Professional Cloud Developer v1.0 (Professional Cloud Developer) - Full Access

Question 101 (Single Topic)

You are developing a web application that will be accessible over both HTTP and HTTPS and will run on Compute Engine instances. On occasion, you will need to SSH from your remote laptop into one of the Compute Engine instances to conduct maintenance on the app. How should you configure the instances while following Google-recommended best practices?

A. Set up a backend with Compute Engine web server instances with a private IP address behind a TCP proxy load balancer.
B. Configure the firewall rules to allow all ingress traffic to connect to the Compute Engine web servers, with each server having a unique external IP address.
C. Configure Cloud Identity-Aware Proxy API for SSH access. Then configure the Compute Engine servers with private IP addresses behind an HTTP(s) load balancer for the application web traffic.
D. Set up a backend with Compute Engine web server instances with a private IP address behind an HTTP(S) load balancer. Set up a bastion host with a public IP address and open firewall ports. Connect to the web instances using the bastion host.

Answer : C

Reference:
https://cloud.google.com/compute/docs/instances/connecting-advanced#cloud_iap

Question 102 (Single Topic)

You have a mixture of packaged and internally developed applications hosted on a Compute Engine instance that is running Linux. These applications write log records as text in local files. You want the logs to be written to Cloud Logging. What should you do?

A. Pipe the content of the files to the Linux Syslog daemon.
B. Install a Google version of fluentd on the Compute Engine instance.
C. Install a Google version of collectd on the Compute Engine instance.
D. Using cron, schedule a job to copy the log files to Cloud Storage once a day.

Answer : B

Reference:
https://cloud.google.com/logging/docs/agent/logging/configuration

Question 103 (Single Topic)

You want to create `fully baked` or `golden` Compute Engine images for your application. You need to bootstrap your application to connect to the appropriate database according to the environment the application is running on (test, staging, production). What should you do?

A. Embed the appropriate database connection string in the image. Create a different image for each environment.
B. When creating the Compute Engine instance, add a tag with the name of the database to be connected. In your application, query the Compute Engine API to pull the tags for the current instance, and use the tag to construct the appropriate database connection string.
C. When creating the Compute Engine instance, create a metadata item with a key of ›€DATABASE›€ and a value for the appropriate database connection string. In your application, read the ›€DATABASE›€ environment variable, and use the value to connect to the appropriate database.
D. When creating the Compute Engine instance, create a metadata item with a key of ›€DATABASE›€ and a value for the appropriate database connection string. In your application, query the metadata server for the ›€DATABASE›€ value, and use the value to connect to the appropriate database.

Answer : C

Question 104 (Single Topic)

You are developing a microservice-based application that will be deployed on a Google Kubernetes Engine cluster. The application needs to read and write to a Spanner database. You want to follow security best practices while minimizing code changes. How should you configure your application to retrieve Spanner credentials?

A. Configure the appropriate service accounts, and use Workload Identity to run the pods.
B. Store the application credentials as Kubernetes Secrets, and expose them as environment variables.
C. Configure the appropriate routing rules, and use a VPC-native cluster to directly connect to the database.
D. Store the application credentials using Cloud Key Management Service, and retrieve them whenever a database connection is made.

Answer : B

Reference:
https://cloud.google.com/sql/docs/mysql/connect-kubernetes-engine

Question 105 (Single Topic)

You are deploying your application on a Compute Engine instance that communicates with Cloud SQL. You will use Cloud SQL Proxy to allow your application to communicate to the database using the service account associated with the application's instance. You want to follow the Google-recommended best practice of providing minimum access for the role assigned to the service account. What should you do?

A. Assign the Project Editor role.
B. Assign the Project Owner role.
C. Assign the Cloud SQL Client role.
D. Assign the Cloud SQL Editor role.

Answer : C

Reference:
https://cloud.google.com/sql/docs/mysql/sql-proxy

Question 106 (Single Topic)

Your team develops stateless services that run on Google Kubernetes Engine (GKE). You need to deploy a new service that will only be accessed by other services running in the GKE cluster. The service will need to scale as quickly as possible to respond to changing load. What should you do?

A. Use a Vertical Pod Autoscaler to scale the containers, and expose them via a ClusterIP Service.
B. Use a Vertical Pod Autoscaler to scale the containers, and expose them via a NodePort Service.
C. Use a Horizontal Pod Autoscaler to scale the containers, and expose them via a ClusterIP Service.
D. Use a Horizontal Pod Autoscaler to scale the containers, and expose them via a NodePort Service.

Answer : C

Question 107 (Single Topic)

You recently migrated a monolithic application to Google Cloud by breaking it down into microservices. One of the microservices is deployed using Cloud
Functions. As you modernize the application, you make a change to the API of the service that is backward-incompatible. You need to support both existing callers who use the original API and new callers who use the new API. What should you do?

A. Leave the original Cloud Function as-is and deploy a second Cloud Function with the new API. Use a load balancer to distribute calls between the versions.
B. Leave the original Cloud Function as-is and deploy a second Cloud Function that includes only the changed API. Calls are automatically routed to the correct function.
C. Leave the original Cloud Function as-is and deploy a second Cloud Function with the new API. Use Cloud Endpoints to provide an API gateway that exposes a versioned API.
D. Re-deploy the Cloud Function after making code changes to support the new API. Requests for both versions of the API are fulfilled based on a version identifier included in the call.

Answer : C

Reference:
https://cloud.google.com/endpoints/docs/openapi/get-started-cloud-functions

Question 108 (Single Topic)

You are developing an application that will allow users to read and post comments on news articles. You want to configure your application to store and display user-submitted comments using Firestore. How should you design the schema to support an unknown number of comments and articles?

A. Store each comment in a subcollection of the article.
B. Add each comment to an array property on the article.
C. Store each comment in a document, and add the commentג€™s key to an array property on the article.
D. Store each comment in a document, and add the commentג€™s key to an array property on the user profile.

Answer : D

Question 109 (Single Topic)

You recently developed an application. You need to call the Cloud Storage API from a Compute
Engine instance that doesn't have a public IP address. What should you do?

A. Use Carrier Peering
B. Use VPC Network Peering
C. Use Shared VPC networks
D. Use Private Google Access

Answer : C

Reference:
https://cloud.google.com/compute/docs/ip-addresses

Question 110 (Single Topic)

You are a developer working with the CI/CD team to troubleshoot a new feature that your team introduced. The CI/CD team used HashiCorp Packer to create a new Compute Engine image from your development branch. The image was successfully built, but is not booting up. You need to investigate the issue with the CI/
CD team. What should you do?

A. Create a new feature branch, and ask the build team to rebuild the image.
B. Shut down the deployed virtual machine, export the disk, and then mount the disk locally to access the boot logs.
C. Install Packer locally, build the Compute Engine image locally, and then run it in your personal Google Cloud project.
D. Check Compute Engine OS logs using the serial port, and check the Cloud Logging logs to confirm access to the serial port.

Answer : C

Reference:
https://cloud.google.com/architecture/automated-build-images-with-jenkins-kubernetes

---

Question 111 (Single Topic)

You manage an application that runs in a Compute Engine instance. You also have multiple backend services executing in stand-alone Docker containers running in Compute Engine instances. The Compute Engine instances supporting the backend services are scaled by managed instance groups in multiple regions. You want your calling application to be loosely coupled. You need to be able to invoke distinct service implementations that are chosen based on the value of an HTTP header found in the request. Which Google Cloud feature should you use to invoke the backend services?

A. Traffic Director
B. Service Directory
C. Anthos Service Mesh
D. Internal HTTP(S) Load Balancing

Answer : D

Question 112 (Single Topic)

Your team is developing an ecommerce platform for your company. Users will log in to the website and add items to their shopping cart. Users will be automatically logged out after 30 minutes of inactivity. When users log back in, their shopping cart should be saved. How should you store users' session and shopping cart information while following Google-recommended best practices?

A. Store the session information in Pub/Sub, and store the shopping cart information in Cloud SQL.
B. Store the shopping cart information in a file on Cloud Storage where the filename is the SESSION ID.
C. Store the session and shopping cart information in a MySQL database running on multiple Compute Engine instances.
D. Store the session information in Memorystore for Redis or Memorystore for Memcached, and store the shopping cart information in Firestore.

Answer : A

Question 113 (Single Topic)

You are designing a resource-sharing policy for applications used by different teams in a Google Kubernetes Engine cluster. You need to ensure that all applications can access the resources needed to run. What should you do? (Choose two.)

A. Specify the resource limits and requests in the object specifications.
B. Create a namespace for each team, and attach resource quotas to each namespace.
C. Create a LimitRange to specify the default compute resource requirements for each namespace.
D. Create a Kubernetes service account (KSA) for each application, and assign each KSA to the namespace.
E. Use the Anthos Policy Controller to enforce label annotations on all namespaces. Use taints and tolerations to allow resource sharing for namespaces.

Answer : AB

Question 114 (Single Topic)

You are developing a new application that has the following design requirements:
⇨ Creation and changes to the application infrastructure are versioned and auditable.
⇨ The application and deployment infrastructure uses Google-managed services as much as possible.
⇨ The application runs on a serverless compute platform.
How should you design the application's architecture?

A. 1. Store the application and infrastructure source code in a Git repository. 2. Use Cloud Build to deploy the application infrastructure with Terraform. 3. Deploy the application to a Cloud Function as a pipeline step.
B. 1. Deploy Jenkins from the Google Cloud Marketplace, and define a continuous integration pipeline in Jenkins. 2. Configure a pipeline step to pull the application source code from a Git repository. 3. Deploy the application source code to App Engine as a pipeline step.
C. 1. Create a continuous integration pipeline on Cloud Build, and configure the pipeline to deploy the application infrastructure using Deployment Manager templates. 2. Configure a pipeline step to create a container with the latest application source code. 3. Deploy the container to a Compute Engine instance as a pipeline step.
D. 1. Deploy the application infrastructure using gcloud commands. 2. Use Cloud Build to define a continuous integration pipeline for changes to the application source code. 3. Configure a pipeline step to pull the application source code from a Git repository, and create a containerized application. 4. Deploy the new container on Cloud Run as a pipeline step.

Answer : D

Reference:
https://cloud.google.com/docs/ci-cd

Question 115 (Single Topic)

You are creating and running containers across different projects in Google Cloud. The application you are developing needs to access Google Cloud services from within Google Kubernetes Engine (GKE). What should you do?

A. Assign a Google service account to the GKE nodes.
B. Use a Google service account to run the Pod with Workload Identity.
C. Store the Google service account credentials as a Kubernetes Secret.
D. Use a Google service account with GKE role-based access control (RBAC).

Answer : A

Question 116 (Single Topic)

You have containerized a legacy application that stores its configuration on an NFS share. You need to deploy this application to Google Kubernetes Engine (GKE) and do not want the application serving traffic until after the configuration has been retrieved. What should you do?

A. Use the gsutil utility to copy files from within the Docker container at startup, and start the service using an ENTRYPOINT script.
B. Create a PersistentVolumeClaim on the GKE cluster. Access the configuration files from the volume, and start the service using an ENTRYPOINT script.
C. Use the COPY statement in the Dockerfile to load the configuration into the container image. Verify that the configuration is available, and start the service using an ENTRYPOINT script.
D. Add a startup script to the GKE instance group to mount the NFS share at node startup. Copy the configuration files into the container, and start the service using an ENTRYPOINT script.

Answer : D

Reference:
https://cloud.google.com/compute/docs/instances/startup-scripts/linux

Question 117 (Single Topic)

Your team is developing a new application using a PostgreSQL database and Cloud Run. You are responsible for ensuring that all traffic is kept private on Google Cloud. You want to use managed services and follow Google-recommended best practices. What should you do?

A. 1. Enable Cloud SQL and Cloud Run in the same project. 2. Configure a private IP address for Cloud SQL. Enable private services access. 3. Create a Serverless VPC Access connector. 4. Configure Cloud Run to use the connector to connect to Cloud SQL.
B. 1. Install PostgreSQL on a Compute Engine virtual machine (VM), and enable Cloud Run in the same project. 2. Configure a private IP address for the VM. Enable private services access. 3. Create a Serverless VPC Access connector. 4. Configure Cloud Run to use the connector to connect to the VM hosting PostgreSQL.
C. 1. Use Cloud SQL and Cloud Run in different projects. 2. Configure a private IP address for Cloud SQL. Enable private services access. 3. Create a Serverless VPC Access connector. 4. Set up a VPN connection between the two projects. Configure Cloud Run to use the connector to connect to Cloud SQL.
D. 1. Install PostgreSQL on a Compute Engine VM, and enable Cloud Run in different projects. 2. Configure a private IP address for the VM. Enable private services access. 3. Create a Serverless VPC Access connector. 4. Set up a VPN connection between the two projects. Configure Cloud Run to use the connector to access the VM hosting PostgreSQL

Answer : B

Question 118 (Single Topic)

You are developing an application that will allow clients to download a file from your website for a specific period of time. How should you design the application to complete this task while following Google-recommended best practices?

A. Configure the application to send the file to the client as an email attachment.
B. Generate and assign a Cloud Storage-signed URL for the file. Make the URL available for the client to download.
C. Create a temporary Cloud Storage bucket with time expiration specified, and give download permissions to the bucket. Copy the file, and send it to the client.
D. Generate the HTTP cookies with time expiration specified. If the time is valid, copy the file from the Cloud Storage bucket, and make the file available for the client to download.

Answer : B

Question 119 (Single Topic)

Your development team has been asked to refactor an existing monolithic application into a set of composable microservices. Which design aspects should you implement for the new application? (Choose two.)

A. Develop the microservice code in the same programming language used by the microservice caller.
B. Create an API contract agreement between the microservice implementation and microservice caller.
C. Require asynchronous communications between all microservice implementations and microservice callers.
D. Ensure that sufficient instances of the microservice are running to accommodate the performance requirements.
E. Implement a versioning scheme to permit future changes that could be incompatible with the current interface.

Answer : B

Question 120 (Single Topic)

You deployed a new application to Google Kubernetes Engine and are experiencing some performance degradation. Your logs are being written to Cloud Logging, and you are using a Prometheus sidecar model for capturing metrics. You need to correlate the metrics and data from the logs to troubleshoot the performance issue and send real-time alerts while minimizing costs. What should you do?

A. Create custom metrics from the Cloud Logging logs, and use Prometheus to import the results using the Cloud Monitoring REST API.
B. Export the Cloud Logging logs and the Prometheus metrics to Cloud Bigtable. Run a query to join the results, and analyze in Google Data Studio.
C. Export the Cloud Logging logs and stream the Prometheus metrics to BigQuery. Run a recurring query to join the results, and send notifications using Cloud Tasks.
D. Export the Prometheus metrics and use Cloud Monitoring to view them as external metrics. Configure Cloud Monitoring to create log-based metrics from the logs, and correlate them with the Prometheus data.

Answer : D

Reference:
https://cloud.google.com/blog/products/operations/troubleshoot-gke-faster-with-monitoring-data-in-your-logs

Question 121 (Single Topic)

You have been tasked with planning the migration of your company's application from on-premises to Google Cloud. Your company's monolithic application is an ecommerce website. The application will be migrated to microservices deployed on Google Cloud in stages. The majority of your company's revenue is generated through online sales, so it is important to minimize risk during the migration. You need to prioritize features and select the first functionality to migrate. What should you do?

A. Migrate the Product catalog, which has integrations to the frontend and product database.
B. Migrate Payment processing, which has integrations to the frontend, order database, and third-party payment vendor.
C. Migrate Order fulfillment, which has integrations to the order database, inventory system, and third-party shipping vendor.
D. Migrate the Shopping cart, which has integrations to the frontend, cart database, inventory system, and payment processing system.

Answer : A

Question 122 (Single Topic)

Your team develops services that run on Google Kubernetes Engine. Your team's code is stored in Cloud Source Repositories. You need to quickly identify bugs in the code before it is deployed to production. You want to invest in automation to improve developer feedback and make the process as efficient as possible.
What should you do?

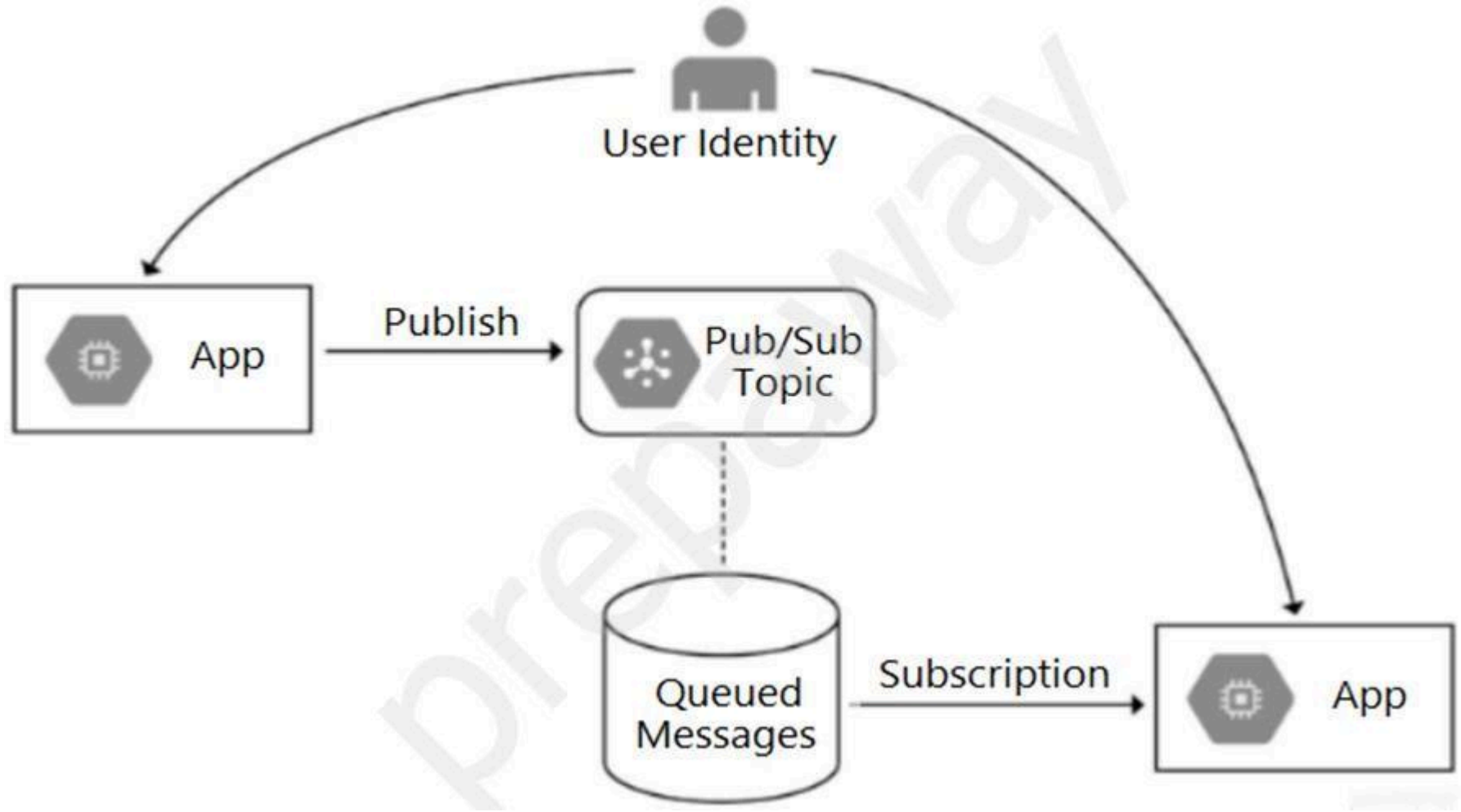
A. Use Spinnaker to automate building container images from code based on Git tags.
B. Use Cloud Build to automate building container images from code based on Git tags.
C. Use Spinnaker to automate deploying container images to the production environment.
D. Use Cloud Build to automate building container images from code based on forked versions.

Answer : A

Reference:
https://spinnaker.io/docs/guides/tutorials/codelabs/kubernetes-v2-source-to-prod/

Question 123 (Single Topic)

Your team is developing an application in Google Cloud that executes with user identities maintained by Cloud Identity. Each of your application's users will have an associated Pub/Sub topic to which messages are published, and a Pub/Sub subscription where the same user will retrieve published messages. You need to ensure that only authorized users can publish and subscribe to their own specific Pub/Sub topic and subscription. What should you do?



A. Bind the user identity to the pubsub.publisher and pubsub.subscriber roles at the resource level.
B. Grant the user identity the pubsub.publisher and pubsub.subscriber roles at the project level.
C. Grant the user identity a custom role that contains the pubsub.topics.create and pubsub.subscriptions.create permissions.
D. Configure the application to run as a service account that has the pubsub.publisher and pubsub.subscriber roles.

Answer : C

Question 124 (Single Topic)

You are evaluating developer tools to help drive Google Kubernetes Engine adoption and integration with your development environment, which includes VS Code and IntelliJ. What should you do?

A. Use Cloud Code to develop applications.
B. Use the Cloud Shell integrated Code Editor to edit code and configuration files.

C. Use a Cloud Notebook instance to ingest and process data and deploy models.
D. Use Cloud Shell to manage your infrastructure and applications from the command line.

Answer : A

Reference:
https://cloud.google.com/code

Question 125 (Single Topic)

You are developing an ecommerce web application that uses App Engine standard environment and Memorystore for Redis. When a user logs into the app, the application caches the user's information (e.g., session, name, address, preferences), which is stored for quick retrieval during checkout.
While testing your application in a browser, you get a 502 Bad Gateway error. You have determined that the application is not connecting to Memorystore. What is the reason for this error?

A. Your Memorystore for Redis instance was deployed without a public IP address.
B. You configured your Serverless VPC Access connector in a different region than your App Engine instance.
C. The firewall rule allowing a connection between App Engine and Memorystore was removed during an infrastructure update by the DevOps team.
D. You configured your application to use a Serverless VPC Access connector on a different subnet in a different availability zone than your App Engine instance.

Answer : A

Reference:
https://cloud.google.com/endpoints/docs/openapi/troubleshoot-response-errors

---

Question 126 (Single Topic)

Your team develops services that run on Google Cloud. You need to build a data processing service and will use Cloud Functions. The data to be processed by the function is sensitive. You need to ensure that invocations can only happen from authorized services and follow Google-recommended best practices for securing functions. What should you do?

A. Enable Identity-Aware Proxy in your project. Secure function access using its permissions.
B. Create a service account with the Cloud Functions Viewer role. Use that service account to invoke the function.
C. Create a service account with the Cloud Functions Invoker role. Use that service account to invoke the function.
D. Create an OAuth 2.0 client ID for your calling service in the same project as the function you want to secure. Use those credentials to invoke the function.

Answer : C

Reference:
https://medium.com/google-cloud/how-to-securely-invoke-a-cloud-function-from-google-kubernetes-engine-running-on-another-gcp-79797ec2b2c6

Question 127 (Single Topic)

You are deploying your applications on Compute Engine. One of your Compute Engine instances failed to launch. What should you do? (Choose two.)

A. Determine whether your file system is corrupted.
B. Access Compute Engine as a different SSH user.
C. Troubleshoot firewall rules or routes on an instance.
D. Check whether your instance boot disk is completely full.
E. Check whether network traffic to or from your instance is being dropped.

Answer : DE

Reference:
https://cloudacademy.com/course/deploying-applications-on-gcp-compute/deploying-applications-and-services-on-compute-engine/

Question 128 (Single Topic)

Your web application is deployed to the corporate intranet. You need to migrate the web application to Google Cloud. The web application must be available only to company employees and accessible to employees as they travel. You need to ensure the security and accessibility of the web application while minimizing application changes. What should you do?

A. Configure the application to check authentication credentials for each HTTP(S) request to the application.
B. Configure Identity-Aware Proxy to allow employees to access the application through its public IP address.
C. Configure a Compute Engine instance that requests users to log in to their corporate account. Change the web application DNS to point to the proxy Compute Engine instance. After authenticating, the Compute Engine instance forwards requests to and from the web application.
D. Configure a Compute Engine instance that requests users to log in to their corporate account. Change the web application DNS to point to the proxy Compute Engine instance. After authenticating, the Compute Engine issues an HTTP redirect to a public IP address hosting the web application.

Answer : B

Question 129 (Single Topic)

You have an application that uses an HTTP Cloud Function to process user activity from both desktop browser and mobile application clients. This function will serve as the endpoint for all metric submissions using HTTP POST.
Due to legacy restrictions, the function must be mapped to a domain that is separate from the domain requested by users on web or mobile sessions. The domain for the Cloud Function is https://fn.example.com.

Desktop and mobile clients use the domain https://www.example.com. You need to add a header to the function's HTTP response so that only those browser and mobile sessions can submit metrics to the Cloud Function. Which response header should you add?
A. Access-Control-Allow-Origin: *
B. Access-Control-Allow-Origin: https://*.example.com
C. Access-Control-Allow-Origin: https://fn.example.com
D. Access-Control-Allow-origin: https://www.example.com

Answer : A

Question 130 (Single Topic)

You have an HTTP Cloud Function that is called via POST. Each submission's request body has a flat, unnested JSON structure containing numeric and text data. After the Cloud Function completes, the collected data should be immediately available for ongoing and complex analytics by many users in parallel. How should you persist the submissions?

A. Directly persist each POST requestɔ€™s JSON data into Datastore.
B. Transform the POST requestɔ€™s JSON data, and stream it into BigQuery.
C. Transform the POST requestɔ€™s JSON data, and store it in a regional Cloud SQL cluster.
D. Persist each POST requestɔ€™s JSON data as an individual file within Cloud Storage, with the file name containing the request identifier.

Answer : D

Question 131 (Single Topic)

Your security team is auditing all deployed applications running in Google Kubernetes Engine. After completing the audit, your team discovers that some of the applications send traffic within the cluster in clear text. You need to ensure that all application traffic is encrypted as quickly as possible while minimizing changes to your applications and maintaining support from Google. What should you do?

A. Use Network Policies to block traffic between applications.
B. Install Istio, enable proxy injection on your application namespace, and then enable mTLS.
C. Define Trusted Network ranges within the application, and configure the applications to allow traffic only from those networks.
D. Use an automated process to request SSL Certificates for your applications from Letɔ€™s Encrypt and add them to your applications.

Answer : A

Question 132 (Single Topic)

You migrated some of your applications to Google Cloud. You are using a legacy monitoring platform deployed on-premises for both on-premises and cloud- deployed applications. You discover that your notification system is responding slowly to time-critical problems in the cloud applications. What should you do?

A. Replace your monitoring platform with Cloud Monitoring.
B. Install the Cloud Monitoring agent on your Compute Engine instances.
C. Migrate some traffic back to your old platform. Perform A/B testing on the two platforms concurrently.
D. Use Cloud Logging and Cloud Monitoring to capture logs, monitor, and send alerts. Send them to your existing platform.

Answer : D

Question 133 (Single Topic)

You recently deployed your application in Google Kubernetes Engine, and now need to release a new version of your application. You need the ability to instantly roll back to the previous version in case there are issues with the new version. Which deployment model should you use?

A. Perform a rolling deployment, and test your new application after the deployment is complete.
B. Perform A/B testing, and test your application periodically after the new tests are implemented.
C. Perform a blue/green deployment, and test your new application after the deployment is. complete.
D. Perform a canary deployment, and test your new application periodically after the new version is deployed.

Answer : D

Question 134 (Single Topic)

You developed a JavaScript web application that needs to access Google Drive's API and obtain permission from users to store files in their Google Drives. You need to select an authorization approach for your application. What should you do?

A. Create an API key.
B. Create a SAML token.
C. Create a service account.
D. Create an OAuth Client ID.

Answer : D

Reference:
https://developers.google.com/drive/api/v3/about-auth

Question 135 (Single Topic)

You manage an ecommerce application that processes purchases from customers who can subsequently cancel or change those purchases. You discover that order volumes are highly variable and the backend order-processing system can only process one request at a time. You want to ensure seamless performance for customers regardless of usage volume. It is crucial that customers' order update requests are performed in the sequence in which they were generated. What should you do?

A. Send the purchase and change requests over WebSockets to the backend.
B. Send the purchase and change requests as REST requests to the backend.
C. Use a Pub/Sub subscriber in pull mode and use a data store to manage ordering.
D. Use a Pub/Sub subscriber in push mode and use a data store to manage ordering.

Answer : B

Question 136 (Single Topic)

Your company needs a database solution that stores customer purchase history and meets the following requirements:
- Customers can query their purchase immediately after submission.
- Purchases can be sorted on a variety of fields.
- Distinct record formats can be stored at the same time.

Which storage option satisfies these requirements?

A. Firestore in Native mode
B. Cloud Storage using an object read
C. Cloud SQL using a SQL SELECT statement
D. Firestore in Datastore mode using a global query

Answer : A

Question 137 (Single Topic)

You recently developed a new service on Cloud Run. The new service authenticates using a custom service and then writes transactional information to a Cloud Spanner database. You need to verify that your application can support up to 5,000 read and 1,000 write transactions per second while identifying any bottlenecks that occur. Your test infrastructure must be able to autoscale. What should you do?

A. Build a test harness to generate requests and deploy it to Cloud Run. Analyze the VPC Flow Logs using Cloud Logging.
B. Create a Google Kubernetes Engine cluster running the Locust or JMeter images to dynamically generate load tests. Analyze the results using Cloud Trace.
C. Create a Cloud Task to generate a test load. Use Cloud Scheduler to run 60,000 Cloud Task transactions per minute for 10 minutes. Analyze the results using Cloud Monitoring.
D. Create a Compute Engine instance that uses a LAMP stack image from the Marketplace, and use Apache Bench to generate load tests against the service. Analyze the results using Cloud Trace.

Answer : B

Question 138 (Single Topic)

You are using Cloud Build for your CI/CD pipeline to complete several tasks, including copying certain files to Compute Engine virtual machines. Your pipeline requires a flat file that is generated in one builder in the pipeline to be accessible by subsequent builders in the same pipeline. How should you store the file so that all the builders in the pipeline can access it?

A. Store and retrieve the file contents using Compute Engine instance metadata.
B. Output the file contents to a file in /workspace. Read from the same /workspace file in the subsequent build step.
C. Use gsutil to output the file contents to a Cloud Storage object. Read from the same object in the subsequent build step.
D. Add a build argument that runs an HTTP POST via curl to a separate web server to persist the value in one builder. Use an HTTP GET via curl from the subsequent build step to read the value.

Answer : D

Question 139 (Single Topic)

Your company's development teams want to use various open source operating systems in their Docker builds. When images are created in published containers in your company's environment, you need to scan them for Common Vulnerabilities and Exposures (CVEs). The scanning process must not impact software development agility. You want to use managed services where possible. What should you do?

A. Enable the Vulnerability scanning setting in the Container Registry.
B. Create a Cloud Function that is triggered on a code check-in and scan the code for CVEs.
C. Disallow the use of non-commercially supported base images in your development environment.
D. Use Cloud Monitoring to review the output of Cloud Build to determine whether a vulnerable version has been used.

Answer : A

Question 140 (Single Topic)

You are configuring a continuous integration pipeline using Cloud Build to automate the deployment of new container images to Google Kubernetes Engine (GKE). The pipeline builds the application from its source code, runs unit and integration tests in separate steps, and pushes the container to Container Registry. The application runs on a Python web server.

The Dockerfile is as follows:

```
FROM python:3.7-alpine -

COPY . /app -

WORKDIR /app -
RUN pip install -r requirements.txt
CMD [ "gunicorn", "-w 4", "main:app" ]
```

You notice that Cloud Build runs are taking longer than expected to complete. You want to decrease the build time. What should you do? (Choose two.)

A. Select a virtual machine (VM) size with higher CPU for Cloud Build runs.
B. Deploy a Container Registry on a Compute Engine VM in a VPC, and use it to store the final images.
C. Cache the Docker image for subsequent builds using the -- cache-from argument in your build config file.
D. Change the base image in the Dockerfile to ubuntu:latest, and install Python 3.7 using a package manager utility.
E. Store application source code on Cloud Storage, and configure the pipeline to use gsutil to download the source code.

Answer : CE

Question 141 (Single Topic)

You are building a CI/CD pipeline that consists of a version control system, Cloud Build, and Container Registry. Each time a new tag is pushed to the repository, a Cloud Build job is triggered, which runs unit tests on the new code builds a new Docker container image, and pushes it into Container Registry. The last step of your pipeline should deploy the new container to your production Google Kubernetes Engine (GKE) cluster. You need to select a tool and deployment strategy that meets the following requirements:
• Zero downtime is incurred
• Testing is fully automated
• Allows for testing before being rolled out to users
• Can quickly rollback if needed

What should you do?

A. Trigger a Spinnaker pipeline configured as an A/B test of your new code and, if it is successful, deploy the container to production.
B. Trigger a Spinnaker pipeline configured as a canary test of your new code and, if it is successful, deploy the container to production.
C. Trigger another Cloud Build job that uses the Kubernetes CLI tools to deploy your new container to your GKE cluster, where you can perform a canary test.
D. Trigger another Cloud Build job that uses the Kubernetes CLI tools to deploy your new container to your GKE cluster, where you can perform a shadow test.

Answer : D

Question 142 (Single Topic)

Your operations team has asked you to create a script that lists the Cloud Bigtable, Memorystore, and Cloud SQL databases running within a project. The script should allow users to submit a filter expression to limit the results presented. How should you retrieve the data?

A. Use the HBase API, Redis API, and MySQL connection to retrieve database lists. Combine the results, and then apply the filter to display the results
B. Use the HBase API, Redis API, and MySQL connection to retrieve database lists. Filter the results individually, and then combine them to display the results
C. Run gcloud bigtable instances list, gcloud redis instances list, and gcloud sql databases list. Use a filter within the application, and then display the results
D. Run gcloud bigtable instances list, gcloud redis instances list, and gcloud sql databases list. Use --filter flag with each command, and then display the results

Answer : A

Question 143 (Single Topic)

You need to deploy a new European version of a website hosted on Google Kubernetes Engine. The current and new websites must be accessed via the same HTTP(S) load balancer's external IP address, but have different domain names. What should you do?

A. Define a new Ingress resource with a host rule matching the new domain
B. Modify the existing Ingress resource with a host rule matching the new domain
C. Create a new Service of type LoadBalancer specifying the existing IP address as the loadBalancerIP
D. Generate a new Ingress resource and specify the existing IP address as the kubernetes.io/ingress.global-static-ip-name annotation value

Answer : A

Question 144 (Single Topic)

You are developing a single-player mobile game backend that has unpredictable traffic patterns as users interact with the game throughout the day and night. You want to optimize costs by ensuring that you have enough resources to handle requests, but minimize over-provisioning. You also want the system to handle traffic spikes efficiently. Which compute platform should you use?

A. Cloud Run
B. Compute Engine with managed instance groups
C. Compute Engine with unmanaged instance groups
D. Google Kubernetes Engine using cluster autoscaling

Answer : B

Question 145 (Single Topic)

The development teams in your company want to manage resources from their local environments. You have been asked to enable developer access to each team's Google Cloud projects. You want to maximize efficiency while following Google-recommended best practices. What should you do?

A. Add the users to their projects, assign the relevant roles to the users, and then provide the users with each relevant Project ID.
B. Add the users to their projects, assign the relevant roles to the users, and then provide the users with each relevant Project Number.
C. Create groups, add the users to their groups, assign the relevant roles to the groups, and then provide the users with each relevant Project ID.
D. Create groups, add the users to their groups, assign the relevant roles to the groups, and then provide the users with each relevant Project Number.

Answer : B

Question 146 (Single Topic)

Your company's product team has a new requirement based on customer demand to autoscale your stateless and distributed service running in a Google Kubernetes Engine (GKE) duster. You want to find a solution that minimizes changes because this feature will go live in two weeks. What should you do?

A. Deploy a Vertical Pod Autoscaler, and scale based on the CPU load.
B. Deploy a Vertical Pod Autoscaler, and scale based on a custom metric.
C. Deploy a Horizontal Pod Autoscaler, and scale based on the CPU toad.
D. Deploy a Horizontal Pod Autoscaler, and scale based on a custom metric.

Answer : A

Question 147 (Single Topic)

Your application is composed of a set of loosely coupled services orchestrated by code executed on Compute Engine. You want your application to easily bring up new Compute Engine instances that find and use a specific version of a service. How should this be configured?

A. Define your service endpoint information as metadata that is retrieved at runtime and used to connect to the desired service.
B. Define your service endpoint information as label data that is retrieved at runtime and used to connect to the desired service.
C. Define your service endpoint information to be retrieved from an environment variable at runtime and used to connect to the desired service.
D. Define your service to use a fixed hostname and port to connect to the desired service. Replace the service at the endpoint with your new version.

Answer : C

Question 148 (Single Topic)

You are developing a microservice-based application that will run on Google Kubernetes Engine (GKE). Some of the services need to access different Google Cloud APIs. How should you set up authentication of these services in the cluster following Google-recommended best practices? (Choose two.)

A. Use the service account attached to the GKE node.
B. Enable Workload Identity in the cluster via the gcloud command-line tool.
C. Access the Google service account keys from a secret management service.
D. Store the Google service account keys in a central secret management service.
E. Use gcloud to bind the Kubernetes service account and the Google service account using roles/iam.workloadIdentity.

Answer : CE

Question 149 (Single Topic)

Your development team has been tasked with maintaining a .NET legacy application. The application incurs occasional changes and was recently updated. Your goal is to ensure that the application provides consistent results while moving through the CI/CD pipeline from environment to environment. You want to minimize the cost of deployment while making sure that external factors and dependencies between hosting environments are not problematic. Containers are not yet approved in your organization. What should you do?

A. Rewrite the application using .NET Core, and deploy to Cloud Run. Use revisions to separate the environments.
B. Use Cloud Build to deploy the application as a new Compute Engine image for each build. Use this image in each environment.
C. Deploy the application using MS Web Deploy, and make sure to always use the latest, patched MS Windows Server base image in Compute Engine.
D. Use Cloud Build to package the application, and deploy to a Google Kubernetes Engine cluster. Use namespaces to separate the environments.

Answer : A

Question 150 (Single Topic)

The new version of your containerized application has been tested and is ready to deploy to production on Google Kubernetes Engine. You were not able to fully load-test the new version in pre-production environments, and you need to make sure that it does not have performance problems once deployed. Your deployment must be automated. What should you do?

A. Use Cloud Load Balancing to slowly ramp up traffic between versions. Use Cloud Monitoring to look for performance issues.
B. Deploy the application via a continuous delivery pipeline using canary deployments. Use Cloud Monitoring to look for performance issues. and ramp up traffic as the metrics support it.
C. Deploy the application via a continuous delivery pipeline using blue/green deployments. Use Cloud Monitoring to look for performance issues, and launch fully when the metrics support it.
D. Deploy the application using kubectl and set the spec.updateStrategv.type to RollingUpdate. Use Cloud Monitoring to look for performance issues, and run the kubectl rollback command if there are any issues.

Answer : A

Question 151 (Single Topic)

Users are complaining that your Cloud Run-hosted website responds too slowly during traffic spikes. You want to provide a better user experience during traffic peaks. What should you do?

A. Read application configuration and static data from the database on application startup.
B. Package application configuration and static data into the application image during build time.
C. Perform as much work as possible in the background after the response has been returned to the user.
D. Ensure that timeout exceptions and errors cause the Cloud Run instance to exit quickly so a replacement instance can be started.

Answer : C

Question 152 (Single Topic)

You are a developer working on an internal application for payroll processing. You are building a component of the application that allows an employee to submit a timesheet, which then initiates several steps:

• An email is sent to the employee and manager, notifying them that the timesheet was submitted.
• A timesheet is sent to payroll processing for the vendor's API.
• A timesheet is sent to the data warehouse for headcount planning.

These steps are not dependent on each other and can be completed in any order. New steps are being considered and will be implemented by different development teams. Each development team will implement the error handling specific to their step. What should you do?

A. Deploy a Cloud Function for each step that calls the corresponding downstream system to complete the required action.
B. Create a Pub/Sub topic for each step. Create a subscription for each downstream development team to subscribe to their step's topic.
C. Create a Pub/Sub topic for timesheet submissions. Create a subscription for each downstream development team to subscribe to the topic.
D. Create a timesheet microservice deployed to Google Kubernetes Engine. The microservice calls each downstream step and waits for a successful response before calling the next step.

Answer : A

Question 153 (Single Topic)

You are designing an application that uses a microservices architecture. You are planning to deploy the application in the cloud and on-premises. You want to make sure the application can scale up on demand and also use managed services as much as possible. What should you do?

A. Deploy open source Istio in a multi-cluster deployment on multiple Google Kubernetes Engine (GKE) clusters managed by Anthos.
B. Create a GKE cluster in each environment with Anthos, and use Cloud Run for Anthos to deploy your application to each cluster.
C. Install a GKE cluster in each environment with Anthos, and use Cloud Build to create a Deployment for your application in each cluster.
D. Create a GKE cluster in the cloud and install open-source Kubernetes on-premises. Use an external load balancer service to distribute traffic across the two environments.

Answer : B

Question 154 (Single Topic)

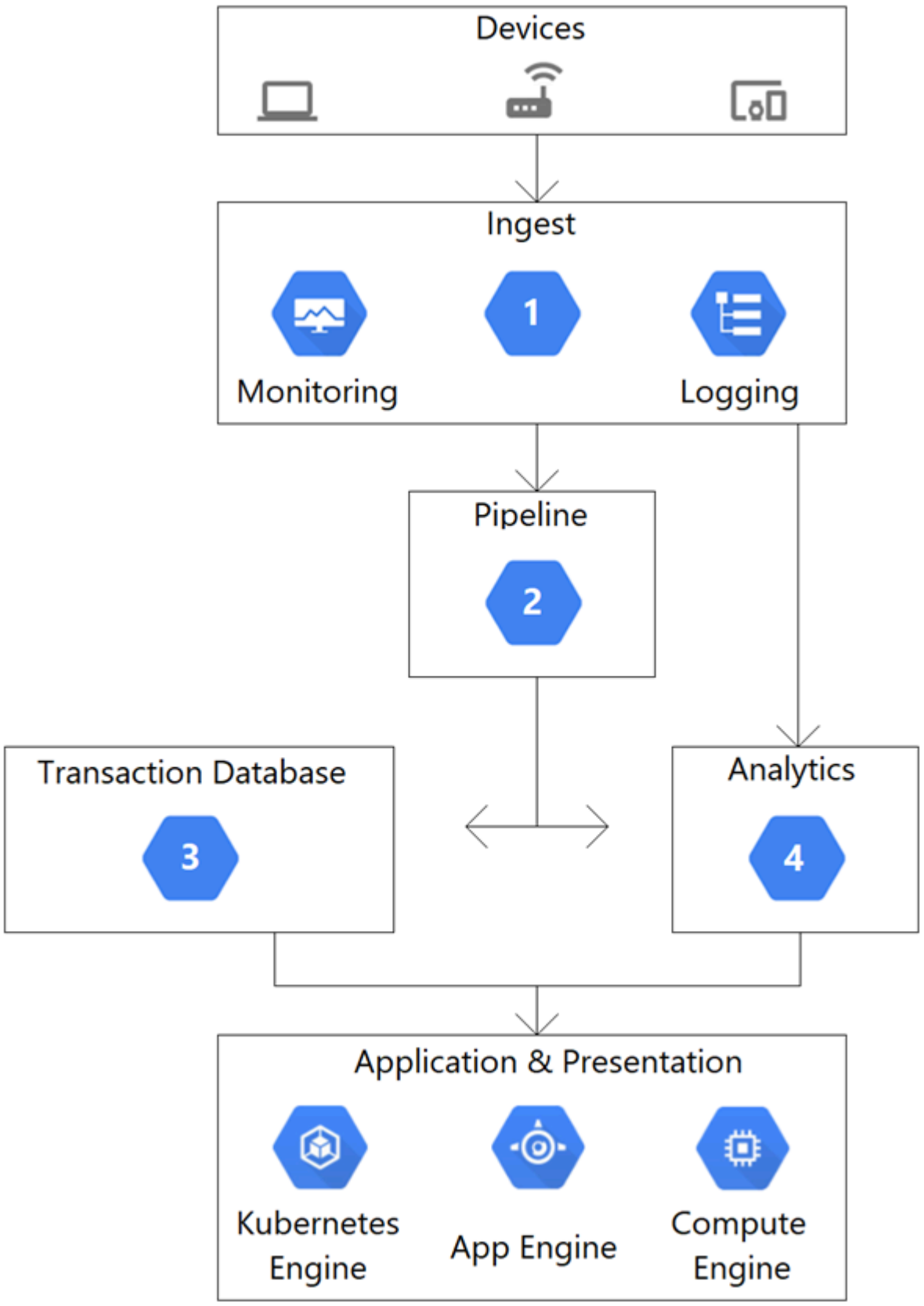
You want to migrate an on-premises container running in Knative to Google Cloud. You need to make sure that the migration doesn't affect your application's deployment strategy, and you want to use a fully managed service. Which Google Cloud service should you use to deploy your container?

A. Cloud Run
B. Compute Engine
C. Google Kubernetes Engine
D. App Engine flexible environment

Answer : A

Question 155 (Single Topic)

This architectural diagram depicts a system that streams data from thousands of devices. You want to ingest data into a pipeline, store the data, and analyze the data using SQL statements. Which Google Cloud services should you use for steps 1, 2, 3, and 4?



A. 1. App Engine
2. Pub/Sub
3. BigQuery
4. Firestore
B. 1. Dataflow
2. Pub/Sub
3. Firestore
4. BigQuery
C. 1. Pub/Sub
2. Dataflow
3. BigQuery
4. Firestore
D. 1. Pub/Sub
2. Dataflow
3. Firestore
4. BigQuery

Answer : D

Question 156 (Single Topic)

Your company just experienced a Google Kubernetes Engine (GKE) API outage due to a zone failure. You want to deploy a highly available GKE architecture that minimizes service interruption to users in the event of a future zone failure. What should you do?

A. Deploy Zonal clusters
B. Deploy Regional clusters
C. Deploy Multi-Zone clusters
D. Deploy GKE on-premises clusters

Answer : A

Question 157 (Single Topic)

Your team develops services that run on Google Cloud. You want to process messages sent to a Pub/Sub topic, and then store them. Each message must be processed exactly once to avoid duplication of data and any data conflicts. You need to use the cheapest and most simple solution. What should you do?

A. Process the messages with a Dataproc job, and write the output to storage.
B. Process the messages with a Dataflow streaming pipeline using Apache Beam's PubSubIO package, and write the output to storage.
C. Process the messages with a Cloud Function, and write the results to a BigQuery location where you can run a job to deduplicate the data.
D. Retrieve the messages with a Dataflow streaming pipeline, store them in Cloud Bigtable, and use another Dataflow streaming pipeline to deduplicate messages.

Answer : B

Question 158 (Single Topic)

You are running a containerized application on Google Kubernetes Engine. Your container images are stored in Container Registry. Your team uses CI/CD practices. You need to prevent the deployment of containers with known critical vulnerabilities. What should you do?

A. • Use Web Security Scanner to automatically crawl your application
• Review your application logs for scan results, and provide an attestation that the container is free of known critical vulnerabilities
• Use Binary Authorization to implement a policy that forces the attestation to be provided before the container is deployed
B. • Use Web Security Scanner to automatically crawl your application
• Review the scan results in the scan details page in the Cloud Console, and provide an attestation that the container is free of known critical vulnerabilities
• Use Binary Authorization to implement a policy that forces the attestation to be provided before the container is deployed
C. • Enable the Container Scanning API to perform vulnerability scanning
• Review vulnerability reporting in Container Registry in the Cloud Console, and provide an attestation that the container is free of known critical vulnerabilities
• Use Binary Authorization to implement a policy that forces the attestation to be provided before the container is deployed
D. • Enable the Container Scanning API to perform vulnerability scanning
• Programmatically review vulnerability reporting through the Container Scanning API, and provide an attestation that the container is free of known critical vulnerabilities
• Use Binary Authorization to implement a policy that forces the attestation to be provided before the container is deployed

Answer : C

Question 159 (Single Topic)

You have an on-premises application that authenticates to the Cloud Storage API using a user-managed service account with a user-managed key. The application connects to Cloud Storage using Private Google Access over a Dedicated Interconnect link. You discover that requests from the application to access objects in the Cloud Storage bucket are failing with a 403 Permission Denied error code. What is the likely cause of this issue?

A. The folder structure inside the bucket and object paths have changed.
B. The permissions of the service account's predefined role have changed.
C. The service account key has been rotated but not updated on the application server.
D. The Interconnect link from the on-premises data center to Google Cloud is experiencing a temporary outage.

Answer : C

Question 160 (Single Topic)

You are using the Cloud Client Library to upload an image in your application to Cloud Storage. Users of the application report that occasionally the upload does not complete and the client library reports an HTTP 504 Gateway Timeout error. You want to make the application more resilient to errors. What changes to the application should you make?

A. Write an exponential backoff process around the client library call.
B. Write a one-second wait time backoff process around the client library call.
C. Design a retry button in the application and ask users to click if the error occurs.
D. Create a queue for the object and inform the users that the application will try again in 10 minutes.

Answer : A

Question 161 (Single Topic)

You are building a mobile application that will store hierarchical data structures in a database. The application will enable users working offline to sync changes when they are back online. A backend service will enrich the data in the database using a service account. The application is expected to be very popular and needs to scale seamlessly and securely. Which database and IAM role should you use?

A. Use Cloud SQL, and assign the roles/cloudsql.editor role to the service account.
B. Use Bigtable, and assign the roles/bigtable.viewer role to the service account.
C. Use Firestore in Native mode and assign the roles/datastore.user role to the service account.
D. Use Firestore in Datastore mode and assign the roles/datastore.viewer role to the service account.

Answer : A

Question 162 (Single Topic)

Your application is deployed on hundreds of Compute Engine instances in a managed instance group (MIG) in multiple zones. You need to deploy a new instance template to fix a critical vulnerability immediately but must avoid impact to your service. What setting should be made to the MIG after updating the instance template?

A. Set the Max Surge to 100%.
B. Set the Update mode to Opportunistic.
C. Set the Maximum Unavailable to 100%.
D. Set the Minimum Wait time to 0 seconds.

Answer : C

Question 163 (Single Topic)

You made a typo in a low-level Linux configuration file that prevents your Compute Engine instance from booting to a normal run level. You just created the Compute Engine instance today and have done no other maintenance on it, other than tweaking files. How should you correct this error?

A. Download the file using scp, change the file, and then upload the modified version
B. Configure and log in to the Compute Engine instance through SSH, and change the file
C. Configure and log in to the Compute Engine instance through the serial port, and change the file
D. Configure and log in to the Compute Engine instance using a remote desktop client, and change the file

Answer : B

Question 164 (Single Topic)

You are developing an application that needs to store files belonging to users in Cloud Storage. You want each user to have their own subdirectory in Cloud Storage. When a new user is created, the corresponding empty subdirectory should also be created. What should you do?

A. Create an object with the name of the subdirectory ending with a trailing slash ('/') that is zero bytes in length.
B. Create an object with the name of the subdirectory, and then immediately delete the object within that subdirectory.
C. Create an object with the name of the subdirectory that is zero bytes in length and has WRITER access control list permission.
D. Create an object with the name of the subdirectory that is zero bytes in length. Set the Content-Type metadata to CLOUDSTORAGE_FOLDER.

Answer : A

Question 165 (Single Topic)

Your company's corporate policy states that there must be a copyright comment at the very beginning of all source files. You want to write a custom step in Cloud Build that is triggered by each source commit. You need the trigger to validate that the source contains a copyright and add one for subsequent steps if not there. What should you do?

A. Build a new Docker container that examines the files in /workspace and then checks and adds a copyright for each source file. Changed files are explicitly committed back to the source repository.
B. Build a new Docker container that examines the files in /workspace and then checks and adds a copyright for each source file. Changed files do not need to be committed back to the source repository.
C. Build a new Docker container that examines the files in a Cloud Storage bucket and then checks and adds a copyright for each source file. Changed files are written back to the Cloud Storage bucket.
D. Build a new Docker container that examines the files in a Cloud Storage bucket and then checks and adds a copyright for each source file. Changed files are explicitly committed back to the source repository.

Answer : C

Question 166 (Single Topic)

One of your deployed applications in Google Kubernetes Engine (GKE) is having intermittent performance issues. Your team uses a third-party logging solution. You want to install this solution on each node in your GKE cluster so you can view the logs. What should you do?

A. Deploy the third-party solution as a DaemonSet
B. Modify your container image to include the monitoring software
C. Use SSH to connect to the GKE node, and install the software manually
D. Deploy the third-party solution using Terraform and deploy the logging Pod as a Kubernetes Deployment

Answer : A

Question 167 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in

demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

How should HipLocal redesign their architecture to ensure that the application scales to support a large increase in users?
A. Use Google Kubernetes Engine (GKE) to run the application as a microservice. Run the MySQL database on a dedicated GKE node.
B. Use multiple Compute Engine instances to run MySQL to store state information. Use a Google Cloud-managed load balancer to distribute the load between instances. Use managed instance groups for scaling.
C. Use Memorystore to store session information and CloudSQL to store state information. Use a Google Cloud-managed load balancer to distribute the load between instances. Use managed instance groups for scaling.
D. Use a Cloud Storage bucket to serve the application as a static website, and use another Cloud Storage bucket to store user state information.

Answer : D

Question 168 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.

• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

How should HipLocal increase their API development speed while continuing to provide the QA team with a stable testing environment that meets feature requirements?
A. Include unit tests in their code, and prevent deployments to QA until all tests have a passing status.
B. Include performance tests in their code, and prevent deployments to QA until all tests have a passing status.
C. Create health checks for the QA environment, and redeploy the APIs at a later time if the environment is unhealthy.
D. Redeploy the APIs to App Engine using Traffic Splitting. Do not move QA traffic to the new versions if errors are found.

Answer : B

Question 169 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.

• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

HipLocal's application uses Cloud Client Libraries to interact with Google Cloud. HipLocal needs to configure authentication and authorization in the Cloud Client Libraries to implement least privileged access for the application. What should they do?
A. Create an API key. Use the API key to interact with Google Cloud.
B. Use the default compute service account to interact with Google Cloud.
C. Create a service account for the application. Export and deploy the private key for the application. Use the service account to interact with Google Cloud.
D. Create a service account for the application and for each Google Cloud API used by the application. Export and deploy the private keys used by the application. Use the service account with one Google Cloud API to interact with Google Cloud.

Answer : A

Question 170 (Single Topic)

You are in the final stage of migrating an on-premises data center to Google Cloud. You are quickly approaching your deadline, and discover that a web API is running on a server slated for decommissioning. You need to recommend a solution to modernize this API while migrating to Google Cloud. The modernized web API must meet the following requirements:

• Autoscales during high traffic periods at the end of each month
• Written in Python 3.x
• Developers must be able to rapidly deploy new versions in response to frequent code changes

You want to minimize cost, effort, and operational overhead of this migration. What should you do?

A. Modernize and deploy the code on App Engine flexible environment.
B. Modernize and deploy the code on App Engine standard environment.
C. Deploy the modernized application to an n1-standard-1 Compute Engine instance.
D. Ask the development team to re-write the application to run as a Docker container on Google Kubernetes Engine.

Answer : C

Question 171 (Single Topic)

You are developing an application that consists of several microservices running in a Google Kubernetes Engine cluster. One microservice needs to connect to a third-party database running on-premises. You need to store credentials to the database and ensure that these credentials can be rotated while following security best practices. What should you do?

A. Store the credentials in a sidecar container proxy, and use it to connect to the third-party database.
B. Configure a service mesh to allow or restrict traffic from the Pods in your microservice to the database.
C. Store the credentials in an encrypted volume mount, and associate a Persistent Volume Claim with the client Pod.
D. Store the credentials as a Kubernetes Secret, and use the Cloud Key Management Service plugin to handle encryption and decryption.

Answer : A

Question 172 (Single Topic)

You manage your company's ecommerce platform's payment system, which runs on Google Cloud. Your company must retain user logs for 1 year for internal auditing purposes and for 3 years to meet compliance requirements. You need to store new user logs on Google Cloud to minimize on-premises storage usage and ensure that they are easily searchable. You want to minimize effort while ensuring that the logs are stored correctly. What should you do?

A. Store the logs in a Cloud Storage bucket with bucket lock turned on.
B. Store the logs in a Cloud Storage bucket with a 3-year retention period.
C. Store the logs in Cloud Logging as custom logs with a custom retention period.
D. Store the logs in a Cloud Storage bucket with a 1-year retention period. After 1 year, move the logs to another bucket with a 2-year retention period.

Answer : C

Question 173 (Single Topic)

Your company has a new security initiative that requires all data stored in Google Cloud to be encrypted by customer-managed encryption keys. You plan to use Cloud Key Management Service (KMS) to configure access to the keys. You need to follow the "separation of duties" principle and Google-recommended best practices. What should you do? (Choose two.)

A. Provision Cloud KMS in its own project.
B. Do not assign an owner to the Cloud KMS project.
C. Provision Cloud KMS in the project where the keys are being used.
D. Grant the roles/cloudkms.admin role to the owner of the project where the keys from Cloud KMS are being used.
E. Grant an owner role for the Cloud KMS project to a different user than the owner of the project where the keys from Cloud KMS are being used.

Answer : AE

Question 174 (Single Topic)

You need to migrate a standalone Java application running in an on-premises Linux virtual machine (VM) to Google Cloud in a cost-effective manner. You decide not to take the lift-and-shift approach, and instead you plan to modernize the application by converting it to a container. How should you accomplish this task?

A. Use Migrate for Anthos to migrate the VM to your Google Kubernetes Engine (GKE) cluster as a container.
B. Export the VM as a raw disk and import it as an image. Create a Compute Engine instance from the Imported image.
C. Use Migrate for Compute Engine to migrate the VM to a Compute Engine instance, and use Cloud Build to convert it to a container.
D. Use Jib to build a Docker image from your source code, and upload it to Artifact Registry. Deploy the application in a GKE cluster, and test the application.

Answer : A

Question 175 (Single Topic)

Your organization has recently begun an initiative to replatform their legacy applications onto Google Kubernetes Engine. You need to decompose a monolithic application into microservices. Multiple instances have read and write access to a configuration file, which is stored on a shared file system. You want to minimize the effort required to manage this transition, and you want to avoid rewriting the application code. What should you do?

A. Create a new Cloud Storage bucket, and mount it via FUSE in the container.
B. Create a new persistent disk, and mount the volume as a shared PersistentVolume.
C. Create a new Filestore instance, and mount the volume as an NFS PersistentVolume.
D. Create a new ConfigMap and volumeMount to store the contents of the configuration file.

Answer : A

Question 176 (Single Topic)

Your development team has built several Cloud Functions using Java along with corresponding integration and service tests. You are building and deploying the functions and launching the tests using Cloud Build. Your Cloud Build job is reporting deployment failures immediately after successfully validating the code. What should you do?

A. Check the maximum number of Cloud Function instances.
B. Verify that your Cloud Build trigger has the correct build parameters.
C. Retry the tests using the truncated exponential backoff polling strategy.
D. Verify that the Cloud Build service account is assigned the Cloud Functions Developer role.

Answer : C

Question 177 (Single Topic)

You manage a microservices application on Google Kubernetes Engine (GKE) using Istio. You secure the communication channels between your microservices by implementing an Istio AuthorizationPolicy, a Kubernetes NetworkPolicy, and mTLS on your GKE cluster. You discover that HTTP requests between two Pods to specific URLs fail, while other requests to other URLs succeed. What is the cause of the connection issue?

A. A Kubernetes NetworkPolicy resource is blocking HTTP traffic between the Pods.
B. The Pod initiating the HTTP requests is attempting to connect to the target Pod via an incorrect TCP port.
C. The Authorization Policy of your cluster is blocking HTTP requests for specific paths within your application.
D. The cluster has mTLS configured in permissive mode, but the Pod's sidecar proxy is sending unencrypted traffic in plain text.

Answer : D

Question 178 (Single Topic)

You recently migrated an on-premises monolithic application to a microservices application on Google Kubernetes Engine (GKE). The application has dependencies on backend services on-premises, including a CRM system and a MySQL database that contains personally identifiable information (PII). The backend services must remain on-premises to meet regulatory requirements.

You established a Cloud VPN connection between your on-premises data center and Google Cloud. You notice that some requests from your microservices application on GKE to the backend services are failing due to latency issues caused by fluctuating bandwidth, which is causing the application to crash. How should you address the latency issues?

A. Use Memorystore to cache frequently accessed PII data from the on-premises MySQL database
B. Use Istio to create a service mesh that includes the microservices on GKE and the on-premises services
C. Increase the number of Cloud VPN tunnels for the connection between Google Cloud and the on-premises services
D. Decrease the network layer packet size by decreasing the Maximum Transmission Unit (MTU) value from its default value on Cloud VPN

Answer : A

Question 179 (Single Topic)

Your company has deployed a new API to a Compute Engine instance. During testing, the API is not behaving as expected. You want to monitor the application over 12 hours to diagnose the problem within the application code without redeploying the application. Which tool should you use?

A. Cloud Trace
B. Cloud Monitoring
C. Cloud Debugger logpoints
D. Cloud Debugger snapshots

Answer : B

Question 180 (Single Topic)

You are designing an application that consists of several microservices. Each microservice has its own RESTful API and will be deployed as a separate Kubernetes Service. You want to ensure that the consumers of these APIs aren't impacted when there is a change to your API, and also ensure that third-party systems aren't interrupted when new versions of the API are released. How should you configure the connection to the application following Google-recommended best practices?

A. Use an Ingress that uses the API's URL to route requests to the appropriate backend.
B. Leverage a Service Discovery system, and connect to the backend specified by the request.
C. Use multiple clusters, and use DNS entries to route requests to separate versioned backends.
D. Combine multiple versions in the same service, and then specify the API version in the POST request.

Answer : C

Question 181 (Single Topic)

Your team is building an application for a financial institution. The application's frontend runs on Compute Engine, and the data resides in Cloud SQL and one Cloud Storage bucket. The application will collect data containing PII, which will be stored in the Cloud SQL database and the Cloud Storage bucket. You need to secure the PII data. What should you do?

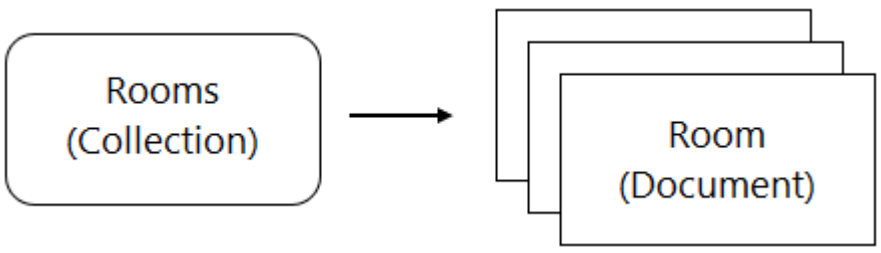
A. 1. Create the relevant firewall rules to allow only the frontend to communicate with the Cloud SQL database
2. Using IAM, allow only the frontend service account to access the Cloud Storage bucket
B. 1. Create the relevant firewall rules to allow only the frontend to communicate with the Cloud SQL database
2. Enable private access to allow the frontend to access the Cloud Storage bucket privately
C. 1. Configure a private IP address for Cloud SQL
2. Use VPC-SC to create a service perimeter
3. Add the Cloud SQL database and the Cloud Storage bucket to the same service perimeter
D. 1. Configure a private IP address for Cloud SQL
2. Use VPC-SC to create a service perimeter
3. Add the Cloud SQL database and the Cloud Storage bucket to different service perimeters

Answer : B

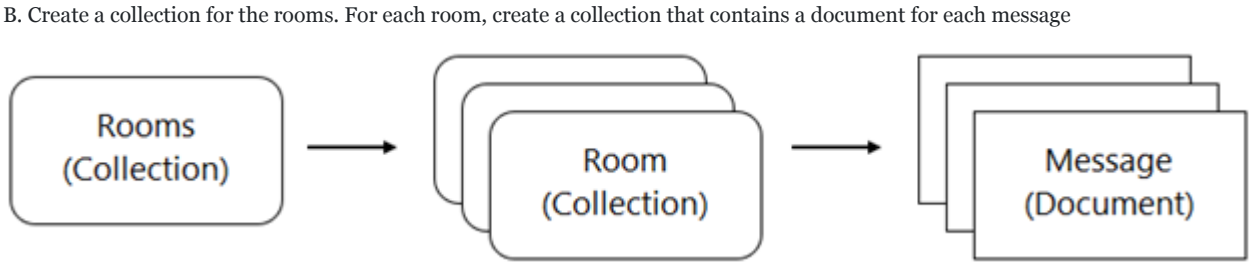
Question 182 (Single Topic)

You are designing a chat room application that will host multiple rooms and retain the message history for each room. You have selected Firestore as your database. How should you represent the data in Firestore?

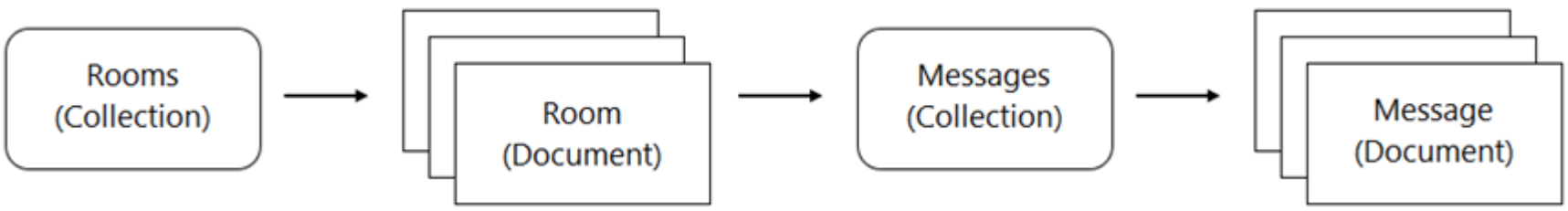
A. Create a collection for the rooms. For each room, create a document that lists the contents of the messages



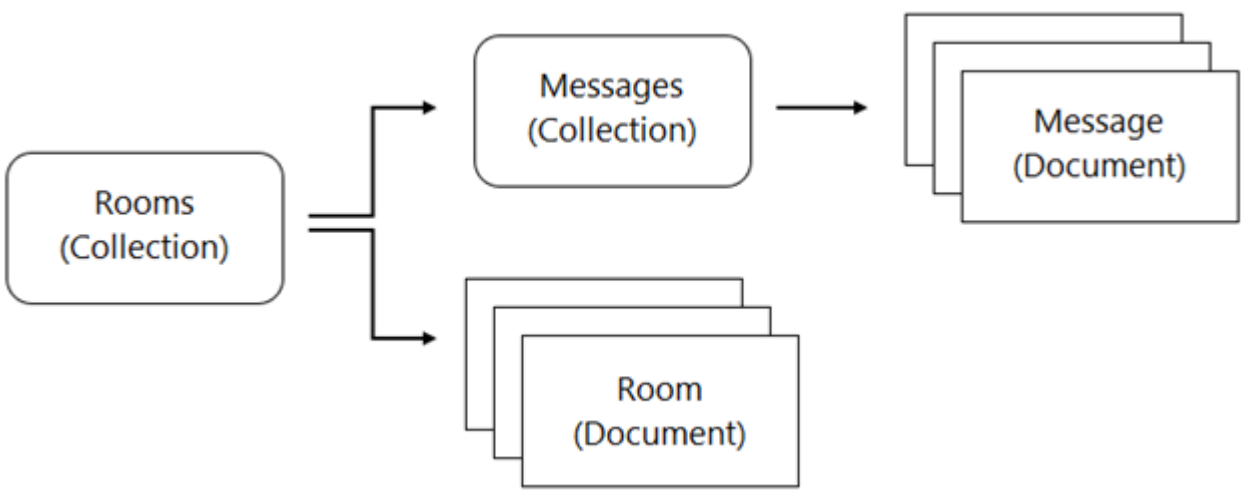
B. Create a collection for the rooms. For each room, create a collection that contains a document for each message



C. Create a collection for the rooms. For each room, create a document that contains a collection for documents, each of which contains a message.



D. Create a collection for the rooms, and create a document for each room. Create a separate collection for messages, with one document per message. Each room's document contains a list of references to the messages.



Answer : C

Question 183 (Single Topic)

You are developing an application that will handle requests from end users. You need to secure a Cloud Function called by the application to allow authorized end users to authenticate to the function via the application while restricting access to unauthorized users. You will integrate Google Sign-In as part of the solution and want to follow Google-recommended best practices. What should you do?

A. Deploy from a source code repository and grant users the roles/cloudfunctions.viewer role.
B. Deploy from a source code repository and grant users the roles/cloudfunctions.invoker role
C. Deploy from your local machine using gcloud and grant users the roles/cloudfunctions.admin role
D. Deploy from your local machine using gcloud and grant users the roles/cloudfunctions.developer role

Answer : C

Question 184 (Single Topic)

You are running a web application on Google Kubernetes Engine that you inherited. You want to determine whether the application is using libraries with known vulnerabilities or is vulnerable to XSS attacks. Which service should you use?

A. Google Cloud Armor
B. Debugger
C. Web Security Scanner
D. Error Reporting

Answer : C

Question 185 (Single Topic)

You are building a highly available and globally accessible application that will serve static content to users. You need to configure the storage and serving components. You want to minimize management overhead and latency while maximizing reliability for users. What should you do?

A. 1. Create a managed instance group. Replicate the static content across the virtual machines (VMs)
2. Create an external HTTP(S) load balancer.
3. Enable Cloud CDN, and send traffic to the managed instance group.
B. 1. Create an unmanaged instance group. Replicate the static content across the VMs.
2. Create an external HTTP(S) load balancer
3. Enable Cloud CDN, and send traffic to the unmanaged instance group.
C. 1. Create a Standard storage class, regional Cloud Storage bucket. Put the static content in the bucket
2. Reserve an external IP address, and create an external HTTP(S) load balancer
3. Enable Cloud CDN, and send traffic to your backend bucket
D. 1. Create a Standard storage class, multi-regional Cloud Storage bucket. Put the static content in the bucket.
2. Reserve an external IP address, and create an external HTTP(S) load balancer.
3. Enable Cloud CDN, and send traffic to your backend bucket.

Answer : B

Question 186 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question refer to the HipLocal case study.
HipLocal wants to reduce the latency of their services for users in global locations. They have created read replicas of their database in locations where their users reside and configured their service to read traffic using those replicas. How should they further reduce latency for all database interactions with the least amount of effort?
A. Migrate the database to Bigtable and use it to serve all global user traffic.
B. Migrate the database to Cloud Spanner and use it to serve all global user traffic.
C. Migrate the database to Firestore in Datastore mode and use it to serve all global user traffic.
D. Migrate the services to Google Kubernetes Engine and use a load balancer service to better scale the application.

Answer : D

Question 187 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.

○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

Which Google Cloud product addresses HipLocal's business requirements for service level indicators and objectives?
A. Cloud Profiler
B. Cloud Monitoring
C. Cloud Trace
D. Cloud Logging

Answer : B

Question 188 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

A recent security audit discovers that HipLocal's database credentials for their Compute Engine-hosted MySQL databases are stored in plain text on persistent disks. HipLocal needs to reduce the risk of these credentials being stolen. What should they do?

A. Create a service account and download its key. Use the key to authenticate to Cloud Key Management Service (KMS) to obtain the database credentials.
B. Create a service account and download its key. Use the key to authenticate to Cloud Key Management Service (KMS) to obtain a key used to decrypt the database credentials.
C. Create a service account and grant it the roles/iam.serviceAccountUser role. Impersonate as this account and authenticate using the Cloud SQL Proxy.
D. Grant the roles/secretmanager.secretAccessor role to the Compute Engine service account. Store and access the database credentials with the Secret Manager API.

Answer : C

Question 189 (Single Topic)

Case study -

This is a case study. Case studies are not timed separately. You can use as much exam time as you would like to complete each case. However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

To start the case study -
To display the first question in this case study, click the Next button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an All Information tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the Question button to return to the question.

Company Overview -
HipLocal is a community application designed to facilitate communication between people in close proximity. It is used for event planning and organizing sporting events, and for businesses to connect with their local communities. HipLocal launched recently in a few neighborhoods in Dallas and is rapidly growing into a global phenomenon. Its unique style of hyper-local community communication and business outreach is in demand around the world.

Executive Statement -
We are the number one local community app; it's time to take our local community services global. Our venture capital investors want to see rapid growth and the same great experience for new local and virtual communities that come online, whether their members are 10 or 10000 miles away from each other.

Solution Concept -
HipLocal wants to expand their existing service, with updated functionality, in new regions to better serve their global customers. They want to hire and train a new team to support these regions in their time zones. They will need to ensure that the application scales smoothly and provides clear uptime data, and that they analyze and respond to any issues that occur.

Existing Technical Environment -
HipLocal's environment is a mix of on-premises hardware and infrastructure running in Google Cloud Platform. The HipLocal team understands their application well, but has limited experience in global scale applications. Their existing technical environment is as follows:
• Existing APIs run on Compute Engine virtual machine instances hosted in GCP.
• State is stored in a single instance MySQL database in GCP.
• Release cycles include development freezes to allow for QA testing.
• The application has no logging.
• Applications are manually deployed by infrastructure engineers during periods of slow traffic on weekday evenings.
• There are basic indicators of uptime; alerts are frequently fired when the APIs are unresponsive.

Business Requirements -
HipLocal's investors want to expand their footprint and support the increase in demand they are seeing. Their requirements are:
• Expand availability of the application to new regions.
• Support 10x as many concurrent users.
• Ensure a consistent experience for users when they travel to different regions.
• Obtain user activity metrics to better understand how to monetize their product.
• Ensure compliance with regulations in the new regions (for example, GDPR).
• Reduce infrastructure management time and cost.
• Adopt the Google-recommended practices for cloud computing.
○ Develop standardized workflows and processes around application lifecycle management.
○ Define service level indicators (SLIs) and service level objectives (SLOs).

Technical Requirements -
• Provide secure communications between the on-premises data center and cloud-hosted applications and infrastructure.
• The application must provide usage metrics and monitoring.
• APIs require authentication and authorization.
• Implement faster and more accurate validation of new features.
• Logging and performance metrics must provide actionable information to be able to provide debugging information and alerts.
• Must scale to meet user demand.

For this question, refer to the HipLocal case study.

HipLocal is expanding into new locations. They must capture additional data each time the application is launched in a new European country. This is causing delays in the development process due to constant schema changes and a lack of environments for conducting testing on the application changes. How should they resolve the issue while meeting the business requirements?

A. Create new Cloud SQL instances in Europe and North America for testing and deployment. Provide developers with local MySQL instances to conduct testing on the application changes.
B. Migrate data to Bigtable. Instruct the development teams to use the Cloud SDK to emulate a local Bigtable development environment.
C. Move from Cloud SQL to MySQL hosted on Compute Engine. Replicate hosts across regions in the Americas and Europe. Provide developers with local MySQL instances to conduct testing on the application changes.
D. Migrate data to Firestore in Native mode and set up instances in Europe and North America. Instruct the development teams to use the Cloud SDK to emulate a local Firestore in Native mode development environment.

Answer : B

Question 190 (Single Topic)

You are writing from a Go application to a Cloud Spanner database. You want to optimize your application’s performance using Google-recommended best practices. What should you do?

A. Write to Cloud Spanner using Cloud Client Libraries.
B. Write to Cloud Spanner using Google API Client Libraries
C. Write to Cloud Spanner using a custom gRPC client library.
D. Write to Cloud Spanner using a third-party HTTP client library.

Answer : C

Question 191 (Single Topic)

You have an application deployed in Google Kubernetes Engine (GKE). You need to update the application to make authorized requests to Google Cloud managed services. You want this to be a one-time setup, and you need to follow security best practices of auto-rotating your security keys and storing them in an encrypted store. You already created a service account with appropriate access to the Google Cloud service. What should you do next?

A. Assign the Google Cloud service account to your GKE Pod using Workload Identity.
B. Export the Google Cloud service account, and share it with the Pod as a Kubernetes Secret.
C. Export the Google Cloud service account, and embed it in the source code of the application.
D. Export the Google Cloud service account, and upload it to HashiCorp Vault to generate a dynamic service account for your application.

Answer : B

Question 192 (Single Topic)

You are planning to deploy hundreds of microservices in your Google Kubernetes Engine (GKE) cluster. How should you secure communication between the microservices on GKE using a managed service?

A. Use global HTTP(S) Load Balancing with managed SSL certificates to protect your services
B. Deploy open source Istio in your GKE cluster, and enable mTLS in your Service Mesh
C. Install cert-manager on GKE to automatically renew the SSL certificates.
D. Install Anthos Service Mesh, and enable mTLS in your Service Mesh.

Answer : B

Question 193 (Single Topic)

You are developing an application that will store and access sensitive unstructured data objects in a Cloud Storage bucket. To comply with regulatory requirements, you need to ensure that all data objects are available for at least 7 years after their initial creation. Objects created more than 3 years ago are accessed very infrequently (less than once a year). You need to configure object storage while ensuring that storage cost is optimized. What should you do? (Choose two.)

A. Set a retention policy on the bucket with a period of 7 years.
B. Use IAM Conditions to provide access to objects 7 years after the object creation date.
C. Enable Object Versioning to prevent objects from being accidentally deleted for 7 years after object creation.
D. Create an object lifecycle policy on the bucket that moves objects from Standard Storage to Archive Storage after 3 years.
E. Implement a Cloud Function that checks the age of each object in the bucket and moves the objects older than 3 years to a second bucket with the Archive Storage class. Use Cloud Scheduler to trigger the Cloud Function on a daily schedule.

Answer : BD

Question 194 (Single Topic)

You are developing an application using different microservices that must remain internal to the cluster. You want the ability to configure each microservice with a specific number of replicas. You also want the ability to address a specific microservice from any other microservice in a uniform way, regardless of the number of replicas the microservice scales to. You plan to implement this solution on Google Kubernetes Engine. What should you do?

A. Deploy each microservice as a Deployment. Expose the Deployment in the cluster using a Service, and use the Service DNS name to address it from other microservices within the cluster.
B. Deploy each microservice as a Deployment. Expose the Deployment in the cluster using an Ingress, and use the Ingress IP address to address the Deployment from other microservices within the cluster.
C. Deploy each microservice as a Pod. Expose the Pod in the cluster using a Service, and use the Service DNS name to address the microservice from other microservices within the cluster.
D. Deploy each microservice as a Pod. Expose the Pod in the cluster using an Ingress, and use the Ingress IP address to address the Pod from other microservices within the cluster.

Answer : C

Question 195 (Single Topic)

You are building an application that uses a distributed microservices architecture. You want to measure the performance and system resource utilization in one of the microservices written in Java. What should you do?

A. Instrument the service with Cloud Profiler to measure CPU utilization and method-level execution times in the service.
B. Instrument the service with Debugger to investigate service errors.
C. Instrument the service with Cloud Trace to measure request latency.
D. Instrument the service with OpenCensus to measure service latency, and write custom metrics to Cloud Monitoring.

Answer : C

Question 196 (Single Topic)

Your team is responsible for maintaining an application that aggregates news articles from many different sources. Your monitoring dashboard contains publicly accessible real-time reports and runs on a Compute Engine instance as a web application. External stakeholders and analysts need to access these reports via a secure channel without authentication. How should you configure this secure channel?

A. Add a public IP address to the instance. Use the service account key of the instance to encrypt the traffic.
B. Use Cloud Scheduler to trigger Cloud Build every hour to create an export from the reports. Store the reports in a public Cloud Storage bucket.
C. Add an HTTP(S) load balancer in front of the monitoring dashboard. Configure Identity-Aware Proxy to secure the communication channel.
D. Add an HTTP(S) load balancer in front of the monitoring dashboard. Set up a Google-managed SSL certificate on the load balancer for traffic encryption.

Answer : B

Question 197 (Single Topic)

You are planning to add unit tests to your application. You need to be able to assert that published Pub/Sub messages are processed by your subscriber in order. You want the unit tests to be cost-effective and reliable. What should you do?

A. Implement a mocking framework.
B. Create a topic and subscription for each tester.
C. Add a filter by tester to the subscription.
D. Use the Pub/Sub emulator.

Answer : D

Question 198 (Single Topic)

You have an application deployed in Google Kubernetes Engine (GKE) that reads and processes Pub/Sub messages. Each Pod handles a fixed number of messages per minute. The rate at which messages are published to the Pub/Sub topic varies considerably throughout the day and week, including occasional large batches of messages published at a single moment.

You want to scale your GKE Deployment to be able to process messages in a timely manner. What GKE feature should you use to automatically adapt your workload?

A. Vertical Pod Autoscaler in Auto mode
B. Vertical Pod Autoscaler in Recommendation mode
C. Horizontal Pod Autoscaler based on an external metric
D. Horizontal Pod Autoscaler based on resources utilization

Answer : C

Question 199 (Single Topic)

You are using Cloud Run to host a web application. You need to securely obtain the application project ID and region where the application is running and display this information to users. You want to use the most performant approach. What should you do?

A. Use HTTP requests to query the available metadata server at the http://metadata.google.internal/ endpoint with the Metadata-Flavor: Google header.
B. In the Google Cloud console, navigate to the Project Dashboard and gather configuration details. Navigate to the Cloud Run “Variables & Secrets” tab, and add the desired environment variables in Key:Value format.
C. In the Google Cloud console, navigate to the Project Dashboard and gather configuration details. Write the application configuration information to Cloud Run's in-memory container filesystem.
D. Make an API call to the Cloud Asset Inventory API from the application and format the request to include instance metadata.

Answer : B

Question 200 (Single Topic)

You need to deploy resources from your laptop to Google Cloud using Terraform. Resources in your Google Cloud environment must be created using a service account. Your Cloud Identity has the roles/iam.serviceAccountTokenCreator Identity and Access Management (IAM) role and the necessary permissions to deploy the resources using Terraform. You want to set up your development environment to deploy the desired resources following Google-recommended best practices. What should you do?

A. 1. Download the service account’s key file in JSON format, and store it locally on your laptop.
2. Set the GOOGLE_APPLICATION_CREDENTIALS environment variable to the path of your downloaded key file.
B. 1. Run the following command from a command line: gcloud config set auth/impersonate_service_account service-account-name@project.iam.gserviceacccount.com.
2. Set the GOOGLE_OAUTH_ACCESS_TOKEN environment variable to the value that is returned by the gcloud auth print-access-token command.
C. 1. Run the following command from a command line: gcloud auth application-default login.
2. In the browser window that opens, authenticate using your personal credentials.
D. 1. Store the service account's key file in JSON format in Hashicorp Vault.
2. Integrate Terraform with Vault to retrieve the key file dynamically, and authenticate to Vault using a short-lived access token.

Answer : D