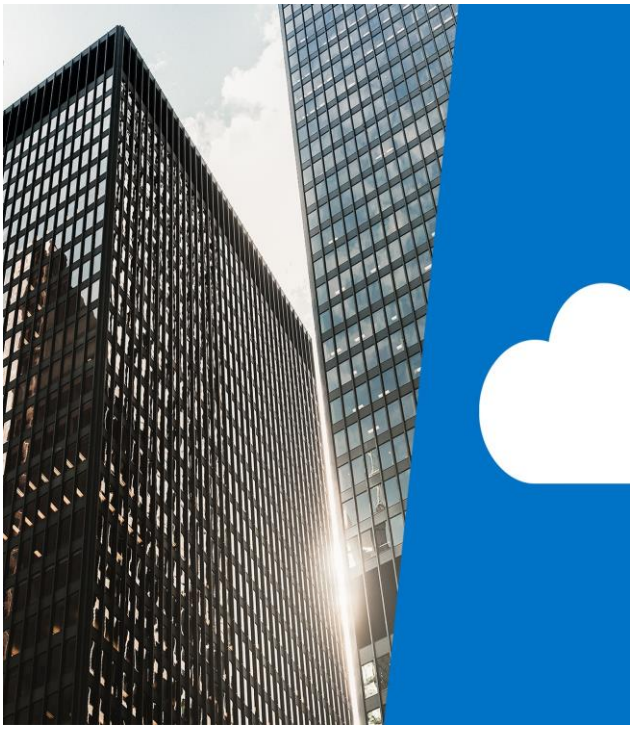
Microsoft

AZ-900T01: Module 02: Core Azure services



1

Lesson 01: Learning objectives

2

Module 2 – Learning objectives

- Understand and describe core Azure architectural components
- Understand and describe core Azure services and products
- Understand and describe Azure solutions
- Understand and describe Azure management tools

3

Lesson 02: Core Azure architectural components

4

Regions

- Azure is made up of datacenters located around the globe. These datacenters are organized and made available to end users by country/region
- In reference to datacenters, a *region* is a geographical area on the planet containing at least one—but potentially multiple —datacenters that are in close proximity and networked together with a low-latency network

5

Regions - *continued*

- Special Azure regions:
  - Azure also has some special regions that you might want to use when building out your applications for compliance or legal purposes. Special regions are:
    - **Azure Government**
    - **Azure Germany**
    - **Azure China 21Vianet**
- Region pairs:
  - Each Azure region is paired with another region within the same geography (such as US, Europe, or Asia). This approach allows for the replication of resources (such as virtual machine (VM) storage) across a geography that helps reduce the likelihood of interruptions due to events such as natural disasters, power outages, or physical network outages affecting both regions at once.

6

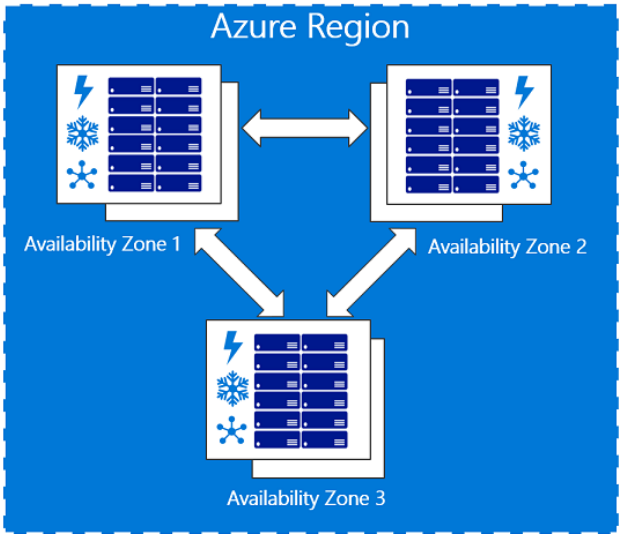
Geographies

- A *geography* is a discrete market typically containing two or more regions that preserves data residency and compliance boundaries
- Geographies allow customers with specific data-residency and compliance needs to keep their data and applications close
- Geographies are broken up into Americas, Europe, Asia Pacific, Middle East, and Africa

7

Availability zones

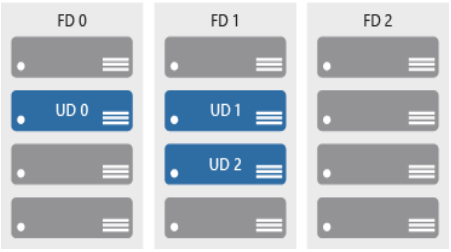
- *Availability zones* are physically separate locations within an Azure region.
- Each availability zone is made up of one or more datacenters equipped with independent power, cooling, and networking.
- Availability Zones are set up to be an isolation boundary.
- If one availability zone goes down, the other continues working.



8

Availability sets

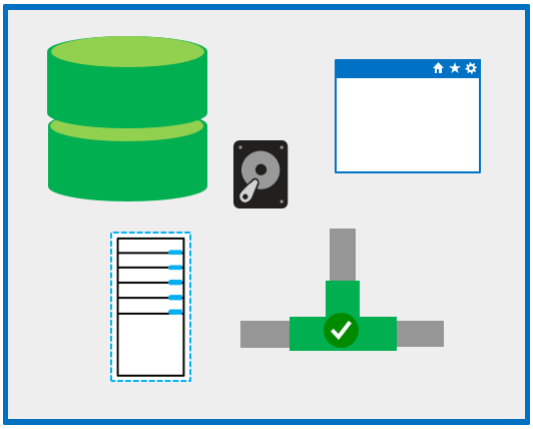
- Availability sets are a way to help ensure applications remain online if a high-impact maintenance event is required, or a hardware failure occurs
- Availability sets are made up of update domains and fault domains:
  - Update domains. When a maintenance event occurs (such as a performance update or critical security patch applied), the update is sequenced through update domains.
  - Fault domains. Fault domains provide for the physical separation of a workload across different hardware in the datacenter.



9

Resource groups

- A *resource group* is a unit of management for resources in Azure.
- Think of a resource group as a container that allows you to aggregate and manage all the resources required for an application in a single manageable unit



10

Azure Resource Manager

- *Azure Resource Manager* is a management layer in which resource groups and all the resources within it are created, configured, managed, and deleted
- With Azure Resource Manager, you can:
  - Deploy application resources
  - Organize resources
  - Control access and resources

11

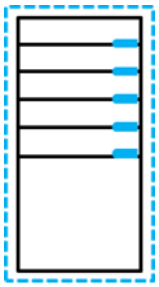
Lesson 03: Core Azure services and products

12

Azure compute services

Azure compute is an on-demand computing service for running cloud-based applications. It provides computing resources such as disks, processors, memory, networking and operating systems.

- Resources are available on-demand and can typically be made available in minutes or even seconds. You pay only for the resources you use and only for as long as you're using them.
- Two common service types for performing compute in Azure are VMs and containers.



13

Azure compute services - virtual machine services

VMs are software emulations of physical computers. Examples of Azure services for virtual machines include:

Azure VMs. Infrastructure as a service (IaaS) to create and use VMs in the cloud

VM scale sets. Designed for automatic scaling of identical VMs

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

Functions. Creates infrastructure based on an event

14

Demo: Create an Azure virtual machine

15

01-Walkthrough-Create a Virtual machine using Azure Portal

- In this walkthrough task we will create a virtual machine in Azure via the Azure Portal, configure it as a web server and connect to the web server over the internet.
- You can complete this walkthrough task by completing the steps outlined in the PDF document, or you can simply read through them, depending on your available time

16

Azure compute services – container services

Containers are a virtualization environment. However, unlike virtual machines, they do not include an operating system. Containers are meant to be lightweight, and are designed to be created, scaled out, and stopped dynamically. Examples of Azure services for containers include:

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

17

Azure network services

Networking on Azure allows you to connect cloud and on-premises infrastructure and services.

Azure Virtual Network. An IaaS service to create and use VMs in the cloud

Azure Load Balancer. Designed for automatic scaling of identical VMs

VPN Gateway. A PaaS offering to build, deploy, and scale enterprise-grade web, mobile, and API apps

Azure Application Gateway. Creates infrastructure based on an event

Content Delivery Network. Creates infrastructure based on an event

18

02-Walkthrough-Create a virtual network via the Azure Portal

- In this walkthrough task we will create a virtual network, deploy two virtual machines onto that virtual network and then configure them to allow one virtual machine to ping the other over that virtual network.

- You can complete this walkthrough task by completing the steps outlined in the PDF document, or you can simply read through them, depending on your available time

19

Azure storage services – data categories

- *Structured data*. Data that adheres to a schema, so all of the data has the same fields or properties. Structured data can be stored in a database table with rows and columns. Examples of structured data include, sensor data or financial data.
- *Semi-structured data*. Data is less organized than structured data, and is not stored in a relational format, meaning the fields do not neatly fit into tables, rows, and columns. Referred to as *non-relational* or *NoSQL* data.
- *Unstructured data*. Data that has no designated structure to it. This also means that there are no restrictions on the kinds of data it can contain. For example, a blob can hold a PDF document, a JPG image, a JSON file, or video content.

20

Azure storage services – Azure services

Azure Storage is a service that you can use to store files, messages, tables, and other types of information.

Blob storage. No restrictions on the kinds of data it can hold. Blobs are highly scalable

Disk storage. Provides disks for virtual machines, applications, and other services

File storage. Azure Files offers fully-managed file shares in the cloud

Archive storage. Storage facility for data that is rarely accessed

21

Demo: Create Blob storage

22

03-Walkthrough-Create Blob storage

- In this walkthrough task we will create a storage account, then create a blob storage container within that storage account, then upload a block blob, view and edit the blob file within the blob container in Azure, and then download the block blob file.
- You can complete this walkthrough task by completing the steps outlined in the PDF document, or you can simply read through them, depending on your available time

23

Azure database services

Azure database services are fully-managed PaaS database services that free up valuable time you'd otherwise spend managing your database

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

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

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

24

04-Walkthrough-Create a SQL database

- In this walkthrough task we will create a SQL database in Azure and then query the data in that database.

- You can complete this walkthrough task by completing the steps outlined in the PDF document, or you can simply read through them, depending on your available time

25

Azure Marketplace

- *Azure Marketplace* is a service on Azure that helps connect end users with Microsoft partners, independent software vendors (ISVs), and start-ups that are offering their solutions and services, which are optimized to run on Azure

- Azure Marketplace allows customers—mostly IT professionals and cloud developers—to find, try, purchase, and provision applications and services from hundreds of leading service providers, all certified to run on Azure. At the time of writing, this includes over 8,000 listings

26

Lesson 04: Azure solutions

27

Internet of Things

The internet allows any item that's online-capable to access valuable information. This ability for devices to garner and then relay information for data analysis is referred to as the *Internet of Things* (IoT)

Microsoft IoT Central. A fully-managed global IoT software as a service (SaaS) solution that makes it easy to connect, monitor, and manage your IoT assets at scale

Azure IoT Hub. 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

28

Big data and analytics

Big data refers to large volumes of data that become increasingly hard to make sense of, or consequently make decisions about. Some big data and analytic services in Azure include:

Azure SQL Data Warehouse: A cloud-based Enterprise Data Warehouse that leverages massively parallel processing (mpp) to run complex queries quickly across petabytes of data

Azure HDInsight: A fully-managed, open-source analytics service for enterprises. It is a cloud service that makes it easier, faster, and more cost-effective to process massive amounts of data

Azure Data Lake Analytics: An on-demand analytics job service that simplifies big data. Instead of deploying, configuring, and tuning hardware, you write queries to transform your data and extract valuable insights.

29

Artificial Intelligence

Artificial Intelligence (AI), in the context of cloud computing, is based around a broad range of services, the core of which is machine learning. Machine learning is a data science technique that allows computers to use existing data to forecast future behaviors, outcomes, and trends. Using machine learning, computers learn without being explicitly programmed. Some AI services in Azure include:

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. A collaborative, drag-and-drop visual workspace where you can build, test, and deploy machine learning solutions without needing to write code

30

Serverless computing

Serverless computing is a cloud-hosted execution environment that runs your code but abstracts the underlying hosting environment. Some serverless services in Azure include:

Azure Functions. Concerned with the code running your service and not the underlying platform or infrastructure. Creates infrastructure based on an event.

Azure Logic Apps. A cloud service that helps you automate and orchestrate tasks, business processes, and workflows when you need to integrate apps, data, systems, and services across enterprises or organizations.

Azure Event Grid. A fully-managed, intelligent event routing service that uses a publish-subscribe model for uniform event consumption.

31

DevOps

DevOps allows you to create, build, and release pipelines that provide continuous integration, delivery, and deployment for your applications. It brings together people, processes, and technology, automating software delivery to provide continuous value to your users

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

32

Lesson 05: Azure management solutions

33

Azure management tools

You can configure and manage Azure using a broad range of tools and platforms. Some of these tools are:

- Azure Portal. A website accessed via a web browser at
- Azure PowerShell. A command shell scripting language
- Azure Command-Line Interface (Azure CLI). A cross-platform command-line scripting program for Windows, Linux, or MacOS operating systems
- Azure Cloud Shell. A browser-based scripting environment in your portal.

34

Demo: Customize the Azure Portal

35

05-Walkthrough-Working with the Azure CLI

- In this walkthrough task we will install the Azure CLI on our local machine, then create a virtual machine using the Azure CLI and an Azure Resource Manager template, then verified that deployment using the Azure CLI in the Azure Cloud Shell

- You can complete this walkthrough task by completing the steps outlined in the PDF document, or you can simply read through them, depending on your available time

36

Azure Advisor

Azure Advisor is a free service built into Azure that provides recommendations on high availability, security, performance, and cost. Advisor analyzes your deployed services and looks for ways to improve your environment across those four areas

With Azure Advisor, you can:

- Get proactive, actionable, and personalized best practices recommendations
- Improve the performance, security, and high availability of your resources as you identify opportunities to reduce your overall Azure costs
- Get recommendations with proposed actions inline

37

Lesson 06: Module 2 review questions

38

Module 2 review questions

1. What are the core architectural components of Azure?
2. Every resource created in Azure must exist in one and only one what?
3. You need to deploy a legacy application in Azure that has some customizations that are needed to ensure it runs successfully. The application will run on a VM running the Windows operating system. Which Azure service would you recommend to run the virtual machine in?

39