

## AWS Certified Cloud Practitioner Study Guide

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### Module 2: Cloud Concepts

#### Lesson 2.1: Basics to AWS Cloud Computing

*Skills Learned From This Lesson: Cloud Computing, pay-as-you-go pricing, AWS*

- Cloud computing provides the advantage of pay-as-you-go pricing model to use services such as Compute, storage, database or any other IT services
  - Advantage 1: Trade capital expense with the variable expense, you can pay for only the resources you need instead of investing in large amounts initially
  - Advantage 2: Benefit from massive economies of scale, this means due to large amount of customer base, they can provide a better deal
  - Advantage 3: Cloud computing also aids in quickly scaling up and down with little to no downtime completely removing the capacity guessing/planning exercise
  - Advantage 4: Achieve speed and agility in provisioning computing resources, literally in just a click away as opposed to taking weeks or even months to provision servers traditionally
  - Advantage 5: Leave the responsibilities with the maintenance of the data centers to AWS so one can focus on the customers
  - Advantage 6: Ability to deploy application across the world with just a few clicks

#### Lesson 2.2: Cloud Models and Deployment

*Skills Learned From This Lesson: Cloud Models, Cloud Deployment, Public cloud*

- The different types of Cloud computing models are Infrastructure as a service(IaaS), Platform as a Service(PaaS) and Software as a Service (SaaS)
  - In the IaaS model, the customer will have the ability to manage the server and the operating system
  - In the PaaS model, the underlying hardware and operating systems are managed, this means security, patching, updates and maintenance is provided as a service so you can focus on building applications

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- In the SaaS model, in addition to services provided by PaaS model, the application is also fully managed by the cloud provider, all you manage is the data. Example: Drop box, Gmail
- The different types of Cloud computing deployments are
  - Public Cloud: In this type of deployment, the server is hosted on the cloud provider data center but is available as a IaaS. Some of the examples of public clouds are AWS, GCP or Azure
  - Private Cloud: This is typically hosted in your own datacenter as a privately managed cloud using technologies like VMware or Openstack
  - Hybrid Cloud: This deployment provides a mix of both Public and Private cloud so you are not completely dependent on the cloud provider, likewise you are also not fully dependent on your own datacenter

## Lesson 2.3: AWS Global Infrastructure

*Skills Learned From This Lesson: Availability Zone, Regions, Edge locations*

- AWS Global Infrastructure comprises of Regions and Availability Zones, as of June 2019 AWS has 21 Regions and 66 Availability Zones with the goal of providing redundancy and availability
- An availability zone (a.k.a. AZ) is a Datacenter (or cluster of datacenters), building full of servers, storage, networking hardware etc.
- A region is a geographic area that consists of two or more availability zones
- The infrastructure also includes edge locations, they are considered as location endpoints for AWS which are used for caching content to speed up the delivery
  - There are more edge locations than regions or Availability zones
  - CloudFront service is an example of an edge location
- There are availability zones exclusively for US Govt. adhering to government standards

## Module 3: AWS Security Concepts

### Lesson 3.1: Shared Responsibility

*Skills Learned From This Lesson: Shared responsibility, Security-of-the-cloud, Security-in-the-cloud*

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- Shared responsibility model determines what AWS is responsible for and what the customer is responsible for
- AWS manages the security **of** the cloud while the customers manage security **in** the cloud
  - Security of the cloud indicates that anything related to the underlying infrastructure such as Host operating system, Virtualization layer, Physical security and Software for AWS services(S3, RDS, Elastic Beanstack) will be the responsibility of AWS
  - Security in the cloud indicates anything the customer would put in such as Guest operating system, Firewalls, Encryption, Data Integrity, Authentication, Networking traffic, IAM and data would be customers responsibility

## Lesson 3.2: AWS Compliance

*Skills Learned From This Lesson: Compliance programs, Global Regulations*

- AWS website provides list of compliance programs that the AWS infrastructure is accredited to such as ISO 27001, SOC2, SOC3, PCI DSS Level 1 etc.
- The accreditation provides customers with trust that the service provider is committed to take every action to keep the customers data safe
- The misconception that data in cloud is not safe is no longer a thing where it is now considered that the data in cloud is more safe than the on premise data center
- Depending on the regulations that you are subjected to, the AWS compliance page provides details specific to individual compliance programs.

## Lesson 3.3: AWS Inspector, Trusted Advisor and CloudTrail

*Skills Learned From This Lesson: AWS Inspector, Trusted Advisor, Cloud Trail*

- AWS inspector is an automated security assessment service used to identify any deviations from the best practices
  - The inspector helps in improving the security and compliance of applications deployed on AWS.

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- The inspector once done with the assessment, provides a list of findings organized by priority for remediation
- AWS Trusted Advisor is a real time service that provides recommendations for reducing costs, identifies area for improvement.
  - The Trusted Advisor service has 2 options
  - Core checks and Recommendations – Comes as Free
  - Full Trusted Advisor has more features for business and enterprises only
- AWS Cloud Trail service is for logging and continuously monitoring providing auditing capability within AWS infrastructure

## Lesson 3.4: AWS WAF and Shield

*Skills Learned From This Lesson: AWS WAF, AWS Shield*

- AWS WAF stands for Web Application Firewall, protects web applications at Layer 7 in the OSI model for common web attacks such as Cross Site forgery (CSF), SQL Injection, Cross Site Scripting impacting the availability, confidentiality or integrity
  - AWS WAF should be at the forefront of the security architecture
- AWS Shield service is a managed DDoS protection service
  - It provides 24/7 detection and automatic inline mitigations
  - There are 2 levels of AWS Shield
  - Shield Standard – comes automatically with the free account
  - Shield Advanced – Comes with the cost as it provides more services

## Module 4: AWS Services and Billing

### Lesson 4.1: Creating an AWS

*Skills Learned From This Lesson: Support plan*

- AWS provides various options for support plan, this includes Free plan to Business Plan
- First thing when the user starts using AWS, the user has ability to setup a billing Alarm under billing preferences, for example setup an alarm for spend increasing over \$10

### Lesson 4.2: Setting up a Billing Alarm

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## *Skills Learned From This Lesson: Billing Alarm*

- First thing when the user starts using AWS, the user has ability to setup a billing Alarm under billing preferences, for example setup an alarm for spend increasing over \$10

## Lesson 4.3: IAM Lab

### *Skills Learned From This Lesson: IAM, Setup Multi-Factor, Apply policies*

- IAM is a service provided for Identity and Access Management under Security, Identity and Compliance section
- IAM controls access to users in accessing the account
- On the dashboard, the screen shows status of checks that needs to be completed to keep it secure
  - Delete your root access keys
  - Activate Multi Factor Authentication for the root account, the options are
    - Using an Authenticator App on your mobile device such as Microsoft Authenticator
    - U2F security key
    - Hardware based token such as Gemalto or RSA
  - Create Individual IAM users with required access to refrain from using root account for lower privilege activities
  - Individual accounts are assigned groups such as Administrative groups which provides pre defined privileges
  - Apply password policies such as password strength or rotating passwords on a regular basis
  - Note IAM service is Global and does not require region selection

## Lesson 4.4: Introduction to AWS Storage

### *Skills Learned From This Lesson: AWS S3 (Simple Storage Service), Data Consistency, S3 features*

- S3 provides developers and IT Teams with secure, durable, highly scalable object storage

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- S3 bucket(similar to folders) is globally unique, the files are stored as objects
- Each object is associated with a key (name of the object), value( file itself), version ID, metadata and sub resources(services such as Encryption)
- S3 is a safe file storage which can support files with sizes anywhere between 0 Bytes to 5 TB. The data is spread across multiple devices and facilities
- Data consistency provides how soon the data is available after creating a file or making updates or deletes
  - AWS offer Read-After-Write consistency for New Puts while Eventual Consistency for Overwrite and deletes. Eventual consistency would probably take a minute to reflect.
- S3 Standard guarantees availability of 99.9% and 11x9s Durability (Durability means the protection from any changes or destroyed by accident, data loss of any sort etc.)
- S3 provides additional special features such as Lifecycle management, Versioning, Encryption, Tiered Storage, Access Control Lists and Bucket policies(security controls)
- Lifecycle policies allows you to move the storage from S3 to low cost storage such as AWS Glacier
- There are 2 types of storage classes namely S3 standard and Infrequently Access
- A version of Infrequent access is One Zone which is cheaper and is don't need the Multi – AZ resilience
- S3 Intelligent Tiering is designed to perform automatic adjustments between tiers with no impact on performance
- S3 Glacier is used for Data Archive with Slow retrieval times, from minutes to hours
- S3 Glacier deep archive is the cheapest and retrieval times go up to 12 hours
- S3 charges are dependent upon the storage management, data transfers, requests, transfer acceleration or cross-region replication

## Lesson 4.5: S3 Lab

### *Skills Learned From This Lesson: Create S3 object*

- Login to management console
- Provide a unique S3 name and assign a region while creating a new S3 bucket
- Configure options such as versioning, logging, encryption etc.
- Public access to bucket is automatically denied by default

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- Set the permissions as required

## Lesson 4.6: Introduction to AWS Compute

*Skills Learned From This Lesson: AWS Compute, Security groups*

- AWS compute provides various AMI (Amazon machine image) from free tiers to paid ones
- The console provides users to select the required images with specific configurations such as vCPU's, Memory and Storage
- Note, the root storage does not come with Cold HDD or Throughput optimized HDD volume type
- Adding tags helps in organizing many EC2 instances
- Security group is a host level firewall to allow only required protocols from known source instances
- Before you launch the instance, remember to download the key pair which will be used to access the instance
- Once launched, the status can be seen on the dashboard, the status should indicate as 'Running'

## Lesson 4.7: EC2 Lab

*Skills Learned From This Lesson: EC2 Lab*

- EC2 is not global
- As the instance type network performance increases, the cost associated with it also increases.
- Cold Hard Drive and Throughput Optimized HDD may not be available to you when spinning up a root EBS volume
- Adding tags helps you organize your EC2 instances

## Lesson 4.8: Introduction to AWS Databases

*Skills Learned From This Lesson: Relational databases, non relational databases*

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- The different types of relational database service are SQL Server, Oracle, MySQL, PostgreSQL, Aurora, MariaDB
- Aurora is the AWS alternative version of RDS
- Relational database is similar to a MS Excel where we have tables, rows and columns which organize and contain your data
- AWS RDS supports multi-AZ which provides failover to backup DB in the event the primary DB fails
- RDS read replicas provide improved performance with read only replica
- AWS Dynamo DB is the non-relational database which provides more scalability and data is stored in the form of JSON objects
- AWS redshift online transaction processing (OLTP) system provides aggregated view of information example when a user logs into Amazon, the user views all the account information that is associated with
- AWS redshift online analytics processing (OLAP) provides intense queries across multiple database and provides valuable business information
- AWS ElastiCache is a webservice that performs in-memory cache in the cloud, it provides performance of web apps by caching frequently queried items
- Two open source caching engines are Memcached and Redis

## Lesson 4.9: Introduction to billing pricing

*Skills Learned From This Lesson: AWS billing*

- AWS pricing policies is based on pay as you go with the following advantages
  - You tend to save when you reserve
  - The more you use, the less you pay
  - Custom pricing
- The three factors for pricing is compute, storage and data leaving AWS environments
- Some of the AWS free service includes AWS VPC, Elastic beanstalk, Cloud formation, IAM, Auto scaling, OpsWork and Consolidated billing

## Lesson 4.10: AWS Calculator

*Skills Learned From This Lesson: AWS cost calculator*

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- AWS cost calculator helps identify costs across various services being used
- Some of the calculators available are AWS Simple Monthly calculator, AWS Total cost of ownership calculator
- The total cost of ownership calculator provides a view to compare against the on-premise infrastructure
- The simple monthly calculators is used to calculate your running costs every month

## Module 5: Preparing for the Exam

### Lesson 5.1: Scheduling Your Exam

- The cloud practitioner exam can be scheduled via AWS certification and training website by logging in.
- Browse through the various exams and schedule it with either PSI or Pearson Vue as the exam provider

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