2.2. Student Handout

Core Cloud Services: Compute, Storage, and Networking

Overview

This handout provides a concise overview of the fundamental cloud services: Compute, Storage, and Networking. Understanding these core components is essential for anyone working with cloud technologies.

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1. Compute: The Brain of the Cloud

Definition:

Compute refers to the processing power in the cloud that allows you to run applications, perform calculations, and execute tasks.

Types of Compute Services:

- **Virtual Machines (VMs):**
- Example 1: Running a web server on an AWS EC2 instance.
- Example 2: Hosting a database on a Google Cloud VM.
- Example 3: Deploying a development environment on an Azure VM.
- **Containers:**
- Example 1: Deploying a microservice using Docker on AWS ECS.
- Example 2: Running a Node.js application in a Kubernetes pod.
- Example 3: Hosting a Python app in a container on Google Kubernetes Engine (GKE).

Potential Gaps:

- Confusion between VMs and Containers: VMs are full virtualized machines, while containers are isolated environments sharing the same OS kernel.

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2. Storage: The Memory of the Cloud

Definition:

Storage in the cloud is where your data is kept, similar to a hard drive or SSD on a computer.

Types of Cloud Storage:

- **Object Storage:**
- Example 1: Storing images and videos in Amazon S3.
- Example 2: Archiving logs in Google Cloud Storage.
- Example 3: Saving backups in Azure Blob Storage.
- **Block Storage:**
- Example 1: Attaching an Amazon EBS volume to an EC2 instance.
- Example 2: Using Google Persistent Disk for a database.
- Example 3: Utilizing Azure Managed Disks for virtual machines.
- **File Storage:**
- Example 1: Sharing files using Amazon EFS.
- Example 2: Collaborating on documents with Google Filestore.
- Example 3: Accessing shared data via Azure Files.

Potential Gaps:

- Understanding Object vs. Block Storage: Object storage is for large, unstructured data, while block storage is for structured data needing fast access.

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3. Networking: The Roads of the Cloud

Definition:

Networking in the cloud refers to how different components communicate with each other.

Key Networking Concepts:

- **Virtual Private Cloud (VPC):**
- Example 1: Creating a secure network on AWS.
- Example 2: Isolating resources in a Google Cloud VPC.
- Example 3: Setting up a private network in Azure.
- **Subnets:**
- Example 1: Dividing a VPC into public and private subnets on AWS.
- Example 2: Organizing resources with subnets in Google Cloud.

- Example 3: Using subnets to separate environments in Azure.
- **Security Groups:**
- Example 1: Controlling access to an EC2 instance with AWS Security Groups.
- Example 2: Setting firewall rules in Google Cloud.
- Example 3: Managing inbound and outbound traffic in Azure.

Potential Gaps:

- Confusion between VPC and Subnets: A VPC is the overall network, while subnets are smaller sections within that network.

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4. Content Delivery Networks (CDN) and Load Balancing

Content Delivery Network (CDN):

- Example 1: Using Amazon CloudFront to deliver website content.
- Example 2: Speeding up content delivery with Google Cloud CDN.
- Example 3: Distributing media files using Azure CDN.

Load Balancing:

- Example 1: Distributing traffic across multiple EC2 instances with AWS Elastic Load Balancing.
- Example 2: Balancing requests among Google Compute Engine instances.
- Example 3: Ensuring high availability with Azure Load Balancer.

Potential Gaps:

- Understanding CDN vs. Load Balancing: CDNs deliver content faster using distributed servers, while load balancers distribute traffic evenly across servers.

Conclusion

Key Takeaways:

1. **Compute** provides processing power through VMs and containers.
2. **Storage** keeps your data safe with object, block, and file storage options.
3. **Networking** connects everything with VPCs, subnets, and security groups.

4. **CDNs** enhance content delivery speed, and **load balancers** ensure traffic distribution.

For further questions or clarifications, feel free to reach out!