AWS Module 1 Final Study Guide

This study guide will help students prepare for the AWS Module 1 quiz by summarizing key concepts and providing a vocabulary list with definitions and acronyms. Focus on understanding the cloud service models, deployment models, AWS tools, and frameworks.

Key Concepts

Cloud Service Models

1. **Platform as a Service (PaaS)**: In this model, you focus on deploying and managing your applications without managing the underlying infrastructure. It provides tools and services for application development.
2. **Software as a Service (SaaS)**: Offers software applications over the internet, eliminating the need for installation or maintenance.
3. **Infrastructure as a Service (IaaS)**: Provides virtualized computing resources over the internet, such as servers and storage.
4. **Cloud Storage as a Service (CSaaS)**: Focuses on storing data in the cloud.

Cloud Deployment Models

1. **Cloud Deployment Model**: Fully deploys and runs applications in the cloud environment.
2. **Hybrid Deployment Model**: Connects cloud-based resources with on-premises infrastructure, offering flexibility.
3. **On-Premises Deployment Model**: Sometimes referred to as a private cloud; resources are deployed within an organization's local infrastructure.

Key Features of AWS

1. On-demand access to IT resources.
2. Pay-as-you-go pricing for individual services.
3. Flexibility in selecting and using services.
4. Services work together like building blocks to create customized solutions.

AWS Tools

1. **AWS Management Console**: Provides a graphical interface for managing AWS resources.
2. **AWS Command Line Interface (CLI)**: Enables resource management using command scripts.
3. **AWS Software Development Kits (SDKs)**: Simplifies programmatic resource management and integrates AWS into existing applications.

AWS Cloud Adoption Framework (CAF)

1. Helps organizations develop efficient plans for cloud adoption.
2. Requires a thoughtful strategy and organizational alignment for successful implementation.
3. Includes perspectives that focus on business or technology capabilities managed by key stakeholders.

Vocabulary

- **AWS Management Console**: A web-based graphical interface for managing AWS resources.
- **AWS CLI (Command Line Interface)**: A tool for managing AWS resources through command-line scripts.
- **AWS SDKs (Software Development Kits)**: Programming tools that simplify integration of AWS services into applications.
- **AWS CAF (Cloud Adoption Framework)**: A framework to guide organizations in planning their cloud adoption journey efficiently.
- **PaaS (Platform as a Service)**: A cloud service model that enables application deployment without managing infrastructure.
- **SaaS (Software as a Service)**: A model where software is delivered over the internet without installation or maintenance requirements.
- **IaaS (Infrastructure as a Service)**: Provides virtualized computing resources like servers and storage over the internet.
- **CSaaS (Cloud Storage as a Service)**: A model focused on storing data in the cloud environment.

- **Cloud Deployment Model**: A method of deploying applications entirely in the cloud environment.
- **Hybrid Deployment Model**: Combines cloud-based resources with on-premises infrastructure for flexibility.
- **On-Premises Deployment Model**: Resources are deployed locally within an organization's infrastructure, often referred to as private cloud.
- **Web Service**: A service available over the internet that uses standardized formats like XML or JSON for communication.

AWS Module 2 Final Study Guide

This study guide is designed to help students prepare for the AWS Module 2 quiz. It covers key concepts, tools, and services relevant to the questions provided. Review the information below thoroughly and use the vocabulary list at the end to reinforce your understanding of important terms.

Key Topics

AWS Identity and Access Management (IAM)

- IAM is primarily used to control user access to AWS services and resources. It ensures secure access management by defining permissions and roles.

Consolidated Billing

- Consolidated Billing helps reduce costs by combining usage across multiple accounts, enabling volume pricing discounts. It also tracks charges for each account and generates a single bill.

AWS Elastic Beanstalk

- Elastic Beanstalk simplifies the deployment and management of applications in the AWS Cloud. It abstracts infrastructure management, allowing developers to focus on their code.

AWS CloudFormation

- CloudFormation automates the creation and provisioning of related AWS resources in a predictable manner using templates. It helps streamline infrastructure deployment.

Automatic Scaling

- Automatic Scaling dynamically adjusts resources based on conditions you define, ensuring optimal performance during demand spikes while minimizing costs during demand lulls.

AWS OpsWorks

- OpsWorks is used for managing and deploying applications of all shapes and sizes. It provides configuration management tools for automating operational tasks.

Total Cost of Ownership (TCO)

- TCO helps estimate and compare direct and indirect costs of running systems on-premises versus in the cloud. Organizations use TCO to evaluate cost savings when adopting AWS.

AWS Management Console

- The AWS Management Console is a browser-based interface for managing AWS resources and organizations. It simplifies resource monitoring and configuration.

AWS Command Line Interface (CLI)

- The CLI provides faster and more convenient access to AWS services through command-line commands, allowing automation of tasks without relying on a graphical interface.

AWS SDKs

- SDKs support programming languages like Java, Python, Ruby, .NET, iOS, and Android. They provide libraries for interacting with AWS services programmatically.

AWS Organizations HTTPS Query API

- This API allows direct HTTPS requests to manage AWS Organizations. It requires digitally signed requests with credentials for secure communication.

Vocabulary

1. **IAM (Identity and Access Management)**: A service that controls user access to AWS resources by defining roles, permissions, and policies.
2. **Consolidated Billing**: A feature that combines usage across multiple accounts to provide volume pricing discounts and simplifies billing with one invoice.
3. **Elastic Beanstalk**: A platform-as-a-service (PaaS) solution that simplifies application deployment and management in the AWS Cloud.
4. **CloudFormation**: A service that automates resource provisioning using templates for predictable infrastructure deployment.
5. **Automatic Scaling**: A feature that adjusts computing resources dynamically based on predefined conditions to optimize performance and cost.
6. **OpsWorks**: A configuration management service for deploying applications across servers using automation tools.

7. **TCO (Total Cost of Ownership)**: An analysis framework used to estimate direct and indirect costs of running workloads on-premises versus in the cloud.
8. **AWS Management Console**: A browser-based graphical interface for managing AWS resources.
9. **CLI (Command Line Interface)**: A tool that enables users to interact with AWS services through command-line commands for faster task execution.
10. **SDK (Software Development Kit)**: Libraries provided by AWS for programming languages like Java, Python, Ruby, .NET, iOS, and Android to interact with AWS services programmatically.
11. **HTTPS Query API**: An API used for issuing HTTPS requests directly to AWS Organizations; requires digital signatures for secure communication.

AWS Module 3 Final Study Guide

This study guide covers the key concepts and topics to help you prepare for the AWS Module 3 quiz. Review the material thoroughly and familiarize yourself with the vocabulary at the end for a solid understanding of AWS services and infrastructure.

Core Concepts

AWS Regions

- AWS Regions are **geographical areas** that consist of multiple Availability Zones (AZs). Each region is designed to provide full redundancy and connectivity to ensure high availability and fault tolerance.
- Regions allow users to deploy applications closer to their customers, reducing latency and meeting compliance requirements.

AWS Availability Zones

- An Availability Zone is a **physically isolated data center** within an AWS Region. Each AZ has independent power, cooling, and networking to ensure fault isolation.

AWS Data Centers

- AWS data centers are designed with **redundant power, networking, and connectivity** to ensure reliability.
- A typical AWS data center houses **50,000 to 80,000 physical servers**, supporting large-scale operations.

Amazon CloudFront

- Amazon CloudFront is a **Content Delivery Network (CDN)** that distributes content globally through edge locations, reducing latency and improving user experience.
- It uses regional edge caches for content that is not frequently accessed enough to remain in edge locations.

Amazon Route 53

- Amazon Route 53 is a **Domain Name System (DNS) service** that routes end users to internet applications by translating domain names into IP addresses.
- It works in conjunction with CloudFront for efficient routing of requests to the nearest edge location.

Points of Presence (PoPs)

- Points of Presence are global locations consisting of:
    - **Edge locations**: Deliver cached content closer to users.
    - **Regional edge caches**: Handle less frequently accessed content, reducing the load on origin servers.
- Services such as Amazon CloudFront, Route 53, AWS Shield, and AWS WAF utilize PoPs.

Regional Edge Caches

- Regional edge caches absorb content that is not accessed frequently enough to remain in an edge location. This reduces the load on origin servers while maintaining performance.

Key Benefits of AWS Services

1. **High Availability**: AWS Regions and AZs ensure redundancy and fault tolerance.
2. **Low Latency**: Services like CloudFront route requests to the nearest edge location automatically.
3. **Scalability**: The infrastructure supports massive scaling with data centers housing tens of thousands of servers.
4. **Global Reach**: Points of Presence enable fast content delivery worldwide.

Vocabulary

1. **AWS Region**: A geographical area consisting of multiple Availability Zones with full redundancy and connectivity.
2. **Availability Zone (AZ)**: A physically isolated data center within an AWS Region with independent power, cooling, and networking.
3. **AWS Data Center**: A facility housing physical servers designed for high availability with redundant power, networking, and connectivity.
4. **Amazon CloudFront**: A Content Delivery Network (CDN) used to distribute content globally and reduce latency.
5. **Amazon Route 53**: A Domain Name System (DNS) service that routes traffic efficiently by translating domain names into IP addresses.

6. **Point of Presence (PoP)**: Global locations consisting of edge locations and regional edge caches for content delivery.
7. **Edge Location**: A site where cached content is delivered closer to end users for lower latency.
8. **Regional Edge Cache**: A cache used for infrequently accessed content to reduce the load on origin servers.
9. **AWS Shield**: A managed Distributed Denial of Service (DDoS) protection service that safeguards applications running on AWS.
10. **AWS WAF (Web Application Firewall)**: A service that helps protect web applications from common web exploits.
11. **Content Delivery Network (CDN)**: A system of distributed servers that deliver web content based on user location, origin server location, and content delivery policies.
12. **Domain Name System (DNS)**: A system that translates human-readable domain names into machine-readable IP addresses.

AWS Module 4 Final Study Guide

This study guide is designed to help students prepare for the AWS Module 4 quiz by focusing on key concepts and responsibilities in the AWS shared responsibility model, infrastructure, security, and service models (IaaS and PaaS). Review the following sections carefully to understand AWS's role, customer responsibilities, and service offerings.

Key Concepts and Responsibilities

AWS Shared Responsibility Model

- AWS is responsible for operating, managing, and controlling components from the physical security of data centers to the virtualization layer.
- Customers are responsible for managing their data, applications, operating system updates, and security patches.

AWS Hardware Infrastructure

- AWS manages servers, storage devices, and other appliances used in its data centers.
- Customers do not manage or interact with AWS's physical hardware directly.

AWS Software Infrastructure

- Includes operating systems, service applications, and virtualization software managed by AWS.
- Customers are responsible for deploying their applications and databases on top of this infrastructure.

Network Security

- AWS secures its network by monitoring external boundaries, securing access points, and providing redundant infrastructure with intrusion detection.
- Customers can configure additional security measures like firewalls but do not manage AWS's core network security.

Data Center Security

- Customers are not allowed to visit AWS data centers to maintain security.
- AWS provides third-party audit reports to verify compliance with industry standards.

Third-Party Verification

- AWS undergoes audits by third-party organizations to ensure compliance with security standards. These reports are shared with customers for transparency.

Service Models

Infrastructure as a Service (IaaS)

- Provides customers with the highest level of flexibility and management control over IT resources.
- Example: Amazon EC2 (Elastic Compute Cloud), where customers manage operating systems, applications, and data.

Customer Responsibilities in IaaS:

- Operating system updates.
- Security patches.
- Application software management.

Platform as a Service (PaaS)

- Removes the need for customers to manage underlying infrastructure such as hardware and operating systems.
- Example: AWS Lambda (serverless compute) and Amazon RDS (Relational Database Service).

Customer Responsibilities in PaaS:

- Managing their data.
- Asset classification.
- Applying appropriate permissions.

Vocabulary

1. **AWS (Amazon Web Services)** - A cloud computing platform offering a variety of services such as compute power, storage, and networking.
2. **Shared Responsibility Model** - A framework defining the division of responsibilities between AWS and customers for security and compliance.

3. **IaaS (Infrastructure as a Service)** - A cloud computing model that provides virtualized computing resources over the internet while giving customers control over operating systems and applications.
4. **PaaS (Platform as a Service)** - A cloud computing model that allows customers to develop, run, and manage applications without dealing with the underlying infrastructure.
5. **EC2 (Elastic Compute Cloud)** - An IaaS offering from AWS that provides scalable virtual servers in the cloud.
6. **RDS (Relational Database Service)** - A PaaS offering from AWS that simplifies database setup, operation, and scaling in the cloud.
7. **AWS Lambda** - A serverless compute service that automatically executes code in response to events without provisioning or managing servers.
8. **Virtualization Layer** - The software layer that allows multiple virtual machines to run on a single physical machine; managed by AWS.
9. **Audit Reports** - Documents provided by third-party auditors verifying compliance with security standards like SOC 2 or ISO 27001.
10. **Intrusion Detection** - Security measures used by AWS to monitor network traffic for suspicious activity or unauthorized access attempts.

AWS Module 5 Final Study Guide

This study guide is designed to help students prepare for the AWS Module 5 quiz. It covers key concepts related to Amazon Virtual Private Cloud (VPC), Elastic IP addresses, NAT gateways, VPC endpoints, and more. Review the topics below to ensure a understanding of the material.

Key Topics and Concepts

Amazon Virtual Private Cloud (Amazon VPC)

- **Purpose of Amazon VPC**: Provides a logically isolated section of the AWS Cloud for launching resources securely.
- **What Happens When You Create a VPC**:
    - Instances in the VPC are automatically assigned private IP addresses.
    - Public IP addresses are not assigned by default.

Elastic IP Addresses

- **Definition**: A static, public IPv4 address designed for dynamic cloud computing.
- **Advantages of Associating Elastic IP with a Network Interface**:
    - Simplifies moving all attributes of the network interface to another instance in a single step.
- **Cost Management**: Release unused Elastic IP addresses to avoid additional costs.

NAT Gateways

- **Primary Function**: Enables instances in private subnets to connect to the internet while preventing incoming internet connections.
- **Requirements for Creation**:
    - A public subnet and an Elastic IP address are needed.
- **Route Table Updates**:
    - After creating a NAT gateway, update the route table associated with private subnets to allow internet access.
- **Why Use NAT Gateways Over NAT Instances**:

    - NAT gateways provide better availability, higher bandwidth, and require less administrative effort.

VPC Endpoints

- **Purpose**: Allows private connectivity between a VPC and supported AWS services without requiring an internet gateway or NAT device.
- **Interface VPC Endpoints**:
    - Enable private connectivity to AWS services powered by AWS PrivateLink.

Internet Gateway

- **Role**: Connects your VPC to the internet, enabling communication between instances and external resources.

Vocabulary

1. **Amazon Virtual Private Cloud (Amazon VPC)**: A service that provides a logically isolated section of the AWS Cloud for launching resources securely.
2. **Private IP Address**: An IP address used for internal communication within a VPC that is not accessible from the internet.
3. **Public IP Address**: An IP address that allows resources in a VPC to communicate with the internet.
4. **Elastic IP Address (EIP)**: A static, public IPv4 address designed for dynamic cloud computing that can be reassigned between instances or network interfaces.
5. **Network Interface**: A virtual network card that can be attached to an instance in a VPC.
6. **NAT Gateway (Network Address Translation Gateway)**: A managed service that allows instances in private subnets to access the internet while preventing inbound connections from the internet.
7. **Route Table**: A set of rules used to determine where network traffic is directed within a VPC.
8. **VPC Endpoint**: A service that allows private connectivity between a VPC and supported AWS services without requiring an internet gateway or NAT device.
9. **AWS PrivateLink**: A technology that enables private connectivity between VPCs and supported AWS services or third-party services.

10. **Internet Gateway (IGW)**: A horizontally scaled, redundant, and highly available component that allows communication between instances in your VPC and the internet.

AWS Module 6 Final Study Guide

Key Concepts and Services

Amazon EC2 Auto Scaling

- Automatically launches or terminates EC2 instances based on predefined conditions to ensure optimal performance and cost efficiency.

Amazon Elastic Container Registry (Amazon ECR)

- A service used to store and retrieve Docker container images, enabling streamlined container management.

VMware Cloud on AWS

- Allows provisioning of a hybrid cloud solution without requiring custom hardware, integrating VMware environments with AWS infrastructure.

AWS Elastic Beanstalk

- Provides a simple way to deploy and manage web applications, handling the provisioning of resources like EC2 instances, load balancers, and databases.

AWS Lambda

- A serverless compute service that charges only for the compute time used. Ideal for running code without managing servers.

Amazon EKS (Elastic Kubernetes Service)

- Enables running managed Kubernetes clusters on AWS, simplifying container orchestration.

Amazon Lightsail

- A simple-to-use service for building applications or websites with pre-configured virtual private servers.

AWS Batch

- Designed to run batch computing jobs at any scale, automating the provisioning of resources for processing workloads.

AWS Outposts

- Extends AWS services to on-premises data centers, allowing you to run select AWS services locally for hybrid cloud solutions.

Amazon EC2 Instances

- Commonly used as application servers, providing scalable compute capacity in the cloud. Eliminates hardware procurement costs compared to traditional servers.

Vocabulary

1. **Amazon EC2 Auto Scaling**: Automatically adjusts the number of EC2 instances based on demand.
2. **Amazon Elastic Container Registry (Amazon ECR):** A fully managed container registry for storing and retrieving Docker images.
3. **VMware Cloud on AWS**: A hybrid cloud solution integrating VMware environments with AWS infrastructure.
4. **AWS Elastic Beanstalk**: A platform-as-a-service (PaaS) solution for deploying and managing web applications.
5. **AWS Lambda**: A serverless computing service that executes code in response to events and charges only for execution time.
6. **Amazon EKS (Elastic Kubernetes Service)**: A managed Kubernetes service for container orchestration on AWS.
7. **Amazon Lightsail**: A simplified platform for launching virtual private servers for applications or websites.
8. **AWS Batch**: A service for running batch computing jobs at scale.
9. **AWS Outposts**: Hardware installed in on-premises data centers that extends AWS services locally.
10. **Amazon EC2 (Elastic Compute Cloud)**: Scalable virtual servers in the cloud that eliminate hardware procurement costs.
11. **Docker Images**: Lightweight, standalone packages containing all dependencies needed to run software in containers.
12. **Kubernetes**: An open-source system for automating deployment, scaling, and management of containerized applications.

13. **Serverless Computing**: A cloud-computing model where the cloud provider manages server infrastructure, allowing developers to focus solely on code execution.
14. **Batch Jobs**: Large-scale computing tasks processed in batches rather than real-time execution.
15. **Proxy Server**: A server that acts as an intermediary between a user and an external server, often used for security or performance optimization.

AWS Module 7 Final Study Guide

This study guide will help you prepare for the AWS Module 7 quiz by covering key concepts, features, and benefits of Amazon Elastic Block Store (EBS), Amazon Simple Storage Service (S3), and Amazon Elastic File System (EFS). Review the material carefully to ensure a solid understanding of these services.

Key Concepts

Amazon Elastic Block Store (EBS)

- **Use Case**: Amazon EBS is primarily used as storage for Amazon EC2 instances. It provides block-level storage that is highly available and reliable.
- **Data Durability**: EBS ensures data durability within an Availability Zone by replicating volumes within that zone.
- **Snapshots**: EBS snapshots allow you to recreate a new volume at any time, providing a reliable backup mechanism.
- **Data Security**: Data in transit between EC2 instances and EBS volumes is encrypted at no additional cost.
- **Dynamic Resizing**: EBS volumes can be resized dynamically without stopping the associated EC2 instance. You can increase capacity and change volume types as needed.

Amazon Simple Storage Service (S3)

- **Maximum Object Size**: A single object in S3 can be up to 5 TB in size.
- **Data Durability**: S3 provides durability by storing data redundantly across multiple facilities and devices.
- **Access Control**: Access to S3 data can be controlled using AWS Identity and Access Management (IAM) policies, S3 bucket policies, and per-object access control lists.

Amazon Elastic File System (EFS)

- **Use Case**: Amazon EFS is designed for file storage, particularly for big data, analytics, and content management applications.
- **File System Semantics**: EFS supports strong consistency and file locking, making it suitable for shared workloads.

- **Scalability**: EFS automatically scales from gigabytes to petabytes without manual intervention.
- **Simultaneous Access**: EFS provides shared storage with elastic capacity, enabling thousands of EC2 instances to access the file system simultaneously.
- **NFS Support**: EFS supports NFSv4 and NFSv4.1 protocols for compatibility with various applications.
- **Pricing Model**: With EFS, you pay only for the storage you use, providing cost efficiency.
- **Operating System Compatibility**: EFS is compatible only with Linux-based AMIs.

Vocabulary

1. **Amazon EC2 (Elastic Compute Cloud)**: A web service that provides resizable compute capacity in the cloud.
2. **Amazon EBS (Elastic Block Store)**: A block storage service designed for use with EC2 instances, offering high availability and reliability within a single Availability Zone.
3. **Amazon S3 (Simple Storage Service)**: An object storage service that offers scalability, data availability, security, and performance.
4. **Amazon EFS (Elastic File System)**: A scalable file storage service that provides shared access for multiple EC2 instances.
5. **Snapshot**: A point-in-time copy of an Amazon EBS volume used for backup or creating new volumes.
6. **Availability Zone (AZ)**: A distinct location within an AWS Region designed to be isolated from failures in other AZs.
7. **IAM (Identity and Access Management)**: AWS service used to manage access to AWS resources securely.
8. **NFS (Network File System)**: A distributed file system protocol supported by Amazon EFS for sharing files over a network.
9. **Durability**: The ability of a storage system to protect data against loss or corruption over time.
10. **Encryption in Transit**: The process of securing data as it moves between systems or services to prevent unauthorized access.

AWS Module 8 Final Study Guide

This study guide is designed to help students prepare for the AWS Module 8 final quiz. It covers key concepts related to Amazon RDS (Relational Database Service), its features, use cases, and limitations. Use this guide to reinforce your understanding of the topics and terminology.

Key Concepts

1. **Amazon RDS Basic Building Block**
    - The fundamental building block of Amazon RDS is the **Database Instance**, which represents the environment where your database engine runs.
2. **Supported Database Engines for Read Replicas**
    - Amazon RDS supports read replicas for the following database engines:
        - **MySQL**
        - **MariaDB**
        - **PostgreSQL**
        - **Amazon Aurora**
3. **Promoting Read Replicas**
    - A read replica can be promoted to a primary database instance, but this requires **manual action**. It is not done automatically.
4. **Replication Method for Read Replicas**
    - Amazon RDS replicates data to read replicas **asynchronously**, ensuring that replicas receive updates without affecting the performance of the primary database.
5. **Benefits of Cross-Region Read Replicas**
    - Creating a read replica in a different region provides benefits such as:
        - **Disaster recovery**: Ensures data availability in case of regional outages.
        - **Reduced latency**: Serves reads from a closer replica, improving performance for users in different regions.

6. **When to Use Amazon RDS**
    - Use Amazon RDS when your application requires:
        - Complex transactions or queries.
        - Managed database services with automated backups, scaling, and maintenance.
7. **Maximum IOPS for Amazon RDS**
    - Amazon RDS can handle up to **30,000 IOPS** for applications with medium to high query or write rates.
8. **When to Avoid Amazon RDS**
    - Avoid using Amazon RDS if your application requires:
        - Extensive database customization.
        - High data size or throughput demands that necessitate sharding.
9. **Sharding Considerations**
    - Applications requiring sharding due to high data size or throughput demands should use a NoSQL database solution such as **Amazon DynamoDB**, rather than relying on Amazon RDS.
10. **Recommended Database Solution for Simple GET/PUT Requests**
    - For simple GET or PUT requests, a NoSQL database like **DynamoDB** is recommended over Amazon RDS due to its simplicity and high performance for such operations.

Vocabulary

- **Amazon RDS (Relational Database Service)**: A managed relational database service that automates administrative tasks like backups, scaling, and patching.
- **Database Instance**: The basic building block of Amazon RDS; an isolated environment where a database engine runs.
- **Database Engine**: The software that processes database queries; examples include MySQL, MariaDB, PostgreSQL, and Amazon Aurora.
- **Read Replica**: A copy of a primary database instance used for scaling read operations and disaster recovery.

- **Asynchronous Replication**: A method of data replication where updates are sent to replicas without waiting for confirmation, ensuring minimal impact on primary instance performance.
- **Disaster Recovery**: Strategies and solutions designed to protect data and maintain availability during outages or failures.
- **Latency**: The delay between a user's request and the system's response; reduced by serving reads from closer replicas.
- **IOPS (Input/Output Operations Per Second)**: A measure of storage performance; Amazon RDS supports up to 30,000 IOPS for demanding applications.
- **Sharding**: A database architecture pattern that splits large datasets into smaller pieces distributed across multiple nodes for improved performance.
- **DynamoDB**: A fully managed NoSQL database service optimized for high throughput and low-latency operations.
- **NoSQL Database**: A type of database designed for unstructured or semi-structured data that does not rely on traditional relational models.
- **Amazon Aurora**: A relational database engine built by AWS offering high performance and scalability.

AWS Module 9 Final Study Guide

This study guide will help you prepare for the AWS Module 9 quiz. It focuses on key concepts, processes, and services relevant to the questions provided. Review the material thoroughly and familiarize yourself with the vocabulary list at the end.

Key Concepts

Storage Array Management

- After data ingestion and archiving, the storage array is cleared and prepared for the next flight. This ensures it is ready for new data collection.

Data Accessibility

- Imagery data is made accessible when the Preprocessor machine uploads it to an Amazon S3 bucket and notifies the Imagery service. This process facilitates efficient processing and analysis.

Imagery Service Functions

- Upon receiving flight information, the Imagery service computes a 3D orientation and location for every moment of the flight. This critical function supports mapping and visualization.

Static Asset Management

- Static assets like images and videos are managed and distributed using Amazon S3. This service provides scalable storage and access.

High Availability and Security

- High availability and secure access are ensured through Elastic Load Balancing with HTTPS and an Auto Scaling group of EC2 instances. These features optimize performance while maintaining security.

Mapping Service Operations

- The Mapping service determines imagery availability by correlating map location input from the website with the Imagery service. This ensures accurate results for selected map locations.

Payment Processing

- Customer credit card payments are handled by a certified third-party PCI-compliant provider, ensuring secure transactions.

Order Processing

- After payment confirmation, the Order service pushes the order to production and records it in the Show and Sell database. This step finalizes order processing efficiently.

Security Principles

- *Keep people away from data*: Reduces human error by minimizing direct access or manual processing of sensitive data.
- *Enable traceability*: Focuses on monitoring, alerting, and auditing actions in real time to maintain security integrity.

Vocabulary

1. **Amazon S3 (Simple Storage Service)**: A scalable cloud storage service used for storing static assets like images, videos, and other data.
2. **Amazon EC2 (Elastic Compute Cloud)**: A web service that provides resizable compute capacity in the cloud.
3. **Elastic Load Balancing (ELB)**: Distributes incoming application traffic across multiple targets to ensure high availability.
4. **Auto Scaling**: Automatically adjusts compute resources based on demand to maintain performance.
5. **Preprocessor Machine**: A system responsible for uploading data to Amazon S3 for further processing.
6. **Imagery Service**: Computes 3D orientation and location data from flight information, enabling accurate mapping.
7. **Mapping Service**: Correlates user input with imagery data to verify map location availability.
8. **Order Service**: Manages order processing by pushing orders to production and recording them in a database.
9. **PCI Compliance (Payment Card Industry Compliance)**: Standards ensuring secure handling of credit card information.

10. **Traceability**: A security principle emphasizing real-time monitoring, alerting, and auditing of system actions.
11. **Show and Sell Database**: A database used to record orders and manage production-related information.

AWS Module 10 Final Study Guide

This study guide is designed to help students prepare for the AWS Module 10 quiz by reviewing key concepts, features, and best practices related to Elastic Load Balancing and Amazon CloudWatch.

Key Concepts

Elastic Load Balancing (ELB)

Types of Load Balancers

- **Application Load Balancer (ALB)**: Operates at OSI Layer 7, ideal for HTTP/HTTPS traffic. Provides advanced routing capabilities such as host-based and path-based routing.
- **Network Load Balancer (NLB)**: Operates at OSI Layer 4, optimized for handling TCP/UDP traffic with high performance and low latency.
- **Classic Load Balancer (CLB)**: An older implementation that lacks advanced routing features and operates primarily at OSI Layer 7.

Why Avoid Classic Load Balancer?

- CLB lacks advanced routing features like host-based and path-based routing.
- It is an older implementation and is not recommended for modern architectures like microservices or containerized applications.

Monitoring Elastic Load Balancing

Amazon CloudWatch

- Publishes data points to monitor the performance of load balancers and their targets.
- Retrieves statistics about system metrics as time-series data, helping verify system performance.

Access Logs

- Captures detailed information about requests made to load balancers.
- Stores logs in Amazon S3 for analysis and troubleshooting.

AWS CloudTrail

- Tracks API calls made to the Elastic Load Balancing service, including details about who made the call and when.
- Logs are stored in Amazon S3 for auditing purposes.

Amazon CloudWatch Alarms

Key Components of a CloudWatch Alarm

- **Namespace**: The service or application being monitored (e.g., AWS/ELB).
- **Metric**: The specific data point being tracked (e.g., RequestCount).
- **Statistic**: The aggregation type applied to the metric (e.g., Sum, Average).
- **Period**: The duration for aggregating data into a single evaluation point.
- **Conditions**: Thresholds such as Greater or Equal, Lower, etc.
- **Actions**: Responses triggered when the alarm enters an ALARM state.

Period Definition

- Represents the duration over which data is aggregated into a single evaluation point (e.g., 5 minutes).

Possible Actions Triggered by CloudWatch Alarms

- Sending notifications to an Amazon SNS topic.
- Triggering Amazon EC2 Auto Scaling actions.
- Performing specific actions on Amazon EC2 instances.

Conditions for Metric Evaluation

- Greater, Greater or Equal, Lower or Equal, or Lower than a specified threshold.

Vocabulary

1. **ALB (Application Load Balancer)**: A load balancer operating at OSI Layer 7, optimized for HTTP/HTTPS traffic with advanced routing capabilities.
2. **NLB (Network Load Balancer)**: A load balancer operating at OSI Layer 4, designed for high-performance TCP/UDP traffic.
3. **CLB (Classic Load Balancer)**: An older type of load balancer with limited features compared to ALB and NLB.

4. **ELB (Elastic Load Balancing)**: AWS service that distributes incoming application traffic across multiple targets.
5. **CloudWatch**: AWS monitoring service that collects metrics and logs to ensure systems are performing as expected.
6. **Access Logs**: Detailed records of requests made to a load balancer, stored in Amazon S3 for analysis.
7. **CloudTrail Logs**: Logs that record API calls made within AWS services for auditing purposes.
8. **Amazon S3 (Simple Storage Service)**: Scalable storage service used to store access logs and CloudTrail logs.
9. **SNS (Simple Notification Service)**: AWS messaging service used to send notifications triggered by alarms or other events.
10. **Metrics**: Data points collected by CloudWatch that represent system performance indicators like CPU utilization or request count.
11. **Namespace**: A grouping category in CloudWatch metrics representing a specific AWS service or application.
12. **Statistic**: Aggregated metric data in CloudWatch, such as Sum, Average, Minimum, or Maximum values.
13. **Thresholds**: Conditions set in CloudWatch alarms to evaluate metrics against predefined values.