

Name : Lauren Abigail
NIM : 2602108426
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Essay Questions

Cloud Concept

1. Explain the concept of pay-as-you-go pricing for cloud services. Discuss the advantages and disadvantages of this pricing model compared to the traditional infrastructure model.

Answer:

The pay-as-you-go concept has many advantages for users. This concept lets the user operate them without any upfront expenses—pay for what you use. This allows users to pay just according to what services that they take. Cloud services also give you multiple storage services that deliver lower storage costs based on needs. There are huge amounts of services that technically will give or give you cheaper cost per gigabyte the more you use the service, because most of the cloud services are paid by their service not per gigabyte. Other than that, cloud also gives you free services that you could access. Pay-as-you-go-concept also gives advantages because it doesn't have any long-term commitments for users that avoid long-term contracts.

On the other hand, the “pay-as-you-go” concept could also bring disadvantages to users. Since this concept is playing a role where users will pay as what they need or as how they use the services, sometimes users could overspend their expenses on cloud. Users need to monitor and manage the services usage on the cloud. So that, they can observe and align the needs and the services needed so there will be no overspending or unpredictable expenses in a sudden. This concept really helps a lot of people but it's going to be bad when the user becomes dependent on the cloud provider. Because, this thing could be risky if the service is outages or disruptions. Other than that, there will also be data transfer cost that will occur. When users want to transferring data in or out from the cloud there will be extra charge and it will be so ineffective when you have large volumes of data.

2. Define Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Provide examples for each type of cloud service model.

Answer:

Infrastructure as a Service or IaaS is a cloud service that will provide you an ability to access virtualized computing using the resources from all over the internet. This IaaS's example is Amazon Web Service EC2, that will offer you storage, virtual servers, and networking resources that will be paid as what services was used.

Platform as a Service or PaaS is a cloud computing service that serves you a platform where you could use, modify, develop, manage, and run it without infrastructure. Example for this Heroku that will let you this platform service that i have mentioned the functions and usage as above.

Software as a Service or SaaS gives you the ability to deliver software applications through the internet on subscription basis. For this service, google workspace will be the right answer. This Google Workspace will give you productivity from many other apps like Gmail, GDrive, and GDocs in just one website.

AWS Infrastructure and Security

3. Explain the four essential components of AWS Identity and Access Management (IAM) and how they work together to enforce the principle of least privilege.

Answer:

The four components of AWS Identity and Access Management or IAM are users, groups, roles, and policies. Users need their own user account to operate the system and it is individual. Groups for example are your company or even a group in classes that have similar tasks, so the progress could be seen by the whole group. Next, is the roles where a user could or have to do a special task for a short term of time. Lastly, it's the policies that keep users in guide and not harming others or any boundaries. Like how the "least privilege"'s rule, users have their boundaries or borders about what's their exact needs that should be fulfilled.

4. Define and explain the concepts of high availability and fault tolerance in cloud computing. Illustrate how these concepts work together with an example.

Answer:

High Availability is a system that guarantees you system to work or run smoothly. This system also keeps your system to work with the best performance

including seed, so they will minimize downtimes by having a backup server that will take over when needed.

Fault Tolerance is a thing to tolerate where there's a fail between any parts. So when a failure happens, the system will still work or run. The thing that this Fault Tolerance system will do is to replicate data within multiple servers so that the other can handle the failure seamlessly.

AWS Service Concept

5. In a few sentences, define each of the following AWS services:

- VPC Peering

Answer:

This service allows users to have communication directly through VPC in AWS that gives you interconnection of resources without going through the internet.

- Amazon machine Image (AMI)

Answer:

This service is founded in the EC2 where the usage is as a template to launch a virtual server. This AMI encompasses the running system, software, and configurations required due to the server's functionality.

- Security Group

Answer:

This is a virtual firewall keeping the traffic and resources secure.

- Serverless Computation

Answer:

This is a way for developers or users to create and run apps without worrying about setting up or looking after servers. The cloud provider takes care of all that, making sure there's enough computing power whenever it's needed.

- Snapshot

Answer:

This thing helps you to store what you've done. So when something got corrupted, this thing will help you to restore important things you need.

- S3 Lifecycle Policy

Answer:

It's like having a super organized system for your files in Amazon's cloud. You can decide when to move files around or even get rid of them if they're old or you don't need them anymore.

- Read Replica

Answer:

This thing will help you to have copies of your work or database that make other people able to read it. This “Read Replica” also helps people to work faster.

Automatic Scaling, Monitoring, and Billing Mechanism

6. Explain the Elastic Load Balancing service in AWS and its use cases for each type.

Answer:

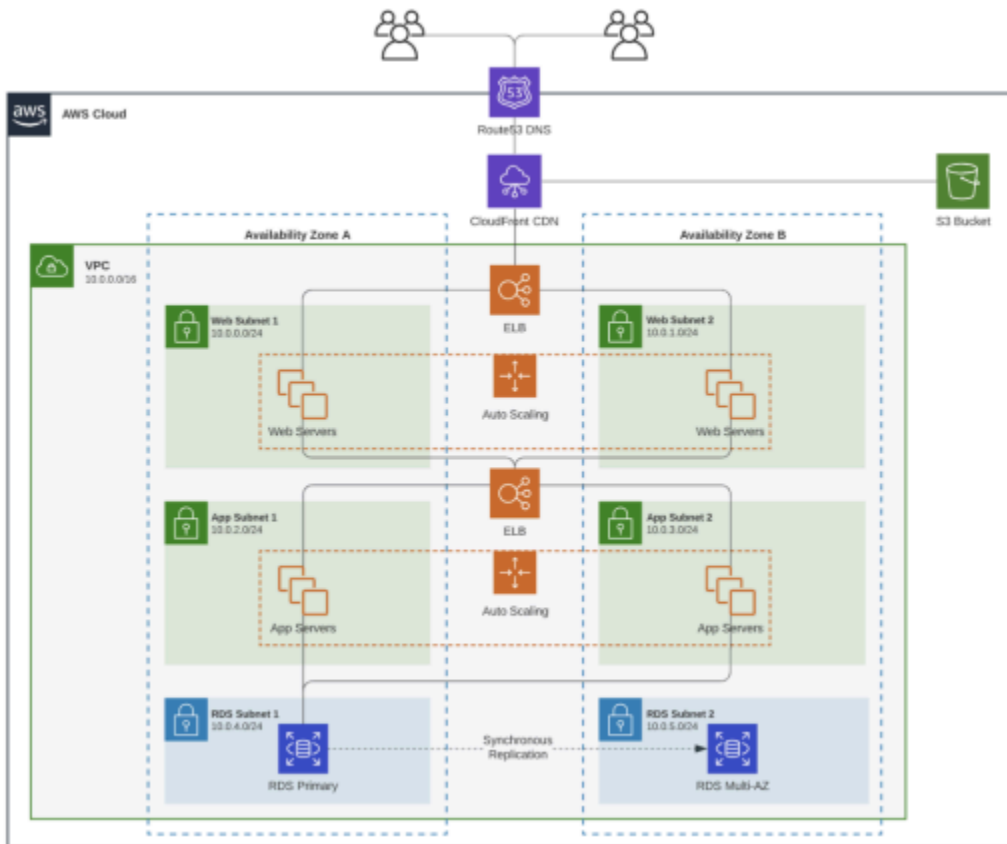
Elastic Load Balancing service could be found in AWS that works to manage traffic for websites and apps hosted in the cloud. It helps visitors to be evenly distributed across multiple servers, preventing any single server from getting too much traffic in it. There are three types of load balancers. There are Application Load Balancer also known as ALB, Network Load Balancer or NLB, and Classic Load Balancer or CLB. ALB is best for websites with different types of content, as it can manage or arrange traffic based on the type of request, for example: web browsing or video streaming. NLB is mainly used for applications requiring high performance and low latency. This NLB service is usually used for gaming or financial services. So that the server is quick to solve forward traffic without much processing. CLB is suitable for basic setups where simple load balancing is needed, evenly distributing incoming requests to servers without additional features.

7. Explain the concept of Total Cost of Ownership (TCO) in detail, including an example.

Answer:

Total cost of Ownership or TCO is the cost that you will expand when you own something. It's not just about the money you put out when buying the thing. But, it's also including the cost of maintenance or even how much effort or energy the thing you buy needs. For example when you buy a house. At first you will pay, you need to pay for the maintenance. In the way, you need to pay for the maintenance such as security deposit, water bills, electricity bills, and also in need to keep your house clean so maybe you need to pay for maids, paint to repaint the house, and many others. This TCO will give you the actual cost you will spend when you purchase something but cumulating these costs altogether.

Cloud Architecture



8. Analyze the cloud architecture in picture 1 and explain the role of each component.

Answer:

- VPC (Virtual Private Cloud): A VPC serves as a virtual network in AWS, offering a segregated environment for your AWS resources, such as Amazon EC2 instances, in private subnets. This enhances security and control over your cloud assets.
- Route 53 DNS: Route 53, an AWS Domain Name System (DNS) service, directs internet traffic to your resources for AWS by translating human-readable domain names into machine-readable IP addresses, facilitating connections between devices.
- CloudFront: CloudFront, an AWS content delivery network (CDN), stores and distributes content like static files across multiple edge locations worldwide. By delivering content from the nearest edge location, it reduces latency and enhances user experience.

- S3 Bucket: S3 (Simple Storage Service) is an AWS object storage service that offers virtually limitless storage for various data types. S3 buckets are highly available, durable, and scalable.
- Availability Zones (AZs): AZs are discrete locations within an AWS region with independent infrastructure, minimizing the impact of failures on applications.
- Web Server: Web servers are software applications that serve web content to users. In AWS, web servers can run on Amazon EC2 instances.
- ELB (Elastic Load Balancer): ELB distributes incoming traffic across multiple EC2 instances in different AZs, ensuring high availability and scalability.
- Auto Scaling: Auto Scaling automatically adjusts the number of EC2 instances based on predefined metrics, optimizing resource utilization.
- RDS (Relational Database Service): RDS is a managed database service by AWS, simplifying the setup, operation, and scalability of relational databases like MySQL, PostgreSQL, Oracle, and Aurora in the cloud.
- Subnet: A subnet is a division of a VPC, providing a smaller network for enhanced security and traffic management. Common subnets include those for web servers, application servers, and database instances.
- Web subnet: This subnet is a place where the web servers reside.
- App subnet: This subnet is used to hold the application servers.
- RDS subnet: This subnet mostly holds the Amazon RDS database instances.
- Synchronous Replication: Synchronous replication ensures data consistency between multiple databases by instantly copying transactions from the primary to secondary databases, minimizing data loss in case of a primary database failure.