**AWS Solutions Architect Training**

**Module 01 - Introduction to Cloud Computing & AWS**

**1.1** What is Cloud Computing  
**1.2** Cloud Service & Deployment Models  
**1.3** How AWS is the leader in the cloud domain  
**1.4** Various cloud computing products offered by AWS  
**1.5** Introduction to AWS S3, EC2, VPC, EBS, ELB, AMI  
**1.6** AWS architecture and the AWS Management Console, virtualization in AWS (Xen hypervisor)  
**1.7** What is auto-scaling  
**1.8** AWS EC2 best practices and cost involved.

**Hands-on Exercise –** Setting up of AWS account, how to launch an EC2 instance, the process of hosting a website and launching a Linux Virtual Machine using an AWS EC2 instance.

**Module 02 - Elastic Compute and Storage Volumes**

**2.1** Introduction to EC2  
**2.2** Regions & Availability Zones(AZs)  
**2.3** Pre-EC2, EC2 instance types  
**2.4** Comparing Public IP and Elastic IP  
**2.5** Demonstrating how to launch an AWS EC2 instance  
**2.6** Introduction to AMIs, Creating and Copying an AMI  
**2.7** Introduction to EBS  
**2.8** EBS volume types  
**2.9** EBS Snapshots  
**2.10** Introduction to EFS  
**2.11** Instance tenancy- Reserved and Spot instances  
**2.12** Pricing and Design Patterns.

**Hands-on Exercise –**  
**1.** Launching an EC2 instance  
**2.** Creating an AMI of the launched instance  
**3.** Copying the AMI to another region  
**4.** Creating an EBS volume  
**5.** Attaching the EBS volume with an instance  
**6.** Taking backup of an EBS volume  
**7.** Creating an EFS volume and mounting the EFS volume to two instances.

**Module 03 - Load Balancing, Autoscaling and DNS**

**3.1** Introduction to Elastic Load Balancer  
**3.2** Types of ELB – Classic, Network and Application  
**3.3** Load balancer architecture  
**3.4** Cross-zone load balancing  
**3.5** Introduction to Auto Scaling, vertical and horizontal scaling, the lifecycle of Auto Scaling  
**3.6** Components of Auto Scaling, scaling options and policy, instance termination  
**3.7** Using load balancer with Auto Scaling  
**3.8** Pre-Route 53 – how DNS works  
**3.9** Routing policy, Route 53 terminologies, Pricing.

**Hands-on Exercise –**  
**1.** Creating a Classic ELB  
**2.** Creating an Application ELB  
**3.** Creating an auto-scaling group  
**4.** Configuring an auto-scaling group  
**5.** Integrating ELB with Auto Scaling  
**6.** Redirect traffic from domain name to ELB using Route 53.

**Module 04 - Virtual Private Cloud**

**4.1** What is Amazon VPC,  
**4.2** VPC as a networking layer for EC2,  
**4.3** IP address and CIDR notations,  
**4.4** Components of VPC – network interfaces, route tables, internet gateway, NAT,  
**4.5** Security in VPC – security groups and NACL, types of VPC, what is a subnet, VPC peering with scenarios, VPC endpoints, VPC pricing and design patterns.  
**Hands-on Exercise –**  
**1.** Creating a VPC and subnets,  
**2.** Creating a 3 Tier architecture with security groups,  
**3.** NACL, Internet gateway and NAT gateway,  
**4.** Creating a complete VPC architecture.

**Module 05 - Storage - Simple Storage Service (S3)**

**5.1** Introduction to AWS storage  
**5.2** Pre-S3 – online cloud storage  
**5.3** API, S3 consistency models  
**5.4** Storage hierarchy, buckets in S3  
**5.5** Objects in S3, metadata and storage classes, object versioning, object lifecycle management, cross-region replication, data encryption, connecting using VPC endpoint, S3 pricing.

**Hands-on Exercise –**  
**1.** Creating an S3 bucket  
**2.** Uploading objects to the S3 bucket  
**3.** Enabling object versioning in the S3 bucket  
**4.** Setting up lifecycle management for only a few objects  
**5.** Setting up lifecycle management for all objects with the same tag  
**6.** Static website hosting using S3.

**Module 06 - Databases and In-Memory DataStores**

**6.1** What is a database, types of databases, databases on AWS  
**6.2** Introduction to Amazon RDS  
**6.3** Multi-AZ deployments, features of RDS  
**6.4** Read replicas in RDS, reserved DB instances  
**6.5** RDS pricing and design patterns  
**6.6** Introduction to Amazon Aurora, benefits of Aurora, Aurora pricing and design patterns  
**6.7** Introduction to DynamoDB, components of DynamoDB, DynamoDB pricing and design patterns  
**6.8** What is Amazon Redshift, advantages of Redshift  
**6.9** What is ElastiCache, why ElastiCache.

**Hands-on Exercise –**  
**1.** Launching a MySQL RDS instance  
**2.** Modifying an RDS instance  
**3.** Connecting to the DB instance from your machine  
**4.** Creating a multi-az deployment  
**5.** Create an Aurora DB cluster  
**6.** Creating an Aurora replica  
**7.** Creating a DynamoDB table.

**Module 07 - Management and Application Services**

**7.1** Introduction to CloudFormation  
**7.2** CloudFormation components  
**7.3** CloudFormation templates  
**7.4** The concept of Infrastructure-as-a-code  
**7.5** Functions and pseudo parameters  
**7.6** Introduction to Simple Notification Service, how does SNS work  
**7.7** Introduction to Simple Email Service, how does SES work  
**7.8** Introduction to Simple Queue Service, how does SQS work.

**Hands-on Exercise –**  
**1.** Creating a CloudFormation stack  
**2.** Launching a t2.micro  
**3.** EC2 instance using CloudFormation  
**4.** Using CloudFormation to automate an architectural deployment  
**5.** Creating an SNS topic, creating a subscription within the topic  
**6.** Setting up SES and sending a mail  
**7.** Creating an SQS queue and sending a sample message.

**Module 08 - Access Management and Monitoring Services**

**8.1** Pre-IAM, why access management  
**8.2** Amazon Resource Name (ARN), IAM features  
**8.3** Multi-factor authentication (MFA) in IAM, JSON  
**8.4** IAM policies, IAM permissions, IAM roles, identity federation, pricing  
**8.5** Introduction to CloudWatch, metrics and namespaces, CloudWatch architecture, dashboards in CW, CloudWatch alarms, CloudWatch logs, pricing and design patterns  
**8.6** Introduction to CloudTrail, tracking API usage.

**Hands-on Exercise –**  
**1.** Creating IAM users and a group  
**2.** creating an IAM policy and attach it to the group  
**3.** creating an IAM role  
**4.** Setup MFA for a user  
**5.** Creating a CloudWatch dashboard and add metrics  
**6.** Create a CloudWatch alarm which triggers according to CPU Utilization of an EC2 instance  
**7.** Creating a billing alarm  
**8.** Creating a log group  
**9.** Creating a trail.

**Module 09 - Automation and Configuration management**

**9.1** What is AWS Lambda  
**9.2** How Lambda is different from EC2  
**9.3** Benefits and limitations of Lambda  
**9.4** How does Lambda work  
**9.5** Use cases of Lambda, Lambda concepts  
**9.6** Integration S3 with Lambda  
**9.7** What is Elastic Beanstalk, how does Beanstalk work, Beanstalk concepts, Beanstalk pricing  
**9.8** What is configuration management  
**9.9** What is AWS OpsWorks, AWS OpsWorks benefits  
**9.10** CloudFormation vs OpsWorks, services in OpsWorks, AWS OpsWorks Stacks, OpsWorks pricing.

**Hands-on Exercise –**  
**1.** Creating a Lambda function  
**2.** Setting up Lambda triggers and destinations  
**3.** Creating an Elastic Beanstalk application  
**4.** Uploading a new version of the application to Beanstalk  
**5.** Creating a stack in OpsWorks  
**6.** Launching the instance using OpsWorks and automatically installing the application.

**Module 10 - Amazon FSx and Global Accelerator**

**10.1** What is FSx  
**10.2** Types of FSx,FSx for Windows server  
**10.3** How does FSx for Windows File Server work, FSx for Lustre  
**10.4** Use cases of FSx  
**10.5** Automatic failover process  
**10.6** Supported clients and access methods  
**10.7** What is a Global Accelerator, How Global Accelerator works, Listeners and Endpoints  
**10.8** What are AWS Organizations, Features of AWS Organizations, Managing multiple accounts  
**10.9** What are ENIs, ENAs and EFAs, Working with network interfaces  
**10.10** Enhanced Networking with ENA, EFA with MPI, Monitoring an EFA

**Hands-on Exercise:**  
**1.** Creating a shared FSx file system between two windows instances  
**2.** Accessing one instance with multiple Elastic IPS using ENI  
**3.** Using Global Accelerator to map instances from 2 regions into one domain name  
**4.** Enabling Enhanced Networking on an Ubuntu instance

**Self Paced**

**Module 11 - Architecting AWS – whitepaper**

**11.1** Important guidelines for creating a well-architected AWS framework that is resilient and performant  
**11.2** Designing of fault-tolerant and high-availability architecture  
**11.3** Resilient storage  
**11.4** Decoupling mechanism  
**11.5** Multi-tier architecture solution  
**11.6** Disaster recovery solution  
**11.7** Scalable and elastic solutions.

**Module 12 - DevOps on AWS**

**12.1** What is DevOps,  
**12.2** Introduction to AWS DevOps,  
**12.3** AWS Developer tools – CodeCommit, CodeBuild, CodeDeploy and CodePipeline, integrating GitHub with CodePipeline,  
**12.4** Creating a DevOps lifecycle using AWS DevOps tools.

**Module 13 - AWS Migration**

**13.1** What is Cloud migration  
**13.2** Why migration is important  
**13.3** Migration process in AWS, the 6 R’s migration strategy  
**13.4** Virtual machine migration, migrating a local vm onto the AWS cloud  
**13.5** Migrating databases using Database Migration Service (DMS)  
**13.6** Migrating a local database to RDS  
**13.7** Migrating an on-premises database server to RDS using DMS, other migration services.

**Module 14 - AWS Architect Interview Questions**

**14.1** Guidance for clearing the exam, most probable interview questions and other helpful tips for clearing the exam and interview.

**What projects I will be working in this AWS certification course?**

**Project 01** – Deploy a multi-tier website on AWS

**Problem Statement:** Deploying a Custom PHP Website to AWS with functionalities for SQL, NoSQL and file storage

**Topics –** RDS, SNS, DynamoDB, S3, VPC, EC2, NAT Gateways, Load Balancer and Auto Scaling

**Highlights:**  
**1.1** Configuring AWS to send emails for every operation using the website  
**1.2** Deploying the web application in private subnet with no internet access  
**1.3** Using Load Balancer to expose the application in the private subnet  
**1.4** Using NoSQL database for metadata storage  
**1.5** Using Auto Scaling for varying traffic workloads

**Project 02 –** Deploying a website for High Availability and High Resilience

**Problem Statement:** Design an architecture which can automatically scale up and down based on traffic and is de coupled for components like Database, webapp etc.

**Topics:** Auto Scaling, Target Groups, Load Balancing, RDS, PaaS, Elastic Beanstalk

**Highlights:**  
**2.1** Designing Architectures which are self-healing and auto scale  
**2.2** Load Balancing across multiple instances using Load Balancer  
**2.3** Deploying AWS RDS for connecting to Elastic Beanstalk

**Project 03 –** Sending Notifications to patients using push notifications

**Problem Statement –** Design an architecture on AWS, which can send notifications to patients based on Doctor Feedback

**Topics:** AWS SNS, VPC, EC2

**Highlights:**  
**3.1** Sending messages through SNS for resiliency  
**3.2** Integrating EC2 and SNS for message storing  
**3.3** Securing the instances using Private and Public subnets in VPC.

**Case Study 01 –** Using different operations on EC2 and EBS

**Problem Statement:**Replicate EC2 instances to other regions for High Availability, extending the size of EBS volumes without losing data

**Topics –**EC2, EBS, AMIs

**Highlights:**  
**1.1** Copying EC2 instance to another region  
**1.2** Scaling EBS Volumes  
**1.3** Mounting the same EBS Volumes to different EC2 instances one at a time

**Case Study 02 –**Autoscaling compute capacity in AWS

**Problem Statement:** Autoscaling and Load Balancing EC2 instances in AWS based on different metrics. Routing custom domain to AWS resources

**Topics – Autoscaling, Load Balancing, Route 53**

**Highlights:**  
**2.1** Load Balancing among multiple EC2 instances  
**2.2** Scaling up and scaling down instances automatically using Autoscaling  
**2.3** Defining metrics for Autoscaling instances  
**2.4** Routing custom domain to AWS resources

**Case Study 03 –** Creating custom VPCs in AWS

**Problem Statement:** Create a custom VPC in AWS, with multiple subnets having private and public access

**Topics:** VPC, Subnets, Internet Gateway, NAT Gateway, Route Tables

**Highlights:**  
**3.1** Creating a custom VPC with various subnets  
**3.2** Configuring routes to the subnets  
**3.3** Using and configuring NAT Gateways

**Case Study 04 –** Using AWS S3 for Lifecycle Access Management

**Problem Statement:** Moving artifacts from on-premise to S3 in the most cost efficient manner

**Topics:** Lifecycle Management, Glacier, Access Tiers, Event in S3

**Highlights:**  
**4.1** Creating Lifecycle rules for S3 objects  
**4.2** Hosting Static Website  
**4.3** Using Route 53

**Case Study 05 –** Highly available relational database in AWS

**Problem Statement:** Create a highly available and scalable AWS Database service in AWS using RDS

**Topics –** Multi Region Deployment, High Availability, RDS, Backups

**Highlights:**  
**5.1** Build a highly scalable database  
**5.2** Creating Database Architecture  
**5.3** Collect data for real time analysis  
**5.4** Resolving Latency Issues

**Case Study 06 –** CloudFormation for Infrastructure as a Code

**Problem Statement:** Provisioning AWS Resources using AWS CloudFormation

**Topics:** CloudFormation, VPC, Route 53, RDS

**Highlights:**  
**6.1** Using CloudFormation to deploy resources  
**6.2** Defining rules for deletion using IaC  
**6.3** Minimize deployment time

**Case Study 07 –** Administering user access using AWS IAM

**Problem Statement:** Creating users for defining granular access to different users

**Topics –** AWS IAM Users, IAM Groups, Policies

**Highlights:**  
**7.1** Creating users in IAM  
**7.2** Defining custom policies  
**7.3** Adding users to groups

**Case Study 08 –** Appplication Services in AWS and Configuration Management

**Problem Statement:** Using application services in AWS to deploy code, configuration management using OpsWorks

**Topics:** Elastic Beanstalk, AWS Lambda, SNS

**Highlights:**  
**8.1** Deploying code to AWS Lambda  
**8.2** Deploying webapp to Elastic Beanstalk  
**8.3** Configuration Management using OpsWorks