Day 1 - Basic Cloud Concepts

What is Cloud Computing?

Definition (As mentioned by NIST) : a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction

Cloud Characteristic:

1. On Demand Self Service : Users should be able to provision and release resources without any human interaction (Any cloud administrative personnel).
2. Broad Network Access : Cloud resources should be available over the network for users and accessed through standard mechanisms such as HTTPS.
3. Resource Pooling : Resources should be pooled and should be available to users with abstraction so that users can easily provision and release resources they need.
4. Rapid Elasticity : Users should be easily able to provision and release resources they need.
5. Measured Service : The cloud provider should optimize and control the usage of resources and measure the resources and services used.

Cloud Categorized by “..As a service” :

1. Software as a service : user runs an application and infrastructure and everything required is managed by cloud provider
2. Platform as a service : a user uses the infrastructure provided by the cloud provider to run the application and management of infrastructure is the responsibility of the cloud provider.
3. Infrastructure as a service : This allows users to provision fundamental computing resources such as processing, storage, networks.

Cloud Categorized By Deployment Method :

1. Private Cloud : The cloud infrastructure is provisioned by exclusive use of a single organization, it may be managed by the organization, third party, or combination of both, may be on premises or off premises.
2. Community Cloud : The cloud infrastructure is provisioned by exclusive use of community with shared concerns. It can be owned, managed and operated by one or more organizations of the community or third party or some combination of both. May be on premise or off premise.

3. Public Cloud : The cloud infrastructure is provisioned for open use by the general public. It might be owned, managed and operated by a business, government or educational institution or some combination of these three. It is on the premise of cloud provider.
4. Hybrid Cloud : The cloud infrastructure is composed of two or more distinct cloud infrastructure, these cloud infrastructure are bound together by standardized or proprietary technology that enables data and application portability.

AWS Cloud Basics

Compute Services

1. Elastic Compute Cloud (EC2) : This service provides secure and resizable compute resources. It reduces the time required to boot new servers (EC2 instances) to minutes, and this efficiency allows users to scale vertically or horizontally. This quality is Elasticity.
2. Lambda : This service allows you to run code without provisioning or managing servers.
3. Elastic Beanstalk : This service is used to deploy and scale web applications developed with popular programming languages.
4. Elastic Container Service (ECS) : This is a container management service that supports Docker containers. It eliminates the need to install, operate and scale your own cluster management infrastructure and allows you to run your application on a managed cluster of EC2 instances.

Storage Services

1. Simple Storage Service (S3) : Simple Storage Service is object storage which provides a web interface to store and retrieve data from anywhere on the web. It can be used as primary storage for cloud native application or data lake for analytics.
2. Elastic Block Store (EBS) : Elastic Block Store provides persistent block storage volumes for use with EC2 instances in AWS cloud.
3. Glacier : This service is used for data storage for long term backup and data archiving.
4. Elastic File System (EFS) : This service provides a simple, scalable file system for use with EC2 instances in AWS cloud.

Network Services

1. Virtual Private Cloud : This service lets you provision isolated sections of AWS cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment.

2. Route 53 : This is Domain Name System service provided by AWS. This service effectively directs user requests to infrastructure running in AWS cloud. This can also route user requests to infrastructure outside AWS.
3. CloudFront : This service is a global content delivery network service. This service accelerates delivery of websites, video content, API and other web assets. This service routes the user request to the nearest edge location and delivers content with best performance.
4. API Gateway : This service helps developers to create, publish, maintain, monitor and secure APIs at any scale. With very few clicks on AWS management you can create an API that acts as a front door for applications to access data, business logic or other functionality of your backend service.
5. Direct Connect : Using this service you can create a private connection between AWS and your private network. This can reduce cost, increase bandwidth throughput and provide more consistent network experience then internet based connections.

Database Services

1. Relational Database Service (RDS) : This service helps set up, operate and scale a relational database in the cloud. RDS provides six databases to choose from, Aurora, MySQL, PostgreSQL, MariaDB, Oracle and Microsoft SQL server.
2. DynamoDB : It is a fast, flexible NoSQL database service for all applications that need consistent single digit millisecond latency at any scale. It is used for gaming, IoT and many other services.
3. ElastiCache : This service makes it easy to deploy, operate and scale an in memory cache in the cloud. This service runs Redis and Memcache behind the scenes.
4. Redshift : This is a fast, fully managed, petabyte scale that makes it simple and cost effective to analyze all your data using existing business intelligence tools.

Security Services

1. Identity and Access Management : IAM service enables you to securely control access to your AWS services and resources for your users.
2. Security groups : These are associated with EC2 instances and provide security at the protocol and port access level.
3. Network ACLs : Network access control lists are used to control the traffic moving between your AWS VPC subnets.

Automation and Application Support

1. CodeDeploy : This is a fully managed deployment service that automates Software Deployments to a variety of compute Services such as EC2, lambda, and your on-premises servers.

2. CloudFormation : This service offers you an easy way to provision and configure related AWS resources based on a template. It also provides you a designer tool which helps you build architecture in template code.
3. OpsWorks : This is a configuration management service that uses chef or puppet.

Management Tools

1. Service Catalog : AWS service catalog allows organizations to create and manage catalog of IT services that are approved for use on AWS.
2. System Manager : AWS Systems Manager gives you visibility and control of your infrastructure on AWS. Systems Manager provides a unified user interface so you can view operational data from multiple AWS services and allows you to automate operational tasks across your AWS resources
3. Trusted Advisor : This online resource helps you reduce cost, increase performance, and improve security by optimizing your AWS environment.

Monitoring

1. CloudWatch : Amazon CloudWatch is a monitoring service for AWS Cloud resources and the applications you run on AWS
2. CloudTrail : AWS CloudTrail is a web service that records AWS API calls for your account and delivers log files to you