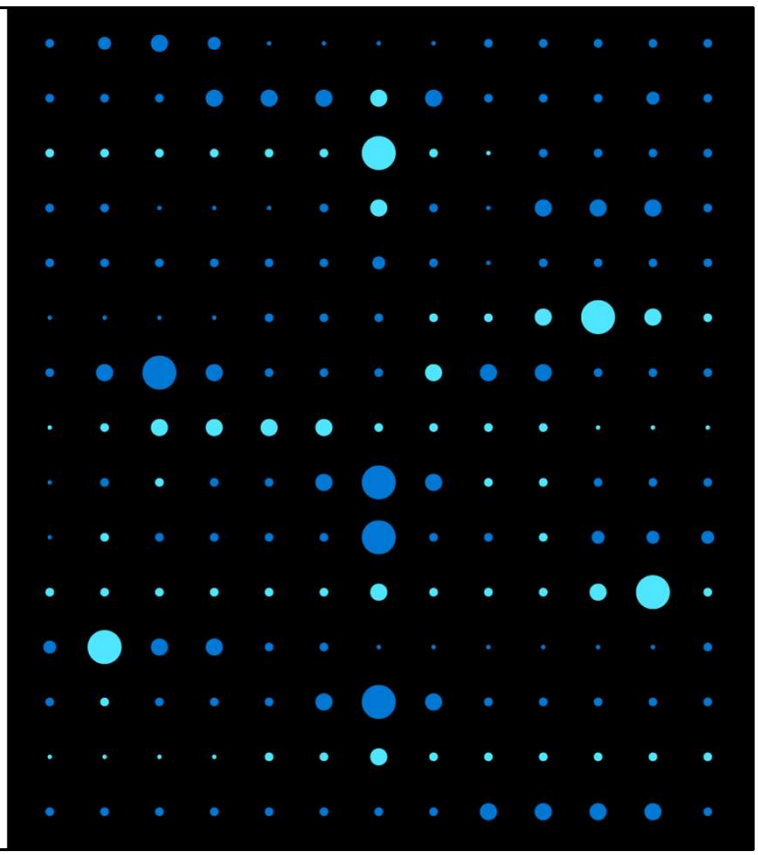
AZ-900T0x Learning path: Distinguish Microsoft Azure Core Services



Adjust the cover for either AZ-900T00 or AZ-900T01.

Learning Objectives

You will learn the following concepts:

- Azure Architectural Components
  - Regions and geographies
  - Availability and Resource
- Core Azure Services
  - Virtual Machines
  - Networking
  - Storing Data
- Azure Solutions
  - IoT, AI, and Data Analytics
  - DevOps, Serverless, and App Services
- Azure Management
  - Azure Advisor
  - PowerShell, CLI, and resource templates

This slide is important. We are telling the learners… This is what I am going to tell you.

We then tell them / show them.

At the end we review what we told them.

Then we give them references for further learning.

Then we say Thanks you where we will then put our closing deck for customer feedback…

Module: Explore Core Azure architectural components

Module: Discuss Core Azure Architectural Components
Introduction

Learning Objectives:

- Explore the physical structure of Azure infrastructure
- Understand the service level agreements provided by Azure
- Learn how to provide your own service level agreements for your apps

Examine Regions

- **Provides flexibility and scale.**
- **Preserves data residency.**
- **Select regions close to your users.**

Worldwide there are 50+ regions representing 140 countries

A list of regions and their locations is available at https://azure.microsoft.com/en-us/global-infrastructure/locations/

- A region represents a collection of datacenters.
- Provides flexibility and scale.
- Preserves data residency.
- Select regions close to your users.
- Be aware of region deployment availability.
- There are global services that are region independent.

Explore Region Pairs

Region	Region
North Central US	South Central US
East US	West US
West US 2	West Central US
US East 2	Central US
Canada Central	Canada East
North Europe	West Europe
UK West	UK South
Germany Central	Germany Northeast
South East Asia	East Asia
East China	North China
Japan East	Japan West
Australia Southeast	Australia East
India South	India Central
Brazil South (Primary)	South Central US

- **Each Azure region is paired with another region.**
- **In an outage, recovery of one region is prioritized out of every pair.**
- **Azure system updates are rolled out to paired regions sequentially (not at the same time).**

A full list of region pairs is available at https://docs.microsoft.com/en-us/azure/best-practices-availability-paired-regions#what-are-paired-regions

- Each Azure region is paired with another region.
- Azure prefers at least 300 miles of separation between datacenters in a regional pair.
- Some services provide automatic replication to the paired region.
- In an outage, recovery of one region is prioritized out of every pair.
- Azure system updates are rolled out to paired regions sequentially (not at the same time).
- Paired regions are members of the same geography – except Brazil.

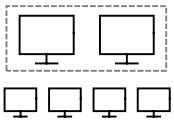
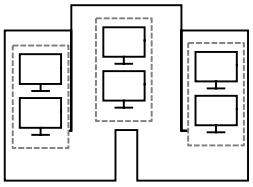
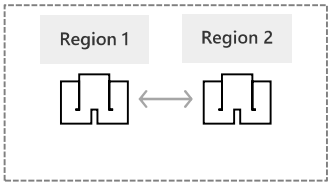
Define Azure Geographies

- **Discrete markets that preserve data residency and compliance boundaries.**
- **Allow customers with specific data-residency and compliance needs to keep their data and applications in close proximity.**

A list of geography locations is available at : https://azure.microsoft.com/en-us/global-infrastructure/geographies/

- Discrete markets that preserve data residency and compliance boundaries.
- Typically contain two or more regions.
- Allow customers with specific data-residency and compliance needs to keep their data and applications in close proximity.
- Categorized as Americas, Europe, Asia Pacific, Middle East, and Africa.

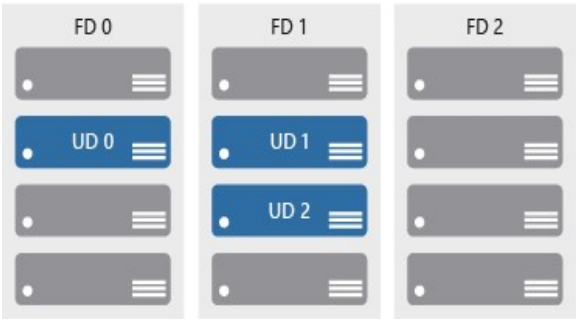
Determine Availability Options

VM SLA	VM SLA	VM SLA	MULTI-REGION DISASTER RECOVERY
99.9% with Premium Storage	99.95%	99.99%	
			
SINGLE VM	**AVAILABILITY SETS**	**AVAILABILITY ZONES**	**REGION PAIRS**
Easier lift and shift	Protecting against failures within datacenters	Protection from entire datacenter failures	Regional protection within Data Residency Boundaries

This slide is to introduce the upcoming topics. You could also use the slide at the end of the lesson to review.

Define Availability sets

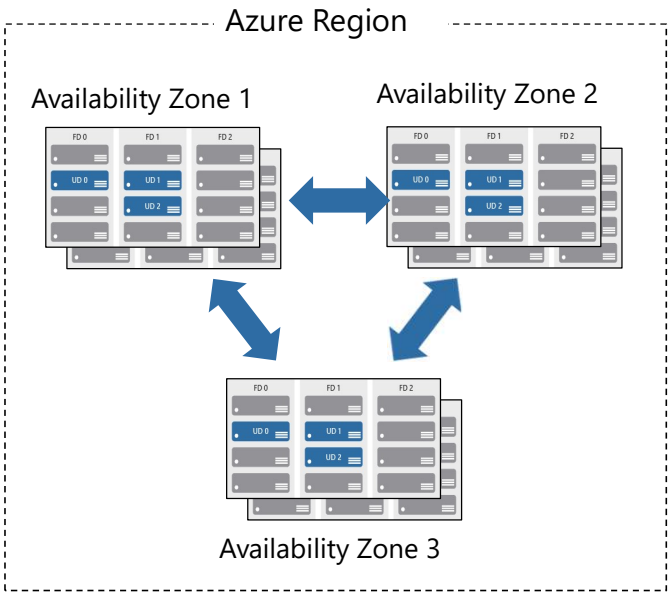
Keep applications online during maintenance or hardware failure.



- Update domains (UD): Scheduled maintenance, performance or security updates are sequenced through update domains.
- Fault domains (FD): Provide a physical separation of workloads across different hardware in a datacenter.

Define Availability zones

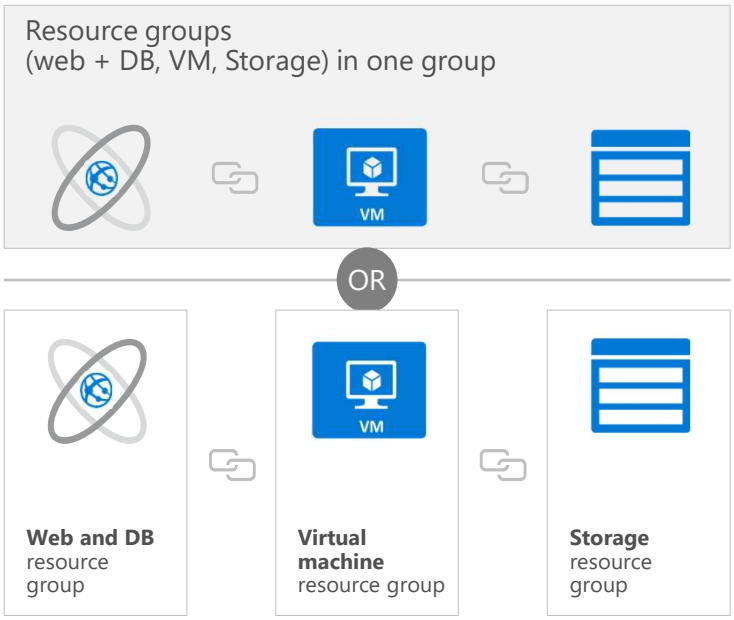
- Physically separate locations within an Azure region.
- Includes one or more datacenters, equipped with independent power, cooling, and networking.
- If one availability zone goes down, the other continues working.



More details about Availability Zones in Azure are available at https://docs.microsoft.com/en-us/azure/availability-zones/az-overview

- Physically separate locations within an Azure region.
- Takes availability sets to the next level
- Includes one or more datacenters, equipped with independent power, cooling, and networking.
- Acts as an isolation boundary.
- If one availability zone goes down, the other continues working.

Explore Resource groups

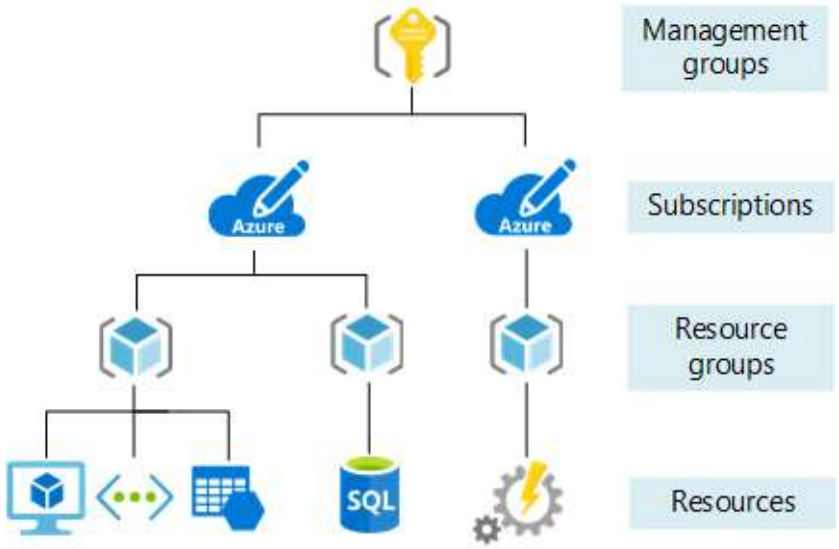


Containers for multiple resources that share the same life cycle.

- Containers for multiple resources that share the same life cycle.
- Aggregates resources into a single manageable unit.
- Every Azure resource must exist in one (and only one) resource group.
- Secure at the resource group (or resource) level - using role-based access control (RBAC).

Explore Azure Resource Manager

Provide a management layer that enables you to create, update, delete, and control access to resources in your Azure subscription.



You can view more details about Azure Resource Manager at https://docs.microsoft.com/en-us/azure/azure-resource-manager

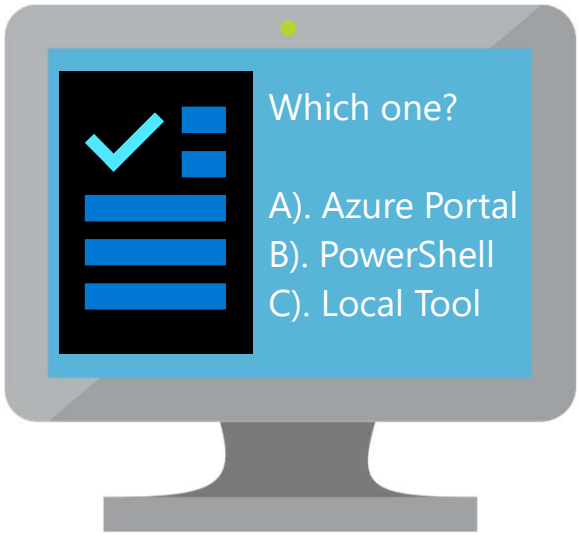
- Provide a management layer that enables you to create, update, and delete resources in your Azure subscription.
- Create, configure, manage and delete resources and resource groups.
- Organize resources.
- Control access and resources.
- Automate using different tools and SDKs.

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module:
Discuss core Azure Architectural Components

1. Use your Smartphones or Mobile Devices
2. Go to (*insert polling app link of your choice*)
   Enter Code: 123-45-678
3. Please participate in the quiz for this section



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In order to promote interactivity, WWL suggests the use of Mentimeter, Kahoot or a similar polling technology. Please feel free to adjust this slide as needed and populate with the instructions based on the polling tool of your choice.

Summary – Discuss Core Azure Architectural Components

We've looked at several features you can use to put organization and control around your Azure resources. We talked about how resource groups worked, and some ways you can use them to organize your resources. By using these tools throughout your Azure environment, you'll have greater organization across your Azure resources.

Learn more:
Visit the following links to learn more about some of the topics we explored in this module.

- Azure regions
- Azure geographies
- Azure Service Level Agreements
- Designing resilient applications for Azure
- Criteria for choosing an Azure compute service

Module: Define Core Azure services and products

Consider covering the Azure Management Tools slide before you do any of the walkthroughs. This slide is in Lesson 05.

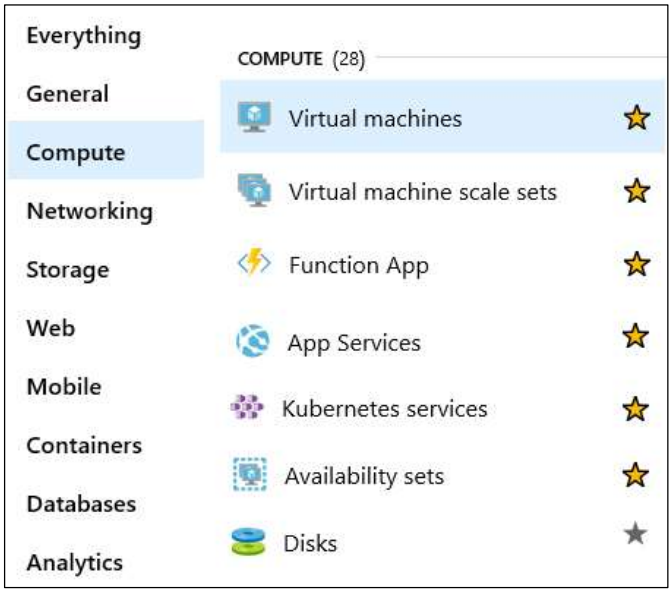
Module: Define Core Azure services and products
Introduction

Learning Objectives:

- Identify and select compute options that are appropriate for your business
- Explore Azure virtual network provides secure network communication among resources such as virtual machines and other networks
- Survey the data storage options in Azure

Define Azure compute

- On-demand computing resources such as disks, processors, memory, networking, and operating systems.
- Makes resources available in minutes or seconds.



For a full list of compute services available with Azure and the context on when to use them, visit https://azure.microsoft.com/en-us/product-categories/compute/

- On-demand computing service for running cloud-based applications.
- Provides computing resources such as disks, processors, memory, networking, and operating systems.
- Makes resources available in minutes or seconds.
- Lots of on-demand services.
- Pay-per-use.

Explore Azure compute services

Azure VMs use Infrastructure as a Service (IaaS) to provide computing power in the cloud.

VM scale sets are designed for automatic scaling of identical VMs.

App services is a Platform as a Service (PaaS) offering to build, deploy, and scale enterprise-grade web, mobile, and API apps.

Functions perform compute actions based on an event.

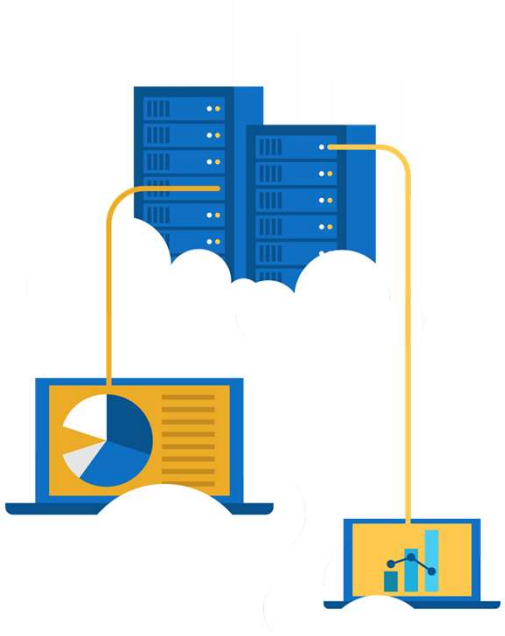
Azure virtual machines - https://azure.microsoft.com/en-us/services/virtual-machines/
Virtual machine scale sets - https://azure.microsoft.com/en-us/services/virtual-machine-scale-sets/
App services - https://azure.microsoft.com/en-us/services/app-service/
Azure Functions - https://azure.microsoft.com/en-us/services/functions/

Microsoft

Walkthrough – Create a Virtual Machine

Create a virtual machine in the Azure Portal, connect to the virtual machine, install the web server role and test.

1. Create the virtual machine.
2. Connect to the virtual machine.
3. Install the web server role and test.



Define Container services

Containers **are a virtualization environment where you do not manage an operating system.**

- Azure Container Instances: A PaaS offering that allows you to upload your containers, which it then will run for you.

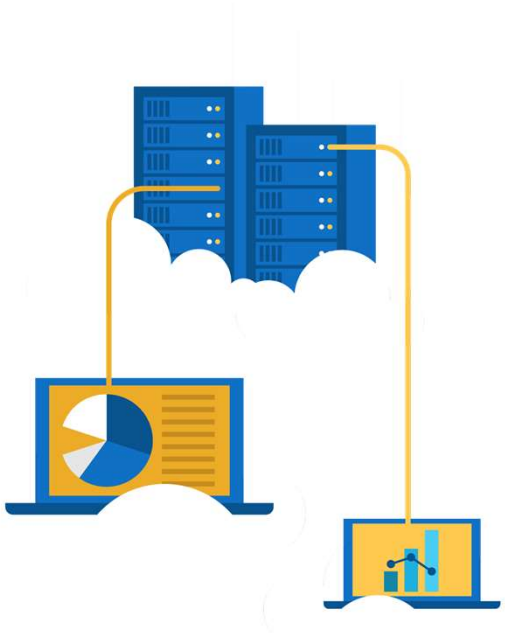
- Azure Kubernetes Service: A container orchestrator service for managing large numbers of containers.

Containers are a virtualization environment. However, unlike virtual machines, you do not manage an operating system. Containers are meant to be lightweight, and are designed to be created, scaled out, and stopped dynamically.

Azure Container Instances - https://azure.microsoft.com/en-us/services/container-instances/
Azure Kubernetes Service - https://azure.microsoft.com/en-us/services/kubernetes-service/

Microsoft

Walkthrough – Deploy Azure Container Instances



Using the Azure Portal create, configure, and deploy a Docker container to an Azure Container Instance. The container will deploy a Hello HTML page.

1. Create a container instance.
2. Deploy the container and test.

Explore Azure network services

	**Azure Virtual Network** provides secure communication between Azure resources.
	**Azure Load Balancer** automatically scales to create highly-available access to applications or resources.
	**VPN Gateway** is a platform managed scalable and highly available application delivery controller.
	**Azure Application Gateway p**rovides for the management of traffic to web applications.
	**Content Delivery Network** provides a distributed network of servers that efficiently deliver web content in their local region.

- Azure Virtual Network provides secure communication between Azure resources.
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- Azure Application Gateway provides for the management of traffic to web applications.

- Content Delivery Network provides a distributed network of servers that efficiently deliver web content in their local region.

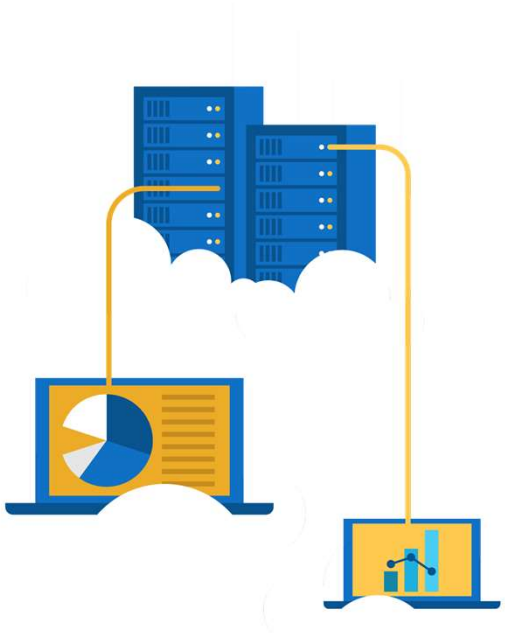
Virtual Networks - https://azure.microsoft.com/en-us/services/virtual-network/
Azure Load Balancer - https://azure.microsoft.com/en-us/services/load-balancer/
VPN gateway - https://azure.microsoft.com/en-us/services/vpn-gateway/
Azure Application Gateway - https://azure.microsoft.com/en-us/services/application-gateway/
Content Delivery Network - https://azure.microsoft.com/en-us/services/cdn/
Networking - https://azure.microsoft.com/en-us/product-categories/networking/

Microsoft

Walkthrough – Create a virtual network

Create a virtual network with two virtual machines and then test connection between the machines.

1. Create a virtual network.
2. Create two virtual machines.
3. Test the connection.

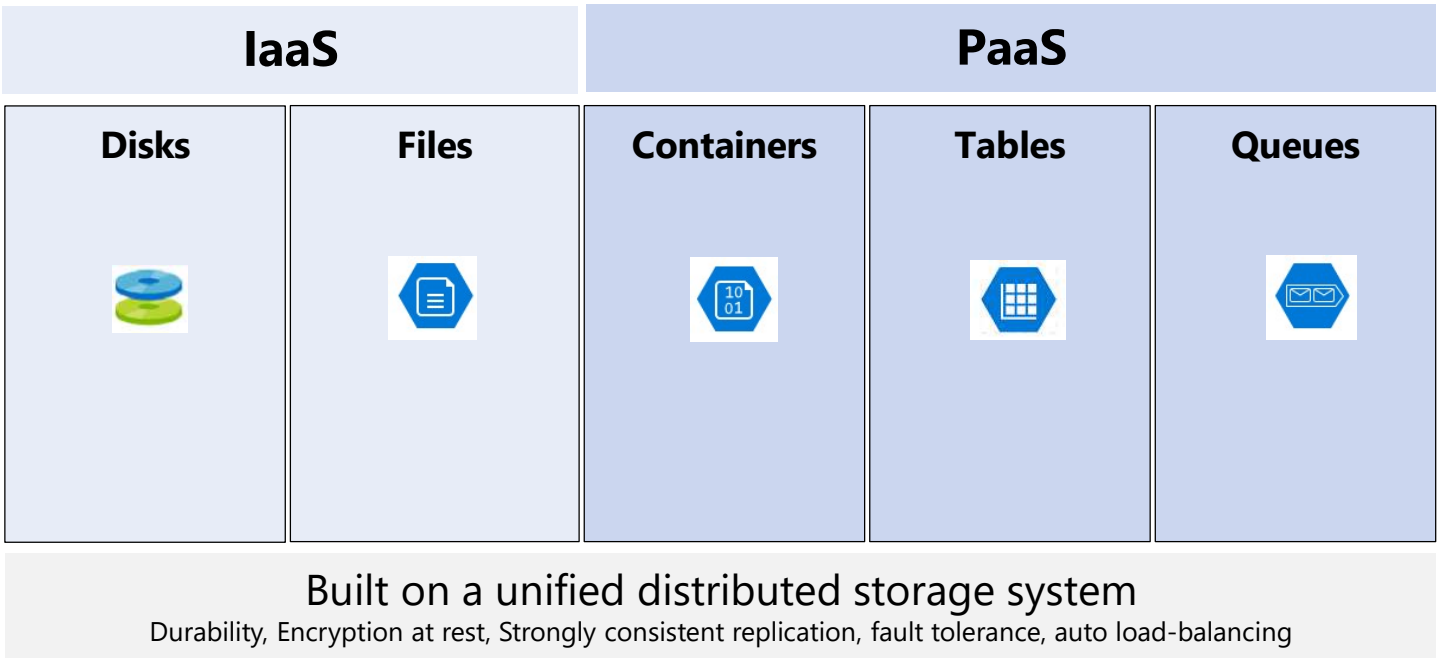


Define Azure data categories

	Schema	Data relationships	Examples
Structured data	Adheres to a schema, with the same data fields or properties.	Storable in relational database tables, with rows and columns.	Sensor data and financial data.
Semi-structured data	Has an ad hoc schema with less organized fields and properties.	Non-relational or NoSQL data, not storable in tables, rows and column.	Books, blogs, JSON, HTML documents.
Unstructured data	Has no designated schema or data structure.	Non-relational or blob data, with no restrictions on the kinds of data blobs contain.	PDFs, JPGs, videos.

There are Azure products to support each data category.

Explore Azure storage services



Storage services - https://azure.microsoft.com/en-us/product-categories/storage/

Microsoft

Walkthrough – Create Blob storage

Create a storage account with a blob storage container. Work with blob files.

1. Create a storage account.
2. Work with blob storage.
3. Monitor the storage account.

Explore Azure database services

	**Azure Cosmos DB** is a globally-distributed database service.
	**Azure SQL Database** is a relational database as a service (DaaS).
	**Azure Database Migration** is a fully-managed service designed to enable seamless migrations from multiple database sources to.

✔ These are just a few of our database service offerings. Take a minute to review other database services and [find the product you need](https://azure.microsoft.com/en-us/product-categories/databases/).

Azure Cosmos DB is a globally-distributed database service that enables you to elastically and independently scale throughput and storage.

Azure SQL Database is a relational database as a service (DaaS) based on the latest stable version of the Microsoft SQL Server database engine.

Azure Database Migration is a fully-managed service designed to enable seamless migrations from multiple database sources to Azure data platforms with minimal downtime.

Azure Cosmos DB - https://azure.microsoft.com/en-us/services/cosmos-db/
Azure SQL Database - https://azure.microsoft.com/en-us/services/sql-database/

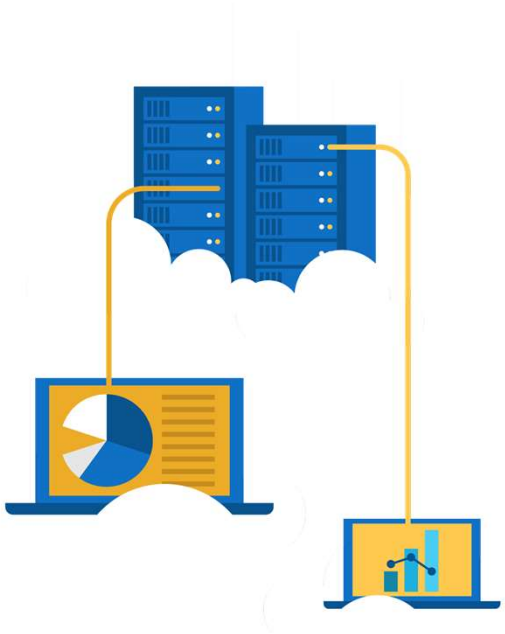
Azure Database Migration Service - https://azure.microsoft.com/en-us/services/database-migration/

Microsoft

Walkthrough – Create a SQL database

Create a SQL database in Azure and then query the data in that database.

1. Create the database.
2. Query the database.



Explore Azure Marketplace

- Connects end users with Microsoft partners, Independent Software Vendors (ISVs), and start-ups that offer solutions and services for Azure.
- Includes close to 10,000 product listings.

There is also a **Marketplace FAQ** available at https://azure.microsoft.com/en-us/marketplace/faq/

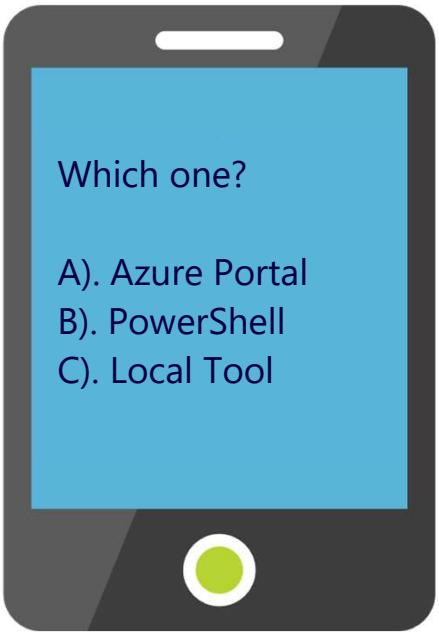
Azure Marketplace - https://azuremarketplace.microsoft.com/en-us/

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module:
Define core Azure Services

1. Use your Smartphones or Mobile Devices
2. Go to *(insert polling app link of your choice)*
3. Enter Code: 123-45-678
4. Please participate in the quiz for this section



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Summary – Define core Azure products and services

Azure provides multiple services to perform cloud compute, but choosing the right service depends on your business needs. Remember that there are some overlaps in capabilities. For example, you could use either Azure containers or Azure Functions as part of a serverless architecture. But ultimately, making the right decision depends on both the service capability and the abilities of your development team.

Learn more:
Visit the following links to learn more about some of the topics we explored in this module.

- Overview of Azure compute options
- Typical scenarios for running Azure VMs

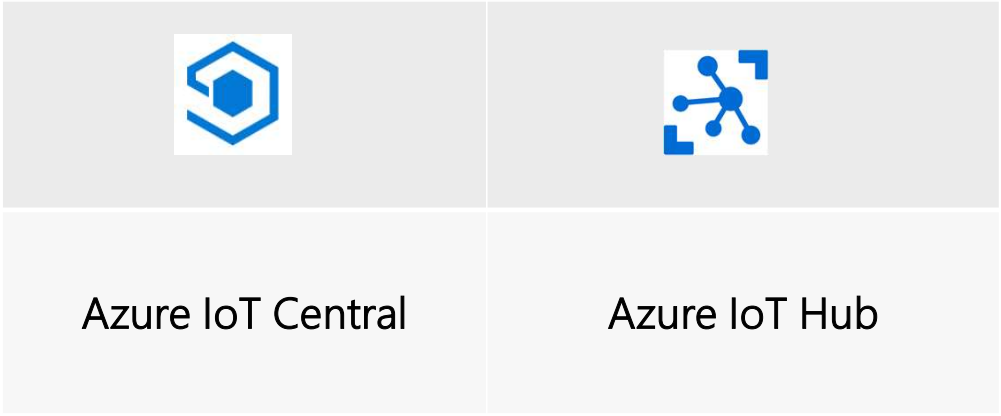
Module: Identify Azure solutions

Module: Identify Azure solution
Introduction

Learning objectives:

- Define Internet-of-Things (Iot) in Azure
- Explore Big Data capabilities in Azure
- Review the Artificial Intelligence (AI) features of Azure
- Explore serverless, Azure app-service, and DevOps

Define Internet of Things



- **Azure IoT Central** is a fully-managed global IoT SaaS solution that makes it easy to connect, monitor, and manage your IoT assets at scale.
- **Azure IoT Hub** is a managed service hosted in the cloud that acts as a central message hub for bidirectional communication between your IoT application and the devices it manages.

These are just two of our IoT offerings. Use the IoT Product Selector to determine what product is best for your situation - https://azure.microsoft.com/en-us/overview/iot/product-selector/

IoT Central - https://docs.microsoft.com/en-us/azure/iot-central/
Azure IoT Hub - https://docs.microsoft.com/en-us/azure/iot-hub/

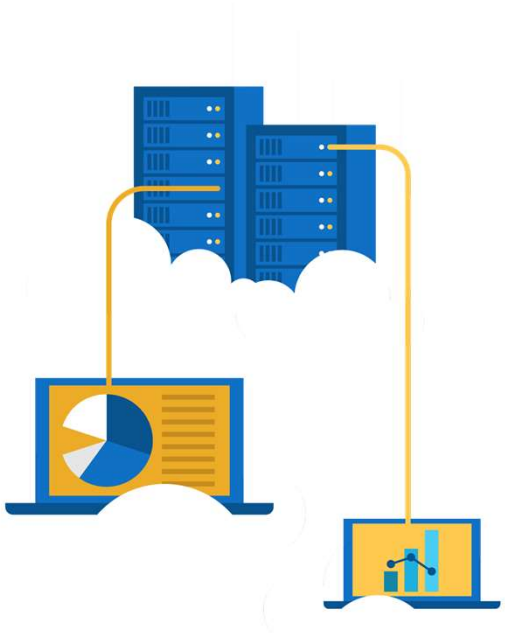
For a full list of IoT-related services available with Azure, and for context on when you use them, see the page https://azure.microsoft.com/en-us/overview/iot/

Microsoft

Walkthrough – Implement the Azure IoT Hub

Create an Azure IoT Hub in Azure Portal and configure the hub to authenticate a connection to an IoT device using the Raspberry Pi device simulator.

1. Create an IoT Hub.
2. Add an IoT device.
3. Test the device using the **Raspberry Pi Simulator**.



Explore Big data and analytics

		
Azure SQL Data Warehouse A cloud-based Enterprise Data Warehouse.	**Azure HDInsight** A fully-managed, open-source analytics service for enterprises.	**Azure Data Lake Analytics** An on-demand analytics job service that simplifies big data.

Azure SQL Data Warehouse - https://azure.microsoft.com/en-us/services/sql-data-warehouse/
Azure HDInsight - https://azure.microsoft.com/en-us/services/hdinsight/
Azure Data Lake Analytics - https://azure.microsoft.com/en-us/services/data-lake-analytics/
Data and Analytics services - https://azure.microsoft.com/en-us/product-categories/analytics/

Explore Artificial Intelligence

Azure Machine Learning service provides a cloud-based environment used to develop, train, test, deploy, manage, and track machine learning models.	
Azure Machine Learning Studio is a collaborative, drag-and-drop visual workspace where you can build, test, and deploy machine learning solutions without needing to write code.	

Azure Machine Learning Service - https://azure.microsoft.com/en-us/services/machine-learning-service/

Azure Machine Learning Studio - https://azure.microsoft.com/en-us/services/machine-learning-studio/

Note: For a full list of Artificial Intelligence and Machine Learning services available with Azure, see the AI + Machine Learning section on the https://azure.microsoft.com/en-us/overview/ai-platform/ page.

Define Serverless computing

	**Azure Functions** is code running your service and not the underlying platform or infrastructure. Creates infrastructure based on an event**.**
	**Azure Logic Apps** is a cloud service that helps you automate and orchestrate tasks, business processes, and workflows when you need to integrate apps, data, systems, and services.
	**Azure Event Grid** is a fully-managed, intelligent event routing service that uses a publish-subscribe model for uniform event consumption.

Azure Functions - https://docs.microsoft.com/en-us/azure/azure-functions/

Azure Logic Apps - https://docs.microsoft.com/en-us/azure/logic-apps/

Azure Event Grid - https://docs.microsoft.com/en-us/azure/event-grid/

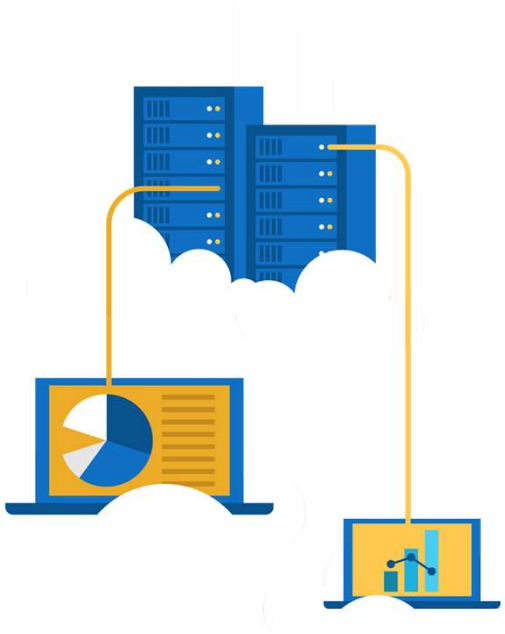
Note: For more details about serverless services available with Azure, see https://azure.microsoft.com/en-us/solutions/serverless/

Microsoft

Walkthrough – Implement Azure Functions

Create a Function app with a Webhook to provide a Hello message with your name.

1. Create a Function app.
2. Create a HTTP triggered event function and test.



Explore DevOps

Azure DevOps services provides development collaboration tools including pipelines, Git repositories, Kanban boards, and extensive automated and cloud-based load testing.	**Azure DevTest Labs** allows you to quickly create environments in Azure while minimizing waste and controlling cost.

Azure DevOps Services - https://docs.microsoft.com/en-us/azure/devops/

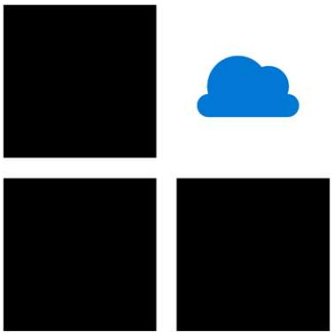
Azure DevTest Labs - https://azure.microsoft.com/en-us/services/devtest-lab/

Note: For more general details on DevOps services available with Azure, see https://docs.microsoft.com/en-us/azure/#pivot=products&panel=devops

Explore Azure App Service

Quickly and easily build web and mobile apps for any platform or device. Azure App Service enables you to build and host web apps, mobile back ends, and RESTful APIs in the programming language of your choice without managing infrastructure.

- Multiple languages and frameworks.
- Global scale with high availability.
- Security and compliance.
- Visual Studio integration.



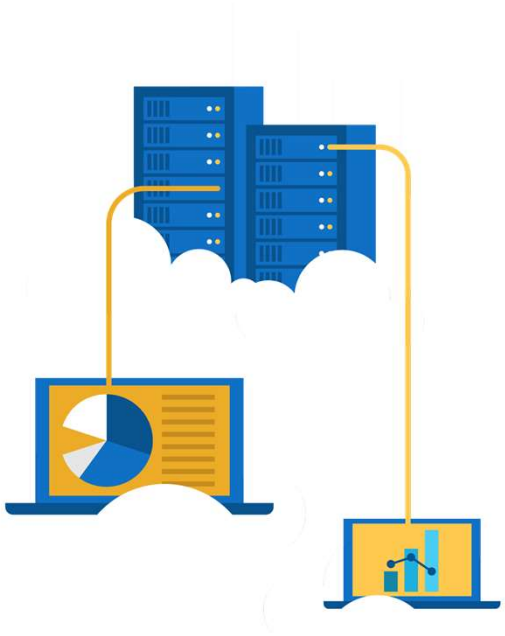
This slide provides a chance to talk about the App Service before the Web App walkthrough.

Microsoft

Walkthrough – Create a Web App

Create a new web app by using a Docker image stored in Azure Container Registry.

1. Create a Web App using a Docker image.
2. Test the Web App..



Knowledge Check

Populate with instructions to use the polling tool of your choice

Module:
Identify Azure Solutions

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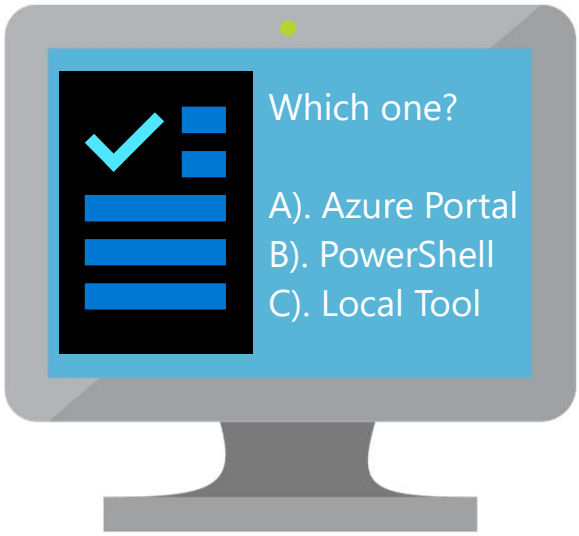

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In order to promote interactivity, WWL suggests the use of Mentimeter, Kahoot or a similar polling technology. Please feel free to adjust this slide as needed and populate with the instructions based on the polling tool of your choice.

Summary – Identify Azure solutions

In this module we looked at supplemental services and solutions like Artificial Intelligence and Internet-of-Things that are available in Azure to help you build great solutions.

Module: Differentiate Azure management tools

Module: Differentiate Azure Management tools
Introduction

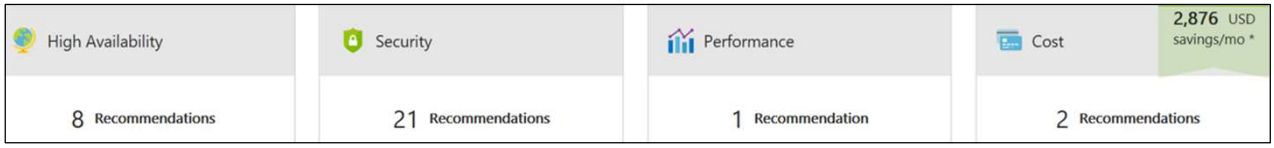
Learning objectives:

- Review Azure management tools
- Explore Azure Advisor
- Create Azure resources using different tools

Explore Azure management tools

	Azure portal
	Azure PowerShell and Azure Command-Line Interface (CLI)
	Azure Cloud Shell
	Azure mobile app
	Azure REST API

Review Azure Advisor



Analyzes your deployed Azure resources and recommends ways to improve availability, security, performance, and costs.

Azure Advisor – htt

- Get proactive, actionable, and personalized best practice recommendations.
- Improve the performance, security, and availability of your resources.
- Identify opportunities to reduce your Azure costs.

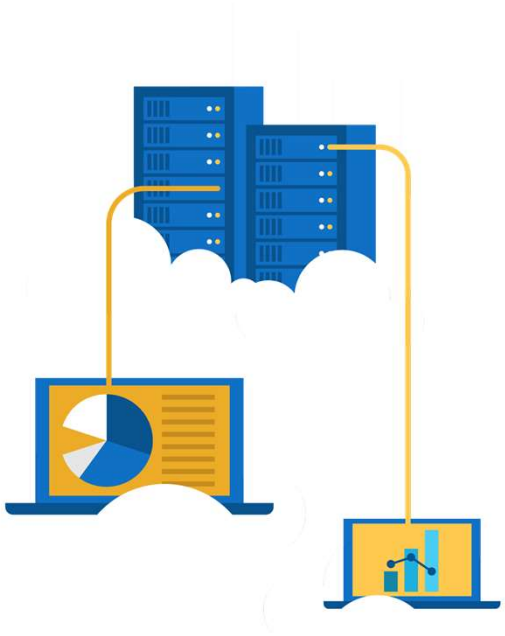
ps://docs.microsoft.com/en-us/azure/advisor/

Microsoft

Walkthrough – Create a VM with an ARM Template

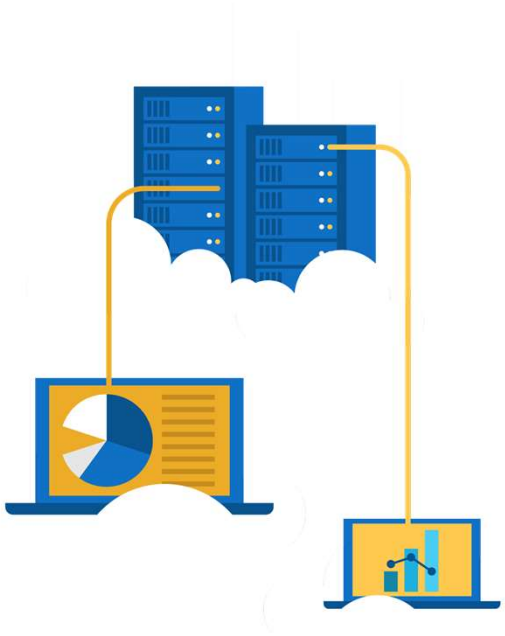
Use the Azure QuickStart gallery to deploy a template that creates a virtual machine.

1. Explore the gallery and deploy a template.
2. Verify your virtual machine deployment.



Microsoft

Walkthrough – Create a VM with PowerShell

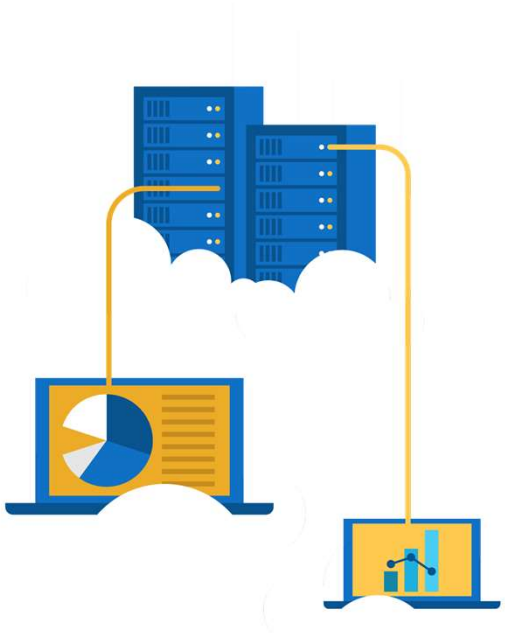


Install PowerShell locally, create a resource group and virtual machine, access and use the Cloud Shell, and review Azure Advisor recommendations.

1. Configure PowerShell locally.
2. Use PowerShell to create a resource group and virtual machine.
3. Execute PowerShell commands in the Cloud Shell.
4. Review Azure Advisor Recommendations.

Microsoft

Walkthrough – Create a VM with the Azure CLI



Install the Azure CLI locally, create a resource group and virtual machine, use the Cloud Shell, and review Azure Advisor recommendations.

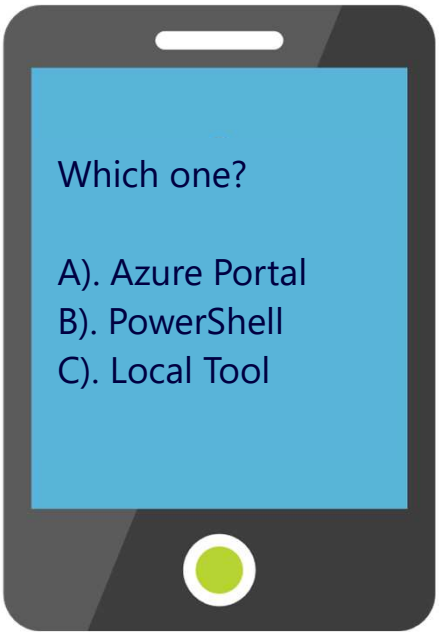
1. Install the CLI locally.
2. Use the CLI to create a resource group and virtual machine.
3. Execute commands in the Cloud Shell.
4. Review Azure Advisor Recommendations.

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module:
Differentiate Azure management tools

1. Use your Smartphones or Mobile Devices
2. Go to *(insert polling app link of your choice)*
3. Enter Code: 123-45-678
4. Please participate in the quiz for this section



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Summary – Differentiate Azure management tools

In this module we looked at management tools that are available to help you build and manage your Azure solutions.

Learning Path review

As you have time go through the review questions in the student materials.