WHIZLABS

Microsoft Azure Exam AZ-900 Certification WhizCard

Quick Bytes for you before the exam!

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Fundamentals of Cloud Computing

What is Cloud Computing?

Cloud computing transmits computer services via the Internet (**the cloud**) to enable faster innovation, more flexible resources, and scale economies. You typically only pay for the cloud services you use, which allows you to save money, better manage your infrastructure, and expand as your company develops.

On-premises vs. Cloud

If you wish to be on-premises, you must make significant upfront investments in servers, storage, security, and a place for a data center, among other things.

This is known as **CapEx**, which many businesses cannot afford in the first place. There are many additional drawbacks for on-premises, such as no scalability, no disaster recovery, and so on, which we will explore more.
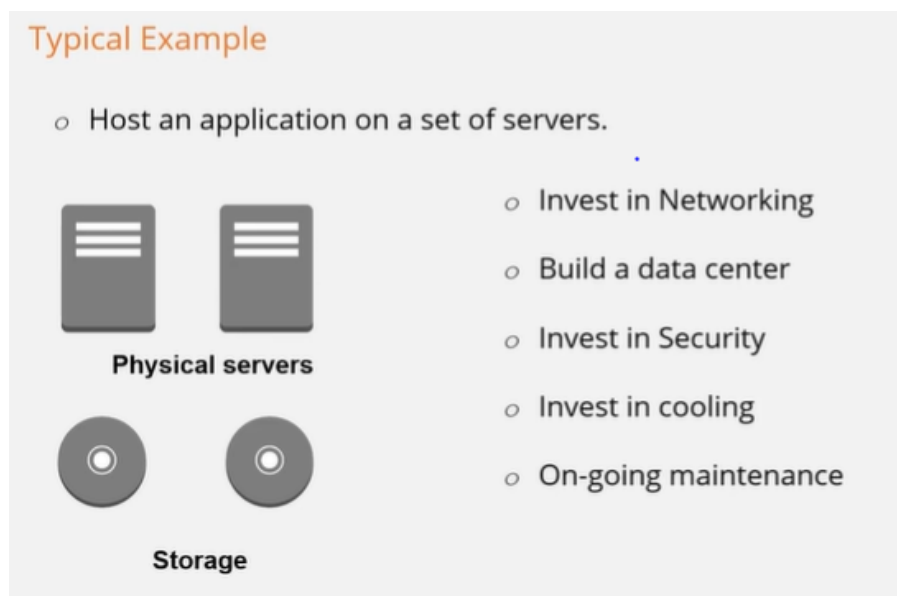
Reference: Whizlabs AZ-900 OC #4

Why Cloud?

The supply of computer services via the internet utilizing a **pay-as-you-go** pricing mechanism is known as cloud computing. You usually just pay for the cloud services you utilize, which allows you to do things like:

- Reduce your operational expenses.
- Improve the efficiency of your infrastructure.
- Scale up or down as your company's requirements vary.

To put it another way, cloud computing uses someone else's data center to rent computing power and storage.

You may handle cloud resources the same way you would your local data center's resources. You return them after you've finished using them. You are only charged for what you use. This is called **OpEx.**

You rent CPUs and storage when you need them rather than keeping them in your data center. The cloud provider maintains the underlying infrastructure for you. You may utilize the cloud to rapidly solve your most difficult business problems and provide cutting-edge solutions to your users.

CapEx vs. OpEx

Purpose	Assets intended to benefit the organization for more than one year	Ongoing expenses to run the day-to-day business
The way of purchasing	One-time purchase	Pay-as-you-go approach
Accounting treatment	CapEx can't be fully deducted in the accounting period. They are depreciated or amortized over time.	OpEx is fully deducted in the accounting period.
Examples	Purchasing office buildings, equipment, vehicles, intellectual property assets	Consumables, wages, rent, maintenance, and repair of machinery

Advantages of Cloud Computing

Scalability
Scalability is the process of allocating or deallocating resources.

Elasticity
Elasticity can be also termed as automatic scaling of the resources, i.e., the ability of the resources to scale dynamically.

Agility
It is the process of deallocating or allocating resources quickly. Generally, when it comes to On-premises, it may take many hours or days to allocate a new resource, but it's just a matter of minutes when it comes to the cloud.

Fault Tolerance

The capacity to stay operational during component and service failures is referred to as fault tolerance.

Disaster Recovery
Disaster Occurs when there is a natural catastrophe. So we have to duplicate the resources at various locations to be up and running even during times of catastrophe.

High Availability
It's the capacity to keep the resources accessible for a long time with minimal downtime. The greater the availability, the better it is.
Most of the resources in azure have high availability.

Cloud Computing
Reference: Microsoft Docs

Cloud models

There are three kinds of cloud models, namely :

Software as a service :
- With this service, you don't need to download or install any software on your PC.
- As with many cloud services, it can be accessed through the internet via a web browser.
- The cloud vendor manages everything. You simply need to concentrate on how you can get the most out of it.
- **Examples of SaaS:** *Office 365, Google docs, Google sheets, DropBox, etc.*
- **Users***: End Customers*

Platform as a service :
- It's a service that lets clients maintain and develop applications without worrying about the underlying infrastructure.

- In this service, the cloud vendor manages infrastructure, operating system, middleware, etc.
- **Example of PaaS**: *Heroku, Google App Engine, Azure Web Apps, OpenShift*
- **Users** - *Developers*

Infrastructure as a service :
- It's a service that provides key computation, storage, and networking resources on demand but in a virtual environment.
- The cloud vendor manages the infrastructure in this service, but the User itself manages the operating system, middleware, runtime, etc.
- **Examples of IaaS**: *DigitalOcean, AWS, Microsoft Azure, Azure Virtual Machines, Google Cloud Platform*
- **Users:** *System administrators*

IaaS vs. PaaS vs. SaaS

	IaaS	PaaS	SaaS
Who uses it	System administrators	Developers	End users
What users get	Virtual data center to store information and create platforms for services and app development, testing, and deployment	Virtual platform and tools to create, test and deploy apps and services	Web software and apps to complete business tasks
Provider controls	Servers Storage Networking Virtualization	Servers Storage Networking Virtualization os Middleware Runtime	Servers Storage Networking Virtualization os Middleware Runtime Applications Data
User controls	OS Middleware Runtime Applications Data	Applications Data	-

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Cloud Types

Types of Cloud Deployment Models are as follows:

Public Cloud

- In this kind of cloud, the whole infrastructure is situated at the cloud vendor aka the business that sells its services to the general public.
- In the case of the public cloud, we just need to go to the website of the relevant cloud provider and build or administer the resources.
- Others can use the resources that we previously utilized once we destroy them.

Examples:- Microsoft Azure, Amazon Web Services,

Private Cloud

- This type of cloud is similar to a public cloud, but the difference is that the infrastructure and requirements are reserved for just a single organization only.
- The resources are isolated and can't be used by other organizations.
- The cloud can be located on-premise as well.

Examples:- Azure stack, Amazon private cloud

Hybrid Cloud

This is a combination of public cloud and private cloud. This is much more complex than public or private clouds. In this type of cloud

- The public cloud is used for non-critical tasks.
- The private cloud is used to carry out critical tasks.

Fundamentals of Azure

What is Azure?

- Azure is one of the largest cloud service providers in the world.
- It offers you the flexibility to use your preferred tools and frameworks to *create, manage, and deploy apps on a large global network.*
- Azure's ever-expanding nature makes it one of the finest on the market, and it is also provided by one of the biggest and famous **MNCs** in Microsoft.
- Azure provides a wide range of services, *including computing resources, networking resources, serverless computing, and many more.*
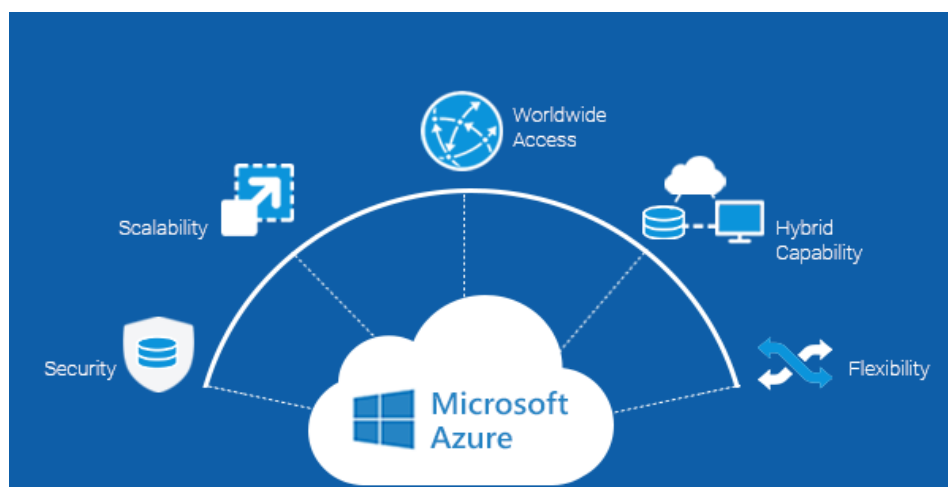
Reference:- Microsoft Docs

Azure Regions

- A region is a geographical location on the globe with at least one, but possibly many, data centers close by and connected by a **low-latency network**.
- When you create a resource in Azure, you must define the location/region to which it should belong. There are few exceptions, such as **Azure DNS**, but generally, all resources must be created with a location specified.
- Azure makes it simple to select the data center and regions appropriate for you and your clients, with more announced regions than any other cloud provider **(60+)**.

Azure Availability Zones

- Within an Azure region, availability zones are physically distinct data centers.
- Each availability zone comprises one or more data centers that are self-contained in terms of **power, cooling, and networking.**
- Availability zones are connected through **high-speed, private fiber-optic networks**.

- The goal of having more than one availability zone in a region is to allow data to be redundantly stored in more than one availability zone, ensuring that even if a data center fails, it does not affect our resources.

Azure Architecture for management of Resources

Azure Subscriptions
- As the name implies, a subscription is a logical entity that grants access to deploy and consume Azure resources.
- A resource may be anything from a virtual machine to a storage account or something that's related to networking.
- Almost anything in Azure can be utilized as a resource.
- A subscription is something that can be purchased and used for a certain amount of time. The same is true for Azure subscriptions.

Azure Management Groups
- A company may use Azure management groups to govern and *manage access, compliance, and rules* for their subscription inside their tenancy.
- An azure management group comes under the azure subscription in the hierarchy of management of resources in Azure.
- A subscription can only have one management group.

Azure Resource Group
- A resource group is a next level in the hierarchy of Azure Architecture. A resource group is the logical mapping of the resources.
- For Creating Any Resource, you need a resource group.
- An Azure Management group is optional. However, azure resource groups and subscriptions are required. **Resource groups can't be nested.**

Azure Resources
- A resource is something that is used to manage services in azure.
- At any one moment, a resource can only be in one resource group.
- The final component in the Azure architectural hierarchy is the **resource**.
- A resource group and a resource can be in two different locations; there is no restriction.

Most Important Resources in Azure

Azure Virtual Machines

Virtualization

- In general, virtualization refers to the process of simulating something.
- The technique of operating a virtual instance of a computer system in a layer separate from the real hardware is known as **virtualization**.
- It most often refers to the use of several operating systems on a computer system at the same time.
- So, if you have a Windows computer, you may run a Linux-based operating system in a Windows virtual machine by using technologies like **VMware,** which supports Virtualization.

Azure Virtual Machines (Infrastructure As A Service)

1. Azure Virtual Machines are an **IAAS** offering
2. **Azure Virtual Machine:**
   a. *Are cost-effective*
   b. *Multiple resources are created along with VM when created*
   c. *Users can choose amongst a variety of available configurations and OS as per the requirements.*

With regular use of a Linux operating system through virtualization, one must download software such as VMware and certain files linked to the Linux OS itself, but this is not the case for Azure Virtual Machines, which can be run in the cloud itself.

We don't need to download any hefty software since we can connect to the VM directly in many ways. Two of those ways are:-

- Using Remote Desktop Connection (RDP)
- Using Azure Bastion Service

A public IP address is assigned to the virtual machine for it to communicate with the internet.

It's important to know how virtual machines are created in azure. For that, please refer to the link given below.

[Quickstart - Create a Windows VM in the Azure portal - Azure Virtual Machines | Microsoft Docs](#)

Azure Virtual Networks

Azure Virtual Machines are hosted in an Azure Virtual Network. In Azure, you create your virtual network. If necessary, you may build several virtual networks in Azure. Each virtual network in azure needs to be assigned to an address space.
Example of an address space 15.0.0.0/16

Some called subnets have an address space that is a subset of the virtual network. As there can be many subsets for a set of numbers, there can be many subnets for a virtual network. You can spin up a virtual machine in a subnet, each machine launched in a subnet gets a private IP address. A private IP address facilitates inter-subnet communication.

Azure Storage Accounts

Azure Storage includes massively scalable object storage for data objects, a cloud file system, a messaging store for secure communications, and a NoSQL store. Azure Storage accounts are extremely durable and available.

Blob Storage

Blob Storage is useful for storing videos, images, large files, log files, etc. Blob storage stores things in the form of objects.
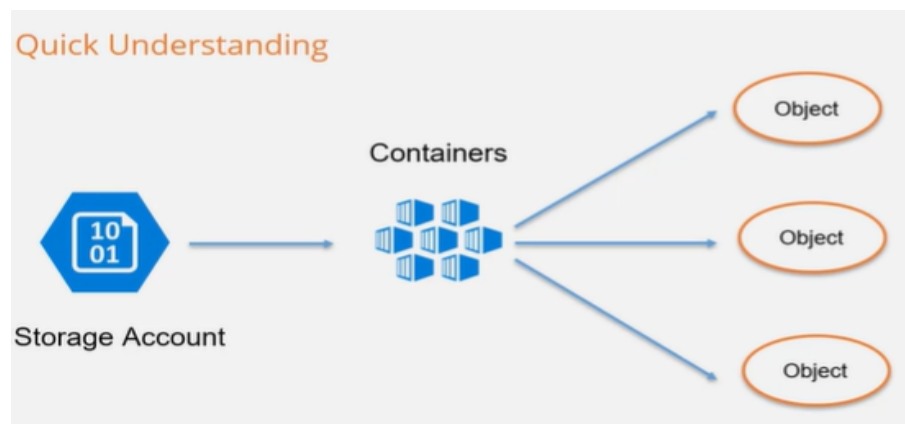
Reference: Whizlabs AZ-900 OC #27

There are three types of storage tiers available in blob storage.
Hot tier - frequently accessed.
Cold Tier - less frequently accessed.
Archive Tier - rarely accessed.

Table Storage

It is a low-cost method of storing table-like data for applications. This type of storage is a key- attribute storage and is most significantly utilized for NoSQL data.

File Storage

File Storage uses the **Server Message Block Protocol** to retrieve files. It can be used to mount file shares on Windows, Linux, and Mac machines.

Queue Storage

It is a messaging service offered by Azure. It is used to <mark>retrieve and save messages</mark>. A queue may <mark>hold millions of messages</mark>.

Storage Type	Example Usage
Table	No SQL Data
Queue	Retrieve and Save Messages
Blob	Images, Pdfs, etc
FIle	Mounting file shares on Various Operating Systems

Azure Database Services
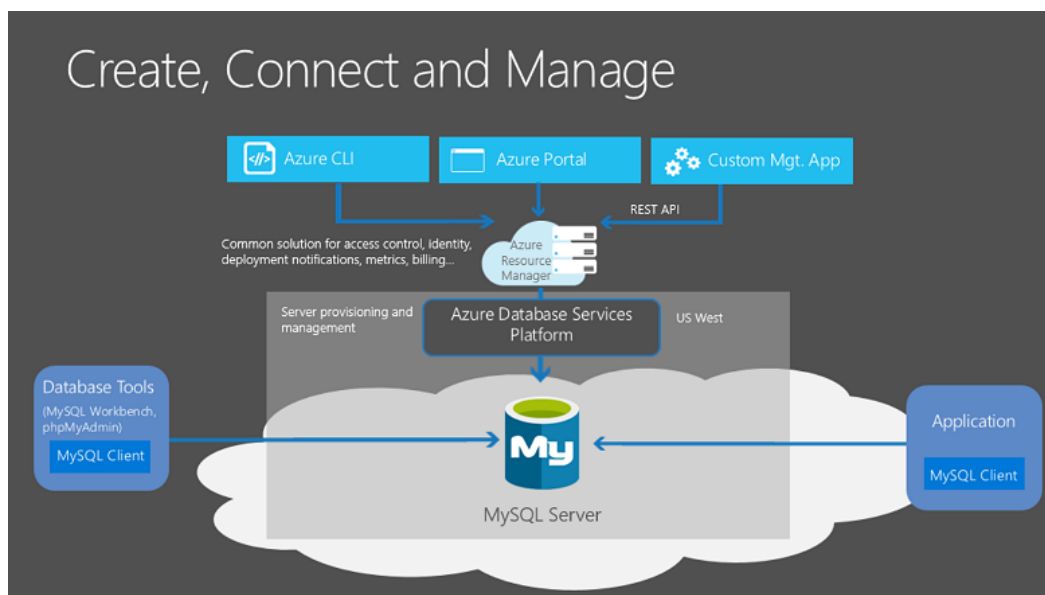
Reference: Microsoft Docs

In Azure, there are several Database services to choose from. They are as follows:

Azure Cosmos DB (Serverless Multi-Model Database)

We can achieve low-latency data access by using the **Azure Cosmos DB** service. It includes a capability that allows for data replication in real-time. It is automatically scalable. It also provides **99.999 %** read and write availability.

Azure SQL Database (PaaS)

Azure SQL Database provides us with **99.99%** availability. It has a built-in backup and recovery feature.

We can also host a SQL Server on a virtual machine, but it wouldn't remain PaaS.

Comparison
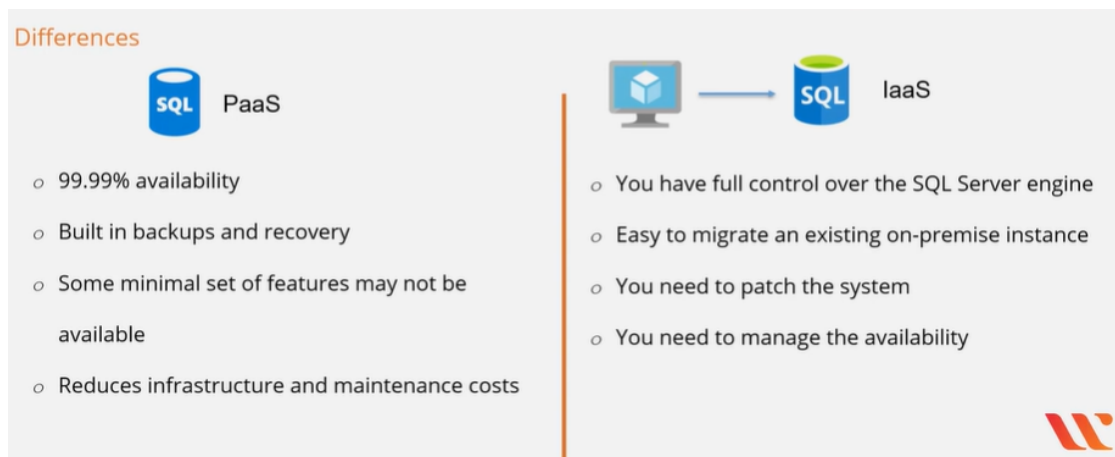
Reference:- Whizlabs Course AZ-900

Azure Database for MySQL(PaaS)

This is a MySQL Community Edition available in azure that comes in with high built-in availability as well as automated backups and restoration points.

Azure Database for PostgreSQL(PaaS)

This is a PostgreSQL Community Edition available in azure that comes in with high built-in availability as well as automated backups and restoration points.

SQL Managed Instance

In SQL Managed instances, the underlying database engine is almost 100 percent compatible with the newest SQL Server Enterprise Edition database engine, which is the primary advantage. This makes it simpler for businesses to migrate existing SQL Server workloads to Azure.

IF YOU WANT TO	USE THIS
Managed intelligent SQL in the cloud	Azure SQL Database
With a managed community MySQL database service, you can provide high availability and elastic scaling to open-source mobile and web apps, or you may transfer MySQL workloads to the cloud.	Azure Database for MySQL

On open-source PostgreSQL, create scalable, secure, and fully managed enterprise-ready apps, scale out single-node PostgreSQL for high performance, or move PostgreSQL and Oracle workloads to the cloud.	Azure Database for PostgreSQL
Build anywhere, at any scale, apps with assured low latency and high availability, or transfer Cassandra, MongoDB, and other NoSQL workloads to the cloud.	Azure Cosmos DB
SQL instance in the cloud that is managed and always up to date	Azure SQL Managed Instance

Core Solutions in Azure

Azure AI Services

Basics of AI and Machine Learning
- The replication of human intellect and skills by computer software is known as Artificial intelligence.
- Machine Learning is a subset of Artificial Intelligence in which a computer program is "*trained*" to draw inferences and make predictions from data.
- Building a machine learning model involves first training the model using our data, then packaging and verifying the model.
- If we are satisfied with the findings, we can deploy the model; if not, we can retrain the model until it achieves the efficiency and accuracy that we need.

Azure Machine Learning (PaaS)
Azure Machine Learning assists us by offering a collection of tools such as notebooks based on well-known languages such as **Python or R** and some visual tools that allow us to construct machine learning models using easy drag and drop right in the portal without installing any software. It includes a large number of pre-built datasets that we may use to test our machine learning models.

Features:
- **Azure Machine learning Pipelines** are used to coordinate *model training, deployment, and administration activities.*
- **Azure Bot Service** is a service that assists us with engaging chat experiences with humans through a Virtual Agent.
- There is also a service called **Azure Cognitive Services** that is being used to address a variety of issues, such as evaluating text for emotional sentiment or analyzing pictures for object or face recognition.

Azure Functions (Serverless)
Azure Functions is a serverless computing service that is available in azure. It supports a variety of development languages, such as C#, F#, Node.js, Java, or PHP.

Features:
- Like many of the Cloud Services, it uses a pay-as-you-go model. It is possible to connect it with a variety of Azure services. Charges are only incurred when a function is triggered, and also, Azure Functions scales automatically.
- We can execute the small pieces of code using Azure Functions without having to worry about the underlying infrastructure.

If you want to	Then
Build a web API	Using the HTTP trigger, create an endpoint for your web apps.
Build a serverless workflow	Utilizing durable functions, chain a sequence of functions together.
Respond to database changes	When a document is generated or modified in Cosmos DB, run custom logic.
Process data in real-time	Use SignalR and Functions to react to data in real-time.

Azure IoT

The term **Internet of Things** refers to any gadget with a sensor. A sensor receives analog data and converts it to a digital signal before transmitting it to a central server through an onboard network connection, such as a wifi radio.

IoTHub (PaaS)

It is a managed service accessible via the cloud that allows for two-way communication with your IoT devices. Telemetry data could well be routed via it. **IoTHub** allows you to manage IoT devices by provisioning them and updating them.

IoT Central (SaaS)

It's a cloud-hosted management IoT application platform for companies that want to govern the devices, data coming out of their IoT devices, and building an entire application for that rather than simply getting raw telemetry data.
To help developers build an application, IoT central has built-in templates grouped by a specific industry. It can also be used to create an application from scratch using Solution Accelerators.
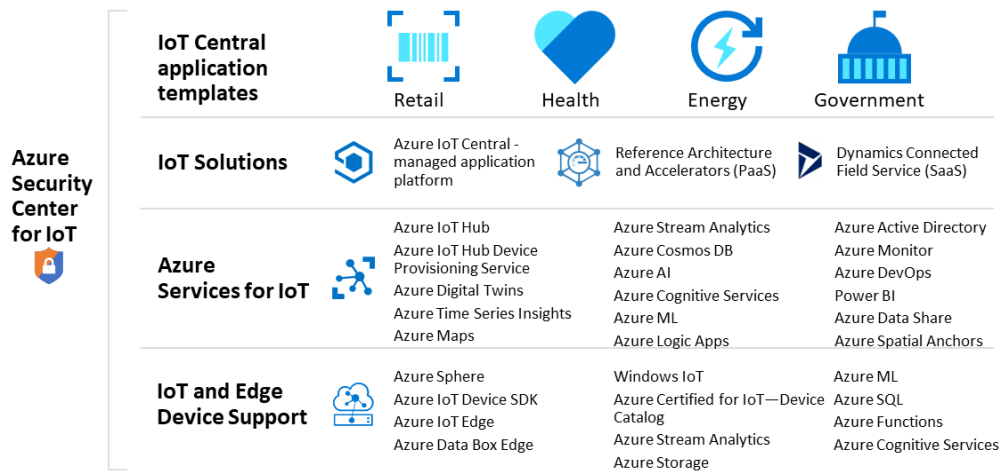
Azure Sphere

It is used for developing very secure end-to-end IoT Solutions. It's a big step forward in the standardization of IoT devices.
The things that Azure Sphere deliver are:-
- *Azure Sphere OS based on Linux*
- *Azure Sphere certified chips*
- *Azure Security Service trusted device-to-cloud communication*

Azure IoT technologies, services, and solutions

IoT Central application templates	Retail	Health	Energy	Government
IoT Solutions	Azure IoT Central - managed application platform	Reference Architecture and Accelerators (PaaS)	Dynamics Connected Field Service (SaaS)	
Azure Services for IoT	Azure IoT Hub Azure IoT Hub Device Provisioning Service Azure Digital Twins Azure Time Series Insights Azure Maps	Azure Stream Analytics Azure Cosmos DB Azure AI Azure Cognitive Services Azure ML Azure Logic Apps	Azure Active Directory Azure Monitor Azure DevOps Power BI Azure Data Share Azure Spatial Anchors	
IoT and Edge Device Support	Azure Sphere Azure IoT Device SDK Azure IoT Edge Azure Data Box Edge	Windows IoT Azure Certified for IoT—Device Catalog Azure Stream Analytics Azure Storage	Azure ML Azure SQL Azure Functions Azure Cognitive Services	

Azure Security Center for IoT

Reference:- Microsoft Docs

Azure DevOps

Azure DevOps is just an umbrella service for a plethora of different development services. The various kinds of Azure DevOps Services are mentioned below.

Azure Boards

It used to Deliver value to your users more quickly by using tried-and-true agile technologies to plan, monitor, and discuss work across your teams.

Azure Repos

It is a version control management tool available in azure. It supports both TVS and Git

Azure Pipelines

Azure Pipelines is a **continuous integration (CI) and continuous delivery (CD)** solution with a lot of features. It integrates with your chosen Git provider and can be deployed to several big cloud providers, including Azure.

Azure Test Plans

This is a great tool for testers who are having difficulty communicating to developers on what sort of issues they have with their product.
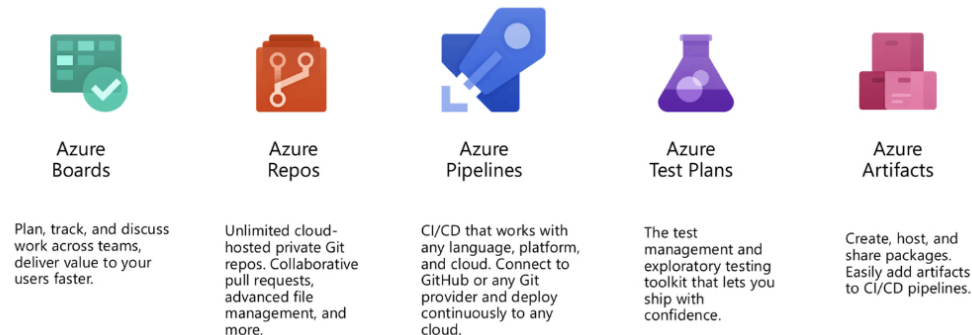
Azure Artifact

This is a private package manager tool available in azure.

Azure DevTest Labs

This tool is used to create a dev-test environment for your developers.

Reference:- Microsoft Docs

BigData and Analytics On Azure

Azure SQL Data Warehouse

It is an enterprise data warehouse that is used to storing petabytes of data. It is used for performing query analysis. In this, the data is stored in such a way that it improves the query performance.

Azure HDInsight

Azure HDInsight is a fully managed, highly available open-source analytics service. It can be used to run infamous frameworks like *Hadoop, Apache Spark, Apache Hive, etc*

Azure Data Lake Analytics

Azure Data Lake Analytics allows you to run queries on terabytes or petabytes of data. It uses a special kind of query language called **U-SQL**.

Azure Synapse Analytics Service

This is an analytics service used to build an enterprise data warehouse and big data analytics solution.

Azure Data Bricks

This is an Analytics service that is based on only Apache Spark. Using Azure Data Bricks, you can create fully managed, dynamically auto-scalable **Apache Spark clusters.**

IF YOU WANT..	USE THIS
With unmatched speed to insight, our analytics service is limitless.	Azure Synapse Analytics

|	
An Azure-optimized Apache R Spark-based analytics platform that is completely managed, quick, simple, and collaborative.	Azure Databricks
For your organization, a fully managed cloud Hadoop and Spark service with a 99.9% SLA.	HDInsight
An orchestration and automation solution for data transportation and transformation.	Azure Data Factory
An enterprise-grade on-demand pay-per-job analytics solution with fully managed security, audits, and support.	Data Lake Analytics
A telemetry ingestion service that gathers, processes, and stores millions of events at a hyper-scale.	Event Hubs

Management Tools in Azure

Azure Monitor

Azure Monitor is a tool that helps you improve the performance and availability of your apps and services. It provides a complete solution for *obtaining, evaluating,* and responding on telemetry from your cloud as well as on-premise platforms.

- Metrics and Logs are the two main diagnostic data that can be seen with the assistance of Azure Monitor.
- You can identify your issues with the help of these diagnostic data
- One can create alerts as well in azure based on the metrics and logs
- A blade called service health allows you to monitor the health of deployed resources and generate alerts based on the health.

Here's a visual representation of how an Azure monitor works.
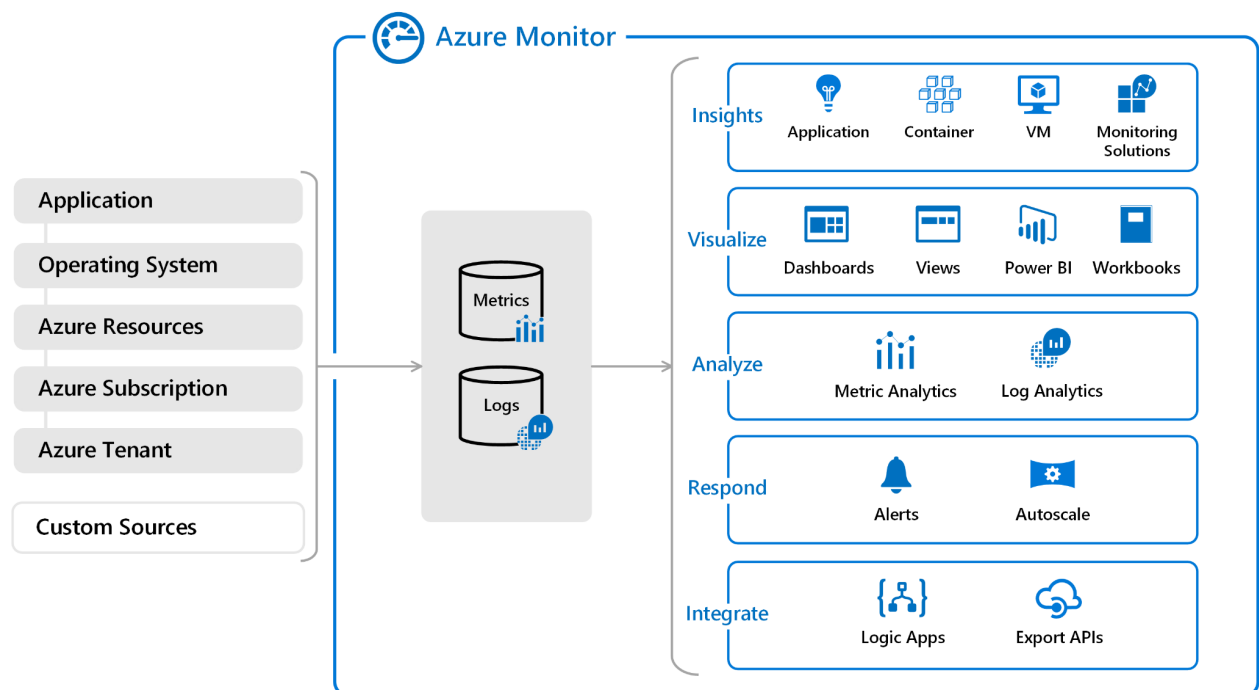
Reference:- Microsoft Docs

Azure Advisor

- Azure Advisor is a recommendation tool that provides suggestions by using some algorithms on four key aspects for resources hosted in Azure, namely: *high availability, security, performance, and cost.*
- It's better to follow these recommendations as it is very beneficial to maintain the health of the resources and the cost deduction.

Azure PowerShell, CLI, and CloudShell

- **Azure Powershell** is a module that Microsoft created to manage Azure resources via the PowerShell command line. It's mostly used for automation and is very easy to learn.
- **Azure CLI** is another command-line interface designed to manage Azure Resources. It's created based on python. It is also mostly used for automation.
- Another command-line interface is the **Azure Cloud Shell,** which is accessible straight from the Azure portal. You do not need to download any modules since you would access them straight from the site by creating a storage account.

Security features in Azure

Azure Security Center

- Azure Security Center is a monitoring service that provides threat protection across all your azure on-premises services.
- Based on your setup, resources, and networks, it can make security recommendations.
- Security Center can keep track of security settings across on-premises, cloud, and hybrid workloads and apply required security to new services as they go live.
- It also runs automated security evaluations to detect possible vulnerabilities before they are exploited.

Azure Sentinel

Azure Sentinel is a Combination of **SIEM and SOAR**
- SIEM stands for *Security Information and Event Management*
- SOAR stands for *Security Orchestration, Automation, and Response*

It is a unified platform for threat *visibility, Proactive threat hunting, Threat Response, and Security Alert Detection.*

Azure Sentinel is more powerful than the Azure Security center because it is used for real-time threat intelligence.

Azure DDoS Protection

An effort by a malign party to interrupt regular traffic on a website by flooding it with huge quantities of false traffic is called a **DDoS** Attack. Azure offers two types of DDoS protection. They are:
- **DDoS Protection Basic**: It is already built-in to all the Azure services. It's completely free.
- **DDoS Protection Standard**: Use the Standard tier if the attacks on your application are sophisticated. It costs approximately **$3000** each month. It provides SLAs for Application and Cost Protection.

Azure Key Vaults

- Azure Key Vault is a cloud service for storing and safely accessing secrets.
- It is used for *key management, secret management, certificate management, and storing secrets supported by hardware models.*
- Azure Key Vault can centralize application secrets, monitor access and use, and simplifies resource management.

![Whizlabs logo]

Azure NSG

- Its purpose is to use certain rules to filter traffic to and from Azure resources in a Virtual Network.

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓	
Inbound Security Rules							
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✅ Allow	🗑
65001	AllowAzureLoadBalancer...	Any	Any	AzureLoadBalancer	Any	✅ Allow	🗑
65500	DenyAllInBound	Any	Any	Any	Any	❌ Deny	🗑
Outbound Security Rules							
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	✅ Allow	🗑
65001	AllowInternetOutBound	Any	Any	Any	Internet	✅ Allow	🗑
65500	DenyAllOutBound	Any	Any	Any	Any	❌ Deny	🗑

- The above picture shows the default rules that are present in the Network Security Group.
- We can manually create our own inbound and outbound port rules to deny or allow the traffic into the azure resources.

Azure Firewall

- This is a fully managed and automatically scalable cloud-based network security service that can be used to protect the resources in an Azure Virtual Network.
- This service allows you to define and enforce policies for application and network connection.
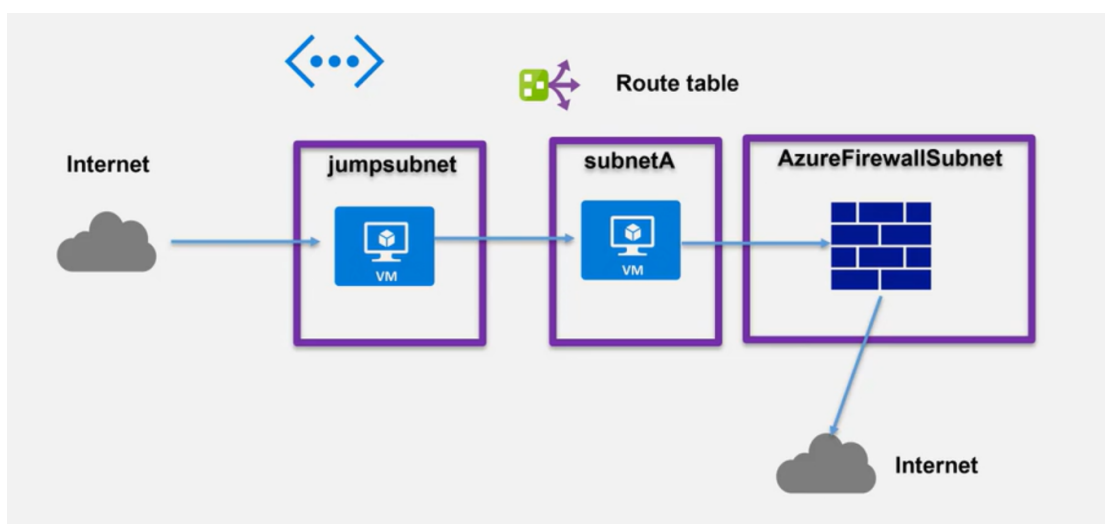
Reference:- Whizlabs AZ-900 Course

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Azure Identity and Governance

Azure Active Directory

- Azure AD is a cloud-based Tenant Identity Management Service by Microsoft that is extremely scalable and distributed globally through the Azure Cloud.
- Essentially, it's a **multi-tenant cloud service**, which means it resides in the cloud and has tenants as part of it.
- In the universe of Azure AD, each tenant is a separate entity.
- Azure AD is unique in that it provides a single Identity Solution for all Microsoft Cloud services, including *Office365, Intune,* and others.
- There are two major services in Azure AD. Identity and Access Management Services are what they're called.
- When compared to any other Active Directory, Azure utilizes a completely different kind of authentication called **OAuth**.

Multi-Factor Authentication

Multi-Factor Authentication employs two or more factors to provide access to the accounts you are attempting to access.

MFA employs two, and in some cases three, components. They're

- *Something you are aware of*
- *Something you possess*
- *Something You are*

To make any modifications to the MFA of the users in Azure, you must be a Global Administrator. A global Administrator is regarded as having the greatest level of privilege. A global administrator can enable the **MFA** in the security blade of the Azure Active Directory.

Azure Managed Identity

Azure Managed Identities are of two types.

System Assigned Managed Identity

It provides a mechanism for the service to have an identity instead of an end-user in the Azure Active Directory. In this case, the identity is tightly coupled to the azure resource.

This kind of Identity has two main Advantages. They are:

- **Automatic Credential Rotation**
- **Identity lifecycle Management**

User Assigned Managed Identity

- We utilize this kind of Identity when we have numerous resources that all share the same target resource.

- In this instance, it generates an identity independent of the Azure resource's lifetime and when new Azure resources are set up for the application.
- We just assign the identity to a new resource that's created. It is loosely coupled with the azure resource.

Azure RBAC and Authentication

- Azure Role-based Access Control is a mechanism to provide access to resources.
- You can provide access at different scope levels like a resource group level or a subscription level etc.
- There are many built-in roles available to provide a certain type of access to the user.
- The different types of Inbuilt roles that are available Owner, Contributor, Reader, etc
- Different roles have different kinds of abilities on the specific scope given to them.

For further details, please see this Microsoft documentation.
Azure built-in roles - Azure RBAC | Microsoft Docs

Azure Locks and Policies

Azure Locks

Azure locks allow you to guarantee that a resource isn't inadvertently destroyed or changed. Locks may be set at several scope levels, such as resource group or subscription level.
In Azure, there are two kinds of locks available:

- **CanNotDelete:** If this kind of lock is applied, the user will be unable to delete a resource but will view and change it.
- **ReadOnly:** If this kind of lock is applied, the user cannot change or delete a resource but may read it.

Azure Policies

- Azure policies are intended to help with resource control, Compliance, Cost Management, security, etc.
- Basically, With policy definitions that impose rules and consequences for your resources, Azure Policy assists you in managing and preventing IT problems.
- There are many inbuilt policies; if needed, we can create our own custom policy.

Examples of policies include:-

- Only virtual machines of this particular **SKU** should be created.
- Every resource should have a tag.

Azure BluePrints

- A blueprint is a step-by-step guide, design, or pattern for creating something.
- Azure blueprint is the declarative way to orchestrate the deployment of various resource templates and some other artifacts.

- Azure Blueprint Artifacts are something that can be used to build the blueprints.

Azure Blueprint Artifacts are composed of four different things. They are:
- *ARM Templates*
- *Resource Groups*
- *Azure RBAC*
- *Azure policies*

They can help you save some time and help to deploy resources quickly and efficiently.

Azure Cost Management

Azure Pricing

- Businesses that subscribe to Azure may pick and choose which services and capabilities to employ on an a la carte basis.
- Each service has its pricing structure, and many are charged according to the service tier required and used.
- There are many ways to save costs in Azure, such as using **Azure Reservations, Budgets,** and so on.
- If your resource is intended for long-term use, Azure Reservations will save you approximately **70%** of what you would spend for a **pay-as-you-go** subscription.

Azure Budgets

- Azure Budgets is a tool that enables you to establish spending limits in Azure.
- We may configure it to several scopes, such as **Subscription level, Resource Group level**, and so on.
- Once we have established the threshold, budgets will notify you when your expenditure is nearing the limit, allowing you to take appropriate action.
- Budgets have the potential to automate in reaction to you reaching certain criteria. **For example**, if you exceed a certain threshold number, you may implement a policy that shuts down these virtual machines.

Azure Reservations & Spot Instances

Azure Reservations

- Azure Reservation is a long-term contract for a variety of Azure services.
- Essentially, you pay the money monthly or in full upfront, but you make almost a **70% profit compared to pay-as-you-go pricing.**
- It's good for businesses that have similar usage patterns most of the time.

Azure Spot Instances

- These make use of Microsoft's leftover Compute Capacity.
- We can save almost 90% compared to pay-as-you-go pricing, but you must only utilize spot instances for periodic workloads that are mostly stateless.
- This implies that we have to use them only when there are no issues if the task is stopped in the middle.
- We should not utilize an Azure Spot instance for a production-based environment.

Azure Pricing Calculator

- An azure price calculator is a tool that can be used to assist us in understanding the costs of Azure services and features. It simply calculates the cost of Azure Services.
- You choose the resources to utilize in Azure Pricing Calculator. You modify the service settings, and, finally, you examine the expenses.

You can go through the below website to know more about Azure PCO.

Pricing Calculator | Microsoft Azure

Azure TCO Calculator

- The **Azure TCO calculator** calculates the cost reductions that could be obtained by moving your workloads to Azure.
- It produces a comprehensive PDF report on the savings by moving to Azure.
- It is your responsibility to change all of the factors in it, such as the number of virtual machines you use, the price tier you choose for the **web apps**, and so on.

Azure Service level Agreements

- Microsoft's commitment to an Azure Service or Product is defined as SLAs. Individual service level agreements (SLAs) are offered for each Azure product and service.
- The **service level agreement (SLA)** specifies what happens if a service or product fails to fulfill the specified availability obligations.
- Performance targets are expressed as uptime and connectivity guarantees.
- The performance goals vary from **99.9% (three nines) to 99.99%. (four nines)**.
- If a service fails to fulfill the promises, you may be entitled to a refund of a portion of your monthly subscription costs.
- When 2 services are integrated and utilized, Azure employs a technique called **composite SLA.**
- *Composite SLA = SLA of service 1 * SLA of service 2*

Azure Service Lifecycle

Every service in Azure follows its own service lifecycle. Almost all the services in azure have three stages.

Private Preview: These services are only available for specific types of customers.

Public Preview: All clients have access to these services. This kind of service is not completely finished, implying that it is unsuitable for production stages; furthermore, the service under public preview doesn't have SLAs.

General Availability: These services are accessible to the whole community, support SLAs, and are appropriate for production environments.