1.2. Student Handout

Cloud Computing Core Cloud Services: Student Handout

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1. What is Cloud Computing?

Definition:

Cloud computing is the delivery of computing services such as servers, storage, databases, networking, software, and analytics over the internet.

Examples:

- Using Google Drive for storing documents and files.
- Hosting a website on Amazon Web Services (AWS).
- Running applications on Microsoft Azure.

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2. Key Characteristics of Cloud Computing

a. On-Demand Self-Service:

Access cloud services as needed without human interaction with the provider.

Examples:

- Increasing storage capacity on Dropbox.
- Launching a new virtual machine on AWS.
- Scaling up database resources on Google Cloud Platform (GCP).

b. Broad Network Access:

Services are accessible over the internet from any location.

Examples:

- Accessing Salesforce CRM from any device.
- Using Office 365 applications from a web browser.
- Streaming videos on Netflix from different devices.

c. Resource Pooling:

Providers serve multiple customers using shared resources.

Examples:

- Multiple users accessing shared storage on AWS S3.
- Running multiple applications on a single Azure server.
- Hosting multiple websites on a shared GCP server.

d. Rapid Elasticity:

Quickly scale resources up or down based on demand.

Examples:

- Scaling up server capacity during an online sale.
- Reducing computing power after a peak event.
- Automatically adjusting storage space for a growing database.

e. Measured Service:

Usage is monitored, controlled, and reported, allowing for pay-as-you-go pricing.

Examples:

- Paying for the exact amount of data processed on AWS Lambda.
- Being billed for the number of emails sent via SendGrid.
- Tracking usage of virtual machines on Azure.

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3. Types of Cloud Services

a. Infrastructure as a Service (IaaS):

Provides virtualized computing resources over the internet.

Examples:

- Renting virtual machines on AWS EC2.
- Using Azure Virtual Machines for hosting applications.
- Storing data on Google Cloud Storage.

b. Platform as a Service (PaaS):

Offers a platform for developing, testing, and deploying applications.

Examples:

- Developing applications using Google App Engine.
- Building web apps with Azure App Service.
- Deploying applications on AWS Elastic Beanstalk.

c. Software as a Service (SaaS):

Delivers software applications over the internet.

Examples:

- Using Gmail for email communication.
- Accessing Microsoft Office 365 for productivity tools.
- Managing projects with Trello.

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4. Cloud Deployment Models

a. Public Cloud:

Cloud infrastructure is available to the general public.

Examples:

- Hosting a website on AWS.
- Using Google Cloud for data analytics.
- Running applications on Microsoft Azure.

b. Private Cloud:

Cloud infrastructure is used exclusively by one organization.

Examples:

- A company using VMware for internal cloud services.
- Hosting sensitive data on a private cloud server.
- Running internal applications on a dedicated cloud.

c. Hybrid Cloud:

Combines public and private clouds for flexibility.

Examples:

- Using a private cloud for sensitive data and a public cloud for scalability.
- Integrating on-premises infrastructure with AWS.
- Running applications on Azure with data stored in a private cloud.

d. Community Cloud:

Shared by several organizations with similar needs.

Examples:

- Universities sharing a cloud for research purposes.
- Government agencies using a shared cloud for collaboration.
- Healthcare organizations sharing a cloud for patient data.

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5. Introduction to Major Cloud Providers

a. Amazon Web Services (AWS):

Offers a wide range of cloud services globally.

Examples:

- Using AWS S3 for data storage.
- Deploying applications on AWS Lambda.
- Analyzing data with AWS Redshift.

b. Microsoft Azure:

Known for integration with Microsoft products.

Examples:

- Hosting databases on Azure SQL Database.
- Running virtual machines on Azure.
- Developing AI models with Azure Machine Learning.

c. Google Cloud Platform (GCP):

Specializes in data analytics and machine learning.

Examples:

- Using BigQuery for data analysis.
- Deploying machine learning models with TensorFlow on GCP.
- Hosting applications on Google Kubernetes Engine.

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6. Understanding the Services Offered by These Providers

Examples:

- Compute Services: AWS EC2, Azure Virtual Machines, GCP Compute Engine.
- Storage Services: AWS S3, Azure Blob Storage, GCP Cloud Storage.
- Database Services: AWS RDS, Azure SQL Database, GCP Cloud SQL.

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7. Global Impact of Cloud Computing

Cloud computing enables businesses to scale quickly, reduce costs, and innovate faster. It provides individuals with access to powerful computing resources.

Examples:

- Startups launching with minimal upfront costs.
- Enterprises scaling operations globally.
- Individuals using cloud-based applications for personal projects.

This handout provides a concise overview of cloud computing concepts, services, and deployment models. If you have any questions, feel free to ask!