



Overview of Cloud Computing – Day 1



Course Objective

The following will be discussed and practiced during this session:

- Overview of Cloud Computing
- Cloud deployment models
- Cloud service models
- AWS Global Infrastructure
- Overview of AWS
- AWS – EC2 instance
- Deploying an application on EC2 instance
- AWS Simple Storage Service (S3)
- AWS Elastic Beanstalk



What is Cloud?

Cloud computing is a major breakthrough in computing arena with massive scalability and rapid elastic provisioning of resources on a pay-per-use terms which eliminates large scale capital investments!

Resources:

Hardware

- Server
- Storage
- Network

Platform

- IDEs
- Databases
- Operating Systems
- Development Frameworks

Software

- Plugins
- Applications
- Services

Utility Model

Consider the case of a vast electrical grid managed by experts which provides a low cost, reliable power supply.

- Electricity is made available to us with much greater efficiency than you could generate on our own
- We will not know details such as source of electricity, the mode of power generation, fuel type in the power plant etc.
- It is available to you on-demand and you pay for what you use

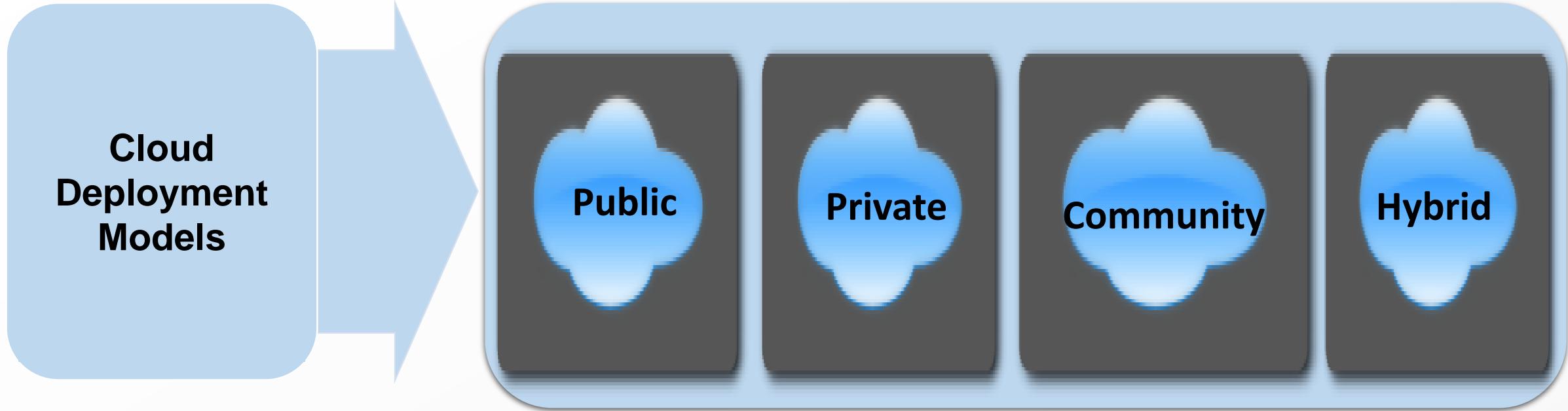


What is Cloud? Definition

**National Institute for
Standards and
Technology (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 Computing Deployment Models



Cloud Deployment Models - Summary

Deployment model	Best suited for	Advantages	Challenges
Public cloud	<ul style="list-style-type: none">• Variable workload• Test & Dev	<ul style="list-style-type: none">• Lowest TCO• Rapid elasticity• Faster deployment	<ul style="list-style-type: none">• Data Security• Privacy
Private cloud	<ul style="list-style-type: none">• Sensitive Data• Legal compliance	<ul style="list-style-type: none">• Security and control• Optimized performance	<ul style="list-style-type: none">• High cost of ownership• Skillset
Hybrid cloud	<ul style="list-style-type: none">• Cloud bursting• On demand access• Sensitive data	<ul style="list-style-type: none">• Lower TCO• Rapid elasticity• High Performance• Highly customizable	<ul style="list-style-type: none">• Portability• Migration• Integration
Community cloud	<ul style="list-style-type: none">• Collaboration of universities, Groups of hospitals	<ul style="list-style-type: none">• Lower TCO than private cloud• Rapid elasticity	<ul style="list-style-type: none">• Complex IT governance• Skill set



Wingspan References

https://hsbc.onwingspan.com/viewer/lex_auth_012638522204233728363/lex_auth_012638520365834240377

Quiz Time



Quiz 1

Which of the following deployment model allows multiple companies to collaborate together in a common cloud infrastructure?

- Public Cloud
- Private Cloud
- Hybrid Cloud
- Community Cloud



Quiz 2

A new venture by an Entrepreneur company, is planning to launch a mobile app for "Fast Song Download and Upload". The intention is to hit the market users who are interested in Music but the company is unsure of the current market trend. Company want to choose a cloud deployment model which can be used for both "Predictable and Unpredictable utilization by users"?

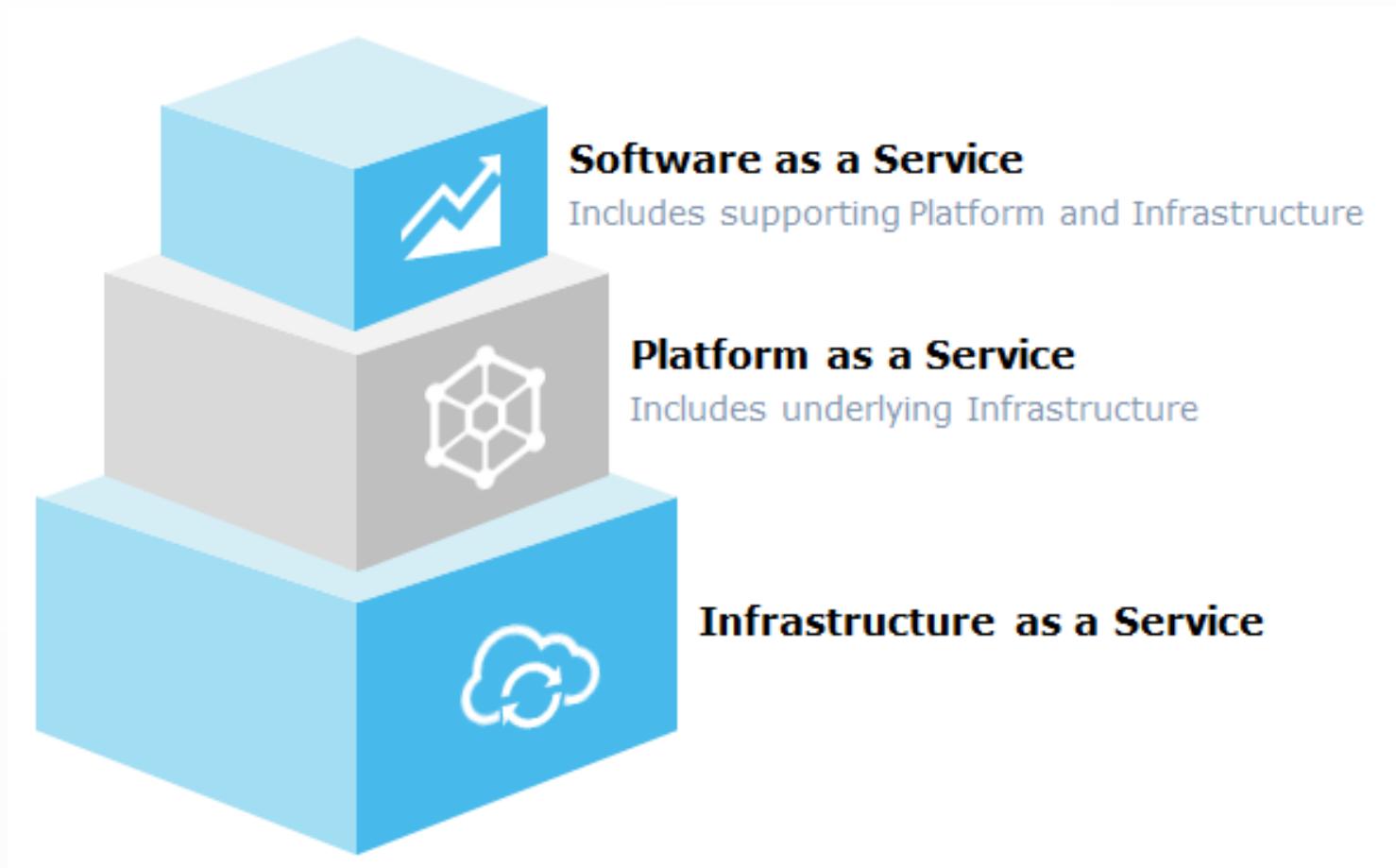
- Public
- Private
- Hybrid
- Community
- Private or Hybrid



Cloud Computing-Service Models



Cloud Computing Service Models



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Quiz Time



Quiz 1

Benefits of Infrastructure as a Service (IaaS) delivery model is/are:

- Pay per use model
- Reduced or no infrastructure maintenance headaches
- Ability to scale from a single server up to entire data centers
- All the given options



Quiz 2

Software as a Service (SaaS) delivery model may provide

- Office Suites
- CRM package
- Financial and HR packages
- All of the choices



Quiz 3

For an Infrastructure as a Service (IaaS) delivery model, you need to manage

- i. OS ii. Firewalls iii. Routers iv. Load Balancers

i only

i and ii only

i, ii and iii only

i, ii, iii and iv

Amazon Web Services(AWS)



Why Amazon Web Services?



Success Stories

AWS Services Overview

Wingspan References

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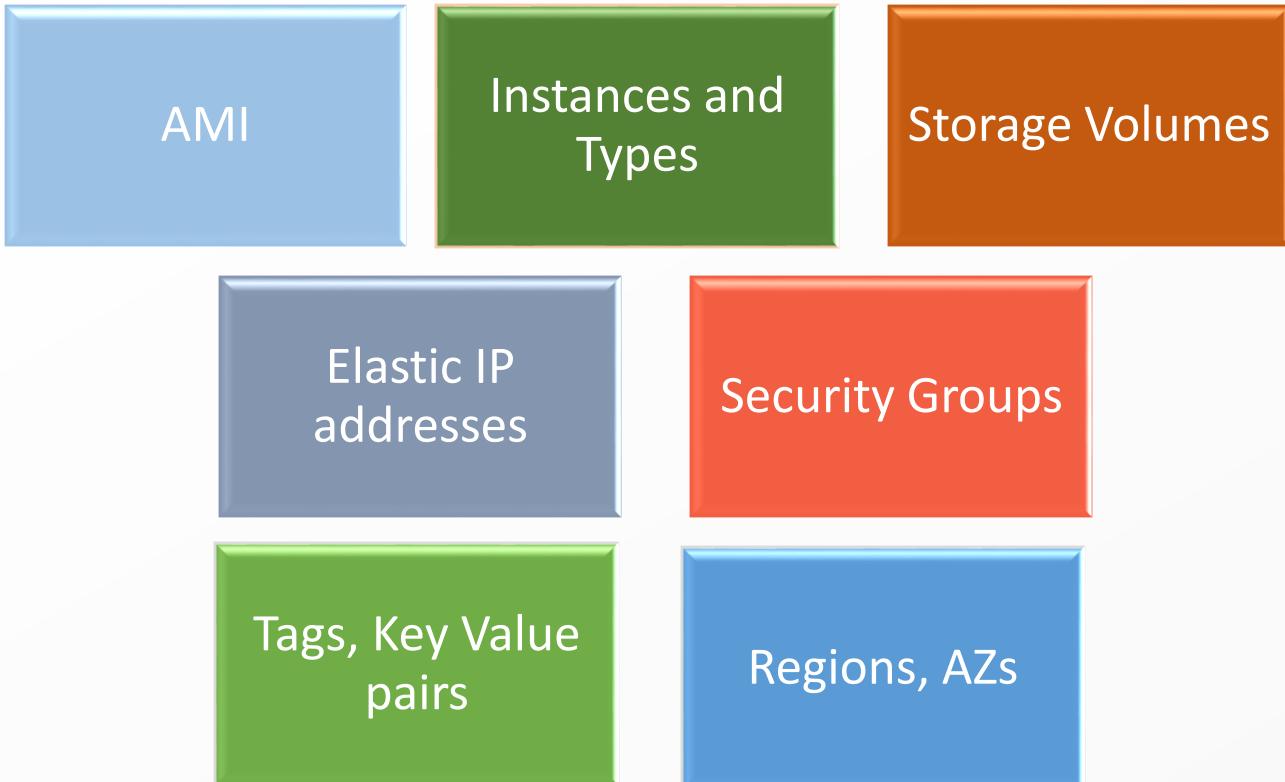
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Introduction to EC2



Amazon EC2 Components



Amazon EC2 features- Instance Types

General Purpose Instance Types

- Provides a **balanced set of CPU and memory resources** and high level of processing performance on a low cost platform

Compute Optimized Instance Types

- Compute Optimized instances have proportionally **more CPU resources** than memory
- Well suited for compute-intensive applications

Storage and IO Optimized Instances Types

- Storage Optimized instances provide **very high disk IO performance** or proportionally higher storage density per instance.
- It also provides high levels of CPU, memory and network performance.

GPU Enabled / Accelerated Computing

- GPU instances provides **graphic processing units** along with high CPU and network performance for applications benefiting from highly parallelized processing, including 3D graphics, HPC, rendering, and media processing applications

Memory Optimized Instance Types

- Memory Optimized instances **offer large memory sizes** for high throughput applications including relational and NoSQL databases, in-memory analytics solutions, scientific computing, and other memory-intensive applications

Amazon Elastic Block Store (EBS)

- EBS is just like a virtual hard drive
- Instances using Amazon AMI includes the EBS volumes attached automatically
- Created in specific AZ which contains computing resources
- One EBS volume can be connected to one instance at a time but many volumes can connect to one instance for increased I/O and performance
- Types are: SSD Based and HDD based

Greater and dedicated I/O levels

Allows to separate data from computing instance

Provides best performance

Attach it to your instance when required

Automatically replicated with the AZ to prevent data loss

Lab Work

Lab Guide: Day 1 Assignments:

Assignment 1a: Creating Linux EC2 Instance and deploying a sample application

Assignment 1b: Creating Windows EC2 instance

Quiz Time



Quiz 1

Which among the given characteristics would best describe Amazon EC2?

- It is an isolated segment of AWS cloud where AWS resources can be launched in a virtual network
- Provides flexible compute capacity in the AWS cloud
- A Service that can be used by the customers for storing and retrieving any volume of data
- An AWS service that helps launch and configure databases in AWS cloud



Quiz 2

Which of the following is/are TRUE while launching an EBS backed EC2 instance

- Root EBS volume cannot be encrypted
- Root EBS volume can be encrypted
- Traffic can be allowed to reach the instance from a particular IP address using security group
- Traffic cannot be allowed to reach the instance from a particular IP address using security group



Wingspan References

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Introduction to S3



Object Storage vs. Block Storage



Amazon S3
Object Store

- Store and retrieve any amount of data
- Static images and video files
- Higher latency
- Can not modify files



Amazon EBS
Block Store

- Behaves like a hard drive
- Operating System and website files
- Can be modified
- Automatically replicated in AZ

Lab Work

Lab Guide: Day 1 Assignments:

Assignment 2a : Create an Amazon S3 bucket

Assignment 2b: Upload objects in to S3 bucket

Quiz Time



Quiz 1

Which of the following holds true about Amazon S3?

- Service which provides block storage volumes for Amazon EC2 instances
- On-premises storage appliance that integrates with cloud storage
- Temporary block storage volumes for Amazon EC2 instances
- A service that provides scalable and highly durable object storage



Quiz 2

Consider that you have created an S3 bucket. While uploading objects into the S3 bucket, which among the below statements holds true?

- Object can hold data up to 1 TB only
- Object can hold data up to 5 TB only
- Object can be only metadata
- Object cannot be a video file



Additional reading –Wingspan Reference

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Additional reading

Introduction to Elastic Beanstalk



Lab Work

Assignment 3: Deploy a sample PHP application using Elastic Beanstalk

Refer: https://aws.amazon.com/getting-started/tutorials/launch-an-app/?trk=gs_card

Quiz Time



Quiz 1

Select the correct statement about AWS Elastic Beanstalk? Choose the best.

- Elastic Beanstalk is an application management platform
- Elastic Beanstalk is configuration management platform
- Customers upload their code and Elastic Beanstalk automatically handles the deployment
- Elastic Beanstalk is an integrated configuration management platform for IT administrators or DevOps engineers



Quiz 2

By using Elastic Beanstalk we can have control over the following elements of an application

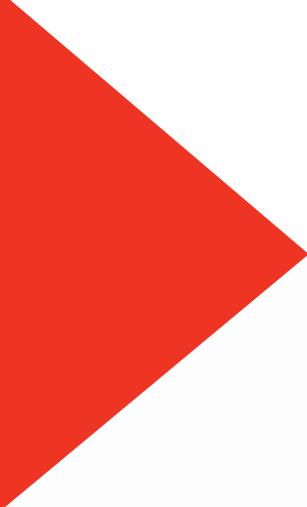
- Operating system
- Database and storage options
- Access log files without logging in to the application servers
- All of the above options



Summary

You have learnt..

- Overview of Cloud Computing
- Cloud deployment models
- Cloud service models
- AWS Global Infrastructure
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Thank You

