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 EC2 functions to build a virtual computing environment.

1 Identify EC2 cost optimization elements.

1 Demonstrate the use of AWS Elastic Beanstalk and AWS Lambda.

1 Run containerized applications in a cluster of managed servers.

Section 1: Compute Services Overview

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1 **AWS Compute Services**:

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

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

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 needs.

Section 2: Amazon EC2

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1 **Amazon EC2 Overview**:

1 Provides resizable virtual machines in the cloud.

1 Supports various operating systems (Windows, Linux).

1 Instances are launched from Amazon Machine Images (AMIs).

1 Security groups control traffic to and from instances.

1 **Launching an EC2 Instance**:

1 Key decisions: AMI, instance type, network settings, IAM role, user data, storage, tags, security group, key pair.

1 **AMI**: Template for the root volume, includes OS and software.

1 **Instance Types**: General purpose, compute optimized, memory optimized, storage optimized, accelerated computing.

1 **Networking**: Instance types vary in network bandwidth; placement groups and enhanced networking can optimize performance.

1 **Storage Options**: Amazon EBS (durable), Instance Store (ephemeral), Amazon EFS, Amazon S3.

1 **Lifecycle**: Instances can be in pending, running, rebooting, stopping, stopped, or terminated states.

1 **EC2 Cost Optimization**:
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1 Use Elastic IP addresses for persistent public IPs.

1 Monitor instances with Amazon CloudWatch.

Section 3: Amazon EC2 Cost Optimization

1 **Pricing Models**:

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

1 **Reserved Instances**: 1-3 year term, lower hourly costs.

1 **Spot Instances**: Bid on unused EC2 instances, can be interrupted.

1 **Dedicated Hosts/Instances**: 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 instances when not in use.

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

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

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Section 4: Container Services

1 **Container Basics**:

1 Containers package applications and dependencies in isolated processes.

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

1 **Amazon ECS**:

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

1 **Cluster Options**: EC2 launch type (manage infrastructure) or Fargate (AWS manages infrastructure).

1 **Kubernetes**:

1 Open-source container orchestration software.

1 **Amazon EKS**: Managed Kubernetes service on AWS.
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1 **Amazon ECR**:

1 Fully managed Docker container registry for storing and deploying container images.

Section 5: Introduction to AWS Lambda

1 **AWS Lambda**:

1 Serverless compute service; runs code in response to events or on a schedule.

1 Pay only for the compute time used.

1 Supports multiple programming languages (Java, Python, Node.js, etc.).

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

1 **Quotas**: Max memory allocation (10,240 MB), max runtime (15 minutes).

1 **Use Cases**:

1 Schedule-based: Start/stop EC2 instances.

1 Event-based: Create thumbnail images when files are uploaded to S3.

Section 6: Introduction to AWS Elastic Beanstalk
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1 **AWS Elastic Beanstalk**:

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

1 Supports multiple platforms (Java, .NET, PHP, Python, Ruby, Go, Docker).

1 Automates deployment, scaling, and monitoring.

1 No additional charge; pay only for the underlying resources used.

1 **Benefits**:

1 Fast and simple to use.

1 Enhances developer productivity.

1 Provides full control over AWS resources.

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Module Wrap-Up

1 **Key Takeaways**:

1 AWS offers a variety of compute services (EC2, Lambda, ECS, EKS, Elastic Beanstalk).

1 EC2 provides resizable virtual machines; Lambda offers serverless computing.

1 Cost optimization involves right-sizing, increasing elasticity, and choosing optimal pricing models.

1 Containers (ECS, EKS) and serverless (Lambda) are key for modern application deployment.

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

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

Additional Resources

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1 **Documentation**: Amazon EC2, ECS, EKS, Lambda, Elastic Beanstalk.

1 **Workshops**: ECS Workshop, EKS Workshop.

1 **Cost Optimization Playbook**: AWS Cost Optimization strategies.

1 This summary provides a concise overview of the key concepts and activities covered in Module 6: Compute.