

AWS Technical Essentials training course (23/06/2023)

Course objectives:

1. Learn key concepts behind cloud computing & explore AWS services – e.g. Compute, Networking, Storage, Databases, Monitoring & Security

Course layout:

1. This course is split into 2 parts – theory & practical (labs)
2. <https://online.vitalsource.com/reader/books/100-TECESS-53-EN-SG-E/pageid/0> (Student Guide - Theory lecture slides/notes; Access for 3 years – valid users only)
3. <https://us-east-1.student.classrooms.aws.training/class/cnG5uv9SaPyQxz22BTPQYH> (Labs)

Content:

This summary below is just a short & summarized version of the main points in the course.

1. Module 1 (Introduction to Amazon Web Services)
 - a. 6 Key benefits:
 - i. Pay as you go (pay for whatever you use),
 - ii. Economies of scales (as you scale your app – higher cost savings),
 - iii. Stop guessing required capacity (can auto scale up/down),
 - iv. Increase speed & agility (cloud development is easy to work with – one click of button, can deploy on the cloud),
 - v. Cost savings (compared to on-prem services),
 - vi. Allows us to go global in minutes (easy to deploy your apps in mins)
 - b. Both customer and AWS are responsible for managing the security of your cloud deployed apps (shared-responsibility model)
 - c. Lab 1: Provides us an introduction to AWS IAM (Identity and Access Management) using the AWS Console
2. Module 2 (AWS Compute)
 - a. AWS provides various computing resources like AWS EC2, ECS (Docker containers), EKS (K8s containers), Fargate and Lambda
 - b. Which compute services you choose from AWS ultimately depends on your business needs and solutioning design
 - c. Can refer to AWS Docs for more information on the respective AWS compute resources
3. Module 3 (AWS Networking)
 - a. Concepts on AWS VPC, public subnet, private subnet, Internet gateway, NAT gateway, VPN gateway, Route tables, Security groups
 - b. Onprem can connect to your VPC by using a VPN connection/AWS Direct Connection and a VPN gateway
 - c. Take note, route tables are attached to the subnet level.
 - d. Security groups (SG) are attached to EC2 instances for example. A newly created SG by default blocks all inbound traffic & allow outbound traffic.
 - e. Lab 2: Provides an understanding on how to create a VPC layer & then launch a web application in the cloud using EC2
4. Module 4 (AWS Storage)
 - a. Concepts about AWS EBS, EFS, S3 will be taught
 - b. Block storage, File storage, Object storage are the various storage types in AWS

- c. Block storage:
 - i. Instance storage (temporarily only) on the EC2 instance
 - ii. Amazon EBS (add on block storage, which can be attached to an EC2 instance) – SSD vs HDD options
 - iii. Whether you choose SSD vs HDD depends on your requirements:
 - 1. High throughput – use HDD (high throughput means need to move large amounts of data)
 - 2. High I/O aka High Transaction – use SSD (i/o means input/output – if you need to have a lot of read/write operations)
 - d. File storage:
 - i. Amazon EFS (a file system that can be attached to your EC2 instances to add/retrieve files)
 - 1. Multiple EC2 instances can be mounted to your file system (EFS)
 - 2. EFS works only for Linux based systems (FYI)
 - ii. Amazon FSx can be used for Windows based servers instead
 - e. Object storage:
 - i. AWS S3 – your files are stored as objects
 - ii. Each object has data, metadata, and key
 - iii. Meta-data contains additional information about the data being stored
 - iv. Object is the unique identifier of the object
 - v. Good for WORM (Write Once Read Many) – e.g. of files good for object storage: Picture files, Media files etc
 - vi. Each object can be retrieved by a Object URL in the AWS Console
 - vii. We can use IAM policy & Bucket policies to control access to your S3 buckets
5. Module 5 (Databases)
- a. Two main types – RDS and Non-RDS
 - b. RDS: Aurora, RDS, Redshift
 - c. Non-RDS: DynamoDB
 - d. There are also other types of databases in AWS (e.g. in-memory databases, graph DBs, Ledger DBs & many more), but focus on those 2 types above
 - e. Additional reference: <https://aws.amazon.com/products/databases>
 - f. For Lab 3, we learnt how to configure our EC2 instance to use a S3 bucket and a DynamoDB database
6. Module 6 (Monitoring, Load Balancing and Scaling):
- a. Amazon CloudWatch:
 - i. Has monitoring capabilities
 - ii. Useful to help recognize operational issues, security threats and events
 - b. Elastic Load Balancing (ELB):
 - i. We can route our application's traffic to different EC2 instances using an Elastic Load Balancer
 - ii. High available and scalable, automatically distributes incoming traffic to different targets
 - iii. The different targets can be in a single AZ or different AZs – up to you to configure
 - c. Auto Scaling in EC2: 2 main types
 - i. Vertical scaling → upgrade/downgrade your EC2 instance's capacity → t2-micro to t2.medium to t2.xlarge

- ii. Horizontal scaling → scale up or down the number of instances → increase or decrease your EC2 instances numbers (e.g. 1 → 2 or 2 → 1)
- iii. Scaling helps to improve application availability (Amazon EC2 Auto Scaling does this for you – scale up & down automatically based on your scaling policies)
- iv. Final lab: We will learn how to configure High Availability in our application using a) ALB and b) Auto Scaling group in EC2

7. Module 7 (Summary)

- a. We have learnt various AWS services – Intro, Compute, Networking, Storage, Databases, Monitoring/Load Balancing/Scaling
- b. Useful reference if you're interested in the AWS Certification Exams:
 - i. <https://aws.amazon.com/certification/exams/> (They got practice exams for you to try out before you take the real exam)
- c. More advanced courses – Developing on AWS & Architecting on AWS