1) You're designing a highly available web application on AWS. Which of the following is crucial for maintaining security in a multi-AZ deployment?

A. Using only one availability zone for simplicity.

B. Utilizing load balancing across multiple AZs.

C. Disabling auto-scaling to prevent unauthorized changes.

D. Storing all application secrets in plain text in the database.

2) You need to implement a cost-effective solution for running a background task that processes a large dataset daily. Which service combination is the best choice?

A. Amazon EC2 with a general-purpose instance.

B. AWS Batch with Spot Instances.

C. AWS Lambda with a large timeout.

D. Amazon EMR with on-demand instances.

3) An application is experiencing slow database queries. After analyzing query logs, you identify several poorly performing queries. What is the MOST effective way to address this?

A. Increase the database instance size.

B. Optimize the database queries.

C. Add more read replicas.

D. Add caching to the application.

4) Your application relies on a single Amazon RDS instance for database operations. You are looking to improve the resilience of your application against database failures. What strategy should you implement?

A. Configure automatic backups of the database instance.

B. Enable Multi-AZ deployment for your RDS instance.

C. Use Amazon S3 to store backups.

D. Both A and B

5) You're designing a globally distributed application. What is a key consideration for minimizing latency for users in different regions?

A. Use a single central database.

B. Deploy application components in multiple AWS regions.

C. Use only one Availability Zone per region.

D. Avoid using CloudFront.

6) You have a highly variable workload requiring significant processing power for short bursts. Which service is best for minimizing cost?

A. Amazon EC2 Reserved Instances

B. Amazon EC2 On-Demand Instances

C. AWS Lambda

D. Amazon EMR

7) A microservice architecture is prone to cascading failures. Which design pattern helps mitigate this?

A. Shared Database

B. Circuit Breaker

C. Monolithic Architecture

D. Tight Coupling

8) Your application uses a message queue. What's the best way to ensure message delivery even if the message queue service experiences temporary disruptions?

A. Rely on at-least-once delivery semantics.

B. Ignore delivery failures.

C. Implement idempotent consumers.

D. Use a single message queue instance.

9) A sudden spike in traffic to your application causes performance degradation. What is the BEST way to handle this using AWS services?

A. Manually add more EC2 instances.

B. Implement Amazon EC2 Auto Scaling.

C. Increase the instance size of your existing EC2 instances.

D. Use Amazon CloudFront CDN only.

10) You're building a globally distributed application. To ensure low latency for users in different regions, what architectural pattern is most suitable?

A. Centralized architecture in a single AWS Region.

B. Multi-Region architecture with regional databases.

C. Single-Region architecture with a global load balancer.

D. Microservices architecture deployed only in the US-East-1 region.

11) A rapidly growing e-commerce application experiences slowdowns during peak hours. Database read operations are the bottleneck. Which combination of AWS services would BEST address this scalability and performance issue?

A. Amazon RDS for MySQL with Read Replicas and auto-scaling.

B. Amazon DynamoDB with a global secondary index.

C. Amazon S3 for storing product images and Amazon ElastiCache for caching frequently accessed data.

D. Amazon EC2 instances with increased CPU and memory.

12) Your database is experiencing high write throughput. Which strategy can improve write performance and scalability?

A. Using a single, large database instance.

B. Implementing read replicas.

C. Employing database sharding or DynamoDB.

D. Increasing the CPU of the database instance.

13) You want to monitor and log all API calls made to your AWS resources. Which service should you use?

A. Amazon CloudWatch

B. AWS Config

C. AWS CloudTrail

D. AWS WAF

14) You are building a highly available and secure web application on AWS. What is a critical security consideration for the load balancer?

A. Disable all security measures for optimal performance.

B. Configure the load balancer to allow all incoming traffic.

C. Utilize SSL/TLS certificates for HTTPS encryption and integrate with a Web Application Firewall (WAF).

D. Place the load balancer in a public subnet without any security groups.

15) You need to restrict access to your Amazon EC2 instances based on the source IP address. Which AWS service is MOST appropriate?

A. IAM roles

B. Security groups

C. AWS WAF

D. AWS CloudTrail

16) An application experiences sporadic high latency spikes. CloudWatch metrics show no consistent pattern in CPU or memory utilization. What is the MOST likely cause?

A. Insufficient instance size.

B. Network connectivity issues.

C. Database performance bottleneck.

D. Insufficient application code optimization.

17) Your application needs to handle a sudden surge in traffic. What's the most effective approach using AWS services?

A. Manually add more EC2 instances.

B. Use AWS Auto Scaling with Elastic Load Balancing.

C. Increase the instance size of your primary EC2 instances.

D. Implement a CDN to offload static content.

18) You're migrating a database to AWS. What's the BEST way to ensure data encryption both in transit and at rest?

A. Enable encryption on the database instance only.

B. Use SSL/TLS encryption in transit and database-level encryption at rest.

C. Rely on the default AWS encryption settings.

D. Use a VPN to encrypt all traffic to and from the database instance.

19) You need to monitor your AWS resources for suspicious activity and potential security threats. Which service is best suited for this?

A. AWS CloudTrail

B. Amazon GuardDuty

C. AWS Config

D. AWS WAF

20) A web application is experiencing slow response times during peak usage. CloudWatch shows high CPU utilization on the application servers. Which scaling strategy will MOST effectively address this issue?

A. Vertical scaling

B. Horizontal scaling

C. Manual scaling

D. No scaling needed

1) You're designing a highly available web application on AWS. Which of the following is crucial for maintaining security in a multi-AZ deployment?

A. Incorrect. Using only one AZ is a single point of failure.

B. Correct. Load balancing across AZs ensures high availability and redundancy.

C. Incorrect. Auto-scaling is crucial for handling traffic fluctuations.

D. Incorrect. Storing secrets in plain text is a major security vulnerability.

2) You need to implement a cost-effective solution for running a background task that processes a large dataset daily. Which service combination is the best choice?

A. More expensive than using Spot Instances and less efficient for batch processing.

B. Cost-effective for batch processing using Spot Instances which are significantly cheaper than On-Demand.

C. Lambda has timeouts, may not be suitable for very large datasets that exceed these limits. Also, Lambda might be charged more if it uses more memory to process that data than the default.

D. More expensive than using AWS Batch and Spot instances, unless you have specialized cluster needs.

3) An application is experiencing slow database queries. After analyzing query logs, you identify several poorly performing queries. What is the MOST effective way to address this?

A. Increasing instance size is a temporary fix and might be expensive. The root cause is inefficient queries.

B. Optimizing queries directly addresses the performance bottleneck by making them more efficient.

C. Read replicas won't help if the problem is slow queries, especially write-heavy queries.

D. Caching is helpful, but it won't solve the core problem of inefficient queries.

4) Your application relies on a single Amazon RDS instance for database operations. You are looking to improve the resilience of your application against database failures. What strategy should you implement?

A. Backups help with recovery but do not protect against immediate failures.

B. Multi-AZ creates a standby instance, providing high availability.

C. S3 is good for storage of backups but doesn't solve the high availability problem.

D. Both backups and Multi-AZ deployment are essential for a robust solution.

5) You're designing a globally distributed application. What is a key consideration for minimizing latency for users in different regions?

A. A single central database will introduce significant latency for users far from the database location.

B. Distributing application components geographically reduces latency for users in different regions.

C. Using multiple AZs within a region improves availability but doesn't address global latency.

D. CloudFront is crucial for global content distribution and reducing latency.

6) You have a highly variable workload requiring significant processing power for short bursts. Which service is best for minimizing cost?

A. Inefficient for short bursts; you pay for capacity you don't use.

B. Pays per second, but still more expensive than Lambda for short bursts.

C. Charges only for compute time used, ideal for short-lived functions.

D. Suitable for large-scale data processing, but overkill for short bursts.

7) A microservice architecture is prone to cascading failures. Which design pattern helps mitigate this?

A. Increases coupling and risk of cascading failures.

B. Circuit breaker isolates failures, preventing them from cascading across microservices.

C. Not a microservice pattern.

D. Tight coupling enhances inter-dependency and risks cascading failures.

8) Your application uses a message queue. What's the best way to ensure message delivery even if the message queue service experiences temporary disruptions?

A. At-least-once can lead to duplicates.

B. Ignoring failures means messages are lost.

C. Idempotent consumers can handle duplicate messages without causing issues.

D. Single instance is a single point of failure.

9) A sudden spike in traffic to your application causes performance degradation. What is the BEST way to handle this using AWS services?

A. Manual scaling is slow and inefficient.

B. Auto Scaling dynamically adjusts the number of instances based on demand.

C. This might improve performance of individual instances but not handle the increased traffic.

D. CDN is good for static content, but not dynamic application scaling.

10) You're building a globally distributed application. To ensure low latency for users in different regions, what architectural pattern is most suitable?

A. Centralized architecture suffers from high latency for users far from the central region.

B. Multi-region architecture minimizes latency by placing resources closer to users.

C. A global load balancer helps distribute traffic, but doesn't reduce latency inherent in distance.

D. Limiting deployment to a single region prevents global accessibility and low latency.

11) A rapidly growing e-commerce application experiences slowdowns during peak hours. Database read operations are the bottleneck. Which combination of AWS services would BEST address this scalability and performance issue?

A. Correct. Read replicas offload read traffic from the primary database instance, significantly improving read performance. Auto-scaling ensures that the system dynamically adjusts to changing demand.

*B. DynamoDB is a good option for high-throughput applications, but the problem statement points to database *read* operations as the bottleneck, and the existing database might be relational.*

C. While offloading static content to S3 and caching data with ElastiCache improve performance, they don't directly address the database read bottleneck.

D. Simply increasing EC2 instance resources is a vertical scaling approach that might provide temporary relief but doesn't address the fundamental scalability issue.

12) Your database is experiencing high write throughput. Which strategy can improve write performance and scalability?

A. Bottleneck for high write throughput.

B. Improves read performance, not write performance.

C. Sharding distributes the data load, while DynamoDB is inherently scalable.

D. Might help marginally but won't scale effectively for high write throughput.

13) You want to monitor and log all API calls made to your AWS resources. Which service should you use?

A. Incorrect. CloudWatch monitors metrics and logs.

B. Incorrect. AWS Config tracks resource configurations.

C. Correct. AWS CloudTrail logs API calls and activity.

D. Incorrect. AWS WAF is a web application firewall.

14) You are building a highly available and secure web application on AWS. What is a critical security consideration for the load balancer?

A. Incorrect: Disabling security features compromises the application's security.

B. Incorrect: Allowing all incoming traffic is extremely insecure.

C. Correct: HTTPS encrypts traffic and WAF protects against common web attacks.

D. Incorrect: This exposes the load balancer to the internet without any protection.

15) You need to restrict access to your Amazon EC2 instances based on the source IP address. Which AWS service is MOST appropriate?

A. IAM roles manage permissions, not network access.

B. Security groups act as virtual firewalls, allowing you to control inbound and outbound traffic based on source/destination IP addresses, ports, and protocols.

C. AWS WAF is a web application firewall, it doesn't manage EC2 instance access.

D. AWS CloudTrail logs API calls and activity; it does not manage network access.

16) An application experiences sporadic high latency spikes. CloudWatch metrics show no consistent pattern in CPU or memory utilization. What is the MOST likely cause?

A. Consistent high CPU/memory utilization would indicate insufficient instance size.

B. Sporadic latency spikes with otherwise normal resource utilization point to intermittent network problems.

C. A database bottleneck would usually show consistent high latency, not sporadic spikes.

D. Inefficient code leads to consistent performance degradation, not sporadic spikes.

17) Your application needs to handle a sudden surge in traffic. What's the most effective approach using AWS services?

A. Manual scaling is slow and not responsive to dynamic traffic changes.

B. Auto Scaling and ELB provide automatic scaling based on real-time traffic demands, ensuring optimal resource allocation.

C. Increasing instance size might not be sufficient if the traffic surge involves a huge number of requests.

D. CDNs are helpful for performance improvements but do not directly address immediate traffic spikes.

18) You're migrating a database to AWS. What's the BEST way to ensure data encryption both in transit and at rest?

A. Doesn't cover data in transit.

B. This provides comprehensive encryption for both data in transit and at rest.

C. Default settings may not be sufficient for all security requirements.

D. VPNs encrypt traffic between networks, but not necessarily at the database level.

19) You need to monitor your AWS resources for suspicious activity and potential security threats. Which service is best suited for this?

A. CloudTrail logs API calls, useful for auditing but not threat detection.

B. GuardDuty continuously monitors for malicious activity.

C. Config tracks configuration changes, helpful for compliance but not real-time threat detection.

D. WAF protects web applications, but doesn't monitor the entire AWS environment.

20) A web application is experiencing slow response times during peak usage. CloudWatch shows high CPU utilization on the application servers. Which scaling strategy will MOST effectively address this issue?

A. Vertical scaling (upgrading instance size) has limits. It's better for addressing individual server issues, not high demand situations.

B. Horizontal scaling (adding more instances) is far more effective for handling increased traffic.

C. Manual scaling is slow and inefficient for dynamic traffic.

D. Ignoring the high CPU indicates a misunderstanding of scaling needs.