

Azure (Az-900) → Pluralsight

Topics covered

- cloud concepts
- Azure services
- azure workloads
- security and privacy in azure
- azure pricing and support

For this certifications

You do not need to know how to configure, manage or implement features - you need to know what the features are and what business problems they solve.

Cloud concepts

Types of cloud computing services

- 1) Infrastructure as a service (IaaS) - Azure, Google Compute Engine, AWS
- 2) Platform as a service (PaaS) - Heroku ; Azure logic Apps
- 3) Software as a service (SaaS) - Office 365, Salesforce, Dropbox

for Microsoft

- 1) IaaS - Azure compute (Virtual Machines), Azure Storage
- 2) PaaS - Azure logic Apps, Azure functions, Azure web jobs, Azure automation
- 3) SaaS - teams, onedrive, sharepoint

- Cloud computing deployment models

- 1) Public cloud

- Cloud service provided by third party provider, hardware can be shared amongst multiple clients

- Most azure customers & offerings are in public cloud.

- Azure, office 365

- 2) Private cloud

Hardware is only used by single company, which often owns hardware

& datacenter.

- Azure stack

- 3) Hybrid cloud

- Combination of public & private cloud with automation & orchestration between the two.

- Azure stack.

for private & hybrid

Azure stack allows you to run cloud services on-premises

Azure stack can be used for connected & disconnected scenarios.

consistent tools, experiences & app models.

easy transfer workloads to Azure (public cloud)

- 4) Community cloud

infrastructure is shared b/w several orgs from a specific community with common concerns (security, compliance, jurisdiction etc)

Azure Government is azure offering specific to government entities

Azure government, azure germany, azure china.

Azure Services & concepts

Resource :- resource is just a manageable item in Azure, includes virtual machines, storage accounts, web apps, databases, vnets etc or anything you create for your application.

Resource group :- A resource group is a container that holds related resources. resource grp contain set of resources that share same lifecycle, in other words you deploy, update & delete them together.

• Resources can exist in only one resource group.

• Resources can communicate across resource groups

Resource group is just a container, it just contains metadata of resources it contains.

Security can be applied of given resource group.
rules

Using Cli

→ Install it to check version : az --version

→ az login

list all resources group : az group list

resources in given group : az resource list --resource-group name of resource group

Azure Services & concepts

- Data is stored 3 times as a backup.

- Infrastructure - as - Code using
Azure - Resource Manager templates

Azure Resource Manager :-
Templates

1. Written in JSON
2. Defines infrastructure & configuration for Azure resources
3. Declarative syntax
4. Deployment
 - using Azure pipelines (CI/CD)
 - from Github
 - using powershell and azure CLI
 - Resource manager REST API
 - using Azure portal

- Azure Advisor

→ personalized cloud consultant that helps you follow best practices to optimize your Azure deployments, improve performance, availability & security of Azure resources

→ Also recommends ways to save cost.

Azure core products

- Azure compute :- set of services , on-demand computing power
 - Includes
 - 1) Virtual Machines - Infrastructure as a service
 - 2) Containers :- Containers are lightweight bundle of applications required to run the service , don't have own OS like VMs.
 - 3) Azure App service :- is platform as a service , allows hosting API apps & mobile apps , can host windows & linux containers
 - 4) Serverless computing :- way to build application without any underlying infrastructure
 - has
 - 1) Azure fn's :- allows you to run small blocks of code
 - 2) Azure logic apps:- allows you to configure workflows in cloud
 - 3) Azure Event grid:- lets you build apps that responds to events

Azure Virtual Machines

- IaaS , so full control over OS . VM's are full copy of OS
- Virtual Machine Scale Sets :- Identical VMs with load balancing
 - No. of VMs can scale out/in
 - spread across fault domains & update domains
- Azure batch :- allows to create pool of VMs , helps to do high performance computing (HPC) & do parallel processing .

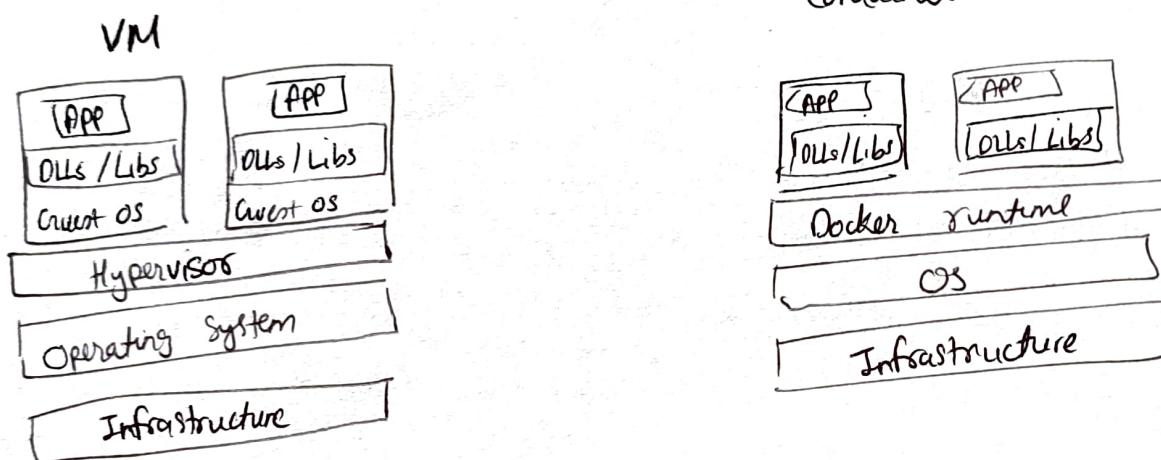
Containers in Azure

- Containers are way to wrap up an application into its own isolated package.
- whenever app is deployed using container , everything required to run app is included in container like runtimes & library dependencies.
- It makes environment same across different deployments , so reduce problems with deploying applications .

VM vs Container

- VMs are virtualization of hardwares , whereas Containers are virtualization of OS.

Container



- A Container is an instance of container Image , image is a read-only template with instructions on how to create container & container is runnable instance of image
- Container registry stores container images , eg is Docker Hub for azure - Azure Container registry
- To host containers in Azure - Azure Container Instances
Azure Kubernetes service.
Azure App service (like traditional web hosting)

Serverless Computing

includes Azure Functions, Azure Logic App, Azure Event Grid

- ↓
 - Run custom code
 - Initiated by triggers
- ↓
 - Designer in portal
 - Design workflow
 - Initiated by triggers
- ↳ - Connects data & event handlers

Core networking products

- 1) Azure virtual Network is fundamental building block in your private network
- 2) A VNet enables many types of Azure resources to communicate

Windows Virtual Desktop

- Full desktop for users - Apps running remotely
- Similar to Remote Desktop Services (RDS)
- Fully managed software in cloud.

Azure Content Delivery Network

- Azure CDN
- distributed network of servers, store cached data
 - store typically static data
 - also dynamic data using Dynamic site acceleration (OSI)

>Data Storage in Azure

Benefits of Azure data storage soln

- 1) Automated backup & recovery
- 2) Replication across the world
- 3) Encryption options
- 4) Security & platform integration
- 5) Development features & support

Categories of data

- Structured data
 - Azure SQL database
 - Azure database for MySQL
 - Azure database for PostgreSQL
- Unstructured data
 - Azure blob storage
 - Azure file storage
 - Azure Disk storage
(pdf, json etc)
- Semi-structured data (No-SQL)
 - Cosmos DB

Cosmos DB

- Globally distributed
- Multimodal
- fast response time
- Ability to scale rapidly & globally
- used for hierarchical data where SQL may have many joins
- preferred for gaming application, social media applications

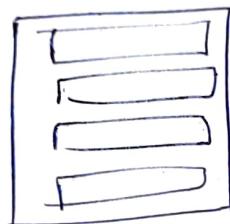
Azure storage services

- Blob storage
- file storage
- Disk storage
- Table storage
- Queue storage

- **BLOB** → Binary Large Object
- Blob can be any type of file including documents, video files, text files & even virtual machine disks.
- Blob service is optimised to store massive amount of unstructured data

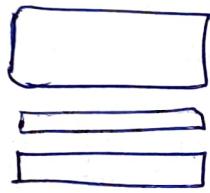
BLOB types

1) Block blobs -



- store text & binary data
- composed of multiple blocks which helps in optimizing uploading

2) Append blobs -



- can only append blocks
- ideal for logs, where you only need to add to file

3) Page blobs :-

- store random access files upto 8TB
- Used to store disks for VMs & databases
- for frequent random read/write applications

So they are foundation of Azure IaaS disks.



- Both OS disks & data disks are stored in page blobs
- Azure SQL database also uses page blobs as persistent storage for its database

▷ Azure Platform Solutions

▷ IOT services in Azure

Azure IOT central , Azure IOT hub , Azure Sphere

- Azure IOT hub : It is hub to collect data feeds from all your things
 - > Platform Service : PaaS
 - Connecting devices to the cloud
 - Managing devices
 - Ingesting data
 - > Bidirectional communication
 - > Automatic provisioning of device objects
- Azure IOT central (SaaS) : Simplify & speed up implementation of IOT sol.
without code
 - > Managed app Platform
 - > Industry specific templates
 - > faster to start developing soln's
 - > Built-in device profiles
 - > No coding platform
- Azure Sphere
 - > focuses on security & standardization
 - > Application platform
 - Micro-controller unit (hardware)
 - Linux-based operating system (software)
 - Cloud-based security service
 - > foundation for IOT devices
 - > provide both hardware & software for IOT devices

: All-in-one soln for IOT devices on Azure

> Big Data in Azure

- 3 V's of Big data
 - 1) Volume
 - 2) Velocity
 - speed at which data moves
 - 3) Variety
 - data can be ingested from various sources in variety of formats.
- Important characteristic of Big Data is distributed computing, since no one computer can handle processing the massive amounts of data, so analytic engines using parallel processing

4 categories of Big Data processing

Ingest > Persist > Analyze > Visualize

3 Azure soln

- 1) Azure HDInsight
- 2) Azure Databricks
- 3) Azure Synapse Analytics

Azure HDInsight > platform to run open source analytics tools like Apache Hadoop, spark, kafka.
cluster of compute nodes
on-demand scalability & autoscale

Azure Databricks > Based on Apache Spark platform
> fully-managed spark clusters > workspace for visualizing data
> Serverless option

Azure Synapse Analytics > formerly Azure SQL Data Warehouse
> Storage Component > Azure Synapse Analytics

: It is paas offering that can run queries against petabytes of data, often used for reports and data analytics.

Azure Data Lake Analytics : Is an on-demand analytics job service that simplifies big data. you just write queries to transform data to extract valuable insight, process large amount of data in parallel.

Azure machine learning

• \Rightarrow Azure Machine Learning Studio

has + computer vision (visual tool)

\Rightarrow Speech API's

\Rightarrow Language API's

\Rightarrow web search

\Rightarrow Decision API's

\Rightarrow Azure Bot services (PaaS)

develop intelligent, enterprise grade bots

\rightarrow Azure ML

cloud based to deploy and develop ML model

\Rightarrow Azure cognitive service

Predefined models, quickly enable app to see, speak, understand & interpret user's need.

DevOps Solutions in Azure

• for Agile & Kanban

\Rightarrow Azure Boards \Rightarrow GitHub Boards

• for CI/CD

\Rightarrow Azure Devops pipelines

\Rightarrow GitHub Actions

{ enables creation of repeatable VM-based test environments using ARM templates.

• To self-manage VM's and platform-as-a-service resource ,

\Rightarrow Azure DevTest lab

Azure DevOps offers set of development, testing & automation tools .

1) Azure Board

{ keep track of work tasks, timelines, issues, planning & much more .

Azure DevOps
(is free)

2) Azure Pipeline

{ Produce & test your software automatically & continuously

3) Azure Repos

• Store secure code for your app .
• Version control code .

4) Azure Test plans

Design tests of applications to implement automatically .

5) Azure artifacts

Share app & code library with other team inside & outside the organization

Microsoft Azure Security And Privacy Concepts

1) Azure Identity Service

- Authentication : act of proving who or what something is
- Authorization : granting correct level of access to a resource or service

Azure AD (Active Directory)

- foundation of authentication
- Single sign on and application integration

2) Azure Role Based Access Control (RBAC)

There will be different types of users requiring different access to Azure

RBAC working

- We have Roles , roles allow you to group together sets of permissions.
- We can make users or groups members of roles & members of given role gets all permission assigned to role.

3 built-in roles

- Owner : lets you manage everything including access to resources
- Contributor : Lets you manage everything except granting access to resources
- Reader : Lets you view everything but not make changes.

3) Azure Access & Governance tools

Governance tools

- a) Azure Tags :- Key / value pairs assigned to resources
Can be used to :- To enforce security requirements
 - to control cost
 - to deploy software
- b) Azure Policy :- It is collection of rules
 - each policy is assigned to scope such as azure subscription
 - Using it means that resources will remain compliant with corporate standards
- c) Initiatives :- are collection of policies
 - Initiatives are assigned to a scope such as resource group.
- d) Azure Blueprints :- Are way of orchestrating deployment of resource templates & artifacts
 - Maintain relationship with deployed resources
 - Blueprints include azure policy & initiatives as well as artifacts such as roles
- e) Azure Advisor Security assistance :-
 - integrates with Azure security center to provide security recommendation
 - It helps prevent, detect and respond to threats.

4) Securing Virtual Networks

Defense - in - depth

- 1) Physical security :- Managed by microsoft (protect datacenters)
- 2) Identity & access :- Managed by you using Azure AD
- 3) Perimeter :- Standard DDoS protection enabled by default
- 4) Network & application :- Network security groups, firewalls & gateways
- 5) Compute and data :- OS security, access control & encryption

• Network Security Group (NSG)

- Filters traffic
- Contains rules
- Each NSG can be linked to multiple resources
- NSG's are stateful (if allow inbound then outbound traffic is allowed itself)

→ Application Security group

- They allow us to define a service made up of resources like VM
- Allow us to reference group of resources
- easier to use & understand then NSG

5) Azure firewalls & user defined rules

- Azure managed stateful firewall service which protects virtual networks
 - Threat intelligence
 - network traffic filtering rules

Azure DDoS protection :- multilayer protection, attack analytics
Always on monitoring

Azure security options:-
1) Azure firewall 2) Azure DDoS protection
3) Azure web application firewall 4) Network security group
5) forced tunneling 6) Market Place devices

6) Azure Security & reporting tools

a) Azure Information Protection (AIP)

- AIP tool is used to classify documents & emails
- AIP applies label to documents like secret, top-secret
- Labeled docs can be protected accordingly.

3 security & reporting resources

- 1) Azure monitor: Collect & analyze metric info for azure & on-premises resources
- 2) Azure service health: Notify about azure services & planned maintenance
- 3) Azure advanced threat protection: Detect & investigate threat / attacks in Azure

Azure key vault :- 3gs use to protect secrets, secrets like certificate, pre-shared keys, password, connection strings etc.

Azure sentinel :- Cloud-native security information event management (SIEM) and security orchestration automated response (SOAR) solution.

A single soln for

- 1) collect data at cloud scale
- 2) Detect previously undetected threats
- 3) Investigate threats with AI
- 4) Respond to incidents rapidly

Azure Compliance & Data protection Standards

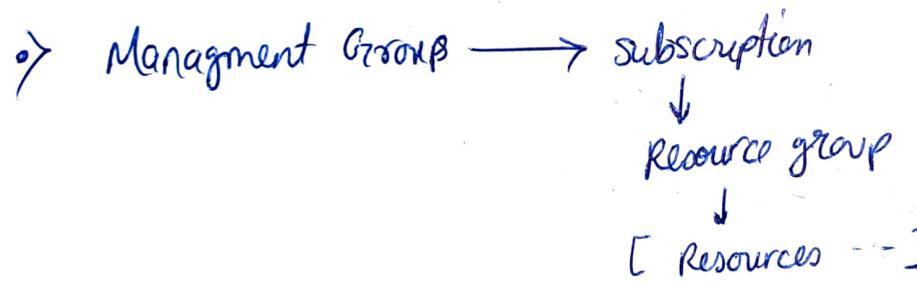
Selected compliance standards

- 1) HIPPA :- Health Insurance portability and accountability Act
- 2) PCI :- Payment Card Industry standard
- 3) GDPR :- General Data Protection Regulation (regulate data protection & privacy in European Union)
- 4) FedRAMP :- federal risk and authorization Management Program
- 5) ISO : International Org. of Standards (International standards across all industries)
- > NIST (National Institute of Standard and Technology) : Defines standard used by US govt. promotes and maintains measurement std. & guidance to help org. access risk focus purely on tech industry.

Azure Pricing & Support Options

Azure Subscriptions

Management Groups:- Allow you to apply governance conditions (access & policies) a level of scope above subscription .



- Subscriptions are top administrative container
- Management groups are a logical management construct across subscriptions

Azure Subscriptions

- 1) Free :- \$200 in azure credit to be used in 30 days , access to free services 12 months
- 2) Pay-as-you-go :- charge monthly on services used
- 3) Student :- \$100 in Azure credit to be used in 12 months , No credit card needed
- 4) Enterprise Agreement :- done with single agreement

factors affecting cost

- 1) Resource type
- 2) Location
- 3) Service
- 4) Egress traffic

2 pricing calculators

- 1) Azure pricing calculator
- 2) Total cost of ownership (TCO) calculator

Support plans

- 1) Basic
- 2) Developer
- 3) Standard
- 4) Professional
- 5) Premier Direct

SLA

- It is the commitment b/w service provider & its customer.
- for azure its most for availability & connectivity
- Resources and services which are in development stage or in beta version are shown in Azure preview section. This services not have SLA or support