Certification Enablement Workshop -AWS Cloud Practitioner

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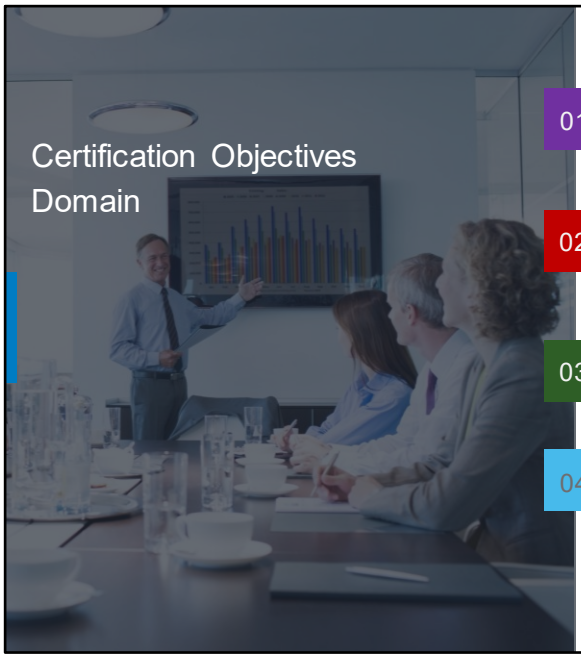
Pre-read and Objectives for the Workshop

Pre-read

- An understanding of AWS Cloud Concepts
- Basic understanding of security and compliance within AWS Cloud
- Ability to distinguish AWS Core Services.
- Knowledge of economics of AWS Cloud

Objectives for the Workshop

- Ability to understand value of AWS Cloud
- Knowledge of AWS Shared Responsibility Model
- An understanding of best practices related to security
- Ability to identify AWS services for common use cases
- An understanding of AWS core services including compute, database, network and storage
- Knowledge on AWS economics, cloud costs and billing practices.



Certification Objectives Domain

01

Cloud Concepts-26%

Defining the AWS Cloud and its value proposition, identifying aspects of AWS Cloud Economics, understanding different cloud architecture design principle

02

Security and Compliance-25%

Defining AWS Shared Responsibility model, defining AWS cloud security and compliance concepts, identifying AWS access management capabilities, identifying different resources for security support

03

Technology-33%

Defining methods of deploying and operating in AWS Cloud, defining the AWS global infrastructure, identifying core AWS services, identifying resources for technology support

04

Billing and pricing-16%

Comparing various pricing model for AWS, recognizing various account structures in relation to AWS billing and pricing, identifying resources available for billing support

3. Technology

3.1 Define methods of deploying and operating in the AWS Cloud
3.2 Define the AWS global infrastructure
3.3 Identify the core AWS services
3.4 Identify resources for technology support

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3.1 Define methods of deploying and operating in the AWS Cloud

- Identify at a high-level different ways of provisioning and operating in the AWS cloud.
- Identify different types of cloud deployment models.
- Identify connectivity options.

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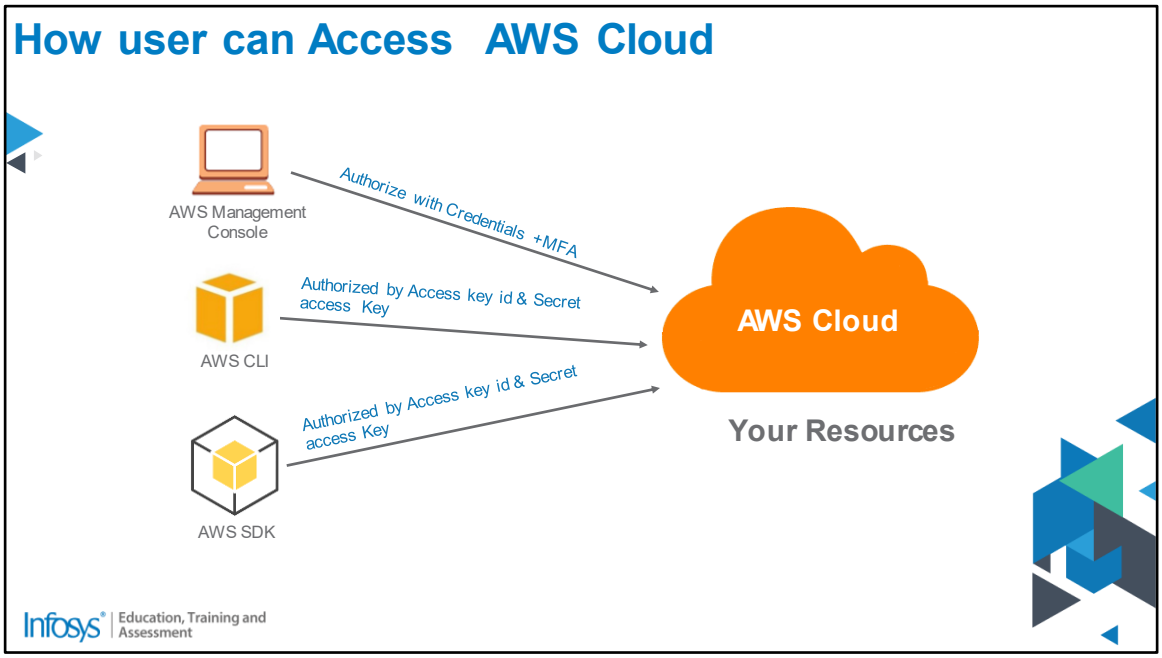
Welcome to video on different methods of deploying and operating in the AWS cloud



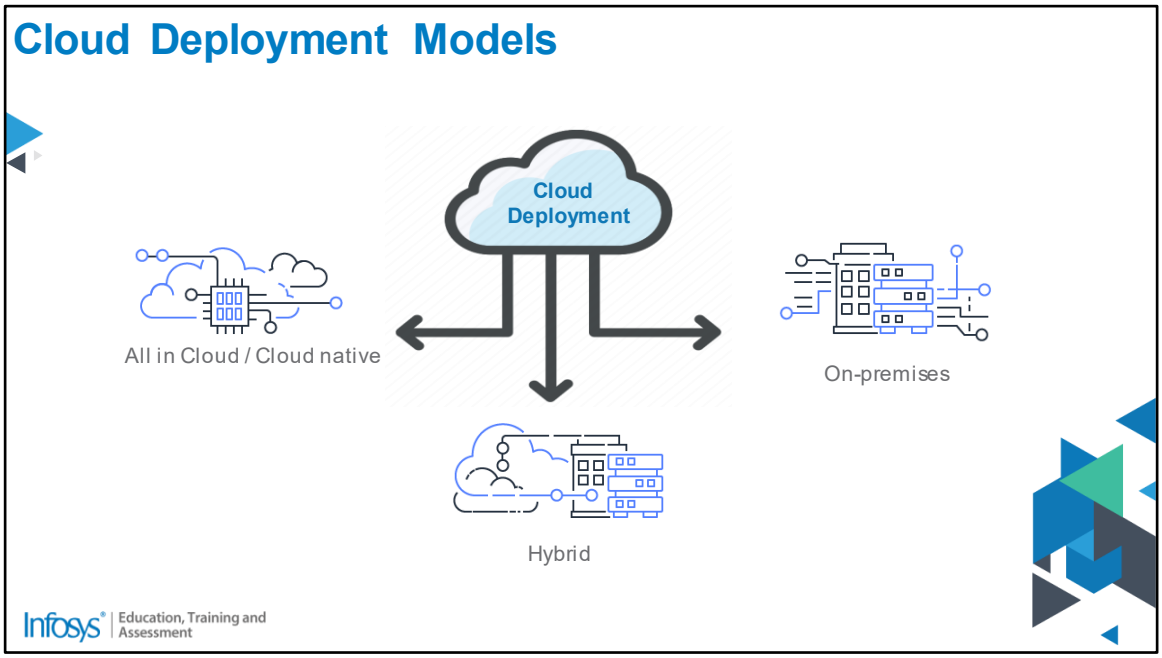
AWS Management Console is a web application helps you to manage all the AWS resources. It is a single place to access the information you need to perform your AWS related tasks and has an option to protected by two level authorization, first level is username and password and MFA as second level authorization.

The AWS CLI (Command Line Interface) is used to manage your AWS services using commands in your command-line shell. It is authorized by Access key and Secret key, that you can download through

My Security credentials in AWS IAM services

AWS SDK (Software development kit) it is a set of language specific API enables you to access and manage AWS services programmatically it supports various programming languages like JavaScript, python, php, .net, java, ruby etc..) and it is also authorized by Access key and secret key.

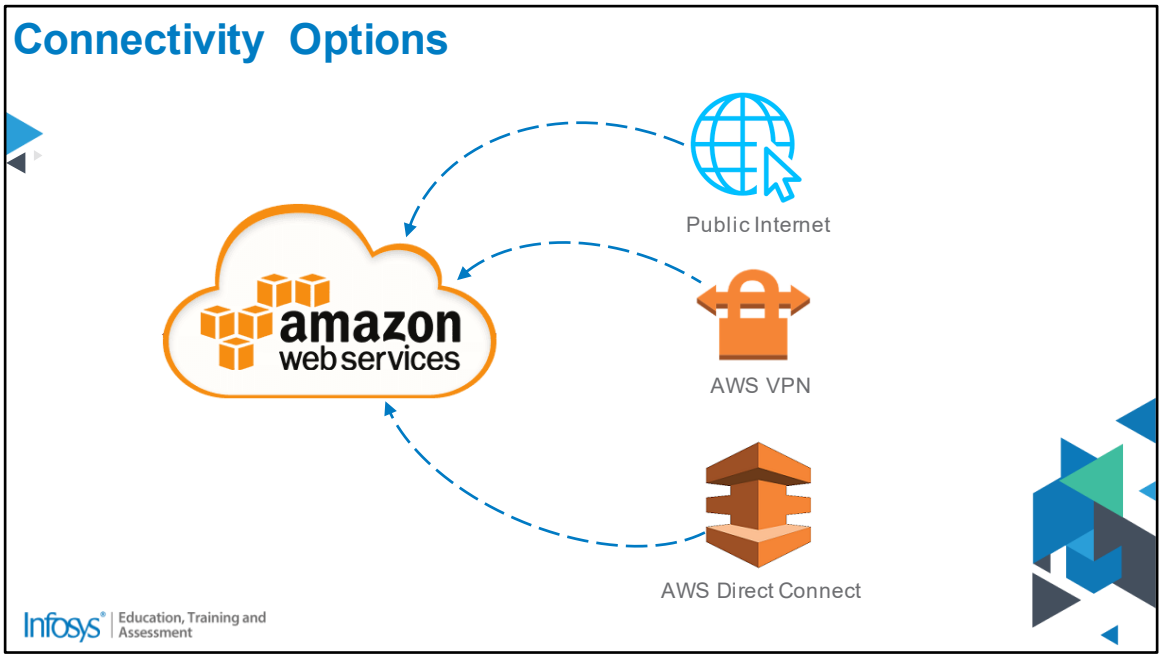
AWS Management Console | CLI | SDK | AWS API



All in Cloud or Cloud native Deployment means Cloud based application is completely deployed in cloud and all parts of the application run in the cloud. User Application would be created in the cloud or been migrated from an existing infrastructure to utilize the benefits of the cloud.

Hybrid Deployment is a method to combine on-premises infrastructure with cloud-based infrastructure. It is considered by organizations which are invested on on-premises and want to use AWS resources as well.

On-Premises deployment is deploying resources using your own on-premises infrastructure using virtualization and resource management tools is also called as “Private Cloud”



AWS Virtual Private Network used to establish a secure connection between your on-premises networks and AWS global network using AWS VPN. Using AWS VPN, you can securely connect from remote offices, client devices also to AWS global network

AWS Direct Connect creates a dedicated network connection to AWS global network. It is the fastest was to access your AWS resources and moreover your data traffic remains in AWS network while in transit and it never touches public internet. AWS

direct connect is available at various location in the world to make connection.

AWS is publicly available in internet under aws.amazon.com and you can straight-away connect to AWS global network from any computer is access to a public internet.

3.2 Define the AWS global infrastructure

- Describe the relationships among Regions, Availability Zones, and Edge Locations.
- Describe how to achieve high availability through the use of multiple Availability Zones.
- Describe when to consider the use of multiple AWS Regions.
- Describe at a high level the benefits of Edge Locations.

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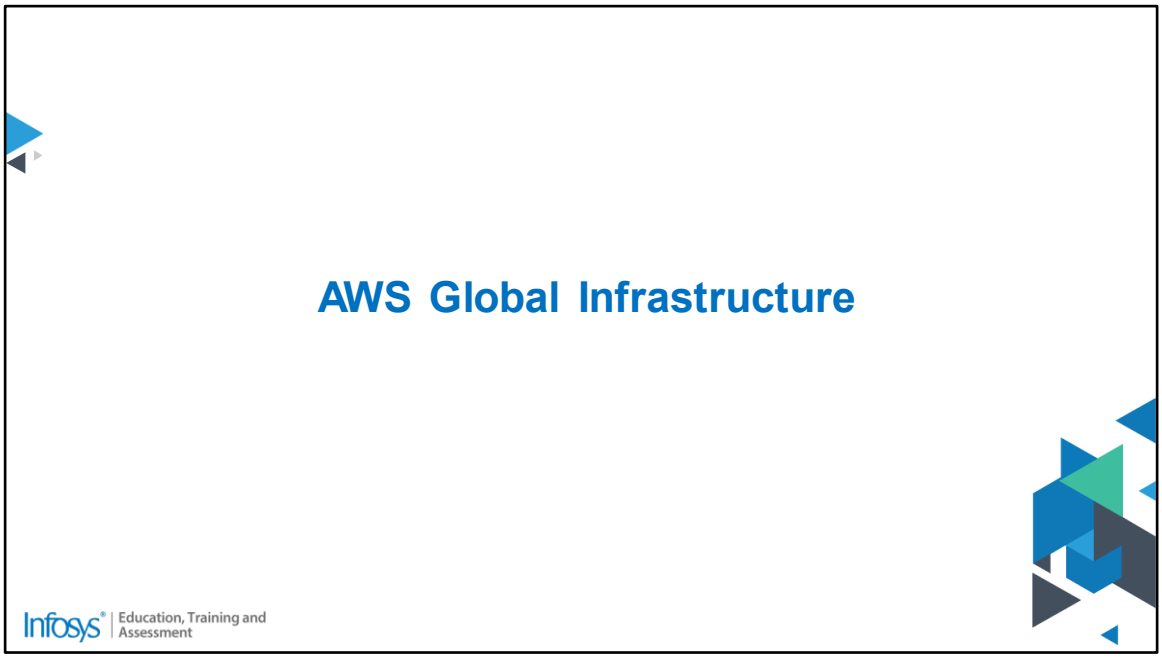
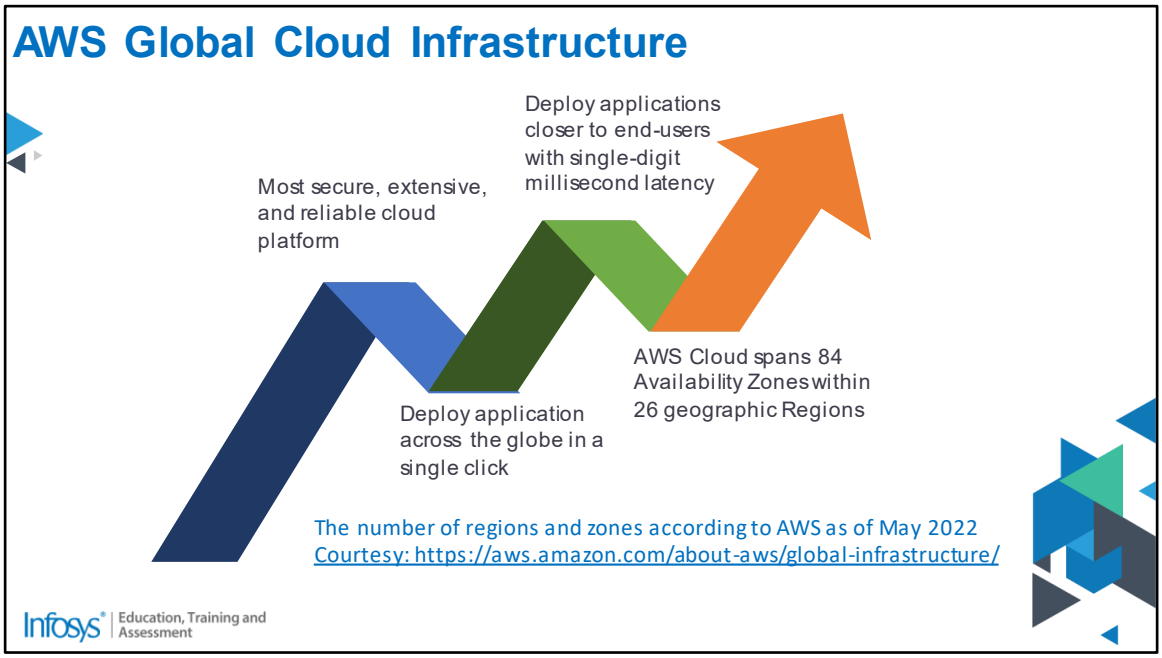


Welcome to the video on AWS global Infrastructure

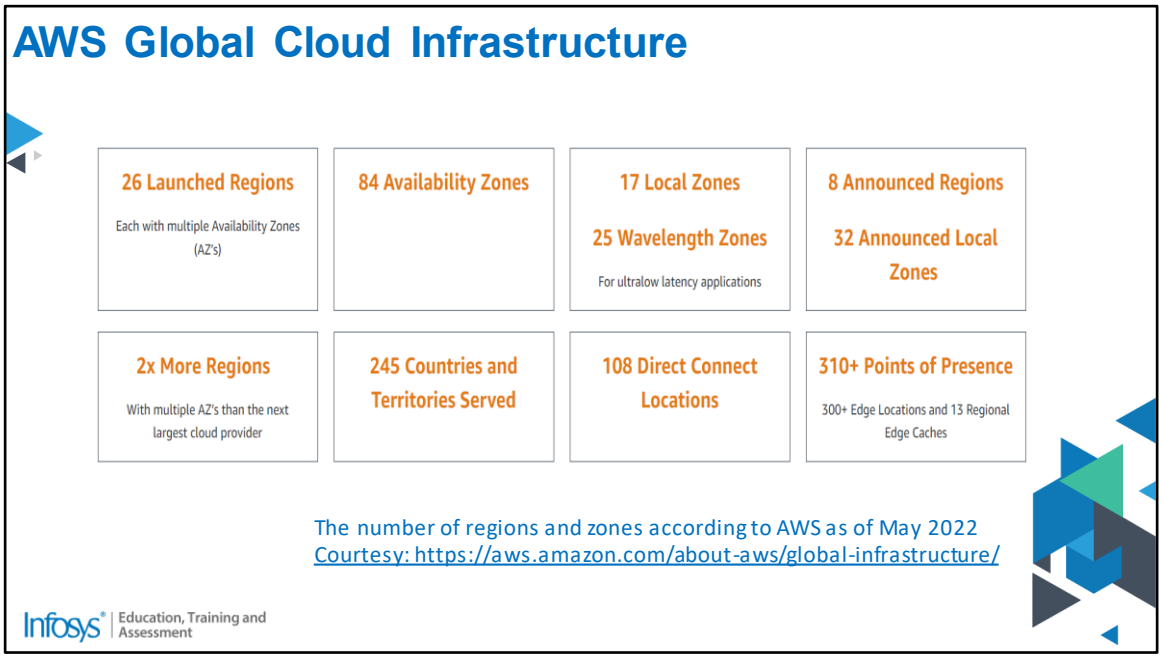


The AWS Global Cloud Infrastructure is popular cloud platform and it is the most secure, extensive, and reliable platform. It offers many featured services from various data centers around the global.

AWS offers you the cloud infrastructure at any place and any time you need it. Using AWS, you can deploy your application workload in a single click or if you want to build and deploy applications closer to your users with less latency.

As of Feb 2022, the AWS Cloud has 26 Regions and 84 Availability Zones around the world. AWS announced plans for 24 more Availability Zones and 8 more AWS Regions.

https://aws.amazon.com/about-aws/global-infrastructure/



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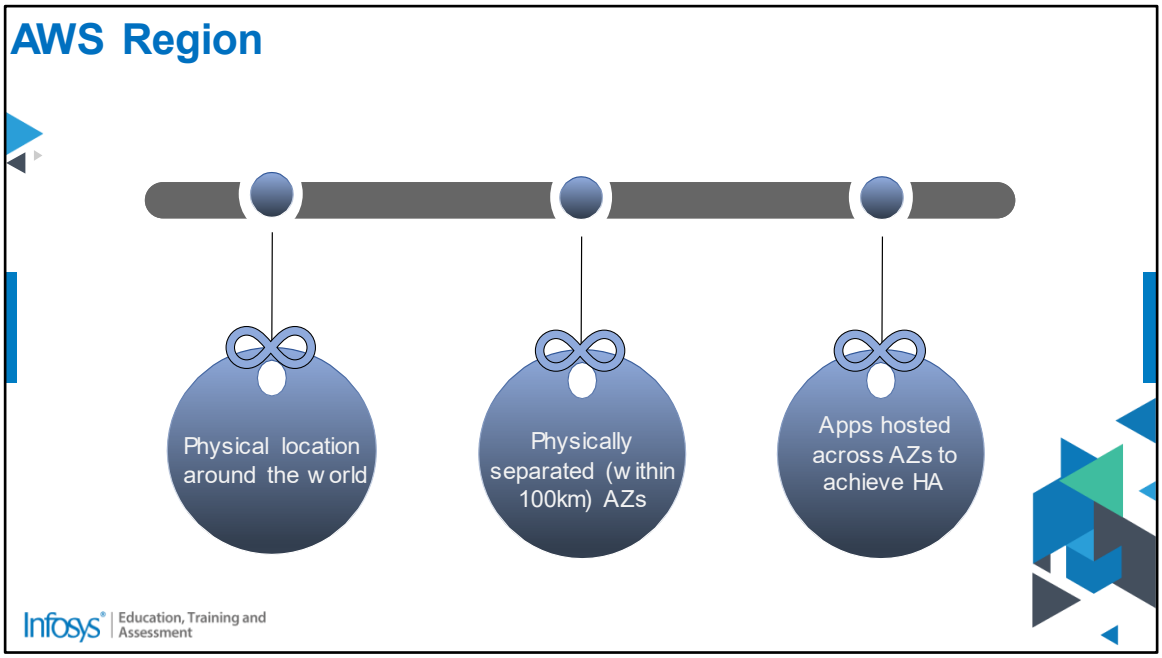

AWS Region – It is a physical location around the world where we cluster data centers.
Each AWS Region has multiple Availability Zones (AZ) and these Availability Zones are isolated and physically separated within the Region.

AWS customers can design their application to run more than one AZs to achieve high availability and greater fault-tolerance. It is AWS responsibility to maintain all AWS Regions has highest levels of security, compliance, and data protection.

https://aws.amazon.com/about-aws/global-

infrastructure/regions_az/?p=ngi&loc=2

Availability Zone (AZ)

One or more discrete data centers

Operate production applications and databases that are
- Highly available **(HA)**
- Fault tolerant
- Scalable

All AZs in an AWS Region are interconnected

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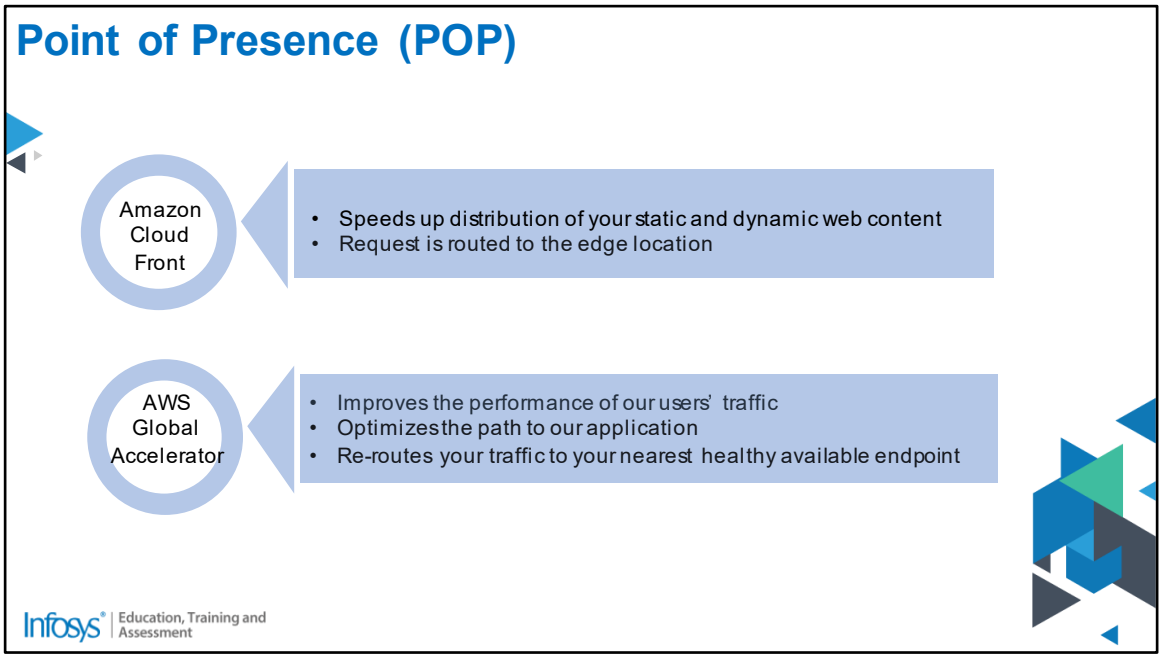
An Availability Zone (AZ) is one or more distinct data centers with multiple power source, networking, and connectivity.

AZs provides customer to operate production applications and databases with highly available, greater fault tolerant, and high scalable than a single data center.

All AZs are interconnected with dedicated fiber optics cable to provide high-bandwidth, low-latency and high-throughput networking between AZs.

https://aws.amazon.com/about-aws/global-infrastructure/regions_az/?p=ngi&loc=2

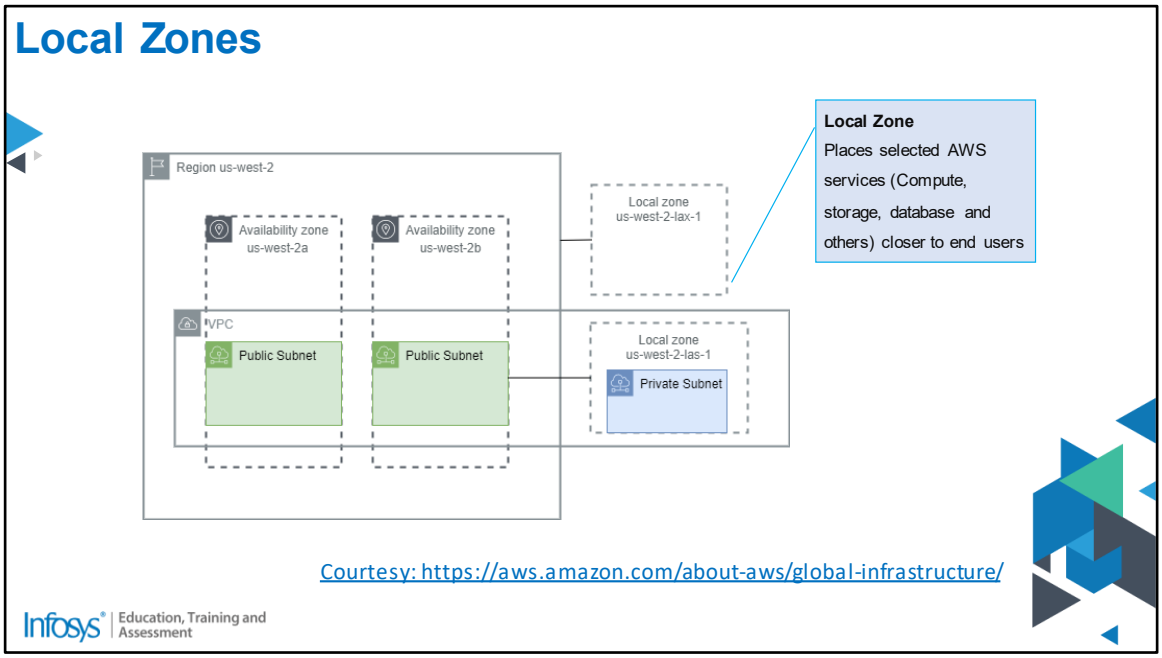


Edge location

A site that CloudFront uses to cache copies of your content for faster delivery to users at any location.

Amazon CloudFront is a web service that speeds up distribution of your static and dynamic web content to your users. CloudFront uses Edge locations to delivers your content worldwide with best possible performance and lowest latency. For example, when a user requests a content, CloudFront routed the request to the edge location and the content is delivered at once since these edge locations are available near to the user.

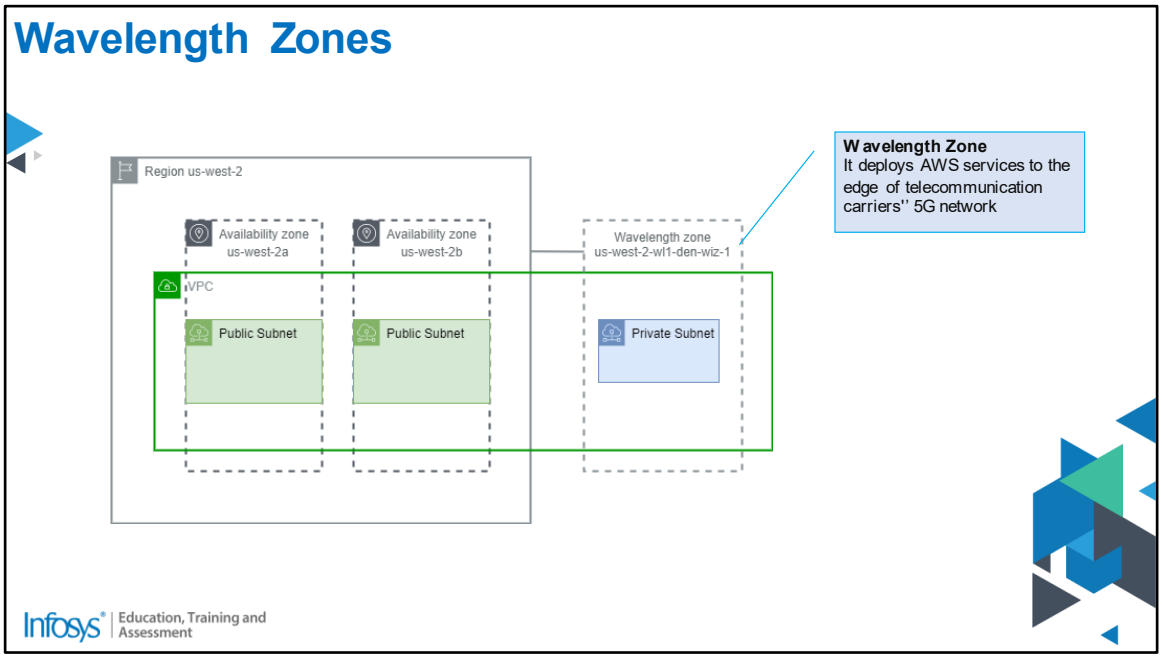
AWS Global Accelerator is a networking service that improves the performance of network traffic by 60%. When the internet is congested, AWS Global Accelerator optimizes the application path to provide latency low, no packet loss and jitter less connectivity in AWS global network. AWS Global Accelerator automatically re-routes your traffic to your nearest healthy available endpoint to mitigate endpoint failure.



Local Zones

It is an Extension of an AWS Region in geographic proximity
It has dedicated connection to internet and supports AWS direct connect, so the resource in local zone can server local users with low-latency

Local Zone code Ex: us-west-2-lax-1 It consist of AWS Region code for Los Angeles followed by identifier that indicates it physical location



Wavelength Zones

Wavelength Zones deploys standard AWS compute and storage services to the edge of telecommunication carriers' 5G networks that Enables developers to build & deliver ultra-low latencies applications for Mobile and end users.

Developers can extend a VPC to one or more Wavelength Zones and resources like Amazon EC2 instances to run applications.

AWS Outposts

AWS Outposts

Fully managed service extends AWS infrastructure

Enables customers to build and run applications in same programming as in AWS Regions

Pool of AWS compute and storage capacity deployed at customer site

AWS operates, monitors, and manages this as part of an AWS Region

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AWS Outposts is a fully managed service that extends AWS infrastructure

AWS customers can use the same programming interfaces as in AWS Regions to build and run applications on premises.

An Outpost is a pool of AWS compute and storage capacity deployed at a customer site.

AWS operates, monitors, and manages this capacity considering as part of an AWS Region itself.

3.3 AWS Core Services

- Describe the categories of services on AWS (compute, storage, network, database).
- Identify AWS compute services.
- Identify different AWS storage services
- Identify AWS networking service
- Identify different AWS database services

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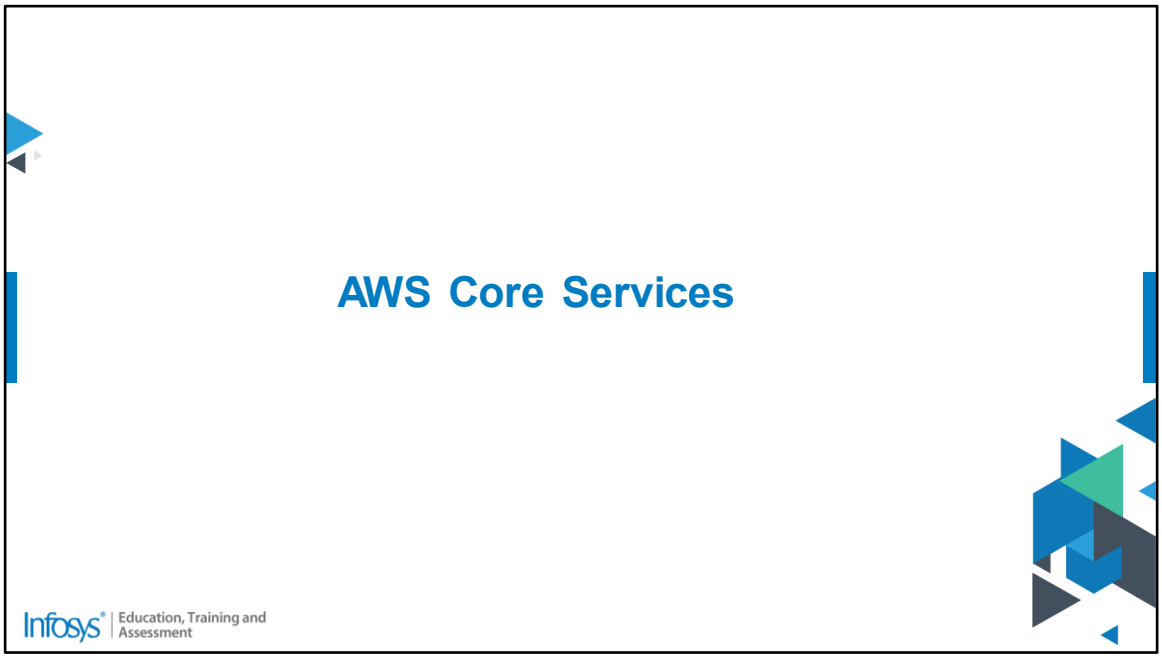
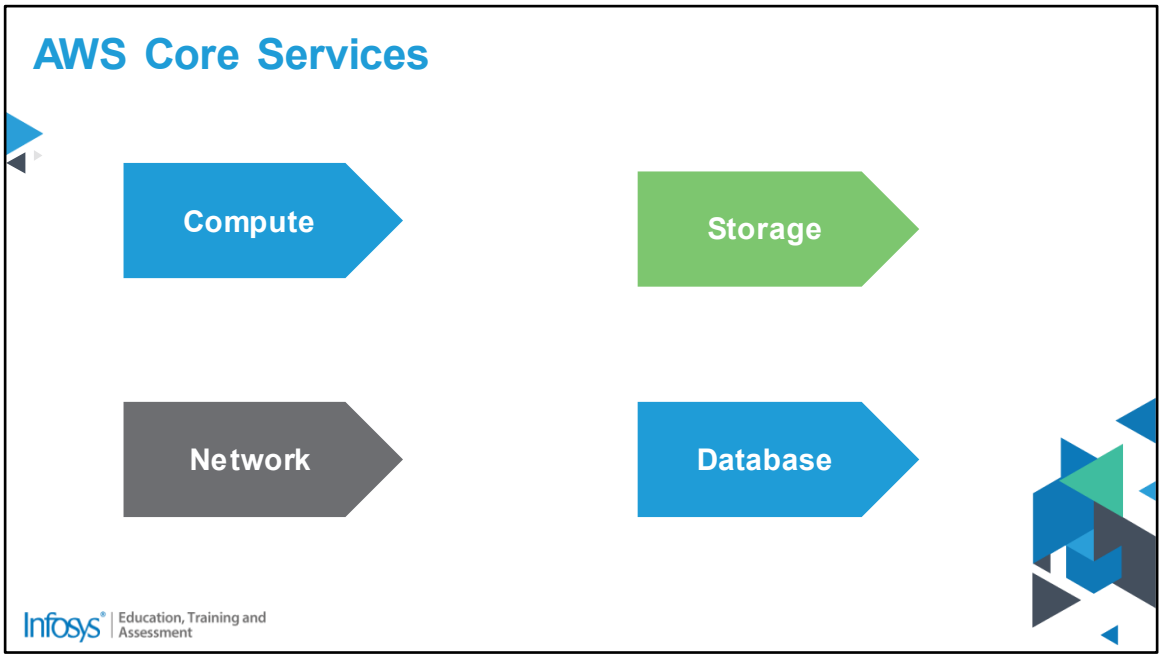


In this Video, you will learn about Core Services offered by AWS.



Here you will explore more about Service offerings such as Aws Compute, Storage, Network, Databases .

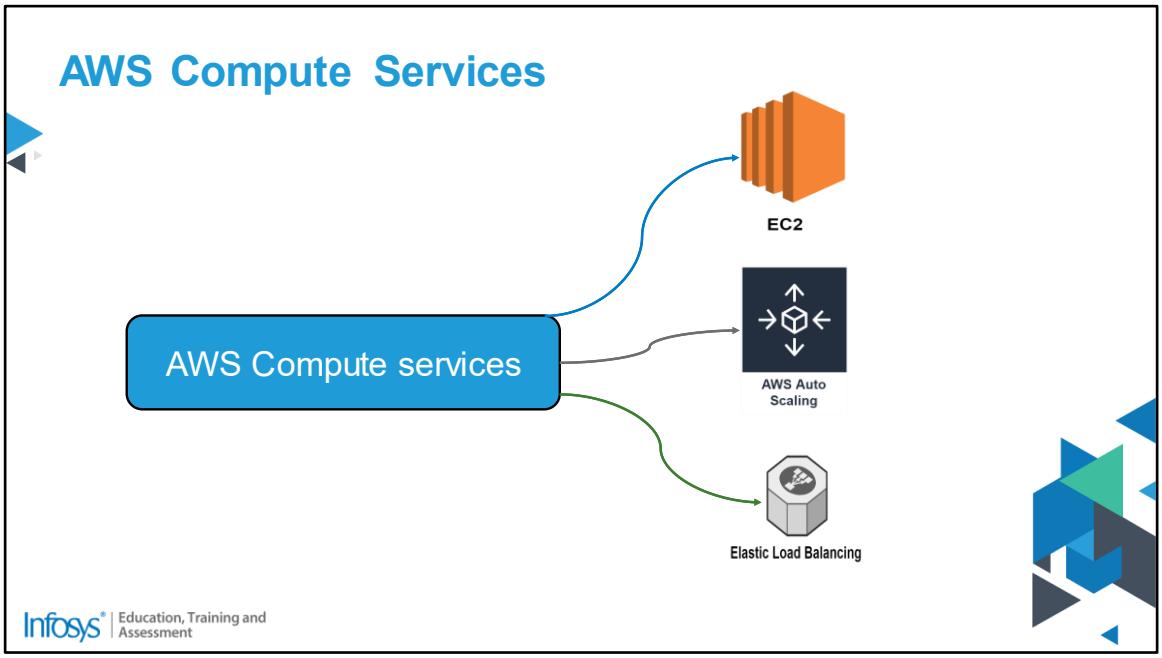
AWS offers cost-effective and flexible **compute services** to encounter Customer demand . It offers a flexible and scalable computing environment in cloud based on the customer business requirement.

AWS storage services reduce cost, offers better innovation and increased agility for the business.

AWS networking services offers broadest and deepest set of networking and content delivery services in the world with AWS.

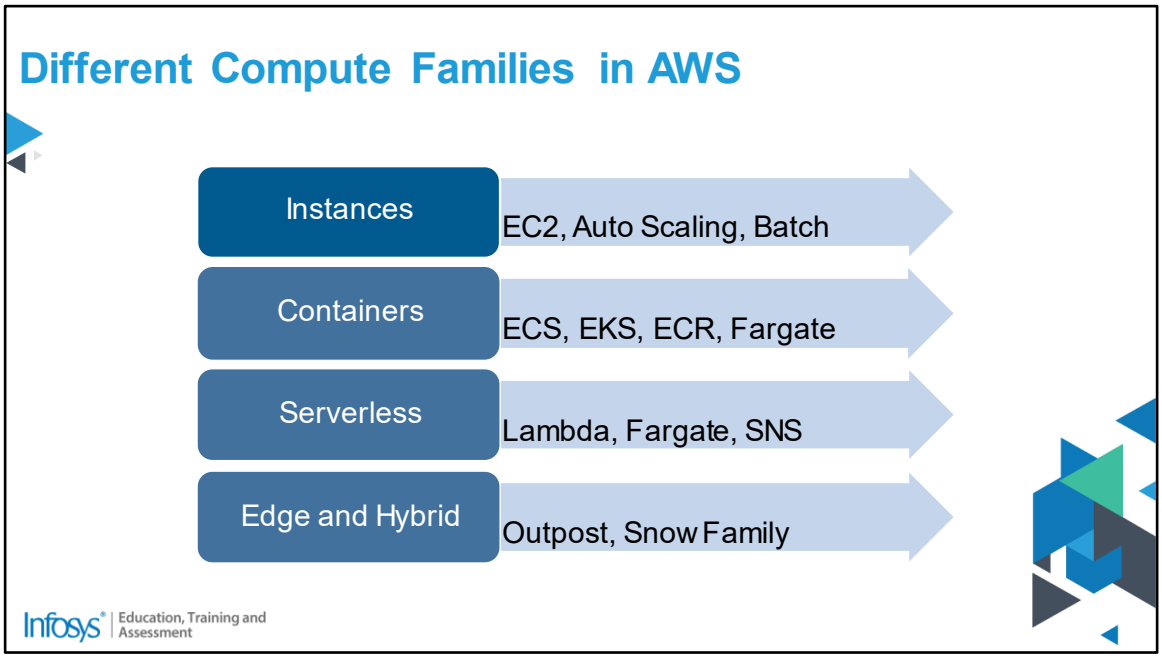
Run applications with the highest level of reliability, security, and performance in the cloud.

AWS offers a range of purpose-built databases which will allow you to innovate faster, save more and grow in no time.



In this module, you will learn about different AWS compute services such as:

- EC2
- Autoscaling
- ELB



AWS provides secured compute capacity with different sizes in the form of EC2. Auto scaling supports in meeting the demand by adding and removing the compute capacity. AWS Batch provide fully managed batch processing of jobs at any scale.

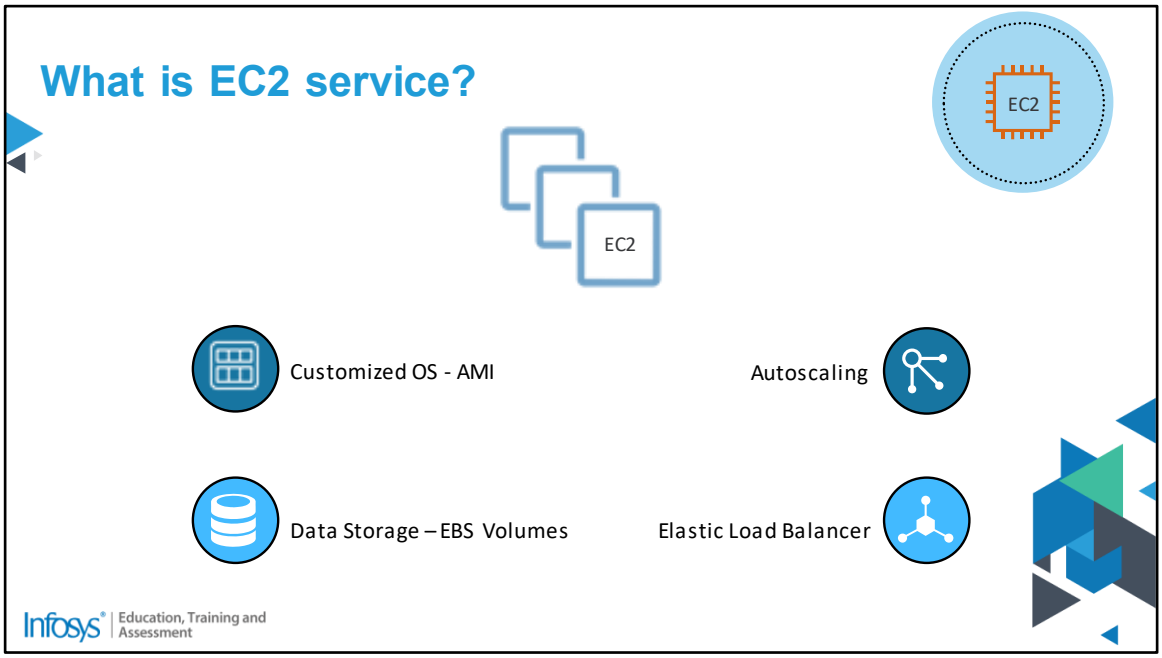
AWS provides a variety of container services such as ECS, EKS, ECR and Fargate. Elastic container services helps in running containers in a secured and reliable way. Elastic Kubernetes services are fully managed open-source services which is supported by AWS. AWS Elastic Container registry is used for managing, storing and deploying the container images. AWS Fargate supports serverless computing way for multiple containers.

Serverless services removes infrastructure management task from customer end and allow them to think only about building and running application services. For example, customers cam use Lambda function which is event driven. AWS SNS is a fully managed service which will be used for communication between any application and person.

AWS provides support for on-premises data center as well as hybrid model of computing under its different services.
AWS outpost is a perfect example of hybrid experience in which AWS infrastructure and its services can be used on a premise of the organization.

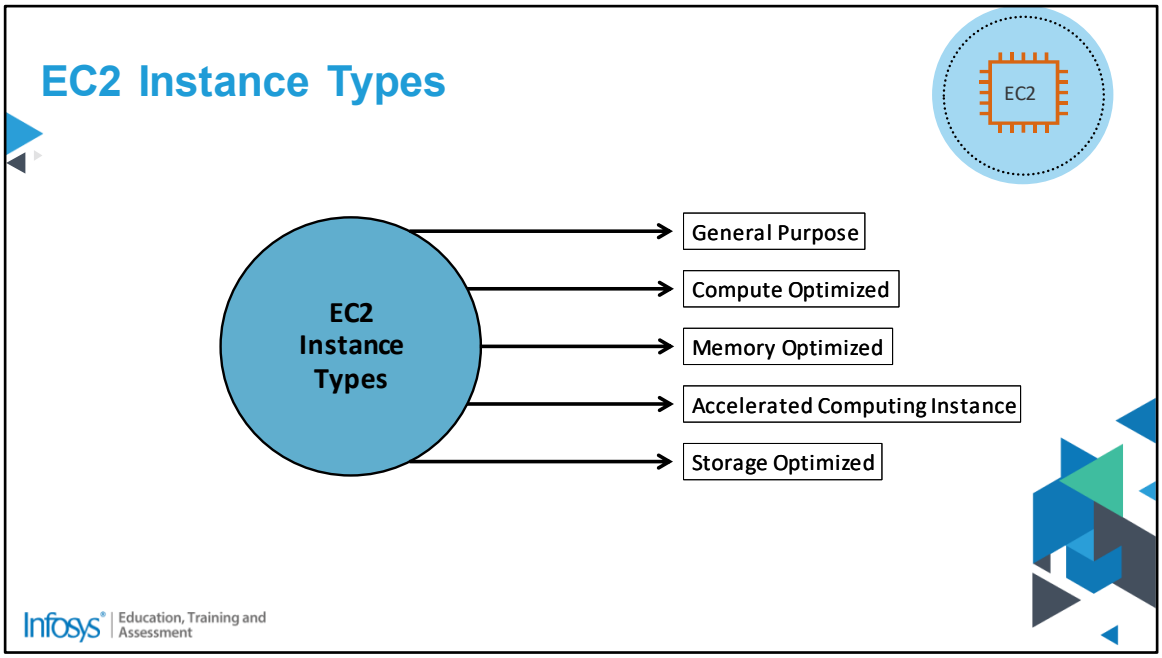
AWS snow family offers support for the customers who are running their workload in a non-data center environment. Snow family has three members named as : SnowCone, Snowball and Snowmobile. Based on the data size and number of CPUs required, these devices can be used.

For more details about each family member, please refer the link attached in the additional reference section.



Amazon EC2 is a very fundamental service of AWS.
The capability of EC2 service includes –

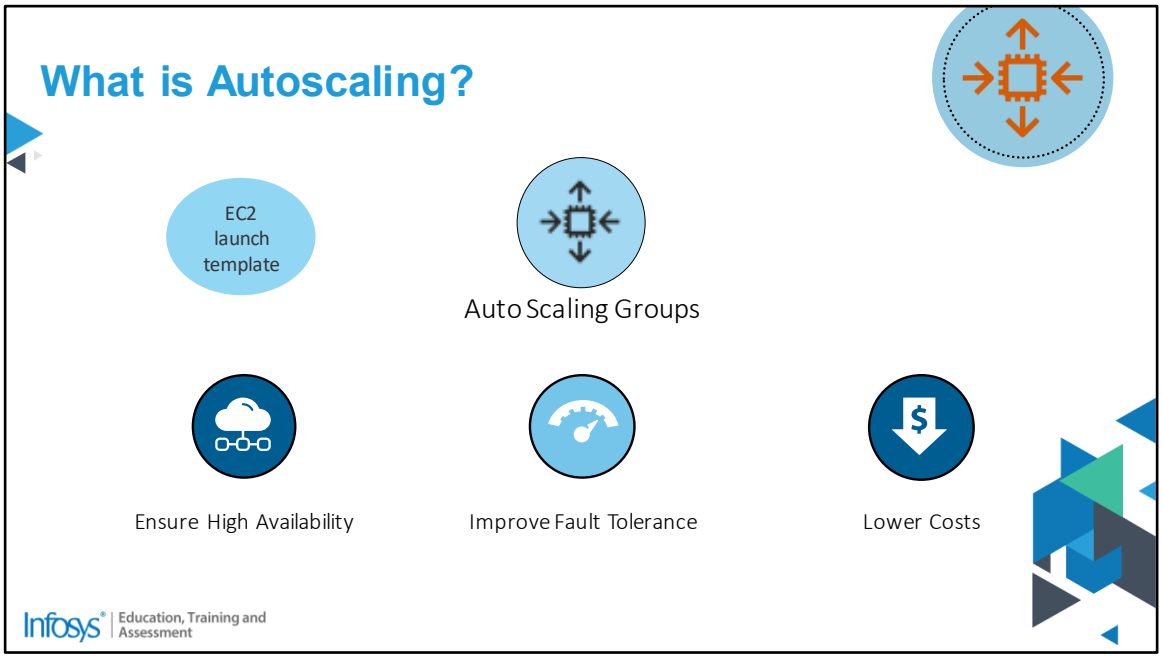
- The ability to launch EC2 instances or virtual machines with a customized operating environment known as Amazon Machine Image or AMI.
- Data in the EC2 instances are stored on virtual disks known as EBS volumes.
- EC2 allows to automatically scale our applications with the use of the Autoscaling feature.
- Traffic between multiple EC2 instances can be managed easily with the help of Elastic load Balancer.



Based on the hardware configuration required AWS provides a vast range of EC2 instance types.

Instance Types are broadly classified into 5 types based on the hardware configurations which are –

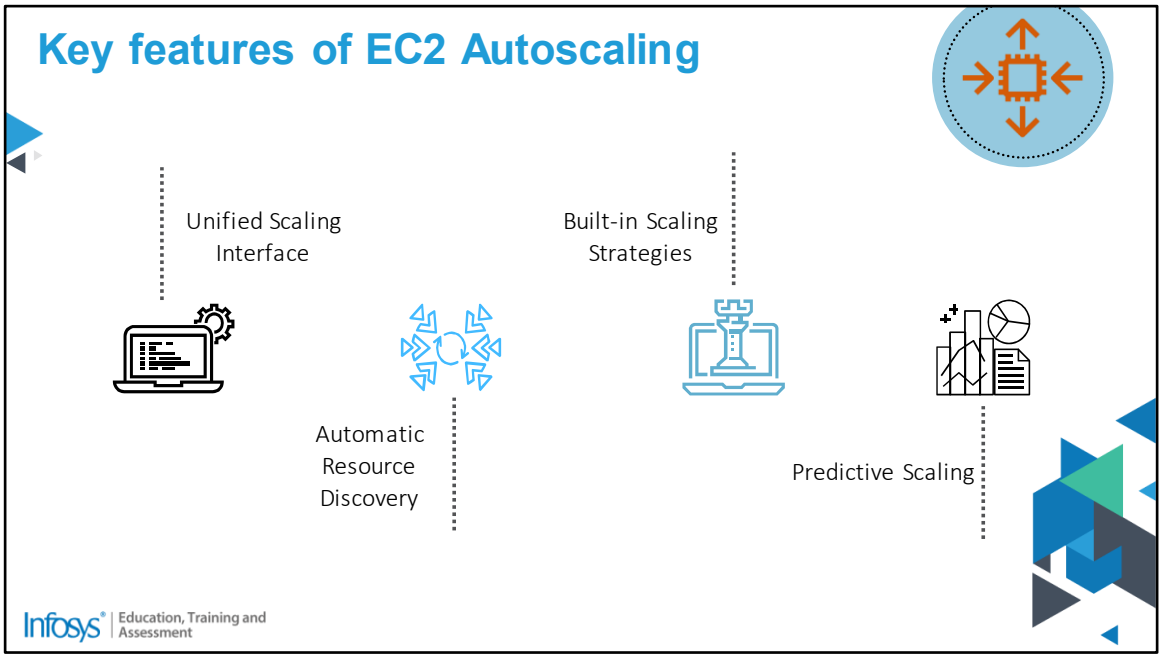
- General Purpose Instance,
- Compute-Optimized,
- Memory-Optimized,
- Accelerated-Computing Instance,
- and, Storage Optimized.



So, what is Autoscaling ?

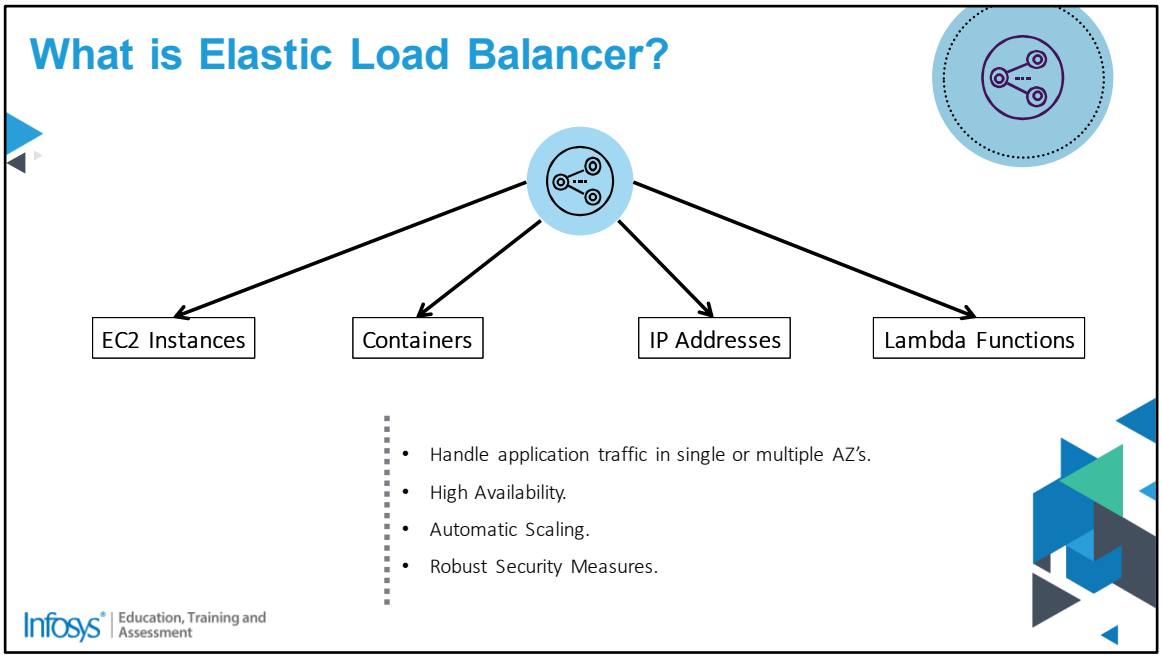
Autoscaling service allows you to maintain high availability of your application by automatically adding or removing EC2 instances as per the need of the application or as stated by the user.

- With EC2 Autoscaling you can significantly **improve the fault tolerance** of your application, as unhealthy instances can be replaced by a new one with Autoscaling.
- Autoscaling **can lower costs**, by adding resources when needed and removing them when not needed.



Some of the key features of Autoscaling are –

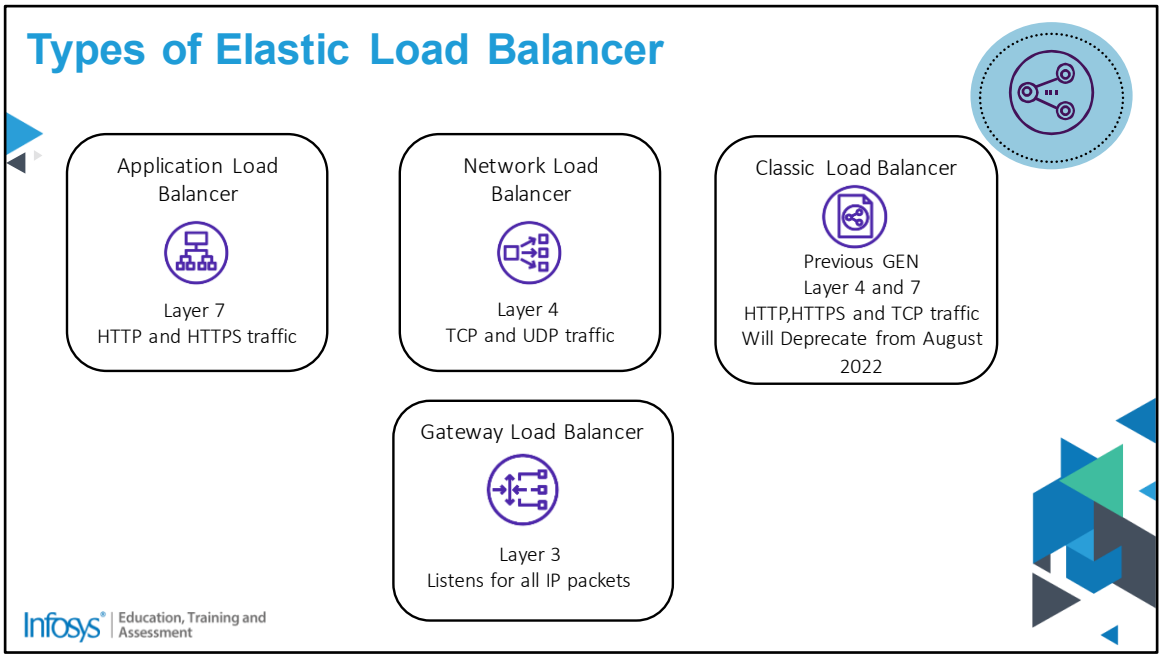
- Autoscaling provides a **unified scaling interface** for all scalable resources including EC2 and EC2 Spot Instances, ECS, DynamoDB and Amazon Aurora.
- It provides **automatic resource discovery**, as it automatically scans your cloud environment and automatically discovers the scalable cloud resources.
- It has **built-in scaling strategies** which can help you to optimize performance, cost or balance between the two.
- Autoscaling provides you with a **predictive scaling** feature which can predict future traffic and provision the correct number of required EC2 instances in advance.



So, What is AWS Elastic Load Balancer or ELB ?

ELB is a scalable solution from AWS which can automatically distribute traffic among multiple targets. The targets can be EC2 Instances, containers, IP Addresses, and Lambda Functions.

- Elastic Load Balancer or ELB can handle the variable traffic load of your application either in a single AZ or Multiple AZ's in a region.
- Elastic Load Balancer offers features such as automatic scaling, robust security measures, and high availability to make applications **fault tolerant**.



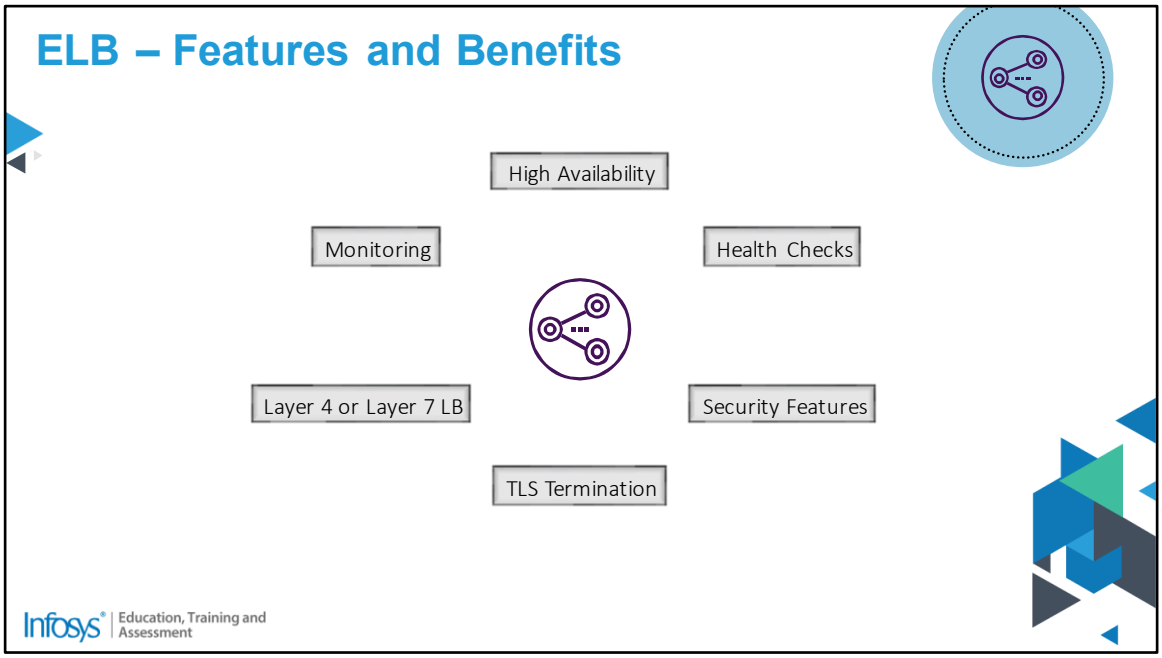
AWS provides 3 kinds of Elastic Load Balancer; users can opt for a specific one based on the type of workload.

First is Application Load Balancer, which is a Layer 7 load balancer and is suited for web applications with HTTP and HTTPS traffic.

Next is the Network Load Balancer, which is a Layer 4 load balancer and is used for providing ultra high performance for TCP and UDP traffic.

Classis Load Balancer is a previous generation load balancer for HTTP, HTTPS and TCP traffic.

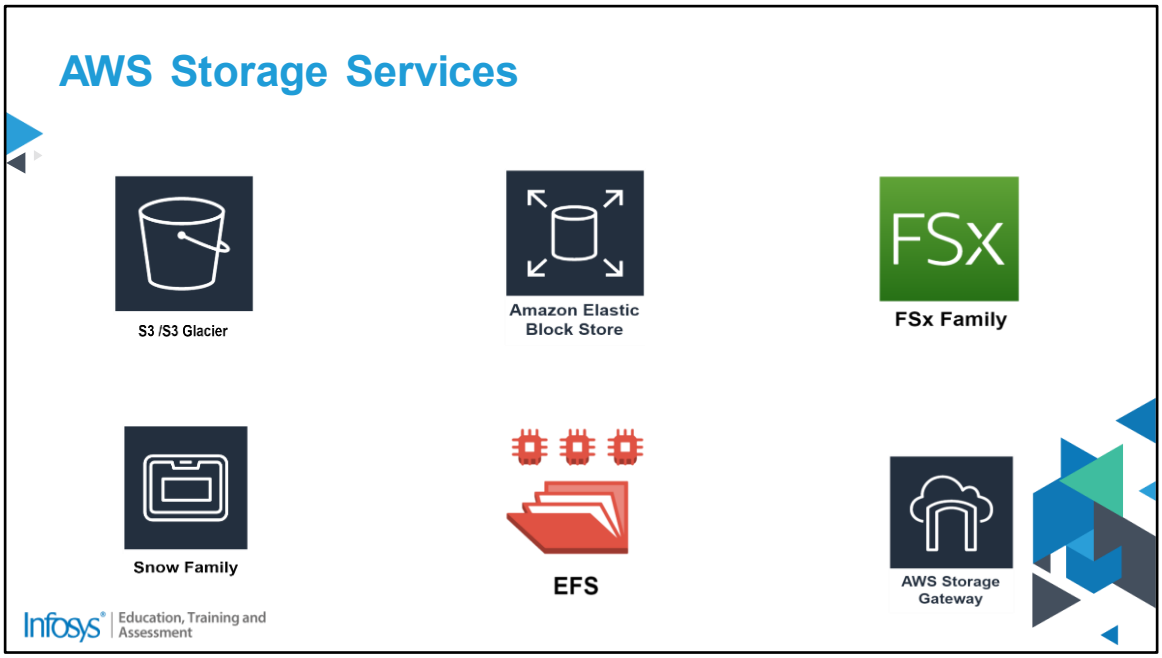
Application and Network Load Balancer are newer generations of Load Balancers offered by AWS and Classis Load Balancer is a previous generation load balancer, and AWS recommends to use either Application or Network Load Balancer.



Let us look at some of the features a benefits of an Elastic Load Balancer –

- High Availability – It can automatically distribute traffic across multiple targets or a Group of EC2 instances, across multiple Availability Zones in a region to make your application highly available to end-users.
- E L B offers health checks, which can detect unhealthy targets, and stops sending traffic to them, for a consistent user experience.
- It offers security, as E L B can reside within a VPC and traffic can be controlled using a Security Group.
- It provides the feature of integrated certificate management and SSL/TLS decryption.
- Load balancing can be done either at Layer 7 or at the application level or at Layer 4 for TCP and UDP traffic.
- Performance metrics and monitoring can be easily achieved as it is integrated with

Amazon Cloud watch.



In this module, you will learn about :

Amazon S3 - Amazon Simple Storage Service aka (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance.

Amazon Elastic Block Store: AWS offers block level storage volume which can be used among multiple EC2 instances. These volumes can be mounted on your instances as devices.

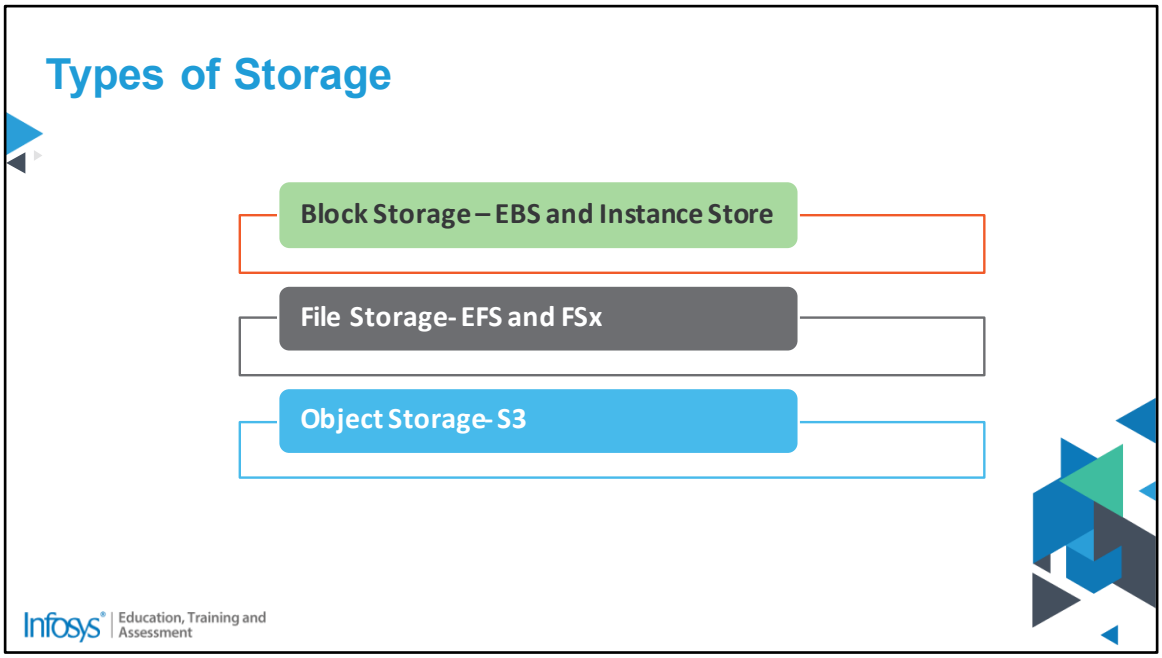
Amazon S3 Glacier: it is an extremely low cost, durable and secured storage class provided by AWS. It can be used for long term backup.

AWS Snowball : It is smallest member of AWS Snow family. It is used for edge computing and data migration. It comes in two choices : Snowball compute optimized, and storage optimized.

Amazon Elastic File System: You can use EFS to create and scale your file system automatically as files are added or removed. It is a simple and serverless elastic file

system.

AWS Storage Gateway: AWS storage gateway offers uninterrupted and virtually unlimited cloud storage for on premise applications.



In this video you will learn about Simple Storage Service (S3)

In this video you will learn about Simple Storage Service (S3)

What is Amazon S3?

- Object storage service of AWS
- Storage service to all kinds of data

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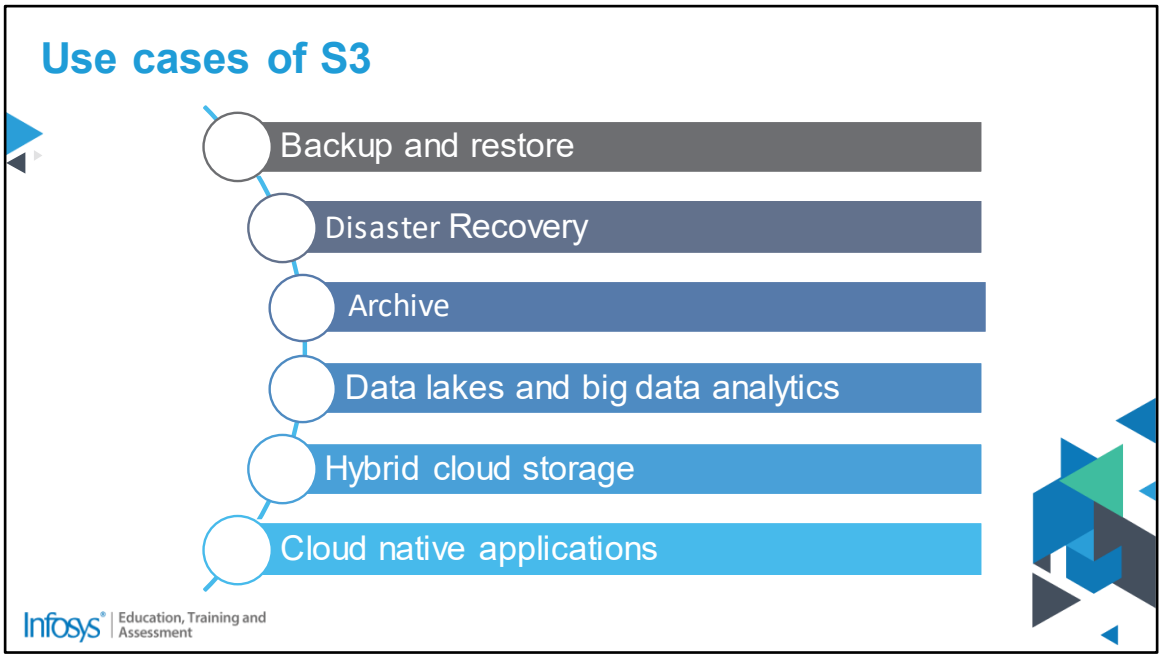
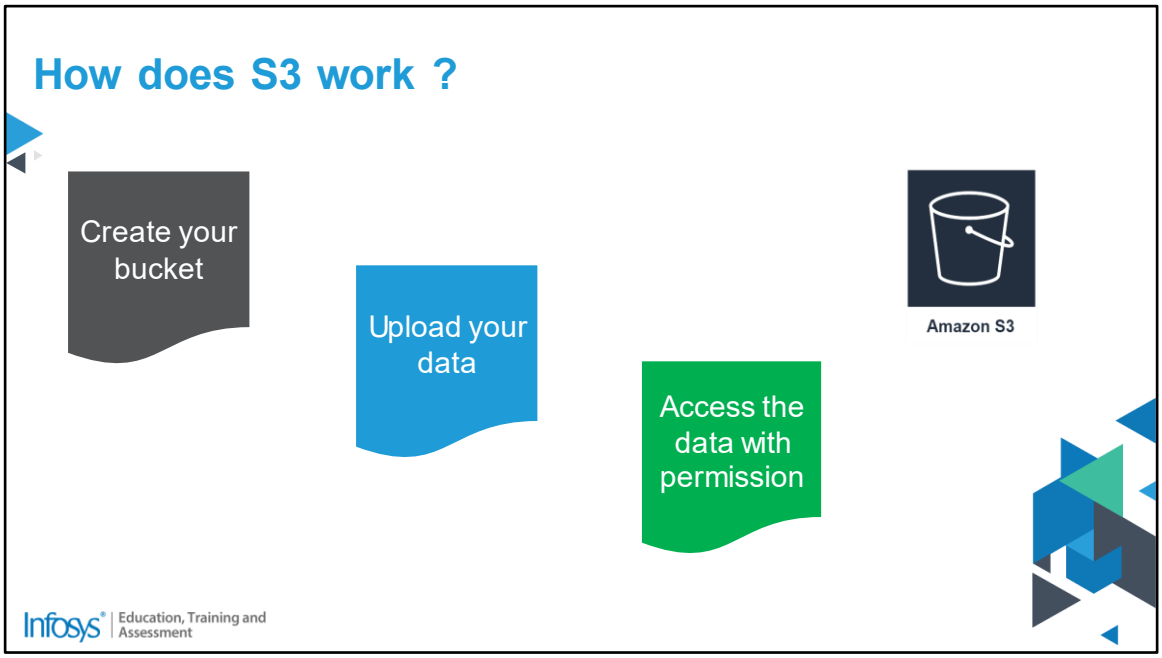
Amazon S3 or simple storage service is used for storing objects. It offers industry leading scalability, performance and security. S3 offers storage to all kinds of customer data has easy management features.



Before we look into S3, let's look at some of the use cases

1. Backup and restore : S3 offers durable , scalable and secure data backup and restore solutions
2. Disaster Recovery : S3 offers cross region data replication through which you can easily recover the lost data
3. Archive : S3 offers long term object storage at lower rates
4. Data lakes and big data analytics : You can accelerate big data analytics by building data lakes on S3
5. Hybrid cloud storage : Connect your on-premise applications to AWS storage using S3 storage gateway
6. Cloud native applications : You can easily build cloud native applications using S3 and other AWS services at cheaper rates



In this video, you will learn the working of S3.

When you want to store any data in S3, first the bucket must be created by specifying name and region of the bucket. You can maximum100 buckets in your AWS account. Any number of objects can be stored in the bucket. Bucket policies can be attached when the bucket is created. The versioning can be enabled on buckets and objects which helps in keeping track of all the versions of your objects. It is helpful if you delete any object by mistake or if you need any older version of object.

Then the data in the bucket can be uploaded as objects. Every object has a unique key which identifies the object in bucket. The object size in a bucket can vary from 1 Byte to 5TB. When your object size is more than 100MB , you can use multi part upload option provided by AWS. It gives an improved throughput.

Amazon provides a way to audit and manage access for all the objects in your bucket. The buckets and objects are private by default unless and until you provide public access. The permissions can be altered based on the need of the application or data that is concerned.

Storage classes

- Standard
- Standard-IA
- One Zone-IA
- Intelligent Tiering
- Glacier
- Glacier Deep Archive
- Outposts

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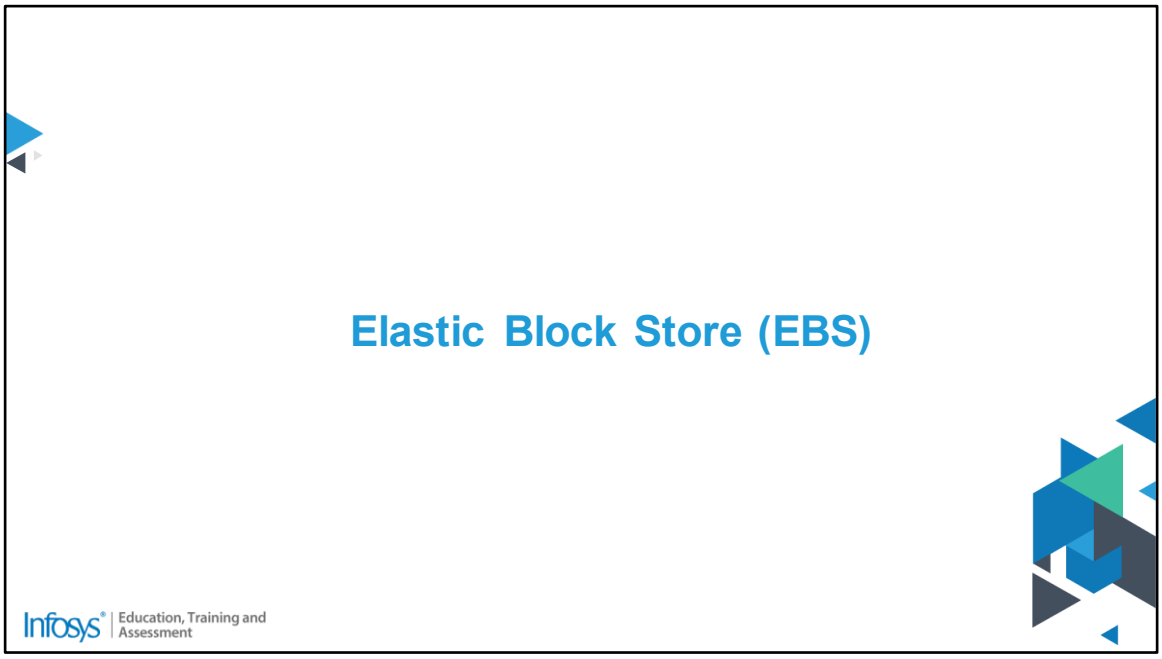
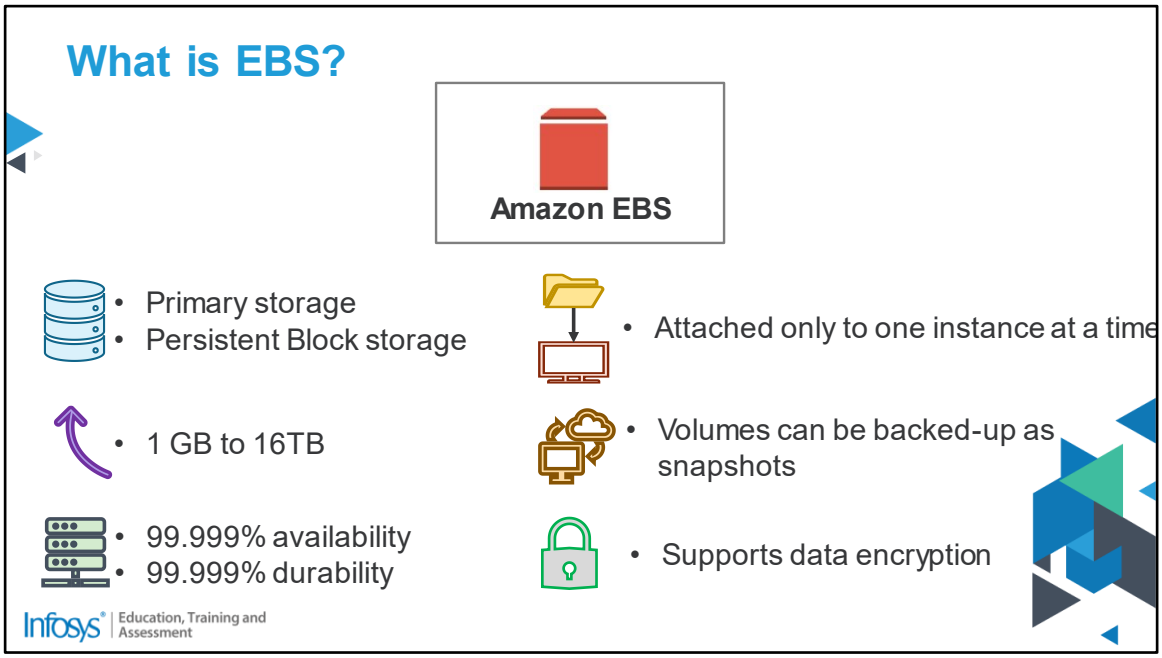
Based on the requirement, customers have the flexibility to choose a suitable storage options. The types of storage available are

Standard : A general purpose storage for frequently accessed data
Standard-IA : Less frequently accessed data which is long lived
One Zone-IA : Less frequently access but provides fast access
Intelligent Tiering : cost optimize storage solution where data is moved to automatically to more cost efficient access tier
Glacier : Low cost archival solution with 99.999999999% durability
Glacier Deep Archive : lowest cost storage to support long term retention
Outposts : deliver object storage to AWS outposts environment in on-prem



In this video you will learn about Elastic Block Store (EBS)



What is EBS?

EBS are suitable for usage as primary storage volume for any databases, file systems, or any other applications which need raw and un-formatted storage.

EBS is a Persistent Block Storage and are specific to an Availability zone.

It can be attached only to one instance at a time.

EBS volume size can range from 1GB to 16 GB.

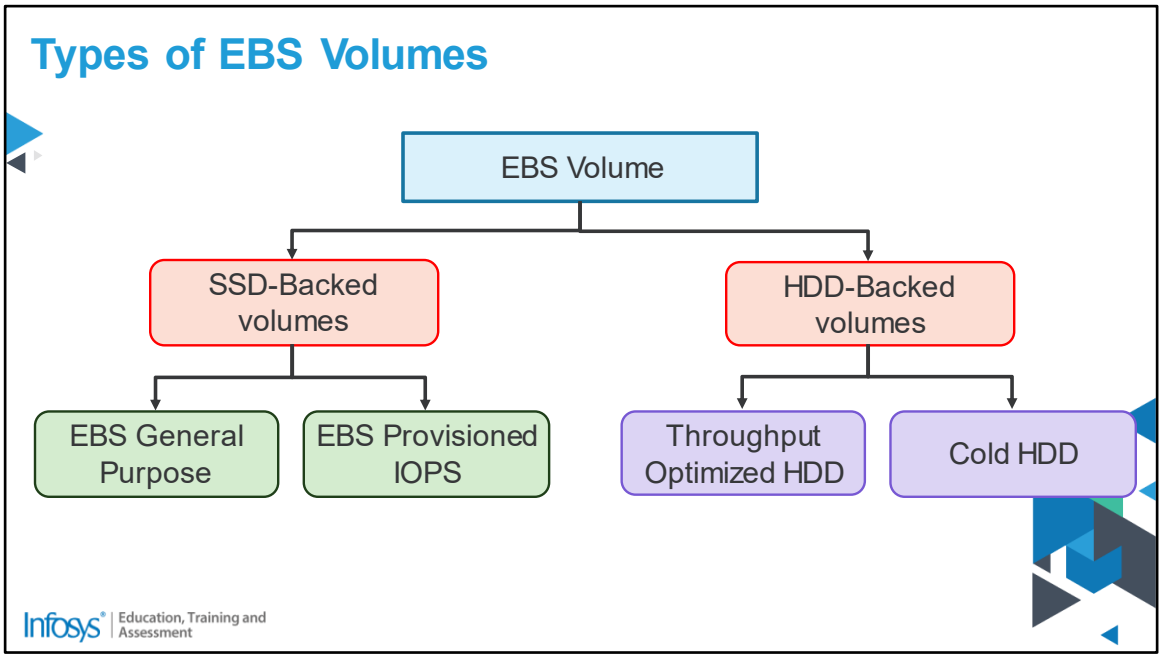
Volumes can be backed-up as snapshots for durability.

It offers 99.999% availability and durability.

The data kept in EBS volume persists even if that EC2 instance is terminated. Once you attach a volume to the instance , you can use it like any other physical drive.

You can encrypt data stored in EBS volumes if required and can create images

or snapshots of data stored in EBS volumes.



AWS offers different types of volumes which differ in features like performance, price, etc.

It is classified as SSD-backed and HDD-backed volumes.

SSD-backed volumes are designed for transactional workloads where the attribute is IOPS.
HDD-backed volumes are designed for huge streaming workloads where prominent performance attribute is throughput.

SSD-backed volumes is further classified into EBS General purpose and EBS provisioned IOPS.

General Purpose SSD balances performance and price for many transactional workloads.

It is best suited for Dev and test, Boot volumes, and low-latency interactive apps.

EBS Provisioned IOPS is designed for workloads which are latency-sensitive. It is Highest performance SSD volume

It is ideal for NoSQL and relational databases which are I/O sensitive.

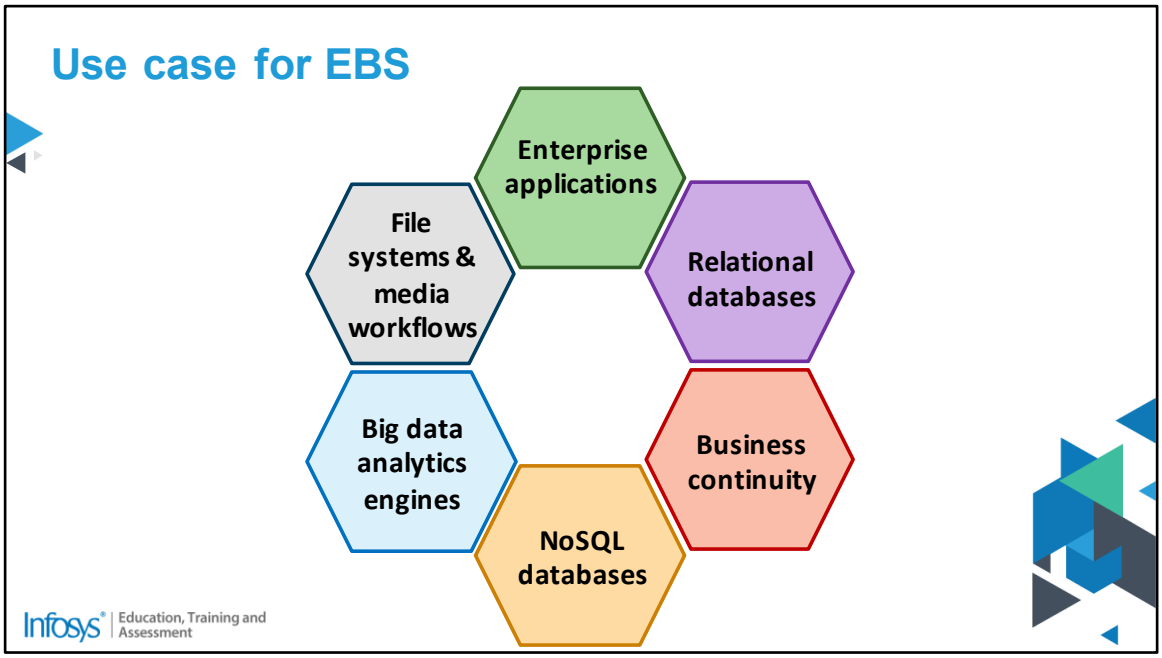
Throughput Optimized HDD is a low-cost HDD volume intended for throughput intensive workloads and frequently accessed data.

It is ideal for data warehouses, big data and log processing.

Cold HDD is designed for less frequently retrieved workloads. It is lowest cost in this segment.

It is ideal for colder data which need lesser scans per day.

Based on the business requirement, the organization can choose the suitable volume type.



When to use Amazon EBS?

You will explore the use cases that are associated to EBS.

Amazon EBS provides high availability and high durability block storage to reliably run Enterprise applications.

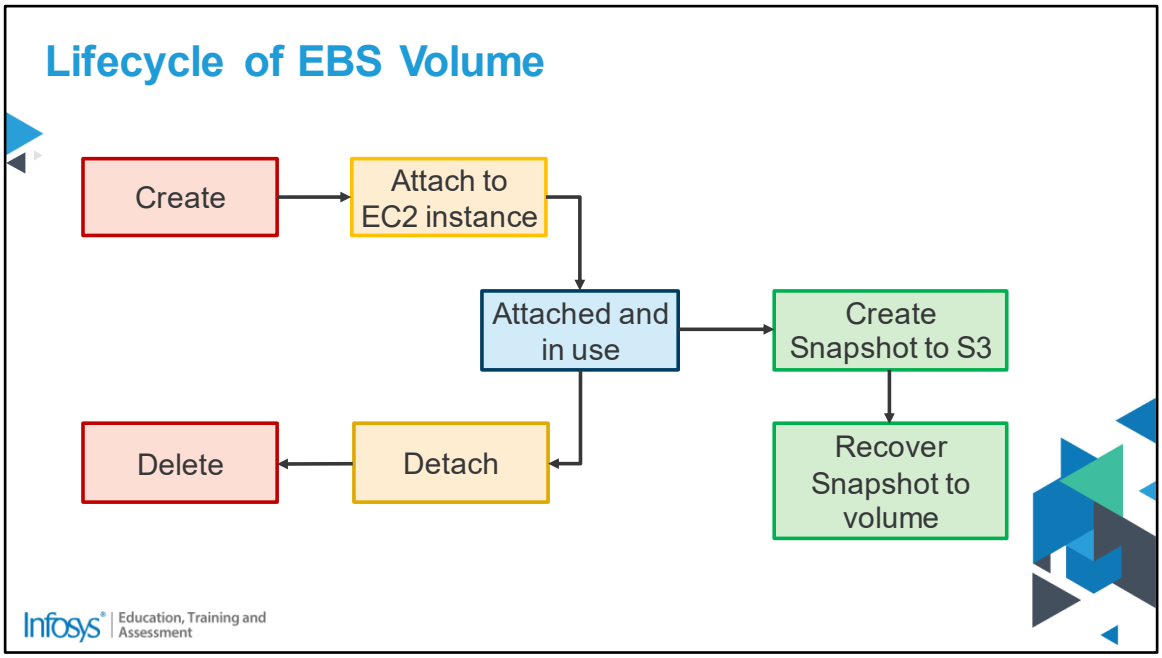
Amazon EBS scales with your performance needs to support your Relational databases.

Business continuity, where the data loss and recovery time should be minimal.

Amazon EBS volumes provide consistent and low-latency performance for running NoSQL databases.

Amazon EBS is ideal for Big data analytics engines.

Amazon EBS lets you scale easily with additional volumes to support growing File systems & media workflows.



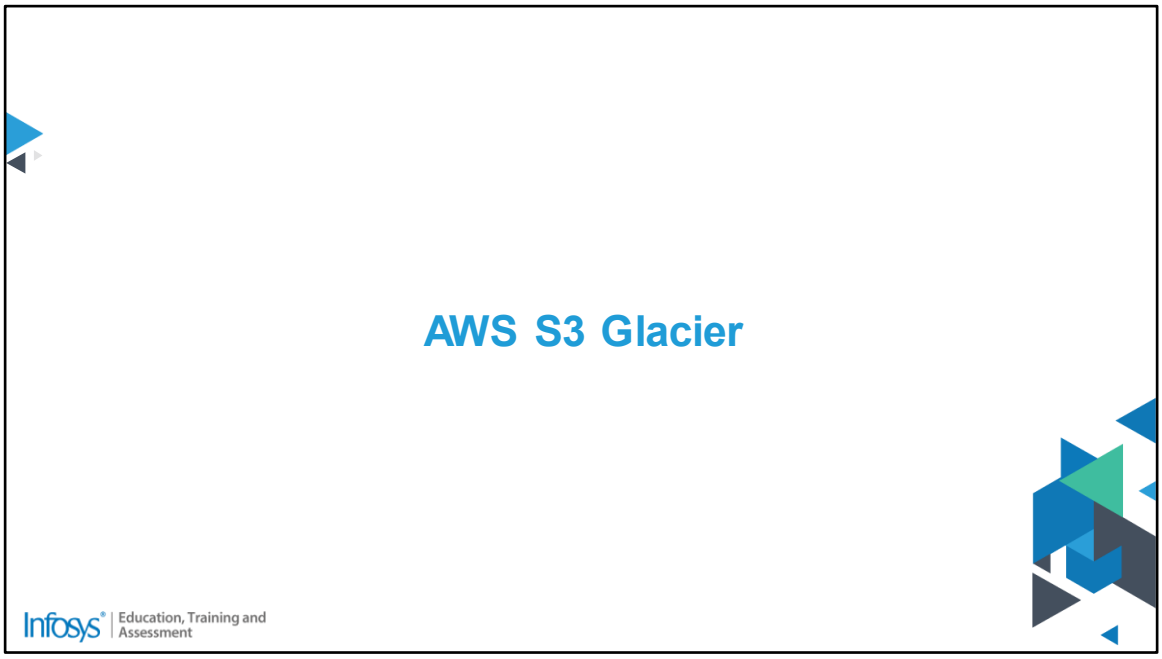
Now, you will learn about the lifecycle of EBS volumes.

The EBS volume is created and attached to an Amazon EC2 instance for use.

For a backup, Snapshots can be created from the EBS volume and saved to Amazon S3.

Later the volume can be detached and deleted.

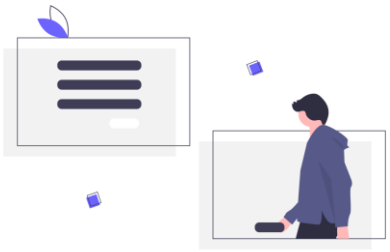
If required, the volume can be restored from the snapshot created.



In this video you will learn about S3 glacier.

What's S3 Glacier ?

- Archival storage solution from AWS
- Archives- Stored data
- Capacity of single archive – 40 TB
- Supports Instant retrieval , flexible retrieval and Deep archive storage options



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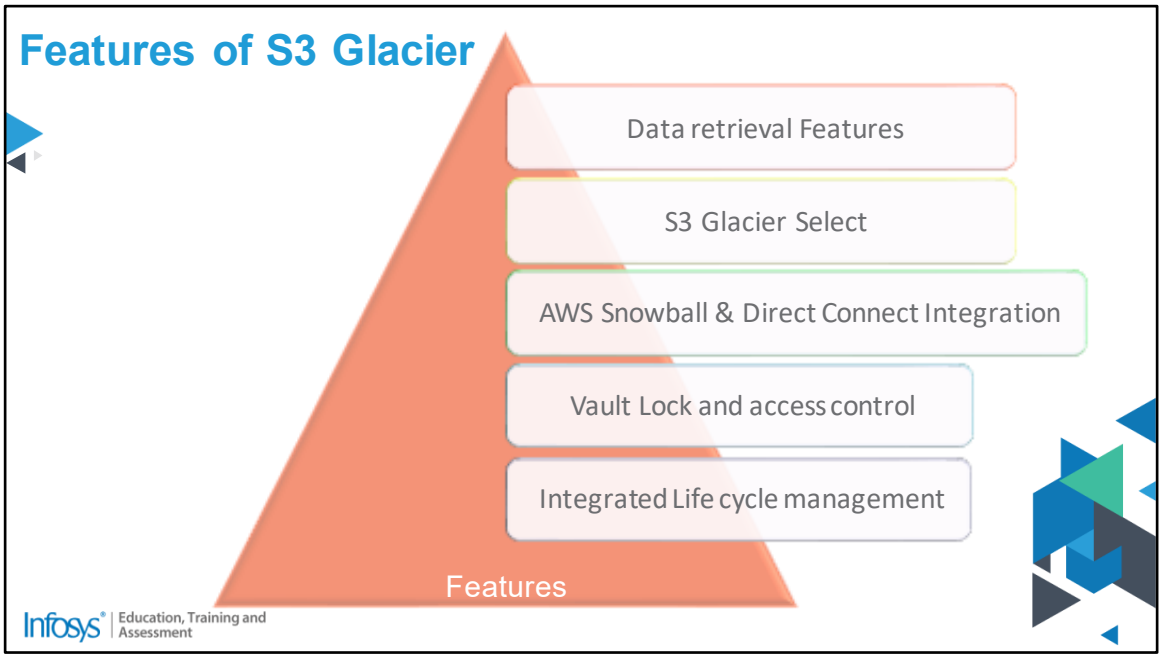
Amazon S3 Glacier is an archival storage solution from AWS. Data stored in S3 Glacier is called as archives. It can store all kind of data – photos, videos, documents etc. A single archive can go upto 40Tb. However, there's no limit on the number of archives you can store on Amazon S3 Glacier.

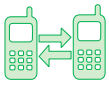


Some of its features include :
Data retrieval feature. Amazon S3 Glacier offers three types of data retrieval – standard, expedited, and bulk retrievals. Expedited retrieval fast tracks your retrieval, and the data is available within 5 minutes. With std, data is typically available within 3-5 hours. Bulk retrieval will allow you retrieve petabytes of data from S3 Glacier.

Amazon S3 Glacier Select feature allows you to run queries directly on S3 Glacier.
It's integrated with AWS Snowball and Direct Connect to accelerate data movements and to establish high quality network connection.
S3 Glacier Vault Lock allows you to deploy and manage access controls on individual Glacier vaults. Access control is managed by AWS IAM.
Amazon S3 Glacier imports S3 lifecycle rules to automate the archival process.

In this video you will learn about Amazon Snowball.

Snow Family Features



- Petabyte-scale
- **Edge computing, data migration, and edge storage device**

- **Encrypted**
- **Upto 100PB storage (Snowmobile)**

Used:

- Cloud migration,
- Disaster recovery
- Datacenter decommission
- Content distribution

Two device options

- Snowcone
- Snowball Edge (Storage optimized and compute optimized)

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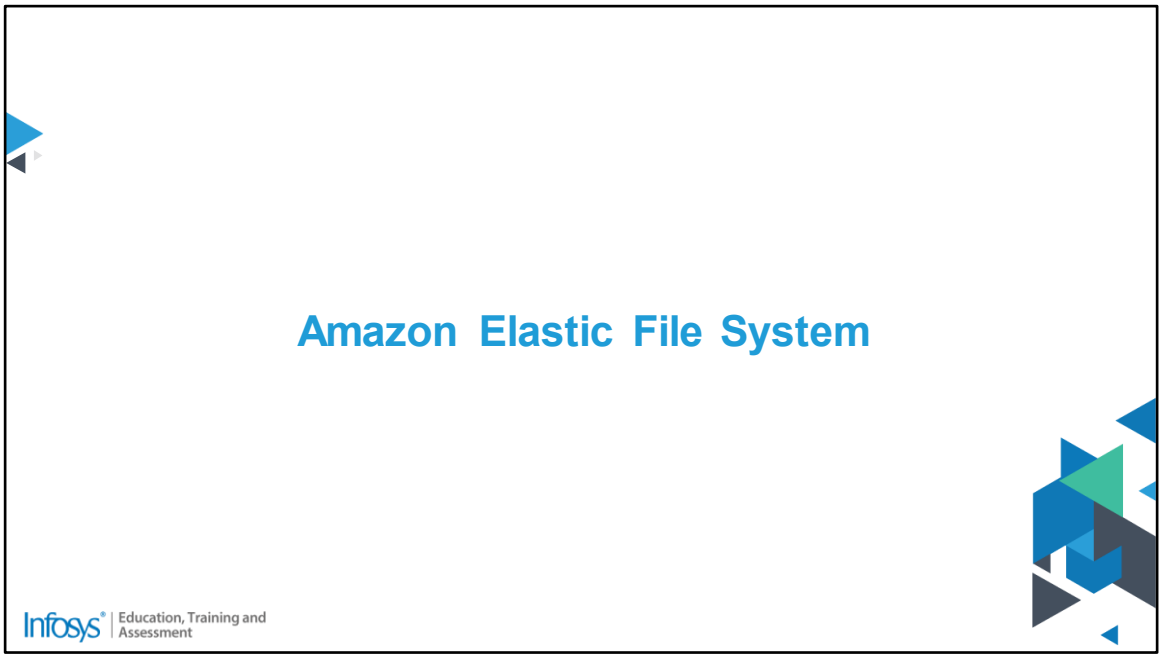
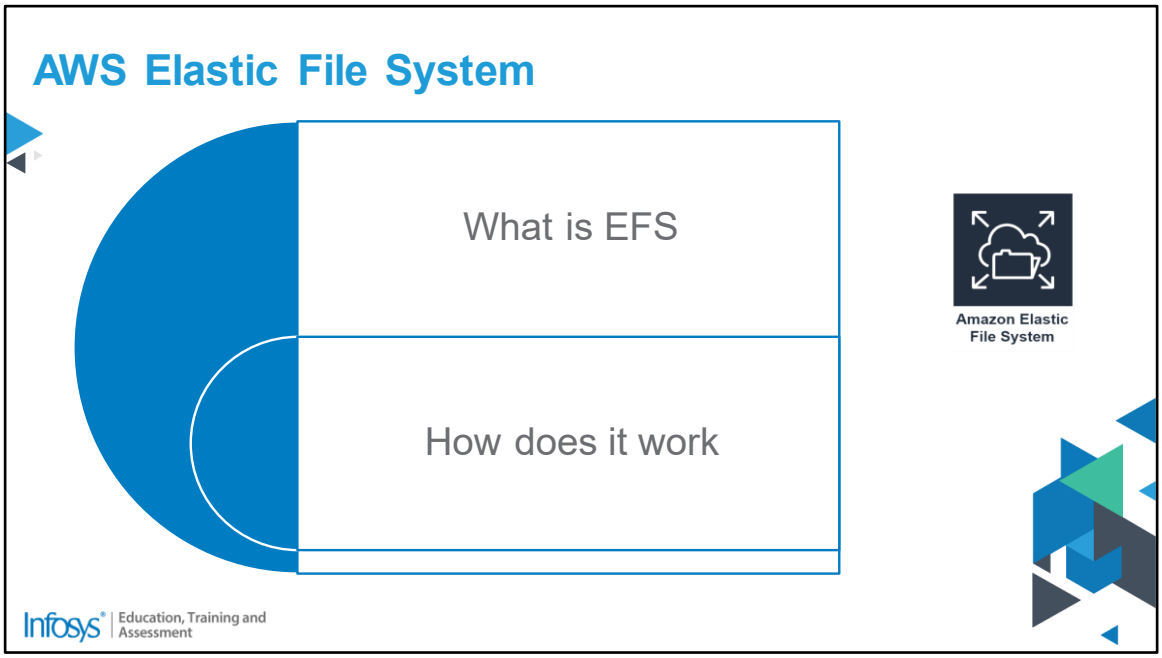
In this
It is a low-cost Petabyte-scale data transportation service.
It is an edge computing, data migration, and edge storage device.
Accelerates transporting large quantities of data into and out of AWS.
Data is encrypted with 256-bit encryption keys.
It can store data up to 100TB.
It can be used during cloud migration, disaster recovery,
datacenter decommission and for content distribution.
Snowball service has two device types
The standard Snowball,
Snowball Edge.

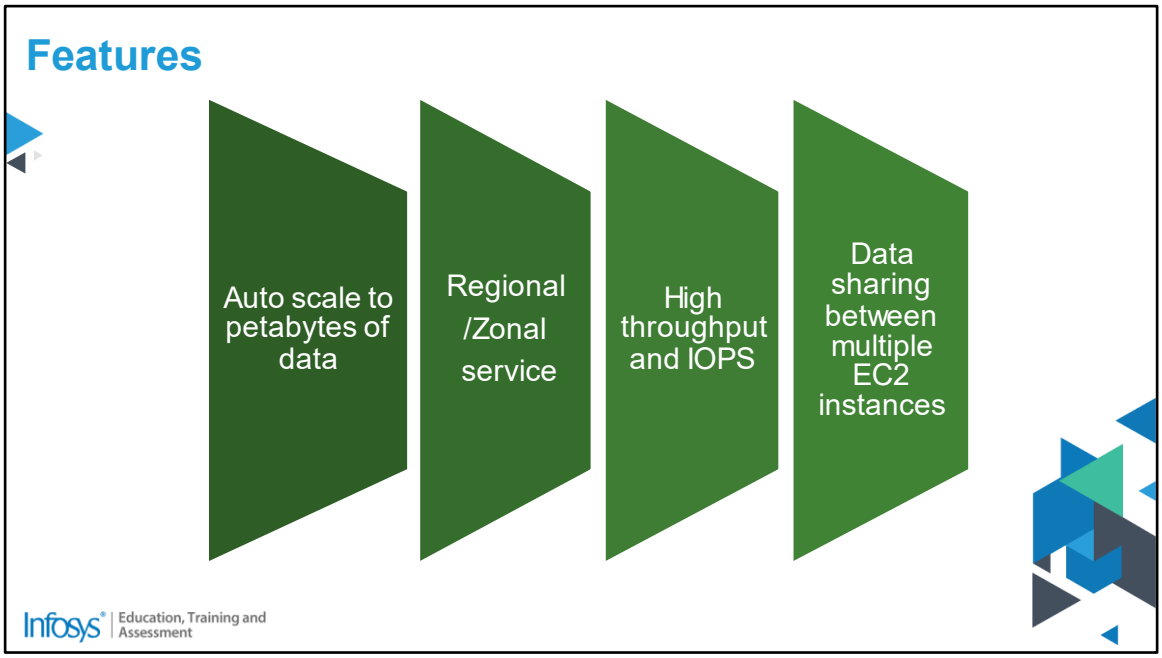


In this video you will learn about Amazon Elastic File System.



Amazon Elastic File system delivers a serverless and simple file system which can be used with AWS cloud and the resources present on premise. There is no need of any provisioning, and it can scale to petabytes without affecting ongoing applications. It offers a simple interface to configure and create any sort of file system easily and quickly. EFS has two storage classes : Standard IA and one zone IA. EFS is POSIX compliant.

The first step is creation of an EFS system then a mount point is created for the same. Then the security group is created at both, EC2 instance and mount target. EFS can work with EC2 instances, AWS direct connect, and AWS back up. AWS EFS can be distributed among 1000s of storage servers. It will be used in media processing workflow, web serving, content management and big data analytics.



Amazon EFS is an elastic and scalable storage solution for NFS file systems

It can scale to petabytes of storage on demand
It provides flexible and dynamic file system in the cloud which can be shared by many EC2 instances
It's a regional service that stores data in multiple Azs
It provides high throughput, IOPS, and low latency,
It provides encryption at transit and rest level
It can used for uses cases including home directories, big data analytics, and content management, media and entertainment workflows etc

Use case for EFS

Solution: Discover decided to store its data in AWS Cloud(EFS)

Benefits:

Store analytics data

Share easily

Reduced cost

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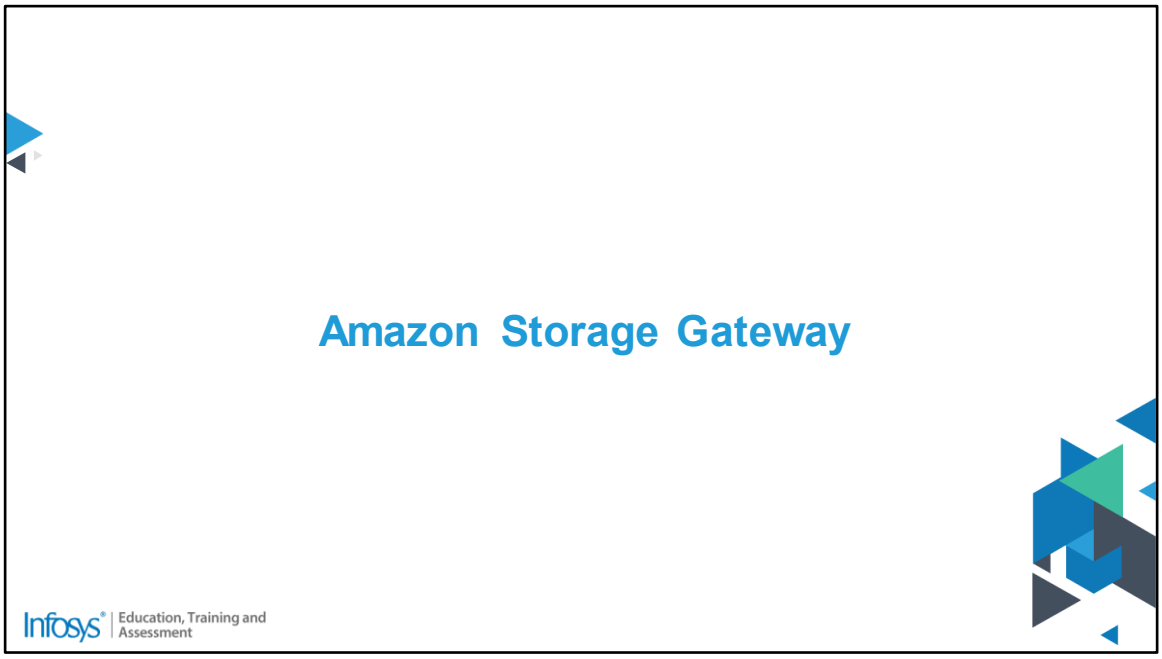
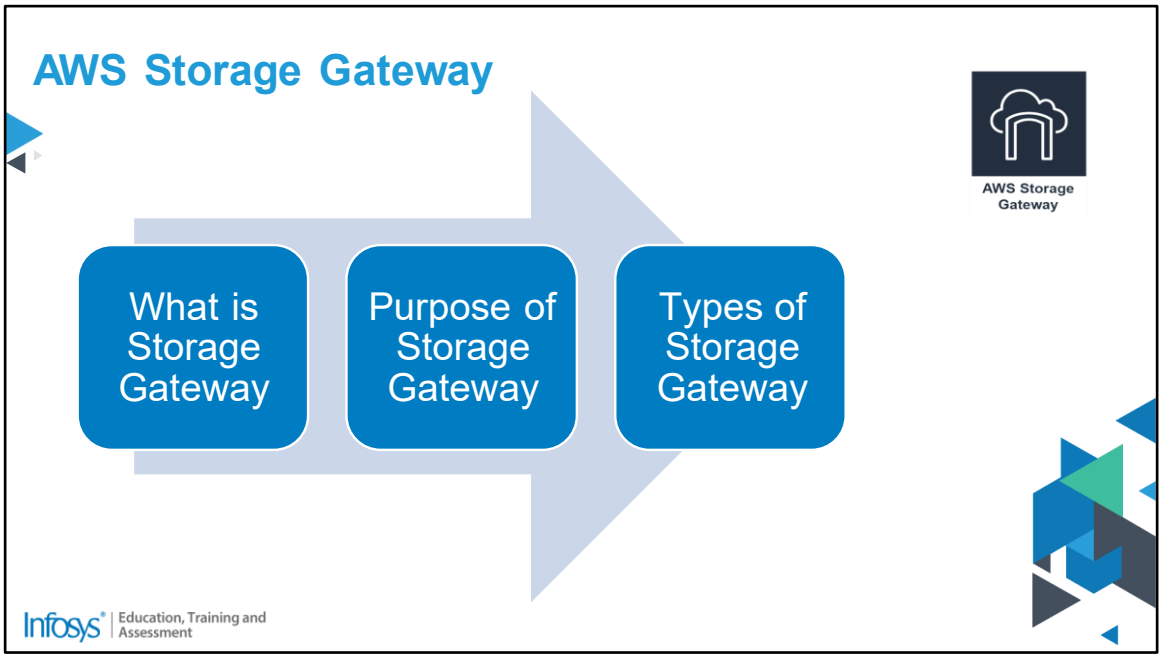
In order to meet the customer satisfaction, Discover financial Services decided to store its data in Amazon EFS
EFS allows Discover to implement a shared storage service that's fully managed and cloud native.
This allowed the teams to store and retrieve very large datasets in EFS and share them whenever the demands came in
Use of EFS has greatly increased the scalability and security and has also reduced costs considerably.



In this video you will learn about AWS Storage Gateway.

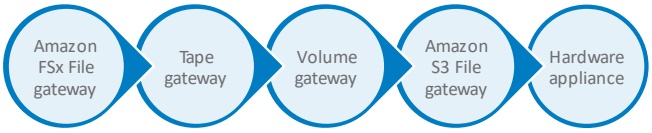


Storage gateway is used to connect a on premise service or software appliances with the cloud. This provides a secured channel for communication between on premise IT environment and infrastructure storage of AWS.

Storage gateway service provides a cost-effective, secured and scalable data storage. Once the storage gateway is installed, it can be linked with your AWS account with the help of activation process. Then with the help of AWS management console, different gateway options can be created

There are three kinds of storage gateway that you will learn in next slide.

Storage Gateway Types



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Storage Gateway offers three different kinds of gateways namely File Gateway, Tape Gateway, and Volume Gateway

File Gateway presents a file interface that enables you to store files in the form of objects in Amazon S3 using the industry-standard SMB and NFS file protocols

Tape Gateway presents a virtual tape library (VTL) consisting of virtual tape drives and a virtual media changer to your backup application using storage industry standard iSCSI protocol.

Volume Gateway presents your applications block storage volumes using the iSCSI protocol.

Use case for AWS Storage Gateway

Solution:

AWS Storage Gateway

Benefits:

- Saved cost and time
- long-term storage tier
- **Reduced DR risk**
- 30 TB per backup
- 320TB on Glacier

"It just took three hours at most to make the setup on AWS. We can now provision virtual tapes on AWS with the click of a button." ,says Jesse, Network Service Manager of SOU.

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In order to address the challenges faced, SOU leveraged **Storage Gateway service from AWS**

AWS provided a solution that allowed the university to save both cost and time.
It Reduced costs together with physical tapes, hardware refreshes, tape-library support, and offsite storage.
The solution also Removed time-consuming administration of physical tapes, saving staff time

It Reduced the risk by means of geographically remote backup for improved disaster-recovery capabilities
SOU uploads around 30TB to AWS per backup, and it is keeping around 320TB on Amazon Glacier through Storage gateway.

"It just took three hours at most to setup the virtual tapes. We can now provision virtual tapes on AWS with the click of a button." ,says Jesse, Network Service Manager of SOU.

AWS Networking Services

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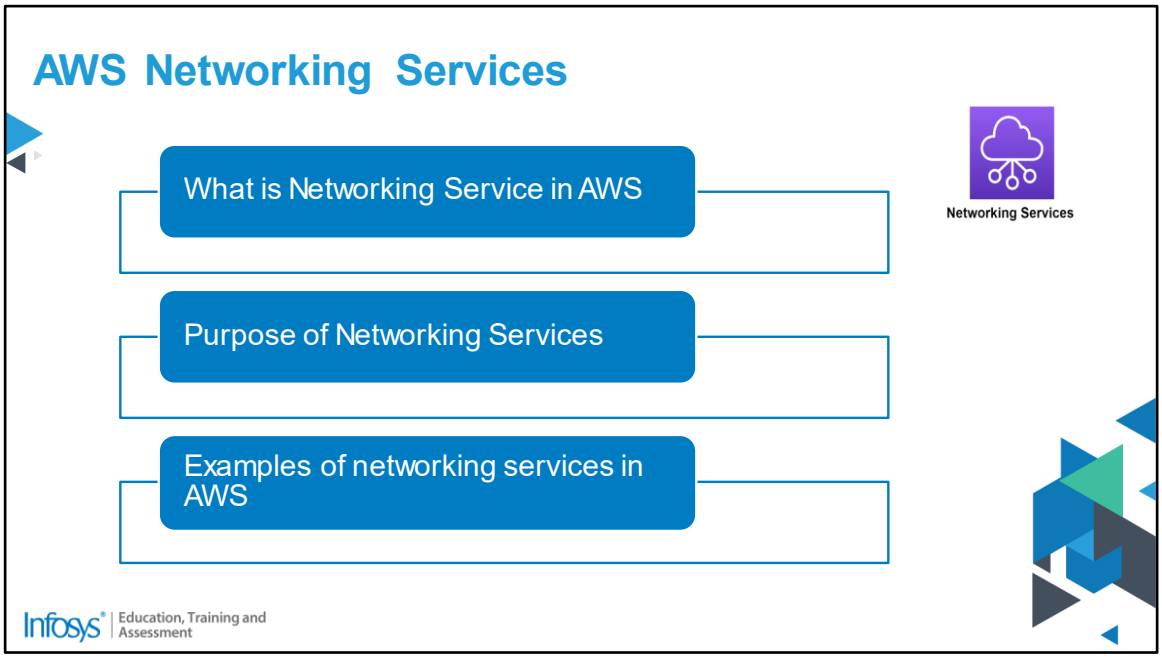
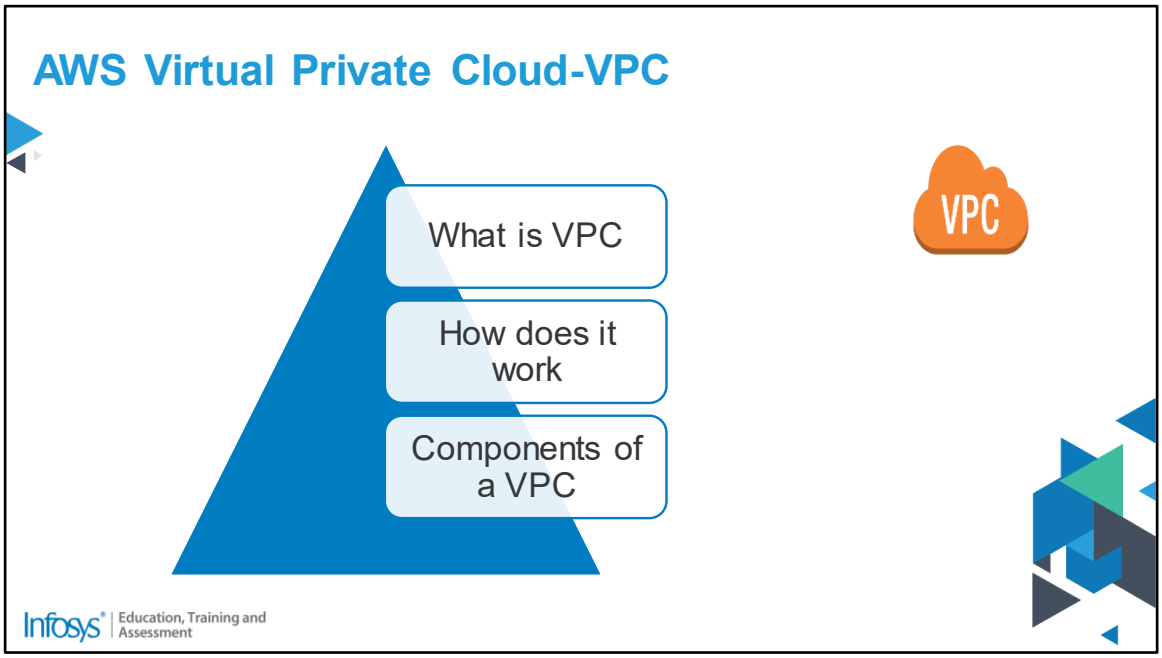
In this module, you will learn about AWS Networking Services.



AWS provides lot of networking services for designing a strong architecture. It provides secured and streamlined network connectivity and deliver the content globally with the high availability. This helps in provisioning logically isolated AWS section.

AWS networking plays an important role in creating the AWS eco system. The networking part is fundamental for many services, so it becomes very important that all of the networking services function properly. The networking service enables communication among all AWS resources without thinking about their physical location. It gives a way for all AWS customers to scale up the workload, separate the cloud infrastructure and even for connecting with a physical infrastructure to an existing personal private network.

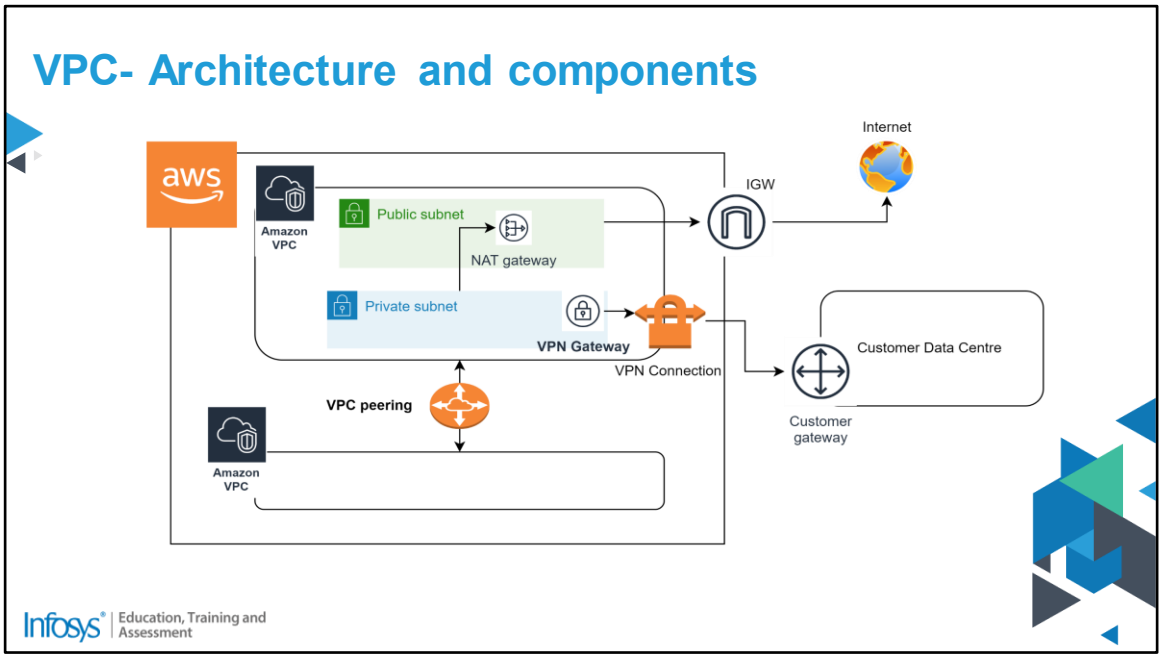
AWS provides a wide range of networking and content delivery services. Some of the examples for networking services are AWS VPC, AWS API Gateway, AWS Direct Connect,, AWS Route 53 and AWS app Mesh.



Amazon VPC means Virtual Private Cloud, and it creates a logically different and isolated sections in AWS Cloud. Inside this VPC you can launch your resources which will be private by default until you change the access methods. As a user you will have complete control over the virtual networking environment like subnets, IP ranges, route tables and network gateways.

Amazon VPC allows you to launch the resources in a network that you have defined virtually. This is very similar to a data center that you could have defined on the organization premise, but with an added benefits of AWS scalable infrastructure.

VPC has many key components such as : Subnet , Route table, Internet gateway, CIDR block, NAT Gateway and Network ACLs. We will see these key components in next slides.



In this video you will learn about the architecture of a VPC and its components.

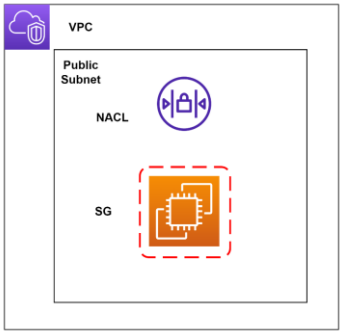
A subnet is the range of IP addresses that we allocate to each machine in our VPC. Subnet which have access to the internet are called as public subnets, subnets which do not have access to outside world, they are private subnets.

NAT gateway is a service managed by AWS which allows EC2 instances present in private subnet for connecting to the internet. These also helps the private instances to connect with other VPC as well as on premise data centers. An internet gateway is used to allow communication between your VPC and internet. This is attached to VPC. A Virtual Private Network Gateway is a networking means which can be used to connect two or more devices in a VPN infrastructure.
A customer gateway can be used to pass the information about customer device or customer application to AWS.

VPC peering will be used for routing traffic between two VPCs with the help of IPv4 and IPv6 addresses. The VPCs for peering can be in same region or different regions.

Some other Key Components of VPC

- NACL
- Security Group
- VPN
- Direct Connect



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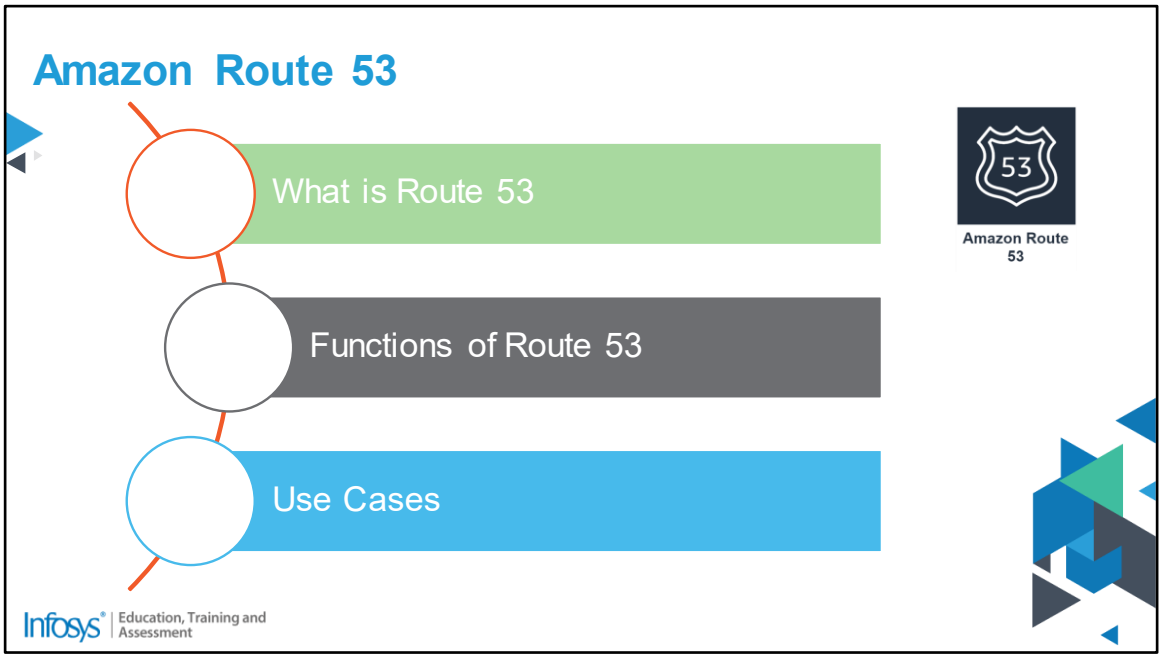
NACL stands for Network Access Control List, and it acts as first line of defense for our subnets. It controls inward and outward traffic of a subnet. It has both allow and deny rule associated with it.

Security Groups acts as a firewall at instance level, and it controls the traffic going in and coming out from an instance. Security groups has only allow rule associated with it. They can reference either another SG or IP addresses.

A Virtual Private Network Gateway is a networking device which is used to connect two or more devices within a VPN infrastructure.

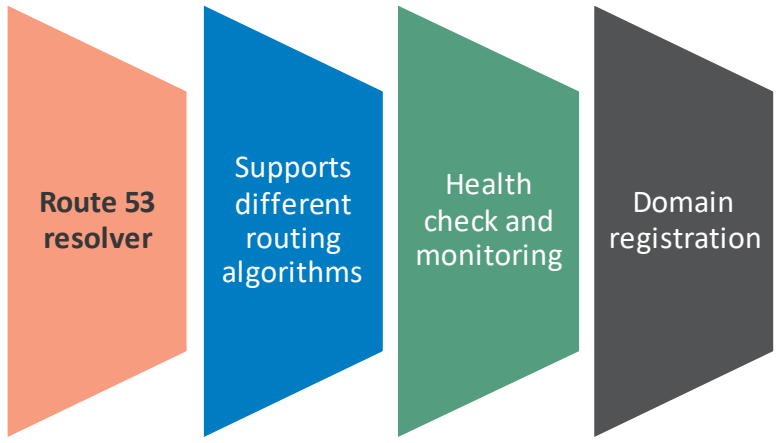
With the help of direct connect we can establish a dedicated private connection between AWS cloud and on-premise data center. This reduces network cost, provides a better network experience and increases bandwidth throughput.



Amazon Route 53 is domain name system service which is highly scalable and available. Route 53 can be mainly used for registering domain names, routing internet traffic to the resources present in your domain and checking the health of your resources.

So, if you need a website for your application, route 53 will help you in registering a name for your website. Once it is registered, now route 53 will help the user connecting to your website once they enter your registered domain name in the address bar. And finally, route 53 frequently sends automated requests to your resources to check their health.

Key Features of Amazon Route 53



Courtesy: Amazon Route 53 features - Amazon Web Services

RDS is relational database service supported by Amazon. As the name suggests, it can be used only for relational databases. We will use SQL language for the same. So, it is a fully managed database service that allow us to create databases in AWS Cloud. These databases can be of multiple kinds like Postgres, Microsoft SQL Server, Oracle, MariaDB, MYSQL, and Aurora. Aurora is a proprietary database from AWS.

RDS is AWS managed database service. So, provisioning the database will be automatic. The patching of the operating system will be done by AWS. You have continuous backups and restore options with point in time restore. You have monitoring dashboards, to see if your database is doing good. You will be able to scale the reads by creating a read replicas and improve the read performance. You have the way to set it up multi-AZ to make sure that you are ready to have a plan for disaster recovery against a whole availabilities on going down. And, finally, you can set up maintenance windows for upgrades. This storage is going to be backed by EBS, would it be a gb2 type or io1 type volume, and the only thing that we cannot do with an RDS database is that we cannot SSH into your RDS database instance.

RDS deployments will be done based on the necessity of the application. For read

intensive applications, read replicas can be created which offloads the main database from read requests. The data will be written to only main DB, up to 5 read replicas can be created. So Read Replicas are used to scale reads. You can use the Multi-AZ option which is used for failover in case of any AZ outage .So, in case in the availability zone, like crashes, and this gives you high availability.

Configuring a Database instance can be achieved in two ways . One option is using an option group which will specify features called options and these are available for any RDS Database instance. The second option is using the Database group parameter. It will be acting as a container for the given engine configuration which can later be used for on or more Database instances.

Management of the created instance can be achieved using multiple operations. Few of the operations are stopping a DB instance, starting it, modifying an instance, maintaining an instance and modifying the instance.

Installing Database

Running database service on EC2

Running database service on RDS

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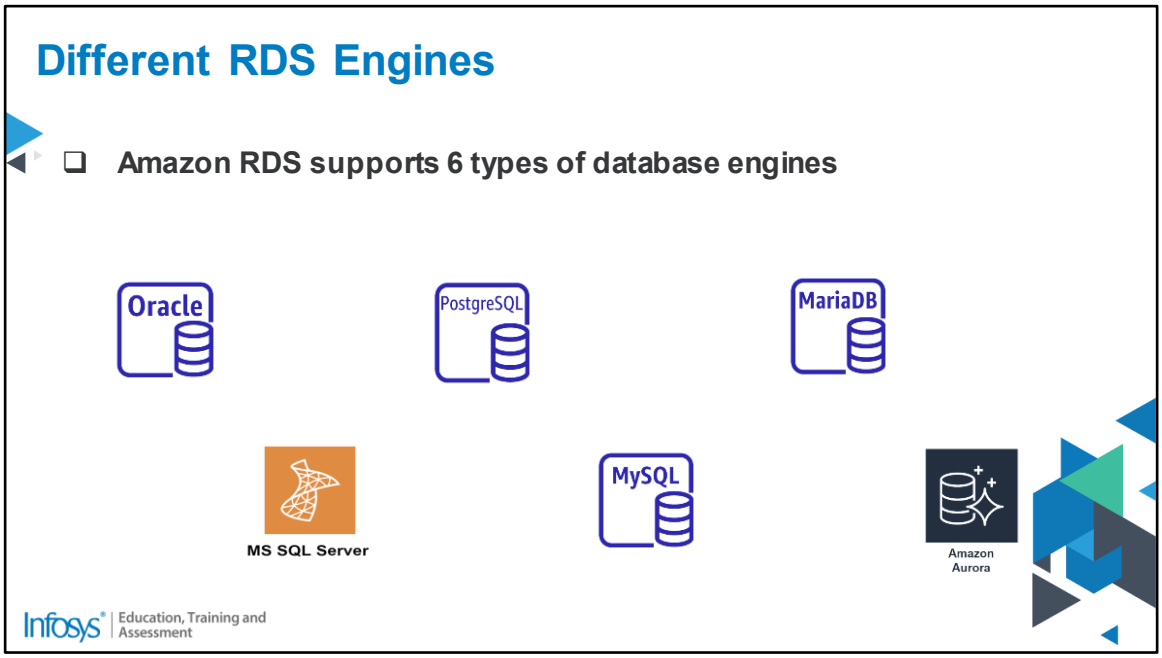
You can install the databases in two ways on a virtual machine:

First method is you use an EC2 machine and install your database on it. Below are the few use cases in which running the database on EC2 :

- You need full control over database and instance
- You need OS level access
- You need to use any third-party database engine which is not supported by Amazon RDS

Second way to use database services is through AWS managed RDS. Few favorable use cases for the this can be:

- You do not want to do any heavy lifting and want only to focus on your business and application.
- You do not want to take care of point in time recoveries and back ups of your database.
- You would like to have highly available database.

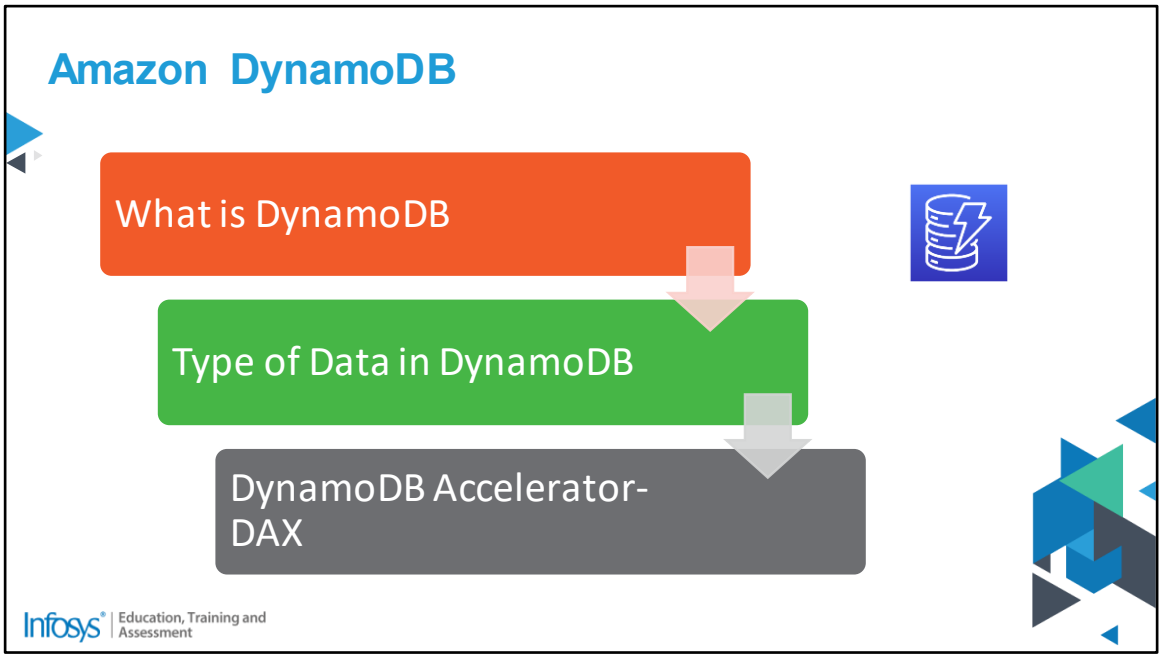


In this video, You will learn about different database engines that are supported by Amazon RDS service.

Amazon RDS supports 6 database engines which are :

Amazon RDS for oracle
Amazon RDS for SQL Server
Amazon RDS for PostgreSQL
Amazon RDS for MySQL
Amazon RDS for MariaDB
Amazon Aurora which is compatible with MySQL and PostgreSQL

Now you will explore these Amazon RDS engines one by one in the subsequent videos.

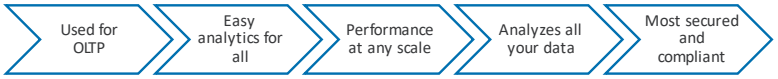


DynamoDB is a highly available and fully managed database which supports replication in three zones. This is not a relational database rather it supports NOSQL databases. It is a flagship product of AWS. It is a serverless database which can scale to massive workloads. But this does not mean that there are no servers, the servers will be still running in the backend

DynamoDB is a key value database and data will have a primary key. The primary key can be made of one or two columns named as partition key or sort key. Other attributes can be added on the right-hand side where the columns for your customized data can be added. Finally, all the items will be inserted as row by row, and this is how a DynamoDB table works.

The concept of Caching is supported in DynamoDB with the help of DynamoDB accelerator or DAX. This is an in-memory and fully managed cache for DynamoDB. This cache is specific for DynamoDB, and this is different from ElasticCache. DAX can be used for storing most frequently read object. It can give 10x performance.

Amazon Redshift



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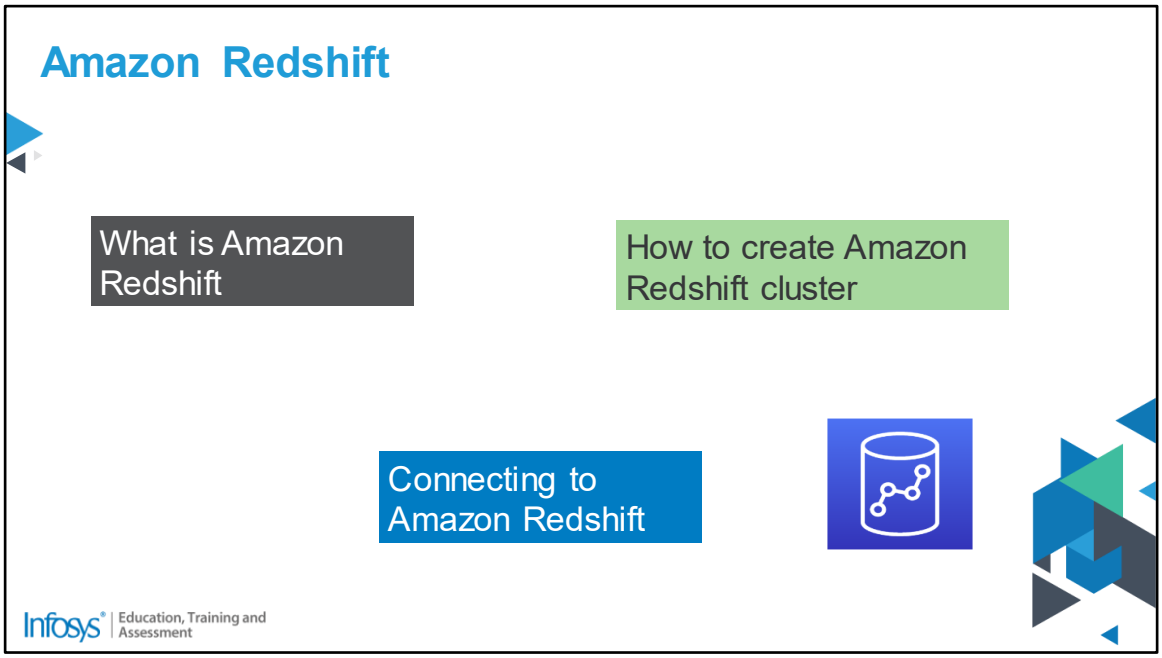
Redshift is a type of database which is built on PostgreSQL. But this is not used for Online Transactional processing. We use RDS for OLTP. Redshift is used for OLAP that is online Analytical processing. This helps to run different analytics on the data with data warehousing. So, redshift is very good at analyzing data and performing some computation on them.

Amazon Redshift Cluster can be created using a sample dataset. Redshift will load the sample dataset at the time of new cluster creation automatically. The data can be queried once the cluster is created.

You can connect to Amazon Redshift Clusters from the cluster page of the console by expanding connect to Amazon Redshift cluster. After that we can use any client tools like JDBC or ODBC by copying the respective URL. Query editorv2 can be used for the databases that is hosted by Redshift Cluster.
Amazon Redshift Features - Cloud Data Warehouse - Amazon Web Services



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3.4 Identify Resources for Technology support

- Recognize there is documentation (best practices, whitepapers, AWS Knowledge Center, forums, blogs).
- Identify the various levels and scope of AWS support.
- Recognize there is a partner network (marketplace, third-party) including Independent Software Vendors and System Integrators.
- Identify sources of AWS technical assistance and knowledge including professional services, solution architects, training and certification, and the Amazon Partner Network
- Identify the benefits of using AWS Trusted Advisor.

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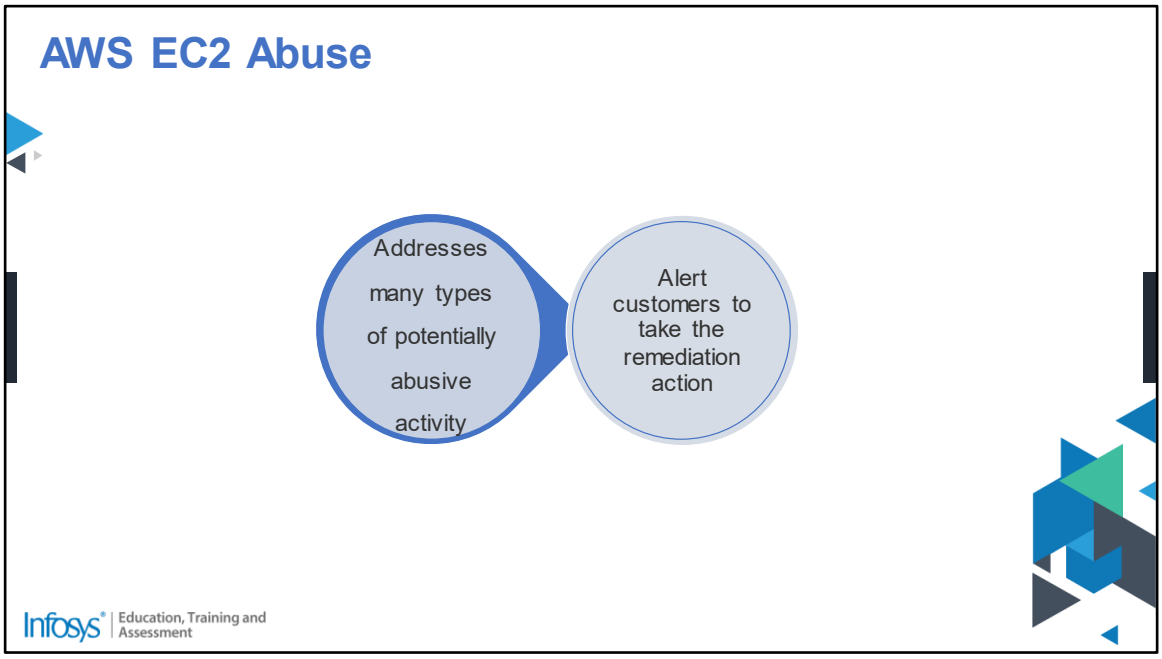
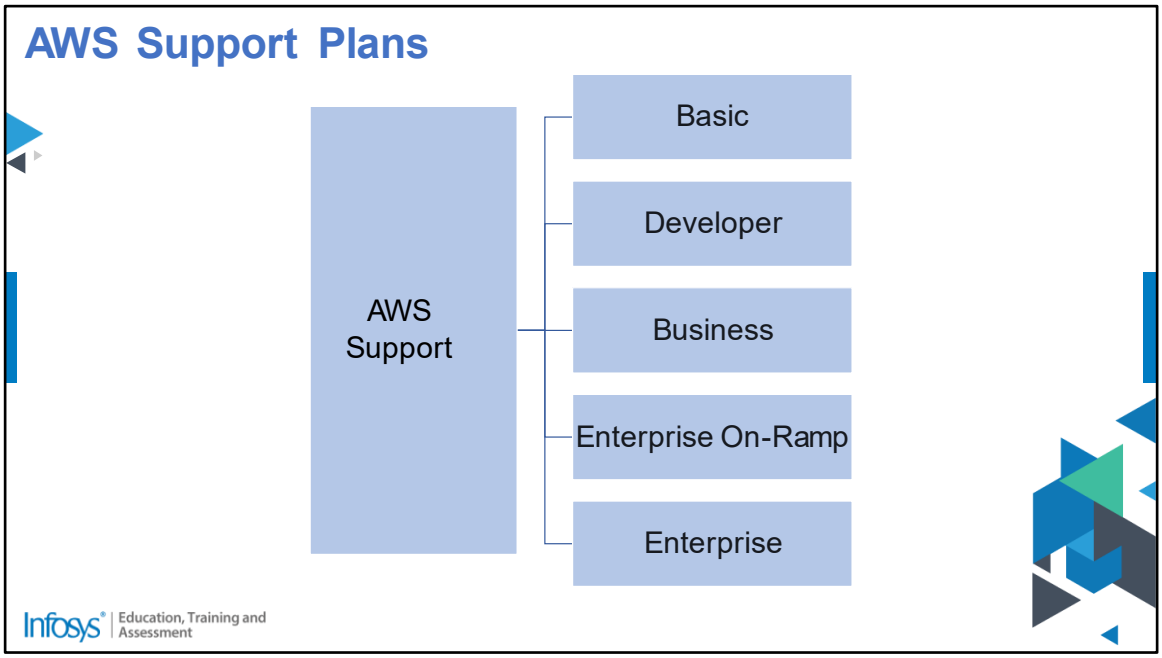
Navigate your next

In this module, you will learn about different available resources for technology support in AWS Cloud.



AWS abuse is used to detect and address many abusive activities such as Denial of Service attack(DoS), spam, malware, and phishing attacks. When an abuse is reported, users are notified.

Based on that actions will be taken by users. Now users can programmatically create custom automation according to the abuse events they receive.



There are five support plans that is offered by AWS. You can choose a plan based on your business need.

Basic support plan offers a 24*7 access to the following:

- One-to-one interactions for account and billing related questions
- Different support forums
- Health checks for the services
- Technical papers, best practice guides and all the related documentation

Developer support plan offers all the services listed under basic support plan with the following added services :

- Diagnostic tools for client side
- Support for building block architecture
- Root user can open unlimited number of support cases, all will be handled.

A business support plan have offers following features:

- Use of AWS trusted advisor
- Software support for third party components
- Guidance for each use cases

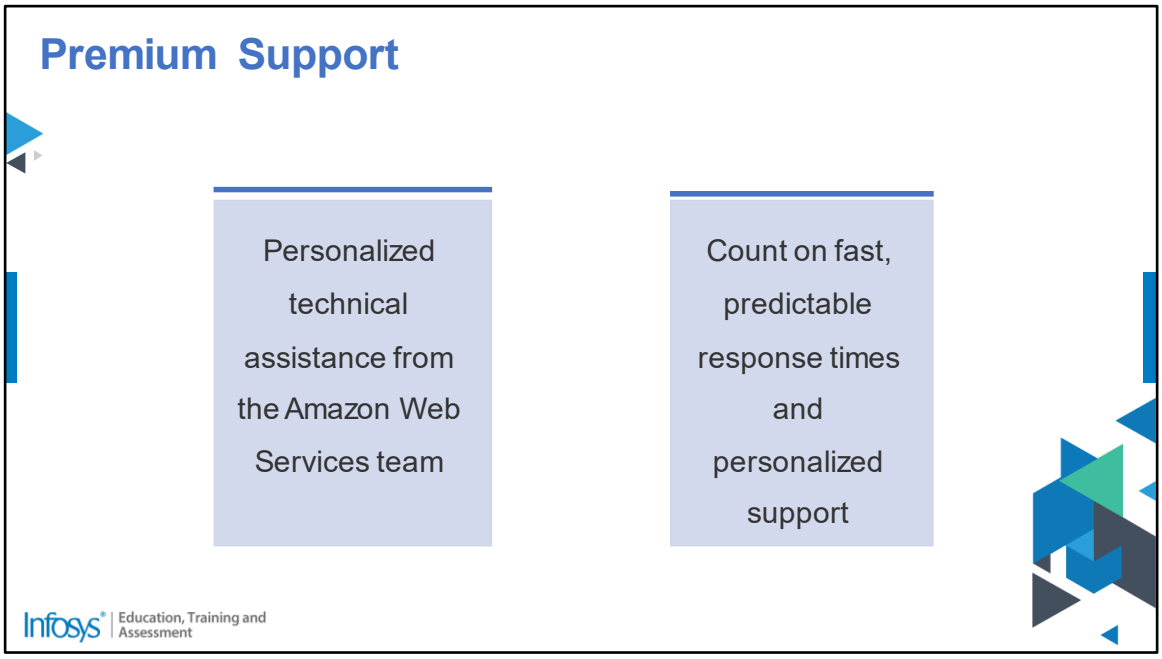
- AWS support API to communicate with trusted advisor and support center.
- Technical support cases can be opened by unlimited number of IAM users

Enterprise on-Ramp support plan offers following additional features:
- A group of Technical account managers which coordinates with the AWS experts
- A team for concierge support
- Costlier than Business support plan

Enterprise support plan have all the features with the additional features:

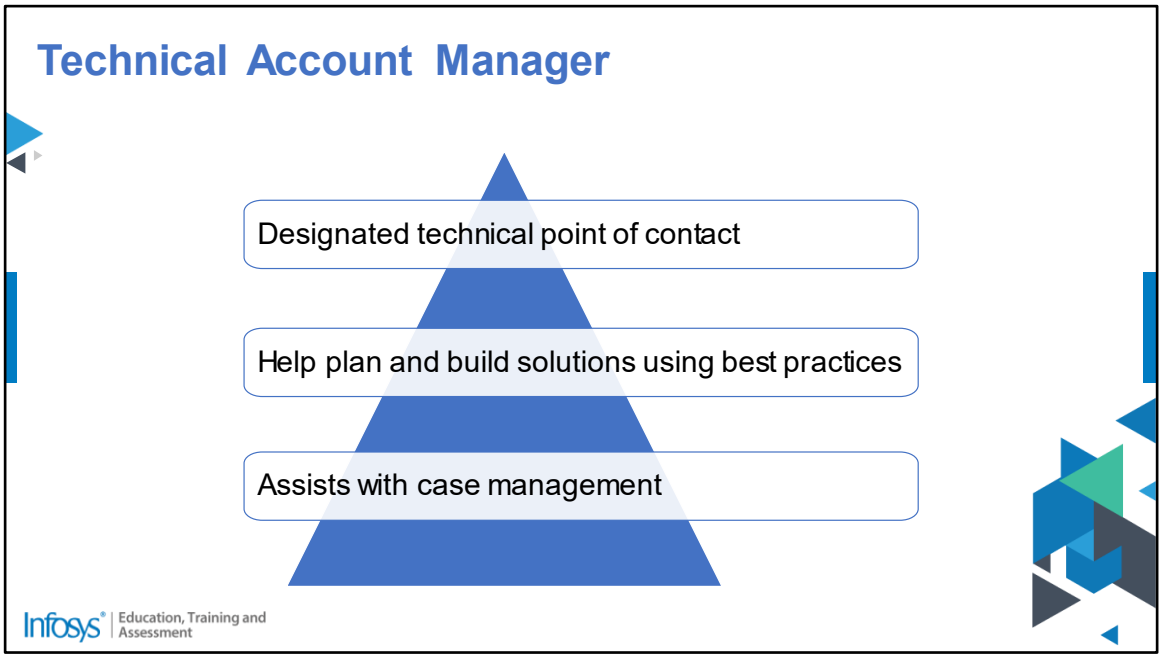
- A designated Technical account manager
- Access for Online labs which are self-paced
- It is costlier than Enterprise on-ramp support plan.

To know more about support plan, please refer the link given in additional reference section.



If you sign for AWS premium support, you get technical assistance for your specific case from AWS team that is dedicated to you. You get this support whenever it is required based on your business demands.

As a customer, you can approach AWS developer support team and count on them for a fast response. They respond to your personalized operational or technical issues related with AWS infrastructure services. This plan also offers a service health dashboard which provides a complete status report for your services, and it is free of cost for all the AWS customers.

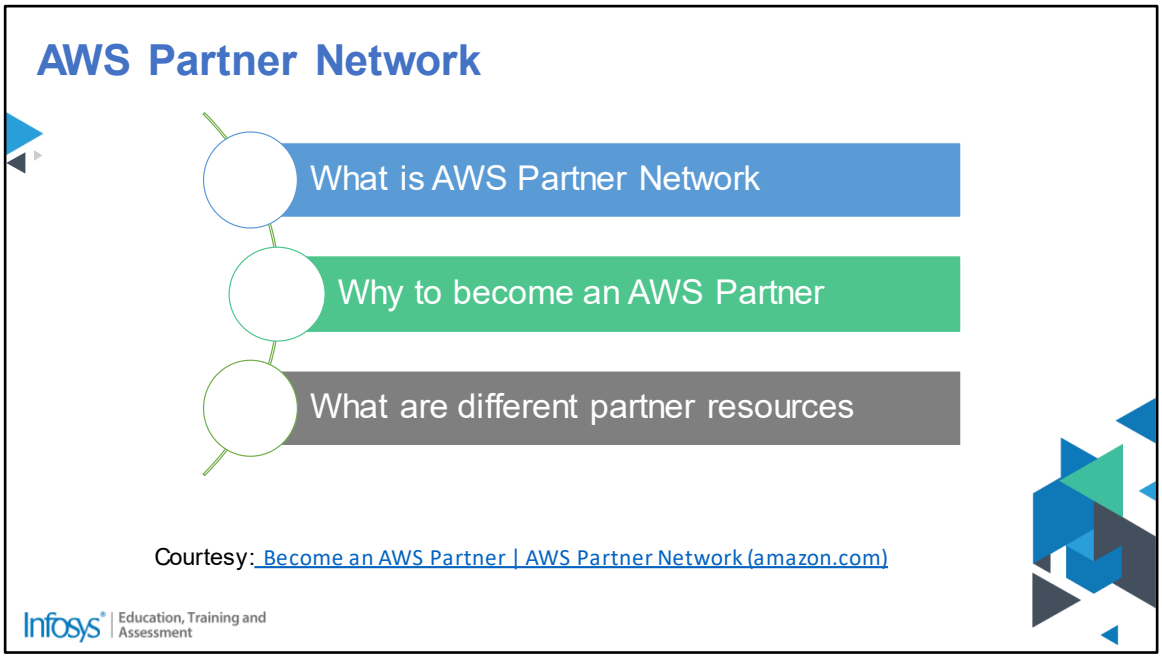


TAM is single point of contact for all the AWS expertise. TAM understands your business and takes care of general health of your working environment.

TAM assists in on boarding, providing advocacy and general guidance for planning and building solutions using best AWS practices.

TAM assists in different open cases. It works with specific use cases (with a case ID) and application.

TAM manages access to subject matter experts and offers insights and recommendation on your expenditure in AWS Cloud. TAM also helps with event management, workload optimization.



AWS Partner network – APN is a group of global partners that supports in selling customer offering in AWS marketplace. Partner networks and AWS, together can offer innovative solutions and deliver better value to their mutual customers.

By becoming an AWS partner you can leverage on latest AWS technologies, globally reach to your customers and can think of better profitability.

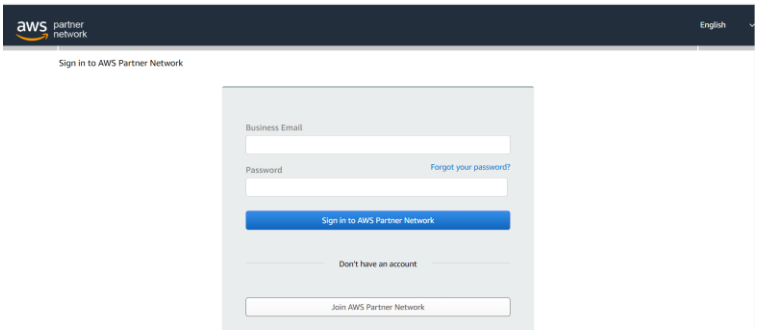
Different partner resources are as listed below:

- Partner central log in
- AWS Marketplace
- Partner events
- Partner training and certification

To explore more about each resources, refer to the attached link.

How to become member of AWS Partner

- Three simple steps for AWS partner network registration



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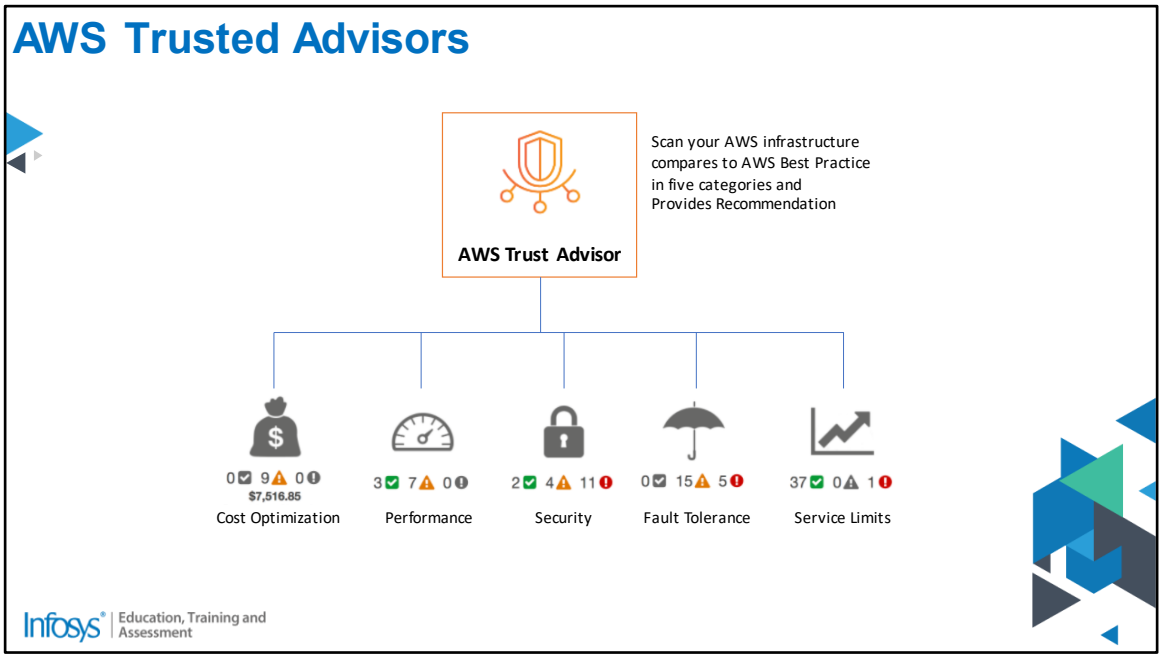
There are three simple steps to register with AWS partner network:

- Become a member and join APN
- Add your company information
- Accept the terms and condition and register your company

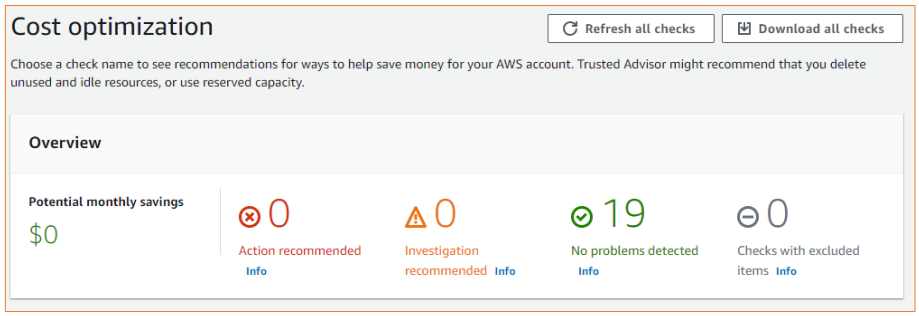
Once your registration is completed, you will be able to log in with the credential on AWS partner network portal.



AWS Trusted Advisors Scan your AWS infrastructure and compares with the AWS Best Practice in Five Categories like
Cost Optimization
Performance
Security
Fault Tolerance and
Service Limits
and provides recommendation to optimize your services and resources.

https://aws.amazon.com/premiumsupport/technology/trusted-advisor/

AWS Trusted Advisors – Cost Optimization



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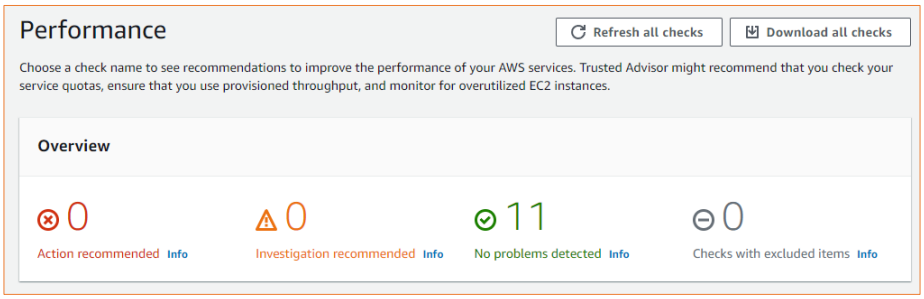
Cost optimization

Trusted Advisor analyses the usage, configuration and spend of the customer and helps the customer by providing actionable recommendations to save cost. For Example, it identifies the idle RDS DB instances, unassociated Elastic IP addresses, underutilized EBS volumes, and excessive timeouts in Lambda functions.

AWS Trusted Advisors – Performance



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Performance

Trusted Advisor analyses the usage, configuration of the customer and helps the customer by providing actionable recommendations to improve the performance.
For Example, it analyses the compute usage of EC2 instances, EBS throughput and latency, and configurations on CloudFront.

Benefits of AWS Trusted Advisor

- ❑ Cost Optimization
- ❑ Performance
- ❑ Security
- ❑ Fault Tolerance
- ❑ Service Quota

Sample Questions

Question 1

An organization has hosted a website which is using the Route53 services of AWS. Multiple users are accessing this application end points. What actions can be performed by Amazon Route 53 which will help the end users? (Select two options)

A. Manage DNS records for domain names.

B. Automate the deployment of workloads into your AWS environment.

C. Access AWS security and compliance reports and select online agreements.

D. Connect user requests to infrastructure in AWS and outside of AWS.

E. Route the traffic to through AWS private Link

Question 2

A Startup company built its web applications using .NET platform. Last year, the company decided to move all the applications to the Cloud Environment, but they do not wish to handle any part of the deployment process. Which service of AWS the company should leverage?

A. AWS Outpost

B. AWS Snowball

C. AWS CloudFront

D. AWS Elastic Beanstalk

Question 3

You are a developer of a Retail company, to save time consumed in the creation of many AWS resources and deployment of applications on the resources created, the team has requested you to automate actions for AWS services and applications through automation scripts. Which tool will you select for the job assigned to you?

A. AWS Snowball

B. AWS QLDB

C. AWS Command Line Interface

D. Amazon Redshift

Question 4

Your company owns an application which uses Amazon EC2 instances to run the customer-facing website behind an ELB with Autoscaler registering the instances to ELB and Amazon RDS database instances to store customers' personal information. How should the developer of your team should configure the VPC according to best practices of AWS?

A. Place the Amazon EC2 instances in a private subnet and the Amazon RDS database instances in a public subnet.

B. Place the Amazon EC2 instances and the Amazon RDS database instances in a private subnet.

C. Place the Amazon EC2 instances in a public subnet and the Amazon RDS database instances in a private subnet.

D. Place the Amazon EC2 instances and the Amazon RDS database instances in a public subnet.

Question 5

A private IT firm has its own data center. They want to use AWS services over a private dedicated connection.

Which component of AWS can be used to establish this dedicated connection?

A. Virtual private gateway

B. AWS Direct Connect

C. DNS

D. Private Subnet

Further References

- AWS FAQ's
- More on Cloud types and deployment models in AWS
- AWS Direct connect and VPN
- VPC and it's components
- More on AWS Databases
- AWS support programs

Try out Labs

- Hands on: Create your first S3 bucket
- Creating an Amazon EC2 linux Instance
- Creating a VPC with two subnets
- Creation of Amazon RDS DB instance with MS SQL Engine