



AMAL JYOTHI COLLEGE OF ENGINEERING

ASSIGNMENT NO 3

CLOUD COMPUTING

SUBMITTED TO,

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What are the services provided by Google, Amazon, Azure ?

- **Compute.**
- **Networking.**
- **Storage**
- **Databases.**

Google Cloud

Compute Services

- **Cloud Functions** has a simple and intuitive developer experience. Just write your code and let Google Cloud handle the operational infrastructure. Develop faster by writing and running small code snippets that respond to events. Connect to Google Cloud or third-party cloud services via triggers to streamline challenging orchestration problems.
- **Google App Engine** is a Platform as a Service and cloud computing platform for developing and hosting web applications in Google-managed data centers. Applications are sandboxed and run across multiple servers.
- **Google Kubernetes Engine** (GKE) provides a managed environment for deploying, managing, and scaling your containerized applications using Google infrastructure. The GKE environment consists of multiple machines (specifically, Compute Engine instances) grouped together to form a cluster.
- **Compute Engine** lets you create and run virtual machines on Google infrastructure. Compute Engine offers scale, performance, and value that lets you easily launch large compute clusters on Google's infrastructure. There are no upfront investments, and you can run thousands of virtual CPUs on a system that offers quick, consistent performance.

Networking Services

- **Hybrid connectivity** cloud Interconnect, Cloud VPN, Carrier Peering, and Direct Peering provide connectivity solutions for Google Cloud. Cloud Interconnect delivers an enterprise-grade connection to Virtual Private Cloud. Direct Peering lets you connect directly to Google Cloud or you can choose a partner with Carrier Peering.
- **Virtual Private Cloud (VPC)** Provision, connect, or isolate Google Cloud resources using the Google global network. Define fine-grained networking policies with Google Cloud, on-premises, or public cloud infrastructure. VPC network includes granular IP address range selection, routes, firewall, Cloud VPN (Virtual Private Network), and Cloud Router.
- **Cloud DNS** is a scalable, reliable, programmable, and managed authoritative domain naming system (DNS) service running on the same infrastructure as Google. Cloud DNS translates domain names like `www.google.com` into IP addresses like `74.125.29.101`. Use our simple interface, a command line, or API to publish and manage millions of DNS zones and records.

Storage Services

- **Cloud Storage** simply store your data in Cloud Storage to get secure and highly available object storage at low costs. A consistent API, latency, and speed across storage classes makes development easy.

- **Persistent Disk** use block storage that is suitable for any virtual machine or container. Storage volumes can be transparently resized, quickly backed up, and support simultaneous readers.
- **Filestore** fully managed, scalable file storage with predictable performance.
- **Cloud Storage for Firebase** quickly and easily store and serve user-generated content. The Firebase SDKs for Cloud Storage add Google security to file uploads and downloads for your Firebase apps.
- **Data transfer services** transfer your structured and unstructured datasets quickly to Cloud Storage, BigQuery, or Cloud Dataproc. Move petabytes with a bulk transfer, stream data directly into Google Cloud, or upload via the command line.
- **Google Workspace Essentials** a collaborative space for storing, sharing, and editing files. With Google-grade security, artificial intelligence, and real-time collaboration, it's a modern alternative to legacy ECMs.

Database Services

- **Cloud SQL** is a fully managed database service that makes it easy to set up and manage your relational PostgreSQL, MySQL, and SQL Server databases in the cloud.
- **Cloud Bigtable** is a NoSQL database service for use cases where low latency reads and high throughput writes, scalability, and reliability are critical.
- **Cloud Spanner** is a scalable relational database service built to support transactions, strong consistency, and high availability across regions and continents.
- **Cloud Memorystore** is a fully managed in-memory data store service for Redis built on scalable, more secure, and highly available infrastructure.
- **Cloud Firestore** is a fast, fully managed, serverless, cloud-native NoSQL document database.
- **Firebase Realtime Database** is a cloud-hosted NoSQL database that lets you store and sync data between your users in real time.
- **BigQuery** is a serverless, highly scalable, and cost-effective data warehouse designed to help you make informed decisions quickly.

Amazon Web services (AWS)

Compute Services

- **Amazon EC2** simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment.
- **Amazon EC2 Auto Scaling** helps you maintain application availability and allows you to automatically add or remove EC2 instances according to conditions you define. You can use the fleet management features of Amazon EC2 Auto Scaling to maintain the health and availability of your fleet.
- **Amazon Elastic Container Registry (ECR)** is a fully-managed Docker container registry that makes it easy for developers to store, manage, and deploy Docker container images.
- **Amazon Elastic Container Service (Amazon ECS)** is a highly scalable, high-performance container orchestration service that supports Docker containers and allows you to easily run and scale containerized applications on AWS.
- **Amazon Elastic Kubernetes Service (Amazon EKS)** makes it easy to deploy, manage, and scale containerized applications using Kubernetes on AWS. Amazon EKS runs the Kubernetes management infrastructure for you across multiple AWS availability zones to eliminate a single point of failure.
- **Amazon Lightsail** is designed to be the easiest way to launch and manage a virtual private server with AWS. Lightsail plans include everything you need to jumpstart your project – a virtual machine, SSD-based storage, data transfer, DNS management, and a static IP address – for a low, predictable price.
- **AWS Batch** enables developers, scientists, and engineers to easily and efficiently run hundreds of thousands of batch computing jobs on AWS. AWS Batch dynamically provisions the optimal quantity and type of compute resources (e.g., CPU or memory-optimized instances) based on the volume and specific resource requirements of the batch jobs submitted.
- **AWS Elastic Beanstalk** is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and Internet Information Services (IIS).

- **AWS Fargate** is a compute engine for Amazon ECS that allows you to run containers without having to manage servers or clusters. With AWS Fargate, you no longer have to provision, configure, and scale clusters of virtual machines to run containers.
- **AWS Lambda** lets you run code without provisioning or managing servers. You pay only for the compute time you consume—there is no charge when your code is not running. With Lambda, you can run code for virtually any type of application or backend service—all with zero administration.
- **AWS Serverless Application Repository** enables you to quickly deploy code samples, components, and complete applications for common use cases such as web and mobile back-ends, event and data processing, logging, monitoring, IoT, and more.
- **AWS Outposts** bring native AWS services, infrastructure, and operating models to virtually any data center, co-location space, or on-premises facility. You can use the same APIs, the same tools, the same hardware, and the same functionality across on-premises and the cloud to deliver a truly consistent hybrid experience.
- **VMware Cloud on AWS** is an integrated cloud offering jointly developed by AWS and VMware delivering a highly scalable, secure and innovative service that allows organizations to seamlessly migrate and extend their on-premises VMware vSphere-based environments to the AWS Cloud running on next-generation Amazon Elastic Compute Cloud (Amazon EC2) bare metal infrastructure.

Networking Services

- **Amazon Virtual Private Cloud (Amazon VPC)** lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.
- **Amazon CloudFront** is a fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to customers globally with low latency, high transfer speeds, all within a developer-friendly environment.
- **Amazon Route 53** is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost-effective way to route end users to Internet applications by translating human readable names, such as `www.example.com`, into the numeric IP addresses, such as `192.0.2.1`, that computers use to connect to each other. Amazon Route 53 is fully compliant with IPv6 as well.

- **AWS PrivateLink** simplifies the security of data shared with cloud-based applications by eliminating the exposure of data to the public Internet. AWS PrivateLink provides private connectivity between VPCs, AWS services, and on-premises applications, securely on the Amazon network.
- **AWS Direct Connect** makes it easy to establish a dedicated network connection from your premises to AWS. Using AWS Direct Connect, you can establish private connectivity between AWS and your data center, office, or co-location environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.
- **AWS Global Accelerator** is a networking service that improves the availability and performance of the applications that you offer to your global users.
- **Amazon API Gateway** is a fully managed service that makes it easy for developers to create, publish, maintain, monitor, and secure APIs at any scale. With a few clicks in the AWS Management Console, you can create an API that acts as a “front door” for applications to access data, business logic, or functionality from your back-end services, such as workloads running on Amazon EC2, code running on AWS Lambda, or any web application.
- **AWS Transit Gateway** is a service that enables customers to connect their Amazon Virtual Private Clouds (VPCs) and their on-premises networks to a single gateway. As you grow the number of workloads running on AWS, you need to be able to scale your networks across multiple accounts and Amazon VPCs to keep up with the growth.
- **AWS App Mesh** makes it easy to monitor and control microservices running on AWS. App Mesh standardizes how your microservices communicate, giving you end-to-end visibility and helping to ensure high-availability for your applications.
- **AWS Cloud Map** is a cloud resource discovery service. With Cloud Map, you can define custom names for your application resources, and it maintains the updated location of these dynamically changing resources. This increases your application availability because your web service always discovers the most up-to-date locations of its resources.
- **Elastic Load Balancing (ELB)** automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, and IP addresses. It can handle the varying load of your application traffic in a single Availability Zone or across multiple Availability Zones.

Storage Services

- **Amazon Simple Storage Service (Amazon S3)** is an object storage service that offers industry-leading scalability, data availability, security, and performance. This means customers of all sizes and industries can use it to store and protect any amount of data for a range of use cases, such as websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics.
- **Amazon Elastic Block Store (Amazon EBS)** provides persistent block storage volumes for use with Amazon EC2 instances in the AWS Cloud. Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability.
- **Amazon Elastic File System (Amazon EFS)** provides a simple, scalable, elastic file system for Linux-based workloads for use with AWS Cloud services and on-premises resources. It is built to scale on demand to petabytes without disrupting applications, growing and shrinking automatically as you add and remove files, so your applications have the storage they need – when they need it.
- **Amazon FSx for Lustre** is a fully managed file system that is optimized for compute-intensive workloads, such as high-performance computing, machine learning, and media data processing workflows. Many of these applications require the high-performance and low latencies of scale-out, parallel file systems.
- **Amazon FSx for Windows File Server** provides a fully managed native Microsoft Windows file system so you can easily move your Windows-based applications that require file storage to AWS. Built on Windows Server, Amazon FSx provides shared file storage with the compatibility and features that your Windows-based applications rely on, including full support for the SMB protocol and Windows NTFS, Active Directory (AD) integration, and Distributed File System (DFS).
- **Amazon S3 Glacier** is a secure, durable, and extremely low-cost storage service for data archiving and long-term backup. It is designed to deliver 99.999999999% durability, and provides comprehensive security and compliance capabilities that can help meet even the most stringent regulatory requirements.
- **AWS Storage Gateway** is a hybrid storage service that enables your on-premises applications to seamlessly use AWS cloud storage. You can use the service for backup and archiving, disaster recovery, cloud data processing, storage tiering, and migration.

Database Services

- **Amazon Aurora** is a MySQL and PostgreSQL compatible relational database engine that combines the speed and availability of high-end commercial databases with the simplicity and cost-effectiveness of open source databases.
- **Amazon Relational Database Service (Amazon RDS)** makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups. It frees you to focus on your applications so you can give them the fast performance, high availability, security and compatibility they need.
- **Amazon Relational Database Service (Amazon RDS)** on VMware lets you deploy managed databases in on-premises VMware environments using the Amazon RDS technology enjoyed by hundreds of thousands of AWS customers. Amazon RDS provides cost-efficient and resizable capacity while automating time-consuming administration tasks including hardware provisioning, database setup, patching, and backups, freeing you to focus on your applications.
- **Amazon DynamoDB** is a key-value and document database that delivers single-digit millisecond performance at any scale. It's a fully managed, multiregion, multimaster database with built-in security, backup and restore, and in-memory caching for internet-scale applications. DynamoDB can handle more than 10 trillion requests per day and support peaks of more than 20 million requests per second.
- **Amazon ElastiCache** is a web service that makes it easy to deploy, operate, and scale an in-memory cache in the cloud. The service improves the performance of web applications by allowing you to retrieve information from fast, managed, in-memory caches, instead of relying entirely on slower disk-based databases.
- **Amazon Neptune** is a fast, reliable, fully-managed graph database service that makes it easy to build and run applications that work with highly connected datasets. The core of Amazon Neptune is a purpose-built, high-performance graph database engine optimized for storing billions of relationships and querying the graph with milliseconds latency.
- **Amazon QLDB** is a fully managed ledger database that provides a transparent, immutable, and cryptographically verifiable transaction log owned by a central trusted authority. Amazon QLDB tracks each and every application data change and maintains a complete and verifiable history of changes over time.
- **Amazon Timestream** is a fast, scalable, fully managed time series database service for IoT and operational applications that makes it easy to store and analyze trillions of events per day at 1/10th the cost of relational databases.

- **Amazon DocumentDB** (with MongoDB compatibility) is a fast, scalable, highly available, and fully managed document database service that supports MongoDB workloads. Amazon DocumentDB is designed from the ground-up to give you the performance, scalability, and availability you need when operating mission-critical MongoDB workloads at scale.

Micorsoft Azure

Compute Services

- **Virtual Machine**: It is an IaaS service, allowing us to deploy and manage VMs inside a virtual network (VNet).
- **App Service**: It is a managed PaaS offering for hosting web apps, mobile app back ends, RESTful APIs, or automated business processes.
- **Service Fabric**: It is a platform that can run on any environment, including Azure or on-premises. It is an orchestrator of micro-services across a cluster of machines.
- **Azure Kubernetes Services**: It manages a hosted Kubernetes service for running containerized applications.
- **Azure Container Instances**: It offers the fastest and most straightforward way to run a container in Azure without having to provision any virtual machines and without having to adopt a high-level service.
- **Azure Functions**: It is a managed FaaS service.
- **Azure Batch**: It is a managed service for running large-scale parallel and high-performance computing (HPC) applications.
- **Cloud Services**: It is a managed service for running cloud applications. It uses a PaaS hosting model.

Networking Services

- **Virtual network**: Enables Azure resources to securely communicate with each other, the internet, and on-premises networks.

- **ExpressRoute** Extends your on-premises networks into the Microsoft cloud over a private connection facilitated by a connectivity provider.
- **VPN Gateway** Sends encrypted traffic between an Azure virtual network and an on-premises location over the public Internet.
- **Virtual WAN** Optimizes and automates branch connectivity to, and through, Azure. Azure regions serve as hubs that you can choose to connect your branches to.
- **Azure DNS Hosts** DNS domains that provide name resolution by using Microsoft Azure infrastructure.
- **Azure Bastion** Configure secure and seamless RDP/SSH connectivity to your virtual machines directly in the Azure portal over TLS. When you connect via Azure Bastion, your virtual machines do not need a public IP address
- **Virtual network NAT Gateway** Create a NAT gateway to provide outbound connectivity for a virtual machine.
- **Azure Peering Service** Collaborate with service providers for optimal and reliable routing to the Microsoft cloud over the public network.
- **Azure Edge Zones** Deploy VMs, containers, and other services to Edge Zones to address low latency and high throughput requirements.
- **Azure Orbital** Communicate with your spacecraft or satellite constellations, downlink and uplink data, process your data in the cloud, chain services with Azure services in unique scenarios, and generate products for your customers.

Storage Services

- **Azure Blobs**: A massively scalable object store for text and binary data. Also includes support for big data analytics through Data Lake Storage Gen2.
- **Azure Files**: Managed file shares for cloud or on-premises deployments.
- **Azure Queues**: A messaging store for reliable messaging between application components.
- **Azure Tables**: A NoSQL store for schema less storage of structured data.
- **Azure Disks**: Block-level storage volumes for Azure VMs.

Database Services

- **Azure SQL Database** is a relational database-as-a service using the Microsoft SQL Server Engine. SQL Database is a high-performance, reliable, and secure database you can use to build data-driven applications and websites in the programming language of your choice, without needing to manage infrastructure.
- **Azure Cosmos DB** provides native support for NoSQL choices, offers multiple well-defined consistency models, guarantees single-digit-millisecond latencies at the 99th percentile, and guarantees high availability with multi-homing capabilities and low latencies anywhere in the world.
- **Azure SQL Data Warehouse** is a cloud-based Enterprise Data Warehouse (EDW) that leverages Massively Parallel Processing (MPP) to quickly run complex queries across petabytes of data.
- **Azure Data Factory (ADF)** is a service designed to allow developers to integrate disparate data sources. It provides access to on-premises data in SQL Server and cloud data in Azure Storage (Blob and Tables) and Azure SQL Database.
- **Azure Redis Cache** is a secure data cache and messaging broker that provides high throughput and low-latency access to data for applications.
- **Azure SQL Server Stretch Database** lets you dynamically stretch warm and cold transactional data from Microsoft SQL Server 2016 to Microsoft Azure.
- **SQL Server on Virtual Machines** Spin up a virtual machine, back up your SQL Server instance, and restore it into Azure. It's that easy to reduce your capital investments and optimize operational expenses by migrating your on-premises SQL Server to the cloud. Spin up a virtual machine, back up your SQL Server instance, and restore it into Azure. It's that easy to reduce your capital investments and optimize operational expenses by migrating your on-premises SQL Server to the cloud.
- **Azure Table storage** stores large amounts of structured data. The service is a NoSQL datastore which accepts authenticated calls from inside and outside the Azure cloud.
- **Azure Database for MySQL** is a fully-managed database service for app developers and it is capable of handling mission-critical workload with predictable performance and dynamic scalability.
- **Azure Database Migration Service** is designed as a seamless, end-to-end solution for moving on-premises SQL Server databases to the cloud.