

Practice Exam Questions



Google Cloud

Cloud Architect

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Exam GCP-Cloud-Architect

Google Cloud Certified Professional - Cloud Architect (GCP)

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[Total Questions: 248]

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Topic 1, Mountkirk Games Case Study 1

Company Overview

Mountkirk Games makes online, session-based. multiplayer games for the most popular mobile platforms.

Company Background

Mountkirk Games builds all of their games with some server-side integration and has historically used cloud providers to lease physical servers. A few of their games were more popular than expected, and they had problems scaling their application servers, MySQL databases, and analytics tools.

Mountkirk's current model is to write game statistics to files and send them through an ETL tool that loads them into a centralized MySQL database for reporting.

Solution Concept

Mountkirk Games is building a new game, which they expect to be very popular. They plan to deploy the game's backend on Google Compute Engine so they can capture streaming metrics, run intensive analytics and take advantage of its autoscaling server environment and integrate with a managed NoSQL database.

Technical Requirements

Requirements for Game Backend Platform

1. Dynamically scale up or down based on game activity.
2. Connect to a managed NoSQL database service.
3. Run customized Linux distro.

Requirements for Game Analytics Platform

1. Dynamically scale up or down based on game activity.
2. Process incoming data on the fly directly from the game servers.
3. Process data that arrives late because of slow mobile networks.
4. Allow SQL queries to access at least 10 TB of historical data.
5. Process files that are regularly uploaded by users' mobile devices.
6. Use only fully managed services

CEO Statement

Our last successful game did not scale well with our previous cloud provider, resulting in lower user adoption and affecting the game's reputation. Our investors want more key performance indicators (KPIs) to evaluate the speed and stability of the game, as well as other metrics that provide deeper insight into usage patterns so we can adapt the games to target users.

CTO Statement

Our current technology stack cannot provide the scale we need, so we want to replace MySQL and move to an environment that provides autoscaling, low latency load balancing, and frees us up from managing physical servers.

CFO Statement

We are not capturing enough user demographic data usage metrics, and other KPIs. As a result, we do not engage the right users. We are not confident that our marketing is targeting the right users, and we are not selling enough premium Blast-Ups inside the games, which dramatically impacts our revenue.

Question No : 1 - (Topic 1)

For this question, refer to the Mountkirk Games case study.

Mountkirk Games wants you to design their new testing strategy. How should the test coverage differ from their existing backends on the other platforms?

- A. Tests should scale well beyond the prior approaches.
- B. Unit tests are no longer required, only end-to-end tests.
- C. Tests should be applied after the release is in the production environment.
- D. Tests should include directly testing the Google Cloud Platform (GCP) infrastructure.

Answer: A

Explanation:

From Scenario:

A few of their games were more popular than expected, and they had problems scaling their application servers, MySQL databases, and analytics tools.

Requirements for Game Analytics Platform include: Dynamically scale up or down based on game activity

Question No : 2 - (Topic 1)

For this question, refer to the Mountkirk Games case study.

Mountkirk Games wants to set up a real-time analytics platform for their new game. The new platform must meet their technical requirements. Which combination of Google technologies will meet all of their requirements?

- A. Container Engine, Cloud Pub/Sub, and Cloud SQL
- B. Cloud Dataflow, Cloud Storage, Cloud Pub/Sub, and BigQuery
- C. Cloud SQL, Cloud Storage, Cloud Pub/Sub, and Cloud Dataflow
- D. Cloud Dataproc, Cloud Pub/Sub, Cloud SQL, and Cloud Dataflow
- E. Cloud Pub/Sub, Compute Engine, Cloud Storage, and Cloud Dataproc

Answer: B

Explanation:

A real time requires Stream / Messaging so Pub/Sub, Analytics by Big Query.

Ingest millions of streaming events per second from anywhere in the world with Cloud Pub/Sub, powered by Google's unique, high-speed private network. Process the streams with Cloud Dataflow to ensure reliable, exactly-once, low-latency data transformation. Stream the transformed data into BigQuery, the cloud-native data warehousing service, for immediate analysis via SQL or popular visualization tools.

From scenario: They plan to deploy the game's backend on Google Compute Engine so they can capture streaming metrics, run intensive analytics.

Requirements for Game Analytics Platform

- ✍ Dynamically scale up or down based on game activity
- ✍ Process incoming data on the fly directly from the game servers
- ✍ Process data that arrives late because of slow mobile networks
- ✍ Allow SQL queries to access at least 10 TB of historical data
- ✍ Process files that are regularly uploaded by users' mobile devices
- ✍ Use only fully managed services

References: <https://cloud.google.com/solutions/big-data/stream-analytics/>

Question No : 3 - (Topic 1)

For this question, refer to the Mountkirk Games case study.

Mountkirk Games' gaming servers are not automatically scaling properly. Last month, they rolled out a new feature, which suddenly became very popular. A record number of users are trying to use the service, but many of them are getting 503 errors and very slow response times. What should they investigate first?

- A. Verify that the database is online.
- B. Verify that the project quota hasn't been exceeded.
- C. Verify that the new feature code did not introduce any performance bugs.
- D. Verify that the load-testing team is not running their tool against production.

Answer: B

Explanation: 503 is service unavailable error. If the database was online everyone would get the 503 error.

https://cloud.google.com/docs/quota#capping_usage

Question No : 4 - (Topic 1)

For this question, refer to the Mountkirk Games case study.

Mountkirk Games has deployed their new backend on Google Cloud Platform (GCP). You want to create a thorough testing process for new versions of the backend before they are released to the public. You want the testing environment to scale in an economical way. How should you design the process?

- A. Create a scalable environment in GCP for simulating production load.
- B. Use the existing infrastructure to test the GCP-based backend at scale.
- C. Build stress tests into each component of your application using resources internal to GCP to simulate load.
- D. Create a set of static environments in GCP to test different levels of load — for example, high, medium, and low.

Answer: A

Explanation:

From scenario: Requirements for Game Backend Platform

- ✍ Dynamically scale up or down based on game activity
- ✍ Connect to a managed NoSQL database service
- ✍ Run customize Linux distro

Question No : 5 - (Topic 1)

For this question, refer to the Mountkirk Games case study.

Mountkirk Games wants to set up a continuous delivery pipeline. Their architecture includes many small services that they want to be able to update and roll back quickly. Mountkirk Games has the following requirements:

- Services are deployed redundantly across multiple regions in the US and Europe.
- Only frontend services are exposed on the public internet.
- They can provide a single frontend IP for their fleet of services.
- Deployment artifacts are immutable.

Which set of products should they use?

- A. Google Cloud Storage, Google Cloud Dataflow, Google Compute Engine
- B. Google Cloud Storage, Google App Engine, Google Network Load Balancer
- C. Google Kubernetes Registry, Google Container Engine, Google HTTP(S) Load Balancer
- D. Google Cloud Functions, Google Cloud Pub/Sub, Google Cloud Deployment Manager

Answer: C

Question No : 6 - (Topic 1)

For this question, refer to the Mountkirk Games case study

Mountkirk Games needs to create a repeatable and configurable mechanism for deploying isolated application environments. Developers and testers can access each other's environments and resources, but they cannot access staging or production resources. The staging environment needs access to some services from production.

What should you do to isolate development environments from staging and production?

- A. Create a project for development and test and another for staging and production.
- B. Create a network for development and test and another for staging and production.
- C. Create one subnetwork for development and another for staging and production.
- D. Create one project for development, a second for staging and a third for production.

Answer: D

Topic 2, TerramEarth Case Study

Company Overview

TerramEarth manufactures heavy equipment for the mining and agricultural industries: About 80% of their business is from mining and 20% from agriculture. They currently have over 500 dealers and service centers in 100 countries. Their mission is to build products that make their customers more productive.

Company Background

TerramEarth formed in 1946, when several small, family owned companies combined to retool after World War II. The company cares about their employees and customers and considers them to be extended members of their family.

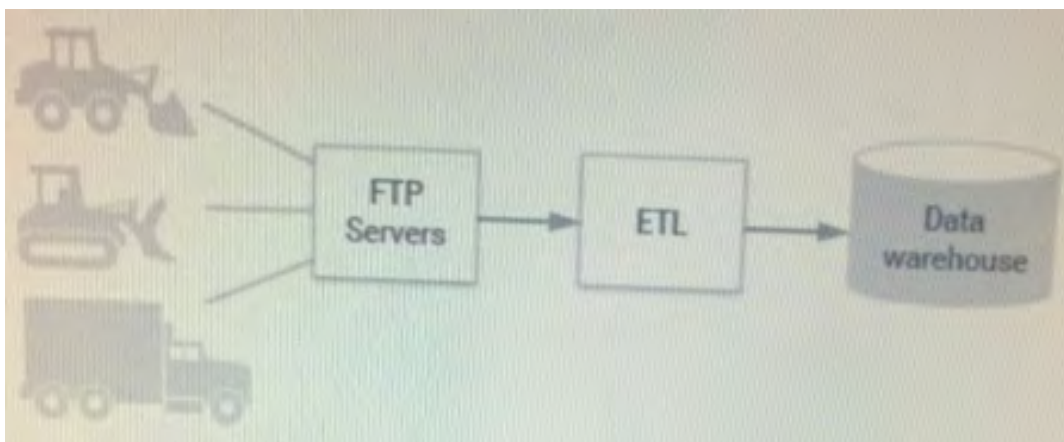
TerramEarth is proud of their ability to innovate on their core products and find new markets as their customers' needs change. For the past 20 years trends in the industry have been largely toward increasing productivity by using larger vehicles with a human operator.

Solution Concept

There are 20 million TerramEarth vehicles in operation that collect 120 fields of data per second. Data is stored locally on the vehicle and can be accessed for analysis when a vehicle is serviced. The data is downloaded via a maintenance port. This same port can be used to adjust operational parameters, allowing the vehicles to be upgraded in the field with new computing modules.

Approximately 200,000 vehicles are connected to a cellular network, allowing TerramEarth to collect data directly. At a rate of 120 fields of data per second, with 22 hours of operation per day. TerramEarth collects a total of about 9 TB/day from these connected vehicles.

Existing Technical Environment



TerramEarth's existing architecture is composed of Linux-based systems that reside in a data center. These systems gzip CSV files from the field and upload via FTP, transform

and aggregate them, and place the data in their data warehouse. Because this process takes time, aggregated reports are based on data that is 3 weeks old.

With this data, TerramEarth has been able to preemptively stock replacement parts and reduce unplanned downtime of their vehicles by 60%. However, because the data is stale, some customers are without their vehicles for up to 4 weeks while they wait for replacement parts.

Business Requirements

- Decrease unplanned vehicle downtime to less than 1 week, without increasing the cost of carrying surplus inventory
- Support the dealer network with more data on how their customers use their equipment IP better position new products and services.
- Have the ability to partner with different companies-especially with seed and fertilizer suppliers in the fast-growing agricultural business-to create compelling joint offerings for their customers

CEO Statement

We have been successful in capitalizing on the trend toward larger vehicles to increase the productivity of our customers. Technological change is occurring rapidly and TerramEarth has taken advantage of connected devices technology to provide our customers with better services, such as our intelligent farming equipment. With this technology, we have been able to increase farmers' yields by 25%, by using past trends to adjust how our vehicles operate. These advances have led to the rapid growth of our agricultural product line, which we expect will generate 50% of our revenues by 2020.

CTO Statement

Our competitive advantage has always been in the manufacturing process with our ability to build better vehicles for tower cost than our competitors. However, new products with different approaches are constantly being developed, and I'm concerned that we lack the skills to undergo the next wave of transformations in our industry. Unfortunately, our CEO doesn't take technology obsolescence seriously and he considers the many new companies in our industry to be niche players. My goals are to build our skills while addressing immediate market needs through incremental innovations.

Question No : 7 - (Topic 2)

For this question refer to the TerramEarth case study.

Which of TerramEarth's legacy enterprise processes will experience significant change as a result of increased Google Cloud Platform adoption.

A. Opex/capex allocation, LAN changes, capacity planning

- B. Capacity planning, TCO calculations, opex/capex allocation
- C. Capacity planning, utilization measurement, data center expansion
- D. Data Center expansion, TCO calculations, utilization measurement

Answer: B

Explanation:

Capacity planning, TCO calculations, opex/capex allocation From the case study, it can conclude that Management (CXO) all concern rapid provision of resources (infrastructure) for growing as well as cost management, such as Cost optimization in Infrastructure, trade up front capital expenditures (Capex) for ongoing operating expenditures (Opex), and Total cost of ownership (TCO)

Question No : 8 - (Topic 2)

For this question, refer to the TerramEarth case study.

TerramEarth has equipped unconnected trucks with servers and sensors to collect telemetry data. Next year they want to use the data to train machine learning models. They want to store this data in the cloud while reducing costs. What should they do?

- A. Have the vehicle's computer compress the data in hourly snapshots, and store it in a Google Cloud storage (GCS) Nearline bucket.
- B. Push the telemetry data in Real-time to a streaming dataflow job that compresses the data, and store it in Google BigQuery.
- C. Push the telemetry data in real-time to a streaming dataflow job that compresses the data, and store it in Cloud Bigtable.
- D. Have the vehicle's computer compress the data in hourly snapshots, and store it in a GCS Coldline bucket.

Answer: D

Explanation:

Coldline Storage is the best choice for data that you plan to access at most once a year, due to its slightly lower availability, 90-day minimum storage duration, costs for data access, and higher per-operation costs. For example:

Cold Data Storage - Infrequently accessed data, such as data stored for legal or regulatory reasons, can be stored at low cost as Coldline Storage, and be available when you need it.

Disaster recovery - In the event of a disaster recovery event, recovery time is key. Cloud Storage provides low latency access to data stored as Coldline Storage.
References: <https://cloud.google.com/storage/docs/storage-classes>

Question No : 9 - (Topic 2)

For this question, refer to the TerramEarth case study.

TerramEarth plans to connect all 20 million vehicles in the field to the cloud. This increases the volume to 20 million 600 byte records a second for 40 TB an hour. How should you design the data ingestion?

- A. Vehicles write data directly to GCS.
- B. Vehicles write data directly to Google Cloud Pub/Sub.
- C. Vehicles stream data directly to Google BigQuery.
- D. Vehicles continue to write data using the existing system (FTP).

Answer: B

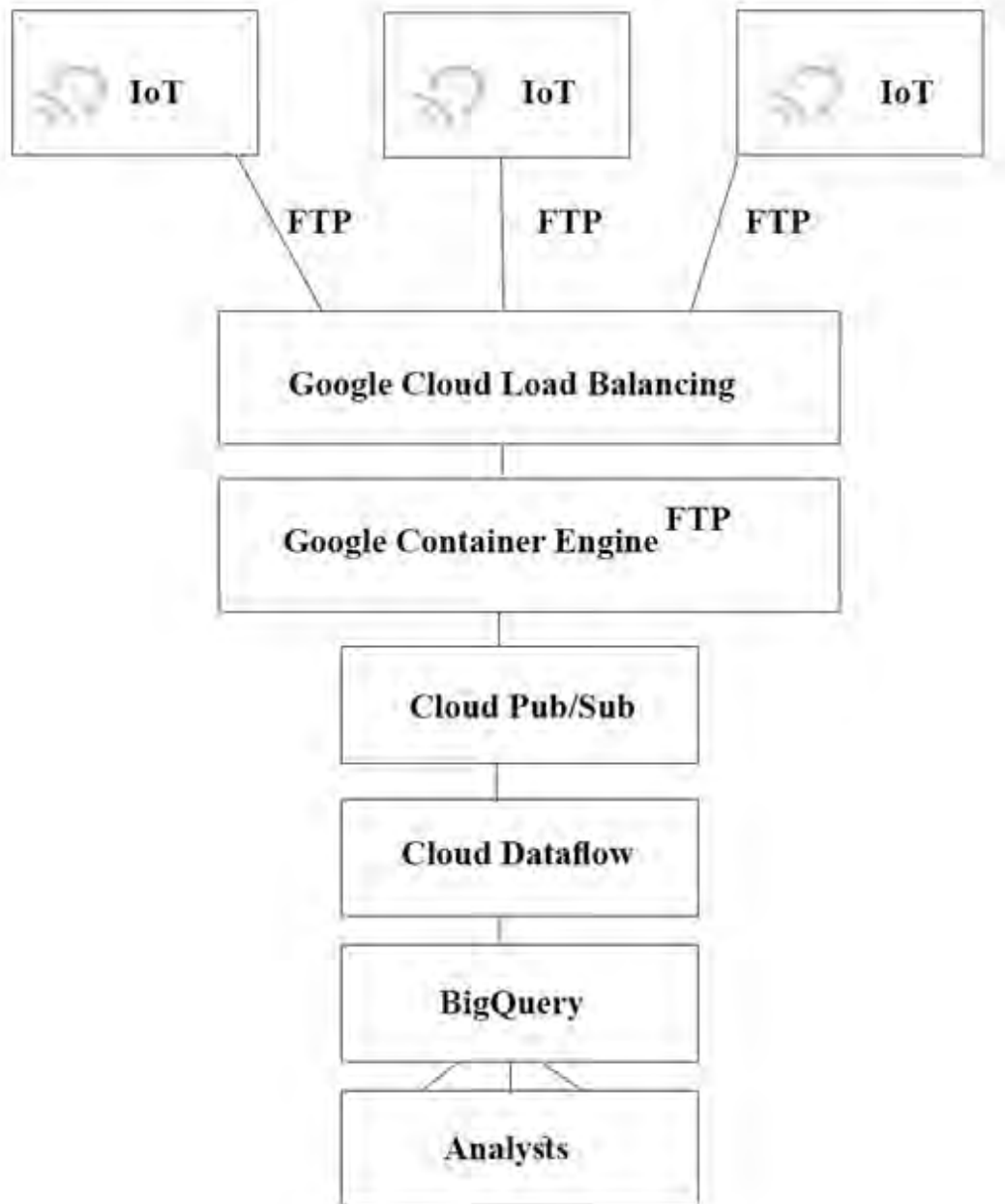
Explanation: <https://cloud.google.com/solutions/data-lifecycle-cloud-platform>
<https://cloud.google.com/solutions/designing-connected-vehicle-platform>

Question No : 10 - (Topic 2)

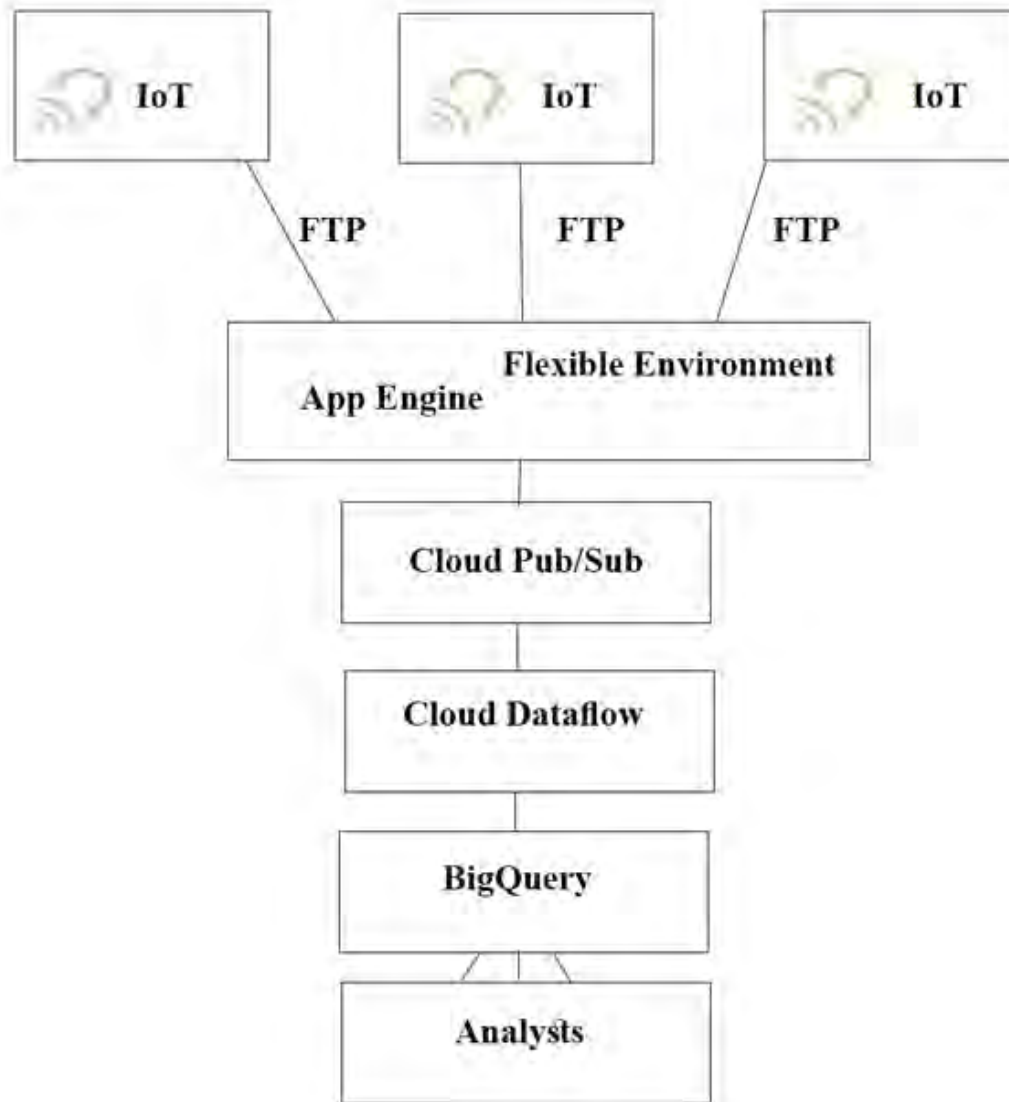
For this question, refer to the TerramEarth case study.

TerramEarth's CTO wants to use the raw data from connected vehicles to help identify approximately when a vehicle in the development team to focus their failure. You want to allow analysts to centrally query the vehicle data. Which architecture should you recommend?

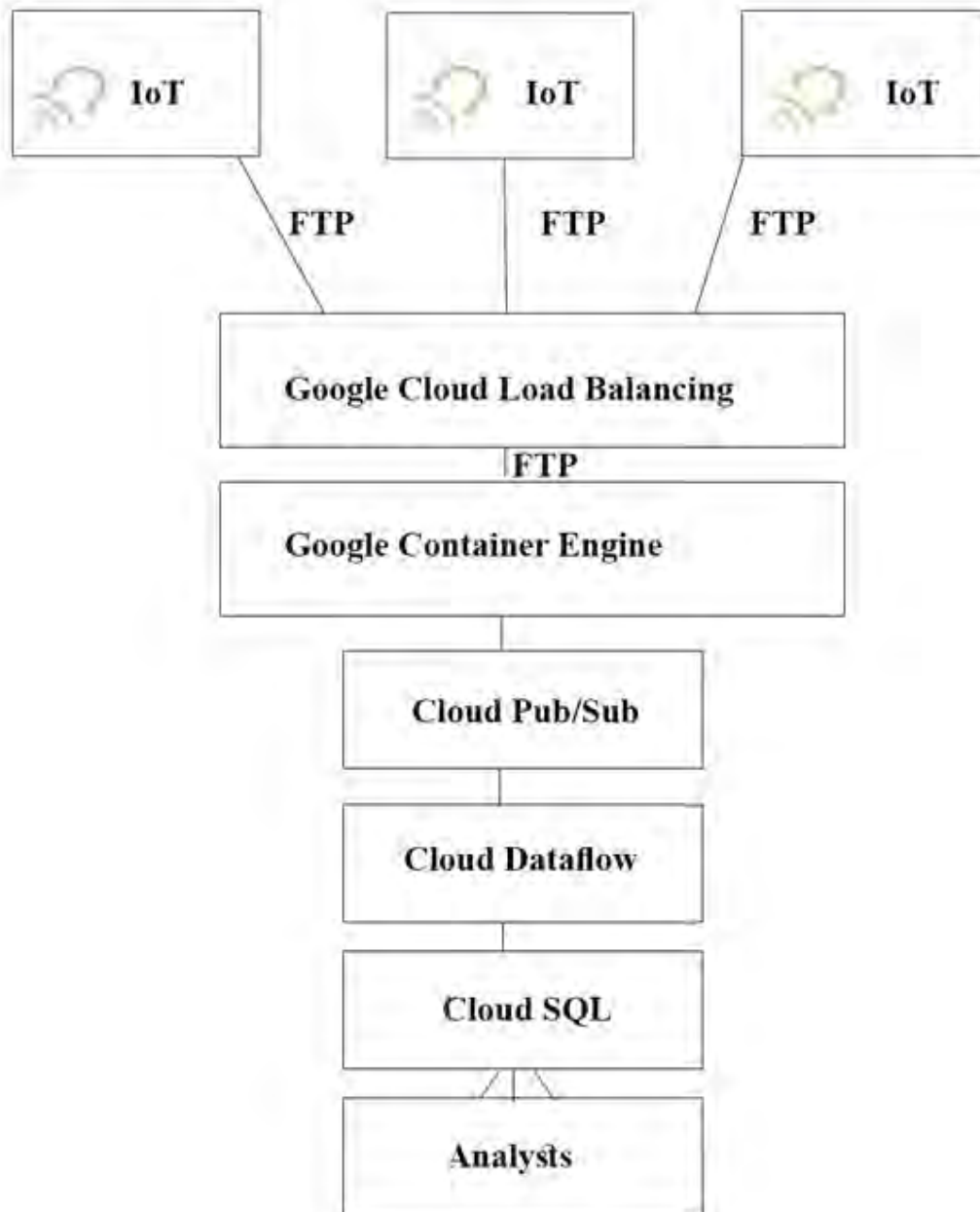
A)



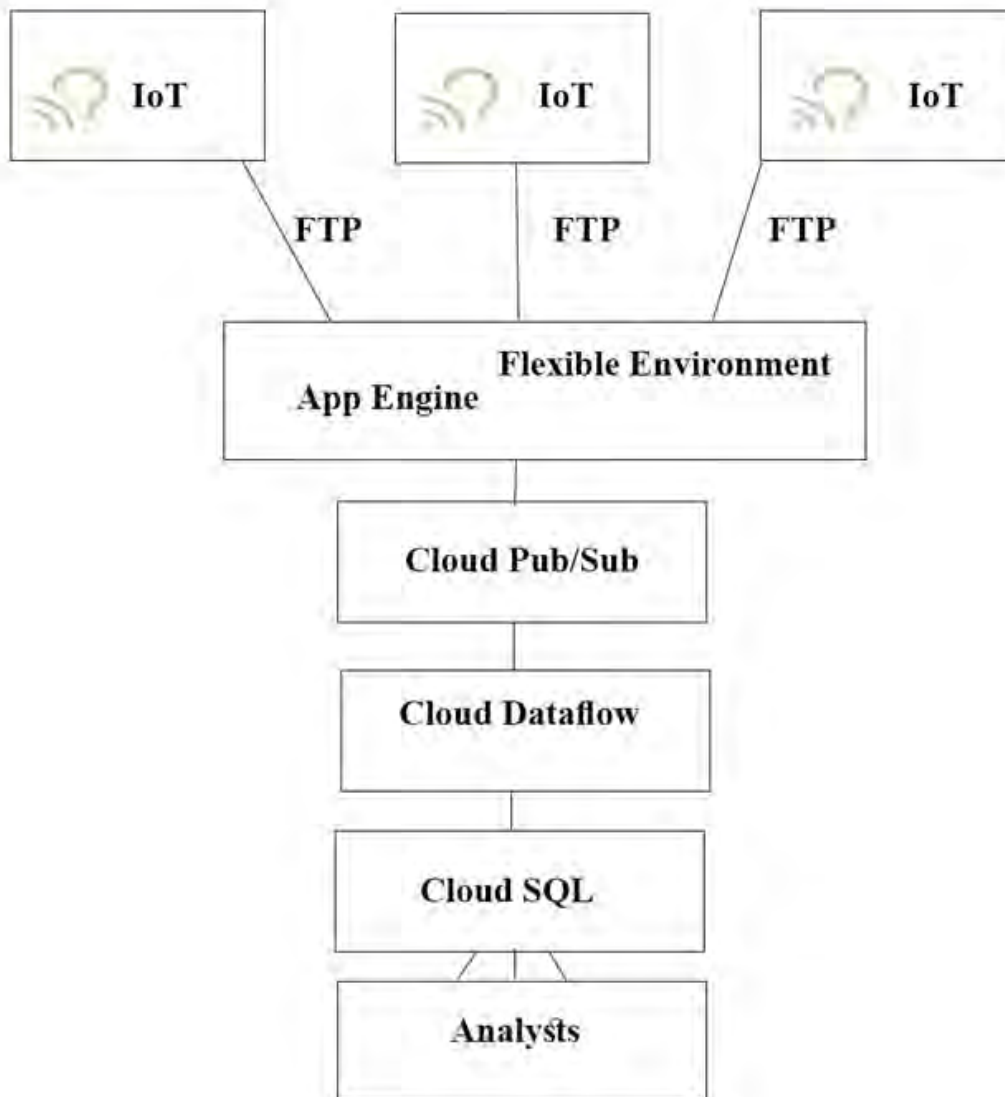
B)



C)



D)



- A. Option A
- B. Option B
- C. Option C
- D. Option D

Answer: A

Explanation: <https://cloud.google.com/solutions/iot/>

<https://cloud.google.com/solutions/designing-connected-vehicle-platform>

https://cloud.google.com/solutions/designing-connected-vehicle-platform#data_ingestion

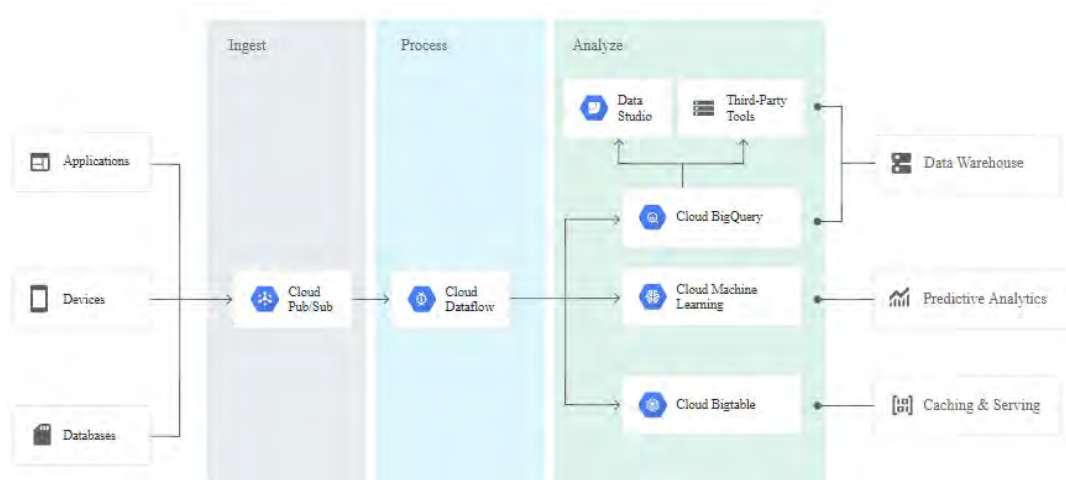
<http://www.eweek.com/big-data-and-analytics/google-touts-value-of-cloud-iot-core-for-analyzing-connected-car-data>

<https://cloud.google.com/solutions/iot/>

The push endpoint can be a load balancer.

A container cluster can be used.

Cloud Pub/Sub for Stream Analytics



References: <https://cloud.google.com/pubsub/>

<https://cloud.google.com/solutions/iot/>

<https://cloud.google.com/solutions/designing-connected-vehicle-platform>

https://cloud.google.com/solutions/designing-connected-vehicle-platform#data_ingestion

<http://www.eweek.com/big-data-and-analytics/google-touts-value-of-cloud-iot-core-for-analyzing-connected-car-data>

<https://cloud.google.com/solutions/iot/>

Question No : 11 - (Topic 2)

For this question, refer to the TerramEarth case study

You analyzed TerramEarth's business requirement to reduce downtime, and found that they can achieve a majority of time saving by reducing customers' wait time for parts. You decided to focus on reduction of the 3 weeks aggregate reporting time. Which modifications to the company's processes should you recommend?

A. Migrate from CSV to binary format, migrate from FTP to SFTP transport, and develop machine learning analysis of metrics.

B. Migrate from FTP to streaming transport, migrate from CSV to binary format, and develop machine learning analysis of metrics.

- C.** Increase fleet cellular connectivity to 80%, migrate from FTP to streaming transport, and develop machine learning analysis of metrics.
- D.** Migrate from FTP to SFTP transport, develop machine learning analysis of metrics, and increase dealer local inventory by a fixed factor.

Answer: C

Explanation:

The Avro binary format is the preferred format for loading compressed data. Avro data is faster to load because the data can be read in parallel, even when the data blocks are compressed.

Cloud Storage supports streaming transfers with the gsutil tool or boto library, based on HTTP chunked transfer encoding. Streaming data lets you stream data to and from your Cloud Storage account as soon as it becomes available without requiring that the data be first saved to a separate file. Streaming transfers are useful if you have a process that generates data and you do not want to buffer it locally before uploading it, or if you want to send the result from a computational pipeline directly into Cloud Storage.

References: <https://cloud.google.com/storage/docs/streaming>
<https://cloud.google.com/bigquery/docs/loading-data>

Question No : 12 - (Topic 2)

For this question, refer to the TerramEarth case study.

TerramEarth's 20 million vehicles are scattered around the world. Based on the vehicle's location its telemetry data is stored in a Google Cloud Storage (GCS) regional bucket (US, Europe, or Asia). The CTO has asked you to run a report on the raw telemetry data to determine why vehicles are breaking down after 100 K miles. You want to run this job on all the data. What is the most cost-effective way to run this job?

- A.** Move all the data into 1 zone, then launch a Cloud Dataproc cluster to run the job.
- B.** Move all the data into 1 region, then launch a Google Cloud Dataproc cluster to run the job.
- C.** Launch a cluster in each region to preprocess and compress the raw data, then move the data into a multi region bucket and use a Dataproc cluster to finish the job.
- D.** Launch a cluster in each region to preprocess and compress the raw data, then move the data into a region bucket and use a Cloud Dataproc cluster to finish the job.

Answer: D

Explanation:

Storage guarantees 2 replicates which are geo diverse (100 miles apart) which can get better remote latency and availability.

More importantly, is that multiregional heavily leverages Edge caching and CDNs to provide the content to the end users.

All this redundancy and caching means that Multiregional comes with overhead to sync and ensure consistency between geo-diverse areas. As such, it's much better for write-once-read-many scenarios. This means frequently accessed (e.g. "hot" objects) around the world, such as website content, streaming videos, gaming or mobile applications.

References: <https://medium.com/google-cloud/google-cloud-storage-what-bucket-class-for-the-best-performance-5c847ac8f9f2>

Question No : 13 - (Topic 2)

For this question refer to the TerramEarth case study

Operational parameters such as oil pressure are adjustable on each of TerramEarth's vehicles to increase their efficiency, depending on their environmental conditions. Your primary goal is to increase the operating efficiency of all 20 million cellular and unconnected vehicles in the field. How can you accomplish this goal?

- A.** Have your engineers inspect the data for patterns, and then create an algorithm with rules that make operational adjustments automatically.
- B.** Capture all operating data, train machine learning models that identify ideal operations, and run locally to make operational adjustments automatically.
- C.** Implement a Google Cloud Dataflow streaming job with a sliding window, and use Google Cloud Messaging (GCM) to make operational adjustments automatically.
- D.** Capture all operating data, train machine learning models that identify ideal operations, and host in Google Cloud Machine Learning (ML) Platform to make operational adjustments automatically.

Answer: B

Question No : 14 - (Topic 2)

For this question, refer to the TerramEarth case study.

To speed up data retrieval, more vehicles will be upgraded to cellular connections and be able to transmit data to the ETL process. The current FTP process is error-prone and restarts the data transfer from the start of the file when connections fail, which happens often. You want to improve the reliability of the solution and minimize data transfer time on the cellular connections. What should you do?

- A.** Use one Google Container Engine cluster of FTP servers. Save the data to a Multi-Regional bucket. Run the ETL process using data in the bucket.
- B.** Use multiple Google Container Engine clusters running FTP servers located in different regions. Save the data to Multi-Regional buckets in us, eu, and asia. Run the ETL process using the data in the bucket.
- C.** Directly transfer the files to different Google Cloud Multi-Regional Storage bucket locations in us, eu, and asia using Google APIs over HTTP(S). Run the ETL process using the data in the bucket.
- D.** Directly transfer the files to a different Google Cloud Regional Storage bucket location in us, eu, and asia using Google APIs over HTTP(S). Run the ETL process to retrieve the data from each Regional bucket.

Answer: D

Explanation: <https://cloud.google.com/storage/docs/locations>

Question No : 15 - (Topic 2)

Your agricultural division is experimenting with fully autonomous vehicles.

You want your architecture to promote strong security during vehicle operation.

Which two architecture should you consider?

Choose 2 answers:

- A.** Treat every micro service call between modules on the vehicle as untrusted.
- B.** Require IPv6 for connectivity to ensure a secure address space.
- C.** Use a trusted platform module (TPM) and verify firmware and binaries on boot.

- D. Use a functional programming language to isolate code execution cycles.
- E. Use multiple connectivity subsystems for redundancy.
- F. Enclose the vehicle's drive electronics in a Faraday cage to isolate chips.

Answer: A,C

Question No : 16 - (Topic 2)

For this question, refer to the TerramEarth case study.

The TerramEarth development team wants to create an API to meet the company's business requirements. You want the development team to focus their development effort on business value versus creating a custom framework. Which method should they use?

- A. Use Google App Engine with Google Cloud Endpoints. Focus on an API for dealers and partners.
- B. Use Google App Engine with a JAX-RS Jersey Java-based framework. Focus on an API for the public.
- C. Use Google App Engine with the Swagger (open API Specification) framework. Focus on an API for the public.
- D. Use Google Container Engine with a Django Python container. Focus on an API for the public.
- E. Use Google Container Engine with a Tomcat container with the Swagger (Open API Specification) framework. Focus on an API for dealers and partners.

Answer: A

Explanation:

[https://cloud.google.com/endpoints/docs/openapi/about-cloud-](https://cloud.google.com/endpoints/docs/openapi/about-cloud-endpoints?hl=en_US&_ga=2.21787131.-1712523161.1522785064)

[endpoints?hl=en_US&_ga=2.21787131.-1712523161.1522785064](https://cloud.google.com/endpoints/docs/openapi/about-cloud-endpoints?hl=en_US&_ga=2.21787131.-1712523161.1522785064)

<https://cloud.google.com/endpoints/docs/openapi/architecture-overview>

<https://cloud.google.com/storage/docs/gsutil/commands/test>

Develop, deploy, protect and monitor your APIs with Google Cloud Endpoints. Using an Open API Specification or one of our API frameworks, Cloud Endpoints gives you the tools you need for every phase of API development.

From scenario:

Business Requirements

Decrease unplanned vehicle downtime to less than 1 week, without increasing the cost of carrying surplus inventory

Support the dealer network with more data on how their customers use their equipment to better position new products and services

Have the ability to partner with different companies – especially with seed and fertilizer suppliers in the fast-growing agricultural business – to create compelling joint offerings for their customers.

Reference: <https://cloud.google.com/certification/guides/cloud-architect/casestudy-terramearth>

Question No : 17 - (Topic 2)

For this question, refer to the TerramEarth case study

Your development team has created a structured API to retrieve vehicle data. They want to allow third parties to develop tools for dealerships that use this vehicle event data. You want to support delegated authorization against this data. What should you do?

- A. Build or leverage an OAuth-compatible access control system.
- B. Build SAML 2.0 SSO compatibility into your authentication system.
- C. Restrict data access based on the source IP address of the partner systems.
- D. Create secondary credentials for each dealer that can be given to the trusted third party.

Answer: A

Explanation:

<https://cloud.google.com/appengine/docs/flexible/go/authorizing-apps>

https://cloud.google.com/docs/enterprise/best-practices-for-enterprise-organizations#delegate_application_authorization_with_oauth2

Delegate application authorization with OAuth2

Cloud Platform APIs support OAuth 2.0, and scopes provide granular authorization over the methods that are supported. Cloud Platform supports both service-account and user-account OAuth, also called three-legged OAuth.

References: https://cloud.google.com/docs/enterprise/best-practices-for-enterprise-organizations#delegate_application_authorization_with_oauth2
<https://cloud.google.com/appengine/docs/flexible/go/authorizing-apps>

Topic 3, JencoMart Case Study

Company Overview

JencoMart is a global retailer with over 10,000 stores in 16 countries. The stores carry a range of goods, such as groceries, tires, and jewelry. One of the company's core values is excellent customer service. In addition, they recently introduced an environmental policy to reduce their carbon output by 50% over the next 5 years.

Company Background

JencoMart started as a general store in 1931, and has grown into one of the world's leading brands known for great value and customer service. Over time, the company transitioned from only physical stores to a stores and online hybrid model, with 25% of sales online. Currently, JencoMart has little presence in Asia, but considers that market key for future growth.

Solution Concept

JencoMart wants to migrate several critical applications to the cloud but has not completed a technical review to determine their suitability for the cloud and the engineering required for migration. They currently host all of these applications on infrastructure that is at its end of life and is no longer supported.

Existing Technical Environment

JencoMart hosts all of its applications in 4 data centers: 3 in North American and 1 in Europe, most applications are dual-homed.

JencoMart understands the dependencies and resource usage metrics of their on-premises architecture.

Application Customer loyalty portal

LAMP (Linux, Apache, MySQL and PHP) application served from the two JencoMart-owned U.S. data centers.

Database

- Oracle Database stores user profiles
 - ✍ 20 TB
 - ✍ Complex table structure
 - ✍ Well maintained, clean data
 - ✍ Strong backup strategy
- PostgreSQL database stores user credentials
 - ✍ Single-homed in US West

No redundancy

Backed up every 12 hours

- ✍ 100% uptime service level agreement (SLA)

✍ Authenticates all users

Compute

- 30 machines in US West Coast, each machine has:

Twin, dual core CPUs

32GB of RAM

✍ Twin 250 GB HDD (RAID 1)

- 20 machines in US East Coast, each machine has:

Single dual-core CPU

24 GB of RAM

✍ Twin 250 GB HDD (RAID 1)

Storage

- Access to shared 100 TB SAN in each location
- Tape backup every week

Business Requirements

- Optimize for capacity during peak periods and value during off-peak periods
- Guarantee service availability and support
- Reduce on-premises footprint and associated financial and environmental impact.
- Move to outsourcing model to avoid large upfront costs associated with infrastructure purchase
- Expand services into Asia.

Technical Requirements

- Assess key application for cloud suitability.
- Modify application for the cloud.
- Move applications to a new infrastructure.
- Leverage managed services wherever feasible
- Sunset 20% of capacity in existing data centers
- Decrease latency in Asia

CEO Statement

JencoMart will continue to develop personal relationships with our customers as more people access the web. The future of our retail business is in the global market and the connection between online and in-store experiences. As a large global company, we also have a responsibility to the environment through 'green' initiatives and policies.

CTO Statement

The challenges of operating data centers prevents focus on key technologies critical to our long-term success. Migrating our data services to a public cloud infrastructure will allow us to focus on big data and machine learning to improve our service customers.

CFO Statement

Since its founding JencoMart has invested heavily in our data services infrastructure. However, because of changing market trends, we need to outsource our infrastructure to ensure our long-term success. This model will allow us to respond to increasing customer demand during peak and reduce costs.

Question No : 18 - (Topic 3)

For this question, refer to the JencoMart case study.

JencoMart has built a version of their application on Google Cloud Platform that serves traffic to Asia. You want to measure success against their business and technical goals. Which metrics should you track?

- A. Error rates for requests from Asia
- B. Latency difference between US and Asia
- C. Total visits, error rates, and latency from Asia
- D. Total visits and average latency for users in Asia
- E. The number of character sets present in the database

Answer: D

Question No : 19 - (Topic 3)

For this question, refer to the JencoMart case study

A few days after JencoMart migrates the user credentials database to Google Cloud Platform and shuts down the old server, the new database server stops responding to SSH connections. It is still serving database requests to the application servers correctly. What three steps should you take to diagnose the problem? Choose 3 answers

- A. Delete the virtual machine (VM) and disks and create a new one.
- B. Delete the instance, attach the disk to a new VM, and investigate.
- C. Take a snapshot of the disk and connect to a new machine to investigate.
- D. Check inbound firewall rules for the network the machine is connected to.
- E. Connect the machine to another network with very simple firewall rules and investigate.
- F. Print the Serial Console output for the instance for troubleshooting, activate the interactive console, and investigate.

Answer: C,D,F

Explanation:

<https://cloud.google.com/compute/docs/troubleshooting/troubleshooting-ssh>

D: Handling "Unable to connect on port 22" error message
Possible causes include:

There is no firewall rule allowing SSH access on the port. SSH access on port 22 is enabled on all Compute Engine instances by default. If you have disabled access, SSH from the Browser will not work. If you run sshd on a port other than 22, you need to enable the access to that port with a custom firewall rule.

The firewall rule allowing SSH access is enabled, but is not configured to allow connections from GCP Console services. Source IP addresses for browser-based SSH sessions are dynamically allocated by GCP Console and can vary from session to session.

References:

<https://cloud.google.com/compute/docs/ssh-in-browser>

<https://cloud.google.com/compute/docs/ssh-in-browser>

Question No : 20 - (Topic 3)

For this question, refer to the JencoMart case study.

JencoMart has decided to migrate user profile storage to Google Cloud Datastore and the application servers to Google Compute Engine (GCE). During the migration, the existing infrastructure will need access to Datastore to upload the data. What service account key-management strategy should you recommend?

- A.** Provision service account keys for the on-premises infrastructure and for the GCE virtual machines (VMs).
- B.** Authenticate the on-premises infrastructure with a user account and provision service account keys for the VMs.
- C.** Provision service account keys for the on-premises infrastructure and use Google Cloud Platform (GCP) managed keys for the VMs
- D.** Deploy a custom authentication service on GCE/Google Container Engine (GKE) for the on-premises infrastructure and use GCP managed keys for the VMs.

Answer: A

Explanation:

<https://cloud.google.com/iam/docs/understanding-service-accounts>

Migrating data to Google Cloud Platform

Let's say that you have some data processing that happens on another cloud provider and you want to transfer the processed data to Google Cloud Platform. You can use a service account from the virtual machines on the external cloud to push the data to Google Cloud Platform. To do this, you must create and download a service account key when you create the service account and then use that key from the external process to call the Cloud Platform APIs.

References:

https://cloud.google.com/iam/docs/understanding-service-accounts#migrating_data_to_google_cloud_platform

Question No : 21 - (Topic 3)

For this question, refer to the JencoMart case study.


The JencoMart security team requires that all Google Cloud Platform infrastructure is deployed using a least privilege model with separation of duties for administration between production and development resources. What Google domain and project structure should you recommend?

- A.** Create two G Suite accounts to manage users: one for development/test/staging and one for production. Each account should contain one project for every application.
- B.** Create two G Suite accounts to manage users: one with a single project for all development applications and one with a single project for all production applications.
- C.** Create a single G Suite account to manage users with each stage of each application in its own project.
- D.** Create a single G Suite account to manage users with one project for the development/test/staging environment and one project for the production environment.

Answer: D

Explanation:

Note: The principle of least privilege and separation of duties are concepts that, although semantically different, are intrinsically related from the standpoint of security. The intent behind both is to prevent people from having higher privilege levels than they actually need

 Principle of Least Privilege: Users should only have the least amount of privileges required to perform their job and no more. This reduces authorization exploitation

by limiting access to resources such as targets, jobs, or monitoring templates for which they are not authorized.

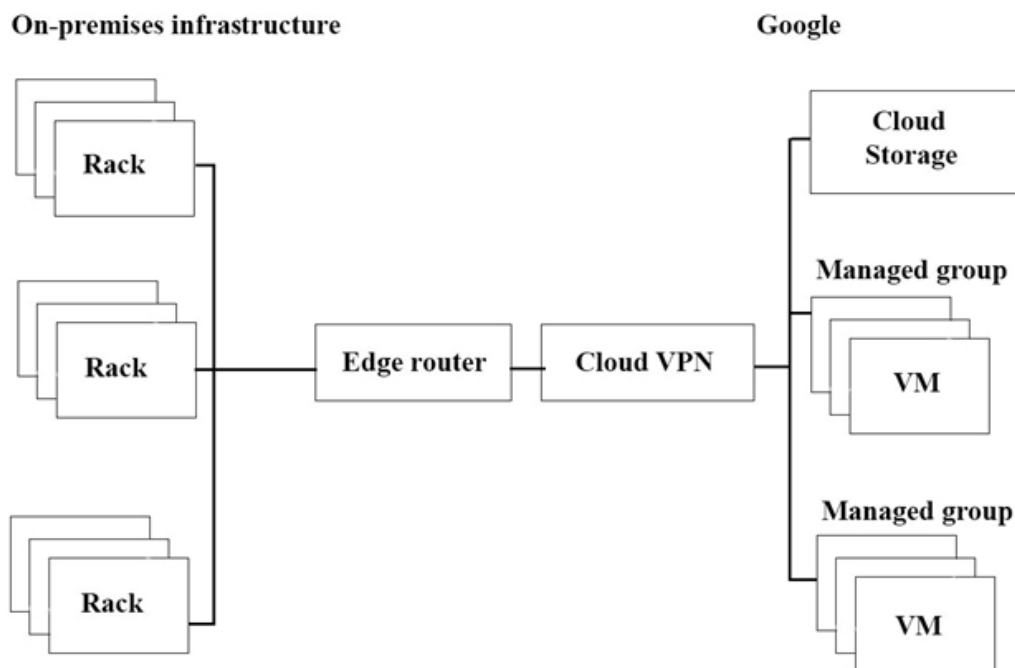
- ✍ Separation of Duties: Beyond limiting user privilege level, you also limit user duties, or the specific jobs they can perform. No user should be given responsibility for more than one related function. This limits the ability of a user to perform a malicious action and then cover up that action.

References: <https://cloud.google.com/kms/docs/separation-of-duties>

Question No : 22 - (Topic 3)

For this question, refer to the JencoMart case study.

The migration of JencoMart's application to Google Cloud Platform (GCP) is progressing too slowly. The infrastructure is shown in the diagram. You want to maximize throughput. What are three potential bottlenecks? (Choose 3 answers.)



- A. A single VPN tunnel, which limits throughput
- B. A tier of Google Cloud Storage that is not suited for this task
- C. A copy command that is not suited to operate over long distances
- D. Fewer virtual machines (VMs) in GCP than on-premises machines

- E. A separate storage layer outside the VMs, which is not suited for this task
- F. Complicated internet connectivity between the on-premises infrastructure and GCP

Answer: A,D,F

Question No : 23 - (Topic 3)

For this question, refer to the JencoMart case study.

JencoMart wants to move their User Profiles database to Google Cloud Platform. Which Google Database should they use?




- A. Cloud Spanner
- B. Google BigQuery
- C. Google Cloud SQL
- D. Google Cloud Datastore

Answer: D

Explanation:

<https://cloud.google.com/datastore/docs/concepts/overview>

Common workloads for Google Cloud Datastore:

-  User profiles
-  Product catalogs
-  Game state

References: <https://cloud.google.com/storage-options/>
<https://cloud.google.com/datastore/docs/concepts/overview>

Topic 4, Dress4Win case study

Company Overview

Dress4win is a web-based company that helps their users organize and manage their personal wardrobe using a website and mobile application. The company also cultivates an active social network that connects their users with designers and retailers. They monetize their services through advertising, e-commerce, referrals, and a freemium app model.

Company Background

Dress4win's application has grown from a few servers in the founder's garage to several hundred servers and appliances in a colocated data center. However, the capacity of their infrastructure is now insufficient for the application's rapid growth. Because of this growth and the company's desire to innovate faster, Dress4win is committing to a full migration to a public cloud.

Solution Concept

For the first phase of their migration to the cloud, Dress4win is considering moving their development and test environments. They are also considering building a disaster recovery site, because their current infrastructure is at a single location. They are not sure which components of their architecture they can migrate as is and which components they need to change before migrating them.

Existing Technical Environment

The Dress4win application is served out of a single data center location.

- ✍ Databases:
- ✍ Application servers:
- ✍ Storage appliances:
- ✍ Apache Hadoop/Spark servers:
- ✍ MQ servers:
- ✍ Miscellaneous servers:

Business Requirements

- ✍ Build a reliable and reproducible environment with scaled parity of production.
- ✍ Improve security by defining and adhering to a set of security and Identity and Access Management (IAM) best practices for cloud.
- ✍ Improve business agility and speed of innovation through rapid provisioning of new resources.
- ✍ Analyze and optimize architecture for performance in the cloud.
- ✍ Migrate fully to the cloud if all other requirements are met.

Technical Requirements

- ✍ Evaluate and choose an automation framework for provisioning resources in cloud.
- ✍ Support failover of the production environment to cloud during an emergency.
- ✍ Identify production services that can migrate to cloud to save capacity.
- ✍ Use managed services whenever possible.
- ✍ Encrypt data on the wire and at rest.
- ✍ Support multiple VPN connections between the production data center and cloud environment.

CEO Statement

Our investors are concerned about our ability to scale and contain costs with our current infrastructure. They are also concerned that a new competitor could use a public cloud platform to offset their up-front investment and freeing them to focus on developing better features.

CTO Statement

We have invested heavily in the current infrastructure, but much of the equipment is approaching the end of its useful life. We are consistently waiting weeks for new gear to be racked before we can start new projects. Our traffic patterns are highest in the mornings and weekend evenings; during other times, 80% of our capacity is sitting idle.

CFO Statement

Our capital expenditure is now exceeding our quarterly projections. Migrating to the cloud

will likely cause an initial increase in spending, but we expect to fully transition before our next hardware refresh cycle. Our total cost of ownership (TCO) analysis over the next 5 years puts a cloud strategy between 30 to 50% lower than our current model.

Question No : 24 - (Topic 4)

The current Dress4win system architecture has high latency to some customers because it is located in one

data center.

As of a future evaluation and optimizing for performance in the cloud, Dress4win wants to distribute its system

architecture to multiple locations when Google cloud platform.

Which approach should they use?

- A.** Use regional managed instance groups and a global load balancer to increase performance because the regional managed instance group can grow instances in each region separately based on traffic.
- B.** Use a global load balancer with a set of virtual machines that forward the requests to a closer group of virtual machines managed by your operations team.
- C.** Use regional managed instance groups and a global load balancer to increase reliability by providing automatic failover between zones in different regions.
- D.** Use a global load balancer with a set of virtual machines that forward the requests to a closer group of virtual machines as part of a separate managed instance groups.

Answer: A

Question No : 25 - (Topic 4)

Dress4win has end to end tests covering 100% of their endpoints.

They want to ensure that the move of cloud does not introduce any new bugs.

Which additional testing methods should the developers employ to prevent an outage?

- A.** They should run the end to end tests in the cloud staging environment to determine if the code is working as intended.
- B.** They should enable google stack driver debugger on the application code to show errors in the code
- C.** They should add additional unit tests and production scale load tests on their cloud staging environment.
- D.** They should add canary tests so developers can measure how much of an impact the new release causes to latency

Answer: B

Question No : 26 - (Topic 4)

For this question, refer to the Dress4Win case study.

Dress4Win has configured a new uptime check with Google Stackdriver for several of their legacy services. The Stackdriver dashboard is not reporting the services as healthy. What should they do?

- A.** Install the Stackdriver agent on all of the legacy web servers.
- B.** In the Cloud Platform Console download the list of the uptime servers' IP addresses and create an inbound firewall rule
- C.** Configure their load balancer to pass through the User-Agent HTTP header when the value matches GoogleStackdriverMonitoring-UptimeChecks
(<https://cloud.google.com/monitoring>)
- D.** Configure their legacy web servers to allow requests that contain user-Agent HTTP header when the value matches GoogleStackdriverMonitoring— UptimeChecks
(<https://cloud.google.com/monitoring>)

Answer: B

Question No : 27 - (Topic 4)

For this question, refer to the Dress4Win case study.

As part of their new application experience, Dress4Wm allows customers to upload images of themselves. The customer has exclusive control over who may view these images. Customers should be able to upload images with minimal latency and also be shown their

images quickly on the main application page when they log in. Which configuration should Dress4Win use?

- A.** Store image files in a Google Cloud Storage bucket. Use Google Cloud Datastore to maintain metadata that maps each customer's ID and their image files.
- B.** Store image files in a Google Cloud Storage bucket. Add custom metadata to the uploaded images in Cloud Storage that contains the customer's unique ID.
- C.** Use a distributed file system to store customers' images. As storage needs increase, add more persistent disks and/or nodes. Assign each customer a unique ID, which sets each file's owner attribute, ensuring privacy of images.
- D.** Use a distributed file system to store customers' images. As storage needs increase, add more persistent disks and/or nodes. Use a Google Cloud SQL database to maintain metadata that maps each customer's ID to their image files.

Answer: A

Question No : 28 - (Topic 4)

For this question, refer to the Dress4Win case study.

At Dress4Win, an operations engineer wants to create a low-cost solution to remotely archive copies of database backup files. The database files are compressed tar files stored in their current data center. How should he proceed?

- A.** Create a cron script using gsutil to copy the files to a Coldline Storage bucket.
- B.** Create a cron script using gsutil to copy the files to a Regional Storage bucket.
- C.** Create a Cloud Storage Transfer Service Job to copy the files to a Coldline Storage bucket.
- D.** Create a Cloud Storage Transfer Service job to copy the files to a Regional Storage bucket.

Answer: A

Explanation:

Follow these rules of thumb when deciding whether to use gsutil or Storage Transfer Service:

- ✍ When transferring data from an on-premises location, use gsutil.
- ✍ When transferring data from another cloud storage provider, use Storage Transfer Service.
- ✍ Otherwise, evaluate both tools with respect to your specific scenario.

Use this guidance as a starting point. The specific details of your transfer scenario will also help you determine which tool is more appropriate

<https://cloud.google.com/storage-transfer/docs/overview>

Question No : 29 - (Topic 4)

For this question, refer to the Dress4Win case study.

As part of Dress4Win's plans to migrate to the cloud, they want to be able to set up a managed logging and monitoring system so they can handle spikes in their traffic load. They want to ensure that:

- The infrastructure can be notified when it needs to scale up and down to handle the ebb and flow of usage throughout the day
- Their administrators are notified automatically when their application reports errors.
- They can filter their aggregated logs down in order to debug one piece of the application across many hosts

Which Google StackDriver features should they use?

- A. Logging, Alerts, Insights, Debug
- B. Monitoring, Trace, Debug, Logging
- C. Monitoring, Logging, Alerts, Error Reporting
- D. Monitoring, Logging, Debug, Error Report

Answer: D

Question No : 30 - (Topic 4)

For this question, refer to the Dress4Win case study.

Dress4Win has asked you to recommend machine types they should deploy their application servers to. How should you proceed?

- A. Perform a mapping of the on-premises physical hardware cores and RAM to the nearest machine types in the cloud.

- B.** Recommend that Dress4Win deploy application servers to machine types that offer the highest RAM to CPU ratio available.
- C.** Recommend that Dress4Win deploy into production with the smallest instances available, monitor them over time, and scale the machine type up until the desired performance is reached.
- D.** Identify the number of virtual cores and RAM associated with the application server virtual machines align them to a custom machine type in the cloud, monitor performance, and scale the machine types up until the desired performance is reached.

Answer: C

Question No : 31 - (Topic 4)

For this question, refer to the Dress4Win case study.

You want to ensure Dress4Win's sales and tax records remain available for infrequent viewing by auditors for at least 10 years. Cost optimization is your top priority. Which cloud services should you choose?

- A.** Google Cloud Storage Coldline to store the data, and gsutil to access the data.
- B.** Google Cloud Storage Nearline to store the data, and gsutil to access the data.
- C.** Google Bigtable with US or EU as location to store the data, and gcloud to access the data.
- D.** BigQuery to store the data, and a web server cluster in a managed instance group to access the data. Google Cloud SQL mirrored across two distinct regions to store the data, and a Redis cluster in a managed instance group to access the data.

Answer: A

Explanation: References: <https://cloud.google.com/storage/docs/storage-classes>

Question No : 32 - (Topic 4)

For this question, refer to the Dress4Win case study.

Dress4Win would like to become familiar with deploying applications to the cloud by successfully deploying some applications quickly, as is. They have asked for your recommendation. What should you advise?

- A. Identify self-contained applications with external dependencies as a first move to the cloud.
- B. Identify enterprise applications with internal dependencies and recommend these as a first move to the cloud.
- C. Suggest moving their in-house databases to the cloud and continue serving requests to on-premise applications.
- D. Recommend moving their message queuing servers to the cloud and continue handling requests to on-premise applications.

Answer: A

Explanation: <https://cloud.google.com/blog/products/gcp/the-five-phases-of-migrating-to-google-cloud-platform>

Question No : 33 - (Topic 4)

For this question, refer to the Dress4Win case study.

The Dress4Win security team has disabled external SSH access into production virtual machines (VMs) on Google Cloud Platform (GCP). The operations team needs to remotely manage the VMs, build and push Docker containers, and manage Google Cloud Storage objects. What can they do?

- A. Grant the operations engineers access to use Google Cloud Shell.
- B. Configure a VPN connection to GCP to allow SSH access to the cloud VMs.
- C. Develop a new access request process that grants temporary SSH access to cloud VMs when an operations engineer needs to perform a task.
- D. Have the development team build an API service that allows the operations team to execute specific remote procedure calls to accomplish their tasks.

Answer: A

Question No : 34 - (Topic 4)

For this question, refer to the Dress4Win case study.

Dress4Win has asked you for advice on how to migrate their on-premises MySQL

deployment to the cloud. They want to minimize downtime and performance impact to their on-premises solution during the migration. Which approach should you recommend?

- A.** Create a dump of the on-premises MySQL master server, and then shut it down, upload it to the cloud environment, and load into a new MySQL cluster.
- B.** Setup a MySQL replica server/slave in the cloud environment, and configure it for asynchronous replication from the MySQL master server on-premises until cutover.
- C.** Create a new MySQL cluster in the cloud, configure applications to begin writing to both on-premises and cloud MySQL masters, and destroy the original cluster at cutover.
- D.** Create a dump of the MySQL replica server into the cloud environment, load it into: Google Cloud Datastore, and configure applications to read/write to Cloud Datastore at cutover.

Answer: B

Question No : 35 - (Topic 4)

For this question, refer to the Dress4Win case study.

Dress4Win has end-to-end tests covering 100% of their endpoints. They want to ensure that the move to the cloud does not introduce any new bugs. Which additional testing methods should the developers employ to prevent an outage?

- A.** They should enable Google Stackdriver Debugger on the application code to show errors in the code.
- B.** They should add additional unit tests and production scale load tests on their cloud staging environment.
- C.** They should run the end-to-end tests in the cloud staging environment to determine if the code is working as intended.
- D.** They should add canary tests so developers can measure how much of an impact the new release causes to latency.

Answer: B

Topic 5, Misc Questions

Question No : 36 - (Topic 5)

Your company has a Google Cloud project that uses BigQuery for data warehousing. They

have a VPN tunnel between the on-premises environment and Google Cloud that is configured with Cloud VPN. The security team wants to avoid data exfiltration by malicious insiders, compromised code, and accidental oversharing. What should they do?

- A. Configure Private Google Access for on-premises only.
- B. Perform the following tasks:
 - 1) Create a service account.
 - 2) Give the BigQuery JobUser role and Storage Reader role to the service account.
 - 3) Remove all other IAM access from the project.
- C. Configure VPC Service Controls and configure Private Google Access.
- D. Configure Private Google Access.

Answer: C

Question No : 37 - (Topic 5)

You need to develop procedures to verify resilience of disaster recovery for remote recovery using GCP. Your production environment is hosted on-premises. You need to establish a secure, redundant connection between your on premises network and the GCP network.

What should you do?

- A. Verify that Dedicated Interconnect can replicate files to GCP. Verify that direct peering can establish a secure connection between your networks if Dedicated Interconnect fails.
- B. Verify that Dedicated Interconnect can replicate files to GCP. Verify that Cloud VPN can establish a secure connection between your networks if Dedicated Interconnect fails.
- C. Verify that the Transfer Appliance can replicate files to GCP. Verify that direct peering can establish a secure connection between your networks if the Transfer Appliance fails.
- D. Verify that the Transfer Appliance can replicate files to GCP. Verify that Cloud VPN can establish a secure connection between your networks if the Transfer Appliance fails.

Answer: B

Explanation: <https://cloud.google.com/interconnect/docs/how-to/direct-peering>

Question No : 38 - (Topic 5)

You are developing an application using different microservices that should remain internal to the cluster. You want to be able to configure each microservice with a specific number of replicas. You also want to be able to address a specific microservice from any other microservice in a uniform way, regardless of the number of replicas the microservice scales to. You need 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 name to address the Pod from other microservices within the cluster.

Answer: A

Explanation: <https://kubernetes.io/docs/concepts/services-networking/ingress/>

Question No : 39 - (Topic 5)

You have deployed several instances on Compute Engine. As a security requirement, instances cannot have a public IP address. There is no VPN connection between Google Cloud and your office, and you need to connect via SSH into a specific machine without violating the security requirements. What should you do?

- A.** Configure Cloud NAT on the subnet where the instance is hosted. Create an SSH connection to the Cloud NAT IP address to reach the instance.
- B.** Add all instances to an unmanaged instance group. Configure TCP Proxy Load Balancing with the instance group as a backend. Connect to the instance using the TCP Proxy IP.
- C.** Configure Identity-Aware Proxy (IAP) for the instance and ensure that you have the role of IAP-secured Tunnel User. Use the gcloud command line tool to ssh into the instance.
- D.** Create a bastion host in the network to SSH into the bastion host from your office location. From the bastion host, SSH into the desired instance.

Answer: C

Explanation:

https://cloud.google.com/iap/docs/using-tcp-forwarding#tunneling_with_ssh

Leveraging the BeyondCorp security model. "This January, we enhanced context-aware access capabilities in Cloud Identity-Aware Proxy (IAP) to help you protect SSH and RDP access to your virtual machines (VMs)—without needing to provide your VMs with public IP addresses, and without having to set up bastion hosts. "

<https://cloud.google.com/blog/products/identity-security/cloud-iap-enables-context-aware-access-to-vms-via-ssh-and-rdp-without-bastion-hosts>

Reference: <https://cloud.google.com/solutions/connecting-securely>

Question No : 40 - (Topic 5)

You need to reduce the number of unplanned rollbacks of erroneous production deployments in your company's web hosting platform. Improvement to the QA/Test processes accomplished an 80% reduction. Which additional two approaches can you take to further reduce the rollbacks? Choose 2 answers

- A. Introduce a green-blue deployment model.
- B. Replace the QA environment with canary releases.
- C. Fragment the monolithic platform into microservices.
- D. Reduce the platform's dependency on relational database systems.
- E. Replace the platform's relational database systems with a NoSQL database.

Answer: A,C

Question No : 41 - (Topic 5)

Your application needs to process credit card transactions. You want the smallest scope of Payment Card Industry (PCI) compliance without compromising the ability to analyze transactional data and trends relating to which payment methods are used. How should you design your architecture?

- A. Create a tokenizer service and store only tokenized data.
- B. Create separate projects that only process credit card data.
- C. Create separate subnetworks and isolate the components that process credit card data.