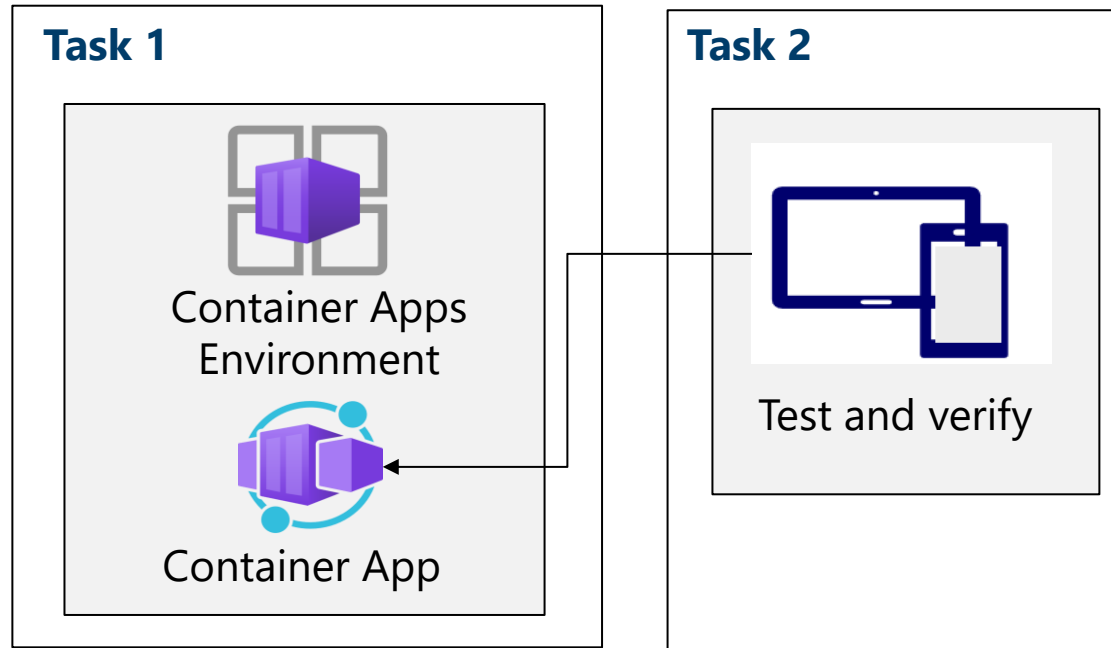
Lab 09b – Azure Container Instances Diagram

Azure Container Instances



Lab 09c – Azure Container Architecture Diagram

Azure Container Apps



End of presentation

