

AWS Certified Solutions Architect 2020 Associate Level Curriculum (SAA-C02)

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Module 1: Introduction to Cloud Computing

- Cloud Computing Fundamentals
 - What is the Cloud?
 - Underlying technologies that power the cloud
 - NIST Definition of the word “Cloud”
 - Cloud Computing Models
 - Cloud Service Model
 - IAAS
 - PASS
 - SAAS
 - Cloud Deployment Model
 - Private
 - Public
 - Hybrid
 - Cloud Providers Quick Comparison
- History & Introduction to AWS
 - What is AWS?
 - AWS Pace of Innovation
 - Gartner Magic Quadrant IAAS Leader
 - AWS Services Stack Overview
 - Regions
 - Availability Zones
 - Point of Presence
 - Concept of High Availability
 - Multi-AZ configuration Models
 - AWS Shared Responsibility Model

Module 2: Compute – EC2 Instances

- Concept of Virtualization
- Virtual Servers & EC2 Instances
- Features of EC2 Instances
- EC2 Instance Families
- Bare Metal
- Elastic GPUs
- VMWare on AWS
- Naming Convention & Comparison
- Billing Models
 - On-Demand
 - Reserved Instance
 - Spot Instance
 - Savings Plan
 - Capacity Reservation
- Mixed usage of billing Models
- Instance Tenancy Models
 - Shared Host Instance
 - Dedicated Host
 - Dedicated Instance
- AWS Nitro System
- AWS Outposts
- EC2 Labs
 - AWS Console Overview
 - Creating EC2 Instances
 - Creating Key Pairs

- Login options to EC2 instances (Putty/Win/Mac/Linux)
- Configuring an application inside EC2 Instance
- Stopping & Starting EC2 Instances
- Terminating EC2 Instances
- EC2 Bootstrap configurations
- EC2 Instance Data & Metadata
- EC2 Hibernate
- Assigning Private & Elastic IPs
- EC2 Placement Groups

Module 3: Storage – EBS Volumes

- AWS Storage Portfolio
- What is Block Storage?
- Features of EBS
- EBS connectivity Models
- EBS Architecture
- Instance Store / Ephemeral storage
- Types of EBS Volumes
- HDD vs SSD
- EBS volumes Comparison
- Snapshots & AMIs
- EBS Labs
 - Configuring EC2 instances with EBS & Instance Store.
 - Modify Existing Volume Size.
 - Add additional EBS volume to EC2.
 - Create Snapshots.

- Automating Snapshot Creation.
- Create EC2 Launch Templates.

Module 4: Elastic Load Balancing (ELB)

- Concept and need for Load Balancing
- Classic Load Balancer
- Application Load Balancer
- Network Load Balancer
- ELB Comparison
- Load Balancer Capacity Units (Billing Model)
- ELB Labs
 - Create Classic Load Balancer
 - Configuring EC2 instances with ELB.
 - Add pages and to check round robin routing.
 - Application Load balancer working Demo.

Module 5: Storage – S3, Glacier & Storage Gateway

- What is Object Storage?
- S3 Features
- Buckets & Objects
- Structure of S3
- Internal Storage Architecture of S3
- S3 Charge Methodologies
- S3 Storage Classes Pricing
- Use Cases
- Archival Storage

- Features of Glacier
- Glacier Retrievals
- Multi-part Upload
- S3 Access Points
- Labs
 - Create buckets
 - Uploading objects into bucket
 - Object and Bucket Permission
 - Bucket properties
 - Host static website on S3
 - S3 Versioning
 - S3 Bucket Replication
 - S3 Lifecycle Policy
 - S3 Encryption
 - Transfer Acceleration
 - S3 Logging
 - S3 Analytics & Metrics
 - Additional Features Walkthrough
 - 3rd Party Apps for S3 uploads
 - Glacier Vaults
 - Glacier Vault Lock

Module 6: Storage – EFS, FSx, Storage GW, Data Transports & AWS Backup

- What is File Storage?
 - File Storage classifications
 - Sharing data across multiple EC2s
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- Features of EFS
- Traditional NFS vs EFS
- FSx for Windows & FSx for Lustre
- AWS Storage GW
 - File Gateway
 - Volume Gateway
 - Tape Gateway
- AWS DataSync
- AWS Transfer for SFTP
- AWS Snow Family
 - Snowball & Snowball Edge
 - Snowcone
 - Snowmobile
- AWS Backup
- Labs
 - Create EFS Share
 - Attaching EFS to EC2 instances
 - Sharing data between instances using EFS
 - Creating FSx for Windows Share
 - Attach Windows & Linux systems to FSx Share
 - Connect On-prem to FSx share over VPN
 - Configuring Storage Gateway – File Storage
 - Configure Storage GW with On-prem
 - Backup Jobs, Vaults & Protected Resources
 - Configure and automated AWS Backups for EC2 instances & Other resources

Module 7: Networking – VPC

- Life Before VPC
- VPC Concepts & Architecture
- Components of VPC
- Networking Basics – IP Addressing
- Subnetting
- Private IP Ranges & Reserved IPs
- VPC Routing
- NAT Gateway
- VPC Endpoints & Interface Endpoints
- VPC Security & Logging
- Security Groups vs NACLs
- Labs
 - Creating a VPC
 - Create Subnets
 - Create Internet Gateway
 - Create & Configure Route Tables
 - Using a VPC for EC2 instances
 - NACLs Configuration
 - Elastic IPs
 - Connecting VPCs with peering
 - VPN Endpoints creation
 - Cross region VPN connectivity

Module 8: DNS - Route 53

- Mapping domain to Route53
- Domain Name Basics
- Global DNS Query Routing Flow
- Common DNS Record Types
- Route 53 - DNS as a service
- Routing Policies
 - Simple Routing Policy
 - Latency Based Routing (LBR)
 - Weighted Routing Policy
 - Geolocation Routing Policy
 - Failover Routing Policy
- Labs
 - DNS Lookups
 - Creating Hosted Zones
 - Adding records in Route53
 - Simple record creation
 - Weighted Routing demo
 - Geo-location based routing demo
 - Health checks & Failover routing

Module 9: Security & IAM

- Shared Responsibility Model
- IAAS vs PAAS vs SAAS Security Model
- Identity and Access Management
- IAM Components

- Users, Groups, Policies & Roles
- IAM Policy Evaluation Flow
- IAM Best Practices
- Labs
 - Activating MFA on Account
 - Creating IAM Users
 - Creating IAM Groups
 - Assigning Users to Groups
 - Assigning Policies
 - Creating Custom Policies
 - Live Testing Policies
 - AWS Certificate Manager (ACM)
 - IAM User Roles & Assuming Roles

Module 10: AWS Database Services

- Database Types and use cases
- AWS Databases services portfolio
- Relational Database Service (RDS)
- RDS Engine Types
- RDS single AZ vs Multi AZ availability pattern
- Amazon Aurora
- High Availability Aurora Architecture
- Read Replicas
- Automated Backups
- Snapshots Use Case
- RDS Proxy

- AWS Database Migration Service Overview
- AWS Schema Conversion Overview
- Difference between SQL vs NoSQL Database Types
- DynamoDB
- ElastiCache
- Labs – Mini Project
 - Create DB Subnet Groups
 - Create MySQL RDS Instance
 - On EC2 Install an application that requires DB
 - Configure & Connect Application to database
 - Database Manual Login & Configuration
 - Monitoring application modification directly on DB
 - Create Aurora Database
 - Actual database migration using DMS from MySQL to Aurora
 - Switch application to Aurora after migration
 - DynamoDB table creation and querying data
 - ElastiCache setup & configuration with application
 - Testing application performance with ElastiCache

Module 11: Elastic Beanstalk

- Elastic Beanstalk overview
- Manual deployment vs EB Automation
- Labs
 - Create a WordPress application environment with RDS Database and EC2 Instance via automated Elastic Beanstalk deployment
 - Blue/Green Deployment Scenarios

Module 12: CloudWatch & Autoscaling

- CloudWatch Monitoring & Features
- Alarms
- Notifications
- CloudWatch Logs
- Custom Metrics
- CloudWatch Agent
- Triggering Autoscaling
- Autoscaling – Vertical vs Horizontal scaling
- Provisioned capacity vs Auto Scaled capacity
- Autoscaling Policies
- Autoscaling Groups
- Launch Configurations
- Lifecycle Hooks
- Triggering Autoscaling with CloudWatch
- Labs
 - Configuring CloudWatch Agent
 - Create CloudWatch Alarms
 - Creating CloudWatch Monitoring Dashboards
 - CloudWatch Billing Alarms
 - CloudWatch event filtering & custom metrics
 - Create AMI for Autoscaling
 - Create Autoscaling Launch Configurations
 - Create an auto-scaled application environment
 - Target Tracking, Step Scaling & Simple Scaling policies
 - Simulate demo environment failure to test Autoscaling

Module 13: CloudFront & Global Accelerator

- Edge Locations & Point of Presence
- CloudFront – Global Content Delivery Network
- Caching Tiers
- Caching Request Flow
- Global Accelerator overview
- Regional, Multi-Regional deployments v/s Global Accelerator Scenario
- Global Accelerator Architecture & speed testing
- Labs
 - Create a CloudFront distribution linked to an S3 bucket as the origin
 - Test the speed/latency difference between direct from origin v/s from CloudFront cache
 - Cache invalidations
 - [Global Accelerator Labs is covered in the next module – HA Labs]

Module 14: High Availability Project

- High availability project creating a multi-tiered live web application infrastructure environment using AWS services only
- Services used in project:
 - EC2 & Autoscaling
 - EBS & AMIs
 - ELB
 - EFS
 - Elasticache
 - VPC, Subnets, Route Tables, Internet GW, NAT GW (Optional) & VPN Endpoint
 - S3

- CloudFront
- Global Accelerator
- Route53
- RDS
- CloudWatch
- KMS
- Load testing the application environment using Apache JMeter

Module 15: CLI, CloudFormation, SES & SNS

- API calls via Command Line Interface
- Automating Infrastructure deployment with CloudFormation
- Templates, Stacks & Changesets
- Analyzing sample Custom CloudFormation templates
- Simple email service overview & Features
- Simple Notification Service overview & features
- Labs
 - Creating IAM user for CLI
 - Configuring CLI profile on EC2 and Local Machine
 - IAM Roles
 - Multi Account access via Roles
 - Creating and deploying a CloudFormation Stack
 - CloudFormation Designer
 - CF Template Customizations

Module 16: ECS, EKS, Fargate, Lambda, SQS & API Gateway

- History progression towards microservices & serverless
- VMs v/s Container technology
- Serverless – AWS Lambda Overview
- Container Services – Amazon ECS, EKS & Fargate Overview
- ECS components & features
- Simple Queueing Service overview
- Concept of APIs and API GW overview.
- Labs
 - Create an ECS application
 - Lambda console overview
 - API Gateway Queries

Module 17: Analytics, Security & Admin , Developer & Enterprise Apps

- Analytics Services Overview
 - Amazon Redshift
 - Amazon EMR
 - Amazon Kinesis
 - Amazon ElasticSearch
 - AWS Glue
 - Amazon Athena
 - Amazon QuickSight
- Security & Administration Services Overview
 - Trusted Advisor
 - Service Catalog
 - AWS Certificate Manager (ACM)

- AWS Config
- OpsWorks
- EC2 Systems Manager
- Developer Tools Services Overview
 - AWS CodePipeline
 - AWS CodeCommit
 - AWS CodeBuild
 - AWS CodeDeploy
- Enterprise Application Services Overview
 - Amazon WorkSpaces
 - Amazon WorkDocs
 - Amazon WorkMail
- Labs
 - Configuring Glue Crawler
 - Querying Data from S3 within Athena
 - Visualizing data with Quicksight
 - Systems Manager Run command
 - Systems Manager EC2 Session

Module 18: AWS Organizations, Billing Console & Closing

- AWS Organizations Overview
- AWS Control Tower Overview
- AWS Billing Console – How to read your AWS bills
- AWS Whitepapers
- Additional Practice Resources
- Exam Info & Format
- Exam Sample Questions Quiz

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