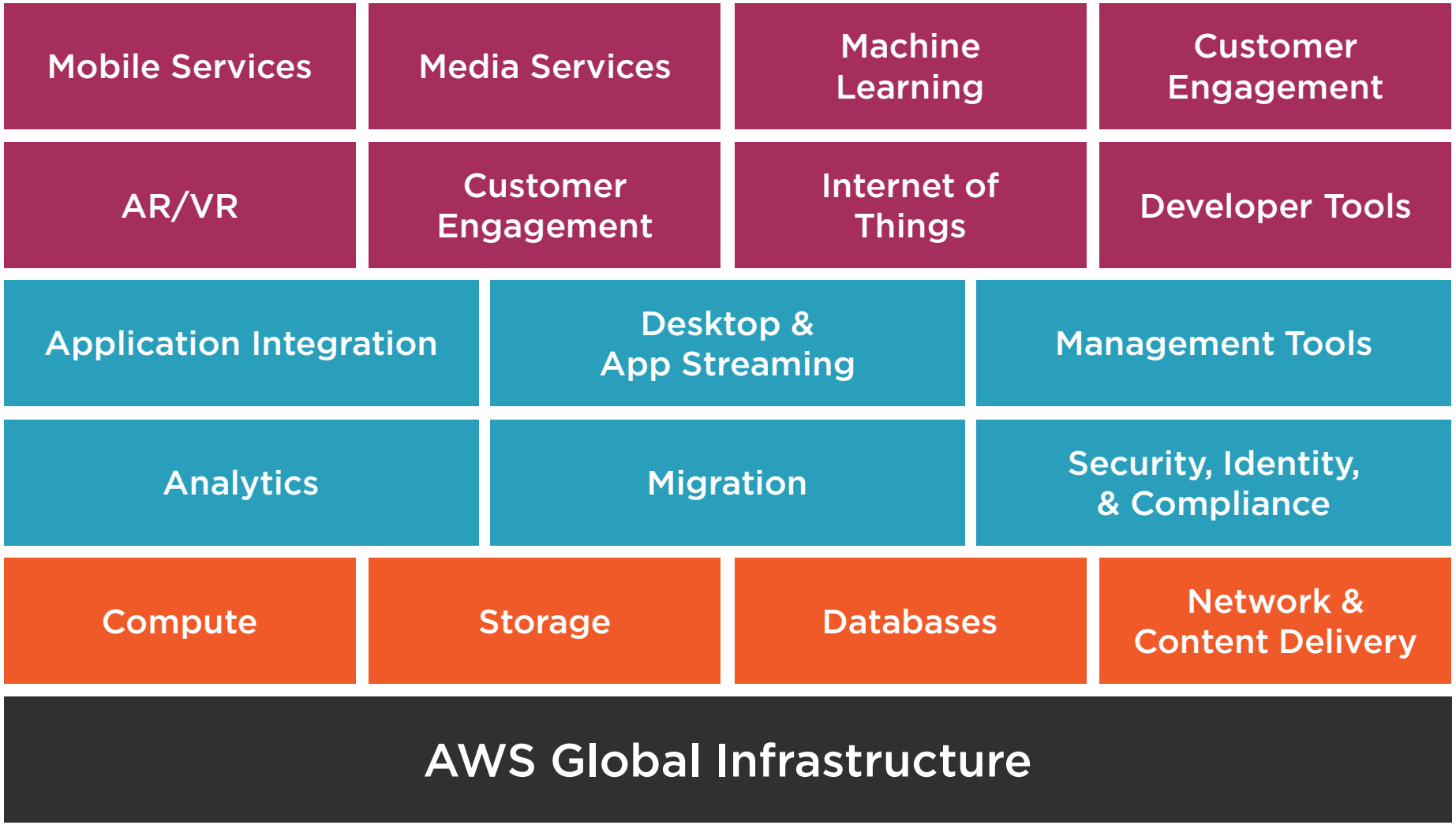
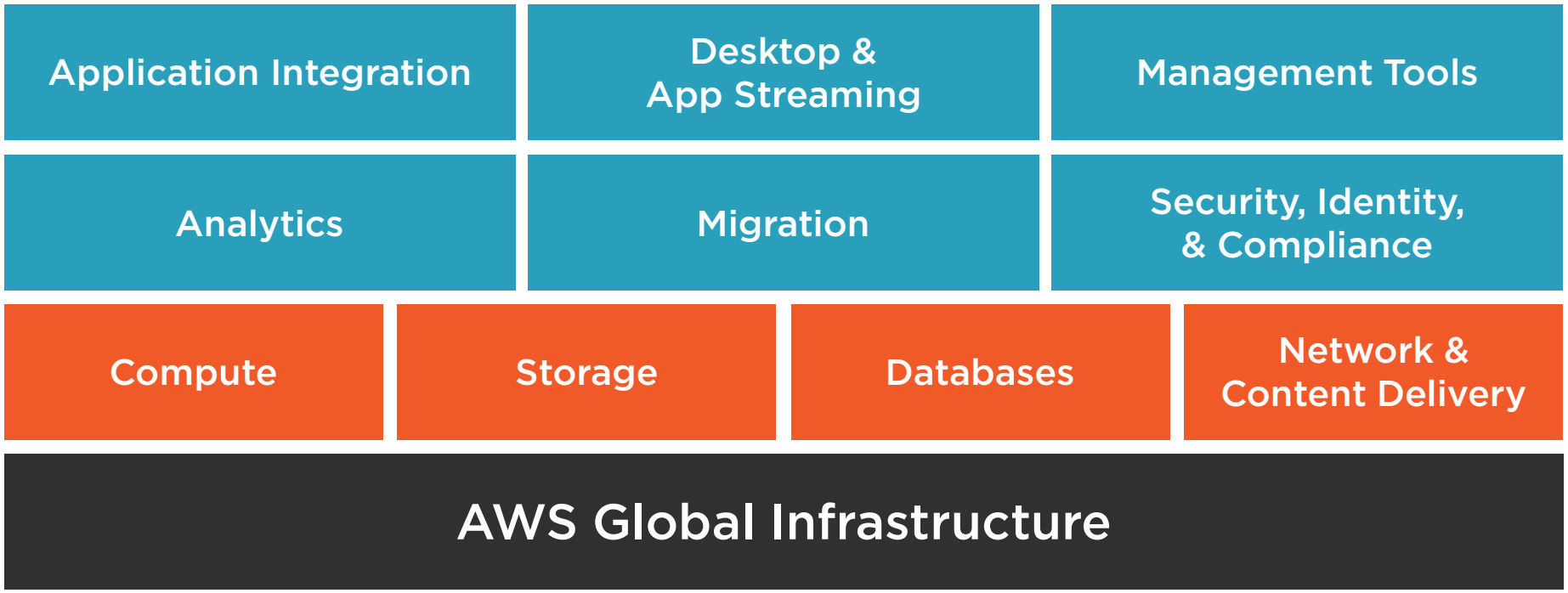
Crushing the Exam

M. Dustin Brimberry
SR. CLOUD ARCHITECT

AWS Services

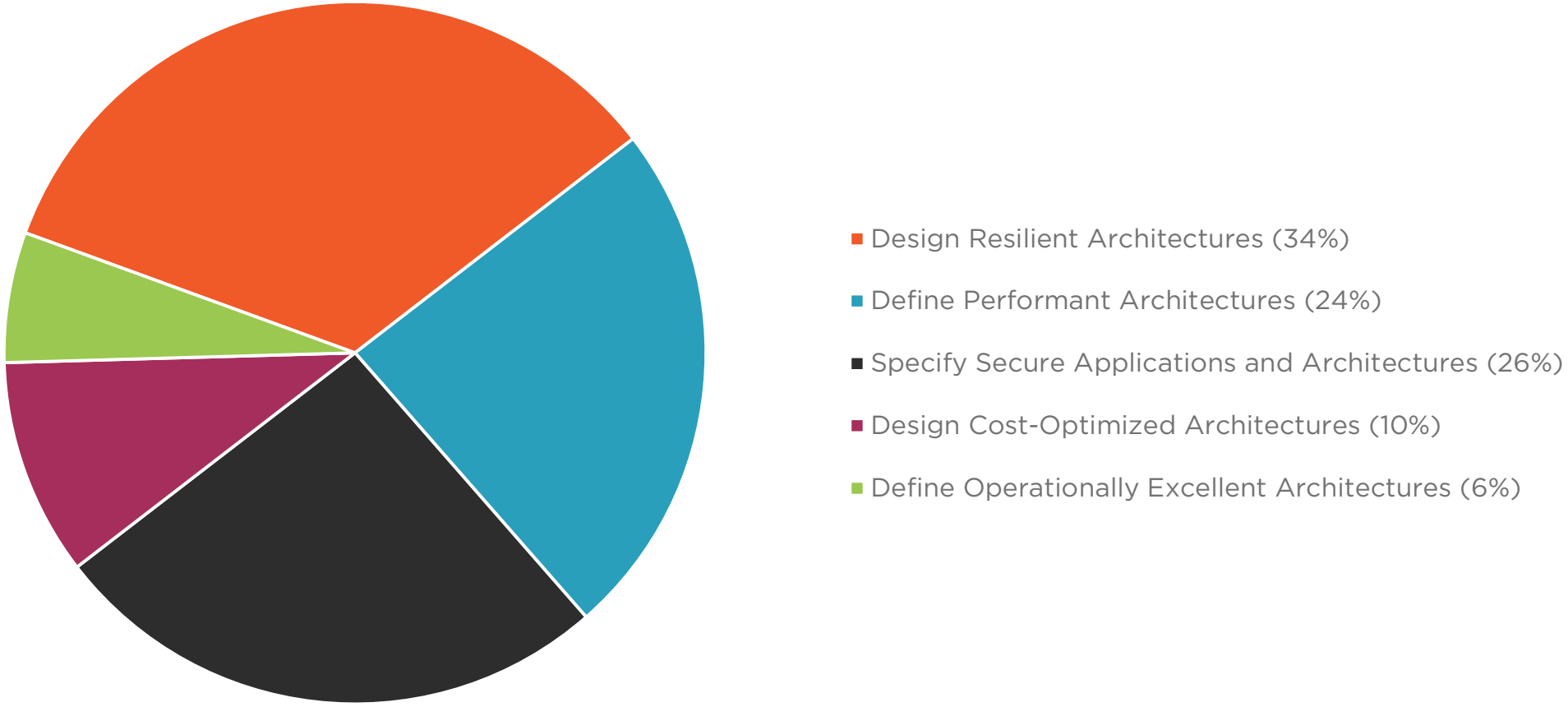


AWS Certified Solutions Architect Associate (SAA-C01) Knowledge Areas



Breaking Down the Exam

AWS Certified Solutions Architect Associate (SAA-C01)



Reviewing the Exam Blueprint

Design Resilient Architectures

Choose reliable/resilient storage

How to design decoupling mechanisms using AWS services

Determine how to design a multi-tier architecture solution

Determine how to design high availability and/or fault tolerant architectures

Define Performant Architectures

Choose performant storage and databases

Apply caching to improve performance

Design solutions for elasticity and scalability

Reviewing the Exam Blueprint

Specify Secure Applications and Architectures

Determine how to secure application tiers

Determine how to secure data

Define the networking infrastructure for a single VPC application

Design Cost-optimized Architectures

Design cost-optimized storage

Design cost-optimized compute

Define Operationally-excellent Architectures

Choose design features in solutions that enable operational excellence

Design Resilient Architectures

Reliable/Resilient Storage

EC2 Instance Store

Elastic Block Store

Amazon EFS

Amazon S3

Amazon Glacier

Decoupling Using AWS Services

Decouple for Health Using Queues

Decouple for Scalability Using Queues

Decouple for Scalability Using Elastic Load Balancer

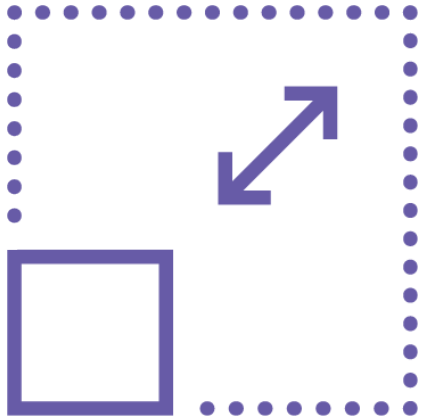
Design Highly Available/Fault Tolerant Solutions

Use Loose Coupling

Avoid Tight Coupling

Design for Scalability/Resilience

CloudFormation



Autoscaling

Lambda

Design Resilient Architectures Example 1

A Solutions Architect is designing a highly scalable system to track patient records. Due to compliance requirements these records must remain available for immediate download for up to six months and then they can be archived.

What is the best approach to address this issue?

A. Store the files in Amazon EBS and create a Lifecycle Policy to move the files to Glacier after 6 months.

B. Store the files in Amazon Glacier and create a Lifecycle policy to archive to Amazon S3 after 6 months.

C. Store the files in Amazon S3 and create a Lifecycle Policy to archive to Glacier after 6 months.

D. Store the files in Amazon EFS and create a Lifecycle Policy to archive the files after 6 months.

Design Resilient Architectures Example 1 (Answer)

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C. **Store the files in Amazon S3 and create a Lifecycle Policy to archive to Glacier after 6 months.**

D. Store the files in Amazon EFS and create a Lifecycle Policy to archive the files after 6 months.

Design Resilient Architectures Example 2

There is a requirement to host a database on an EC2 Instance. The storage option chosen must also support 28,000 IOPS.

Which Amazon EBS volume type meets the performance requirements of this database?

A. EBS Provisioned IOPS SSD (io1)

B. EBS Throughput Optimized HDD (st1)

C. EBS General Purpose SSD (gp2)

D. EBS Cold HDD (sc1)

Design Resilient Architectures Example 2 (Answer)

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Exam Takeaways

Design for infrastructure to fail

Understand differences between fault tolerant and high availability

Assume that an answer using a single AZ is always incorrect

Managed services are preferred

Define Performant Architectures

Choose Performant Storage and Databases

EBS Volume Types

S3 Storage Classes

Databases

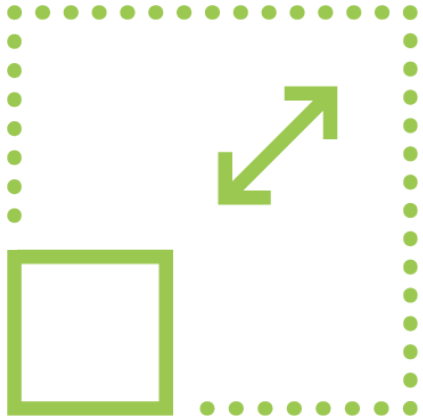
Choose Performant Storage and Databases

Cloudfront

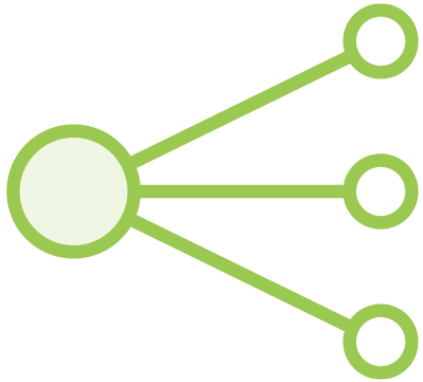
Elasticache (Memcached)

Elasticache (Redis)

Design Solutions for Elasticity and Scalability



Horizontal vs. Vertical Scaling



Elastic Load Balancer

CloudWatch Metrics

Define Performant Architectures Example 1

A RDS MySql database is getting lots of reads and has become the bottleneck for the application.

What action can be performed to ensure that the database does not become remain a performance bottleneck?

A. Setup a CloudFront distribution in front of the database

B. Setup an Elastic Load Balancer in front of the database

C. Setup an ElastiCache cluster in front of the database

D. Setup SNS in front of the database

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Define Performant Architectures Example 2

A company has an application hosted in AWS. The application is deployed on an set of EC2 instances across two AZs for high availability. The infrastructure is deployed behind a ALB.

The following are requirements from an administrative perspective:

I. Ensure notifications are sent when the read requests exceed 1000 requests per minute

II. Ensure notifications are sent when latency exceeds 15 seconds

III. Any API activity which calls sensitive data must be monitored

Which of the following meets the requirements? (Choose 2):

A. Use CloudTrail to monitor API activity

B. Use CloudWatch logs to monitor the API activity

C. Use CloudWatch metrics to create customer metrics and setup an alarm to send out notifications when the threshold is reached

D. Use custom log software to monitor the latency and read requests to the ALB

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Define Performant Architectures Example 3

An application is being designed for deployment into AWS. The application will use Amazon S3 buckets for storing as well as reading data. The write traffic is expected to be 6,500 requests per second and the read traffic will be around 8,000 requests per second.

What is the best way to architect the solution for maximum Amazon S3 performance?

A. Use as many S3 prefixes as you need in parallel to achieve the required throughput

B. Prefix each object name with a hex hash key along with the current date

C. Enable versioning on the S3 bucket

D. Setup cross-region replication on the bucket and perform reads from the secondary bucket

Define Performant Architectures Example 3 (Answer)

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Define Performant Architectures Example 4

A company has a workflow that send video files from their datacenter into the cloud for transcoding. They are using EC2 worker instances to pull the transcoding jobs from SQS.

Why is SQS the best choice for creating a decoupled architecture?

A. SQS guarantees the order of messages

B. SQS checks the health of the worker instances

C. SQS makes it easier to carry out horizontal scaling of the encoding tasks

D. SQS synchronously provides transcoding output

Define Performant Architectures Example 4 (Answer)

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B. SQS checks the health of the worker instances

C. **SQS makes it easier to carry out horizontal scaling of the encoding tasks**

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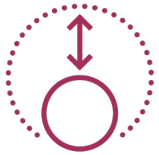
Exam Takeaways

For unstructured data S3 is a good storage solution

Look for caching options to improve performance



Know when to use auto scaling for a given architecture

Select the best instance size for a given workload

Specify Secure Applications and Architectures

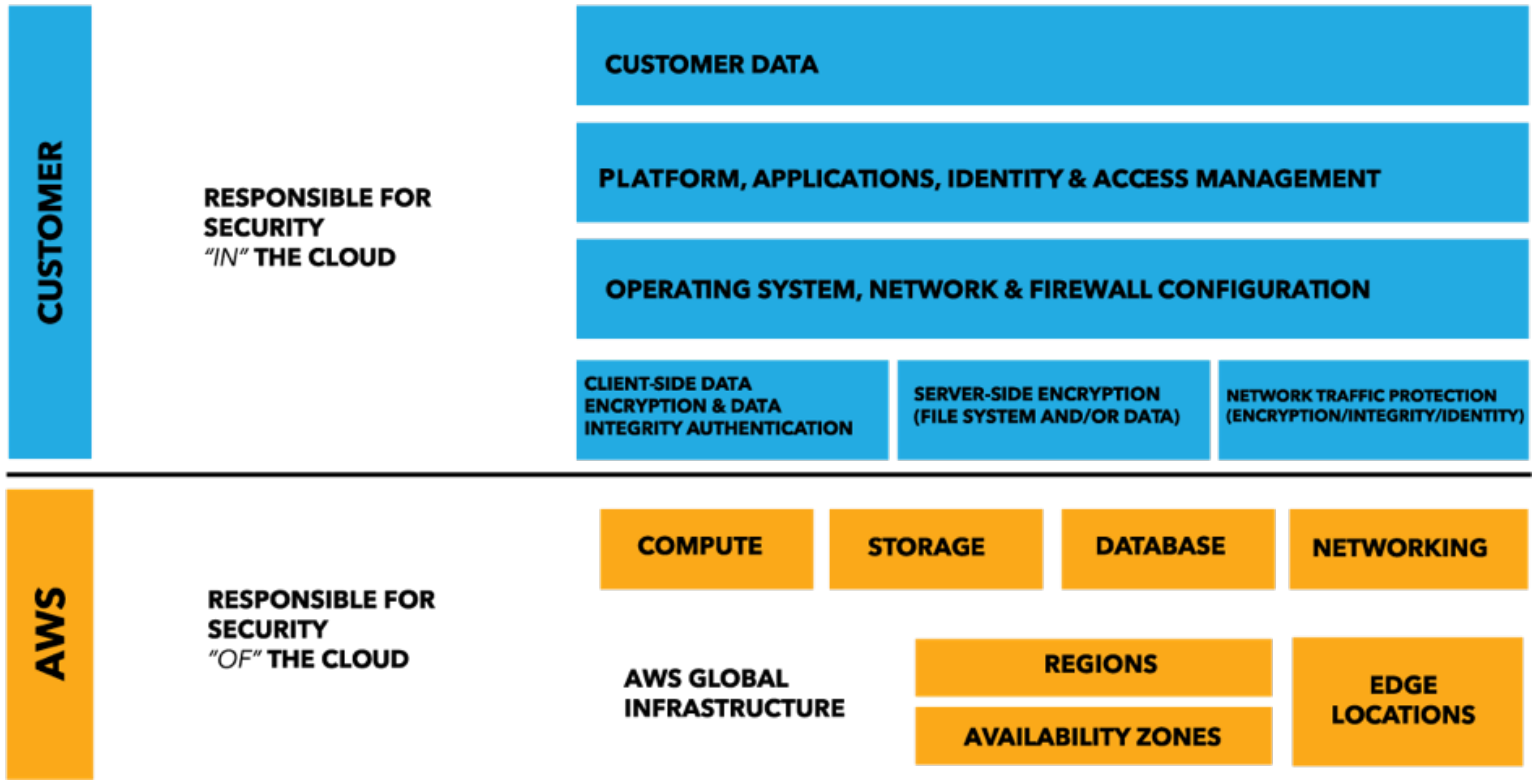
Secure the Infrastructure

Shared Responsibility Model

Principle of Least Privilege

Identity and Access Management (IAM)

AWS Shared Responsibility Model



Define the Networking Infrastructure for a Single VPC Design

VPC

Security Groups and NACLs

Subnets

VPC Connections

Securing the Data

Data in transit

Data at rest

Key Storage and Management

AWS KMS

AWS CloudHSM

Specify Secure Applications and Architectures Example 1

An EC2 instance hosts a voting application that accesses a DynamoDB table. This EC2 instance needs to be able to access the table in the most secure way possible.

Which of the following is the most secure way for the EC2 instance to access the DynamoDB table?

A. Use KMS keys with permissions to interact with DynamoDB and assign those keys to the application

B. Use an IAM user account that is designated as a service account to endure minimum required credentials and assign to the instance

C. Use an IAM role with permissions to interact with DynamoDB and assign it to the EC2 instance

D. Configure a VPC gateway endpoint to allow the resources to access DynamoDB

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Specify Secure Applications and Architectures Example 2

You need to ensure that data stored in Amazon S3 is encrypted. Which of the following encryption methods can be used assuming that you do not want to manage the encryption keys?

A. **SSE-S3**

B. **SSE-C**

C. **SSE-KMS**

D. **SSE-KMS with CloudHSM**

Specify Secure Applications and Architectures Example 2 (Answer)

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A. **SSE-S3**

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C. **SSE-KMS**

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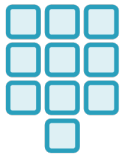
Exam Takeaways

Lock down the AWS root account

Remember Security Groups don't have an explicit deny option

Remember NACLs support explicit deny options



Use roles over access keys always

Design Cost Optimized Architectures

Design Cost Optimized Storage

EBS Volume Types

S3 Storage Classes

Areas of Focus for Storage Cost Optimization

Optimizing S3 Costs

- Storage Class
- Storage Consumption
- Requests
- Data Transfer

Optimizing EBS Volume Costs

- Volume Type
- IOPS
- Snapshots
- Data Transfer

Design Cost Optimized Storage

EC2 Instances

Serverless

Areas of Focus for Compute Cost Optimization

- Hours of Server Running
- Instance Configuration
- Instance Purchase Type
- Number of Instances
- CloudWatch Monitoring
- Auto Scaling
- OS and Software
- Tenancy Type

Design Cost Optimized Architectures Example 1

A custom application with a 200 GB MySQL database runs on an EC2 instance.

The application is only being used for short periods of time in the morning and sometimes in the evening.

What is the most cost effective storage type for the application?

A. Amazon EBS provisioned IOPS SSD

B. Amazon EBS Throughput Optimized HDD

C. Amazon EBS General Purpose SSD

D. Amazon EFS

Design Cost Optimized Architectures Example 1 (Answer)

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Design Cost Optimized Architectures Example 2

A Solutions Architect is designing a system which needs a minimum of 8 m5.large instances to serve traffic. The system will be deployed in us-east-1 and needs to be able to handle the failure of an entire availability zone.

Assume that all EC2 instances are properly linked to the ELB and you can use AZ's a through f.

How should you distribute the servers to save as much cost as possible while maintaining high availability?

A. 3 servers in each AZ (a through d)

B. 8 servers in each AZ (a and b)

C. 2 servers in each AZ (a through e)

D. 4 servers in each AZ (a through c)

Design Cost Optimized Architectures Example 2

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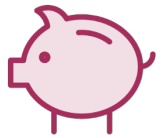
Exam Takeaways

For always on instances, purchase reserved instances

Look for serverless options to eliminate instance costs



Choose most cost effective instance type for a given workload

Use the most cost effective data storage option

Define Operationally Excellent Architectures

Choose Design Features in Solutions that Enable Operational Excellence

Key AWS Services for Operational Excellence

- AWS CloudTrail
- AWS Config
- AWS CloudFormation
- AWS Inspector
- AWS Trusted Advisor
- VPC Flow Logs

Define Operationally Excellent Architectures Example 1

A database application running on an EC2 instance needs to get updates from the Internet. A Solutions Architect needs to design a highly available solution to get the updates without exposing the instance to the internet.

Which solution best meets these requirements?

A. Attach a VPC endpoint and add routes for 0.0.0.0/0

B. Launch a NAT Gateway and add routes for 0.0.0.0/0

C. Deploy a NAT instance in a public subnet and add routes for 0.0.0.0/0

D. Attach an Internet Gateway and add routes for 0.0.0.0/0

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Define Operationally Excellent Architectures Example 2

A consultant designs large architectures using several AWS services that include IAM, EC2, RDS, DynamoDB and VPC. The consultant would like to take his designs and make them easier to deploy in AWS in a more automated manner.

Which service would best meet the requirements?

A. Elastic Beanstalk

B. CodeDeploy

C. CloudFormation

D. OpsWorks

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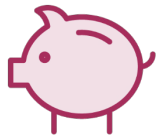

Choose most cost effective instance type for a given workload

Use the most cost effective data storage option

Strategies for the Exam

Exam Techniques

Understand	Determine the key question being asked Figure out what the key question is asking
Eliminate	Get rid of answers that have fake info or errors Eliminate answers that conflict with the key concept
Evaluate	Think through the trade-offs of the responses that are left Consider what is stated as well as implied
Choose	Pick the right number of answer choices Select the best options and eliminate the wrong ones
Validate	Make sure the answer you choose answers the key question Verify that your answer choice does not conflict with the details in the question

The Exam

The exam has 65 questions

No penalty of guessing

130 minutes to complete the exam

Mark question for later review

Multiple choice with single answer as well as two answer questions

Summary

The Exam blueprint

Key areas of focus

Exam Strategies