**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)
   1. 6 Key benefits:
      1. Pay as you go (pay for whatever you use),
      2. Economies of scales (as you scale your app – higher cost savings),
      3. Stop guessing required capacity (can auto scale up/down),
      4. Increase speed & agility (cloud development is easy to work with – one click of button, can deploy on the cloud),
      5. Cost savings (compared to on-prem services),
      6. Allows us to go global in minutes (easy to deploy your apps in mins)
   2. Both customer and AWS are responsible for managing the security of your cloud deployed apps (shared-responsibility model)
   3. Lab 1: Provides us an introduction to AWS IAMS (Identity and Access Management) using the AWS Console
2. Module 2 (AWS Compute)
   1. AWS provides various computing resources like AWS EC2, ECS (Docker containers), EKS (K8s containers), FarGate and Lambda
   2. Which compute services you choose from AWS ultimately depends on your business needs and solutioning design
   3. Can refer to AWS Docs for more information on the respective AWS compute resources
3. Module 3 (AWS Networking)
   1. Concepts on AWS VPC, public subnet, private subnet, Internet gateway, NAT gateway, VPN gateway, Route tables, Security groups
   2. Onprem can connect to your VPC by using a VPN connection/AWS Direct Connection and a VPN gateway
   3. Take note, route tables are attached to the subnet level.
   4. Security groups (SG) are attached to EC2 instances for example. A newly created SG by default blocks all inbound traffic & allow outbound traffic.
   5. 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)
   1. Concepts about AWS EBS, EFS, S3 will be taught
   2. Block storage, File storage, Object storage are the various storage types in AWS
   3. Block storage:
      1. Instance storage (temporarily only) on the EC2 instance
      2. Amazon EBS (add on block storage, which can be attached to an EC2 instance) – SSD vs HDD options
      3. 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)
   4. File storage:
      1. 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)
      2. Amazon FSx can be used for Windows based servers instead
   5. Object storage:
      1. AWS S3 – your files are stored as objects
      2. Each object has data, metadata, and key
      3. Meta-data contains additional information about the data being stored
      4. Object is the unique identifier of the object
      5. Good for WORM (Write Once Read Many) – e.g. of files good for object storage: Picture files, Media files etc
      6. Each object can be retrieved by a Object URL in the AWS Console
      7. We can use IAM policy & Bucket policies to control access to your S3 buckets
5. Module 5 (Databases)
   1. Two main types – RDS and Non-RDS
   2. RDS: Aurora, RDS, Redshift
   3. Non-RDS: DynamoDB
   4. 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
   5. Additional reference: <https://aws.amazon.com/products/databases>
   6. 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):
   1. Amazon CloudWatch:
      1. Has monitoring capabilities
      2. Useful to help recognize operational issues, security threats and events
   2. Elastic Load Balancing (ELB):
      1. We can route our application’s traffic to different EC2 instances using an Elastic Load Balancer
      2. High available and scalable, automatically distributes incoming traffic to different targets
      3. The different targets can be in a single AZ or different AZs – up to you to configure
   3. Auto Scaling in EC2: 2 main types
      1. Vertical scaling 🡪 upgrade/downgrade your EC2 instance’s capacity 🡪 t2-micro to t2.medium to t2.2xlarge
      2. Horizontal scaling 🡪 scale up or down the number of instances 🡪 increase or decrease your EC2 instances numbers (e.g. 1 🡪 2 or 2 🡪 1)
      3. Scaling helps to improve application availability (Amazon EC2 Auto Scaling does this for you – scale up & down automatically based on your scaling policies)
      4. 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)
   1. We have learnt various AWS services – Intro, Compute, Networking, Storage, Databases, Monitoring/Load Balancing/Scaling
   2. Useful reference if you’re interested in the AWS Certification Exams:
      1. <https://aws.amazon.com/certification/exams/> (They got practice exams for you to try out before you take the real exam)
   3. More advanced courses – Developing on AWS & Architecting on AWS