



# SAP-C02<sup>Q&As</sup>

AWS Certified Solutions Architect - Professional

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## QUESTION 1

A company is running a traditional web application on Amazon EC2 instances. The company needs to refactor the application as microservices that run on containers. Separate versions of the application exist in two distinct environments: production and testing. Load for the application is variable, but the minimum load and the maximum load are known. A solutions architect needs to design the updated application with a serverless architecture that minimizes operational complexity.

Which solution will meet these requirements MOST cost-effectively?

- A. Upload the container images to AWS Lambda as functions. Configure a concurrency limit for the associated Lambda functions to handle the expected peak load. Configure two separate Lambda integrations within Amazon API Gateway: one for production and one for testing.
- B. Upload the container images to Amazon Elastic Container Registry (Amazon ECR). Configure two auto scaled Amazon Elastic Container Service (Amazon ECS) clusters with the Fargate launch type to handle the expected load. Deploy tasks from the ECR images. Configure two separate Application Load Balancers to direct traffic to the ECS clusters.
- C. Upload the container images to Amazon Elastic Container Registry (Amazon ECR). Configure two auto scaled Amazon Elastic Kubernetes Service (Amazon EKS) clusters with the Fargate launch type to handle the expected load. Deploy tasks from the ECR images. Configure two separate Application Load Balancers to direct traffic to the EKS clusters.
- D. Upload the container images to AWS Elastic Beanstalk. In Elastic Beanstalk, create separate environments and deployments for production and testing. Configure two separate Application Load Balancers to direct traffic to the Elastic Beanstalk deployments.

Correct Answer: D

Explanation: minimizes operational + microservices that run on containers = AWS Elastic Beanstalk

## QUESTION 2

A company wants to deploy an API to AWS. The company plans to run the API on AWS Fargate behind a load balancer. The API requires the use of header-based routing and must be accessible from on-premises networks through an AWS Direct Connect connection and a private VIF.

The company needs to add the client IP addresses that connect to the API to an allow list in AWS. The company also needs to add the IP addresses of the API to the allow list. The company's security team will allow /27 CIDR ranges to be added to the allow list. The solution must minimize complexity and operational overhead.

Which solution will meet these requirements?

- A. Create a new Network Load Balancer (NLB) in the same subnets as the Fargate task deployments. Create a security group that includes only the client IP addresses that need access to the API. Attach the new security group to the Fargate tasks. Provide the security team with the NLB's IP addresses for the allow list.
- B. Create two new /27 subnets. Create a new Application Load Balancer (ALB) that extends across the new subnets. Create a security group that includes only the client IP addresses that need access to the API. Attach the security group to the ALB. Provide the security team with the new subnet IP ranges for the allow list.
- C. Create two new /27 subnets. Create a new Network Load Balancer (NLB) that extends across the new subnets.

Create a new Application Load Balancer (ALB) within the new subnets. Create a security group that includes only the client IP addresses that need access to the API. Attach the security group to the ALB. Add the ALB's IP addresses as targets behind the NLB. Provide the security team with the NLB's IP addresses for the allow list.

D. Create a new Application Load Balancer (ALB) in the same subnets as the Fargate task deployments. Create a security group that includes only the client IP addresses that need access to the API. Attach the security group to the ALB. Provide the security team with the ALB's IP addresses for the allow list.

Correct Answer: A

### QUESTION 3

A company is running a two-tier web-based application in an on-premises data center. The application layer consists of a single server running a stateful application. The application connects to a PostgreSQL database running on a separate server. The application's user base is expected to grow significantly, so the company is migrating the application and database to AWS. The solution will use Amazon Aurora PostgreSQL, Amazon EC2 Auto Scaling, and Elastic Load Balancing.

Which solution will provide a consistent user experience that will allow the application and database tiers to scale?

- A. Enable Aurora Auto Scaling for Aurora Replicas. Use a Network Load Balancer with the least outstanding requests routing algorithm and sticky sessions enabled.
- B. Enable Aurora Auto Scaling for Aurora writers. Use an Application Load Balancer with the round robin routing algorithm and sticky sessions enabled.
- C. Enable Aurora Auto Scaling for Aurora Replicas. Use an Application Load Balancer with the round robin routing and sticky sessions enabled.
- D. Enable Aurora Scaling for Aurora writers. Use a Network Load Balancer with the least outstanding requests routing algorithm and sticky sessions enabled.

Correct Answer: C

Explanation: Aurora Auto Scaling enables your Aurora DB cluster to handle sudden increases in connectivity or workload. When the connectivity or workload decreases, Aurora Auto Scaling removes unnecessary Aurora Replicas so that you don't pay for unused provisioned DB instances

### QUESTION 4

A financial services company in North America plans to release a new online web application to its customers on AWS . The company will launch the application in the us-east-1 Region on Amazon EC2 instances. The application must be highly available and must dynamically scale to meet user traffic. The company also wants to implement a disaster recovery environment for the application in the us-west-1 Region by using active- passive failover.

Which solution will meet these requirements?

- A. Create a VPC in us-east-1 and a VPC in us-west-1 Configure VPC peering In the us-east-1 VPC. create an Application Load Balancer (ALB) that extends across multiple Availability Zones in both VPCs Create an Auto Scaling group that deploys the EC2 instances across the multiple Availability Zones in both VPCs Place the Auto Scaling group behind the ALB.
- B. Create a VPC in us-east-1 and a VPC in us-west-1. In the us-east-1 VPC. create an Application Load Balancer (ALB)



that extends across multiple Availability Zones in that VPC. Create an Auto Scaling group that deploys the EC2 instances across the multiple Availability Zones in the us-east-1 VPC Place the Auto Scaling group behind the ALB Set up the same configuration in the us-west-1 VPC. Create an Amazon Route 53 hosted zone Create separate records for each ALB Enable health checks to ensure high availability between Regions.

C. Create a VPC in us-east-1 and a VPC in us-west-1 In the us-east-1 VPC, create an Application Load Balancer (ALB) that extends across multiple Availability Zones in that VPC Create an Auto Scaling group that deploys the EC2 instances across the multiple Availability Zones in the us-east-1 VPC Place the Auto Scaling group behind the ALB Set up the same configuration in the us-west-1 VPC Create an Amazon Route 53 hosted zone. Create separate records for each ALB Enable health checks and configure a failover routing policy for each record.

D. Create a VPC in us-east-1 and a VPC in us-west-1 Configure VPC peering In the us-east-1 VPC, create an Application Load Balancer (ALB) that extends across multiple Availability Zones in Create an Auto Scaling group that deploys the EC2 instances across the multiple Availability Zones in both VPCs Place the Auto Scaling group behind the ALB Create an Amazon Route 53 host.. Create a record for the ALB.

Correct Answer: C

Explanation: This solution meets the requirement of high availability and dynamic scaling by creating an Application Load Balancer (ALB) that spans multiple availability zones in both us-east-1 and us-west-1 regions. This ensures that traffic

is distributed across multiple instances in different availability zones, providing redundancy in case of an instance failure. The Auto Scaling group ensures that additional instances are added or removed based on user traffic. The disaster

recovery environment is achieved by creating an active-passive failover setup with Amazon Route 53. You can create separate records for each ALB and enable health checks to ensure high availability between regions. You can also

configure a failover routing policy for each record, so that traffic is automatically routed to the secondary region in case of a failure in the primary region.

References:

<https://aws.amazon.com/route53/>

<https://aws.amazon.com/route53/health-checks/>

<https://aws.amazon.com/route53/routing-policy/>

<https://aws.amazon.com/elasticloadbalancing/>

<https://aws.amazon.com/autoscaling/>

## QUESTION 5

A software company has deployed an application that consumes a REST API by using Amazon API Gateway, AWS Lambda functions, and an Amazon DynamoDB table. The application is showing an increase in the number of errors during PUT requests. Most of the PUT calls come from a small number of clients that are authenticated with specific API keys.

A solutions architect has identified that a large number of the PUT requests originate from one client. The API is noncritical, and clients can tolerate retries of unsuccessful calls. However, the errors are displayed to customers and are causing damage to the API's reputation.

What should the solutions architect recommend to improve the customer experience?

- A. Implement retry logic with exponential backoff and irregular variation in the client application. Ensure that the errors are caught and handled with descriptive error messages.
- B. Implement API throttling through a usage plan at the API Gateway level. Ensure that the client application handles code 429 replies without error.
- C. Turn on API caching to enhance responsiveness for the production stage. Run 10- minute load tests. Verify that the cache capacity is appropriate for the workload.
- D. Implement reserved concurrency at the Lambda function level to provide the resources that are needed during sudden increases in traffic.

Correct Answer: A

Explanation: <https://aws.amazon.com/premiumsupport/knowledge-center/aws-batch-requests-error/>  
<https://aws.amazon.com/premiumsupport/knowledge-center/api-gateway-429-limit/>

## QUESTION 6

A company has a serverless multi-tenant content management system on AWS. The architecture contains a web-based front end that interacts with an Amazon API Gateway API that uses a custom AWS Lambda authorizes. The authorizer authenticates a user to its tenant ID and encodes the information in a JSON Web Token (JWT) token. After authentication, each API call through API Gateway targets a Lambda function that interacts with a single Amazon DynamoDB table to fulfill requests.

To comply with security standards, the company needs a stronger isolation between tenants. The company will have hundreds of customers within the first year.

Which solution will meet these requirements with the LEAST operational?

- A. Create a DynamoDB table for each tenant by using the tenant ID in the table name. Create a service that uses the JWT token to retrieve the appropriate Lambda execution role that is tenant-specific. Attach IAM policies to the execution role to allow access only to the DynamoDB table for the tenant.
- B. Add tenant ID information to the partition key of the DynamoDB table. Create a service that uses the JWT token to retrieve the appropriate Lambda execution role that is tenant-specific. Attach IAM policies to the execution role to allow access to items in the table only when the key matches the tenant ID.
- C. Create a separate AWS account for each tenant of the application. Use dedicated infrastructure for each tenant. Ensure that no cross-account network connectivity exists.
- D. Add tenant ID as a sort key in every DynamoDB table. Add logic to each Lambda function to use the tenant ID that comes from the JWT token as the sort key in every operation on the DynamoDB table.

Correct Answer: B

## QUESTION 7

A company is planning to store a large number of archived documents and make the documents available to employees through the corporate intranet. Employees will access the system by connecting through a client VPN service that is attached to a VPC. The data must not be accessible to the public.



The documents that the company is storing are copies of data that is held on physical media elsewhere. The number of requests will be low. Availability and speed of retrieval are not concerns of the company.

Which solution will meet these requirements at the LOWEST cost?

- A. Create an Amazon S3 bucket. Configure the S3 bucket to use the S3 One Zone- Infrequent Access (S3 One Zone-IA) storage class as default. Configure the S3 bucket for website hosting. Create an S3 interface endpoint. Configure the S3 bucket to allow access only through that endpoint.
- B. Launch an Amazon EC2 instance that runs a web server. Attach an Amazon Elastic File System (Amazon EFS) file system to store the archived data in the EFS One Zone- Infrequent Access (EFS One Zone-IA) storage class. Configure the instance security groups to allow access only from private networks.
- C. Launch an Amazon EC2 instance that runs a web server. Attach an Amazon Elastic Block Store (Amazon EBS) volume to store the archived data. Use the Cold HDD (sc1) volume type. Configure the instance security groups to allow access only from private networks.
- D. Create an Amazon S3 bucket. Configure the S3 bucket to use the S3 Glacier Deep Archive storage class as default. Configure the S3 bucket for website hosting. Create an S3 interface endpoint. Configure the S3 bucket to allow access only through that endpoint.

Correct Answer: D

Explanation: The S3 Glacier Deep Archive storage class is the lowest-cost storage class offered by Amazon S3, and it is designed for archival data that is accessed infrequently and for which retrieval time of several hours is acceptable. S3 interface endpoint for the VPC ensures that access to the bucket is only from resources within the VPC and this will meet the requirement of not being accessible to the public. And also, S3 bucket can be configured for website hosting, and this will allow employees to access the documents through the corporate intranet. Using an EC2 instance and a file system or block store would be more expensive and unnecessary because the number of requests to the data will be low and availability and speed of retrieval are not concerns. Additionally, using Amazon S3 bucket will provide durability, scalability and availability of data.

## QUESTION 8

A solution architect needs to deploy an application on a fleet of Amazon EC2 instances. The EC2 instances run in private subnets in an Auto Scaling group. The application is expected to generate logs at a rate of 100 MB each second on each of the EC2 instances.

The logs must be stored in an Amazon S3 bucket so that an Amazon EMR cluster can consume them for further processing. The logs must be quickly accessible for the first 90 days and should be retrievable within 48 hours thereafter.

What is the MOST cost-effective solution that meets these requirements?

- A. Set up an S3 copy job to write logs from each EC2 instance to the S3 bucket with S3 Standard storage. Use a NAT instance within the private subnets to connect to Amazon S3. Create S3 Lifecycle policies to move logs that are older than 90 days to S3 Glacier.
- B. Set up an S3 sync job to copy logs from each EC2 instance to the S3 bucket with S3 Standard storage. Use a gateway VPC endpoint for Amazon S3 to connect to Amazon S3. Create S3 Lifecycle policies to move logs that are older than 90 days to S3 Glacier Deep Archive.
- C. Set up an S3 batch operation to copy logs from each EC2 instance to the S3 bucket with S3 Standard storage. Use a NAT gateway with the private subnets to connect to Amazon S3. Create S3 Lifecycle policies to move logs that are older than 90 days to S3 Glacier Deep Archive.



D. Set up an S3 sync job to copy logs from each EC2 instance to the S3 bucket with S3 Standard storage. Use a gateway VPC endpoint for Amazon S3 to connect to Amazon S3. Create S3 Lifecycle policies to move logs that are older than 90 days to S3 Glacier.

Correct Answer: C

## QUESTION 9

A video processing company has an application that downloads images from an Amazon S3 bucket, processes the images, stores a transformed image in a second S3 bucket, and updates metadata about the image in an Amazon DynamoDB table. The application is written in Node.js and runs by using an AWS Lambda function. The Lambda function is invoked when a new image is uploaded to Amazon S3.

The application ran without incident for a while. However, the size of the images has grown significantly. The Lambda function is now failing frequently with timeout errors. The function timeout is set to its maximum value. A solutions architect needs to refactor the application's architecture to prevent invocation failures. The company does not want to manage the underlying infrastructure.

Which combination of steps should the solutions architect take to meet these requirements? (Choose two.)

- A. Modify the application deployment by building a Docker image that contains the application code. Publish the image to Amazon Elastic Container Registry (Amazon ECR).
- B. Create a new Amazon Elastic Container Service (Amazon ECS) task definition with a compatibility type of AWS Fargate. Configure the task definition to use the new image in Amazon Elastic Container Registry (Amazon ECR). Adjust the Lambda function to invoke an ECS task by using the ECS task definition when a new file arrives in Amazon S3.
- C. Create an AWS Step Functions state machine with a Parallel state to invoke the Lambda function. Increase the provisioned concurrency of the Lambda function.
- D. Create a new Amazon Elastic Container Service (Amazon ECS) task definition with a compatibility type of Amazon EC2. Configure the task definition to use the new image in Amazon Elastic Container Registry (Amazon ECR). Adjust the Lambda function to invoke an ECS task by using the ECS task definition when a new file arrives in Amazon S3.
- E. Modify the application to store images on Amazon Elastic File System (Amazon EFS) and to store metadata on an Amazon RDS DB instance. Adjust the Lambda function to mount the EFS file share.

Correct Answer: BC

Explanation: C. Create an AWS Step Functions state machine with a Parallel state to invoke the Lambda function. Increase the provisioned concurrency of the Lambda function. AWS Step Functions is a service that lets you coordinate multiple AWS services such as AWS Lambda, Amazon S3, and Amazon DynamoDB into serverless workflows so you can build and update apps quickly. Step Functions can help to split the image processing task into multiple steps and parallelize the processing with a parallel state, which will increase the overall performance and reduce the chance of timeout errors. Additionally, by increasing the provisioned concurrency of the Lambda function, the system will be able to handle more requests simultaneously, which will help to prevent invocation failures. B. Create a new Amazon Elastic Container Service (Amazon ECS) task definition with a compatibility type of AWS Fargate. Configure the task definition to use the new image in Amazon Elastic Container Registry (Amazon ECR). Adjust the Lambda function to invoke an ECS task by using the ECS task definition when a new file arrives in Amazon S3. Using AWS Fargate or EC2 with Elastic Container Service (ECS) will allow the company to run the containerized image of their application without having to manage the underlying infrastructure. The lambda function can be adjusted to invoke an ECS task when a new file arrives in S3, allowing the application to process the images in a more efficient and scalable way. This solution will remove the timeout issue and prevent invocation failures. Reference:



<https://aws.amazon.com/step-functions/>

<https://aws.amazon.com/lambda/pricing/>

<https://aws.amazon.com/ecs/fargate/>

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#### QUESTION 10

A company has many AWS accounts and uses AWS Organizations to manage all of them. A solutions architect must implement a solution that the company can use to share a common network across multiple accounts.

The company's infrastructure team has a dedicated infrastructure account that has a VPC. The infrastructure team must use this account to manage the network. Individual accounts cannot have the ability to manage their own networks. However, individual accounts must be able to create AWS resources within subnets.

Which combination of actions should the solutions architect perform to meet these requirements? (Select TWO.)

- A. Create a transit gateway in the infrastructure account.
- B. Enable resource sharing from the AWS Organizations management account.
- C. Create VPCs in each AWS account within the organization in AWS Organizations. Configure the VPCs to share the same CIDR range and subnets as the VPC in the infrastructure account. Peer the VPCs in each individual account with the VPC in the infrastructure account.
- D. Create a resource share in AWS Resource Access Manager in the infrastructure account. Select the specific AWS Organizations OU that will use the shared network. Select each subnet to associate with the resource share.
- E. Create a resource share in AWS Resource Access Manager in the infrastructure account. Select the specific AWS Organizations OU that will use the shared network. Select each prefix list to associate with the resource share.

Correct Answer: CE

Explanation: <https://docs.aws.amazon.com/vpc/latest/userguide/sharing-managed-prefix-lists.html>

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#### QUESTION 11

A company is developing a gene reporting device that will collect genomic information to assist researchers with collecting large samples of data from a diverse population. The device will push 8 KB of genomic data every second to a data platform that will need to process and analyze the data and provide information back to researchers. The data platform must meet the following requirements:

Provide near-real-time analytics of the inbound genomic data. Ensure the data is flexible, parallel, and durable. Deliver results of processing to a data warehouse.

Which strategy should a solutions architect use to meet these requirements?

- A. Use Amazon Kinesis Data Firehose to collect the inbound sensor data, analyze the data with Kinesis clients, and save the results to an Amazon RDS instance.
- B. Use Amazon Kinesis Data Streams to collect the inbound sensor data, analyze the data with Kinesis clients, and save the results to an Amazon Redshift cluster using Amazon EMR.





C. Use Amazon S3 to collect the inbound device data analyze the data from Amazon SOS with Kinesis and save the results to an Amazon Redshift duster

D. Use an Amazon API Gateway to put requests into an Amazon SQS queue analyze the data with an AWS Lambda function and save the results ?an Amazon Redshift duster using Amazon EMR

Correct Answer: A

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## QUESTION 12

A retail company has structured its AWS accounts to be part of an organization in AWS Organizations. The company has set up consolidated billing and has mapped its departments to the following OUs: Finance. Sales. Human Resources



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