Set 1

1. **Explain Cloud SQL in Google Cloud?**

    - Cloud SQL is Google Cloud's fully managed relational database service. It makes it easy to set up, maintain, manage, and administer your relational MySQL, PostgreSQL, and SQL Server databases in the cloud. It automates tasks like backups, replication, patches, and updates.

2. **Mention one security feature of Cloud SQL.**

    - One security feature of Cloud SQL is encryption of data at rest and in transit.

3. **Explain the purpose of automated backups in Cloud SQL?**

    - The purpose of automated backups in Cloud SQL is to enable point-in-time recovery (PITR) of database instances, protecting against data loss due to accidental deletion, application errors, or other failures. They are also crucial for disaster recovery.

4. **What is the role of a publisher in Cloud Pub/Sub?**

    - In Cloud Pub/Sub, a publisher is an application or service that creates messages and sends (publishes) them to a specific named resource called a topic.

5. **What command is used to publish a message in Pub/Sub?**

    - The `gcloud pubsub topics publish TOPIC_NAME --message "YOUR_MESSAGE"` command is used to publish a message to a Pub/Sub topic using the Google Cloud CLI.

6. **What does VPC stand for in Google Cloud?**

    - VPC in Google Cloud stands for Virtual Private Cloud.

7. **What is the main purpose of Cloud Monitoring?**

    - The main purpose of Cloud Monitoring is to provide visibility into the performance, uptime, and overall health of applications and cloud infrastructure by collecting metrics, events, and metadata.

8. **What does a custom dashboard in Cloud Monitoring do?**

- A custom dashboard in Cloud Monitoring allows users to create personalized views by selecting and arranging charts that display the metrics most relevant to their specific applications, services, or infrastructure components, facilitating easier tracking and analysis.

9. **Describe two key features of Cloud Monitoring.**

    - Two key features of Cloud Monitoring are:
        1. **Metrics Collection & Visualization:** It collects a wide range of performance metrics from Google Cloud services and custom sources, and allows users to visualize this data through charts and dashboards.
        2. **Alerting:** It enables users to set up alerting policies that notify them when specific metric thresholds are breached or certain conditions occur, allowing for proactive issue response.

10. **What is the command to create a Kubernetes cluster in GKE?**

    - The command to create a Kubernetes cluster in Google Kubernetes Engine (GKE) using the gcloud CLI is typically `gcloud container clusters create CLUSTER_NAME --zone ZONE_NAME` (with other optional flags).

11. **Which API must be enabled to use Cloud SQL?**

    - The "Cloud SQL Admin API" must be enabled to use Cloud SQL.

12. **Differentiate between public IP and private IP in Cloud SQL connectivity.**

    - **Public IP:** Allows Cloud SQL instances to be accessible over the public internet. Connections are typically secured using SSL/TLS and authorized networks.
    - **Private IP:** Allows Cloud SQL instances to be accessible only from within a Virtual Private Cloud (VPC) network, using internal IP addresses. This provides enhanced security by not exposing the database directly to the internet.

13. **What is a topic in Cloud Pub/Sub?**

    - In Cloud Pub/Sub, a topic is a named resource to which publishers send messages. It acts as a channel for distributing messages to all interested subscribers.

14. **What is the role of gcloud pubsub subscriptions pull command?**

    - The `gcloud pubsub subscriptions pull` command is used to retrieve (pull) messages from a specified Pub/Sub subscription. This is one way subscribers can consume messages.

15. **How does Google Cloud SQL ensure security and compliance? Include details on IAM, encryption, and networking.**

    - Google Cloud SQL ensures security and compliance through a multi-layered approach:
        - **IAM (Identity and Access Management):** Cloud SQL integrates with Google Cloud IAM to provide fine-grained access control. Users and service accounts can be granted specific roles (e.g., Cloud SQL Client, Cloud SQL Editor, Cloud SQL Admin) to control who can connect to, manage, or administer database instances.
        - **Encryption:** Data is encrypted at rest by default using Google-managed encryption keys. Customers can also use Customer-Managed Encryption Keys (CMEK). Data in transit is secured using SSL/TLS connections.
        - **Networking:** Instances can be configured with public IP addresses (secured by firewalls/authorized networks) or private IP addresses (for access only within a VPC network). VPC Service Controls can further restrict data exfiltration. Network firewalls control traffic to instances.
        - **Compliance:** Google Cloud (and by extension Cloud SQL) adheres to various international security and privacy standards and certifications (e.g., ISO 27001, SOC 2, HIPAA, GDPR).
        - **Automated Backups and Replication:** Provide data resilience and disaster recovery options.
        - **Audit Logging:** Cloud Audit Logs track administrative actions and data access for security analysis and compliance.

Set 2

2. **Which API must be enabled to use Cloud SQL?**

    - The "Cloud SQL Admin API" must be enabled.

3. **What command is used to list Pub/Sub subscriptions?**

    - The `gcloud pubsub subscriptions list` command is used to list Pub/Sub subscriptions.

4. **What service does Cloud SQL for MySQL provide?**

    - Cloud SQL for MySQL provides a fully managed relational database service for MySQL, automating tasks like patching, updates, backups, and replication.

5. **Give a command to publish a message to a Pub/Sub topic.**

- `gcloud pubsub topics publish TOPIC_NAME --message "YOUR_MESSAGE"`

6. **What is a subnet in a VPC?**

    - A subnet (subnetwork) in a VPC is a segmented range of IP addresses within the VPC. Resources like VMs are launched into subnets, allowing for logical separation and organization of resources within the virtual network.

7. **Name a benefit of using custom subnet mode.**

    - A benefit of using custom subnet mode in a VPC is that it gives you full control over the IP address ranges for your subnets, allowing you to define them according to your specific needs, avoid IP address conflicts with on-premises networks, and plan your network topology more precisely.

8. **Which tool is used to view real-time logs?**

    - In Google Cloud, Cloud Logging (formerly Stackdriver Logging) is the primary tool used to view real-time logs from various Google Cloud services and custom applications.

9. **What is the role of Kubernetes?**

    - Kubernetes is an open-source container orchestration platform that automates the deployment, scaling, and management of containerized applications. It groups containers into logical units for easy management and discovery.

10. **What is the default container port in the example Dockerfile?**

    - The default container port depends entirely on the application being containerized and how the `EXPOSE` instruction is used in its specific Dockerfile. Common examples are port 80 for web servers or 8080 for application servers, but there is no universal default.

11. **List two advantages of using Cloud SQL for MySQL.**

    - Two advantages are:
        1. **Fully Managed Service:** Reduces operational overhead as Google handles patching, backups, replication, and updates.
        2. **Scalability and High Availability:** Easily scale instances up or down, and configure for high availability with failover replicas.

2. **Which API must be enabled to use Cloud SQL?**

- The "Cloud SQL Admin API" must be enabled.

3. **Differentiate between public IP and private IP in Cloud SQL connectivity.**

    - **Public IP:** Allows internet-based access to the Cloud SQL instance, typically secured with firewalls and SSL.
    - **Private IP:** Restricts access to within a specific VPC network, enhancing security by preventing direct internet exposure.

4. **What is the benefit of using custom subnet mode when creating a VPC?**

    - Using custom subnet mode allows for precise control over IP address ranges within your VPC, facilitating better network planning, integration with on-premises networks, and avoidance of IP address conflicts.

5. **Discuss how logs and metrics can be correlated for issue diagnosis.**

    - When an issue arises, metrics (e.g., high CPU utilization, increased error rates, high latency from Cloud Monitoring) often indicate the symptom. By noting the time window of the metric anomaly, engineers can then dive into logs (e.g., application logs, system logs from Cloud Logging) for that specific period. Logs provide detailed contextual information, error messages, stack traces, or specific request details that can reveal the root cause of the metric deviation. For example, a spike in 5xx error metrics might correlate with application logs showing database connection timeouts or out-of-memory errors. Using trace IDs that span across services can further help correlate logs and metrics from different components involved in a request flow.

6. **How does Cloud Monitoring help in maintaining performance and reliability of cloud resources?**

    - Cloud Monitoring helps maintain performance and reliability by:
        1. **Providing Real-time Visibility:** It collects and displays metrics on resource utilization (CPU, memory, disk, network) and service performance (latency, error rates), allowing operators to see how resources are behaving.
        2. **Enabling Proactive Alerting:** Users can set up alerts based on metric thresholds. When performance degrades or a resource becomes unreliable (e.g., high error rate, low disk space), alerts notify the appropriate teams to take corrective action before users are significantly impacted.

3. **Facilitating Capacity Planning:** Historical metric data helps in understanding trends and planning for future capacity needs, preventing performance bottlenecks.
4. **Supporting Automated Actions:** Monitoring data can trigger automated responses, such as auto-scaling (adding or removing instances based on load to maintain performance) or automated failover procedures, enhancing reliability.
5. **Aiding in Root Cause Analysis:** Dashboards and metrics provide the data needed to diagnose performance issues and identify the root causes of unreliability, leading to more stable systems.