Summary Report

Module 6: Compute - Summary

Module Overview

1 **Topics Covered**:

1 Compute services overview

1 Amazon EC2

1 Amazon EC2 cost optimization

1 Container services

1 Introduction to AWS Lambda

1 Introduction to AWS Elastic Beanstalk

1 **Activities**:

1 Amazon EC2 vs. Managed Service

1 Hands-on with AWS Lambda

1 Hands-on with AWS Elastic Beanstalk

1 **Demo**: Recorded demonstration of Amazon EC2

1 **Lab**: Introduction to Amazon EC2

1 **Knowledge Check**: Test understanding of key concepts

Module Objectives

After completing this module, you should be able to:

1 Provide an overview of AWS compute services.

1 Demonstrate the use of Amazon EC2.

1 Perform basic functions in EC2 to build a virtual computing environment.

1 Identify EC2 cost optimization elements.

1 Demonstrate when to use AWS Elastic Beanstalk and AWS Lambda.

1 Run containerized applications in a cluster of managed servers.

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Section 1: Compute Services Overview

1 **AWS Compute Services**:

1 **Amazon EC2**: Resizable virtual machines.

1 **EC2 Auto Scaling**: Automatically launches or terminates instances based on conditions.

1 **AWS Lambda**: Serverless compute service.

1 **AWS Elastic Beanstalk**: Simplifies web application deployment.

1 **Container Services**: Amazon ECS, EKS, Fargate, and ECR.

1 **Other Services**: VMware Cloud, Lightsail, Batch, Outposts, Serverless Application Repository.

1 **Categories of Compute Services**:

1 **Virtual Machines (IaaS)**: Amazon EC2.

1 **Serverless**: AWS Lambda.

1 **Container-Based**: Amazon ECS, EKS, Fargate.

1 **Platform as a Service (PaaS)**: AWS Elastic Beanstalk.

1 **Choosing the Optimal Compute Service**:

1 Evaluate compute options based on application design, usage patterns, and configuration settings.

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Section 2: Amazon EC2

1 **Amazon EC2 Overview**:

1 Provides resizable virtual machines in the cloud.

1 Supports various workloads (e.g., web servers, databases, game servers).

1 Key features: Elasticity, compute power, and cloud hosting.

1 **Launching an EC2 Instance**:

1 **AMI (Amazon Machine Image)**: Template for launching instances.

1 **Instance Types**: Choose based on CPU, memory, storage, and networking needs.

1 **Network Settings**: Specify VPC, subnet, and public IP assignment.

1 **IAM Role**: Attach roles for secure API calls.

1 **User Data**: Scripts to automate configurations at launch.

1 **Storage Options**: Configure root volume and additional storage.

1 **Security Groups**: Control traffic to and from instances.

1 **Key Pair**: Secure access to instances.

1 **EC2 Instance Lifecycle**:

1 States: Pending, Running, Rebooting, Stopping, Stopped, Terminated.

1 **Elastic IP Addresses**: Persistent public IP addresses for instances.

1 **Monitoring**: Use Amazon CloudWatch for metrics and logs.

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Section 3: Amazon EC2 Cost Optimization

1 **Pricing Models**:

1 **On-Demand Instances**: Pay by the hour, no long-term commitments.

1 **Reserved Instances**: Discounted pricing for 1 or 3-year terms.

1 **Spot Instances**: Bid on unused capacity for significant savings.

1 **Dedicated Hosts**: Physical servers dedicated to your use.

1 **Four Pillars of Cost Optimization**:

1 **Right-Size**: Choose the appropriate instance type.

1 **Increase Elasticity**: Use auto-scaling and stop/hibernate unused instances.

1 **Optimal Pricing Model**: Combine On-Demand, Reserved, and Spot Instances.

1 **Optimize Storage**: Resize EBS volumes, delete unused snapshots, and use lifecycle policies.

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Section 4: Container Services

1 **Container Basics**:

1 Containers package applications and dependencies for consistent deployment.

1 **Docker**: Platform for building, testing, and deploying containers.

1 **Amazon ECS (Elastic Container Service)**:

1 Orchestrates Docker containers on a managed cluster of EC2 instances.

1 **Cluster Options**: EC2-backed or Fargate-backed (serverless).

1 **Kubernetes**:

1 Open-source container orchestration software.

1 **Amazon EKS (Elastic Kubernetes Service)**: Managed Kubernetes service on AWS.

1 **Amazon ECR (Elastic Container Registry)**:

1 Stores, manages, and deploys Docker container images.

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Section 5: Introduction to AWS Lambda

1 **AWS Lambda**:

1 Serverless compute service that runs code in response to events.

1 Pay only for the compute time consumed.

1 **Event Sources**: Amazon S3, SNS, CloudWatch, DynamoDB, API Gateway, etc.

1 **Lambda Function Configuration**:

1 Specify runtime, execution role, memory allocation, and timeout.

1 **Quotas**: 10,240 MB memory, 15-minute timeout, 1,000 concurrent executions.

1 **Use Cases**:

1 Schedule-based: Start/stop EC2 instances.

1 Event-based: Create thumbnail images from S3 uploads.

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Section 6: Introduction to AWS Elastic Beanstalk

1 **AWS Elastic Beanstalk**:

1 Platform as a Service (PaaS) for deploying web applications.

1 Automates deployment, scaling, and monitoring.

1 Supports multiple platforms: Java, .NET, PHP, Node.js, Python, Ruby, Go, Docker.

1 **Benefits**: Fast deployment, developer productivity, scalability, and resource control.

1 **Pricing**: No additional charge; pay only for underlying AWS resources.

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Module Wrap-Up

1 **Key Takeaways**:

1 AWS offers a variety of compute services for different use cases.

1 Amazon EC2 provides flexible virtual machines.

1 AWS Lambda enables serverless computing.

1 AWS Elastic Beanstalk simplifies web application deployment.

1 Container services (ECS, EKS) manage containerized applications.

1 **Knowledge Check**: Test understanding of module concepts.

1 **Sample Exam Question**: Identify the service that helps developers deploy resources using multiple programming languages (Answer: AWS Elastic Beanstalk).

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Additional Resources

1 **Documentation**:

1 Amazon EC2: https://docs.aws.amazon.com/ec2/

1 AWS Lambda: https://docs.aws.amazon.com/lambda/

1 AWS Elastic Beanstalk: https://docs.aws.amazon.com/elastic-beanstalk/

1 **Workshops**:

1. Amazon ECS: https://ecsworkshop.com/

1. Amazon EKS: https://www.eksworkshop.com/

1. **Cost Optimization**: https://d1.awsstatic.com/pricing/AWS_CO_Playbook_Final.pdf