



Module 1: Fundamentals of Cloud & Important Definitions

Be familiar with the fundamentals of Cloud Computing.

Know basic important definitions.

Elasticity	Allows scaling service based on demand. It can make AWS workload cost-effective based on dynamic user demand .
On-Demand	Allows customers to launch servers and services whenever they intend to.
High-Availability	Architectural Design to accommodate the failure of any single component.
Least Privilege	Grant access to only resources needed to perform the task.

Module 2: AWS Global Infrastructure

Sr No	Topics	Description
1	Regions	Physical locations spread across the globe to host your data.
2	Availability Zones	AZ is a combination of one or more data centers in a region. Minimum 2 AZ needed to achieve high-availability.
3	Edge Locations	An edge location is where end-users access services located at AWS. Delivers contents close to the users. Caches responses so it reduces traffic on the origin server. CloudFront can be used. Will help improve the overall latency and improve the performance of the website.

The primary aim of distributing servers across availability zones is to prepare for failure.

Module 3: Elastic Compute Cloud (EC2)

Before you launch an EC2 instance, you will have to select the region.

AMI is basically an OS for EC2 instance. The OS can have its own set of software configurations.

We can launch multiple images from a single AMI.

Module 4: EBS and Instance Store

4.1 Elastic Block Store (EBS)

AWS EBS provides persistent block storage volumes for AWS EC2 instance.

4.2 Instance Store:

Fast performance but will be lost if you stop your server.

Module 5: Simple Storage Service

Sr No	Storage Classes	Description
1	General Purpose	Recommended for frequently accessed data.
2	Infrequent Access	Long-lived infrequent accessed data.
3	Reduced Redundancy	Frequently accessed, non-critical data.
4	Intelligent-Tiering	Long-lived data with unknown access patterns.
5	One Zone-IA	Long-lived, infrequently accessed, non-critical data.
6	Glacier Deep Archive	Archive data that rarely need to be accessed. Retrieval time in hours.
7	Glacier	Archived data with retrieval time in minutes to hours. Suitable for use-case where durable low-cost storage needed.

Know the difference between Buckets and Objects.

Buckets are like folders where you can store multiple objects.

S3 is a durable storage system and is based on object storage.

S3 can also be used for storing RDS backups.

S3 can also be used to host simple websites (low cost)

Module 7: Virtual Private Cloud (VPC)

Allows us to define a custom network for our resources in AWS.

We can then implement minute controls.

VPC peering allows resources between two VPC's to communicate with each other.

Module 8: Hybrid Cloud Architectures

Hybrid Cloud Architectures is a combination of AWS and other platforms (on-premise / other cloud providers)

Direct Connect is used to connect AWS VPC to Datacenter environments

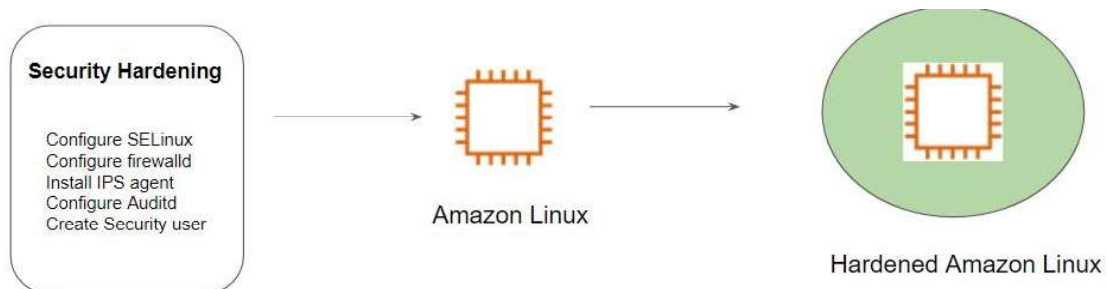
Direct Connect provides a dedicated network connection between on-premises and AWS.

Various services like Route53, Virtual Private Gateways (VGW) can be used in a hybrid design.

Services like Classic Load Balancer, Auto Scaling, are not supported in a hybrid design.

Module 9: Amazon Machine Image (AMI)

Amazon Machine Image (AMI) is the master image from which new EC2 instances can be launched.



Module 10: AWS Snowball

AWS Snowball is a data transport solution that accelerates moving terabytes to petabytes of data into and out of AWS using storage devices designed to be secure for physical transport.



Module 11: AWS Snowmobile

AWS Snowmobile is an Exabyte-scale data transfer service used to move extremely large amounts of data to AWS.



Module 12: AWS Elastic Load Balancers

Allows users to distribute traffic across multiple EC2 instances.

ELB will automatically scale (behind the scenes) depending on the traffic pattern.

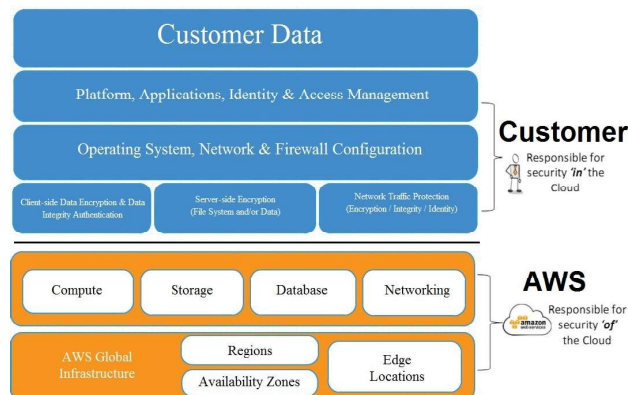
Type of Load Balancers:

Load Balancer Types	Description
Application Load Balancer	For Layer 7 Traffic.
Network Load Balancer:	Very fast performance. Can associate static IP address.
Classic Load Balancer	For development / testing.

Module 13: Shared Responsibility Model

AWS is responsible for the physical security of the facilities as well as the infrastructure that includes compute, database, storage, and networking resources.

The customer is responsible for software, data, and access that sits on top of the infrastructure layer.



Be prepared for questions related to the Shared Responsibility Model.

Remember that when it comes to “Customer Data”, the responsibility falls to customer.

Some aspects like “Awareness and Training” are shared control between customers and AWS.

Customers' Responsibility	AWS Responsibility
Encrypting the data. Updating the server's OS (patching EC2) Firewall Configurations. (SG, NACL)	Anything related to Hardware. Ensuring AWS services are always up. Training Data Center staff Patching OS for RDS, ElastiCache, Fargate Physical Security.

Module 14: Identity and Access Management (IAM)

Users/Groups/Roles/Policies

If IAM user wants to access a specific AWS service, assign an IAM policy to it.

Access/Secret keys can be for AWS CLI operations (associated with IAM user)

For EC2 Instance, you can make use of IAM Role.

IAM Policies allows an administrator to control which user can do what operation.

For additional security, make use of MFA and strong passwords.

If you want to apply a set of policies to a large group of users, use IAM groups.

Module 15: AWS Shield

Dedicated Service which protects against DDoS attacks.

Two variants: Shield Standard and Shield Advanced

Feature	AWS Shield Standard	AWS Shield Advanced
Network Flow Monitoring	✓	✓
Automated Layer 7 Monitoring		✓
Common DDoS Attack protection	✓	✓
Additional DDoS mitigation capacity		✓
Layer 3/4 attack notifications and reports		✓
Layer 3/4/7 historical reports		✓
DDoS Response team support		✓
Cost protection		✓

Module 16: Trusted Advisor

AWS Trusted Advisor analyzes your AWS environment and provides best practice recommendations in five major categories:

Business and Enterprise Support customers have access to all the Trusted Advisor checks.

Remember the name of these checks categories.



Module 17: AWS CloudTrail

AWS CloudTrail is a service that enables governance, compliance, operational auditing, and risk auditing of your AWS account.

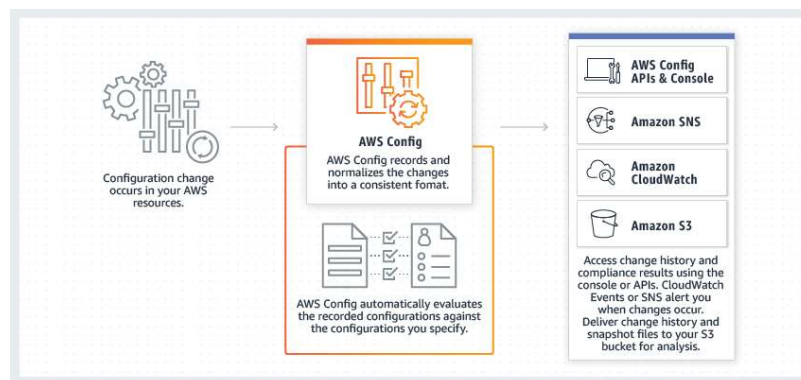
It records the activities in your AWS account so that Administrators can track which user has performed which operation in the AWS account.

User	Action	Time
James	Logged In	3:50 PM
Anne	Modified SG	7:30 PM
Susan	New EC2	11:00 PM

Module 18: AWS Config

AWS Config allows customers to audit and monitor changes to AWS resources.

This service is also useful for change management purposes.



Module 19: Firewalls

Security Group acts as a virtual firewall for EC2 instances.

Network ACL applies at a subnet level instead of the EC2 instance level.

Managing both is the responsibility of the customer.

Module 20: Miscellaneous Pointers for Security

AWS Shield, AWS CloudFront, and WAF can protect against DDoS attacks.

AWS Classroom Training is also available for customers who want to learn about AWS and Security in an official instructor-led setting.

AWS Professional services can also guide an organization when the customer needs specialty level guidances. They even work with APN

Module 21: CloudFormation

AWS CloudFormation allows us to deploy the infrastructure in the form of code.

It's often also referred to as Infrastructure as Code solution.

Supports almost all the AWS services.

CloudFormation is a free service (resources created would be charged)



Module 22: AWS Elastic Beanstalk

You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring.

AWS Elastic Beanstalk can manage and automate deployments in AWS.

Limited by what it can provision: EC2, RDS, Load Balancers, Security Groups.

Module 23: Serverless Computing

AWS Lambda lets you run code without provisioning or managing servers.

You pay only for the compute time you consume - there is no charge when your code is not running.

Just upload your code and Lambda takes care of everything required to run and scale your code with high availability.

When you see “serverless” in question, Lambda is probably the right option.

AWS Serverless Platform NOT EC2, EMR.

Services that are part of the AWS Serverless platform can be SNS, DynamoDB, and others.

Module 24: CloudFront

AWS CloudFront is a Content Delivery Network service.

CloudFront is a global service.

CloudFront is also one of the services which help during DDoS attacks.

Data can be cached across multiple edge locations (leads to lower latency)

Data is cached using AWS Edge Locations.

Module 25: Database Primer

Relational Database (RDS)

NoSQL Database (DynamoDB)

Data Warehouse (Redshift)

In-Memory Databases - Redis and Memcached (ElastiCache)

25.1 Relational Database Service:

AWS RDS is a fully managed Relational Database Service in the cloud.
Simplifies database administration tasks.

Supports a wide variety of databases engines:

- MySQL
- PostgreSQL
- MariaDB
- Microsoft SQL Server
- Amazon Aurora
- Oracle

Various DB engines like MySQL, PostgreSQL, Microsoft SQL can also be hosted in EC2.

25.2 Important Pointers for Databases:

Various DB engines like MySQL, PostgreSQL, Microsoft SQL can also be hosted in EC2.

Aurora is one of the database services that can easily scale.

In Aurora, as your data grows, your cluster volume storage grows as well (storage scaling)

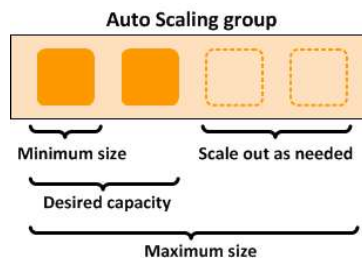
If there is a need for globally redundant databases, then RDS Read Replicas can be used.

Module 26: Auto-Scaling

Auto-Scaling allows us to scale up or down the servers depending on the demand.

We can define a minimum and maximum.

The minimum is the number of EC2 instances that are always running.



Module 27: AWS Access Options

We can access AWS in the following three ways:

- AWS Console (GUI)
- AWS Command Line Interface (CLI)
- AWS SDK

Access/Secret keys are used along with AWS CLI to connect to AWS resources.

Software Development Kit (SDK) allows access to AWS resources from application code.

Module 28: AWS CloudWatch

Primarily a monitoring service that can monitor for various aspects like CPU, Disk, Network utilization, and others.

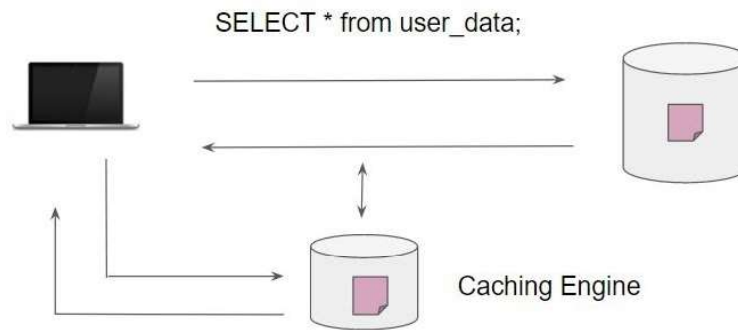
CloudWatch Logs allows users to centrally upload logs from all the servers.

CloudWatch logs allow real-time monitoring as well as adjustable retention.

Module 29: AWS ElastiCache

ElastiCache is a fully managed AWS service that makes it easier to deploy, operate and scale an in-memory data-store or cache in the cloud.

Used for storing results associated with frequently accessed queries.

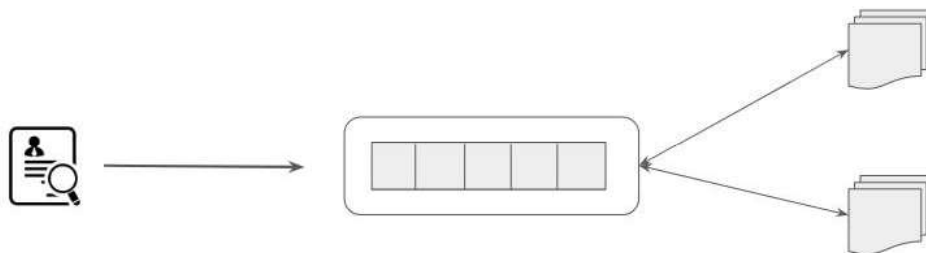


Module 30: Simple Queue Service (SQS)

AWS SQS makes it simple and quite cost-effective to decouple the components of a specific application.

Used for an architectural design where loosely coupled components are needed.

Loosely Coupled System = Important Design Principle



Module 31: Serverless Computing

AWS provides a set of fully managed services that you can use to build and run serverless applications

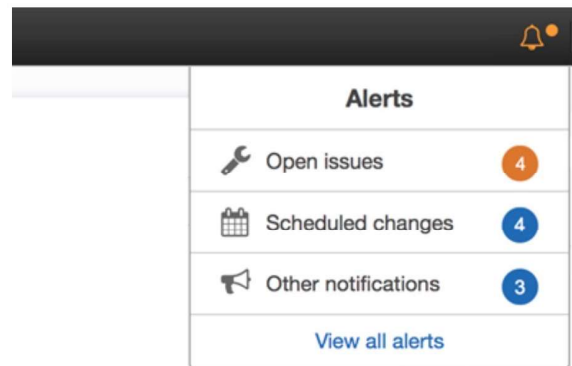
Examples:

Compute → AWS Lambda
Storage → AWS S3
Data Store → DynamoDB
App Integration → SQS, SNS

Module 32: Personal Health Dashboard

AWS Personal Health Dashboard provides alerts and remediation guidance when AWS is experiencing events that may impact you.

Amazon Web Services publishes our most up-to-the-minute information on service availability. This is part of the Service Health Dashboard.



Module 33: Miscellenous Pointer - Deployment

Route53 is the DNS service based on AWS.

For Storage systems, if frequent read/write of data is needed, make use of block-based storage like EBS, EFS instead of object store like Glacier, S3.

For choosing the right region for an application, consider the following:

- Least latency to the clients (end users)
- Data sovereignty and compliance aspects.

Know that some services are regional while some are global.

- Example of Regional Service: ELB, EC2, Auto-Scaling, RDS, DynamoDB, S3
- Example of Global Service: Route53, CloudFront

Version Control, GIT → AWS Code Commit

AWS Rekognition can automatically detect objects from an image with a specific probability.

AWS Code Deploy and AWS OpsWorks are the services that can deploy applications in the on-premise servers.

Amazon Redshift is the data warehouse solution that customers can use in AWS.

AWS EFS is the shared file storage solution that can be used across EC2 instance and on-premise servers.

If applications within on-premise need to make use of AWS storage solutions, AWS Storage Gateway can be used.

Module 34: Consolidated Billing

Part of the AWS Organizations service.

One bill for multiple AWS accounts.

Consolidated Billing allows us to have volume discounts.

Reserved Group instances are applied to all linked accounts.

Module 35: Free Things in AWS!

- CloudFormation
- Identity and Access Management (IAM)
- Auto-Scaling
- Elastic Beanstalk
- AWS VPC
- Consolidated Billing
- AWS Forums, Whitepapers, Documentations, and blogs.

Module 36: Support Plans

Enterprise Support Benefits from Technical Account Manager.

Minimum Support Plan for Chat/Phone Support is Business

One hour target response time for support cases - Business / Enterprise

Infrastructure Event Management is available for Enterprise Customers, and also to Business support customers but with an additional cost.

Module 37: EC2 Pricing

Sr No	EC2 Instance	Description
1	On-Demand Instances	Pay fixed-rate (at hourly/second basis) without any commitment.
2	Reserved Instances	You need to reserve capacity with a term of 1 to 3 years. A significant discount can be availed. Convertible RI = Allows changing attributes. Good for non-interruptible workloads. Three Year, All Upfront, Standard RI = Highest Discount
3	Spot Instances	Good for applications with flexible start and end times (interruptible workloads) Suitable for Infrequent, interruptible workloads. Can provide discounts up to 90%
4	Dedicated Hosts	Physical EC2 server dedicated for use of a single customer. Generally used when licenses are server bound.

Module 38: Pricing Calculator

Both of the following options can be used to estimate the cost in AWS.

38.1 Simple Monthly Calculator

- Used to check what a specific service usage would cost.
- It can be used to forecast the cost of workloads.

38.2 TCO Calculator (Total Cost of Ownership)

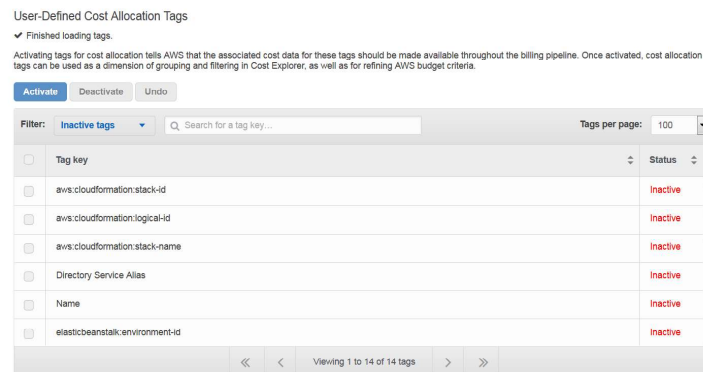
- Used for comparing the cost of running infrastructure on-premise vs Cloud.
- It can even generate reports that can be shared with the management.
- Be aware of what costs are included as part of TCO.
- Shared Responsibility Model of AWS can reduce the overall TCO.
- It's recommended to use Reserved Instances in calculating pricing with TCO.
- Example: Anti-Virus cost is not included but Datacenter security cost can be the part.

Module 39: Cost Allocation Tags

After you have created tags and associated it with resources, you can then activate them in Billing and Cost Management console for cost allocation tracking

After you activate them, they appear on your cost allocation report.

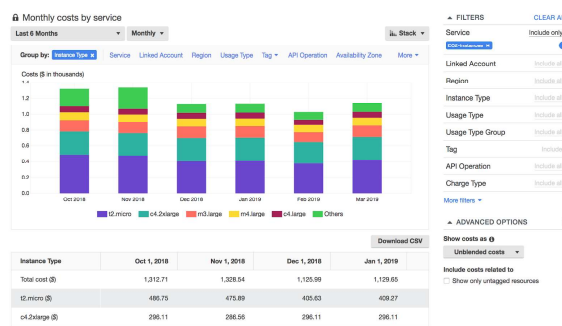
If you want to track and categorize spending in detail, Cost Allocation Tags is a good feature.



Module 40: AWS Cost Explorer

Allows customers to visualize cost over a period of time.

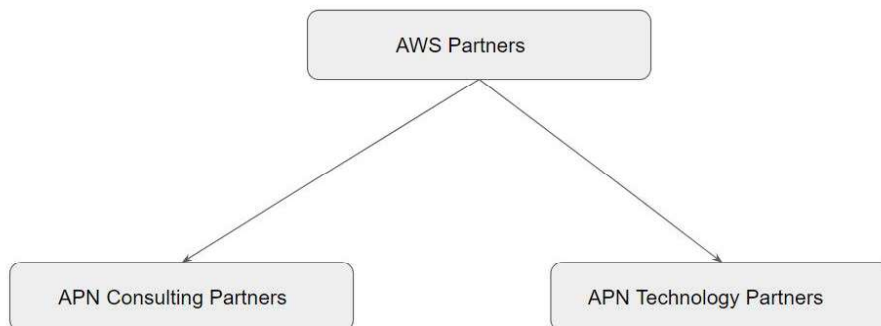
Provides out of box reporting and tracking associated with Reserved Instances and it benefits across your AWS accounts.



Module 41: AWS Partner Network (APN)

APN Consulting Partners helps customers of all types and sizes design, architect, build, migrate, and manage their workloads and applications on AWS, accelerating their journey to the cloud.

APN Technology Partner refers to organizations that are developing their own products/services that they will deploy on top of AWS to sell it to the customers.



Module 42: AWS Marketplace

AWS Marketplace is a catalog with thousands of software listing from third-part independent software vendors which makes it easy for customers to deploy solutions in AWS.



Module 43: AWS Budgets

AWS Budgets gives you the ability to set custom budgets that alert you when your costs or usage exceed (or are forecasted to exceed) your budgeted amount.

AWS Budgets

Filter by budget name

Download CSV Create budget

Budget name	Budget type	Current	Budgeted	Forecasted	Current vs. budgeted	Forecasted vs. budgeted	
Project Nemo Cost Budget	Cost	\$43.90	\$45.00	\$56.33	97.55%	125.17%	...
Eastern US Regional Budget	Cost	\$85.21	\$100.00	\$125.28	85.21%	125.28%	...
Total Monthly Cost Budget	Cost	\$141.50	\$175.00	\$187.00	80.86%	106.86%	...
Total IL22 Cost Budget	Cost	\$136.90	\$200.00	\$195.21	68.45%	97.61%	...
S3 Usage Budget	Usage	5,001 Requests	5,000 Requests	4,076.76 Requests	65.47%	85.01%	...
Monthly DataTransfer Usage Budget	Usage	2.28 GB	4 GB	3.07 GB	57.05%	76.93%	...
Quarterly Budget	Cost	\$133.10	\$550.00	\$516.10	24.2%	93.84%	...

Best of Luck for Exams, Rockstar!

you can do it!



motivational penguin