

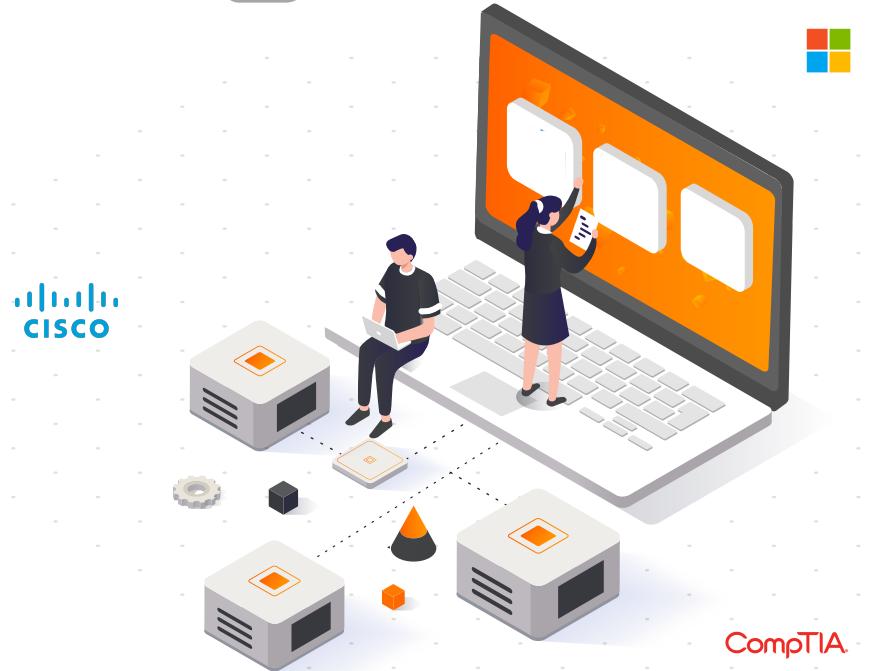


# CertyIQ

## Premium exam material

Get certification quickly with the CertyIQ Premium exam material.  
Everything you need to prepare, learn & pass your certification exam easily. Lifetime free updates  
**First attempt guaranteed success.**

<https://www.CertyIQ.com>



CompTIA

# About CertyIQ

We here at CertyIQ eventually got enough of the industry's greedy exam paid for. Our team of IT professionals comes with years of experience in the IT industry Prior to training CertyIQ we worked in test areas where we observed the horrors of the paywall exam preparation system.

The misuse of the preparation system has left our team disillusioned. And for that reason, we decided it was time to make a difference. We had to make In this way, CertyIQ was created to provide quality materials without stealing from everyday people who are trying to make a living.

## Doubt Support

We have developed a very scalable solution using which we are able to solve 400+ doubts every single day with an average rating of 4.8 out of 5.

<https://www.certyiq.com>

Mail us on - [certyiqofficial@gmail.com](mailto:certyiqofficial@gmail.com)



### Lifetime Free Updates

We provide lifetime free updates to our customers. To make life easier for our valued customers and fulfill their needs



### Free Exam PDF

You are sure to pass the exam completely free of charge



### Money Back Guarantee

We Provide 100% money back guarantee to our customer in case of any failure

John

October 19, 2022



Thanks you so much for your help. I scored 972 in my exam today. More than 90% were from your PDFs!

October 22, 2022



Passed my exam today with 891 marks. Out of 52 questions, 51 were from certyiq PDFs including Contoso case study. Thank You certyiq team!

Dana

September 04, 2022



Thanks a lot for this updated AZ-900 Q&A. I just passed my exam and got 974, I followed both of your Az-900 videos and the 6 PDF, the PDFs are very much valid, all answers are correct. Could you please create a similar video/PDF for DP900, your content/PDF's is really awesome. The team did a really good job. Thank You 😊.

Henry Rome

2 months ago



These questions are real and 100 % valid. Thank you so much for your efforts, also your 4 PDFs are awesome, I passed the DP900 exam on 1 Sept. With 968 marks. Thanks a lot, buddy!

Esmaria

2 months ago



Simple easy to understand explanations. To anyone out there wanting to write AZ900, I highly recommend 6 PDF's. Thank you so much, appreciate all your hard work in having such great content. Passed my exam Today - 3 September with 942 score.

Ahamed Shibly

2 months ago



Customer support is realy fast and helpful, I just finished my exam and this video along with the 6 PDF helped me pass! Definitely recommend getting the PDFs. Thank you!

# Google

(Professional Data Engineer)

Professional Data Engineer on Google Cloud Platform

Total: **389 Questions**

Link: <https://certiq.com/papers/google/professional-data-engineer>

**Question: 1**

Your company built a TensorFlow neural-network model with a large number of neurons and layers. The model fits well for the training data. However, when tested against new data, it performs poorly. What method can you employ to address this?

- A. Threading
- B. Serialization
- C. Dropout Methods
- D. Dimensionality Reduction

**Answer: C****Explanation:**

Bad performance of a model is either due to lack of relationship between dependent and independent variables used, or just overfit due to having used too many features and/or bad features.

A: Threading parallelisation can reduce training time, but if the selected features are the same then the resulting performance won't have changed

B: Serialization is only changing data into byte streams. This won't be useful.

C: This can show which features are bad. E.g. if it is one feature causing bad performance, then the dropout method will show it, so you can remove it from the model and retrain it.

D: This would become clear if the model did not fit the training data well. But the question says that the model fits the training data well, so D is not the answer.

**Reference:**

<https://medium.com/mlreview/a-simple-deep-learning-model-for-stock-price-prediction-using-tensorflow-30505541d877>

Please note that there are tons of ways of further improving this result: design of layers and neurons, choosing different initialization and activation schemes, introduction of dropout layers of neurons, early stopping and so on. Furthermore, different types of deep learning models, such as recurrent neural networks might achieve better performance on this task. However, this is not the scope of this introductory post.

**Question: 2**

You are building a model to make clothing recommendations. You know a user's fashion preference is likely to change over time, so you build a data pipeline to stream new data back to the model as it becomes available. How should you use this data to train the model?

- A. Continuously retrain the model on just the new data.
- B. Continuously retrain the model on a combination of existing data and the new data.
- C. Train on the existing data while using the new data as your test set.

D. Train on the new data while using the existing data as your test set.

**Answer: B**

**Explanation:**

As new data can be with new features. Hence the new data can be split to both training and test data to retrain as well as with existing data. because we have to use a combination of old and new test data as well as training data.

**CertyIQ**

**Question: 3**

You designed a database for patient records as a pilot project to cover a few hundred patients in three clinics. Your design used a single database table to represent all patients and their visits, and you used self-joins to generate reports. The server resource utilization was at 50%. Since then, the scope of the project has expanded. The database must now store 100 times more patient records. You can no longer run the reports, because they either take too long or they encounter errors with insufficient compute resources. How should you adjust the database design?

- A. Add capacity (memory and disk space) to the database server by the order of 200.
- B. Shard the tables into smaller ones based on date ranges, and only generate reports with prespecified date ranges.
- C. Normalize the master patient-record table into the patient table and the visits table, and create other necessary tables to avoid self-join.
- D. Partition the table into smaller tables, with one for each clinic. Run queries against the smaller table pairs, and use unions for consolidated reports.

**Answer: C**

**Explanation:**

Based on Google documentation, self-join is an anti-pattern because this option provides the least amount of inconvenience over using pre-specified date ranges or one table per clinic while also increasing performance due to avoiding self-joins.

**Reference:**

<https://cloud.google.com/bigquery/docs/best-practices-performance-patterns>

**CertyIQ**

**Question: 4**

You create an important report for your large team in Google Data Studio 360. The report uses Google BigQuery as its data source. You notice that visualizations are not showing data that is less than 1 hour old. What should you do?

- A. Disable caching by editing the report settings.
- B. Disable caching in BigQuery by editing table details.
- C. Refresh your browser tab showing the visualizations.
- D. Clear your browser history for the past hour then reload the tab showing the visualizations.

**Answer: A**

**Explanation:**

Disable caching by editing the report settings.

A cache is a temporary data storage system. Fetching cached data can be much faster than fetching it directly from the underlying data set, and helps reduce the number of queries sent, minimizing costs for paid data access.

Reference:

<https://support.google.com/datastudio/answer/7020039?hl=en#zippy=%2Cin-this-article>

<https://support.google.com/datastudio/answer/7020039?hl=en>

## How to tell if report data is cached

You can see if data is coming from the cache by viewing the report and looking in the bottom left corner. When all the charts on the current page are being served from the cache, you'll see a lightning bolt icon along with the time and date of the last update .

## Blending and cached data

For a blended data source, the cache will use the setting that satisfies the desired refresh times for all of the data sources included in the blend.

For example, if you blend a Sheets data source having a refresh time of 15 minutes, with a BigQuery data source having a refresh time of 4 hours, the resulting blended data source will have a refresh time of 15 minutes.

### Question: 5

CertyIQ

An external customer provides you with a daily dump of data from their database. The data flows into Google Cloud Storage GCS as comma-separated values (CSV) files. You want to analyze this data in Google BigQuery, but the data could have rows that are formatted incorrectly or corrupted. How should you build this pipeline?

- A. Use federated data sources, and check data in the SQL query.
- B. Enable BigQuery monitoring in Google Stackdriver and create an alert.
- C. Import the data into BigQuery using the gcloud CLI and set max\_bad\_records to 0.
- D. Run a Google Cloud Dataflow batch pipeline to import the data into BigQuery, and push errors to another dead-letter table for analysis.

### Answer: D

**Explanation:**

Run a Google Cloud Dataflow batch pipeline to import the data into BigQuery, and push errors to another dead-letter table for analysis.

By running a Cloud Dataflow pipeline to import the data, you can perform data validation, cleaning and transformation before it gets loaded into BigQuery. Dataflow allows you to handle corrupted or incorrectly formatted rows by pushing them to another dead-letter table for analysis. This way, you can ensure that only clean and correctly formatted data is loaded into BigQuery for analysis.

**Question: 6**

Your weather app queries a database every 15 minutes to get the current temperature. The frontend is powered by Google App Engine and serves millions of users. How should you design the frontend to respond to a database failure?

- A. Issue a command to restart the database servers.
- B. Retry the query with exponential backoff, up to a cap of 15 minutes.
- C. Retry the query every second until it comes back online to minimize staleness of data.
- D. Reduce the query frequency to once every hour until the database comes back online.

**Answer: B****Explanation:**

App engine creates applications that use Cloud SQL database connections effectively. Below is what is written in google cloud documentation.

If your application attempts to connect to the database and does not succeed, the database could be temporarily unavailable. In this case, sending too many simultaneous connection requests might waste additional database resources and increase the time needed to recover. Using exponential backoff prevents your application from sending an unresponsive number of connection requests when it can't connect to the database.

This retry only makes sense when first connecting, or when first grabbing a connection from the pool. If errors happen in the middle of a transaction, the application must do the retrying, and it must retry from the beginning of a transaction. So even if your pool is configured properly, the application might still see errors if connections are lost.

**Reference:**

<https://cloud.google.com/sql/docs/mysql/manage-connections>

**Question: 7**

You are creating a model to predict housing prices. Due to budget constraints, you must run it on a single resource-constrained virtual machine. Which learning algorithm should you use?

- A. Linear regression
- B. Logistic classification
- C. Recurrent neural network
- D. Feedforward neural network

**Answer: A****Explanation:**

A tip here to decide when a linear regression should be used or logistic regression needs to be used. If you are forecasting that is the values in the column that you are predicting is numeric, it is always linear regression. If you are classifying, that is buy or no buy, yes or no, you will be using logistic regression.

**Question: 8**

You are building new real-time data warehouse for your company and will use Google BigQuery streaming inserts. There is no guarantee that data will only be sent in once but you do have a unique ID for each row of data and an event timestamp. You want to ensure that duplicates are not included while interactively querying data. Which query type should you use?

- A. Include ORDER BY DESC on timestamp column and LIMIT to 1.
- B. Use GROUP BY on the unique ID column and timestamp column and SUM on the values.
- C. Use the LAG window function with PARTITION by unique ID along with WHERE LAG IS NOT NULL.
- D. Use the ROW\_NUMBER window function with PARTITION by unique ID along with WHERE row equals 1.

**Answer: D****Explanation:**

Description: Row Number equals 1 with partitioning will ensure only one record is fetched per partition

**Question: 9**

Your company is using WILDCARD tables to query data across multiple tables with similar names. The SQL statement is currently failing with the following error:

```
# Syntax error : Expected end of statement but got "-" at [4:11]
SELECT age
FROM
    bigquery-public-data.noaa_gsod.gsod
WHERE
    age != 99
    AND_TABLE_SUFFIX = '1929'
ORDER BY
    age DESC
```

Which table name will make the SQL statement work correctly?

- A. 'bigquery-public-data.noaa\_gsod.gsod'
- B. bigquery-public-data.noaa\_gsod.gsod\*
- C. 'bigquery-public-data.noaa\_gsod.gsod'\*
- D. 'bigquery-public-data.noaa\_gsod.gsod\*'

**Answer: D****Explanation:**

Reference:

<https://cloud.google.com/bigquery/docs/wildcard-tables>

## Filtering selected tables using \_TABLE\_SUFFIX

To restrict a query so that it scans only a specified set of tables, use the `_TABLE_SUFFIX` pseudo column in a `WHERE` clause with a condition that is a constant expression.

The `_TABLE_SUFFIX` pseudo column contains the values matched by the table wildcard. For example, the previous sample query, which scans all tables from the 1940s, uses a table wildcard to represent the last digit of the year:

```
FROM  
`bigquery-public-data.noaa_gsod.gsod194*`
```



### Question: 10

CertyIQ

Your company is in a highly regulated industry. One of your requirements is to ensure individual users have access only to the minimum amount of information required to do their jobs. You want to enforce this requirement with Google BigQuery. Which three approaches can you take? (Choose three.)

- A. Disable writes to certain tables.
- B. Restrict access to tables by role.
- C. Ensure that the data is encrypted at all times.
- D. Restrict BigQuery API access to approved users.
- E. Segregate data across multiple tables or databases.
- F. Use Google Stackdriver Audit Logging to determine policy violations.

### Answer: BDE

#### Explanation:

- B. Restrict access to tables by role: You can define roles in BigQuery and grant specific permissions to these roles to control who can access particular tables.
- D. Restrict BigQuery API access to approved users: You can control access to the BigQuery API and, consequently, to the underlying data by ensuring that only approved users or services can make API requests.
- E. Segregate data across multiple tables or databases: You can separate data into different tables or databases based on user access requirements, which allows you to limit users' access to specific data sets.

These approaches, when used together, can help you enforce data access controls in a regulated environment. Options A, C, and F are also important considerations but are not direct methods for enforcing fine-grained access control to specific data.

### Question: 11

CertyIQ

You are designing a basket abandonment system for an ecommerce company. The system will send a message to a user based on these rules:

- ⇒ No interaction by the user on the site for 1 hour
- Has added more than \$30 worth of products to the basket
- ⇒ Has not completed a transaction

You use Google Cloud Dataflow to process the data and decide if a message should be sent. How should you design the pipeline?

- A. Use a fixed-time window with a duration of 60 minutes.
- B. Use a sliding time window with a duration of 60 minutes.
- C. Use a session window with a gap time duration of 60 minutes.
- D. Use a global window with a time based trigger with a delay of 60 minutes.

**Answer: C**

**Explanation:**

Use a session window with a gap time duration of 60 minutes.

**CertyIQ**

### Question: 12

Your company handles data processing for a number of different clients. Each client prefers to use their own suite of analytics tools, with some allowing direct query access via Google BigQuery. You need to secure the data so that clients cannot see each other's data. You want to ensure appropriate access to the data.

Which three steps should you take? (Choose three.)

- A. Load data into different partitions.
- B. Load data into a different dataset for each client.
- C. Put each client's BigQuery dataset into a different table.
- D. Restrict a client's dataset to approved users.
- E. Only allow a service account to access the datasets.
- F. Use the appropriate identity and access management (IAM) roles for each client's users.

**Answer: BDF**

**Explanation:**

- B. Load data into a different dataset for each client.
- D. Restrict a client's dataset to approved users.
- F. Use the appropriate identity and access management (IAM) roles for each client's users.

By loading each client's data into a separate dataset, you ensure that each client's data is isolated from the data of other clients. Restricting access to each client's dataset to only approved users, as specified in D, further enhances data security by ensuring that only authorized users can access the data. By using appropriate IAM roles for each client's users, as specified in F, you can grant different levels of access to different clients and their users, ensuring that each client has only the level of access required for their specific needs.

**CertyIQ**

### Question: 13

You want to process payment transactions in a point-of-sale application that will run on Google Cloud Platform. Your user base could grow exponentially, but you do not want to manage infrastructure scaling. Which Google database service should you use?

- A. Cloud SQL
- B. BigQuery

- C. Cloud Bigtable
- D. Cloud Datastore

**Answer: D**

**Explanation:**

As user base grows, write transaction grows since we are dealing with POS (that not the place for reading but writing). In order to accommodate more writes in transactional flavor which can be horizontally scalable DATASTORE should be preferred.

**CertyIQ**

**Question: 14**

You want to use a database of information about tissue samples to classify future tissue samples as either normal or mutated. You are evaluating an unsupervised anomaly detection method for classifying the tissue samples. Which two characteristic support this method? (Choose two.)

- A. There are very few occurrences of mutations relative to normal samples.
- B. There are roughly equal occurrences of both normal and mutated samples in the database.
- C. You expect future mutations to have different features from the mutated samples in the database.
- D. You expect future mutations to have similar features to the mutated samples in the database.
- E. You already have labels for which samples are mutated and which are normal in the database.

**Answer: AC**

**Explanation:**

Anomaly detection unsupervised learning

The objective of Unsupervised Anomaly Detection is to detect previously unseen rare objects or events without any prior knowledge about these. The only information available is that the percentage of anomalies in the dataset is small, usually less than 1%.

Reference:

[https://paperswithcode.com/task/unsupervised-anomaly-detection#:~:text=The%20objective%20of%20Unsupervised%20Anomaly,%2C%20usually%20less%20than%201%](https://paperswithcode.com/task/unsupervised-anomaly-detection#:~:text=The%20objective%20of%20Unsupervised%20Anomaly,%2C%20usually%20less%20than%201%20)

**CertyIQ**

**Question: 15**

You need to store and analyze social media postings in Google BigQuery at a rate of 10,000 messages per minute in near real-time. Initially, design the application to use streaming inserts for individual postings. Your application also performs data aggregations right after the streaming inserts. You discover that the queries after streaming inserts do not exhibit strong consistency, and reports from the queries might miss in-flight data. How can you adjust your application design?

- A. Re-write the application to load accumulated data every 2 minutes.
- B. Convert the streaming insert code to batch load for individual messages.
- C. Load the original message to Google Cloud SQL, and export the table every hour to BigQuery via streaming inserts.
- D. Estimate the average latency for data availability after streaming inserts, and always run queries after

waiting twice as long.

**Answer: D**

**Explanation:**

The data is first comes to buffer and then written to Storage. If we are running queries in buffer we will face above mentioned issues. If we wait for the bigquery to write the data to storage then we won't face the issue. So We need to wait till it's written to storage

**Question: 16**

**CertyIQ**

Your startup has never implemented a formal security policy. Currently, everyone in the company has access to the datasets stored in Google BigQuery. Teams have freedom to use the service as they see fit, and they have not documented their use cases. You have been asked to secure the data warehouse. You need to discover what everyone is doing. What should you do first?

- A. Use Google Stackdriver Audit Logs to review data access.
- B. Get the identity and access management (IAM) policy of each table
- C. Use Stackdriver Monitoring to see the usage of BigQuery query slots.
- D. Use the Google Cloud Billing API to see what account the warehouse is being billed to.

**Answer: A**

**Explanation:**

Description: First we need to know who is accessing what then we can create suitable policies. Stackdriver is used to track access logs for Bigquery,

**Question: 17**

**CertyIQ**

Your company is migrating their 30-node Apache Hadoop cluster to the cloud. They want to re-use Hadoop jobs they have already created and minimize the management of the cluster as much as possible. They also want to be able to persist data beyond the life of the cluster. What should you do?

- A. Create a Google Cloud Dataflow job to process the data.
- B. Create a Google Cloud Dataproc cluster that uses persistent disks for HDFS.
- C. Create a Hadoop cluster on Google Compute Engine that uses persistent disks.
- D. Create a Cloud Dataproc cluster that uses the Google Cloud Storage connector.
- E. Create a Hadoop cluster on Google Compute Engine that uses Local SSD disks.

**Answer: D**

**Explanation:**

Dataproc is used to migrate Hadoop and Spark jobs on GCP. Dataproc with GCS connected through Google Cloud Storage connector helps store data after the life of the cluster. When the job is high I/O intensive, then we need to create a small persistent disk.

**Question: 18**

**CertyIQ**

Business owners at your company have given you a database of bank transactions. Each row contains the user ID, transaction type, transaction location, and transaction amount. They ask you to investigate what type of machine learning can be applied to the data. Which three machine learning applications can you use? (Choose three.)

- A. Supervised learning to determine which transactions are most likely to be fraudulent.
- B. Unsupervised learning to determine which transactions are most likely to be fraudulent.
- C. Clustering to divide the transactions into N categories based on feature similarity.
- D. Supervised learning to predict the location of a transaction.
- E. Reinforcement learning to predict the location of a transaction.
- F. Unsupervised learning to predict the location of a transaction.

**Answer: BCD**

**Explanation:**

B - Not labelled as Fraud or not. So Unsupervised.

C - Clustering can be done based on location, amount etc.

D - Location is already given. So labelled. Hence supervised.

Fraud is not a feature, so unsupervised, location is given so supervised, Clustering can be done looking at the done with same features

BCD makes more sense to me. Its for sure not unsupervised, since locations are in the data already.

Reinforcement also doesn't fit, as there no AI and no interactions with data from the observer.

**Question: 19**

**CertyIQ**

Your company's on-premises Apache Hadoop servers are approaching end-of-life, and IT has decided to migrate the cluster to Google Cloud Dataproc. A like-for-like migration of the cluster would require 50 TB of Google Persistent Disk per node. The CIO is concerned about the cost of using that much block storage. You want to minimize the storage cost of the migration. What should you do?

- A. Put the data into Google Cloud Storage.
- B. Use preemptible virtual machines (VMs) for the Cloud Dataproc cluster.
- C. Tune the Cloud Dataproc cluster so that there is just enough disk for all data.
- D. Migrate some of the cold data into Google Cloud Storage, and keep only the hot data in Persistent Disk.

**Answer: A**

**Explanation:**

First rule of dataproc is to keep data in GCS

**Question: 20**

**CertyIQ**

You work for a car manufacturer and have set up a data pipeline using Google Cloud Pub/Sub to capture anomalous sensor events. You are using a push subscription in Cloud Pub/Sub that calls a custom HTTPS endpoint that you have created to take action of these anomalous events as they occur. Your custom HTTPS endpoint keeps getting an inordinate amount of duplicate messages. What is the most likely cause of these duplicate messages?

- A. The message body for the sensor event is too large.
- B. Your custom endpoint has an out-of-date SSL certificate.
- C. The Cloud Pub/Sub topic has too many messages published to it.
- D. Your custom endpoint is not acknowledging messages within the acknowledgement deadline.

**Answer: D**

**Explanation:**

The custom endpoint is not acknowledging the message, that is the reason for Pub/Sub to send the message again and again. Not acknowledging a message makes Pub/Sub to think it has not been received, so it sends duplicate messages.

### Question: 21

**CertyIQ**

Your company uses a proprietary system to send inventory data every 6 hours to a data ingestion service in the cloud. Transmitted data includes a payload of several fields and the timestamp of the transmission. If there are any concerns about a transmission, the system re-transmits the data. How should you deduplicate the data most efficiently?

- A. Assign global unique identifiers (GUID) to each data entry.
- B. Compute the hash value of each data entry, and compare it with all historical data.
- C. Store each data entry as the primary key in a separate database and apply an index.
- D. Maintain a database table to store the hash value and other metadata for each data entry.

**Answer: A**

**Explanation:**

Inventory data can often be naturally duplicate. Assigning a unique GUID at sender's end is ensuring that we can track a unique record reliably at the receiving end and if there are issues which causes same field to be sent twice, we can easily dedup using the GUID with lesser hassle.

Answer "D" is not as efficient or error-proof due to two reasons

1. You need to calculate hash at sender as well as at receiver end to do the comparison. Waste of computing power.
2. Even if we discount the computing power, we should note that the system is sending inventory information. Two messages sent at different times can denote same inventory level (and thus have same hash). Adding sender time stamp to hash will defeat the purpose of using hash as now retried messages will have different timestamp and a different hash.

If timestamp is used as message creation timestamp than that can also be used as a UUID.

### Question: 22

**CertyIQ**

Your company has hired a new data scientist who wants to perform complicated analyses across very large datasets stored in Google Cloud Storage and in a Cassandra cluster on Google Compute Engine. The scientist primarily wants to create labelled data sets for machine learning projects, along with some visualization tasks. She reports that her laptop is not powerful enough to perform her tasks and it is slowing her down. You want to help her perform her tasks.

What should you do?

- A. Run a local version of Jupiter on the laptop.
- B. Grant the user access to Google Cloud Shell.
- C. Host a visualization tool on a VM on Google Compute Engine.
- D. Deploy Google Cloud Datalab to a virtual machine (VM) on Google Compute Engine.

**Answer: D**

**Explanation:**

Datalab provides Jupyter for this kind of work

Cloud Datalab -> AI Notebooks -> Vertex AI Workbench

**CertyIQ**

**Question: 23**

You are deploying 10,000 new Internet of Things devices to collect temperature data in your warehouses globally. You need to process, store and analyze these very large datasets in real time. What should you do?

- A. Send the data to Google Cloud Datastore and then export to BigQuery.
- B. Send the data to Google Cloud Pub/Sub, stream Cloud Pub/Sub to Google Cloud Dataflow, and store the data in Google BigQuery.
- C. Send the data to Cloud Storage and then spin up an Apache Hadoop cluster as needed in Google Cloud Dataproc whenever analysis is required.
- D. Export logs in batch to Google Cloud Storage and then spin up a Google Cloud SQL instance, import the data from Cloud Storage, and run an analysis as needed.

**Answer: B**

**Explanation:**

Pubsub for realtime, Dataflow for pipeline, Bigquery for analytics. You can use cloud data flow for both batch and streaming pipelines. Pub sub will be used to stream data into cloud data flow.

**CertyIQ**

**Question: 24**

You have spent a few days loading data from comma-separated values (CSV) files into the Google BigQuery table CLICK\_STREAM. The column DT stores the epoch time of click events. For convenience, you chose a simple schema where every field is treated as the STRING type. Now, you want to compute web session durations of users who visit your site, and you want to change its data type to the TIMESTAMP. You want to minimize the migration effort without making future queries computationally expensive. What should you do?

- A. Delete the table CLICK\_STREAM, and then re-create it such that the column DT is of the TIMESTAMP type. Reload the data.
- B. Add a column TS of the TIMESTAMP type to the table CLICK\_STREAM, and populate the numeric values from the column TS for each row. Reference the column TS instead of the column DT from now on.
- C. Create a view CLICK\_STREAM\_V, where strings from the column DT are cast into TIMESTAMP values. Reference the view CLICK\_STREAM\_V instead of the table CLICK\_STREAM from now on.
- D. Add two columns to the table CLICK\_STREAM: TS of the TIMESTAMP type and IS\_NEW of the BOOLEAN type. Reload all data in append mode. For each appended row, set the value of IS\_NEW to true. For future queries, reference the column TS instead of the column DT, with the WHERE clause ensuring that the value of IS\_NEW must be true.
- E. Construct a query to return every row of the table CLICK\_STREAM, while using the built-in function to cast

strings from the column DT into TIMESTAMP values. Run the query into a destination table NEW\_CLICK\_STREAM, in which the column TS is the TIMESTAMP type. Reference the table NEW\_CLICK\_STREAM instead of the table CLICK\_STREAM from now on. In the future, new data is loaded into the table NEW\_CLICK\_STREAM.

**Answer: E**

**Explanation:**

more simple and reasonable. Also recommended if not concerned about cost but simplicity.

Reference:

[https://cloud.google.com/bigquery/docs/manually-changing-schemas#changing\\_a\\_columns\\_data\\_type](https://cloud.google.com/bigquery/docs/manually-changing-schemas#changing_a_columns_data_type)

**Question: 25**

**CertyIQ**

You want to use Google Stackdriver Logging to monitor Google BigQuery usage. You need an instant notification to be sent to your monitoring tool when new data is appended to a certain table using an insert job, but you do not want to receive notifications for other tables. What should you do?

- A. Make a call to the Stackdriver API to list all logs, and apply an advanced filter.
- B. In the Stackdriver logging admin interface, and enable a log sink export to BigQuery.
- C. In the Stackdriver logging admin interface, enable a log sink export to Google Cloud Pub/Sub, and subscribe to the topic from your monitoring tool.
- D. Using the Stackdriver API, create a project sink with advanced log filter to export to Pub/Sub, and subscribe to the topic from your monitoring tool.

**Answer: D**

**Explanation:**

Using the Stack driver API, create a project sink with advanced log filter to export to Pub/Sub, and subscribe to the topic from your monitoring tool.

A and B are wrong since don't notify anything to the monitoring tool.

C has no filter on what will be notified. We want only some tables.

**Question: 26**

**CertyIQ**

You are working on a sensitive project involving private user data. You have set up a project on Google Cloud Platform to house your work internally. An external consultant is going to assist with coding a complex transformation in a Google Cloud Dataflow pipeline for your project. How should you maintain users' privacy?

- A. Grant the consultant the Viewer role on the project.
- B. Grant the consultant the Cloud Dataflow Developer role on the project.
- C. Create a service account and allow the consultant to log on with it.
- D. Create an anonymized sample of the data for the consultant to work with in a different project.

**Answer: D**

**Explanation:**

Create an anonymized sample of the data for the consultant to work within a different project.

### Question: 27

CertyIQ

You are building a model to predict whether or not it will rain on a given day. You have thousands of input features and want to see if you can improve training speed by removing some features while having a minimum effect on model accuracy. What can you do?

- A. Eliminate features that are highly correlated to the output labels.
- B. Combine highly co-dependent features into one representative feature.
- C. Instead of feeding in each feature individually, average their values in batches of 3.
- D. Remove the features that have null values for more than 50% of the training records.

### Answer: B

#### Explanation:

Data that is co-dependent is highly correlated is some kind of redundant information in some cases. If the features  $x_1$ ,  $x_2$  and  $x_3$  are  $x_2 = x_1 + 1$  and  $x_3 = 2 \cdot x_1$ , for example,  $x_2$  and  $x_3$  are redundant because can be explained with  $x_1$  feature, so can be excluded from the model. Other option is to group these features. There is a lot of ways to resolve, but the main idea is to use data engineer in co-dependent features to reduce the number of features in the model. Null values can have many meanings and need different approach to handle, otherwise it causes inaccurate model, so not D

### Question: 28

CertyIQ

Your company is performing data preprocessing for a learning algorithm in Google Cloud Dataflow. Numerous data logs are being generated during this step, and the team wants to analyze them. Due to the dynamic nature of the campaign, the data is growing exponentially every hour.

The data scientists have written the following code to read the data for a new key features in the logs.

```
BigQueryIO.Read  
    .named("ReadLogData")  
    .from("clouddataflow-readonly:samples.log_data")
```

You want to improve the performance of this data read. What should you do?

- A. Specify the TableReference object in the code.
- B. Use .fromQuery operation to read specific fields from the table.
- C. Use of both the Google BigQuery TableSchema and TableFieldSchema classes.
- D. Call a transform that returns TableRow objects, where each element in the PCollection represents a single row in the table.

### Answer: B

#### Explanation:

Use .fromQuery operation to read specific fields from the table. BigQueryIO.read().from() directly reads the whole table from BigQuery. This function exports the whole table to temporary files in Google Cloud Storage, where it will later be read from. This requires almost no computation, as it only performs an export job, and

later Dataflow reads from GCS (not from Big Query).

Big Query IO .read .from Query() executes a query and then reads the results received after the query execution. Therefore, this function is more time-consuming, given that it requires that a query is first executed (which will incur in the corresponding economic and computational costs).

### Question: 29

CertyIQ

Your company is streaming real-time sensor data from their factory floor into Bigtable and they have noticed extremely poor performance. How should the row key be redesigned to improve Bigtable performance on queries that populate real-time dashboards?

- A. Use a row key of the form <timestamp>.
- B. Use a row key of the form <sensorid>.
- C. Use a row key of the form <timestamp>#<sensorid>.
- D. Use a row key of the form >#<sensorid>#<timestamp>.

**Answer: D**

**Explanation:**

Best practices of bigtable states that rowkey should not be only timestamp or have timestamp at starting. It's better to have sensorid and timestamp as rowkey

### Question: 30

CertyIQ

Your company's customer and order databases are often under heavy load. This makes performing analytics against them difficult without harming operations.

The databases are in a MySQL cluster, with nightly backups taken using mysqldump. You want to perform analytics with minimal impact on operations. What should you do?

- A. Add a node to the MySQL cluster and build an OLAP cube there.
- B. Use an ETL tool to load the data from MySQL into Google BigQuery.
- C. Connect an on-premises Apache Hadoop cluster to MySQL and perform ETL.
- D. Mount the backups to Google Cloud SQL, and then process the data using Google Cloud Dataproc.

**Answer: B**

**Explanation:**

Bigquery is most suitable for analytical purposes and the question is asking about 'minimal impact' on current DB

A is correct, unless you are not a google partner and you want to spend money and time on infra.

C and D are also correct, if you are a Hadoop master and you still want to be on a local environment for C and for both answers you are just solving the ETL part.

B is the correct answer since you are performing the ETL and using a specialized analytic tool (BigQuery) for which is the main issue of this question (perform analytics without having an impact on the operations).

**Question: 31**

CertyIQ

You have Google Cloud Dataflow streaming pipeline running with a Google Cloud Pub/Sub subscription as the source. You need to make an update to the code that will make the new Cloud Dataflow pipeline incompatible with the current version. You do not want to lose any data when making this update. What should you do?

- A. Update the current pipeline and use the drain flag.
- B. Update the current pipeline and provide the transform mapping JSON object.
- C. Create a new pipeline that has the same Cloud Pub/Sub subscription and cancel the old pipeline.
- D. Create a new pipeline that has a new Cloud Pub/Sub subscription and cancel the old pipeline.

**Answer: A****Explanation:**

This option is correct as the key requirement is not to lose the data, the Dataflow pipeline can be stopped using the Drain option. Drain options would cause Dataflow to stop any new processing, but would also allow the existing processing to complete

**Question: 32**

CertyIQ

Your company is running their first dynamic campaign, serving different offers by analyzing real-time data during the holiday season. The data scientists are collecting terabytes of data that rapidly grows every hour during their 30-day campaign. They are using Google Cloud Dataflow to preprocess the data and collect the feature (signals) data that is needed for the machine learning model in Google Cloud Bigtable. The team is observing suboptimal performance with reads and writes of their initial load of 10 TB of data. They want to improve this performance while minimizing cost. What should they do?

- A. Redefine the schema by evenly distributing reads and writes across the row space of the table.
- B. The performance issue should be resolved over time as the size of the BigTable cluster is increased.
- C. Redesign the schema to use a single row key to identify values that need to be updated frequently in the cluster.
- D. Redesign the schema to use row keys based on numeric IDs that increase sequentially per user viewing the offers.

**Answer: A****Explanation:**

Cloud Bigtable performs best when reads and writes are evenly distributed throughout your table, which helps Cloud Bigtable distribute the workload across all of the nodes in your cluster. If reads and writes cannot be spread across all of your Cloud Bigtable nodes, performance will suffer.

If you find that you're reading and writing only a small number of rows, you might need to redesign your schema so that reads and writes are more evenly distributed.

**Question: 33**

CertyIQ

Your software uses a simple JSON format for all messages. These messages are published to Google Cloud Pub/Sub, then processed with Google Cloud Dataflow to create a real-time dashboard for the CFO. During testing, you notice that some messages are missing

in the dashboard. You check the logs, and all messages are being published to Cloud Pub/Sub successfully. What should you do next?

- A. Check the dashboard application to see if it is not displaying correctly.
- B. Run a fixed dataset through the Cloud Dataflow pipeline and analyze the output.
- C. Use Google Stackdriver Monitoring on Cloud Pub/Sub to find the missing messages.
- D. Switch Cloud Dataflow to pull messages from Cloud Pub/Sub instead of Cloud Pub/Sub pushing messages to Cloud Dataflow.

**Answer: B**

**Explanation:**

Stack driver monitoring is for performance, not logging of missing data.

**Question: 34**

**CertyIQ**

Flowlogistic Case Study -

Company Overview -

Flowlogistic is a leading logistics and supply chain provider. They help businesses throughout the world manage their resources and transport them to their final destination. The company has grown rapidly, expanding their offerings to include rail, truck, aircraft, and oceanic shipping.

Company Background -

The company started as a regional trucking company, and then expanded into other logistics market. Because they have not updated their infrastructure, managing and tracking orders and shipments has become a bottleneck. To improve operations, Flowlogistic developed proprietary technology for tracking shipments in real time at the parcel level. However, they are unable to deploy it because their technology stack, based on Apache Kafka, cannot support the processing volume. In addition, Flowlogistic wants to further analyze their orders and shipments to determine how best to deploy their resources.

Solution Concept -

Flowlogistic wants to implement two concepts using the cloud:

- ⇒ Use their proprietary technology in a real-time inventory-tracking system that indicates the location of their loads
- ⇒ Perform analytics on all their orders and shipment logs, which contain both structured and unstructured data, to determine how best to deploy resources, which markets to expand info. They also want to use predictive analytics to learn earlier when a shipment will be delayed.

Existing Technical Environment -

Flowlogistic architecture resides in a single data center:

- ⇒ Databases
  - 8 physical servers in 2 clusters
    - SQL Server "" user data, inventory, static data
    - 3 physical servers
      - Cassandra "" metadata, tracking messages
  - 10 Kafka servers "" tracking message aggregation and batch insert
    - ⇒ Application servers "" customer front end, middleware for order/customs
  - 60 virtual machines across 20 physical servers
    - Tomcat "" Java services
    - Nginx "" static content
    - Batch servers
      - ⇒ Storage appliances
      - iSCSI for virtual machine (VM) hosts
      - Fibre Channel storage area network (FC SAN) "" SQL server storage
      - Network-attached storage (NAS) image storage, logs, backups
    - ⇒ 10 Apache Hadoop /Spark servers
      - Core Data Lake
      - Data analysis workloads
    - ⇒ 20 miscellaneous servers

- Jenkins, monitoring, bastion hosts,

#### Business Requirements -

Build a reliable and reproducible environment with scaled parity of production.

- - ⇒ Aggregate data in a centralized Data Lake for analysis
  - ⇒ Use historical data to perform predictive analytics on future shipments
  - ⇒ Accurately track every shipment worldwide using proprietary technology
  - ⇒ 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 -

- ⇒ Handle both streaming and batch data
- ⇒ Migrate existing Hadoop workloads
- ⇒ Ensure architecture is scalable and elastic to meet the changing demands of the company.
- ⇒ Use managed services whenever possible
- ⇒ Encrypt data flight and at rest
- ⇒ Connect a VPN between the production data center and cloud environment

#### SEO Statement -

We have grown so quickly that our inability to upgrade our infrastructure is really hampering further growth and efficiency. We are efficient at moving shipments around the world, but we are inefficient at moving data around. We need to organize our information so we can more easily understand where our customers are and what they are shipping.

#### CTO Statement -

IT has never been a priority for us, so as our data has grown, we have not invested enough in our technology. I have a good staff to manage IT, but they are so busy managing our infrastructure that I cannot get them to do the things that really matter, such as organizing our data, building the analytics, and figuring out how to implement the CFO's tracking technology.

#### CFO Statement -

Part of our competitive advantage is that we penalize ourselves for late shipments and deliveries. Knowing where our shipments are at all times has a direct correlation to our bottom line and profitability. Additionally, I don't want to commit capital to building out a server environment.

Flowlogistic wants to use Google BigQuery as their primary analysis system, but they still have Apache Hadoop and Spark workloads that they cannot move to

BigQuery. Flowlogistic does not know how to store the data that is common to both workloads. What should they do?

- A. Store the common data in BigQuery as partitioned tables.
- B. Store the common data in BigQuery and expose authorized views.
- C. Store the common data encoded as Avro in Google Cloud Storage.
- D. Store the common data in the HDFS storage for a Google Cloud Dataproc cluster.

#### Answer: C

#### Explanation:

avro data can be accessed by spark as well

#### Question: 35

CertyIQ

Flowlogistic Case Study -

#### Company Overview -

Flowlogistic is a leading logistics and supply chain provider. They help businesses throughout the world manage their resources and transport them to their final destination. The company has grown rapidly, expanding their offerings to include rail, truck, aircraft, and oceanic shipping.

Company Background -

The company started as a regional trucking company, and then expanded into other logistics market. Because they have not updated their infrastructure, managing and tracking orders and shipments has become a bottleneck. To improve operations, Flowlogistic developed proprietary technology for tracking shipments in real time at the parcel level. However, they are unable to deploy it because their technology stack, based on Apache Kafka, cannot support the processing volume. In addition, Flowlogistic wants to further analyze their orders and shipments to determine how best to deploy their resources.

#### Solution Concept -

Flowlogistic wants to implement two concepts using the cloud:

- ⇒ Use their proprietary technology in a real-time inventory-tracking system that indicates the location of their loads
- ⇒ Perform analytics on all their orders and shipment logs, which contain both structured and unstructured data, to determine how best to deploy resources, which markets to expand info. They also want to use predictive analytics to learn earlier when a shipment will be delayed.

#### Existing Technical Environment -

Flowlogistic architecture resides in a single data center:

- ⇒ Databases
  - 8 physical servers in 2 clusters
    - SQL Server "" user data, inventory, static data
  - 3 physical servers
    - Cassandra "" metadata, tracking messages
  - 10 Kafka servers "" tracking message aggregation and batch insert
- ⇒ Application servers "" customer front end, middleware for order/customs
- 60 virtual machines across 20 physical servers
  - Tomcat "" Java services
  - Nginx "" static content
  - Batch servers
  - ⇒ Storage appliances
    - iSCSI for virtual machine (VM) hosts
    - Fibre Channel storage area network (FC SAN) "" SQL server storage
    - Network-attached storage (NAS) image storage, logs, backups
  - ⇒ 10 Apache Hadoop /Spark servers
  - Core Data Lake
  - Data analysis workloads
  - ⇒ 20 miscellaneous servers
  - Jenkins, monitoring, bastion hosts,

#### Business Requirements -

- ⇒ Build a reliable and reproducible environment with scaled party of production.
- ⇒ Aggregate data in a centralized Data Lake for analysis
- ⇒ Use historical data to perform predictive analytics on future shipments
- ⇒ Accurately track every shipment worldwide using proprietary technology
- ⇒ 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 -

- ⇒ Handle both streaming and batch data
- ⇒ Migrate existing Hadoop workloads
- ⇒ Ensure architecture is scalable and elastic to meet the changing demands of the company.
- ⇒ Use managed services whenever possible
- ⇒ Encrypt data flight and at rest
- ⇒ Connect a VPN between the production data center and cloud environment

#### SEO Statement -

We have grown so quickly that our inability to upgrade our infrastructure is really hampering further growth and efficiency. We are efficient at moving shipments around the world, but we are inefficient at moving data around. We need to organize our information so we can more easily understand where our customers are and what they are shipping.

#### CTO Statement -

IT has never been a priority for us, so as our data has grown, we have not invested enough in our technology. I have a good staff to manage IT, but they are so busy managing our infrastructure that I cannot get them to do the things that really matter, such as organizing our data, building the analytics, and figuring out how to implement the CFO's tracking technology.

#### CFO Statement -

Part of our competitive advantage is that we penalize ourselves for late shipments and deliveries. Knowing where out shipments are at all times has a direct correlation to our bottom line and profitability. Additionally, I don't want to commit capital to building out a server environment.

Flowlogistic's management has determined that the current Apache Kafka servers cannot handle the data volume for their real-time inventory tracking system.

You need to build a new system on Google Cloud Platform (GCP) that will feed the proprietary tracking software. The system must be able to ingest data from a variety of global sources, process and query in real-time, and store the data reliably. Which combination of GCP products should you choose?

- A. Cloud Pub/Sub, Cloud Dataflow, and Cloud Storage
- B. Cloud Pub/Sub, Cloud Dataflow, and Local SSD
- C. Cloud Pub/Sub, Cloud SQL, and Cloud Storage
- D. Cloud Load Balancing, Cloud Dataflow, and Cloud Storage

#### Answer: A

#### Explanation:

A. Cloud Pub/Sub, Cloud Dataflow, and Cloud Storage

as explained by JayZeeLee :

B is incorrect, because local SSD wouldn't satisfy the needs.

C is incorrect, because one of the requirements is 'Global', Cloud SQL is well suited for regional applications. Cloud Spanner is a better suit in that regard.

D is incorrect, because Load Balancer is for web traffic, not messages.

**CertyIQ**

#### Question: 36

#### Flowlogistic Case Study -

##### Company Overview -

Flowlogistic is a leading logistics and supply chain provider. They help businesses throughout the world manage their resources and transport them to their final destination. The company has grown rapidly, expanding their offerings to include rail, truck, aircraft, and oceanic shipping.

##### Company Background -

The company started as a regional trucking company, and then expanded into other logistics market. Because they have not updated their infrastructure, managing and tracking orders and shipments has become a bottleneck. To improve operations, Flowlogistic developed proprietary technology for tracking shipments in real time at the parcel level. However, they are unable to deploy it because their technology stack, based on Apache Kafka, cannot support the processing volume. In addition, Flowlogistic wants to further analyze their orders and shipments to determine how best to deploy their resources.

##### Solution Concept -

Flowlogistic wants to implement two concepts using the cloud:

Use their proprietary technology in a real-time inventory-tracking system that indicates the location of their loads

⇒ Perform analytics on all their orders and shipment logs, which contain both structured and unstructured data, to determine how best to deploy resources, which markets to expand into. They also want to use predictive analytics to learn earlier when a shipment will be delayed.

##### Existing Technical Environment -

Flowlogistic architecture resides in a single data center:

⇒ Databases

8 physical servers in 2 clusters

- SQL Server " user data, inventory, static data

3 physical servers

- Cassandra "" metadata, tracking messages

10 Kafka servers "" tracking message aggregation and batch insert

⇒ Application servers "" customer front end, middleware for order/customs

60 virtual machines across 20 physical servers

- Tomcat "" Java services

- Nginx "" static content

- Batch servers

⇒ Storage appliances

- iSCSI for virtual machine (VM) hosts

- Fibre Channel storage area network (FC SAN) "" SQL server storage

- Network-attached storage (NAS) image storage, logs, backups

⇒ 10 Apache Hadoop /Spark servers

- Core Data Lake

- Data analysis workloads

⇒ 20 miscellaneous servers

- Jenkins, monitoring, bastion hosts,

**Business Requirements -**

⇒ Build a reliable and reproducible environment with scaled panty of production.

⇒ Aggregate data in a centralized Data Lake for analysis

⇒ Use historical data to perform predictive analytics on future shipments

⇒ Accurately track every shipment worldwide using proprietary technology

⇒ 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 -**

Handle both streaming and batch data

■

⇒ Migrate existing Hadoop workloads

⇒ Ensure architecture is scalable and elastic to meet the changing demands of the company.

⇒ Use managed services whenever possible

⇒ Encrypt data flight and at rest

⇒ Connect a VPN between the production data center and cloud environment

**SEO Statement -**

We have grown so quickly that our inability to upgrade our infrastructure is really hampering further growth and efficiency. We are efficient at moving shipments around the world, but we are inefficient at moving data around. We need to organize our information so we can more easily understand where our customers are and what they are shipping.

**CTO Statement -**

IT has never been a priority for us, so as our data has grown, we have not invested enough in our technology. I have a good staff to manage IT, but they are so busy managing our infrastructure that I cannot get them to do the things that really matter, such as organizing our data, building the analytics, and figuring out how to implement the CFO's tracking technology.

**CFO Statement -**

Part of our competitive advantage is that we penalize ourselves for late shipments and deliveries. Knowing where out shipments are at all times has a direct correlation to our bottom line and profitability. Additionally, I don't want to commit capital to building out a server environment.

Flowlogistic's CEO wants to gain rapid insight into their customer base so his sales team can be better informed in the field. This team is not very technical, so they've purchased a visualization tool to simplify the creation of BigQuery reports. However, they've been overwhelmed by all the data in the table, and are spending a lot of money on queries trying to find the data they need. You want to solve their problem in the most cost-effective way. What should you do?

- A. Export the data into a Google Sheet for virtualization.
- B. Create an additional table with only the necessary columns.
- C. Create a view on the table to present to the virtualization tool.
- D. Create identity and access management (IAM) roles on the appropriate columns, so only they appear in a query.

**Answer: C**

**Explanation:**

A logical view can be created with only the required columns which is required for visualization. B is not the right option as you will create a table and make it static. What happens when the original data is updated. This new table will not have the latest data and hence view is the best possible option here.

**CertyIQ**

**Question: 37**

Flowlogistic Case Study -

Company Overview -

Flowlogistic is a leading logistics and supply chain provider. They help businesses throughout the world manage their resources and transport them to their final destination. The company has grown rapidly, expanding their offerings to include rail, truck, aircraft, and oceanic shipping.

Company Background -

The company started as a regional trucking company, and then expanded into other logistics market. Because they have not updated their infrastructure, managing and tracking orders and shipments has become a bottleneck. To improve operations, Flowlogistic developed proprietary technology for tracking shipments in real time at the parcel level. However, they are unable to deploy it because their technology stack, based on Apache Kafka, cannot support the processing volume. In addition, Flowlogistic wants to further analyze their orders and shipments to determine how best to deploy their resources.

Solution Concept -

Flowlogistic wants to implement two concepts using the cloud:

- ⇒ Use their proprietary technology in a real-time inventory-tracking system that indicates the location of their loads
- ⇒ Perform analytics on all their orders and shipment logs, which contain both structured and unstructured data, to determine how best to deploy resources, which markets to expand info. They also want to use predictive analytics to learn earlier when a shipment will be delayed.

Existing Technical Environment -

Flowlogistic architecture resides in a single data center:

- ⇒ Databases
  - 8 physical servers in 2 clusters
    - SQL Server "" user data, inventory, static data
  - 3 physical servers
    - Cassandra "" metadata, tracking messages
  - 10 Kafka servers "" tracking message aggregation and batch insert
- ⇒ Application servers "" customer front end, middleware for order/customs
  - 60 virtual machines across 20 physical servers
    - Tomcat "" Java services
    - Nginx "" static content
    - Batch servers
    - ⇒ Storage appliances
    - iSCSI for virtual machine (VM) hosts
    - Fibre Channel storage area network (FC SAN) "" SQL server storage
    - Network-attached storage (NAS) image storage, logs, backups
  - ⇒ 10 Apache Hadoop /Spark servers
  - Core Data Lake
  - Data analysis workloads
  - ⇒ 20 miscellaneous servers
  - Jenkins, monitoring, bastion hosts,

Business Requirements -

- ⇒ Build a reliable and reproducible environment with scaled parity of production.
- ⇒ Aggregate data in a centralized Data Lake for analysis
- ⇒ Use historical data to perform predictive analytics on future shipments
- ⇒ Accurately track every shipment worldwide using proprietary technology
- ⇒ 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 -

- ⇒ Handle both streaming and batch data
- ⇒ Migrate existing Hadoop workloads
- ⇒ Ensure architecture is scalable and elastic to meet the changing demands of the company.
- ⇒ Use managed services whenever possible
- ⇒ Encrypt data flight and at rest
- ⇒ Connect a VPN between the production data center and cloud environment

#### SEO Statement -

We have grown so quickly that our inability to upgrade our infrastructure is really hampering further growth and efficiency. We are efficient at moving shipments around the world, but we are inefficient at moving data around. We need to organize our information so we can more easily understand where our customers are and what they are shipping.

#### CTO Statement -

IT has never been a priority for us, so as our data has grown, we have not invested enough in our technology. I have a good staff to manage IT, but they are so busy managing our infrastructure that I cannot get them to do the things that really matter, such as organizing our data, building the analytics, and figuring out how to implement the CFO's tracking technology.

#### CFO Statement -

Part of our competitive advantage is that we penalize ourselves for late shipments and deliveries. Knowing where out shipments are at all times has a direct correlation to our bottom line and profitability. Additionally, I don't want to commit capital to building out a server environment.

Flowlogistic is rolling out their real-time inventory tracking system. The tracking devices will all send package-tracking messages, which will now go to a single

Google Cloud Pub/Sub topic instead of the Apache Kafka cluster. A subscriber application will then process the messages for real-time reporting and store them in

Google BigQuery for historical analysis. You want to ensure the package data can be analyzed over time.

Which approach should you take?

- Attach the timestamp on each message in the Cloud Pub/Sub subscriber application as they are received.
- Attach the timestamp and Package ID on the outbound message from each publisher device as they are sent to Cloud Pub/Sub.
- Use the NOW() function in BigQuery to record the event's time.
- Use the automatically generated timestamp from Cloud Pub/Sub to order the data.

#### Answer: B

#### Explanation:

- There is no indication that the application can do this. Moreover, due to networking problems, it is possible that Pub/Sub doesn't receive messages in order. This will make analysis difficult.
- This makes sure that you have access to publishing timestamp which provides you with the correct ordering of messages.
- If timestamps are already messed up, BigQuery will get wrong results anyways.
- The timestamp we are interested in is when the data was produced by the publisher, not when it was received by Pub/Sub.

#### Question: 38

MJTelco Case Study -

Company Overview -

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

#### Company Background -

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationship between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

#### Solution Concept -

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

#### Business Requirements -

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

#### Technical Requirements -

- ⇒ Ensure secure and efficient transport and storage of telemetry data
- ⇒ Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.
- ⇒ Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day
- ⇒ Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

#### CEO Statement -

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

#### CTO Statement -

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

#### CFO Statement -

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

MJTelco's Google Cloud Dataflow pipeline is now ready to start receiving data from the 50,000 installations. You want to allow Cloud Dataflow to scale its compute power up as required. Which Cloud Dataflow pipeline configuration setting should you update?

- A. The zone
- B. The number of workers
- C. The disk size per worker
- D. The maximum number of workers

**Answer: D**

**Explanation:**

A: The zone has nothing to do with scaling computer power.

B: The key word here is, "Scale its compute power up AS REQUIRED", with this answer, the number of workers would immediately scale the computer power.

C: we need to scale compute power, not storage

D: is the correct answer, changing the Number of Maximum workers will allow Dataflow to add up to that number of workers if required.

Reference:

[https://cloud.google.com/dataflow/docs/reference/pipeline-options#resource\\_utilization](https://cloud.google.com/dataflow/docs/reference/pipeline-options#resource_utilization)

**CertyIQ**

## Question: 39

MJTelco Case Study -

Company Overview -

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

Company Background -

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationship between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

Solution Concept -

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments " development/test, staging, and production " to meet the needs of running experiments, deploying new features, and serving production customers.

Business Requirements -

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

Technical Requirements -

- ⇒ Ensure secure and efficient transport and storage of telemetry data
- ⇒ Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.
- ⇒ Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day
- ⇒ Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

#### **CEO Statement -**

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

#### **CTO Statement -**

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

#### **CFO Statement -**

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

You need to compose visualizations for operations teams with the following requirements:

- ⇒ The report must include telemetry data from all 50,000 installations for the most recent 6 weeks (sampling once every minute).
- ⇒ The report must not be more than 3 hours delayed from live data.
- ⇒ The actionable report should only show suboptimal links.
- ⇒ Most suboptimal links should be sorted to the top.
- ⇒ Suboptimal links can be grouped and filtered by regional geography.
- ⇒ User response time to load the report must be <5 seconds.

Which approach meets the requirements?

- A. Load the data into Google Sheets, use formulas to calculate a metric, and use filters/sorting to show only suboptimal links in a table.
- B. Load the data into Google BigQuery tables, write Google Apps Script that queries the data, calculates the metric, and shows only suboptimal rows in a table in Google Sheets.
- C. Load the data into Google Cloud Datastore tables, write a Google App Engine Application that queries all rows, applies a function to derive the metric, and then renders results in a table using the Google charts and visualization API.
- D. Load the data into Google BigQuery tables, write a Google Data Studio 360 report that connects to your data, calculates a metric, and then uses a filter expression to show only suboptimal rows in a table.

#### **Answer: D**

#### **Explanation:**

1. DataStudio and BQ are the simplest way to do it
2. They also can activate BI Engine feature to improve the response time.

#### **Question: 40**

**CertyIQ**

#### **MJTelco Case Study -**

##### **Company Overview -**

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

##### **Company Background -**

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationship between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

#### Solution Concept -

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

#### Business Requirements -

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- Provide reliable and timely access to data for analysis from distributed research workers
  -
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

#### Technical Requirements -

- ⇒ Ensure secure and efficient transport and storage of telemetry data
- ⇒ Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.
- ⇒ Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day
- ⇒ Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

#### CEO Statement -

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

#### CTO Statement -

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

#### CFO Statement -

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

You create a new report for your large team in Google Data Studio 360. The report uses Google BigQuery as its data source. It is company policy to ensure employees can view only the data associated with their region, so you create and populate a table for each region. You need to enforce the regional access policy to the data.

Which two actions should you take? (Choose two.)

- A. Ensure all the tables are included in global dataset.
- B. Ensure each table is included in a dataset for a region.
- C. Adjust the settings for each table to allow a related region-based security group view access.
- D. Adjust the settings for each view to allow a related region-based security group view access.
- E. Adjust the settings for each dataset to allow a related region-based security group view access.

#### Answer: BE

#### Explanation:

Even if now BQ offers table level access control, since the number of tables can be expected to be high, controlling access at the dataset level would ease operations. That is why I would still go for E instead of C.

**Question: 41****MJTelco Case Study -****Company Overview -**

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

**Company Background -**

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationship between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

**Solution Concept -**

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

**Business Requirements -**

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

**Technical Requirements -**

■ Ensure secure and efficient transport and storage of telemetry data

- ⇒ Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.
- ⇒ Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day
- ⇒ Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

**CEO Statement -**

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

**CTO Statement -**

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

**CFO Statement -**

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

MJTelco needs you to create a schema in Google Bigtable that will allow for the historical analysis of the last 2 years of records. Each record that comes in is sent every 15 minutes, and contains a unique identifier of the device and a data record. The most common query is for all the data for a given device for a given day.

Which schema should you use?

- A. Rowkey: date#device\_id Column data: data\_point
- B. Rowkey: date Column data: device\_id, data\_point
- C. Rowkey: device\_id Column data: date, data\_point
- D. Rowkey: data\_point Column data: device\_id, date
- E. Rowkey: date#data\_point Column data: device\_id

**Answer: D**

**Explanation:**

rowkey be Device\_Id+Date(reverse)

**CertyIQ**

**Question: 42**

Your company has recently grown rapidly and now ingesting data at a significantly higher rate than it was previously. You manage the daily batch MapReduce analytics jobs in Apache Hadoop. However, the recent increase in data has meant the batch jobs are falling behind. You were asked to recommend ways the development team could increase the responsiveness of the analytics without increasing costs. What should you recommend they do?

- A. Rewrite the job in Pig.
- B. Rewrite the job in Apache Spark.
- C. Increase the size of the Hadoop cluster.
- D. Decrease the size of the Hadoop cluster but also rewrite the job in Hive.

**Answer: B**

**Explanation:**

SPARK > hadoop, pig, hive

Spark performs in-memory processing and faster, which results in optimization of job's processing time

**CertyIQ**

**Question: 43**

You work for a large fast food restaurant chain with over 400,000 employees. You store employee information in Google BigQuery in a Users table consisting of a FirstName field and a LastName field. A member of IT is building an application and asks you to modify the schema and data in BigQuery so the application can query a FullName field consisting of the value of the FirstName field concatenated with a space, followed by the value of the LastName field for each employee. How can you make that data available while minimizing cost?

- A. Create a view in BigQuery that concatenates the FirstName and LastName field values to produce the FullName.
- B. Add a new column called FullName to the Users table. Run an UPDATE statement that updates the FullName column for each user with the concatenation of the FirstName and LastName values.
- C. Create a Google Cloud Dataflow job that queries BigQuery for the entire Users table, concatenates the FirstName value and LastName value for each user, and loads the proper values for FirstName, LastName, and FullName into a new table in BigQuery.
- D. Use BigQuery to export the data for the table to a CSV file. Create a Google Cloud Dataproc job to process the CSV file and output a new CSV file containing the proper values for FirstName, LastName and FullName. Run a BigQuery load job to load the new CSV file into BigQuery.

**Answer: A**

**Explanation:**

Answer will be A because when you create View it does not store extra space and its a logical representation, for rest of the option you need to write large code and extra processing for dataflow/dataproc

**CertyIQ****Question: 44**

You are deploying a new storage system for your mobile application, which is a media streaming service. You decide the best fit is Google Cloud Datastore. You have entities with multiple properties, some of which can take on multiple values. For example, in the entity 'Movie' the property 'actors' and the property 'tags' have multiple values but the property 'date released' does not. A typical query would ask for all movies with actor=<actorname> ordered by date\_released or all movies with tag=Comedy ordered by date\_released. How should you avoid a combinatorial explosion in the number of indexes?

- A. Manually configure the index in your index config as follows:

**Indexes:**

-kind: Movie

Properties:

-name: actors

name: date\_released

-kind: Movie

Properties:

-name: tags

name: date\_released

- B. Manually configure the index in your index config as follows:

**Indexes:**

-kind: Movie

Properties:

-name: actors

-name: tags

-name: date\_published

- C. Set the following in your entity options: exclude\_from\_indexes = 'actors, tags'

- D. Set the following in your entity options: exclude\_from\_indexes = 'date\_published'

**Answer: A****Explanation:**

From Google cloud documentation

The rows of an index table are sorted first by ancestor and then by property values, in the order specified in the index definition. The perfect index for a query, which allows the query to be executed most efficiently, is defined on the following properties, in order:

Properties used in equality filters

Property used in an inequality filter (of which there can be no more than one)

Properties used in sort orders

Properties used in projections (that are not already included in sort orders)

### Question: 45

CertyIQ

You work for a manufacturing plant that batches application log files together into a single log file once a day at 2:00 AM. You have written a Google Cloud Dataflow job to process that log file. You need to make sure the log file is processed once per day as inexpensively as possible. What should you do?

- A. Change the processing job to use Google Cloud Dataproc instead.
- B. Manually start the Cloud Dataflow job each morning when you get into the office.
- C. Create a cron job with Google App Engine Cron Service to run the Cloud Dataflow job.
- D. Configure the Cloud Dataflow job as a streaming job so that it processes the log data immediately.

Answer: C

Explanation:

A: Dataproc is a managed Apache Spark and Apache Hadoop service, makes no sense to use it

B: This might sound as the cheapest, but is highly error prone, besides, anyone in charge of this has a salary and I doubt is a low one.

C: This is the easiest/fastest/cheapest way to trigger job runs, you can even set retry attempts.

source: <https://cloud.google.com/appengine/docs/flexible/nodejs/scheduling-jobs-with-cron-yaml>.

D: Setting this would be much more expensive than the cron-job

### Question: 46

CertyIQ

You work for an economic consulting firm that helps companies identify economic trends as they happen. As part of your analysis, you use Google BigQuery to correlate customer data with the average prices of the 100 most common goods sold, including bread, gasoline, milk, and others. The average prices of these goods are updated every 30 minutes. You want to make sure this data stays up to date so you can combine it with other data in BigQuery as cheaply as possible.

What should you do?

- A. Load the data every 30 minutes into a new partitioned table in BigQuery.
- B. Store and update the data in a regional Google Cloud Storage bucket and create a federated data source in BigQuery
- C. Store the data in Google Cloud Datastore. Use Google Cloud Dataflow to query BigQuery and combine the data programmatically with the data stored in Cloud Datastore
- D. Store the data in a file in a regional Google Cloud Storage bucket. Use Cloud Dataflow to query BigQuery and combine the data programmatically with the data stored in Google Cloud Storage.

**Answer: B****Explanation:**

As per google docs on BigQuery:

Use cases for external data sources include:

Loading and cleaning your data in one pass by querying the data from an external data source (a location external to BigQuery) and writing the cleaned result into BigQuery storage.

Having a small amount of frequently changing data that you join with other tables. As an external data source, the frequently changing data does not need to be reloaded every time it is updated.

**CertyIQ****Question: 47**

You are designing the database schema for a machine learning-based food ordering service that will predict what users want to eat. Here is some of the information you need to store:

- ⇒ The user profile: What the user likes and doesn't like to eat
- ⇒ The user account information: Name, address, preferred meal times
- ⇒ The order information: When orders are made, from where, to whom

The database will be used to store all the transactional data of the product. You want to optimize the data schema. Which Google Cloud Platform product should you use?

- A. BigQuery
- B. Cloud SQL
- C. Cloud Bigtable
- D. Cloud Datastore

**Answer: A****Explanation:**

You want to optimize the data schema + Machine Learning --> Bigquery. So A

**CertyIQ****Question: 48**

Your company is loading comma-separated values (CSV) files into Google BigQuery. The data is fully imported successfully; however, the imported data is not matching byte-to-byte to the source file. What is the most likely cause of this problem?

- A. The CSV data loaded in BigQuery is not flagged as CSV.
- B. The CSV data has invalid rows that were skipped on import.
- C. The CSV data loaded in BigQuery is not using BigQuery's default encoding.
- D. The CSV data has not gone through an ETL phase before loading into BigQuery.

**Answer: C****Explanation:**

If you don't specify an encoding, or if you specify UTF-8 encoding when the CSV file is not UTF-8 encoded, BigQuery attempts to convert the data to UTF-8. Generally, your data will be loaded successfully, but it may not match byte-for-byte what you expect."

Reference:

[https://cloud.google.com/bigquery/docs/loading-data-cloud-storage-csv#details\\_of\\_loading\\_csv\\_data](https://cloud.google.com/bigquery/docs/loading-data-cloud-storage-csv#details_of_loading_csv_data)

### Question: 49

CertyIQ

Your company produces 20,000 files every hour. Each data file is formatted as a comma separated values (CSV) file that is less than 4 KB. All files must be ingested on Google Cloud Platform before they can be processed. Your company site has a 200 ms latency to Google Cloud, and your Internet connection bandwidth is limited as 50 Mbps. You currently deploy a secure FTP (SFTP) server on a virtual machine in Google Compute Engine as the data ingestion point. A local SFTP client runs on a dedicated machine to transmit the CSV files as is. The goal is to make reports with data from the previous day available to the executives by 10:00 a.m. each day. This design is barely able to keep up with the current volume, even though the bandwidth utilization is rather low. You are told that due to seasonality, your company expects the number of files to double for the next three months. Which two actions should you take? (Choose two.)

- A. Introduce data compression for each file to increase the rate file of file transfer.
- B. Contact your internet service provider (ISP) to increase your maximum bandwidth to at least 100 Mbps.
- C. Redesign the data ingestion process to use gsutil tool to send the CSV files to a storage bucket in parallel.
- D. Assemble 1,000 files into a tape archive (TAR) file. Transmit the TAR files instead, and disassemble the CSV files in the cloud upon receiving them.
- E. Create an S3-compatible storage endpoint in your network, and use Google Cloud Storage Transfer Service to transfer on-premises data to the designated storage bucket.

Answer: CD

Explanation:

A: size is small enough that compressing each file will not help (indeed, it may even add overhead).

B: bandwidth is not a problem, no need to increase.

C: Parallel uploading the files with -m will increase speed in general.

D: many individual small files are a problem, since each file adds overhead to the processing and upload to GCS, and the upload sped of GCS is proportional to the size. If we pack all the small files in a bigger single TAR, it will improve the overall performance.

E: Storage Transfer Service is intended to move 100s of TB, and requires a 300Mbps connection as minimum (the doc even states that if your connection is less than 300Mbps is better to use gsutil).

Reference:

<https://cloud.google.com/storage-transfer/docs/on-prem-overview#requirements>

<https://jbrojbrojbro.medium.com/parallel-uploads-for-smaller-files-387ff86afc74>

### Question: 50

CertyIQ

You are choosing a NoSQL database to handle telemetry data submitted from millions of Internet-of-Things (IoT) devices. The volume of data is growing at 100 TB per year, and each data entry has about 100 attributes. The data processing pipeline does not require atomicity, consistency, isolation, and durability (ACID). However, high availability and low latency are required.

You need to analyze the data by querying against individual fields. Which three databases meet your requirements? (Choose three.)

- A. Redis
- B. HBase
- C. MySQL
- D. MongoDB
- E. Cassandra
- F. HDFS with Hive

**Answer: BDE**

**Explanation:**

- A. Redis - Redis is an in-memory non-relational key-value store. Redis is a great choice for implementing a highly available in-memory cache to decrease data access latency, increase throughput, and ease the load off your relational or NoSQL database and application. Since the question does not ask cache, A is discarded.
- B. HBase - Meets reqs
- C. MySQL - they do not need ACID, so not needed.
- D. MongoDB - Meets reqs
- E. Cassandra - Apache Cassandra is an open source NoSQL distributed database trusted by thousands of companies for scalability and high availability without compromising performance. Linear scalability and proven fault-tolerance on commodity hardware or cloud infrastructure make it the perfect platform for mission-critical data.
- F. HDFS with Hive - Hive allows users to read, write, and manage petabytes of data using SQL. Hive is built on top of Apache Hadoop, which is an open-source framework used to efficiently store and process large datasets. As a result, Hive is closely integrated with Hadoop, and is designed to work quickly on petabytes of data. HIVE IS NOT A DATABASE.

**Question: 51**

CertyIQ

You are training a spam classifier. You notice that you are overfitting the training data. Which three actions can you take to resolve this problem? (Choose three.)

- A. Get more training examples
- B. Reduce the number of training examples
- C. Use a smaller set of features
- D. Use a larger set of features
- E. Increase the regularization parameters
- F. Decrease the regularization parameters

**Answer: ACE**

**Explanation:**

The tools to prevent overfitting: less variables, regularization, early ending on the training...

Overfitting means that the classifier knows too well the data and fails to generalize. We should use a smaller number of features to help the classifier generalize, and more examples so that it can have more variety.

The gap in errors between training and test suggests a high variance problem in which the algorithm has overfit the training set.

- Adding more training data will increase the complexity of the training set and help with the variance problem.
- Reducing the feature set will ameliorate the overfitting and help with the variance problem.
- Increasing the regularization parameter will reduce overfitting and help with the variance problem.

Reference:

[https://github.com/mGalarnyk/datasciencecoursera/blob/master/Stanford\\_Machine\\_Learning/Week6/AdviceQuiz.r](https://github.com/mGalarnyk/datasciencecoursera/blob/master/Stanford_Machine_Learning/Week6/AdviceQuiz.r)

## Question: 52

CertyIQ

You are implementing security best practices on your data pipeline. Currently, you are manually executing jobs as the Project Owner. You want to automate these jobs by taking nightly batch files containing non-public information from Google Cloud Storage, processing them with a Spark Scala job on a Google Cloud Dataproc cluster, and depositing the results into Google BigQuery.

How should you securely run this workload?

- A. Restrict the Google Cloud Storage bucket so only you can see the files
- B. Grant the Project Owner role to a service account, and run the job with it
- C. Use a service account with the ability to read the batch files and to write to BigQuery
- D. Use a user account with the Project Viewer role on the Cloud Dataproc cluster to read the batch files and write to BigQuery

**Answer: C**

**Explanation:**

The answer is C because Service Account is the best way to access the BigQuery API if your application can run jobs associated with service credentials rather than an end-user's credentials, such as a batch processing pipeline. <https://cloud.google.com/bigquery/docs/authentication>

Data owners cant create jobs or queries. -> B out We need service Account -> D out Access only granting me does not solve the problem -> A out The answer is C. ( Minimum rights to perform the job)

## Question: 53

CertyIQ

You are using Google BigQuery as your data warehouse. Your users report that the following simple query is running very slowly, no matter when they run the query:

SELECT country, state, city FROM [myproject:mydataset.mytable] GROUP BY country

You check the query plan for the query and see the following output in the Read section of Stage:1:



What is the most likely cause of the delay for this query?

- A. Users are running too many concurrent queries in the system
- B. The [myproject:mydataset.mytable] table has too many partitions
- C. Either the state or the city columns in the [myproject:mydataset.mytable] table have too many NULL values
- D. Most rows in the [myproject:mydataset.mytable] table have the same value in the country column, causing data skew

**Answer: D**

**Explanation:**

D Image says that average(dark) and maximum(light) have difference in few times, this it is a skew. The color indicators show the relative timings for all steps across all stages. For example, the COMPUTE step of Stage 00 shows a bar whose shaded fraction is 21/30 since 30ms is the maximum time spent in a single step of any stage. The parallel input information shows that each stage required only a single worker, so there's no variance between average and slowest timings.

**Reference:**

<https://cloud.google.com/bigquery/query-plan>

<https://cloud.google.com/bigquery/docs/best-practices-performance-patterns>

**CertyIQ****Question: 54**

Your globally distributed auction application allows users to bid on items. Occasionally, users place identical bids at nearly identical times, and different application servers process those bids. Each bid event contains the item, amount, user, and timestamp. You want to collate those bid events into a single location in real time to determine which user bid first. What should you do?

- A. Create a file on a shared file and have the application servers write all bid events to that file. Process the file with Apache Hadoop to identify which user bid first.
- B. Have each application server write the bid events to Cloud Pub/Sub as they occur. Push the events from Cloud Pub/Sub to a custom endpoint that writes the bid event information into Cloud SQL.
- C. Set up a MySQL database for each application server to write bid events into. Periodically query each of those distributed MySQL databases and update a master MySQL database with bid event information.
- D. Have each application server write the bid events to Google Cloud Pub/Sub as they occur. Use a pull subscription to pull the bid events using Google Cloud Dataflow. Give the bid for each item to the user in the bid event that is processed first.

**Answer: B****Explanation:**

Have each application server write the bid events to Cloud Pub/Sub as they occur. Push the events from Cloud Pub/Sub to a custom endpoint that writes the bid event information into Cloud SQL.

**CertyIQ****Question: 55**

Your organization has been collecting and analyzing data in Google BigQuery for 6 months. The majority of the data analyzed is placed in a time-partitioned table named events\_partitioned. To reduce the cost of queries, your organization created a view called events, which queries only the last 14 days of data. The view is described in legacy SQL. Next month, existing applications will be connecting to BigQuery to read the events data via an ODBC connection. You need to ensure the applications can connect. Which two actions should you take? (Choose two.)

- A. Create a new view over events using standard SQL
- B. Create a new partitioned table using a standard SQL query
- C. Create a new view over events\_partitioned using standard SQL
- D. Create a service account for the ODBC connection to use for authentication
- E. Create a Google Cloud Identity and Access Management (Cloud IAM) role for the ODBC connection and shared events

**Answer: CD**

**Explanation:**

C = A standard SQL query cannot reference a view defined using legacy SQL syntax.

D = For the ODBC drivers is needed a service account which will get a standard Bigquery role

**CertyIQ**

**Question: 56**

You have enabled the free integration between Firebase Analytics and Google BigQuery. Firebase now automatically creates a new table daily in BigQuery in the format app\_events\_YYYYMMDD. You want to query all of the tables for the past 30 days in legacy SQL. What should you do?

- A. Use the TABLE\_DATE\_RANGE function
- B. Use the WHERE\_PARTITIONTIME pseudo column
- C. Use WHERE date BETWEEN YYYY-MM-DD AND YYYY-MM-DD
- D. Use SELECT IF.(date >= YYYY-MM-DD AND date <= YYYY-MM-DD

**Answer: A**

**Explanation:**

Reference:

<https://cloud.google.com/blog/products/gcp/using-bigquery-and-firebase-analytics-to-understand-your-mobile-app?hl=am>

# Building complex queries

What if we want to run a query across both platforms of our app over a specific date range? Since Firebase Analytics data is split into tables for each day, we can do this using BigQuery's `TABLE_DATE_RANGE` function. This query returns a count of the cities users are coming from over a one week period:

```
01  SELECT
02      user_dim.geo_info.city,
03      COUNT(user_dim.geo_info.city) as city_count
04  FROM
05  TABLE_DATE_RANGE ([firebase-analytics-sample-data:a:
06  TABLE_DATE_RANGE ([firebase-analytics-sample-data:i:
07  GROUP BY
08      user_dim.geo_info.city
09  ORDER BY
10      city_count DESC
```



## Question: 57

CertyIQ

Your company is currently setting up data pipelines for their campaign. For all the Google Cloud Pub/Sub streaming data, one of the important business requirements is to be able to periodically identify the inputs and their timings during their campaign. Engineers have decided to use windowing and transformation in Google Cloud Dataflow for this purpose. However, when testing this feature, they find that the Cloud Dataflow job fails for the all streaming insert. What is the most likely cause of this problem?

- A. They have not assigned the timestamp, which causes the job to fail
- B. They have not set the triggers to accommodate the data coming in late, which causes the job to fail
- C. They have not applied a global windowing function, which causes the job to fail when the pipeline is created
- D. They have not applied a non-global windowing function, which causes the job to fail when the pipeline is created

## Answer: D

### Explanation:

They have not applied a non-global windowing function, which causes the job to fail when the pipeline is created.

**Question: 58**

CertyIQ

You architect a system to analyze seismic data. Your extract, transform, and load (ETL) process runs as a series of MapReduce jobs on an Apache Hadoop cluster. The ETL process takes days to process a data set because some steps are computationally expensive. Then you discover that a sensor calibration step has been omitted. How should you change your ETL process to carry out sensor calibration systematically in the future?

- A. Modify the transformMapReduce jobs to apply sensor calibration before they do anything else.
- B. Introduce a new MapReduce job to apply sensor calibration to raw data, and ensure all other MapReduce jobs are chained after this.
- C. Add sensor calibration data to the output of the ETL process, and document that all users need to apply sensor calibration themselves.
- D. Develop an algorithm through simulation to predict variance of data output from the last MapReduce job based on calibration factors, and apply the correction to all data.

**Answer: B****Explanation:**

Two reasons, it is a cleaner approach with single job to handle the calibration before the data is used in the pipeline. Second, doing this step in later stages can be complex and maintenance of those jobs in the future will become challenging.

**Question: 59**

CertyIQ

An online retailer has built their current application on Google App Engine. A new initiative at the company mandates that they extend their application to allow their customers to transact directly via the application. They need to manage their shopping transactions and analyze combined data from multiple datasets using a business intelligence (BI) tool. They want to use only a single database for this purpose. Which Google Cloud database should they choose?

- A. BigQuery
- B. Cloud SQL
- C. Cloud BigTable
- D. Cloud Datastore

**Answer: B****Explanation:**

Big query is not suitable for transactional use case, and Cloud SQL supports transactions as well as analysis through a BI tool.

**Reference:**

<https://cloud.google.com/sql/>

# Cloud SQL

Fully managed relational database service for MySQL, PostgreSQL, and SQL Server. Run the same relational databases you know with their rich extension collections, configuration flags and developer ecosystem, but without the hassle of self management.

[Try Cloud SQL free](#)[Contact sales](#)

- ✓ Reduce maintenance cost with fully managed [MySQL](#), [PostgreSQL](#) and [SQL Server](#) databases
- ✓ Ensure business continuity with reliable and secure services backed by 24/7 SRE team
- ✓ Automate database provisioning, storage capacity management, and other time-consuming tasks
- ✓ Database observability made easy for developers with Cloud SQL Insights
- ✓ Easy integration with existing apps and Google Cloud services like GKE and BigQuery

## Question: 60

CertyIQ

You launched a new gaming app almost three years ago. You have been uploading log files from the previous day to a separate Google BigQuery table with the table name format LOGS\_yyyymmdd. You have been using table wildcard functions to generate daily and monthly reports for all time ranges. Recently, you discovered that some queries that cover long date ranges are exceeding the limit of 1,000 tables and failing. How can you resolve this issue?

- A. Convert all daily log tables into date-partitioned tables
- B. Convert the sharded tables into a single partitioned table
- C. Enable query caching so you can cache data from previous months
- D. Create separate views to cover each month, and query from these views

**Answer: B**

**Explanation:**

Convert MANY sharded tables into a single ONE (partitioned) table

C'mon, how much time are you going to take to partition every single table you have? second point and the most important, you have a table for every SINGLE DAY "LOGS\_YYYYMMDD" partitioning every table will end on scanning all the records of each table when you query them by date ranges using the wildcards, there will be no difference on time-partitioning each table versus consuming them as described.

## Question: 61

CertyIQ

Your analytics team wants to build a simple statistical model to determine which customers are most likely to work with your company again, based on a few different metrics. They want to run the model on Apache Spark, using data housed in Google Cloud Storage, and you have recommended using Google Cloud Dataproc to execute this job. Testing has shown that this workload can run in approximately 30 minutes on a 15-node cluster, outputting the results into Google BigQuery. The plan is to run this workload weekly. How should you optimize the cluster for cost?

- A. Migrate the workload to Google Cloud Dataflow
- B. Use pre-emptible virtual machines (VMs) for the cluster
- C. Use a higher-memory node so that the job runs faster
- D. Use SSDs on the worker nodes so that the job can run faster

### Answer: B

#### Explanation:

Preemptible workers are the default secondary worker type. They are reclaimed and removed from the cluster if they are required by Google Cloud for other tasks. Although the potential removal of preemptible workers can affect job stability, you may decide to use preemptible instances to lower per-hour compute costs for non-critical data processing or to create very large clusters at a lower total cost

#### Reference:

<https://cloud.google.com/dataproc/docs/concepts/compute/secondary-vms>

## Question: 62

CertyIQ

Your company receives both batch- and stream-based event data. You want to process the data using Google Cloud Dataflow over a predictable time period.

However, you realize that in some instances data can arrive late or out of order. How should you design your Cloud Dataflow pipeline to handle data that is late or out of order?

- A. Set a single global window to capture all the data.
- B. Set sliding windows to capture all the lagged data.
- C. Use watermarks and timestamps to capture the lagged data.
- D. Ensure every datasource type (stream or batch) has a timestamp, and use the timestamps to define the logic for lagged data.

### Answer: C

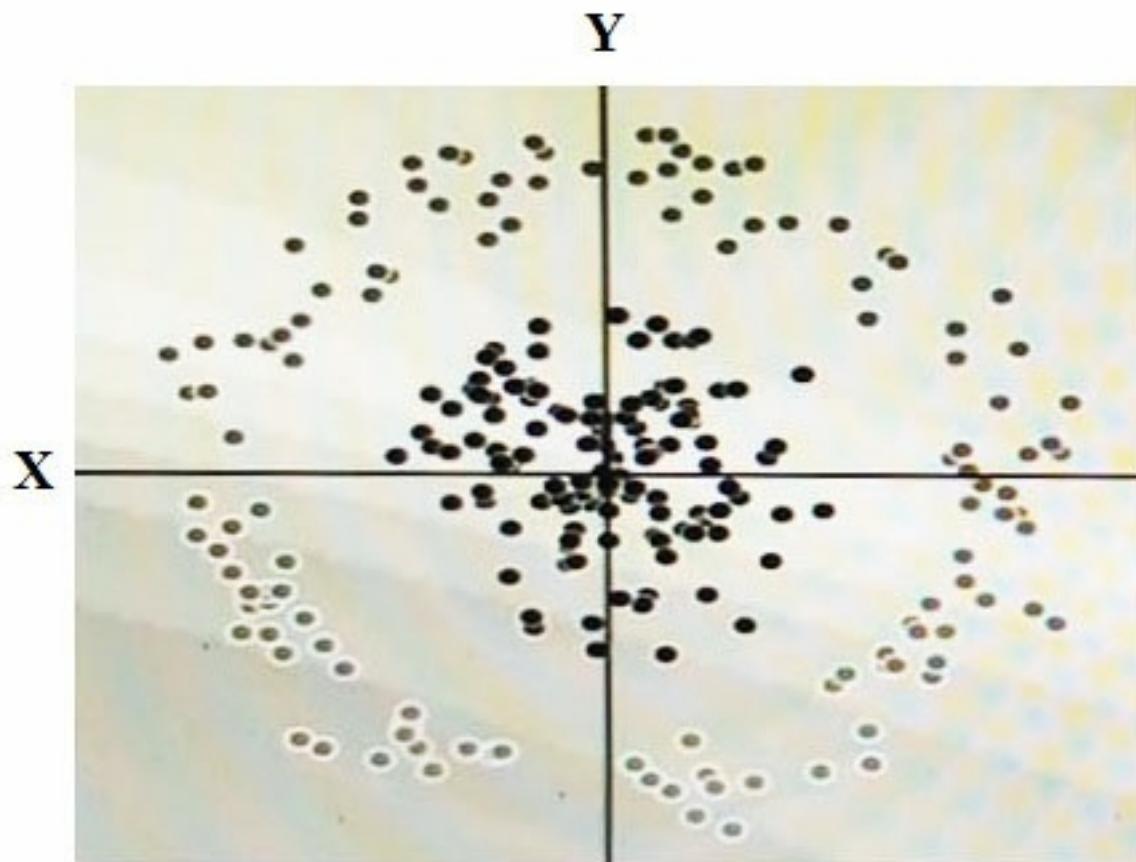
#### Explanation:

"Watermark in implementation is a monotonically increasing timestamp. When Beam/Dataflow see a record with an event timestamp that is earlier than the watermark, the record is treated as late data."

A is a direct No, if data don't have timestamp, we'll only have the processing time and not the "event time". B is not either, sliding windows are not for this. Hopping/sliding windowing is useful for taking running averages of data, but not to process late data. D looks correct but has one concept missing, the watermark to know if the process time is ok with the event time or not. I'm not 100% sure is incorrect. If, since we have a "predictable time period", might be this will do. I mean, if our dashboard is shown after the last input data has arrived (single global window), this should be ok. We'd have a "perfect watermark". Anyway we'd need triggering .

**Question: 63****CertyIQ**

You have some data, which is shown in the graphic below. The two dimensions are X and Y, and the shade of each dot represents what class it is. You want to classify this data accurately using a linear algorithm. To do this you need to add a synthetic feature. What should the value of that feature be?



- A.  $X^2 + Y^2$
- B.  $X^2$
- C.  $Y^2$
- D.  $\cos(X)$

**Answer: A****Explanation:**

For fitting a linear classifier when the data is in a circle use A.

**Question: 64****CertyIQ**

You are integrating one of your internal IT applications and Google BigQuery, so users can query BigQuery from the application's interface. You do not want individual users to authenticate to BigQuery and you do not want to

give them access to the dataset. You need to securely access BigQuery from your IT application. What should you do?

- A. Create groups for your users and give those groups access to the dataset
- B. Integrate with a single sign-on (SSO) platform, and pass each user's credentials along with the query request
- C. Create a service account and grant dataset access to that account. Use the service account's private key to access the dataset
- D. Create a dummy user and grant dataset access to that user. Store the username and password for that user in a file on the files system, and use those credentials to access the BigQuery dataset

**Answer: C**

**Explanation:**

Service Account are best option when granting access from tools/applications

**Question: 65**

**CertyIQ**

You are building a data pipeline on Google Cloud. You need to prepare data using a casual method for a machine-learning process. You want to support a logistic regression model. You also need to monitor and adjust for null values, which must remain real-valued and cannot be removed. What should you do?

- A. Use Cloud Dataprep to find null values in sample source data. Convert all nulls to 'none' using a Cloud Dataproc job.
- B. Use Cloud Dataprep to find null values in sample source data. Convert all nulls to 0 using a Cloud Dataprep job.
- C. Use Cloud Dataflow to find null values in sample source data. Convert all nulls to 'none' using a Cloud Dataprep job.
- D. Use Cloud Dataflow to find null values in sample source data. Convert all nulls to 0 using a custom script.

**Answer: B**

**Explanation:**

real-valued can not be null N/A or empty, have to be "0", so it has to be B.

Dataprep suites this, so none of dataflow options qualify as answer. Then 0 can be real-value than a "none".

**Question: 66**

**CertyIQ**

You set up a streaming data insert into a Redis cluster via a Kafka cluster. Both clusters are running on Compute Engine instances. You need to encrypt data at rest with encryption keys that you can create, rotate, and destroy as needed. What should you do?

- A. Create a dedicated service account, and use encryption at rest to reference your data stored in your Compute Engine cluster instances as part of your API service calls.
- B. Create encryption keys in Cloud Key Management Service. Use those keys to encrypt your data in all of the Compute Engine cluster instances.
- C. Create encryption keys locally. Upload your encryption keys to Cloud Key Management Service. Use those keys to encrypt your data in all of the Compute Engine cluster instances.
- D. Create encryption keys in Cloud Key Management Service. Reference those keys in your API service calls when accessing the data in your Compute Engine cluster instances.

**Answer: B****Explanation:**

A makes no sense, you need to use your own keys. You don't create keys locally and upload them, you should import it to make it work..using the kms public key...not just "uploading" it. C is also out. It's between B and D Cloud KMS is a cloud-hosted key management service that lets you manage cryptographic keys for your cloud services the same way you do on-premises, You can generate, use, rotate, and destroy cryptographic keys from there. Since you want to encrypt data at rest, is B, you don't use them for any API calls.

Reference:

<https://cloud.google.com/compute/docs/disks/customer-managed-encryption>

<https://cloud.google.com/security/encryption-at-rest/>

**CertyIQ****Question: 67**

You are developing an application that uses a recommendation engine on Google Cloud. Your solution should display new videos to customers based on past views. Your solution needs to generate labels for the entities in videos that the customer has viewed. Your design must be able to provide very fast filtering suggestions based on data from other customer preferences on several TB of data. What should you do?

- A. Build and train a complex classification model with Spark MLlib to generate labels and filter the results. Deploy the models using Cloud Dataproc. Call the model from your application.
- B. Build and train a classification model with Spark MLlib to generate labels. Build and train a second classification model with Spark MLlib to filter results to match customer preferences. Deploy the models using Cloud Dataproc. Call the models from your application.
- C. Build an application that calls the Cloud Video Intelligence API to generate labels. Store data in Cloud Bigtable, and filter the predicted labels to match the user's viewing history to generate preferences.
- D. Build an application that calls the Cloud Video Intelligence API to generate labels. Store data in Cloud SQL, and join and filter the predicted labels to match the user's viewing history to generate preferences.

**Answer: C****Explanation:**

A & B - Need to build your own model, so discarded as options C D can do the job here using Cloud Video Intelligence API. BigTable is better option. So C is correct

**CertyIQ****Question: 68**

You are selecting services to write and transform JSON messages from Cloud Pub/Sub to BigQuery for a data pipeline on Google Cloud. You want to minimize service costs. You also want to monitor and accommodate input data volume that will vary in size with minimal manual intervention. What should you do?

- A. Use Cloud Dataproc to run your transformations. Monitor CPU utilization for the cluster. Resize the number of worker nodes in your cluster via the command line.
- B. Use Cloud Dataproc to run your transformations. Use the diagnose command to generate an operational output archive. Locate the bottleneck and adjust cluster resources.
- C. Use Cloud Dataflow to run your transformations. Monitor the job system lag with Stackdriver. Use the default autoscaling setting for worker instances.
- D. Use Cloud Dataflow to run your transformations. Monitor the total execution time for a sampling of jobs. Configure the job to use non-default Compute Engine machine types when needed.

**Answer: C****Explanation:**

best suitable for the purpose with autoscaling and google recommended transform engine between pubsub n bq

C only as referred by MaxNRG

C. Dataproc does not seem to be a good solution in this case as it always require a manual intervention to adjust resources. Autoscaling with dataflow will automatically handle changing data volumes with no manual intervention, and monitoring through Stackdriver can be used to spot bottleneck. Total execution time is not good there as it does not provide a precise view on potential bottleneck.

**CertyIQ****Question: 69**

Your infrastructure includes a set of YouTube channels. You have been tasked with creating a process for sending the YouTube channel data to Google Cloud for analysis. You want to design a solution that allows your world-wide marketing teams to perform ANSI SQL and other types of analysis on up-to-date YouTube channels log data. How should you set up the log data transfer into Google Cloud?

- A. Use Storage Transfer Service to transfer the offsite backup files to a Cloud Storage Multi-Regional storage bucket as a final destination.
- B. Use Storage Transfer Service to transfer the offsite backup files to a Cloud Storage Regional bucket as a final destination.
- C. Use BigQuery Data Transfer Service to transfer the offsite backup files to a Cloud Storage Multi-Regional storage bucket as a final destination.
- D. Use BigQuery Data Transfer Service to transfer the offsite backup files to a Cloud Storage Regional storage bucket as a final destination.

**Answer: A****Explanation:**

Destination is GCS and having multi-regional so A is the best option available.

Even since BigQuery Data Transfer Service initially supports Google application sources like Google Ads, Campaign Manager, Google Ad Manager and YouTube but it does not support destination anything other than bq data set

**CertyIQ****Question: 70**

You are designing storage for very large text files for a data pipeline on Google Cloud. You want to support ANSI SQL queries. You also want to support compression and parallel load from the input locations using Google recommended practices. What should you do?

- A. Transform text files to compressed Avro using Cloud Dataflow. Use BigQuery for storage and query.
- B. Transform text files to compressed Avro using Cloud Dataflow. Use Cloud Storage and BigQuery permanent linked tables for query.
- C. Compress text files to gzip using the Grid Computing Tools. Use BigQuery for storage and query.
- D. Compress text files to gzip using the Grid Computing Tools. Use Cloud Storage, and then import into Cloud Bigtable for query.

**Answer: B****Explanation:**

The question is focused on designing storage for very large files, with support for compression, ANSI SQL queries, and parallel loading from the input locations. This can be met using GCS for storage and Bigquery permanent tables with external data source in GCS.

**CertyIQ****Question: 71**

You are developing an application on Google Cloud that will automatically generate subject labels for users' blog posts. You are under competitive pressure to add this feature quickly, and you have no additional developer resources. No one on your team has experience with machine learning. What should you do?

- A. Call the Cloud Natural Language API from your application. Process the generated Entity Analysis as labels.
- B. Call the Cloud Natural Language API from your application. Process the generated Sentiment Analysis as labels.
- C. Build and train a text classification model using TensorFlow. Deploy the model using Cloud Machine Learning Engine. Call the model from your application and process the results as labels.
- D. Build and train a text classification model using TensorFlow. Deploy the model using a Kubernetes Engine cluster. Call the model from your application and process the results as labels.

**Answer: A****Explanation:**

Entity analysis -> Identify entities within documents receipts, invoices, and contracts and label them by types such as date, person, contact information, organization, location, events, products, and media.

Sentiment analysis -> Understand the overall opinion, feeling, or attitude sentiment expressed in a block of text.

-- Avoid Custom models

**CertyIQ****Question: 72**

You are designing storage for 20 TB of text files as part of deploying a data pipeline on Google Cloud. Your input data is in CSV format. You want to minimize the cost of querying aggregate values for multiple users who will query the data in Cloud Storage with multiple engines. Which storage service and schema design should you use?

- A. Use Cloud Bigtable for storage. Install the HBase shell on a Compute Engine instance to query the Cloud Bigtable data.
- B. Use Cloud Bigtable for storage. Link as permanent tables in BigQuery for query.
- C. Use Cloud Storage for storage. Link as permanent tables in BigQuery for query.
- D. Use Cloud Storage for storage. Link as temporary tables in BigQuery for query.

**Answer: C****Explanation:**

BigQuery can access data in external sources, known as federated sources. Instead of first loading data into BigQuery, you can create a reference to an external source. External

sources can be Cloud Bigtable, Cloud Storage, and Google Drive.

When accessing external data, you can create either permanent or temporary external tables. Permanent tables are those that are created in a dataset and linked to an external source. Dataset-level access controls can be applied to these tables. When you are using a temporary table, a table is created in a special dataset and will be available for approximately 24 hours. Temporary tables are useful for one-time operations, such as loading data into a data warehouse.

"Dan Sullivan" Book

### Question: 73

CertyIQ

You are designing storage for two relational tables that are part of a 10-TB database on Google Cloud. You want to support transactions that scale horizontally.

You also want to optimize data for range queries on non-key columns. What should you do?

- A. Use Cloud SQL for storage. Add secondary indexes to support query patterns.
- B. Use Cloud SQL for storage. Use Cloud Dataflow to transform data to support query patterns.
- C. Use Cloud Spanner for storage. Add secondary indexes to support query patterns.
- D. Use Cloud Spanner for storage. Use Cloud Dataflow to transform data to support query patterns.

#### Answer: C

#### Explanation:

Spanner allows transaction tables to scale horizontally and secondary indexes for range queries

### Question: 74

CertyIQ

Your financial services company is moving to cloud technology and wants to store 50 TB of financial time-series data in the cloud. This data is updated frequently and new data will be streaming in all the time. Your company also wants to move their existing Apache Hadoop jobs to the cloud to get insights into this data. Which product should they use to store the data?

- A. Cloud Bigtable
- B. Google BigQuery
- C. Google Cloud Storage
- D. Google Cloud Datastore

#### Answer: A

#### Explanation:

Reference:

<https://cloud.google.com/bigtable/docs/schema-design-time-series>  
" target="\_blank" style="word-break: break-all;">>

The basic design patterns for storing time-series data in Bigtable are as follows:

- Rows are time buckets
  - New columns for new events
  - New cells for new events
- Rows represent single timestamps
  - Serialized column data
  - Unserialized column data

### Question: 75

CertyIQ

An organization maintains a Google BigQuery dataset that contains tables with user-level data. They want to expose aggregates of this data to other Google Cloud projects, while still controlling access to the user-level data. Additionally, they need to minimize their overall storage cost and ensure the analysis cost for other projects is assigned to those projects. What should they do?

- A. Create and share an authorized view that provides the aggregate results.
- B. Create and share a new dataset and view that provides the aggregate results.
- C. Create and share a new dataset and table that contains the aggregate results.
- D. Create dataViewer Identity and Access Management (IAM) roles on the dataset to enable sharing.

### Answer: A

#### Explanation:

Reference:

<https://cloud.google.com/bigquery/docs/share-access-views>

" target="\_blank" style="word-break: break-all;">>

BigQuery is a petabyte-scale analytics data warehouse that you can use to run SQL queries over vast amounts of data in near real time.

Giving a view access to a dataset is also known as creating an [authorized view](#) in BigQuery. An authorized view lets you share query results with particular users and groups without giving them access to the underlying tables. You can also use the view's SQL query to restrict the columns (fields) the users are able to query. In this tutorial, you create an authorized view.

### Question: 76

CertyIQ

Government regulations in your industry mandate that you have to maintain an auditable record of access to certain types of data. Assuming that all expiring logs will be archived correctly, where should you store data that is subject to that mandate?

- A. Encrypted on Cloud Storage with user-supplied encryption keys. A separate decryption key will be given to

- each authorized user.
- B. In a BigQuery dataset that is viewable only by authorized personnel, with the Data Access log used to provide the auditability.
  - C. In Cloud SQL, with separate database user names to each user. The Cloud SQL Admin activity logs will be used to provide the auditability.
  - D. In a bucket on Cloud Storage that is accessible only by an AppEngine service that collects user information and logs the access before providing a link to the bucket.

**Answer: B**

**Explanation:**

- B. In a BigQuery dataset that is viewable only by authorized personnel, with the Data Access log used to provide the auditability.

Storing the data in a BigQuery dataset with restricted access ensures control over who can view the data, and utilizing Data Access logs provides a comprehensive audit trail for compliance purposes. This option aligns well with the need for maintaining an auditable record as mandated by government regulations.

**Question: 77**

**CertyIQ**

Your neural network model is taking days to train. You want to increase the training speed. What can you do?

- A. Subsample your test dataset.
- B. Subsample your training dataset.
- C. Increase the number of input features to your model.
- D. Increase the number of layers in your neural network.

**Answer: B**

**Explanation:**

It is B. D would improve the accuracy, not speed.

**Question: 78**

**CertyIQ**

You are responsible for writing your company's ETL pipelines to run on an Apache Hadoop cluster. The pipeline will require some checkpointing and splitting pipelines. Which method should you use to write the pipelines?

- A. PigLatin using Pig
- B. HiveQL using Hive
- C. Java using MapReduce
- D. Python using MapReduce

**Answer: A**

**Explanation:**

Pig is scripting language which can be used for checkpointing and splitting pipelines

**Question: 79**

Your company maintains a hybrid deployment with GCP, where analytics are performed on your anonymized customer data. The data are imported to Cloud Storage from your data center through parallel uploads to a data transfer server running on GCP. Management informs you that the daily transfers take too long and have asked you to fix the problem. You want to maximize transfer speeds. Which action should you take?

- A. Increase the CPU size on your server.
- B. Increase the size of the Google Persistent Disk on your server.
- C. Increase your network bandwidth from your datacenter to GCP.
- D. Increase your network bandwidth from Compute Engine to Cloud Storage.

**Answer: C****Explanation:**

Speed of data transfer depends on Bandwidth

Few things in computing highlight the hardware limitations of networks as transferring large amounts of data. Typically you can transfer 1 GB in eight seconds over a 1 Gbps network. If you scale that up to a huge dataset (for example, 100 TB), the transfer time is 12 days. Transferring huge datasets can test the limits of your infrastructure and potentially cause problems for your business.

**Question: 80**

MJTelco Case Study -

**Company Overview -**

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

**Company Background -**

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationship between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

**Solution Concept -**

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

**Business Requirements -**

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

#### **Technical Requirements -**

Ensure secure and efficient transport and storage of telemetry data

Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.

Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day

Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

#### **CEO Statement -**

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

#### **CTO Statement -**

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

#### **CFO Statement -**

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

MJTelco is building a custom interface to share data. They have these requirements:

1. They need to do aggregations over their petabyte-scale datasets.
2. They need to scan specific time range rows with a very fast response time (milliseconds).

Which combination of Google Cloud Platform products should you recommend?

- A. Cloud Datastore and Cloud Bigtable
- B. Cloud Bigtable and Cloud SQL
- C. BigQuery and Cloud Bigtable
- D. BigQuery and Cloud Storage

#### **Answer: C**

#### **Explanation:**

Bigquery and Big table =PB storage capacity

Bigtable=to read scan rows Big query select row to read

#### **Question: 81**

**CertyIQ**

#### **MJTelco Case Study -**

##### **Company Overview -**

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

##### **Company Background -**

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationships between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

## Solution Concept -

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.

Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

## Business Requirements -

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

## Technical Requirements -

Ensure secure and efficient transport and storage of telemetry data

Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.

Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day

Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

## CEO Statement -

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

## CTO Statement -

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

## CFO Statement -

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

You need to compose visualization for operations teams with the following requirements:

- ⇒ Telemetry must include data from all 50,000 installations for the most recent 6 weeks (sampling once every minute)

⇒ The report must not be more than 3 hours delayed from live data.

⇒ The actionable report should only show suboptimal links.

⇒ Most suboptimal links should be sorted to the top.

Suboptimal links can be grouped and filtered by regional geography.

⇒ User response time to load the report must be <5 seconds.

You create a data source to store the last 6 weeks of data, and create visualizations that allow viewers to see multiple date ranges, distinct geographic regions, and unique installation types. You always show the latest data without any changes to your visualizations. You want to avoid creating and updating new visualizations each month. What should you do?

A. Look through the current data and compose a series of charts and tables, one for each possible combination of criteria.

B. Look through the current data and compose a small set of generalized charts and tables bound to criteria filters that allow value selection.

C. Export the data to a spreadsheet, compose a series of charts and tables, one for each possible combination of criteria, and spread them across multiple tabs.

D. Load the data into relational database tables, write a Google App Engine application that queries all rows, summarizes the data across each criteria, and then renders results using the Google Charts and visualization API.

**Answer: D**

**Explanation:**

Data in SQL so querying becomes easier on any pattern. Create multiple charts, graphs to fulfill your requirements.

**CertyIQ**

**Question: 82**

MJTelco Case Study -

**Company Overview -**

MJTelco is a startup that plans to build networks in rapidly growing, underserved markets around the world. The company has patents for innovative optical communications hardware. Based on these patents, they can create many reliable, high-speed backbone links with inexpensive hardware.

**Company Background -**

Founded by experienced telecom executives, MJTelco uses technologies originally developed to overcome communications challenges in space. Fundamental to their operation, they need to create a distributed data infrastructure that drives real-time analysis and incorporates machine learning to continuously optimize their topologies. Because their hardware is inexpensive, they plan to overdeploy the network allowing them to account for the impact of dynamic regional politics on location availability and cost.

Their management and operations teams are situated all around the globe creating many-to-many relationships between data consumers and providers in their system. After careful consideration, they decided public cloud is the perfect environment to support their needs.

**Solution Concept -**

MJTelco is running a successful proof-of-concept (PoC) project in its labs. They have two primary needs:

- ⇒ Scale and harden their PoC to support significantly more data flows generated when they ramp to more than 50,000 installations.
- ⇒ Refine their machine-learning cycles to verify and improve the dynamic models they use to control topology definition.

MJTelco will also use three separate operating environments "development/test, staging, and production" to meet the needs of running experiments, deploying new features, and serving production customers.

**Business Requirements -**

- ⇒ Scale up their production environment with minimal cost, instantiating resources when and where needed in an unpredictable, distributed telecom user community.
- ⇒ Ensure security of their proprietary data to protect their leading-edge machine learning and analysis.
- ⇒ Provide reliable and timely access to data for analysis from distributed research workers
- ⇒ Maintain isolated environments that support rapid iteration of their machine-learning models without affecting their customers.

**Technical Requirements -**

Ensure secure and efficient transport and storage of telemetry data

Rapidly scale instances to support between 10,000 and 100,000 data providers with multiple flows each.

Allow analysis and presentation against data tables tracking up to 2 years of data storing approximately 100m records/day

Support rapid iteration of monitoring infrastructure focused on awareness of data pipeline problems both in telemetry flows and in production learning cycles.

**CEO Statement -**

Our business model relies on our patents, analytics and dynamic machine learning. Our inexpensive hardware is organized to be highly reliable, which gives us cost advantages. We need to quickly stabilize our large distributed data pipelines to meet our reliability and capacity commitments.

**CTO Statement -**

Our public cloud services must operate as advertised. We need resources that scale and keep our data secure. We also need environments in which our data scientists can carefully study and quickly adapt our models. Because we rely on automation to process our data, we also need our development and test environments to work as we iterate.

**CFO Statement -**

The project is too large for us to maintain the hardware and software required for the data and analysis. Also, we cannot afford to staff an operations team to monitor so many data feeds, so we will rely on automation and infrastructure. Google Cloud's machine learning will allow our quantitative researchers to work on our high-value problems instead of problems with our data pipelines.

Given the record streams MJTelco is interested in ingesting per day, they are concerned about the cost of Google BigQuery increasing. MJTelco asks you to provide a design solution. They require a single large data table called tracking\_table. Additionally, they want to minimize the cost of daily queries while performing fine-grained analysis of each day's events. They also want to use streaming ingestion. What should you do?

- A. Create a table called tracking\_table and include a DATE column.
- B. Create a partitioned table called tracking\_table and include a TIMESTAMP column.
- C. Create sharded tables for each day following the pattern tracking\_table\_YYYYMMDD.
- D. Create a table called tracking\_table with a TIMESTAMP column to represent the day.

**Answer: B**

**Explanation:**

They're using BigQuery so partitioning is the better choice here. B

**Question: 83**

**CertyIQ**

Flowlogistic Case Study -

Company Overview -

Flowlogistic is a leading logistics and supply chain provider. They help businesses throughout the world manage their resources and transport them to their final destination. The company has grown rapidly, expanding their offerings to include rail, truck, aircraft, and oceanic shipping.

Company Background -

The company started as a regional trucking company, and then expanded into other logistics market. Because they have not updated their infrastructure, managing and tracking orders and shipments has become a bottleneck. To improve operations, Flowlogistic developed proprietary technology for tracking shipments in real time at the parcel level. However, they are unable to deploy it because their technology stack, based on Apache Kafka, cannot support the processing volume. In addition, Flowlogistic wants to further analyze their orders and shipments to determine how best to deploy their resources.

Solution Concept -

Flowlogistic wants to implement two concepts using the cloud:

- ⇒ Use their proprietary technology in a real-time inventory-tracking system that indicates the location of their loads
- ⇒ Perform analytics on all their orders and shipment logs, which contain both structured and unstructured data, to determine how best to deploy resources, which markets to expand info. They also want to use predictive analytics to learn earlier when a shipment will be delayed.

Existing Technical Environment -

Flowlogistic architecture resides in a single data center:

- ⇒ Databases
  - 8 physical servers in 2 clusters
  - SQL Server "" user data, inventory, static data
  - 3 physical servers
  - Cassandra "" metadata, tracking messages
- 10 Kafka servers "" tracking message aggregation and batch insert
- ⇒ Application servers "" customer front end, middleware for order/customs
- 60 virtual machines across 20 physical servers
- Tomcat "" Java services
- Nginx "" static content
- Batch servers
- ⇒ Storage appliances
  - iSCSI for virtual machine (VM) hosts
  - Fibre Channel storage area network (FC SAN) "" SQL server storage

Network-attached storage (NAS) image storage, logs, backups

⇒ 10 Apache Hadoop /Spark servers

- Core Data Lake

- Data analysis workloads

⇒ 20 miscellaneous servers

- Jenkins, monitoring, bastion hosts,

**Business Requirements -**

⇒ Build a reliable and reproducible environment with scaled parity of production.

⇒ Aggregate data in a centralized Data Lake for analysis

⇒ Use historical data to perform predictive analytics on future shipments

⇒ Accurately track every shipment worldwide using proprietary technology

⇒ 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 -**

⇒ Handle both streaming and batch data

⇒ Migrate existing Hadoop workloads

⇒ Ensure architecture is scalable and elastic to meet the changing demands of the company.

⇒ Use managed services whenever possible

⇒ Encrypt data flight and at rest

Connect a VPN between the production data center and cloud environment

**SEO Statement -**

We have grown so quickly that our inability to upgrade our infrastructure is really hampering further growth and efficiency. We are efficient at moving shipments around the world, but we are inefficient at moving data around. We need to organize our information so we can more easily understand where our customers are and what they are shipping.

**CTO Statement -**

IT has never been a priority for us, so as our data has grown, we have not invested enough in our technology. I have a good staff to manage IT, but they are so busy managing our infrastructure that I cannot get them to do the things that really matter, such as organizing our data, building the analytics, and figuring out how to implement the CFO's tracking technology.

**CFO Statement -**

Part of our competitive advantage is that we penalize ourselves for late shipments and deliveries. Knowing where our shipments are at all times has a direct correlation to our bottom line and profitability. Additionally, I don't want to commit capital to building out a server environment.

Flowlogistic's management has determined that the current Apache Kafka servers cannot handle the data volume for their real-time inventory tracking system.

You need to build a new system on Google Cloud Platform (GCP) that will feed the proprietary tracking software. The system must be able to ingest data from a variety of global sources, process and query in real-time, and store the data reliably. Which combination of GCP products should you choose?

- A. Cloud Pub/Sub, Cloud Dataflow, and Cloud Storage
- B. Cloud Pub/Sub, Cloud Dataflow, and Local SSD
- C. Cloud Pub/Sub, Cloud SQL, and Cloud Storage
- D. Cloud Load Balancing, Cloud Dataflow, and Cloud Storage
- E. Cloud Dataflow, Cloud SQL, and Cloud Storage

**Answer: A**

**Explanation:**

PubSub (for global ingestion from multiple sources) + Dataflow (for process and query) + reliable (gcs).

**Question: 84**

After migrating ETL jobs to run on BigQuery, you need to verify that the output of the migrated jobs is the same as

**CertyIQ**

the output of the original. You've loaded a table containing the output of the original job and want to compare the contents with output from the migrated job to show that they are identical. The tables do not contain a primary key column that would enable you to join them together for comparison.

What should you do?

- A. Select random samples from the tables using the RAND() function and compare the samples.
- B. Select random samples from the tables using the HASH() function and compare the samples.
- C. Use a Dataproc cluster and the BigQuery Hadoop connector to read the data from each table and calculate a hash from non-timestamp columns of the table after sorting. Compare the hashes of each table.
- D. Create stratified random samples using the OVER() function and compare equivalent samples from each table.

#### Answer: C

#### Explanation:

HASH() to compare data skipping dates and timestamps

options A B and D only will determine that it "might" be identical since is only a sample. HASH() can be helpful when doing bulk comparisons, but you still have to compare field by field to get the final answer. The only one left is C which looks good to me

Full comparison with this option, rest are comparison on sample which doesnot ensure all the data will be ok

#### Question: 85

CertyIQ

You are a head of BI at a large enterprise company with multiple business units that each have different priorities and budgets. You use on-demand pricing for BigQuery with a quota of 2K concurrent on-demand slots per project. Users at your organization sometimes don't get slots to execute their query and you need to correct this. You'd like to avoid introducing new projects to your account.

What should you do?

- A. Convert your batch BQ queries into interactive BQ queries.
- B. Create an additional project to overcome the 2K on-demand per-project quota.
- C. Switch to flat-rate pricing and establish a hierarchical priority model for your projects.
- D. Increase the amount of concurrent slots per project at the Quotas page at the Cloud Console.

#### Answer: C

#### Explanation:

Reference:

<https://cloud.google.com/blog/products/gcp/busting-12-myths-about-bigquery>

" target="\_blank" style="word-break: break-all;">>

You might simply prefer a fixed monthly bill, or encounter workloads that are extremely sensitive to query latency, and thus have predictability and control requirements that cannot be met by the on-demand service. For such situations, you can use the [flat-rate service](#). In this model, a certain number of slots are dedicated to your project(s), and you can establish a hierarchical priority model amongst the projects. The flat-rate model is especially suitable for large enterprises with multiple business units and workloads with varying priorities and budgets. For instance, the arrangement illustrated below gives priority to queries that are issued from the "Dashboarding" project over the queries from the other two projects. But even with prioritization, slots won't be wasted. If the prioritized "Dashboarding" project does not use all its dedicated slots, they'll be distributed among the remaining projects. Even data stored in the "Data Science" project can be queried from the "Dashboarding" project with a higher priority than when it's queried from within the "Data Science" project itself.

### Question: 86

CertyIQ

You have an Apache Kafka cluster on-prem with topics containing web application logs. You need to replicate the data to Google Cloud for analysis in BigQuery and Cloud Storage. The preferred replication method is mirroring to avoid deployment of Kafka Connect plugins.

What should you do?

- A. Deploy a Kafka cluster on GCE VM Instances. Configure your on-prem cluster to mirror your topics to the cluster running in GCE. Use a Dataproc cluster or Dataflow job to read from Kafka and write to GCS.
- B. Deploy a Kafka cluster on GCE VM Instances with the Pub/Sub Kafka connector configured as a Sink connector. Use a Dataproc cluster or Dataflow job to read from Kafka and write to GCS.
- C. Deploy the Pub/Sub Kafka connector to your on-prem Kafka cluster and configure Pub/Sub as a Source connector. Use a Dataflow job to read from Pub/Sub and write to GCS.
- D. Deploy the Pub/Sub Kafka connector to your on-prem Kafka cluster and configure Pub/Sub as a Sink connector. Use a Dataflow job to read from Pub/Sub and write to GCS.

### Answer: A

#### Explanation:

The solution specifically mentions mirroring and minimizing the use of Kafka Connect plugin.

D would be the more Google Cloud-native way of implementing the same, but the requirement is better met by A.

#### Reference:

<https://cwiki.apache.org/confluence/pages/viewpage.action?pageId=27846330>

**Question: 87**

CertyIQ

You've migrated a Hadoop job from an on-prem cluster to dataproc and GCS. Your Spark job is a complicated analytical workload that consists of many shuffling operations and initial data are parquet files (on average 200-400 MB size each). You see some degradation in performance after the migration to Dataproc, so you'd like to optimize for it. You need to keep in mind that your organization is very cost-sensitive, so you'd like to continue using Dataproc on preemptibles (with 2 non-preemptible workers only) for this workload.

What should you do?

- A. Increase the size of your parquet files to ensure them to be 1 GB minimum.
- B. Switch to TFRecords formats (appr. 200MB per file) instead of parquet files.
- C. Switch from HDDs to SSDs, copy initial data from GCS to HDFS, run the Spark job and copy results back to GCS.
- D. Switch from HDDs to SSDs, override the preemptible VMs configuration to increase the boot disk size.

**Answer: D****Explanation:**

## 1) Switch to SSD disks

If you perform many shuffling operations or partitioned writes, switch to SSDs to boost performance.

## 2) Use preemptible VMs

As a default, preemptible VMs are created with a smaller boot disk size, and you might want to override this configuration if you are running shuffle-heavy workloads

## Reference:

[https://cloud.google.com/architecture/hadoop/migrating-apache-spark-jobs-to-cloud-dataproc#optimize\\_performance](https://cloud.google.com/architecture/hadoop/migrating-apache-spark-jobs-to-cloud-dataproc#optimize_performance)

**Question: 88**

CertyIQ

Your team is responsible for developing and maintaining ETLs in your company. One of your Dataflow jobs is failing because of some errors in the input data, and you need to improve reliability of the pipeline (incl. being able to reprocess all failing data).

What should you do?

- A. Add a filtering step to skip these types of errors in the future, extract erroneous rows from logs. that transforms the data, extract erroneous rows from logs.. that can be stored to PubSub later.

**Answer: D****Explanation:**

Correction in question - All options are mentioned below:

- A. Add a filtering step to skip these types of errors in the future, extract erroneous rows from logs.
- B. Add a try... catch block to your DoFn that transforms the data, extract erroneous rows from logs.
- C. Add a try... catch block to your DoFn that transforms the data, write erroneous rows to PubSub directly from the DoFn.

\*D. Add a try... catch block to your DoFn that transforms the data, use a sideOutput to create a PCollection that can be stored to PubSub later.

**Correct Answer = D**

Try Catch is the best way for exception handling and defensive programming to deal with DoFn transformations and bad data. For this case, whose it is important to re-use the data, sink the bad data in the pub/sub for bad data processing/reprocessing it is the best way. Finally, to branch bad and good data in a PCollection (determined by Try Catch in DoFn), the best practice is to use sideOutput

**Question: 89**

CertyIQ

You're training a model to predict housing prices based on an available dataset with real estate properties. Your plan is to train a fully connected neural net, and you've discovered that the dataset contains latitude and longitude of the property. Real estate professionals have told you that the location of the property is highly influential on price, so you'd like to engineer a feature that incorporates this physical dependency.

What should you do?

- A. Provide latitude and longitude as input vectors to your neural net.
- B. Create a numeric column from a feature cross of latitude and longitude.
- C. Create a feature cross of latitude and longitude, bucketize it at the minute level and use L1 regularization during optimization.
- D. Create a feature cross of latitude and longitude, bucketize it at the minute level and use L2 regularization during optimization.

**Answer: C**

**Explanation:**

Regularization + location into one

C. Create a feature cross of latitude and longitude, bucketize it at the minute level and use L1 regularization during optimization.

use L1 regularization because we know the feature is a strong feature. L2 will evenly distribute weights

**Question: 90**

CertyIQ

You are deploying MariaDB SQL databases on GCE VM Instances and need to configure monitoring and alerting. You want to collect metrics including network connections, disk IO and replication status from MariaDB with minimal development effort and use StackDriver for dashboards and alerts.

What should you do?

- A. Install the OpenCensus Agent and create a custom metric collection application with a StackDriver exporter.
- B. Place the MariaDB instances in an Instance Group with a Health Check.
- C. Install the StackDriver Logging Agent and configure fluentd in\_tail plugin to read MariaDB logs.
- D. Install the StackDriver Agent and configure the MySQL plugin.

**Answer: D**

**Explanation:**

Install the StackDriver Agent and configure the MySQL plugin.

**Question: 91****CertyIQ**

You work for a bank. You have a labelled dataset that contains information on already granted loan application and whether these applications have been defaulted. You have been asked to train a model to predict default rates for credit applicants.

What should you do?

- A. Increase the size of the dataset by collecting additional data.
- B. Train a linear regression to predict a credit default risk score.
- C. Remove the bias from the data and collect applications that have been declined loans.
- D. Match loan applicants with their social profiles to enable feature engineering.

**Answer: B****Explanation:**

A is incorrect as you need to work with the data you have available

C is an optimisation not a solution

D is ethically incorrect and invasion to privacy, there could be several legal implications with this

B although oversimplified but is a workable solution

**Question: 92****CertyIQ**

You need to migrate a 2TB relational database to Google Cloud Platform. You do not have the resources to significantly refactor the application that uses this database and cost to operate is of primary concern. Which service do you select for storing and serving your data?

- A. Cloud Spanner
- B. Cloud Bigtable
- C. Cloud Firestore
- D. Cloud SQL

**Answer: D****Explanation:**

Cloud SQL supports MySQL 5.6 or 5.7, and provides up to 624 GB of RAM and 30 TB of data storage, with the option to automatically increase the storage size as needed.

**Question: 93****CertyIQ**

You're using Bigtable for a real-time application, and you have a heavy load that is a mix of read and writes. You've recently identified an additional use case and need to perform hourly an analytical job to calculate certain statistics across the whole database. You need to ensure both the reliability of your production application as well as the analytical workload.

What should you do?

- A. Export Bigtable dump to GCS and run your analytical job on top of the exported files.
- B. Add a second cluster to an existing instance with a multi-cluster routing, use live-traffic app profile for your

regular workload and batch-analytics profile for the analytics workload.

C. Add a second cluster to an existing instance with a single-cluster routing, use live-traffic app profile for your regular workload and batch-analytics profile for the analytics workload.

D. Increase the size of your existing cluster twice and execute your analytics workload on your new resized cluster.

**Answer: C**

**Explanation:**

When you use a single cluster to run a batch analytics job that performs numerous large reads alongside an application that performs a mix of reads and writes, the large batch job can slow things down for the application's users. With replication, you can use app profiles with single-cluster routing to route batch analytics jobs and application traffic to different clusters, so that batch jobs don't affect your applications' users.

Reference:

<https://cloud.google.com/bigtable/docs/replication-overview#use-cases>

**CertyIQ**

**Question: 94**

You are designing an Apache Beam pipeline to enrich data from Cloud Pub/Sub with static reference data from BigQuery. The reference data is small enough to fit in memory on a single worker. The pipeline should write enriched results to BigQuery for analysis. Which job type and transforms should this pipeline use?

- A. Batch job, PubSubIO, side-inputs
- B. Streaming job, PubSubIO, JdbcIO, side-outputs
- C. Streaming job, PubSubIO, BigQueryIO, side-inputs
- D. Streaming job, PubSubIO, BigQueryIO, side-outputs

**Answer: C**

**Explanation:**

Static reference data from BigQuery will go as side-inputs and data from pub-sub will go as streaming data using PubSubIO and finally BigQueryIO is required to push the final data to BigQuery

**CertyIQ**

**Question: 95**

You have a data pipeline that writes data to Cloud Bigtable using well-designed row keys. You want to monitor your pipeline to determine when to increase the size of your Cloud Bigtable cluster. Which two actions can you take to accomplish this? (Choose two.)

- A. Review Key Visualizer metrics. Increase the size of the Cloud Bigtable cluster when the Read pressure index is above 100.
- B. Review Key Visualizer metrics. Increase the size of the Cloud Bigtable cluster when the Write pressure index is above 100.
- C. Monitor the latency of write operations. Increase the size of the Cloud Bigtable cluster when there is a sustained increase in write latency.
- D. Monitor storage utilization. Increase the size of the Cloud Bigtable cluster when utilization increases above 70% of max capacity.
- E. Monitor latency of read operations. Increase the size of the Cloud Bigtable cluster of read operations take

longer than 100 ms.

**Answer: CD**

**Explanation:**

C -> Adding more nodes to a cluster (not replication) can improve the write performance  
<https://cloud.google.com/bigtable/docs/performance>

D -> since Google recommends adding nodes when storage utilization is > 70%  
<https://cloud.google.com/bigtable/docs/modifying-instance#nodes>

**CertyIQ**

**Question: 96**

You want to analyze hundreds of thousands of social media posts daily at the lowest cost and with the fewest steps.

You have the following requirements:

⇒ You will batch-load the posts once per day and run them through the Cloud Natural Language API.

⇒ You will extract topics and sentiment from the posts.

⇒ You must store the raw posts for archiving and reprocessing.

⇒ You will create dashboards to be shared with people both inside and outside your organization.

You need to store both the data extracted from the API to perform analysis as well as the raw social media posts for historical archiving. What should you do?

- A. Store the social media posts and the data extracted from the API in BigQuery.
- B. Store the social media posts and the data extracted from the API in Cloud SQL.
- C. Store the raw social media posts in Cloud Storage, and write the data extracted from the API into BigQuery.
- D. Feed to social media posts into the API directly from the source, and write the extracted data from the API into BigQuery.

**Answer: C**

**Explanation:**

First store the data on GCS, then extract only the relevant info for analysis and load into BQ. This way, huge data i.e., audio, videos can stay on GCS (not lost). BQ cannot store audio/video. And note that Cloud Natural Language API is used for analysis which uses Text as its source

Social media posts can contain images/videos which cannot be stored in BigQuery

**CertyIQ**

**Question: 97**

You store historic data in Cloud Storage. You need to perform analytics on the historic data. You want to use a solution to detect invalid data entries and perform data transformations that will not require programming or knowledge of SQL.

What should you do?

- A. Use Cloud Dataflow with Beam to detect errors and perform transformations.
- B. Use Cloud Dataprep with recipes to detect errors and perform transformations.
- C. Use Cloud Dataproc with a Hadoop job to detect errors and perform transformations.
- D. Use federated tables in BigQuery with queries to detect errors and perform transformations.

**Answer: B**

**Explanation:**

“Cloud Dataprep by Trifacta is an intelligent data service for visually exploring, cleaning, and preparing structured and unstructured data for analysis, reporting, and machine learning”

**Reference:**

<https://cloud.google.com/dataprep/>

**CertyIQ****Question: 98**

Your company needs to upload their historic data to Cloud Storage. The security rules don't allow access from external IPs to their on-premises resources. After an initial upload, they will add new data from existing on-premises applications every day. What should they do?

- A. Execute gsutil rsync from the on-premises servers.
- B. Use Dataflow and write the data to Cloud Storage.
- C. Write a job template in Dataproc to perform the data transfer.
- D. Install an FTP server on a Compute Engine VM to receive the files and move them to Cloud Storage.

**Answer: A****Explanation:**

The gsutil rsync command makes the contents under dst\_url the same as the contents under src\_url, by copying any missing files/objects (or those whose data has changed), and (if the -d option is specified) deleting any extra files/objects. src\_url must specify a directory, bucket, or bucket subdirectory

**CertyIQ****Question: 99**

You have a query that filters a BigQuery table using a WHERE clause on timestamp and ID columns. By using bq query --dry\_run you learn that the query triggers a full scan of the table, even though the filter on timestamp and ID select a tiny fraction of the overall data. You want to reduce the amount of data scanned by BigQuery with minimal changes to existing SQL queries. What should you do?

- A. Create a separate table for each ID.
- B. Use the LIMIT keyword to reduce the number of rows returned.
- C. Recreate the table with a partitioning column and clustering column.
- D. Use the bq query --maximum\_bytes\_billed flag to restrict the number of bytes billed.

**Answer: C****Explanation:**

Applying a LIMIT clause to a SELECT \* query does not affect the amount of data read. You are billed for reading all bytes in the entire table, and the query counts against your free tier quota.

A and D doesn't make sense

Its C, when you want to select by a partition you should write something like:

CREATE TABLE `blablabla.partitioned`

PARTITION BY

DATE(timestamp)

CLUSTER BY id

AS

SELECT \* FROM `blablabla`

Reference:

<https://cloud.google.com/bigquery/docs/best-practices-costs>

CertyIQ

### Question: 100

You have a requirement to insert minute-resolution data from 50,000 sensors into a BigQuery table. You expect significant growth in data volume and need the data to be available within 1 minute of ingestion for real-time analysis of aggregated trends. What should you do?

- A. Use bq load to load a batch of sensor data every 60 seconds.
- B. Use a Cloud Dataflow pipeline to stream data into the BigQuery table.
- C. Use the INSERT statement to insert a batch of data every 60 seconds.
- D. Use the MERGE statement to apply updates in batch every 60 seconds.

**Answer: B**

**Explanation:**

Cloud dataflow is used to stream data to bigquery in near realtime

CertyIQ

### Question: 101

You need to copy millions of sensitive patient records from a relational database to BigQuery. The total size of the database is 10 TB. You need to design a solution that is secure and time-efficient. What should you do?

- A. Export the records from the database as an Avro file. Upload the file to GCS using gsutil, and then load the Avro file into BigQuery using the BigQuery web UI in the GCP Console.
- B. Export the records from the database as an Avro file. Copy the file onto a Transfer Appliance and send it to Google, and then load the Avro file into BigQuery using the BigQuery web UI in the GCP Console.
- C. Export the records from the database into a CSV file. Create a public URL for the CSV file, and then use Storage Transfer Service to move the file to Cloud Storage. Load the CSV file into BigQuery using the BigQuery web UI in the GCP Console.
- D. Export the records from the database as an Avro file. Create a public URL for the Avro file, and then use Storage Transfer Service to move the file to Cloud Storage. Load the Avro file into BigQuery using the BigQuery web UI in the GCP Console.

**Answer: B**

**Explanation:**

In sense of speak(time-effective) <https://cloud.google.com/transfer-appliance/docs/4.0/overview#transfer-speeds> ransfer Appliance, you can receive the appliance and capture 300 terabytes of data in under 25 days. Your data can be accessed in Cloud Storage within another 25 days, all without consuming any outbound network bandwidth.

less than 1TB . gsutil more than 1TB, transfer service when the internet speeds aren't good, transfer appliance

### Question: 102

CertyIQ

You need to create a near real-time inventory dashboard that reads the main inventory tables in your BigQuery data warehouse. Historical inventory data is stored as inventory balances by item and location. You have several thousand updates to inventory every hour. You want to maximize performance of the dashboard and ensure that the data is accurate. What should you do?

- A. Leverage BigQuery UPDATE statements to update the inventory balances as they are changing.
- B. Partition the inventory balance table by item to reduce the amount of data scanned with each inventory update.
- C. Use the BigQuery streaming the stream changes into a daily inventory movement table. Calculate balances in a view that joins it to the historical inventory balance table. Update the inventory balance table nightly.
- D. Use the BigQuery bulk loader to batch load inventory changes into a daily inventory movement table. Calculate balances in a view that joins it to the historical inventory balance table. Update the inventory balance table nightly.

### Answer: C

#### Explanation:

C is correct.

It says "update Every hour"

And need " accuracy"

### Question: 103

CertyIQ

You have a data stored in BigQuery. The data in the BigQuery dataset must be highly available. You need to define a storage, backup, and recovery strategy of this data that minimizes cost. How should you configure the BigQuery table that have a recovery point objective (RPO) of 30 days?

- A. Set the BigQuery dataset to be regional. In the event of an emergency, use a point-in-time snapshot to recover the data.
- B. Set the BigQuery dataset to be regional. Create a scheduled query to make copies of the data to tables suffixed with the time of the backup. In the event of an emergency, use the backup copy of the table.
- C. Set the BigQuery dataset to be multi-regional. In the event of an emergency, use a point-in-time snapshot to recover the data.
- D. Set the BigQuery dataset to be multi-regional. Create a scheduled query to make copies of the data to tables suffixed with the time of the backup. In the event of an emergency, use the backup copy of the table.

### Answer: C

#### Explanation:

Set the BigQuery dataset to be multi-regional. In the event of an emergency, use a point-in-time snapshot to recover the data.

### Question: 104

CertyIQ

You used Dataprep to create a recipe on a sample of data in a BigQuery table. You want to reuse this recipe on a daily upload of data with the same schema, after the load job with variable execution time completes. What should you do?

- A. Create a cron schedule in Dataprep.
- B. Create an App Engine cron job to schedule the execution of the Dataprep job.
- C. Export the recipe as a Dataprep template, and create a job in Cloud Scheduler.
- D. Export the Dataprep job as a Dataflow template, and incorporate it into a Composer job.

**Answer: D**

**Explanation:**

Dataprep and Dataflow are same family

- D. Export the Dataprep job as a Dataflow template, and incorporate it into a Composer job.

**Question: 105**

**CertyIQ**

You want to automate execution of a multi-step data pipeline running on Google Cloud. The pipeline includes Dataproc and Dataflow jobs that have multiple dependencies on each other. You want to use managed services where possible, and the pipeline will run every day. Which tool should you use?

- A. cron
- B. Cloud Composer
- C. Cloud Scheduler
- D. Workflow Templates on Dataproc

**Answer: B**

**Explanation:**

"multiple dependencies on each other. You want to use managed service" = Cloud Composer

if you want your wf to schedule there are 3 ways to perform it, it of them is composer

**Reference:**

<https://cloud.google.com/dataproc/docs/concepts/workflows/workflow-schedule-solutions>

**Question: 106**

**CertyIQ**

You are managing a Cloud Dataproc cluster. You need to make a job run faster while minimizing costs, without losing work in progress on your clusters. What should you do?

- A. Increase the cluster size with more non-preemptible workers.
- B. Increase the cluster size with preemptible worker nodes, and configure them to forcefully decommission.
- C. Increase the cluster size with preemptible worker nodes, and use Cloud Stackdriver to trigger a script to preserve work.
- D. Increase the cluster size with preemptible worker nodes, and configure them to use graceful decommissioning.

**Answer: D**

### **Explanation:**

Reference:

<https://cloud.google.com/dataproc/docs/concepts/configuring-clusters/flex>

" target="\_blank" style="word-break: break-all;">>

Dataproc Enhanced Flexibility Mode (EFM) manages shuffle data to minimize job progress delays caused by the removal of nodes from a running cluster. EFM offloads shuffle data in one of two user-selectable modes:

1. Primary-worker shuffle. Mappers write data to primary workers. Workers pull from those remote nodes during the reduce phase. This mode is only available to, and is recommended for, Spark jobs.
2. HCFS (Hadoop Compatible File System) shuffle. Mappers write data to an HCFS implementation ([HDFS](#) by default). As with primary worker mode, only primary workers participate in HDFS and HCFS implementations (if HCFS shuffle uses the [Cloud Storage Connector](#), data is stored off-cluster). This mode can benefit jobs with small amounts of data, but due to scaling limitations, it is not recommended for larger jobs.

Since both EFM modes do not store intermediate shuffle data on secondary workers, EFM is well suited to clusters that use [preemptible VMs](#) or only [autoscale](#) the secondary worker group.

**CertyIQ**

### **Question: 107**

You work for a shipping company that uses handheld scanners to read shipping labels. Your company has strict data privacy standards that require scanners to only transmit tracking numbers when events are sent to Kafka topics. A recent software update caused the scanners to accidentally transmit recipients' personally identifiable information (PII) to analytics systems, which violates user privacy rules. You want to quickly build a scalable solution using cloud-native managed services to prevent exposure of PII to the analytics systems. What should you do?

- A. Create an authorized view in BigQuery to restrict access to tables with sensitive data.
- B. Install a third-party data validation tool on Compute Engine virtual machines to check the incoming data for sensitive information.
- C. Use Cloud Logging to analyze the data passed through the total pipeline to identify transactions that may contain sensitive information.
- D. Build a Cloud Function that reads the topics and makes a call to the Cloud Data Loss Prevention (Cloud DLP) API. Use the tagging and confidence levels to either pass or quarantine the data in a bucket for review.

### **Answer: D**

### **Explanation:**

Build a Cloud Function that reads the topics and makes a call to the Cloud Data Loss Prevention (Cloud DLP) API. Use the tagging and confidence levels to either pass or quarantine the data in a bucket for review.

**CertyIQ**

### **Question: 108**

You have developed three data processing jobs. One executes a Cloud Dataflow pipeline that transforms data uploaded to Cloud Storage and writes results to BigQuery. The second ingests data from on-premises servers and uploads it to Cloud Storage. The third is a Cloud Dataflow pipeline that gets information from third-party data providers and uploads the information to Cloud Storage. You need to be able to schedule and monitor the execution of these three workflows and manually

execute them when needed. What should you do?

- A. Create a Direct Acyclic Graph in Cloud Composer to schedule and monitor the jobs.
- B. Use Stackdriver Monitoring and set up an alert with a Webhook notification to trigger the jobs.
- C. Develop an App Engine application to schedule and request the status of the jobs using GCP API calls.
- D. Set up cron jobs in a Compute Engine instance to schedule and monitor the pipelines using GCP API calls.

**Answer: A**

**Explanation:**

<https://cloud.google.com/composer/docs/how-to/using/writing-dags>

Cloud Composer is a fully managed workflow orchestration service that empowers you to author, schedule, and monitor pipelines that span across clouds and on-premises data centers.

<https://cloud.google.com/composer/?hl=en>

**CertyIQ**

**Question: 109**

You have Cloud Functions written in Node.js that pull messages from Cloud Pub/Sub and send the data to BigQuery. You observe that the message processing rate on the Pub/Sub topic is orders of magnitude higher than anticipated, but there is no error logged in Cloud Logging. What are the two most likely causes of this problem? (Choose two.)

- A. Publisher throughput quota is too small.
- B. Total outstanding messages exceed the 10-MB maximum.
- C. Error handling in the subscriber code is not handling run-time errors properly.
- D. The subscriber code cannot keep up with the messages.
- E. The subscriber code does not acknowledge the messages that it pulls.

**Answer: CE**

**Explanation:**

By not acknowledging the pulled message, this result in it be putted back in Cloud Pub/Sub, meaning the messages accumulate instead of being consumed and removed from Pub/Sub. The same thing can happen if the subscriber maintains the lease on the message it receives in case of an error. This reduces the overall rate of processing because messages get stuck on the first subscriber. Also, errors in Cloud Function do not show up in Stackdriver Log Viewer if they are not correctly handled.

**CertyIQ**

**Question: 110**

You are creating a new pipeline in Google Cloud to stream IoT data from Cloud Pub/Sub through Cloud Dataflow to BigQuery. While previewing the data, you notice that roughly 2% of the data appears to be corrupt. You need to modify the Cloud Dataflow pipeline to filter out this corrupt data. What should you do?

- A. Add a SideInput that returns a Boolean if the element is corrupt.
- B. Add a ParDo transform in Cloud Dataflow to discard corrupt elements.
- C. Add a Partition transform in Cloud Dataflow to separate valid data from corrupt data.
- D. Add a GroupByKey transform in Cloud Dataflow to group all of the valid data together and discard the rest.

**Answer: B****Explanation:**

The Partition transform would require the element identifying the valid/invalid records for partitioning the pcollection that means there is some logic to be executed before the Partition transformation is invoked. That logic can be implemented in a ParDO transform and which can both identify valid/invalid records and also generate two PCollections one with valid records and other with invalid records.

**Question: 111****CertyIQ**

You have historical data covering the last three years in BigQuery and a data pipeline that delivers new data to BigQuery daily. You have noticed that when the Data Science team runs a query filtered on a date column and limited to 30``90 days of data, the query scans the entire table. You also noticed that your bill is increasing more quickly than you expected. You want to resolve the issue as cost-effectively as possible while maintaining the ability to conduct SQL queries. What should you do?

- A. Re-create the tables using DDL. Partition the tables by a column containing a TIMESTAMP or DATE Type.
- B. Recommend that the Data Science team export the table to a CSV file on Cloud Storage and use Cloud Datalab to explore the data by reading the files directly.
- C. Modify your pipeline to maintain the last 30``90 days of data in one table and the longer history in a different table to minimize full table scans over the entire history.
- D. Write an Apache Beam pipeline that creates a BigQuery table per day. Recommend that the Data Science team use wildcards on the table name suffixes to select the data they need.

**Answer: A****Explanation:**

Recreating the DDL with new partition is easy and does not require any changes on applications that read data from it

**Question: 112****CertyIQ**

You operate a logistics company, and you want to improve event delivery reliability for vehicle-based sensors. You operate small data centers around the world to capture these events, but leased lines that provide connectivity from your event collection infrastructure to your event processing infrastructure are unreliable, with unpredictable latency. You want to address this issue in the most cost-effective way. What should you do?

- A. Deploy small Kafka clusters in your data centers to buffer events.
- B. Have the data acquisition devices publish data to Cloud Pub/Sub.
- C. Establish a Cloud Interconnect between all remote data centers and Google.
- D. Write a Cloud Dataflow pipeline that aggregates all data in session windows.

**Answer: B****Explanation:**

Cloud Pub/Sub, it supports batch & streaming , push and pull capabilities

**Question: 113**

CertyIQ

You are a retailer that wants to integrate your online sales capabilities with different in-home assistants, such as Google Home. You need to interpret customer voice commands and issue an order to the backend systems. Which solutions should you choose?

- A. Speech-to-Text API
- B. Cloud Natural Language API
- C. Dialogflow Enterprise Edition
- D. AutoML Natural Language

**Answer: C****Explanation:**

Dialogflow provides a seamless integration with Google Assistant. This integration has the following advantages: You can use the same Dialogflow agent to power Google Assistant and other integrations. Dialogflow agents provide Google Cloud enterprise-grade security, privacy, support, and SLAs

**Question: 114**

CertyIQ

Your company has a hybrid cloud initiative. You have a complex data pipeline that moves data between cloud provider services and leverages services from each of the cloud providers. Which cloud-native service should you use to orchestrate the entire pipeline?

- A. Cloud Dataflow
- B. Cloud Composer
- C. Cloud Dataprep
- D. Cloud Dataproc

**Answer: B****Explanation:**

<https://cloud.google.com/composer/>

B: Cloud Composer is a fully managed workflow orchestration service that empowers you to author, schedule, and monitor pipelines that span across clouds and on-premises data centers.

<https://cloud.google.com/composer/> Cloud Composer can help create workflows that connect data, processing, and services across clouds, giving you a unified data environment. Built on the popular Apache Airflow open source project and operated using the Python programming language, Cloud Composer is free from lock-in and easy to use. Cloud Composer gives you the ability to connect your pipeline through a single orchestration tool whether your workflow lives on-premises, in multiple clouds, or fully within GCP. The ability to author, schedule, and monitor your workflows in a unified manner means you can break down the silos in your environment and focus less on infrastructure.

**Question: 115**

CertyIQ

You use a dataset in BigQuery for analysis. You want to provide third-party companies with access to the same dataset. You need to keep the costs of data sharing low and ensure that the data is current. Which solution should you choose?

- A. Use Analytics Hub to control data access, and provide third party companies with access to the dataset.
- B. Use Cloud Scheduler to export the data on a regular basis to Cloud Storage, and provide third-party companies with access to the bucket.
- C. Create a separate dataset in BigQuery that contains the relevant data to share, and provide third-party companies with access to the new dataset.
- D. Create a Dataflow job that reads the data in frequent time intervals, and writes it to the relevant BigQuery dataset or Cloud Storage bucket for third-party companies to use.

**Answer: A**

**Explanation:**

As an Analytics Hub user, you can perform the following tasks:

As an Analytics Hub publisher, you can monetize data by sharing it with your partner network or within your own organization in real time. Listings let you share data without replicating the shared data. You can build a catalog of analytics-ready data sources with granular permissions that let you deliver data to the right audiences.

As an Analytics Hub subscriber, you can discover the data that you are looking for, combine shared data with your existing data, and leverage the built-in features of BigQuery. When you subscribe to a listing, a linked dataset is created in your project.

As an Analytics Hub viewer, you can browse through the datasets that you have access to in Analytics Hub and request the publisher to access the shared data.

As an Analytics Hub administrator, you can create data exchanges that enable data sharing, and then give permissions to data publishers and subscribers to access these data exchanges.

<https://cloud.google.com/bigquery/docs/analytics-hub-introduction>

**Question: 116**

**CertyIQ**

Your company is in the process of migrating its on-premises data warehousing solutions to BigQuery. The existing data warehouse uses trigger-based change data capture (CDC) to apply updates from multiple transactional database sources on a daily basis. With BigQuery, your company hopes to improve its handling of CDC so that changes to the source systems are available to query in BigQuery in near-real time using log-based CDC streams, while also optimizing for the performance of applying changes to the data warehouse. Which two steps should they take to ensure that changes are available in the BigQuery reporting table with minimal latency while reducing compute overhead? (Choose two.)

- A. Perform a DML INSERT, UPDATE, or DELETE to replicate each individual CDC record in real time directly on the reporting table.
- B. Insert each new CDC record and corresponding operation type to a staging table in real time.
- C. Periodically DELETE outdated records from the reporting table.
- D. Periodically use a DML MERGE to perform several DML INSERT, UPDATE, and DELETE operations at the same time on the reporting table.
- E. Insert each new CDC record and corresponding operation type in real time to the reporting table, and use a materialized view to expose only the newest version of each unique record.

**Answer: BD**

**Explanation:**

To aim for minimal latency while reducing compute overhead:

B. Insert each new CDC record and corresponding operation type to a staging table in real time.

D. Periodically use a DML MERGE to perform several DML INSERT, UPDATE, and DELETE operations at the same time on the reporting table. (all statements comes from the staging table)

### Question: 117

CertyIQ

You are designing a data processing pipeline. The pipeline must be able to scale automatically as load increases. Messages must be processed at least once and must be ordered within windows of 1 hour. How should you design the solution?

- A. Use Apache Kafka for message ingestion and use Cloud Dataproc for streaming analysis.
- B. Use Apache Kafka for message ingestion and use Cloud Dataflow for streaming analysis.
- C. Use Cloud Pub/Sub for message ingestion and Cloud Dataproc for streaming analysis.
- D. Use Cloud Pub/Sub for message ingestion and Cloud Dataflow for streaming analysis.

### Answer: D

#### Explanation:

D: "at least once and must be ordered within windows" means Pub/Sub (at least once) with Dataflow (windows).

### Question: 118

CertyIQ

You need to set access to BigQuery for different departments within your company. Your solution should comply with the following requirements:

- ⇒ Each department should have access only to their data.
- ⇒ Each department will have one or more leads who need to be able to create and update tables and provide them to their team.
- ⇒ Each department has data analysts who need to be able to query but not modify data.

How should you set access to the data in BigQuery?

- A. Create a dataset for each department. Assign the department leads the role of OWNER, and assign the data analysts the role of WRITER on their dataset.
- B. Create a dataset for each department. Assign the department leads the role of WRITER, and assign the data analysts the role of READER on their dataset.
- C. Create a table for each department. Assign the department leads the role of Owner, and assign the data analysts the role of Editor on the project the table is in.
- D. Create a table for each department. Assign the department leads the role of Editor, and assign the data analysts the role of Viewer on the project the table is in.

### Answer: B

#### Explanation:

Create a dataset for each department. Assign the department leads the role of WRITER, and assign the data analysts the role of READER on their dataset.

### Question: 119

CertyIQ

You operate a database that stores stock trades and an application that retrieves average stock price for a given

company over an adjustable window of time. The data is stored in Cloud Bigtable where the datetime of the stock trade is the beginning of the row key. Your application has thousands of concurrent users, and you notice that performance is starting to degrade as more stocks are added. What should you do to improve the performance of your application?

- A. Change the row key syntax in your Cloud Bigtable table to begin with the stock symbol.
- B. Change the row key syntax in your Cloud Bigtable table to begin with a random number per second.
- C. Change the data pipeline to use BigQuery for storing stock trades, and update your application.
- D. Use Cloud Dataflow to write a summary of each day's stock trades to an Avro file on Cloud Storage. Update your application to read from Cloud Storage and Cloud Bigtable to compute the responses.

**Answer: A**

**Explanation:**

Description: Timestamp at starting of rowkey causes bottleneck issues

**Question: 120**

**CertyIQ**

You are operating a Cloud Dataflow streaming pipeline. The pipeline aggregates events from a Cloud Pub/Sub subscription source, within a window, and sinks the resulting aggregation to a Cloud Storage bucket. The source has consistent throughput. You want to monitor an alert on behavior of the pipeline with Cloud Stackdriver to ensure that it is processing data. Which Stackdriver alerts should you create?

- A. An alert based on a decrease of subscription/num\_undelivered\_messages for the source and a rate of change increase of instance/storage/ used\_bytes for the destination
- B. An alert based on an increase of subscription/num\_undelivered\_messages for the source and a rate of change decrease of instance/storage/ used\_bytes for the destination
- C. An alert based on a decrease of instance/storage/used\_bytes for the source and a rate of change increase of subscription/ num\_undelivered\_messages for the destination
- D. An alert based on an increase of instance/storage/used\_bytes for the source and a rate of change decrease of subscription/ num\_undelivered\_messages for the destination

**Answer: B**

**Explanation:**

The correct answer is Option B : increase of subscription/num\_undelivered\_messages and decrease of instance/storage/ used\_bytes, reason as follows:-

- The first question we should ask is - why do we want to monitor things - this his very subject, one can say - we want to monitor to check - if everything is running "OK" or we want to monitor things to check if everything is running "NOT OK".

Generally, we would go with the second point - i.e.- we want to monitor things - to check what is NOT OK. if everything works fine - may be we should monitor.

Going with that logic - Option B standouts - i.e.- the more we have undelivered messages in subscriber and less we have data in the sync (cloud storage) - means things are not OK and that why we want to monitor it .

As mentioned - this approach is subject and different people may have different approach in deciding why we monitor

**Question: 121**

CertyIQ

You currently have a single on-premises Kafka cluster in a data center in the us-east region that is responsible for ingesting messages from IoT devices globally.

Because large parts of globe have poor internet connectivity, messages sometimes batch at the edge, come in all at once, and cause a spike in load on your

Kafka cluster. This is becoming difficult to manage and prohibitively expensive. What is the Google-recommended cloud native architecture for this scenario?

- A. Edge TPUs as sensor devices for storing and transmitting the messages.
- B. Cloud Dataflow connected to the Kafka cluster to scale the processing of incoming messages.
- C. An IoT gateway connected to Cloud Pub/Sub, with Cloud Dataflow to read and process the messages from Cloud Pub/Sub.
- D. A Kafka cluster virtualized on Compute Engine in us-east with Cloud Load Balancing to connect to the devices around the world.

**Answer: C****Explanation:**

Answer C - Cloud Native = Pub/Sub + DataFlow

**Question: 122**

CertyIQ

You decided to use Cloud Datastore to ingest vehicle telemetry data in real time. You want to build a storage system that will account for the long-term data growth, while keeping the costs low. You also want to create snapshots of the data periodically, so that you can make a point-in-time (PIT) recovery, or clone a copy of the data for Cloud Datastore in a different environment. You want to archive these snapshots for a long time. Which two methods can accomplish this?

(Choose two.)

- A. Use managed export, and store the data in a Cloud Storage bucket using Nearline or Coldline class.
- B. Use managed export, and then import to Cloud Datastore in a separate project under a unique namespace reserved for that export.
- C. Use managed export, and then import the data into a BigQuery table created just for that export, and delete temporary export files.
- D. Write an application that uses Cloud Datastore client libraries to read all the entities. Treat each entity as a BigQuery table row via BigQuery streaming insert. Assign an export timestamp for each export, and attach it as an extra column for each row. Make sure that the BigQuery table is partitioned using the export timestamp column.
- E. Write an application that uses Cloud Datastore client libraries to read all the entities. Format the exported data into a JSON file. Apply compression before storing the data in Cloud Source Repositories.

**Answer: AB****Explanation:**

Option A; Cheap storage and it is a supported method <https://cloud.google.com/datastore/docs/export-import-entities>

Option B; Rationale - "Data exported from one Datastore mode database can be imported into another Datastore mode database, even one in another project."

**Reference:**

<<https://cloud.google.com/datastore/docs/export-import-entities>>

**Question: 123**

CertyIQ

You need to create a data pipeline that copies time-series transaction data so that it can be queried from within BigQuery by your data science team for analysis. Every hour, thousands of transactions are updated with a new status. The size of the initial dataset is 1.5 PB, and it will grow by 3 TB per day. The data is heavily structured, and your data science team will build machine learning models based on this data. You want to maximize performance and usability for your data science team. Which two strategies should you adopt? (Choose two.)

- A. Denormalize the data as much as possible.
- B. Preserve the structure of the data as much as possible.
- C. Use BigQuery UPDATE to further reduce the size of the dataset.
- D. Develop a data pipeline where status updates are appended to BigQuery instead of updated.
- E. Copy a daily snapshot of transaction data to Cloud Storage and store it as an Avro file. Use BigQuery's support for external data sources to query.

**Answer: AD****Explanation:**

Using BigQuery as an OLTP store is considered an anti-pattern. Because OLTP stores have a high volume of updates and deletes, they are a mismatch for the data warehouse use case. To decide which storage option best fits your use case, review the Cloud storage products table.

BigQuery is built for scale and can scale out as the size of the warehouse grows, so there is no need to delete older data. By keeping the entire history, you can deliver more insight on your business. If the storage cost is a concern, you can take advantage of BigQuery's long term storage pricing by archiving older data and using it for special analysis when the need arises. If you still have good reasons for dropping older data, you can use BigQuery's native support for date-partitioned tables and partition expiration. In other words, BigQuery can automatically delete older data.

[https://cloud.google.com/solutions/bigquery-data-warehouse#handling\\_change](https://cloud.google.com/solutions/bigquery-data-warehouse#handling_change)

**Question: 124**

CertyIQ

You are designing a cloud-native historical data processing system to meet the following conditions:

- ⇒ The data being analyzed is in CSV, Avro, and PDF formats and will be accessed by multiple analysis tools including Dataproc, BigQuery, and Compute Engine.
- ⇒ A batch pipeline moves daily data.
- ⇒ Performance is not a factor in the solution.
- ⇒ The solution design should maximize availability.

How should you design data storage for this solution?

- A. Create a Dataproc cluster with high availability. Store the data in HDFS, and perform analysis as needed.
- B. Store the data in BigQuery. Access the data using the BigQuery Connector on Dataproc and Compute Engine.
- C. Store the data in a regional Cloud Storage bucket. Access the bucket directly using Dataproc, BigQuery, and Compute Engine.
- D. Store the data in a multi-regional Cloud Storage bucket. Access the data directly using Dataproc, BigQuery, and Compute Engine.

**Answer: D****Explanation:**

Problem: How to store data,

Considerations: High availability, performance not an issue

A → avoid HDFS

C → multi-regional > regional in terms of availability

B could be the answer but we're dealing with PDF documents, we need blob storage (cloud storage). If we only have csv or Avro, this may be the answer

**CertyIQ**

### Question: 125

You have a petabyte of analytics data and need to design a storage and processing platform for it. You must be able to perform data warehouse-style analytics on the data in Google Cloud and expose the dataset as files for batch analysis tools in other cloud providers. What should you do?

- A. Store and process the entire dataset in BigQuery.
- B. Store and process the entire dataset in Bigtable.
- C. Store the full dataset in BigQuery, and store a compressed copy of the data in a Cloud Storage bucket.
- D. Store the warm data as files in Cloud Storage, and store the active data in BigQuery. Keep this ratio as 80% warm and 20% active.

### Answer: C

#### Explanation:

"You must be able to perform data warehouse-style analytics on the data in Google Cloud and expose the dataset as files for batch analysis tools in other cloud providers?"

Analytics -> BQ

Exposing -> GCS

**CertyIQ**

### Question: 126

You work for a manufacturing company that sources up to 750 different components, each from a different supplier. You've collected a labeled dataset that has on average 1000 examples for each unique component. Your team wants to implement an app to help warehouse workers recognize incoming components based on a photo of the component. You want to implement the first working version of this app (as Proof-Of-Concept) within a few working days. What should you do?

- A. Use Cloud Vision AutoML with the existing dataset.
- B. Use Cloud Vision AutoML, but reduce your dataset twice.
- C. Use Cloud Vision API by providing custom labels as recognition hints.
- D. Train your own image recognition model leveraging transfer learning techniques.

### Answer: A

#### Explanation:

Use Cloud Vision AutoML with the existing dataset.

**Question: 127**

CertyIQ

You are working on a niche product in the image recognition domain. Your team has developed a model that is dominated by custom C++ TensorFlow ops your team has implemented. These ops are used inside your main training loop and are performing bulky matrix multiplications. It currently takes up to several days to train a model. You want to decrease this time significantly and keep the cost low by using an accelerator on Google Cloud. What should you do?

- A. Use Cloud TPUs without any additional adjustment to your code.
- B. Use Cloud TPUs after implementing GPU kernel support for your customs ops.
- C. Use Cloud GPUs after implementing GPU kernel support for your customs ops.
- D. Stay on CPUs, and increase the size of the cluster you're training your model on.

**Answer: C****Explanation:**

Use Cloud GPUs after implementing GPU kernel support for your customs ops.

**Question: 128**

CertyIQ

You work on a regression problem in a natural language processing domain, and you have 100M labeled examples in your dataset. You have randomly shuffled your data and split your dataset into train and test samples (in a 90/10 ratio). After you trained the neural network and evaluated your model on a test set, you discover that the root-mean-squared error (RMSE) of your model is twice as high on the train set as on the test set. How should you improve the performance of your model?

- A. Increase the share of the test sample in the train-test split.
- B. Try to collect more data and increase the size of your dataset.
- C. Try out regularization techniques (e.g., dropout or batch normalization) to avoid overfitting.
- D. Increase the complexity of your model by, e.g., introducing an additional layer or increase sizing the size of vocabularies or n-grams used.

**Answer: D****Explanation:**

This is a case of underfitting - not overfitting (for over fitting the model will have extremely low training error but a high testing error) - so we need to make the model more complex - answer is D

**Question: 129**

CertyIQ

You use BigQuery as your centralized analytics platform. New data is loaded every day, and an ETL pipeline modifies the original data and prepares it for the final users. This ETL pipeline is regularly modified and can generate errors, but sometimes the errors are detected only after 2 weeks. You need to provide a method to recover from these errors, and your backups should be optimized for storage costs. How should you organize your data in BigQuery and store your backups?

- A. Organize your data in a single table, export, and compress and store the BigQuery data in Cloud Storage.
- B. Organize your data in separate tables for each month, and export, compress, and store the data in Cloud Storage.
- C. Organize your data in separate tables for each month, and duplicate your data on a separate dataset in BigQuery.
- D. Organize your data in separate tables for each month, and use snapshot decorators to restore the table to a

time prior to the corruption.

**Answer: B**

**Explanation:**

<https://cloud.google.com/architecture/dr-scenarios-for-data#BigQuery>

B seems the best solution (but C is also good candidate) D is incorrect - table decorators allow time travel back only up to 7 days (see <https://cloud.google.com/bigquery/table-decorators>) - if you want to keep older snapshots, you would have to save them into separate table yourself (and pay for storage).

**Question: 130**

CertyIQ

The marketing team at your organization provides regular updates of a segment of your customer dataset. The marketing team has given you a CSV with 1 million records that must be updated in BigQuery. When you use the UPDATE statement in BigQuery, you receive a quotaExceeded error. What should you do?

- A. Reduce the number of records updated each day to stay within the BigQuery UPDATE DML statement limit.
- B. Increase the BigQuery UPDATE DML statement limit in the Quota management section of the Google Cloud Platform Console.
- C. Split the source CSV file into smaller CSV files in Cloud Storage to reduce the number of BigQuery UPDATE DML statements per BigQuery job.
- D. Import the new records from the CSV file into a new BigQuery table. Create a BigQuery job that merges the new records with the existing records and writes the results to a new BigQuery table.

**Answer: D**

**Explanation:**

BigQuery is primarily designed and suit to append-only technology with some limited DML statements.

It's not a relational database where you constantly update your user records if they edit their profile. Instead you need to arhitect your code so each edit is a new row in Bigquery, and you always query the latest row.

The DML statement limitation is low, because it targets different scenarios and not yours, aka live update on rows. You could ingest your data into a separate table, and issue 1 update statement per day.

<https://stackoverflow.com/questions/45183082/can-we-increase-update-quota-in-bigquery>

<https://cloud.google.com/blog/products/gcp/performing-large-scale-mutations-in-bigquery>

**Question: 131**

CertyIQ

As your organization expands its usage of GCP, many teams have started to create their own projects. Projects are further multiplied to accommodate different stages of deployments and target audiences. Each project requires unique access control configurations. The central IT team needs to have access to all projects. Furthermore, data from Cloud Storage buckets and BigQuery datasets must be shared for use in other projects in an ad hoc way. You want to simplify access control management by minimizing the number of policies. Which two steps should you take? (Choose two.)

- A. Use Cloud Deployment Manager to automate access provision.
- B. Introduce resource hierarchy to leverage access control policy inheritance.
- C. Create distinct groups for various teams, and specify groups in Cloud IAM policies.

- D. Only use service accounts when sharing data for Cloud Storage buckets and BigQuery datasets.
- E. For each Cloud Storage bucket or BigQuery dataset, decide which projects need access. Find all the active members who have access to these projects, and create a Cloud IAM policy to grant access to all these users.

**Answer: BC**

**Explanation:**

Description: Google suggests that we should provide access by following google hierarchy and groups for users with similar roles

**CertyIQ**

**Question: 132**

Your United States-based company has created an application for assessing and responding to user actions. The primary table's data volume grows by 250,000 records per second. Many third parties use your application's APIs to build the functionality into their own frontend applications. Your application's APIs should comply with the following requirements:

- ⇒ Single global endpoint
- ⇒ ANSI SQL support
- ⇒ Consistent access to the most up-to-date data

What should you do?

- A. Implement BigQuery with no region selected for storage or processing.
- B. Implement Cloud Spanner with the leader in North America and read-only replicas in Asia and Europe.
- C. Implement Cloud SQL for PostgreSQL with the master in North America and read replicas in Asia and Europe.
- D. Implement Bigtable with the primary cluster in North America and secondary clusters in Asia and Europe.

**Answer: B**

**Explanation:**

Answer: B

Description: All the criteria meets for Spanner

**CertyIQ**

**Question: 133**

A data scientist has created a BigQuery ML model and asks you to create an ML pipeline to serve predictions. You have a REST API application with the requirement to serve predictions for an individual user ID with latency under 100 milliseconds. You use the following query to generate predictions: `SELECT predicted_label, user_id FROM ML.PREDICT (MODEL 'dataset.model', table user_features)`. How should you create the ML pipeline?

- A. Add a WHERE clause to the query, and grant the BigQuery Data Viewer role to the application service account.
- B. Create an Authorized View with the provided query. Share the dataset that contains the view with the application service account.
- C. Create a Dataflow pipeline using BigQueryIO to read results from the query. Grant the Dataflow Worker role to the application service account.
- D. Create a Dataflow pipeline using BigQueryIO to read predictions for all users from the query. Write the results to Bigtable using BigtableIO. Grant the Bigtable Reader role to the application service account so that the application can read predictions for individual users from Bigtable.

**Answer: D**

**Explanation:**

Description: Bigtable provides lowest latency

**CertyIQ****Question: 134**

You are building an application to share financial market data with consumers, who will receive data feeds. Data is collected from the markets in real time.

Consumers will receive the data in the following ways:

- ⇒ Real-time event stream
- ⇒ ANSI SQL access to real-time stream and historical data
- ⇒ Batch historical exports

Which solution should you use?

- A. Cloud Dataflow, Cloud SQL, Cloud Spanner
- B. Cloud Pub/Sub, Cloud Storage, BigQuery
- C. Cloud Dataproc, Cloud Dataflow, BigQuery
- D. Cloud Pub/Sub, Cloud Dataproc, Cloud SQL

**Answer: B****Explanation:**

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

Real-time made real easy

Adopt simple ingestion for complex events

Ingest and analyze hundreds of millions of events per second from applications or devices virtually anywhere on the globe with Pub/Sub. Or directly stream millions of events per second into your data warehouse for SQL-based analysis with BigQuery's streaming API.

**CertyIQ****Question: 135**

You are building a new application that you need to collect data from in a scalable way. Data arrives continuously from the application throughout the day, and you expect to generate approximately 150 GB of JSON data per day by the end of the year. Your requirements are:

- ⇒ Decoupling producer from consumer
- ⇒ Space and cost-efficient storage of the raw ingested data, which is to be stored indefinitely
- ⇒ Near real-time SQL query
- ⇒ Maintain at least 2 years of historical data, which will be queried with SQL

Which pipeline should you use to meet these requirements?

- A. Create an application that provides an API. Write a tool to poll the API and write data to Cloud Storage as gzipped JSON files.
- B. Create an application that writes to a Cloud SQL database to store the data. Set up periodic exports of the database to write to Cloud Storage and load into BigQuery.
- C. Create an application that publishes events to Cloud Pub/Sub, and create Spark jobs on Cloud Dataproc to convert the JSON data to Avro format, stored on HDFS on Persistent Disk.
- D. Create an application that publishes events to Cloud Pub/Sub, and create a Cloud Dataflow pipeline that transforms the JSON event payloads to Avro, writing the data to Cloud Storage and BigQuery.

**Answer: D**

**Explanation:**

D: Cloud Pub/Sub, Cloud Dataflow, Cloud Storage, BigQuery

**Reference:**

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

**CertyIQ****Question: 136**

You are running a pipeline in Dataflow that receives messages from a Pub/Sub topic and writes the results to a BigQuery dataset in the EU. Currently, your pipeline is located in europe-west4 and has a maximum of 3 workers, instance type n1-standard-1. You notice that during peak periods, your pipeline is struggling to process records in a timely fashion, when all 3 workers are at maximum CPU utilization. Which two actions can you take to increase performance of your pipeline? (Choose two.)

- A. Increase the number of max workers
- B. Use a larger instance type for your Dataflow workers
- C. Change the zone of your Dataflow pipeline to run in us-central1
- D. Create a temporary table in Bigtable that will act as a buffer for new data. Create a new step in your pipeline to write to this table first, and then create a new pipeline to write from Bigtable to BigQuery
- E. Create a temporary table in Cloud Spanner that will act as a buffer for new data. Create a new step in your pipeline to write to this table first, and then create a new pipeline to write from Cloud Spanner to BigQuery

**Answer: AB****Explanation:**

A & B instance n1-standard-1 is low configuration and hence need to be larger configuration, definitely B should be one of the option.

Increase max workers will increase parallelism and hence will be able to process faster given larger CPU size and multi core processor instance type is chosen. Option A can be a better step.

**CertyIQ****Question: 137**

You have a data pipeline with a Cloud Dataflow job that aggregates and writes time series metrics to Cloud Bigtable. This data feeds a dashboard used by thousands of users across the organization. You need to support additional concurrent users and reduce the amount of time required to write the data. Which two actions should you take? (Choose two.)

- A. Configure your Cloud Dataflow pipeline to use local execution
- B. Increase the maximum number of Cloud Dataflow workers by setting maxNumWorkers in PipelineOptions
- C. Increase the number of nodes in the Cloud Bigtable cluster
- D. Modify your Cloud Dataflow pipeline to use the Flatten transform before writing to Cloud Bigtable
- E. Modify your Cloud Dataflow pipeline to use the CoGroupByKey transform before writing to Cloud Bigtable

**Answer: BC****Explanation:**

B&C If you need to change DataFlow pipeline, better using Combine than CoGroupByKey according Google recommendations:

Combine is orders of magnitude faster than GroupByKey because Dataflow knows how to parallelize a combine step. Combine allows Dataflow to distribute a key to multiple workers and process it in parallel

### Question: 138

CertyIQ

You have several Spark jobs that run on a Cloud Dataproc cluster on a schedule. Some of the jobs run in sequence, and some of the jobs run concurrently. You need to automate this process. What should you do?

- A. Create a Cloud Dataproc Workflow Template
- B. Create an initialization action to execute the jobs
- C. Create a Directed Acyclic Graph in Cloud Composer
- D. Create a Bash script that uses the Cloud SDK to create a cluster, execute jobs, and then tear down the cluster

**Answer: C**

**Explanation:**

Create a Directed Acyclic Graph in Cloud Composer.

### Question: 139

CertyIQ

You are building a new data pipeline to share data between two different types of applications: jobs generators and job runners. Your solution must scale to accommodate increases in usage and must accommodate the addition of new applications without negatively affecting the performance of existing ones. What should you do?

- A. Create an API using App Engine to receive and send messages to the applications
- B. Use a Cloud Pub/Sub topic to publish jobs, and use subscriptions to execute them
- C. Create a table on Cloud SQL, and insert and delete rows with the job information
- D. Create a table on Cloud Spanner, and insert and delete rows with the job information

**Answer: B**

**Explanation:**

use pubsub

one of the use of pub/sub is decoupling app

### Question: 140

CertyIQ

You need to create a new transaction table in Cloud Spanner that stores product sales data. You are deciding what to use as a primary key. From a performance perspective, which strategy should you choose?

- A. The current epoch time
- B. A concatenation of the product name and the current epoch time
- C. A random universally unique identifier number (version 4 UUID)
- D. The original order identification number from the sales system, which is a monotonically increasing integer

**Answer: C**

**Explanation:**

According to the documentation:

Use a Universally Unique Identifier (UUID)

You can use a Universally Unique Identifier (UUID) as defined by RFC 4122 as the primary key. Version 4 UUID is recommended, because it uses random values in the bit sequence. Version 1 UUID stores the timestamp in the high order bits and is not recommended.

Reference:

<https://cloud.google.com/spanner/docs/schema-design>

**CertyIQ****Question: 141**

Data Analysts in your company have the Cloud IAM Owner role assigned to them in their projects to allow them to work with multiple GCP products in their projects. Your organization requires that all BigQuery data access logs be retained for 6 months. You need to ensure that only audit personnel in your company can access the data access logs for all projects. What should you do?

- A. Enable data access logs in each Data Analyst's project. Restrict access to Stackdriver Logging via Cloud IAM roles.
- B. Export the data access logs via a project-level export sink to a Cloud Storage bucket in the Data Analysts' projects. Restrict access to the Cloud Storage bucket.
- C. Export the data access logs via a project-level export sink to a Cloud Storage bucket in a newly created projects for audit logs. Restrict access to the project with the exported logs.
- D. Export the data access logs via an aggregated export sink to a Cloud Storage bucket in a newly created project for audit logs. Restrict access to the project that contains the exported logs.

**Answer: D****Explanation:**

Aggregated log sink will create a single sink for all projects, the destination can be a google cloud storage, pub/sub topic, bigquery table or a cloud logging bucket. without aggregated sink this will be required to be done for each project individually which will be cumbersome.

Reference:

[https://cloud.google.com/logging/docs/export/aggregated\\_sinks](https://cloud.google.com/logging/docs/export/aggregated_sinks)

**CertyIQ****Question: 142**

Each analytics team in your organization is running BigQuery jobs in their own projects. You want to enable each team to monitor slot usage within their projects.

What should you do?

- A. Create a Cloud Monitoring dashboard based on the BigQuery metric query/scanned\_bytes
- B. Create a Cloud Monitoring dashboard based on the BigQuery metric slots/allocated\_for\_project
- C. Create a log export for each project, capture the BigQuery job execution logs, create a custom metric based on the totalSlotMs, and create a Cloud Monitoring dashboard based on the custom metric
- D. Create an aggregated log export at the organization level, capture the BigQuery job execution logs, create a custom metric based on the totalSlotMs, and create a Cloud Monitoring dashboard based on the custom metric

**Answer: B**

**Explanation:**

Reference:

[https://cloud.google.com/blog/topics/developers-practitioners/monitoring-bigquery-reservations-and-slot-utilization-information\\_schema](https://cloud.google.com/blog/topics/developers-practitioners/monitoring-bigquery-reservations-and-slot-utilization-information_schema)

**CertyIQ**

**Question: 143**

You are operating a streaming Cloud Dataflow pipeline. Your engineers have a new version of the pipeline with a different windowing algorithm and triggering strategy. You want to update the running pipeline with the new version. You want to ensure that no data is lost during the update. What should you do?

- A. Update the Cloud Dataflow pipeline inflight by passing the --update option with the --jobName set to the existing job name
- B. Update the Cloud Dataflow pipeline inflight by passing the --update option with the --jobName set to a new unique job name
- C. Stop the Cloud Dataflow pipeline with the Cancel option. Create a new Cloud Dataflow job with the updated code
- D. Stop the Cloud Dataflow pipeline with the Drain option. Create a new Cloud Dataflow job with the updated code

**Answer: D**

**Explanation:**

1. D of course. Also you can only update for minor changes on windowing/triggering. Question say a different strategy.
2. drain for graceful shutdown

**CertyIQ**

**Question: 144**

You need to move 2 PB of historical data from an on-premises storage appliance to Cloud Storage within six months, and your outbound network capacity is constrained to 20 Mb/sec. How should you migrate this data to Cloud Storage?

- A. Use Transfer Appliance to copy the data to Cloud Storage
- B. Use gsutil cp "J to compress the content being uploaded to Cloud Storage
- C. Create a private URL for the historical data, and then use Storage Transfer Service to copy the data to Cloud Storage
- D. Use trickle or ionice along with gsutil cp to limit the amount of bandwidth gsutil utilizes to less than 20 Mb/sec so it does not interfere with the production traffic

**Answer: A**

**Explanation:**

A with little calculation we know the kind of data will require approx 19 months to transfer on 20Mbps bandwidth. Also, google recommends Transfer appliance for petabytes of data.

## Question: 145

CertyIQ

You receive data files in CSV format monthly from a third party. You need to cleanse this data, but every third month the schema of the files changes. Your requirements for implementing these transformations include:

- ⇒ Executing the transformations on a schedule
- ⇒ Enabling non-developer analysts to modify transformations
- ⇒ Providing a graphical tool for designing transformations

What should you do?

- A. Use Dataprep by Trifacta to build and maintain the transformation recipes, and execute them on a scheduled basis
- B. Load each month's CSV data into BigQuery, and write a SQL query to transform the data to a standard schema. Merge the transformed tables together with a SQL query
- C. Help the analysts write a Dataflow pipeline in Python to perform the transformation. The Python code should be stored in a revision control system and modified as the incoming data's schema changes
- D. Use Apache Spark on Dataproc to infer the schema of the CSV file before creating a Dataframe. Then implement the transformations in Spark SQL before writing the data out to Cloud Storage and loading into BigQuery

### Answer: A

#### Explanation:

A

you can use dataprep for continuously changing target schema

In general, a target consists of the set of information required to define the expected data in a dataset. Often referred to as a "schema," this target schema information can include:

- Names of columns
- Order of columns
- Column data types
- Data type format
- Example rows of data

A dataset associated with a target is expected to conform to the requirements of the schema. Where there are differences between target schema and dataset schema, a validation indicator (or schema tag) is displayed.

[https://cloud.google.com/dataprep/docs/html/Overview-of-RapidTarget\\_136155049](https://cloud.google.com/dataprep/docs/html/Overview-of-RapidTarget_136155049)

## Question: 146

CertyIQ

You want to migrate an on-premises Hadoop system to Cloud Dataproc. Hive is the primary tool in use, and the data format is Optimized Row Columnar (ORC).

All ORC files have been successfully copied to a Cloud Storage bucket. You need to replicate some data to the cluster's local Hadoop Distributed File System (HDFS) to maximize performance. What are two ways to start using Hive in Cloud Dataproc? (Choose two.)

- A. Run the gsutil utility to transfer all ORC files from the Cloud Storage bucket to HDFS. Mount the Hive tables locally.
- B. Run the gsutil utility to transfer all ORC files from the Cloud Storage bucket to any node of the Dataproc cluster. Mount the Hive tables locally.

- C. Run the gsutil utility to transfer all ORC files from the Cloud Storage bucket to the master node of the Dataproc cluster. Then run the Hadoop utility to copy them do HDFS. Mount the Hive tables from HDFS.
- D. Leverage Cloud Storage connector for Hadoop to mount the ORC files as external Hive tables. Replicate external Hive tables to the native ones.
- E. Load the ORC files into BigQuery. Leverage BigQuery connector for Hadoop to mount the BigQuery tables as external Hive tables. Replicate external Hive tables to the native ones.

**Answer: BC**

**Explanation:**

Description: HDFS lies on datanode, data on masternode needs to be copied on datanode

**CertyIQ**

**Question: 147**

You are implementing several batch jobs that must be executed on a schedule. These jobs have many interdependent steps that must be executed in a specific order. Portions of the jobs involve executing shell scripts, running Hadoop jobs, and running queries in BigQuery. The jobs are expected to run for many minutes up to several hours. If the steps fail, they must be retried a fixed number of times. Which service should you use to manage the execution of these jobs?

- A. Cloud Scheduler
- B. Cloud Dataflow
- C. Cloud Functions
- D. Cloud Composer

**Answer: D**

**Explanation:**

The main point is that Cloud Composer should be used when there is inter-dependencies between the job, e.g. we need the output of a job to start another whenever the first finished, and use dependencies coming from first job.

**CertyIQ**

**Question: 148**

You work for a shipping company that has distribution centers where packages move on delivery lines to route them properly. The company wants to add cameras to the delivery lines to detect and track any visual damage to the packages in transit. You need to create a way to automate the detection of damaged packages and flag them for human review in real time while the packages are in transit. Which solution should you choose?

- A. Use BigQuery machine learning to be able to train the model at scale, so you can analyze the packages in batches.
- B. Train an AutoML model on your corpus of images, and build an API around that model to integrate with the package tracking applications.
- C. Use the Cloud Vision API to detect for damage, and raise an alert through Cloud Functions. Integrate the package tracking applications with this function.
- D. Use TensorFlow to create a model that is trained on your corpus of images. Create a Python notebook in Cloud Datalab that uses this model so you can analyze for damaged packages.

**Answer: B**

**Explanation:**

AutoML is used to train model and do damage detection Auto Vision is used is a pre trained model used to detect objects in images

Cloud Vision API -> pre-trained models to detect labels, faces, words AutoML -> custom specific models trained for specific use case

### Question: 149

CertyIQ

You are migrating your data warehouse to BigQuery. You have migrated all of your data into tables in a dataset. Multiple users from your organization will be using the data. They should only see certain tables based on their team membership. How should you set user permissions?

- A. Assign the users/groups data viewer access at the table level for each table
- B. Create SQL views for each team in the same dataset in which the data resides, and assign the users/groups data viewer access to the SQL views
- C. Create authorized views for each team in the same dataset in which the data resides, and assign the users/groups data viewer access to the authorized views
- D. Create authorized views for each team in datasets created for each team. Assign the authorized views data viewer access to the dataset in which the data resides. Assign the users/groups data viewer access to the datasets in which the authorized views reside

### Answer: A

#### Explanation:

<https://cloud.google.com/bigquery/docs/table-access-controls-intro> Don't think too much ,there is nothing to do with view, the question refer to table obviously. Assume that User see certain table so he can see everything in such a table

It has nothing to do with authorize view because of the following Authorized views make use of query results but this question emphasise on Table level <https://cloud.google.com/bigquery/docs/authorized-views> An authorized view lets you share query results with particular users and groups without giving them access to the underlying source data.

### Question: 150

CertyIQ

You want to build a managed Hadoop system as your data lake. The data transformation process is composed of a series of Hadoop jobs executed in sequence.

To accomplish the design of separating storage from compute, you decided to use the Cloud Storage connector to store all input data, output data, and intermediary data. However, you noticed that one Hadoop job runs very slowly with Cloud Dataproc, when compared with the on-premises bare-metal Hadoop environment (8-core nodes with 100-GB RAM). Analysis shows that this particular Hadoop job is disk I/O intensive. You want to resolve the issue. What should you do?

- A. Allocate sufficient memory to the Hadoop cluster, so that the intermediary data of that particular Hadoop job can be held in memory
- B. Allocate sufficient persistent disk space to the Hadoop cluster, and store the intermediate data of that particular Hadoop job on native HDFS
- C. Allocate more CPU cores of the virtual machine instances of the Hadoop cluster so that the networking bandwidth for each instance can scale up
- D. Allocate additional network interface card (NIC), and configure link aggregation in the operating system to use the combined throughput when working with Cloud Storage

**Answer: B****Explanation:**

Local HDFS storage is a good option if:

Your jobs require a lot of metadata operations—for example, you have thousands of partitions and directories, and each file size is relatively small.

You modify the HDFS data frequently or you rename directories. (Cloud Storage objects are immutable, so renaming a directory is an expensive operation because it consists of copying all objects to a new key and deleting them afterwards.)

You heavily use the append operation on HDFS files.

You have workloads that involve heavy I/O. For example, you have a lot of partitioned writes, such as the following:

```
spark.read().write.partitionBy(...).parquet("gs://")
```

You have I/O workloads that are especially sensitive to latency. For example, you require single-digit millisecond latency per storage operation.

**CertyIQ****Question: 151**

You work for an advertising company, and you've developed a Spark ML model to predict click-through rates at advertisement blocks. You've been developing everything at your on-premises data center, and now your company is migrating to Google Cloud. Your data center will be closing soon, so a rapid lift-and-shift migration is necessary. However, the data you've been using will be migrated to BigQuery. You periodically retrain your Spark ML models, so you need to migrate existing training pipelines to Google Cloud. What should you do?

- A. Use Vertex AI for training existing Spark ML models
- B. Rewrite your models on TensorFlow, and start using Vertex AI
- C. Use Dataproc for training existing Spark ML models, but start reading data directly from BigQuery
- D. Spin up a Spark cluster on Compute Engine, and train Spark ML models on the data exported from BigQuery

**Answer: C****Explanation:**

Data proc has bigquery connector

**CertyIQ****Question: 152**

You work for a global shipping company. You want to train a model on 40 TB of data to predict which ships in each geographic region are likely to cause delivery delays on any given day. The model will be based on multiple attributes collected from multiple sources. Telemetry data, including location in GeoJSON format, will be pulled from each ship and loaded every hour. You want to have a dashboard that shows how many and which ships are likely to cause delays within a region. You want to use a storage solution that has native functionality for prediction and geospatial processing. Which storage solution should you use?

- A. BigQuery
- B. Cloud Bigtable
- C. Cloud Datastore

**Answer: A**

**Explanation:**

Geospatial and ML functionality is with bigquery

**CertyIQ**

You operate an IoT pipeline built around Apache Kafka that normally receives around 5000 messages per second. You want to use Google Cloud Platform to create an alert as soon as the moving average over 1 hour drops below 4000 messages per second. What should you do?

- A. Consume the stream of data in Dataflow using Kafka IO. Set a sliding time window of 1 hour every 5 minutes. Compute the average when the window closes, and send an alert if the average is less than 4000 messages.
- B. Consume the stream of data in Dataflow using Kafka IO. Set a fixed time window of 1 hour. Compute the average when the window closes, and send an alert if the average is less than 4000 messages.
- C. Use Kafka Connect to link your Kafka message queue to Pub/Sub. Use a Dataflow template to write your messages from Pub/Sub to Bigtable. Use Cloud Scheduler to run a script every hour that counts the number of rows created in Bigtable in the last hour. If that number falls below 4000, send an alert.
- D. Use Kafka Connect to link your Kafka message queue to Pub/Sub. Use a Dataflow template to write your messages from Pub/Sub to BigQuery. Use Cloud Scheduler to run a script every five minutes that counts the number of rows created in BigQuery in the last hour. If that number falls below 4000, send an alert.

**Answer: A**

**Explanation:**

Dataflow can connect with Kafka and sliding window is used for taking averages

**CertyIQ**

You plan to deploy Cloud SQL using MySQL. You need to ensure high availability in the event of a zone failure. What should you do?

- A. Create a Cloud SQL instance in one zone, and create a failover replica in another zone within the same region.
- B. Create a Cloud SQL instance in one zone, and create a read replica in another zone within the same region.
- C. Create a Cloud SQL instance in one zone, and configure an external read replica in a zone in a different region.
- D. Create a Cloud SQL instance in a region, and configure automatic backup to a Cloud Storage bucket in the same region.

**Answer: A**

**Explanation:**

<https://cloud.google.com/sql/docs/mysql/high-availability>

"Multiple zones (Highly available)

Automatic failover to another zone within your selected region. Recommended for production instances.  
Increases cost."

**Question: 155**

CertyIQ

Your company is selecting a system to centralize data ingestion and delivery. You are considering messaging and data integration systems to address the requirements. The key requirements are:

- ⇒ The ability to seek to a particular offset in a topic, possibly back to the start of all data ever captured
- ⇒ Support for publish/subscribe semantics on hundreds of topics

Retain per-key ordering -

Which system should you choose?

- A. Apache Kafka
- B. Cloud Storage
- C. Dataflow
- D. Firebase Cloud Messaging

**Answer: A****Explanation:**

It's the only technology that met the requirements

**Question: 156**

CertyIQ

You are planning to migrate your current on-premises Apache Hadoop deployment to the cloud. You need to ensure that the deployment is as fault-tolerant and cost-effective as possible for long-running batch jobs. You want to use a managed service. What should you do?

- A. Deploy a Dataproc cluster. Use a standard persistent disk and 50% preemptible workers. Store data in Cloud Storage, and change references in scripts from hdfs:// to gs://
- B. Deploy a Dataproc cluster. Use an SSD persistent disk and 50% preemptible workers. Store data in Cloud Storage, and change references in scripts from hdfs:// to gs://
- C. Install Hadoop and Spark on a 10-node Compute Engine instance group with standard instances. Install the Cloud Storage connector, and store the data in Cloud Storage. Change references in scripts from hdfs:// to gs://
- D. Install Hadoop and Spark on a 10-node Compute Engine instance group with preemptible instances. Store data in HDFS. Change references in scripts from hdfs:// to gs://

**Answer: A****Explanation:**

Ask for cost effective so persistent disk are HDD which are cheaper in comparison to SSD.

**Question: 157**

CertyIQ

Your team is working on a binary classification problem. You have trained a support vector machine (SVM) classifier with default parameters, and received an area under the Curve (AUC) of 0.87 on the validation set. You want to increase the AUC of the model. What should you do?

- A. Perform hyperparameter tuning
- B. Train a classifier with deep neural networks, because neural networks would always beat SVMs
- C. Deploy the model and measure the real-world AUC; it's always higher because of generalization

D. Scale predictions you get out of the model (tune a scaling factor as a hyperparameter) in order to get the highest AUC

**Answer: A**

**Explanation:**

as mentioned by Spider7 "performing tuning rather than using the model default parameters there's a way to increase the overall model performance --> A."

**Question: 158**

CertyIQ

You need to deploy additional dependencies to all nodes of a Cloud Dataproc cluster at startup using an existing initialization action. Company security policies require that Cloud Dataproc nodes do not have access to the Internet so public initialization actions cannot fetch resources. What should you do?

- A. Deploy the Cloud SQL Proxy on the Cloud Dataproc master
- B. Use an SSH tunnel to give the Cloud Dataproc cluster access to the Internet
- C. Copy all dependencies to a Cloud Storage bucket within your VPC security perimeter
- D. Use Resource Manager to add the service account used by the Cloud Dataproc cluster to the Network User role

**Answer: C**

**Explanation:**

If you create a Data proc cluster with internal IP addresses only, attempts to access the Internet in an initialization action will fail unless you have configured routes to direct the traffic through a NAT or a VPN gateway. Without access to the Internet, you can enable Private Google Access, and place job dependencies in Cloud Storage; cluster nodes can download the dependencies from Cloud Storage from internal IPs.

**Question: 159**

CertyIQ

You need to choose a database for a new project that has the following requirements:

- ⇒ Fully managed
- ⇒ Able to automatically scale up
- ⇒ Transactionally consistent
- ⇒ Able to scale up to 6 TB
- ⇒ Able to be queried using SQL

Which database do you choose?

- A. Cloud SQL
- B. Cloud Bigtable
- C. Cloud Spanner
- D. Cloud Datastore

**Answer: A**

**Explanation:**

It asks for scaling up which can be done in cloud sql, horizontal scaling is not possible in cloud sql

Automatic storage increase

If you enable this setting, Cloud SQL checks your available storage every 30 seconds. If the available storage falls below a threshold size, Cloud SQL automatically adds additional storage capacity. If the available storage repeatedly falls below the threshold size, Cloud SQL continues to add storage until it reaches the maximum of 30 TB.

### Question: 160

CertyIQ

You work for a mid-sized enterprise that needs to move its operational system transaction data from an on-premises database to GCP. The database is about 20 TB in size. Which database should you choose?

- A. Cloud SQL
- B. Cloud Bigtable
- C. Cloud Spanner
- D. Cloud Datastore

#### Answer: A

#### Explanation:

A Cloud SQL is correct as the requirement is to kinda lift n shift the db from on prem to cloud

### Question: 161

CertyIQ

You need to choose a database to store time series CPU and memory usage for millions of computers. You need to store this data in one-second interval samples. Analysts will be performing real-time, ad hoc analytics against the database. You want to avoid being charged for every query executed and ensure that the schema design will allow for future growth of the dataset. Which database and data model should you choose?

- A. Create a table in BigQuery, and append the new samples for CPU and memory to the table
- B. Create a wide table in BigQuery, create a column for the sample value at each second, and update the row with the interval for each second
- C. Create a narrow table in Bigtable with a row key that combines the Computer Engine computer identifier with the sample time at each second
- D. Create a wide table in Bigtable with a row key that combines the computer identifier with the sample time at each minute, and combine the values for each second as column data.

#### Answer: C

#### Explanation:

A tall and narrow table has a small number of events per row, which could be just one event, whereas a short and wide table has a large number of events per row. As explained in a moment, tall and narrow tables are best suited for time-series data.

For time series, you should generally use tall and narrow tables. This is for two reasons: Storing one event per row makes it easier to run queries against your data. Storing many events per row makes it more likely that the total row size will exceed the recommended maximum (see Rows can be big but are not infinite).

#### Reference:

[https://cloud.google.com/bigtable/docs/schema-design-time-series#patterns\\_for\\_row\\_key\\_design](https://cloud.google.com/bigtable/docs/schema-design-time-series#patterns_for_row_key_design)

**Question: 162****CertyIQ**

You want to archive data in Cloud Storage. Because some data is very sensitive, you want to use the 'Trust No One' (TNO) approach to encrypt your data to prevent the cloud provider staff from decrypting your data. What should you do?

- A. Use gcloud kms keys create to create a symmetric key. Then use gcloud kms encrypt to encrypt each archival file with the key and unique additional authenticated data (AAD). Use gsutil cp to upload each encrypted file to the Cloud Storage bucket, and keep the AAD outside of Google Cloud.
- B. Use gcloud kms keys create to create a symmetric key. Then use gcloud kms encrypt to encrypt each archival file with the key. Use gsutil cp to upload each encrypted file to the Cloud Storage bucket. Manually destroy the key previously used for encryption, and rotate the key once.
- C. Specify customer-supplied encryption key (CSEK) in the .boto configuration file. Use gsutil cp to upload each archival file to the Cloud Storage bucket. Save the CSEK in Cloud Memorystore as permanent storage of the secret.
- D. Specify customer-supplied encryption key (CSEK) in the .boto configuration file. Use gsutil cp to upload each archival file to the Cloud Storage bucket. Save the CSEK in a different project that only the security team can access.

**Answer: A****Explanation:**

Use gcloud kms keys create to create a symmetric key. Then use gcloud kms encrypt to encrypt each archival file with the key and unique additional authenticated data (AAD). Use gsutil cp to upload each encrypted file to the Cloud Storage bucket, and keep the AAD outside of Google Cloud.

**Question: 163****CertyIQ**

You have data pipelines running on BigQuery, Dataflow, and Dataproc. You need to perform health checks and monitor their behavior, and then notify the team managing the pipelines if they fail. You also need to be able to work across multiple projects. Your preference is to use managed products or features of the platform. What should you do?

- A. Export the information to Cloud Monitoring, and set up an Alerting policy
- B. Run a Virtual Machine in Compute Engine with Airflow, and export the information to Cloud Monitoring
- C. Export the logs to BigQuery, and set up App Engine to read that information and send emails if you find a failure in the logs
- D. Develop an App Engine application to consume logs using GCP API calls, and send emails if you find a failure in the logs

**Answer: A****Explanation:**

A Your preference is to use managed products or features of the platform

**Question: 164****CertyIQ**

You are working on a linear regression model on BigQuery ML to predict a customer's likelihood of purchasing your company's products. Your model uses a city name variable as a key predictive component. In order to train and serve the model, your data must be organized in columns. You want to prepare your data using the least amount of coding while maintaining the predictable variables. What should you do?

- A. Create a new view with BigQuery that does not include a column with city information.
- B. Use SQL in BigQuery to transform the state column using a one-hot encoding method, and make each city a column with binary values.
- C. Use TensorFlow to create a categorical variable with a vocabulary list. Create the vocabulary file and upload that as part of your model to BigQuery ML.
- D. Use Cloud Data Fusion to assign each city to a region that is labeled as 1, 2, 3, 4, or 5, and then use that number to represent the city in the model.

**Answer: B**

**Explanation:**

key is in 'binary value'. It says low code not 'no code'. B is right one.

### Question: 165

CertyIQ

You work for a large bank that operates in locations throughout North America. You are setting up a data storage system that will handle bank account transactions. You require ACID compliance and the ability to access data with SQL. Which solution is appropriate?

- A. Store transaction data in Cloud Spanner. Enable stale reads to reduce latency.
- B. Store transaction in Cloud Spanner. Use locking read-write transactions.
- C. Store transaction data in BigQuery. Disabled the query cache to ensure consistency.
- D. Store transaction data in Cloud SQL. Use a federated query BigQuery for analysis.

**Answer: B**

**Explanation:**

I'd say B as the documentation primarily says ACID compliance for Spanner, not Cloud SQL.

<https://cloud.google.com/blog/topics/developers-practitioners/your-google-cloud-database-options-explained>

Also, spanner supports read-write transactions for use cases, as handling bank transactions:

[https://cloud.google.com/spanner/docs/transactions#read-write\\_transactions](https://cloud.google.com/spanner/docs/transactions#read-write_transactions)

### Question: 166

CertyIQ

A shipping company has live package-tracking data that is sent to an Apache Kafka stream in real time. This is then loaded into BigQuery. Analysts in your company want to query the tracking data in BigQuery to analyze geospatial trends in the lifecycle of a package. The table was originally created with ingest-date partitioning. Over time, the query processing time has increased. You need to implement a change that would improve query performance in BigQuery. What should you do?

- A. Implement clustering in BigQuery on the ingest date column.
- B. Implement clustering in BigQuery on the package-tracking ID column.
- C. Tier older data onto Cloud Storage files and create a BigQuery table using Cloud Storage as an external data source.
- D. Re-create the table using data partitioning on the package delivery date.

**Answer: B**

**Explanation:**

As the table has already created with ingest-date partitioning.

**Question: 167****CertyIQ**

Your company currently runs a large on-premises cluster using Spark, Hive, and HDFS in a colocation facility. The cluster is designed to accommodate peak usage on the system; however, many jobs are batch in nature, and usage of the cluster fluctuates quite dramatically. Your company is eager to move to the cloud to reduce the overhead associated with on-premises infrastructure and maintenance and to benefit from the cost savings. They are also hoping to modernize their existing infrastructure to use more serverless offerings in order to take advantage of the cloud. Because of the timing of their contract renewal with the colocation facility, they have only 2 months for their initial migration. How would you recommend they approach their upcoming migration strategy so they can maximize their cost savings in the cloud while still executing the migration in time?

- A. Migrate the workloads to Dataproc plus HDFS; modernize later.
- B. Migrate the workloads to Dataproc plus Cloud Storage; modernize later.
- C. Migrate the Spark workload to Dataproc plus HDFS, and modernize the Hive workload for BigQuery.
- D. Modernize the Spark workload for Dataflow and the Hive workload for BigQuery.

**Answer: B****Explanation:**

<https://cloud.google.com/architecture/hadoop/migrating-apache-spark-jobs-to-cloud-dataproc#overview>

When you want to move your Apache Spark workloads from an on-premises environment to Google Cloud, we recommend using Dataproc to run Apache Spark/Apache Hadoop clusters. Dataproc is a fully managed, fully supported service offered by Google Cloud. It allows you to separate storage and compute, which helps you to manage your costs and be more flexible in scaling your workloads.

[https://cloud.google.com/bigquery/docs/migration/hive#data\\_migration](https://cloud.google.com/bigquery/docs/migration/hive#data_migration)

Migrating Hive data from your on-premises or other cloud-based source cluster to BigQuery has two steps:

1. Copying data from a source cluster to Cloud Storage
2. Loading data from Cloud Storage into BigQuery

**Question: 168****CertyIQ**

You work for a financial institution that lets customers register online. As new customers register, their user data is sent to Pub/Sub before being ingested into

BigQuery. For security reasons, you decide to redact your customers' Government issued Identification Number while allowing customer service representatives to view the original values when necessary. What should you do?

- A. Use BigQuery's built-in AEAD encryption to encrypt the SSN column. Save the keys to a new table that is only viewable by permissioned users.
- B. Use BigQuery column-level security. Set the table permissions so that only members of the Customer Service user group can see the SSN column.
- C. Before loading the data into BigQuery, use Cloud Data Loss Prevention (DLP) to replace input values with a cryptographic hash.
- D. Before loading the data into BigQuery, use Cloud Data Loss Prevention (DLP) to replace input values with a cryptographic format-preserving encryption token.

**Answer: D**

**Explanation:**

Before loading the data into BigQuery, use Cloud Data Loss Prevention (DLP) to replace input values with a cryptographic format-preserving encryption token.

**Question: 169**

**CertyIQ**

You are migrating a table to BigQuery and are deciding on the data model. Your table stores information related to purchases made across several store locations and includes information like the time of the transaction, items purchased, the store ID, and the city and state in which the store is located. You frequently query this table to see how many of each item were sold over the past 30 days and to look at purchasing trends by state, city, and individual store. How would you model this table for the best query performance?

- A. Partition by transaction time; cluster by state first, then city, then store ID.
- B. Partition by transaction time; cluster by store ID first, then city, then state.
- C. Top-level cluster by state first, then city, then store ID.
- D. Top-level cluster by store ID first, then city, then state.

**Answer: A**

**Explanation:**

A. Partition by transaction time; cluster by state first, then city, then store ID.

A The question mention that the query is 30 days recently

**Question: 170**

**CertyIQ**

You are updating the code for a subscriber to a Pub/Sub feed. You are concerned that upon deployment the subscriber may erroneously acknowledge messages, leading to message loss. Your subscriber is not set up to retain acknowledged messages. What should you do to ensure that you can recover from errors after deployment?

- A. Set up the Pub/Sub emulator on your local machine. Validate the behavior of your new subscriber logic before deploying it to production.
- B. Create a Pub/Sub snapshot before deploying new subscriber code. Use a Seek operation to re-deliver messages that became available after the snapshot was created.
- C. Use Cloud Build for your deployment. If an error occurs after deployment, use a Seek operation to locate a timestamp logged by Cloud Build at the start of the deployment.
- D. Enable dead-lettering on the Pub/Sub topic to capture messages that aren't successfully acknowledged. If an error occurs after deployment, re-deliver any messages captured by the dead-letter queue.

**Answer: B**

**Explanation:**

Create a Pub/Sub snapshot before deploying new subscriber code. Use a Seek operation to re-deliver messages that became available after the snapshot was created.

According to the second reference in the list below, a concern with deploying new subscriber code is that the new executable may erroneously acknowledge messages, leading to message loss. Incorporating snapshots into your deployment process gives you a way to recover from bugs in new subscriber code.

Answer cannot be C because To seek to a timestamp, you must first configure the subscription to retain acknowledged messages using retain-acked-messages. If retain-acked-messages is set, Pub/Sub retains acknowledged messages for 7 days.

Reference:

<https://cloud.google.com/pubsub/docs/replay-message>

[https://cloud.google.com/pubsub/docs/replay-overview#seek\\_use\\_cases](https://cloud.google.com/pubsub/docs/replay-overview#seek_use_cases)

## Question: 171

CertyIQ

You work for a large real estate firm and are preparing 6 TB of home sales data to be used for machine learning. You will use SQL to transform the data and use BigQuery ML to create a machine learning model. You plan to use the model for predictions against a raw dataset that has not been transformed. How should you set up your workflow in order to prevent skew at prediction time?

- A. When creating your model, use BigQuery's TRANSFORM clause to define preprocessing steps. At prediction time, use BigQuery's ML.EVALUATE clause without specifying any transformations on the raw input data.
- B. When creating your model, use BigQuery's TRANSFORM clause to define preprocessing steps. Before requesting predictions, use a saved query to transform your raw input data, and then use ML.EVALUATE.
- C. Use a BigQuery view to define your preprocessing logic. When creating your model, use the view as your model training data. At prediction time, use BigQuery's ML.EVALUATE clause without specifying any transformations on the raw input data.
- D. Preprocess all data using Dataflow. At prediction time, use BigQuery's ML.EVALUATE clause without specifying any further transformations on the input data.

## Answer: A

Explanation:

This query's nested SELECT statement and FROM clause are the same as those in the CREATE MODEL query. Because the TRANSFORM clause is used in training, you don't need to specify the specific columns and transformations. They are automatically restored. Reference: <https://cloud.google.com/bigquery-ml/docs/bigqueryml-transform>

## Question: 172

CertyIQ

You are analyzing the price of a company's stock. Every 5 seconds, you need to compute a moving average of the past 30 seconds' worth of data. You are reading data from Pub/Sub and using DataFlow to conduct the analysis. How should you set up your windowed pipeline?

- A. Use a fixed window with a duration of 5 seconds. Emit results by setting the following trigger: AfterProcessingTime.pastFirstElementInPane().plusDelayOf (Duration.standardSeconds(30))
- B. Use a fixed window with a duration of 30 seconds. Emit results by setting the following trigger: AfterWatermark.pastEndOfWindow().plusDelayOf (Duration.standardSeconds(5))
- C. Use a sliding window with a duration of 5 seconds. Emit results by setting the following trigger: AfterProcessingTime.pastFirstElementInPane().plusDelayOf (Duration.standardSeconds(30))
- D. Use a sliding window with a duration of 30 seconds and a period of 5 seconds. Emit results by setting the following trigger: AfterWatermark.pastEndOfWindow ()

## Answer: D

Explanation:

Moving average — → sliding window

D. Use a sliding window with a duration of 30 seconds and a period of 5 seconds. Emit results by setting the following trigger: After Watermark .past End Of Window () Reveal Solution

### Question: 173

CertyIQ

You are designing a pipeline that publishes application events to a Pub/Sub topic. Although message ordering is not important, you need to be able to aggregate events across disjoint hourly intervals before loading the results to BigQuery for analysis. What technology should you use to process and load this data to BigQuery while ensuring that it will scale with large volumes of events?

- A. Create a Cloud Function to perform the necessary data processing that executes using the Pub/Sub trigger every time a new message is published to the topic.
- B. Schedule a Cloud Function to run hourly, pulling all available messages from the Pub/Sub topic and performing the necessary aggregations.
- C. Schedule a batch Dataflow job to run hourly, pulling all available messages from the Pub/Sub topic and performing the necessary aggregations.
- D. Create a streaming Dataflow job that reads continually from the Pub/Sub topic and performs the necessary aggregations using tumbling windows.

**Answer:** D

**Explanation:**

Create a streaming Dataflow job that reads continually from the Pub/Sub topic and performs the necessary aggregations using tumbling windows.

A tumbling window represents a consistent, disjoint time interval in the data stream.

Reference:

<https://cloud.google.com/dataflow/docs/concepts/streaming-pipelines#tumbling-windows>

### Question: 174

CertyIQ

You work for a large financial institution that is planning to use Dialogflow to create a chatbot for the company's mobile app. You have reviewed old chat logs and tagged each conversation for intent based on each customer's stated intention for contacting customer service. About 70% of customer requests are simple requests that are solved within 10 intents. The remaining 30% of inquiries require much longer, more complicated requests. Which intents should you automate first?

- A. Automate the 10 intents that cover 70% of the requests so that live agents can handle more complicated requests.
- B. Automate the more complicated requests first because those require more of the agents' time.
- C. Automate a blend of the shortest and longest intents to be representative of all intents.
- D. Automate intents in places where common words such as 'payment' appear only once so the software isn't confused.

**Answer:** A

**Explanation:**

As it states in the documentation: "If your agent will be large or complex, start by building a dialog that only

addresses the top level requests. Once the basic structure is established, iterate on the conversation paths to ensure you're covering all of the possible routes an end-user may take."

(<https://cloud.google.com/dialogflow/cx/docs/concept/agent-design#build-iteratively>)

Therefore, you should initially automate the 70 % of the requests that are simpler before automating the more complicated ones.

### Question: 175

CertyIQ

Your company is implementing a data warehouse using BigQuery, and you have been tasked with designing the data model. You move your on-premises sales data warehouse with a star data schema to BigQuery but notice performance issues when querying the data of the past 30 days. Based on Google's recommended practices, what should you do to speed up the query without increasing storage costs?

- A. Denormalize the data.
- B. Shard the data by customer ID.
- C. Materialize the dimensional data in views.
- D. Partition the data by transaction date.

### Answer: D

#### Explanation:

Star schema is supported by Big Query but is not the most efficient form, if you should design a schema from scratch google recommend to use nested and repeated fields. In this case, you already have done a migration of the schema and data, so it sounds good and with less effort to do partitioning by transaction date than to redesign the schema. And other aspect to consider is that this is a data warehouse, so is sure that there is an ETL process and if you change the schema you must adapt the ETL process. I vote for D.

Star schema is not denormalized itself, but this assumes you already have moved ur data to big query, because you are querying. So, as BQ is not relational, the data already have been denormalized. I go with D.

### Question: 176

CertyIQ

You have uploaded 5 years of log data to Cloud Storage. A user reported that some data points in the log data are outside of their expected ranges, which indicates errors. You need to address this issue and be able to run the process again in the future while keeping the original data for compliance reasons. What should you do?

- A. Import the data from Cloud Storage into BigQuery. Create a new BigQuery table, and skip the rows with errors.
- B. Create a Compute Engine instance and create a new copy of the data in Cloud Storage. Skip the rows with errors.
- C. Create a Dataflow workflow that reads the data from Cloud Storage, checks for values outside the expected range, sets the value to an appropriate default, and writes the updated records to a new dataset in Cloud Storage.
- D. Create a Dataflow workflow that reads the data from Cloud Storage, checks for values outside the expected range, sets the value to an appropriate default, and writes the updated records to the same dataset in Cloud Storage.

### Answer: C

#### Explanation:

Create a Dataflow workflow that reads the data from Cloud Storage, checks for values outside the expected range, sets the value to an appropriate default, and writes the updated records to a new dataset in Cloud Storage.

You can't filter out data using BQ load commands. You must imbed the logic to filter out data (i.e. time ranges) in another decoupled way (i.e. Dataflow, Cloud Functions, etc.). Therefore, A and B add additional complexity and deviates from the Data Lake design paradigm. D is wrong as the question strictly implies that the existing data set needs to be retained for compliance.

### Question: 177

CertyIQ

You want to rebuild your batch pipeline for structured data on Google Cloud. You are using PySpark to conduct data transformations at scale, but your pipelines are taking over twelve hours to run. To expedite development and pipeline run time, you want to use a serverless tool and SQL syntax. You have already moved your raw data into Cloud Storage. How should you build the pipeline on Google Cloud while meeting speed and processing requirements?

- A. Convert your PySpark commands into SparkSQL queries to transform the data, and then run your pipeline on Dataproc to write the data into BigQuery.
- B. Ingest your data into Cloud SQL, convert your PySpark commands into SparkSQL queries to transform the data, and then use federated quenes from BigQuery for machine learning.
- C. Ingest your data into BigQuery from Cloud Storage, convert your PySpark commands into BigQuery SQL queries to transform the data, and then write the transformations to a new table.
- D. Use Apache Beam Python SDK to build the transformation pipelines, and write the data into BigQuery.

### Answer: C

#### Explanation:

The question is C but not because the SQL Syntax, as you can perfectly use SparkSQL on Dataproc reading files from GCS. It's because the "serverless" requirement.

### Question: 178

CertyIQ

You are testing a Dataflow pipeline to ingest and transform text files. The files are compressed gzip, errors are written to a dead-letter queue, and you are using SideInputs to join data. You noticed that the pipeline is taking longer to complete than expected; what should you do to expedite the Dataflow job?

- A. Switch to compressed Avro files.
- B. Reduce the batch size.
- C. Retry records that throw an error.
- D. Use CoGroupByKey instead of the SideInput.

### Answer: D

#### Explanation:

D: it is most likely.

There are a lot of reference doc to tell about comparison between them

<https://cloud.google.com/architecture/building-production-ready-data-pipelines-using-dataflow-developing>

and-testing#choose\_correctly\_between\_side\_inputs\_or\_cogroupbykey\_for\_joins

Reference:

<https://cloud.google.com/blog/products/data-analytics/guide-to-common-cloud-dataflow-use-case-patterns-part-2>

<https://stackoverflow.com/questions/58080383/sideinput-i-o-kills-performance>

## Question: 179

CertyIQ

You are building a real-time prediction engine that streams files, which may contain PII (personal identifiable information) data, into Cloud Storage and eventually into BigQuery. You want to ensure that the sensitive data is masked but still maintains referential integrity, because names and emails are often used as join keys.

How should you use the Cloud Data Loss Prevention API (DLP API) to ensure that the PII data is not accessible by unauthorized individuals?

- A. Create a pseudonym by replacing the PII data with cryptogenic tokens, and store the non-tokenized data in a locked-down bucket.
- B. Redact all PII data, and store a version of the unredacted data in a locked-down bucket.
- C. Scan every table in BigQuery, and mask the data it finds that has PII.
- D. Create a pseudonym by replacing PII data with a cryptographic format-preserving token.

Answer: D

Explanation:

Answer D makes more sense to me.

Reference:

<https://cloud.google.com/dlp/docs/pseudonymization>

## Question: 180

CertyIQ

You are migrating an application that tracks library books and information about each book, such as author or year published, from an on-premises data warehouse to BigQuery. In your current relational database, the author information is kept in a separate table and joined to the book information on a common key. Based on Google's recommended practice for schema design, how would you structure the data to ensure optimal speed of queries about the author of each book that has been borrowed?

- A. Keep the schema the same, maintain the different tables for the book and each of the attributes, and query as you are doing today.
- B. Create a table that is wide and includes a column for each attribute, including the author's first name, last name, date of birth, etc.
- C. Create a table that includes information about the books and authors, but nest the author fields inside the author column.
- D. Keep the schema the same, create a view that joins all of the tables, and always query the view.

Answer: C

Explanation:

Create a table that includes information about the books and authors, but nest the author fields inside the author column.

**Question: 181****CertyIQ**

You need to give new website users a globally unique identifier (GUID) using a service that takes in data points and returns a GUID. This data is sourced from both internal and external systems via HTTP calls that you will make via microservices within your pipeline. There will be tens of thousands of messages per second and that can be multi-threaded. and you worry about the backpressure on the system. How should you design your pipeline to minimize that backpressure?

- A. Call out to the service via HTTP.
- B. Create the pipeline statically in the class definition.
- C. Create a new object in the startBundle method of DoFn.
- D. Batch the job into ten-second increments.

**Answer: D****Explanation:**

Batch the job into ten-second increments.

**Question: 182****CertyIQ**

You are migrating your data warehouse to Google Cloud and decommissioning your on-premises data center. Because this is a priority for your company, you know that bandwidth will be made available for the initial data load to the cloud. The files being transferred are not large in number, but each file is 90 GB. Additionally, you want your transactional systems to continually update the warehouse on Google Cloud in real time. What tools should you use to migrate the data and ensure that it continues to write to your warehouse?

- A. Storage Transfer Service for the migration; Pub/Sub and Cloud Data Fusion for the real-time updates
- B. BigQuery Data Transfer Service for the migration; Pub/Sub and Dataproc for the real-time updates
- C. gsutil for the migration; Pub/Sub and Dataflow for the real-time updates
- D. gsutil for both the migration and the real-time updates

**Answer: C****Explanation:**

gsutil for the migration; Pub/Sub and Dataflow for the real-time updates Use Gsutil when there is enough bandwidth to meet your project deadline for less than 1 TB of data. Storage Transfer Service is for much larger volumes for migration. Moreover, Cloud Data Fusion and Dataproc are not ideal for real-time updates. BigQuery Data Transfer Service does not support all on-prem sources.

**Question: 183****CertyIQ**

You are using Bigtable to persist and serve stock market data for each of the major indices. To serve the trading application, you need to access only the most recent stock prices that are streaming in. How should you design your row key and tables to ensure that you can access the data with the simplest query?

- A. Create one unique table for all of the indices, and then use the index and timestamp as the row key design.
- B. Create one unique table for all of the indices, and then use a reverse timestamp as the row key design.
- C. For each index, have a separate table and use a timestamp as the row key design.

D. For each index, have a separate table and use a reverse timestamp as the row key design.

**Answer: B**

**Explanation:**

Create one unique table for all of the indices, and then use a reverse timestamp as the row key design.

**CertyIQ**

You are building a report-only data warehouse where the data is streamed into BigQuery via the streaming API. Following Google's best practices, you have both a staging and a production table for the data. How should you design your data loading to ensure that there is only one master dataset without affecting performance on either the ingestion or reporting pieces?

- A. Have a staging table that is an append-only model, and then update the production table every three hours with the changes written to staging.
- B. Have a staging table that is an append-only model, and then update the production table every ninety minutes with the changes written to staging.
- C. Have a staging table that moves the staged data over to the production table and deletes the contents of the staging table every three hours.
- D. Have a staging table that moves the staged data over to the production table and deletes the contents of the staging table every thirty minutes.

**Answer: C**

**Explanation:**

Have a staging table that moves the staged data over to the production table and deletes the contents of the staging table every three hours.

**CertyIQ**

**Question: 185**

You issue a new batch job to Dataflow. The job starts successfully, processes a few elements, and then suddenly fails and shuts down. You navigate to the Dataflow monitoring interface where you find errors related to a particular DoFn in your pipeline. What is the most likely cause of the errors?

- A. Job validation
- B. Exceptions in worker code
- C. Graph or pipeline construction
- D. Insufficient permissions

**Answer: B**

**Explanation:**

Exceptions in worker code

While your job is running, you might encounter errors or exceptions in your worker code. These errors generally mean that the DoFns in your pipeline code have generated unhandled exceptions, which result in failed tasks in your Dataflow job.

Exceptions in user code (for example, your DoFn instances) are reported in the Dataflow monitoring interface.

**Question: 186****CertyIQ**

Your new customer has requested daily reports that show their net consumption of Google Cloud compute resources and who used the resources. You need to quickly and efficiently generate these daily reports. What should you do?

- A. Do daily exports of Cloud Logging data to BigQuery. Create views filtering by project, log type, resource, and user.
- B. Filter data in Cloud Logging by project, resource, and user; then export the data in CSV format.
- C. Filter data in Cloud Logging by project, log type, resource, and user, then import the data into BigQuery.
- D. Export Cloud Logging data to Cloud Storage in CSV format. Cleanse the data using Dataprep, filtering by project, resource, and user.

**Answer: A****Explanation:**

Do daily exports of Cloud Logging data to BigQuery. Create views filtering by project, log type, resource, and user.

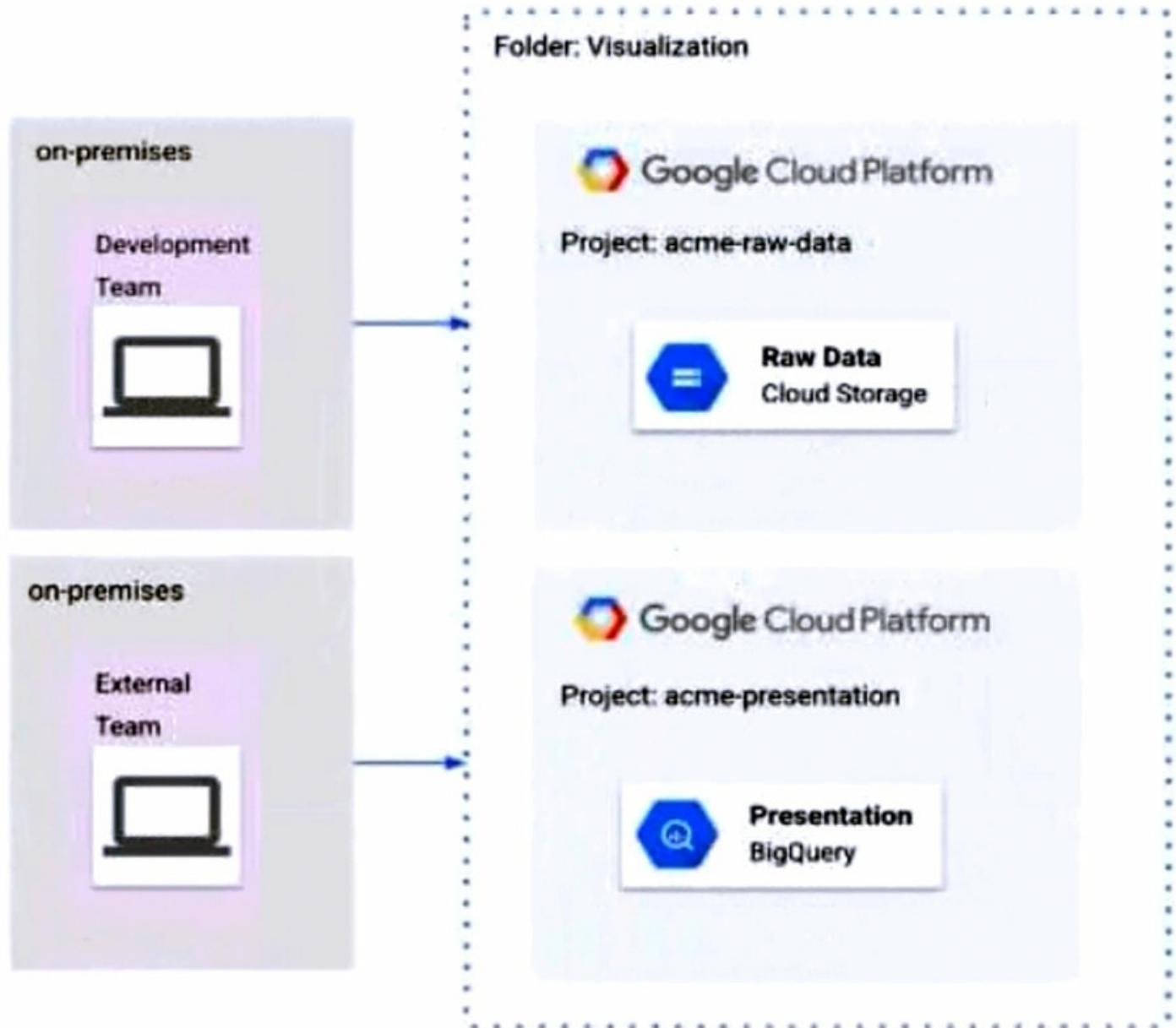
You cannot import custom or filtered billing criteria into BigQuery. There are three types of Cloud Billing data tables with a fixed schema that must further drilled-down via BigQuery views.

**Reference:**

<https://cloud.google.com/billing/docs/how-to/export-data-bigquery#setup>

**Question: 187****CertyIQ**

The Development and External teams have the project viewer Identity and Access Management (IAM) role in a folder named Visualization. You want the Development Team to be able to read data from both Cloud Storage and BigQuery, but the External Team should only be able to read data from BigQuery. What should you do?



- A. Remove Cloud Storage IAM permissions to the External Team on the acme-raw-data project.
- B. Create Virtual Private Cloud (VPC) firewall rules on the acme-raw-data project that deny all ingress traffic from the External Team CIDR range.
- C. Create a VPC Service Controls perimeter containing both projects and BigQuery as a restricted API. Add the External Team users to the perimeter's Access Level.
- D. Create a VPC Service Controls perimeter containing both projects and Cloud Storage as a restricted API. Add the Development Team users to the perimeter's Access Level.

**Answer:** D

**Explanation:**

Create a VPC Service Controls perimeter containing both projects and Cloud Storage as a restricted API. Add the Development Team users to the perimeter's Access Level.

### Question: 188

Your startup has a web application that currently serves customers out of a single region in Asia. You are targeting funding that will allow your startup to serve customers globally. Your current goal is to optimize for cost, and your post-funding goal is to optimize for global presence and performance. You must use a native JDBC driver. What should you do?

- A. Use Cloud Spanner to configure a single region instance initially, and then configure multi-region Cloud Spanner instances after securing funding.
- B. Use a Cloud SQL for PostgreSQL highly available instance first, and Bigtable with US, Europe, and Asia replication after securing funding.
- C. Use a Cloud SQL for PostgreSQL zonal instance first, and Bigtable with US, Europe, and Asia after securing funding.
- D. Use a Cloud SQL for PostgreSQL zonal instance first, and Cloud SQL for PostgreSQL with highly available configuration after securing funding.

**Answer: A**

**Explanation:**

- A. Use Cloud Spanner to configure a single region instance initially, and then configure multi-region Cloud Spanner instances after securing funding.

When you create a Cloud Spanner instance, you must configure it as either regional (that is, all the resources are contained within a single Google Cloud region) or multi-region (that is, the resources span more than one region).

You can change the instance configuration to multi-regional (or global) at anytime.

**CertyIQ**

**Question: 189**

You need to migrate 1 PB of data from an on-premises data center to Google Cloud. Data transfer time during the migration should take only a few hours. You want to follow Google-recommended practices to facilitate the large data transfer over a secure connection. What should you do?

- A. Establish a Cloud Interconnect connection between the on-premises data center and Google Cloud, and then use the Storage Transfer Service.
- B. Use a Transfer Appliance and have engineers manually encrypt, decrypt, and verify the data.
- C. Establish a Cloud VPN connection, start gcloud compute scp jobs in parallel, and run checksums to verify the data.
- D. Reduce the data into 3 TB batches, transfer the data using gsutil, and run checksums to verify the data.

**Answer: A**

**Explanation:**

Well it doesn't mention anything about not enough bandwidth to meet your project deadline. I guess you can assume they have 200GBps+ of bandwidth, otherwise it shouldn't take only a few hours.

**CertyIQ**

**Question: 190**

You are loading CSV files from Cloud Storage to BigQuery. The files have known data quality issues, including mismatched data types, such as STRINGS and INT64s in the same column, and inconsistent formatting of values such as phone numbers or addresses. You need to create the data pipeline to maintain data quality and perform the required cleansing and transformation. What should you do?

- A. Use Data Fusion to transform the data before loading it into BigQuery.
- B. Use Data Fusion to convert the CSV files to a self-describing data format, such as AVRO, before loading the data to BigQuery.
- C. Load the CSV files into a staging table with the desired schema, perform the transformations with SQL, and

then write the results to the final destination table.

D. Create a table with the desired schema, load the CSV files into the table, and perform the transformations in place using SQL.

**Answer: A**

**Explanation:**

A. Use Data Fusion to transform the data before loading it into BigQuery.

Reference:

[https://cloud.google.com/data-fusion/docs/concepts/transformation-pushdown#supported\\_transformations](https://cloud.google.com/data-fusion/docs/concepts/transformation-pushdown#supported_transformations)

**Question: 191**

CertyIQ

You are developing a new deep learning model that predicts a customer's likelihood to buy on your ecommerce site. After running an evaluation of the model against both the original training data and new test data, you find that your model is overfitting the data. You want to improve the accuracy of the model when predicting new data. What should you do?

- A. Increase the size of the training dataset, and increase the number of input features.
- B. Increase the size of the training dataset, and decrease the number of input features.
- C. Reduce the size of the training dataset, and increase the number of input features.
- D. Reduce the size of the training dataset, and decrease the number of input features.

**Answer: B**

**Explanation:**

Increase the size of the training dataset, and decrease the number of input features.

**Question: 192**

CertyIQ

You are implementing a chatbot to help an online retailer streamline their customer service. The chatbot must be able to respond to both text and voice inquiries.

You are looking for a low-code or no-code option, and you want to be able to easily train the chatbot to provide answers to keywords. What should you do?

- A. Use the Cloud Speech-to-Text API to build a Python application in App Engine.
- B. Use the Cloud Speech-to-Text API to build a Python application in a Compute Engine instance.
- C. Use Dialogflow for simple queries and the Cloud Speech-to-Text API for complex queries.
- D. Use Dialogflow to implement the chatbot, defining the intents based on the most common queries collected.

**Answer: D**

**Explanation:**

D definitely, as the documentation says (specially that you can call the detect Intent method for audio inputs):

<https://cloud.google.com/dialogflow/es/docs/how/detect-intent-tts>

Also Speech-To-Text API does nothing more than translate.

**Question: 193****CertyIQ**

An aerospace company uses a proprietary data format to store its flight data. You need to connect this new data source to BigQuery and stream the data into BigQuery. You want to efficiently import the data into BigQuery while consuming as few resources as possible. What should you do?

- A. Write a shell script that triggers a Cloud Function that performs periodic ETL batch jobs on the new data source.
- B. Use a standard Dataflow pipeline to store the raw data in BigQuery, and then transform the format later when the data is used.
- C. Use Apache Hive to write a Dataproc job that streams the data into BigQuery in CSV format.
- D. Use an Apache Beam custom connector to write a Dataflow pipeline that streams the data into BigQuery in Avro format.

**Answer: D****Explanation:**

For me it's clearly D

It's between B and D, but read B, store raw data in Big Query? Use a Dataflow pipeline just to store raw data into Big Query, and transform later? You'd need to do another pipeline for that, and is not efficient.

**Question: 194****CertyIQ**

An online brokerage company requires a high volume trade processing architecture. You need to create a secure queuing system that triggers jobs. The jobs will run in Google Cloud and call the company's Python API to execute trades. You need to efficiently implement a solution. What should you do?

- A. Use a Pub/Sub push subscription to trigger a Cloud Function to pass the data to the Python API.
- B. Write an application hosted on a Compute Engine instance that makes a push subscription to the Pub/Sub topic.
- C. Write an application that makes a queue in a NoSQL database.
- D. Use Cloud Composer to subscribe to a Pub/Sub topic and call the Python API.

**Answer: A****Explanation:**

A. Use a Pub/Sub push subscription to trigger a Cloud Function to pass the data to the Python API.

**Question: 195****CertyIQ**

Your company wants to be able to retrieve large result sets of medical information from your current system, which has over 10 TBs in the database, and store the data in new tables for further query. The database must have a low-maintenance architecture and be accessible via SQL. You need to implement a cost-effective solution that can support data analytics for large result sets. What should you do?

- A. Use Cloud SQL, but first organize the data into tables. Use JOIN in queries to retrieve data.
- B. Use BigQuery as a data warehouse. Set output destinations for caching large queries.
- C. Use a MySQL cluster installed on a Compute Engine managed instance group for scalability.

D. Use Cloud Spanner to replicate the data across regions. Normalize the data in a series of tables.

**Answer: B**

**Explanation:**

Use BigQuery as a data warehouse. Set output destinations for caching large queries.

**CertyIQ**

You have 15 TB of data in your on-premises data center that you want to transfer to Google Cloud. Your data changes weekly and is stored in a POSIX-compliant source. The network operations team has granted you 500 Mbps bandwidth to the public internet. You want to follow Google-recommended practices to reliably transfer your data to Google Cloud on a weekly basis. What should you do?

- A. Use Cloud Scheduler to trigger the gsutil command. Use the -m parameter for optimal parallelism.
- B. Use Transfer Appliance to migrate your data into a Google Kubernetes Engine cluster, and then configure a weekly transfer job.
- C. Install Storage Transfer Service for on-premises data in your data center, and then configure a weekly transfer job.
- D. Install Storage Transfer Service for on-premises data on a Google Cloud virtual machine, and then configure a weekly transfer job.

**Answer: C**

**Explanation:**

Install Storage Transfer Service for on-premises data in your data center, and then configure a weekly transfer job.

**CertyIQ**

**Question: 197**

You are designing a system that requires an ACID-compliant database. You must ensure that the system requires minimal human intervention in case of a failure.

What should you do?

- A. Configure a Cloud SQL for MySQL instance with point-in-time recovery enabled.
- B. Configure a Cloud SQL for PostgreSQL instance with high availability enabled.
- C. Configure a Bigtable instance with more than one cluster.
- D. Configure a BigQuery table with a multi-region configuration.

**Answer: B**

**Explanation:**

Postgres is highly ACID compliant as compared to Mysql

cloud sql with high availability enabled is enough

**CertyIQ**

**Question: 198**

You are implementing workflow pipeline scheduling using open source-based tools and Google Kubernetes Engine (GKE). You want to use a Google managed service to simplify and automate the task. You also want to accommodate Shared VPC networking considerations. What should you do?

- A. Use Dataflow for your workflow pipelines. Use Cloud Run triggers for scheduling.
- B. Use Dataflow for your workflow pipelines. Use shell scripts to schedule workflows.
- C. Use Cloud Composer in a Shared VPC configuration. Place the Cloud Composer resources in the host project.
- D. Use Cloud Composer in a Shared VPC configuration. Place the Cloud Composer resources in the service project.

**Answer: D**

**Explanation:**

D. Use Cloud Composer in a Shared VPC configuration. Place the Cloud Composer resources in the service project. Shared VPC requires that you designate a host project to which networks and subnetworks belong and a service project, which is attached to the host project. When Cloud Composer participates in a Shared VPC, the Cloud Composer environment is in the service project. Reference:

D according to documentation Shared VPC requires that you designate a host project to which networks and subnetworks belong and a service project, which is attached to the host project. When Cloud Composer participates in a Shared VPC, the Cloud Composer environment is in the service project.

Reference:

<https://cloud.google.com/composer/docs/how-to/managing/configuring-shared-vpc>

[https://cloud.google.com/composer/docs/how-to/managing/configuring-shared-vpc#set\\_up\\_shared\\_vpc\\_and\\_attach\\_the\\_service\\_project](https://cloud.google.com/composer/docs/how-to/managing/configuring-shared-vpc#set_up_shared_vpc_and_attach_the_service_project)

**Question: 199**

**CertyIQ**

You are using BigQuery and Data Studio to design a customer-facing dashboard that displays large quantities of aggregated data. You expect a high volume of concurrent users. You need to optimize the dashboard to provide quick visualizations with minimal latency. What should you do?

- A. Use BigQuery BI Engine with materialized views.
- B. Use BigQuery BI Engine with logical views.
- C. Use BigQuery BI Engine with streaming data.
- D. Use BigQuery BI Engine with authorized views.

**Answer: A**

**Explanation:**

- A. Use BigQuery BI Engine with materialized views.

**Question: 200**

**CertyIQ**

Government regulations in the banking industry mandate the protection of clients' personally identifiable information (PII). Your company requires PII to be access controlled, encrypted, and compliant with major data protection standards. In addition to using Cloud Data Loss Prevention (Cloud DLP), you want to follow Google-recommended practices and use service accounts to control access to PII. What should you do?

- A. Assign the required Identity and Access Management (IAM) roles to every employee, and create a single service account to access project resources.
- B. Use one service account to access a Cloud SQL database, and use separate service accounts for each human user.
- C. Use Cloud Storage to comply with major data protection standards. Use one service account shared by all users.
- D. Use Cloud Storage to comply with major data protection standards. Use multiple service accounts attached to IAM groups to grant the appropriate access to each group.

**Answer: D**

**Explanation:**

D. Use Cloud Storage to comply with major data protection standards. Use multiple service accounts attached to IAM groups to grant the appropriate access to each group. Reveal Solution

## Question: 201

**CertyIQ**

You need to migrate a Redis database from an on-premises data center to a Memorystore for Redis instance. You want to follow Google-recommended practices and perform the migration for minimal cost, time and effort. What should you do?

- A. Make an RDB backup of the Redis database, use the gsutil utility to copy the RDB file into a Cloud Storage bucket, and then import the RDB file into the Memorystore for Redis instance.
- B. Make a secondary instance of the Redis database on a Compute Engine instance and then perform a live cutover.
- C. Create a Dataflow job to read the Redis database from the on-premises data center and write the data to a Memorystore for Redis instance.
- D. Write a shell script to migrate the Redis data and create a new Memorystore for Redis instance.

**Answer: A**

**Explanation:**

A. Make an RDB backup of the Redis database, use the gsutil utility to copy the RDB file into a Cloud Storage bucket, and then import the RDB file into the Memorystore for Redis instance. The import and export feature uses the native RDB snapshot feature of Redis to import data into or export data out of a Memorystore for Redis instance. The use of the native RDB format prevents lock-in and makes it very easy to move data within Google Cloud or outside of Google Cloud. Import and export uses Cloud Storage buckets to store RDB files.

Reference:

Reference:

<https://cloud.google.com/memorystore/docs/redis/import-export-overview>

<https://cloud.google.com/memorystore/docs/redis/general-best-practices>

## Question: 202

**CertyIQ**

Your platform on your on-premises environment generates 100 GB of data daily, composed of millions of structured JSON text files. Your on-premises environment cannot be accessed from the public internet. You want to use Google Cloud products to query and explore the platform data. What should you do?

- A. Use Cloud Scheduler to copy data daily from your on-premises environment to Cloud Storage. Use the

- BigQuery Data Transfer Service to import data into BigQuery.
- B. Use a Transfer Appliance to copy data from your on-premises environment to Cloud Storage. Use the BigQuery Data Transfer Service to import data into BigQuery.
- C. Use Transfer Service for on-premises data to copy data from your on-premises environment to Cloud Storage. Use the BigQuery Data Transfer Service to import data into BigQuery.
- D. Use the BigQuery Data Transfer Service dataset copy to transfer all data into BigQuery.

**Answer: C**

**Explanation:**

Transfer Service for on-premises is optimal for on-premises google ( large files (< 1 TB) and bandwidth available and scheduling)

BigQuery Data Transfer Service is good for gcs to bigquery

Reference:

<https://cloud.google.com/architecture/migration-to-google-cloud-transferring-your-large-datasets#transfer-options>

<https://cloud.google.com/blog/products/storage-data-transfer/introducing-storage-transfer-service-for-on-premises-data>

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

**Question: 203**

**CertyIQ**

A TensorFlow machine learning model on Compute Engine virtual machines (n2-standard-32) takes two days to complete training. The model has custom TensorFlow operations that must run partially on a CPU. You want to reduce the training time in a cost-effective manner. What should you do?

- A. Change the VM type to n2-highmem-32.
- B. Change the VM type to e2-standard-32.
- C. Train the model using a VM with a GPU hardware accelerator.
- D. Train the model using a VM with a TPU hardware accelerator.

**Answer: C**

**Explanation:**

C. Train the model using a VM with a GPU hardware accelerator.

**Question: 204**

**CertyIQ**

You want to create a machine learning model using BigQuery ML and create an endpoint for hosting the model using Vertex AI. This will enable the processing of continuous streaming data in near-real time from multiple vendors. The data may contain invalid values. What should you do?

- A. Create a new BigQuery dataset and use streaming inserts to land the data from multiple vendors. Configure your BigQuery ML model to use the "ingestion" dataset as the framing data.
- B. Use BigQuery streaming inserts to land the data from multiple vendors where your BigQuery dataset ML model is deployed.
- C. Create a Pub/Sub topic and send all vendor data to it. Connect a Cloud Function to the topic to process the

data and store it in BigQuery.

D. Create a Pub/Sub topic and send all vendor data to it. Use Dataflow to process and sanitize the Pub/Sub data and stream it to BigQuery.

**Answer: D**

**Explanation:**

D is the best option to sanitize the data to its D

Better to use pubsub for streaming and reading message data Dataflow ParDo can perform filtering of data

**Question: 205**

CertyIQ

You have a data processing application that runs on Google Kubernetes Engine (GKE). Containers need to be launched with their latest available configurations from a container registry. Your GKE nodes need to have GPUs, local SSDs, and 8 Gbps bandwidth. You want to efficiently provision the data processing infrastructure and manage the deployment process. What should you do?

- A. Use Compute Engine startup scripts to pull container images, and use gcloud commands to provision the infrastructure.
- B. Use Cloud Build to schedule a job using Terraform build to provision the infrastructure and launch with the most current container images.
- C. Use GKE to autoscale containers, and use gcloud commands to provision the infrastructure.
- D. Use Dataflow to provision the data pipeline, and use Cloud Scheduler to run the job.

**Answer: B**

**Explanation:**

B. Use Cloud Build to schedule a job using Terraform build to provision the infrastructure and launch with the most current container images.

**Question: 206**

CertyIQ

You need ads data to serve AI models and historical data for analytics. Longtail and outlier data points need to be identified. You want to cleanse the data in near-real time before running it through AI models. What should you do?

- A. Use Cloud Storage as a data warehouse, shell scripts for processing, and BigQuery to create views for desired datasets.
- B. Use Dataflow to identify longtail and outlier data points programmatically, with BigQuery as a sink.
- C. Use BigQuery to ingest, prepare, and then analyze the data, and then run queries to create views.
- D. Use Cloud Composer to identify longtail and outlier data points, and then output a usable dataset to BigQuery.

**Answer: B**

**Explanation:**

Use Dataflow to identify longtail and outlier data points programmatically, with BigQuery as a sink.

**Question: 207**

CertyIQ

You are collecting IoT sensor data from millions of devices across the world and storing the data in BigQuery. Your access pattern is based on recent data, filtered by location\_id and device\_version with the following query:

```
SELECT  
    MAX(temperature)  
FROM  
    acme_iot_data.sensors  
WHERE  
    create_date > DATE_SUB(CURRENT_DATE(), INTERVAL 7 day)  
    AND location_id = "SW1W9TQ"  
    AND device_version = "202007r3"
```

You want to optimize your queries for cost and performance. How should you structure your data?

- A. Partition table data by create\_date, location\_id, and device\_version.
- B. Partition table data by create\_date, cluster table data by location\_id, and device\_version.
- C. Cluster table data by create\_date, location\_id, and device\_version.
- D. Cluster table data by create\_date, partition by location\_id, and device\_version.

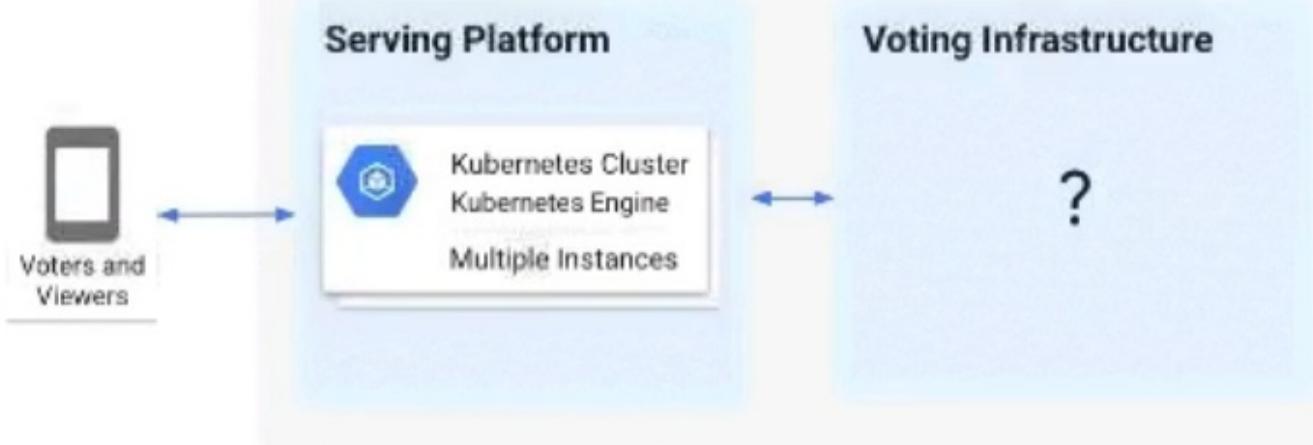
**Answer: B****Explanation:**

1. Answer is B:- Partitioning the table by create\_date allows us to efficiently query data based on time, which is common in access patterns that prioritize recent data. - Clustering the table by location\_id and device\_version further organizes the data within each partition, making queries filtered by these columns more efficient and cost-effective.
2. The best answer is B. Partition table data by create\_date, cluster table data by location\_id, and device\_version. Here's a breakdown of why this structure is optimal:
  - Partitioning by create\_date: Aligns with query pattern: Filters for recent data based on create\_date, so partitioning by this column allows BigQuery to quickly narrow down the data to scan, reducing query costs and improving performance.
  - Manages data growth: Partitioning effectively segments data by date, making it easier to manage large datasets and optimize storage costs.
  - Clustering by location\_id and device\_version: Enhances filtering: Frequently filtering by location\_id and device\_version, clustering physically co-locates related data within partitions, further reducing scan time and improving performance.

**Question: 208**

CertyIQ

A live TV show asks viewers to cast votes using their mobile phones. The event generates a large volume of data during a 3-minute period. You are in charge of the "Voting infrastructure" and must ensure that the platform can handle the load and that all votes are processed. You must display partial results while voting is open. After voting closes, you need to count the votes exactly once while optimizing cost. What should you do?



- A.Create a Memorystore instance with a high availability (HA) configuration.
- B.Create a Cloud SQL for PostgreSQL database with high availability (HA) configuration and multiple read replicas.
- C.Write votes to a Pub/Sub topic and have Cloud Functions subscribe to it and write votes to BigQuery.
- D.Write votes to a Pub/Sub topic and load into both Bigtable and BigQuery via a Dataflow pipeline. Query Bigtable for real-time results and BigQuery for later analysis. Shut down the Bigtable instance when voting concludes.

**Answer: D****Explanation:**

Answer is D:- Google Cloud Pub/Sub can manage the high-volume data ingestion. - Google Cloud Dataflow can efficiently process and route data to both Bigtable and BigQuery.- Bigtable is excellent for handling high-throughput writes and reads, making it suitable for real-time vote tallying. - BigQuery is ideal for exact vote counting and deeper analysis once voting concludes.

**Question: 209****CertyIQ**

A shipping company has live package-tracking data that is sent to an Apache Kafka stream in real time. This is then loaded into BigQuery. Analysts in your company want to query the tracking data in BigQuery to analyze geospatial trends in the lifecycle of a package. The table was originally created with ingest-date partitioning. Over time, the query processing time has increased. You need to copy all the data to a new clustered table. What should you do?

- A.Re-create the table using data partitioning on the package delivery date.
- B.Implement clustering in BigQuery on the package-tracking ID column.
- C.Implement clustering in BigQuery on the ingest date column.
- D.Tier older data onto Cloud Storage files and create a BigQuery table using Cloud Storage as an external data source.

**Answer: B****Explanation:**

Query Focus: Analysts are interested in geospatial trends within individual package lifecycles. Clustering by package-tracking ID physically co-locates related data, significantly improving query performance for these

analyses. Addressing Slow Queries: Clustering addresses the query slowdown issue by optimizing data organization for the specific query patterns. Partitioning vs. Clustering: Partitioning: Divides data into segments based on a column's values, primarily for managing large datasets and optimizing query costs. Clustering: Organizes data within partitions for faster querying based on specific columns.

## Question: 210

CertyIQ

You are designing a data mesh on Google Cloud with multiple distinct data engineering teams building data products. The typical data curation design pattern consists of landing files in Cloud Storage, transforming raw data in Cloud Storage and BigQuery datasets, and storing the final curated data product in BigQuery datasets. You need to configure Dataplex to ensure that each team can access only the assets needed to build their data products. You also need to ensure that teams can easily share the curated data product. What should you do?

- A.1. Create a single Dataplex virtual lake and create a single zone to contain landing, raw, and curated data.  
2. Provide each data engineering team access to the virtual lake.
- B.1. Create a single Dataplex virtual lake and create a single zone to contain landing, raw, and curated data.  
2. Build separate assets for each data product within the zone.  
3. Assign permissions to the data engineering teams at the zone level.
- C.1. Create a Dataplex virtual lake for each data product, and create a single zone to contain landing, raw, and curated data.  
2. Provide the data engineering teams with full access to the virtual lake assigned to their data product.
- D.1. Create a Dataplex virtual lake for each data product, and create multiple zones for landing, raw, and curated data.  
2. Provide the data engineering teams with full access to the virtual lake assigned to their data product.

## Answer: D

### Explanation:

- 1. Create a Dataplex virtual lake for each data product, and create multiple zones for landing, raw, and curated data.
- 2. Provide the data engineering teams with full access to the virtual lake assigned to their data product.

## Question: 211

CertyIQ

You are using BigQuery with a multi-region dataset that includes a table with the daily sales volumes. This table is updated multiple times per day. You need to protect your sales table in case of regional failures with a recovery point objective (RPO) of less than 24 hours, while keeping costs to a minimum. What should you do?

- A. Schedule a daily export of the table to a Cloud Storage dual or multi-region bucket.
- B. Schedule a daily copy of the dataset to a backup region.
- C. Schedule a daily BigQuery snapshot of the table.
- D. Modify ETL job to load the data into both the current and another backup region.

## Answer: A

### Explanation:

Schedule a daily export of the table to a Cloud Storage dual or multi-region bucket.

**Question: 212**

CertyIQ

You are troubleshooting your Dataflow pipeline that processes data from Cloud Storage to BigQuery. You have discovered that the Dataflow worker nodes cannot communicate with one another. Your networking team relies on Google Cloud network tags to define firewall rules. You need to identify the issue while following Google-recommended networking security practices. What should you do?

- A.Determine whether your Dataflow pipeline has a custom network tag set.
- B.Determine whether there is a firewall rule set to allow traffic on TCP ports 12345 and 12346 for the Dataflow network tag.
- C.Determine whether there is a firewall rule set to allow traffic on TCP ports 12345 and 12346 on the subnet used by Dataflow workers.
- D.Determine whether your Dataflow pipeline is deployed with the external IP address option enabled.

**Answer: B****Explanation:**

1. This option focuses directly on ensuring that the firewall rules are set up correctly for the network tags used by Dataflow worker nodes. It specifically addresses the potential issue of worker nodes not being able to communicate due to restrictive firewall rules blocking the necessary ports.
2. Focus on Network Tags:Adheres to the recommended practice of using network tags for firewall configuration, enhancing security and flexibility.Avoids targeting specific subnets, which can be less secure and harder to manage.

**Question: 213**

CertyIQ

Your company's customer\_order table in BigQuery stores the order history for 10 million customers, with a table size of 10 PB. You need to create a dashboard for the support team to view the order history. The dashboard has two filters, country\_name and username. Both are string data types in the BigQuery table. When a filter is applied, the dashboard fetches the order history from the table and displays the query results. However, the dashboard is slow to show the results when applying the filters to the following query:

```
SELECT date, order, status FROM customer_order  
WHERE country = '<country_name>' AND username = '<username>'
```

How should you redesign the BigQuery table to support faster access?

- A.Cluster the table by country and username fields.
- B.Cluster the table by country field, and partition by username field.
- C.Partition the table by country and username fields.
- D.Partition the table by \_PARTITIONTIME.

**Answer: A****Explanation:**

Clustering organizes the data based on the specified columns (in this case, country\_name and username). - When a query filters on these columns, BigQuery can efficiently scan only the relevant parts of the table

**Question: 214**

CertyIQ

You have a Standard Tier Memorystore for Redis instance deployed in a production environment. You need to simulate a Redis instance failover in the most accurate disaster recovery situation, and ensure that the failover has

no impact on production data. What should you do?

- A.Create a Standard Tier Memorystore for Redis instance in the development environment. Initiate a manual failover by using the limited-data-loss data protection mode.
- B.Create a Standard Tier Memorystore for Redis instance in a development environment. Initiate a manual failover by using the force-data-loss data protection mode.
- C.Increase one replica to Redis instance in production environment. Initiate a manual failover by using the force-data-loss data protection mode.
- D.Initiate a manual failover by using the limited-data-loss data protection mode to the Memorystore for Redis instance in the production environment.

**Answer: B**

**Explanation:**

Create a Standard Tier Memorystore for Redis instance in a development environment. Initiate a manual failover by using the force-data-loss data protection mode.

**Question: 215**

**CertyIQ**

You are administering a BigQuery dataset that uses a customer-managed encryption key (CMEK). You need to share the dataset with a partner organization that does not have access to your CMEK. What should you do?

- A.Provide the partner organization a copy of your CMEKs to decrypt the data.
- B.Export the tables to parquet files to a Cloud Storage bucket and grant the storageinsights.viewer role on the bucket to the partner organization.
- C.Copy the tables you need to share to a dataset without CMEKs. Create an Analytics Hub listing for this dataset.
- D.Create an authorized view that contains the CMEK to decrypt the data when accessed.

**Answer: C**

**Explanation:**

Copy the tables you need to share to a dataset without CMEKs. Create an Analytics Hub listing for this dataset.

**Question: 216**

**CertyIQ**

You are developing an Apache Beam pipeline to extract data from a Cloud SQL instance by using JdbcIO. You have two projects running in Google Cloud. The pipeline will be deployed and executed on Dataflow in Project A. The Cloud SQL instance is running in Project B and does not have a public IP address. After deploying the pipeline, you noticed that the pipeline failed to extract data from the Cloud SQL instance due to connection failure. You verified that VPC Service Controls and shared VPC are not in use in these projects. You want to resolve this error while ensuring that the data does not go through the public internet. What should you do?

- A.Set up VPC Network Peering between Project A and Project B. Add a firewall rule to allow the peered subnet range to access all instances on the network.
- B.Turn off the external IP addresses on the Dataflow worker. Enable Cloud NAT in Project A.
- C.Add the external IP addresses of the Dataflow worker as authorized networks in the Cloud SQL instance.
- D.Set up VPC Network Peering between Project A and Project B. Create a Compute Engine instance without external IP address in Project B on the peered subnet to serve as a proxy server to the Cloud SQL database.

**Answer: D**

**Explanation:**

Set up VPC Network Peering between Project A and Project B. Create a Compute Engine instance without external IP address in Project B on the peered subnet to serve as a proxy server to the Cloud SQL database.

**Question: 217**

CertyIQ

You have a BigQuery table that contains customer data, including sensitive information such as names and addresses. You need to share the customer data with your data analytics and consumer support teams securely. The data analytics team needs to access the data of all the customers, but must not be able to access the sensitive data. The consumer support team needs access to all data columns, but must not be able to access customers that no longer have active contracts. You enforced these requirements by using an authorized dataset and policy tags. After implementing these steps, the data analytics team reports that they still have access to the sensitive columns. You need to ensure that the data analytics team does not have access to restricted data. What should you do? (Choose two.)

- A.Create two separate authorized datasets; one for the data analytics team and another for the consumer support team.
- B.Ensure that the data analytics team members do not have the Data Catalog Fine-Grained Reader role for the policy tags.
- C.Replace the authorized dataset with an authorized view. Use row-level security and apply filter\_expression to limit data access.
- D.Remove the bigquery.dataViewer role from the data analytics team on the authorized datasets.
- E.Enforce access control in the policy tag taxonomy.

**Answer: BE**

**Explanation:**

- B.Ensure that the data analytics team members do not have the Data Catalog Fine-Grained Reader role for the policy tags.
- E.Enforce access control in the policy tag taxonomy.

**Question: 218**

CertyIQ

You have a Cloud SQL for PostgreSQL instance in Region' with one read replica in Region2 and another read replica in Region3. An unexpected event in Region' requires that you perform disaster recovery by promoting a read replica in Region2. You need to ensure that your application has the same database capacity available before you switch over the connections. What should you do?

- A.Enable zonal high availability on the primary instance. Create a new read replica in a new region.
- B.Create a cascading read replica from the existing read replica in Region3.
- C.Create two new read replicas from the new primary instance, one in Region3 and one in a new region.
- D.Create a new read replica in Region1, promote the new read replica to be the primary instance, and enable zonal high availability.

**Answer: C**

**Explanation:**

Create two new read replicas from the new primary instance, one in Region3 and one in a new region.

**Question: 219****CertyIQ**

You orchestrate ETL pipelines by using Cloud Composer. One of the tasks in the Apache Airflow directed acyclic graph (DAG) relies on a third-party service. You want to be notified when the task does not succeed. What should you do?

- A. Assign a function with notification logic to the `on_retry_callback` parameter for the operator responsible for the task at risk.
- B. Configure a Cloud Monitoring alert on the `sla_missed` metric associated with the task at risk to trigger a notification.
- C. Assign a function with notification logic to the `on_failure_callback` parameter for the operator responsible for the task at risk.
- D. Assign a function with notification logic to the `sla_miss_callback` parameter for the operator responsible for the task at risk.

**Answer: C****Explanation:**

Assign a function with notification logic to the `on_failure_callback` parameter for the operator responsible for the task at risk.

**Question: 220****CertyIQ**

You are migrating your on-premises data warehouse to BigQuery. One of the upstream data sources resides on a MySQL database that runs in your on-premises data center with no public IP addresses. You want to ensure that the data ingestion into BigQuery is done securely and does not go through the public internet. What should you do?

- A. Update your existing on-premises ETL tool to write to BigQuery by using the BigQuery Open Database Connectivity (ODBC) driver. Set up the proxy parameter in the `simba.googlebigqueryodbc.ini` file to point to your data center's NAT gateway.
- B. Use Datastream to replicate data from your on-premises MySQL database to BigQuery. Set up Cloud Interconnect between your on-premises data center and Google Cloud. Use Private connectivity as the connectivity method and allocate an IP address range within your VPC network to the Datastream connectivity configuration. Use Server-only as the encryption type when setting up the connection profile in Datastream.
- C. Use Datastream to replicate data from your on-premises MySQL database to BigQuery. Use Forward-SSH tunnel as the connectivity method to establish a secure tunnel between Datastream and your on-premises MySQL database through a tunnel server in your on-premises data center. Use None as the encryption type when setting up the connection profile in Datastream.
- D. Use Datastream to replicate data from your on-premises MySQL database to BigQuery. Gather Datastream public IP addresses of the Google Cloud region that will be used to set up the stream. Add those IP addresses to the firewall allowlist of your on-premises data center. Use IP Allowlisting as the connectivity method and Server-only as the encryption type when setting up the connection profile in Datastream.

**Answer: B****Explanation:**

1. - Datastream is a serverless change data capture and replication service, which can be used to replicate data changes from MySQL to BigQuery. - Using Cloud Interconnect provides a private, secure connection between your on-premises environment and Google Cloud ==> This method ensures that data doesn't go through the public internet and is a recommended approach for secure, large-scale data migrations. - Setting up private connectivity with Datastream allows for secure and direct data transfer.
2. Secure Private Connection: Cloud Interconnect establishes a direct, private connection between your on-

premises network and Google Cloud, bypassing the public internet and ensuring data confidentiality. Datastream Integration: Datastream seamlessly replicates data from your MySQL database to BigQuery, handling the complexities of data transfer and synchronization.

### Question: 221

CertyIQ

You store and analyze your relational data in BigQuery on Google Cloud with all data that resides in US regions. You also have a variety of object stores across Microsoft Azure and Amazon Web Services (AWS), also in US regions. You want to query all your data in BigQuery daily with as little movement of data as possible. What should you do?

- A. Use BigQuery Data Transfer Service to load files from Azure and AWS into BigQuery.
- B. Create a Dataflow pipeline to ingest files from Azure and AWS to BigQuery.
- C. Load files from AWS and Azure to Cloud Storage with Cloud Shell gsutil rsync arguments.
- D. Use the BigQuery Omni functionality and BigLake tables to query files in Azure and AWS.

### Answer: D

#### Explanation:

BigQuery Omni allows us to analyze data stored across Google Cloud, AWS, and Azure directly from BigQuery without having to move or copy the data. - It extends BigQuery's data analysis capabilities to other clouds, enabling cross-cloud analytics.

### Question: 222

CertyIQ

You have a variety of files in Cloud Storage that your data science team wants to use in their models. Currently, users do not have a method to explore, cleanse, and validate the data in Cloud Storage. You are looking for a low code solution that can be used by your data science team to quickly cleanse and explore data within Cloud Storage. What should you do?

- A. Provide the data science team access to Dataflow to create a pipeline to prepare and validate the raw data and load data into BigQuery for data exploration.
- B. Create an external table in BigQuery and use SQL to transform the data as necessary. Provide the data science team access to the external tables to explore the raw data.
- C. Load the data into BigQuery and use SQL to transform the data as necessary. Provide the data science team access to staging tables to explore the raw data.
- D. Provide the data science team access to Dataprep to prepare, validate, and explore the data within Cloud Storage.

### Answer: D

#### Explanation:

Dataprep is a serverless, no-code data preparation tool that allows users to visually explore, cleanse, and prepare data for analysis. - It's designed for business analysts, data scientists, and others who want to work with data without writing code. - Dataprep can directly access and transform data in Cloud Storage, making it a suitable choice for a team that prefers a low-code, user-friendly solution.

### Question: 223

CertyIQ

You are building an ELT solution in BigQuery by using Dataform. You need to perform uniqueness and null value checks on your final tables. What should you do to efficiently integrate these checks into your pipeline?

- A.Build BigQuery user-defined functions (UDFs).
- B.Create Dataplex data quality tasks.
- C.Build Dataform assertions into your code.
- D.Write a Spark-based stored procedure.

**Answer: C**

**Explanation:**

1. - Dataform provides a feature called "assertions," which are essentially SQL-based tests that you can define to verify the quality of your data. - Assertions in Dataform are a built-in way to perform data quality checks, including checking for uniqueness and null values in your tables.
2. Native Integration: Dataform assertions are designed specifically for data quality checks within Dataform pipelines, ensuring seamless integration and compatibility. They leverage Dataform's execution model and configuration, aligning with the existing workflow. Declarative Syntax: Assertions are defined using a simple, declarative syntax within Dataform code, making them easy to write and understand, even for users with less SQL expertise.

**Question: 224**

**CertyIQ**

A web server sends click events to a Pub/Sub topic as messages. The web server includes an eventTimestamp attribute in the messages, which is the time when the click occurred. You have a Dataflow streaming job that reads from this Pub/Sub topic through a subscription, applies some transformations, and writes the result to another Pub/Sub topic for use by the advertising department. The advertising department needs to receive each message within 30 seconds of the corresponding click occurrence, but they report receiving the messages late. Your Dataflow job's system lag is about 5 seconds, and the data freshness is about 40 seconds. Inspecting a few messages show no more than 1 second lag between their eventTimestamp and publishTime. What is the problem and what should you do?

- A.The advertising department is causing delays when consuming the messages. Work with the advertising department to fix this.
- B.Messages in your Dataflow job are taking more than 30 seconds to process. Optimize your job or increase the number of workers to fix this.
- C.Messages in your Dataflow job are processed in less than 30 seconds, but your job cannot keep up with the backlog in the Pub/Sub subscription. Optimize your job or increase the number of workers to fix this.
- D.The web server is not pushing messages fast enough to Pub/Sub. Work with the web server team to fix this.

**Answer: G**

**Explanation:**

Messages in your Dataflow job are processed in less than 30 seconds, but your job cannot keep up with the backlog in the Pub/Sub subscription. Optimize your job or increase the number of workers to fix this.

**Question: 225**

**CertyIQ**

Your organization stores customer data in an on-premises Apache Hadoop cluster in Apache Parquet format. Data is processed on a daily basis by Apache Spark jobs that run on the cluster. You are migrating the Spark jobs and Parquet data to Google Cloud. BigQuery will be used on future transformation pipelines so you need to ensure that your data is available in BigQuery. You want to use managed services, while minimizing ETL data processing changes and overhead costs. What should you do?

- A.Migrate your data to Cloud Storage and migrate the metadata to Dataproc Metastore (DPMS). Refactor Spark pipelines to write and read data on Cloud Storage, and run them on Dataproc Serverless.
- B.Migrate your data to Cloud Storage and register the bucket as a Dataplex asset. Refactor Spark pipelines to write and read data on Cloud Storage, and run them on Dataproc Serverless.
- C.Migrate your data to BigQuery. Refactor Spark pipelines to write and read data on BigQuery, and run them on Dataproc Serverless.
- D.Migrate your data to BigLake. Refactor Spark pipelines to write and read data on Cloud Storage, and run them on Dataproc on Compute Engine.

**Answer: C**

**Explanation:**

Migrate your data to BigQuery. Refactor Spark pipelines to write and read data on BigQuery, and run them on Dataproc Serverless.

**Question: 226**

**CertyIQ**

Your organization has two Google Cloud projects, project A and project B. In project A, you have a Pub/Sub topic that receives data from confidential sources. Only the resources in project A should be able to access the data in that topic. You want to ensure that project B and any future project cannot access data in the project A topic. What should you do?

- A.Add firewall rules in project A so only traffic from the VPC in project A is permitted.
- B.Configure VPC Service Controls in the organization with a perimeter around project A.
- C.Use Identity and Access Management conditions to ensure that only users and service accounts in project A. can access resources in project A.
- D.Configure VPC Service Controls in the organization with a perimeter around the VPC of project A.

**Answer: B**

**Explanation:**

Configure VPC Service Controls in the organization with a perimeter around project A.

**Question: 227**

**CertyIQ**

You stream order data by using a Dataflow pipeline, and write the aggregated result to Memorystore. You provisioned a Memorystore for Redis instance with Basic Tier, 4 GB capacity, which is used by 40 clients for read-only access. You are expecting the number of read-only clients to increase significantly to a few hundred and you need to be able to support the demand. You want to ensure that read and write access availability is not impacted, and any changes you make can be deployed quickly. What should you do?

- A.Create a new Memorystore for Redis instance with Standard Tier. Set capacity to 4 GB and read replica to No read replicas (high availability only). Delete the old instance.
- B.Create a new Memorystore for Redis instance with Standard Tier. Set capacity to 5 GB and create multiple read replicas. Delete the old instance.
- C.Create a new Memorystore for Memcached instance. Set a minimum of three nodes, and memory per node to 4 GB. Modify the Dataflow pipeline and all clients to use the Memcached instance. Delete the old instance.
- D.Create multiple new Memorystore for Redis instances with Basic Tier (4 GB capacity). Modify the Dataflow pipeline and new clients to use all instances.

**Answer: B**

**Explanation:**

Create a new Memorystore for Redis instance with Standard Tier. Set capacity to 5 GB and create multiple read replicas. Delete the old instance.

**CertyIQ****Question: 228**

You have a streaming pipeline that ingests data from Pub/Sub in production. You need to update this streaming pipeline with improved business logic. You need to ensure that the updated pipeline reprocesses the previous two days of delivered Pub/Sub messages. What should you do? (Choose two.)

- A.Use the Pub/Sub subscription clear-retry-policy flag
- B.Use Pub/Sub Snapshot capture two days before the deployment.
- C.Create a new Pub/Sub subscription two days before the deployment.
- D.Use the Pub/Sub subscription retain-acked-messages flag.
- E.Use Pub/Sub Seek with a timestamp.

**Answer: BE****Explanation:**

- B.Use Pub/Sub Snapshot capture two days before the deployment.
- E.Use Pub/Sub Seek with a timestamp.

**Reference:**

<https://cloud.google.com/pubsub/docs/replay-overview>

**CertyIQ****Question: 229**

You currently use a SQL-based tool to visualize your data stored in BigQuery. The data visualizations require the use of outer joins and analytic functions. Visualizations must be based on data that is no less than 4 hours old. Business users are complaining that the visualizations are too slow to generate. You want to improve the performance of the visualization queries while minimizing the maintenance overhead of the data preparation pipeline. What should you do?

- A.Create materialized views with the allow\_non\_incremental\_definition option set to true for the visualization queries. Specify the max\_staleness parameter to 4 hours and the enable\_refresh parameter to true. Reference the materialized views in the data visualization tool.
- B.Create views for the visualization queries. Reference the views in the data visualization tool.
- C.Create a Cloud Function instance to export the visualization query results as parquet files to a Cloud Storage bucket. Use Cloud Scheduler to trigger the Cloud Function every 4 hours. Reference the parquet files in the data visualization tool.
- D.Create materialized views for the visualization queries. Use the incremental updates capability of BigQuery materialized views to handle changed data automatically. Reference the materialized views in the data visualization tool.

**Answer: A****Explanation:**

1. - Materialized views in BigQuery precompute and store the result of a base query, which can speed up data retrieval for complex queries used in visualizations. - The max\_staleness parameter allows us to specify how

old the data can be, ensuring that the visualizations are based on data no less than 4 hours old. - The enable\_refresh parameter ensures that the materialized view is periodically refreshed.- The allow\_non\_incremental\_definition is used for enabling the creation of non-incrementally refreshable materialized views.

2. Precomputed Results: Materialized views store precomputed results of complex queries, significantly accelerating subsequent query performance, addressing the slow visualization issue.  
Allow Non-Incremental Views: Using allow\_non\_incremental\_definition circumvents the limitation of incremental updates for outer joins and analytic functions, ensuring views can be created for the specified queries.  
Near-Real-Time Data: Setting max\_staleness to 4 hours guarantees data freshness within the acceptable latency for visualizations.  
Automatic Refresh: Enabling refresh with enable\_refresh maintains view consistency with minimal maintenance overhead.  
Minimal Overhead: Materialized views automatically update as underlying data changes, reducing maintenance compared to manual exports or view definitions.

### Question: 230

CertyIQ

You need to modernize your existing on-premises data strategy. Your organization currently uses:

- Apache Hadoop clusters for processing multiple large data sets, including on-premises Hadoop Distributed File System (HDFS) for data replication.
- Apache Airflow to orchestrate hundreds of ETL pipelines with thousands of job steps.

You need to set up a new architecture in Google Cloud that can handle your Hadoop workloads and requires minimal changes to your existing orchestration processes. What should you do?

- A.Use Bigtable for your large workloads, with connections to Cloud Storage to handle any HDFS use cases. Orchestrate your pipelines with Cloud Composer.
- B.Use Dataproc to migrate Hadoop clusters to Google Cloud, and Cloud Storage to handle any HDFS use cases. Orchestrate your pipelines with Cloud Composer.
- C.Use Dataproc to migrate Hadoop clusters to Google Cloud, and Cloud Storage to handle any HDFS use cases. Convert your ETL pipelines to Dataflow.
- D.Use Dataproc to migrate your Hadoop clusters to Google Cloud, and Cloud Storage to handle any HDFS use cases. Use Cloud Data Fusion to visually design and deploy your ETL pipelines.

### Answer: B

#### Explanation:

Use Dataproc to migrate Hadoop clusters to Google Cloud, and Cloud Storage to handle any HDFS use cases. Orchestrate your pipelines with Cloud Composer.

### Question: 231

CertyIQ

You recently deployed several data processing jobs into your Cloud Composer 2 environment. You notice that some tasks are failing in Apache Airflow. On the monitoring dashboard, you see an increase in the total workers memory usage, and there were worker pod evictions. You need to resolve these errors. What should you do? (Choose two.)

- A.Increase the directed acyclic graph (DAG) file parsing interval.
- B.Increase the Cloud Composer 2 environment size from medium to large.
- C.Increase the maximum number of workers and reduce worker concurrency.
- D.Increase the memory available to the Airflow workers.
- E.Increase the memory available to the Airflow triggerer.

### Answer: C

**Explanation:**

- C.Increase the maximum number of workers and reduce worker concurrency.
- D.Increase the memory available to the Airflow workers.

**CertyIQ****Question: 232**

You are on the data governance team and are implementing security requirements to deploy resources. You need to ensure that resources are limited to only the europe-west3 region. You want to follow Google-recommended practices.

What should you do?

- A.Set the constraints/gcp.resourceLocations organization policy constraint to in:europe-west3-locations.
- B.Deploy resources with Terraform and implement a variable validation rule to ensure that the region is set to the europe-west3 region for all resources.
- C.Set the constraints/gcp.resourceLocations organization policy constraint to in:eu-locations.
- D.Create a Cloud Function to monitor all resources created and automatically destroy the ones created outside the europe-west3 region.

**Answer: A****Explanation:**

Set the constraints/gcp.resourceLocations organization policy constraint to in:europe-west3-locations.

**CertyIQ****Question: 233**

You are a BigQuery admin supporting a team of data consumers who run ad hoc queries and downstream reporting in tools such as Looker. All data and users are combined under a single organizational project. You recently noticed some slowness in query results and want to troubleshoot where the slowdowns are occurring. You think that there might be some job queuing or slot contention occurring as users run jobs, which slows down access to results. You need to investigate the query job information and determine where performance is being affected. What should you do?

- A.Use slot reservations for your project to ensure that you have enough query processing capacity and are able to allocate available slots to the slower queries.
- B.Use Cloud Monitoring to view BigQuery metrics and set up alerts that let you know when a certain percentage of slots were used.
- C.Use available administrative resource charts to determine how slots are being used and how jobs are performing over time. Run a query on the INFORMATION\_SCHEMA to review query performance.
- D.Use Cloud Logging to determine if any users or downstream consumers are changing or deleting access grants on tagged resources.

**Answer: C****Explanation:**

BigQuery provides administrative resource charts that show slot utilization and job performance, which can help identify patterns of heavy usage or contention. - Additionally, querying the INFORMATION\_SCHEMA with the JOBS or JOBS\_BY\_PROJECT view can provide detailed information about specific queries, including execution time, slot usage, and whether they were queued.

**Question: 234**

CertyIQ

You migrated a data backend for an application that serves 10 PB of historical product data for analytics. Only the last known state for a product, which is about 10 GB of data, needs to be served through an API to the other applications. You need to choose a cost-effective persistent storage solution that can accommodate the analytics requirements and the API performance of up to 1000 queries per second (QPS) with less than 1 second latency. What should you do?

- A.1. Store the historical data in BigQuery for analytics.
  - 2. Use a materialized view to precompute the last state of a product.
  - 3. Serve the last state data directly from BigQuery to the API.
- B.1. Store the products as a collection in Firestore with each product having a set of historical changes.
  - 2. Use simple and compound queries for analytics.
  - 3. Serve the last state data directly from Firestore to the API.
- C.1. Store the historical data in Cloud SQL for analytics.
  - 2. In a separate table, store the last state of the product after every product change.
  - 3. Serve the last state data directly from Cloud SQL to the API.
- D.1. Store the historical data in BigQuery for analytics.
  - 2. In a Cloud SQL table, store the last state of the product after every product change.
  - 3. Serve the last state data directly from Cloud SQL to the API.

**Answer: D****Explanation:**

- 1. Store the historical data in BigQuery for analytics.
- 2. In a Cloud SQL table, store the last state of the product after every product change.
- 3. Serve the last state data directly from Cloud SQL to the API.

**Question: 235**

CertyIQ

You want to schedule a number of sequential load and transformation jobs. Data files will be added to a Cloud Storage bucket by an upstream process. There is no fixed schedule for when the new data arrives. Next, a Dataproc job is triggered to perform some transformations and write the data to BigQuery. You then need to run additional transformation jobs in BigQuery. The transformation jobs are different for every table. These jobs might take hours to complete. You need to determine the most efficient and maintainable workflow to process hundreds of tables and provide the freshest data to your end users. What should you do?

- A.1. Create an Apache Airflow directed acyclic graph (DAG) in Cloud Composer with sequential tasks by using the Cloud Storage, Dataproc, and BigQuery operators.
  - 2. Use a single shared DAG for all tables that need to go through the pipeline.
  - 3. Schedule the DAG to run hourly.
- B.1. Create an Apache Airflow directed acyclic graph (DAG) in Cloud Composer with sequential tasks by using the Cloud Storage, Dataproc, and BigQuery operators.
  - 2. Create a separate DAG for each table that needs to go through the pipeline.
  - 3. Schedule the DAGs to run hourly.
- C.1. Create an Apache Airflow directed acyclic graph (DAG) in Cloud Composer with sequential tasks by using the Dataproc and BigQuery operators.
  - 2. Use a single shared DAG for all tables that need to go through the pipeline.
  - 3. Use a Cloud Storage object trigger to launch a Cloud Function that triggers the DAG.
- D.1. Create an Apache Airflow directed acyclic graph (DAG) in Cloud Composer with sequential tasks by using the Dataproc and BigQuery operators.
  - 2. Create a separate DAG for each table that needs to go through the pipeline.
  - 3. Use a Cloud Storage object trigger to launch a Cloud Function that triggers the DAG.

**Answer: D**

**Explanation:**

- D. 1. Create an Apache Airflow directed acyclic graph (DAG) in Cloud Composer with sequential tasks by using the Dataproc and BigQuery operators.
2. Create a separate DAG for each table that needs to go through the pipeline.
3. Use a Cloud Storage object trigger to launch a Cloud Function that triggers the DAG.

**CertyIQ**

**Question: 236**

You are deploying a MySQL database workload onto Cloud SQL. The database must be able to scale up to support several readers from various geographic regions. The database must be highly available and meet low RTO and RPO requirements, even in the event of a regional outage. You need to ensure that interruptions to the readers are minimal during a database failover. What should you do?

- A.Create a highly available Cloud SQL instance in region A. Create a highly available read replica in region B. Scale up read workloads by creating cascading read replicas in multiple regions. Backup the Cloud SQL instances to a multi-regional Cloud Storage bucket. Restore the Cloud SQL backup to a new instance in another region when Region A is down.
- B.Create a highly available Cloud SQL instance in region A. Scale up read workloads by creating read replicas in multiple regions. Promote one of the read replicas when region A is down.
- C.Create a highly available Cloud SQL instance in region A. Create a highly available read replica in region B. Scale up read workloads by creating cascading read replicas in multiple regions. Promote the read replica in region B when region A is down.
- D.Create a highly available Cloud SQL instance in region A. Scale up read workloads by creating read replicas in the same region. Failover to the standby Cloud SQL instance when the primary instance fails.

**Answer: C**

**Explanation:**

Create a highly available Cloud SQL instance in region A. Create a highly available read replica in region B. Scale up read workloads by creating cascading read replicas in multiple regions. Promote the read replica in region B when region A is down.

**CertyIQ**

**Question: 237**

You are planning to load some of your existing on-premises data into BigQuery on Google Cloud. You want to either stream or batch-load data, depending on your use case. Additionally, you want to mask some sensitive data before loading into BigQuery. You need to do this in a programmatic way while keeping costs to a minimum. What should you do?

- A.Use Cloud Data Fusion to design your pipeline, use the Cloud DLP plug-in to de-identify data within your pipeline, and then move the data into BigQuery.
- B.Use the BigQuery Data Transfer Service to schedule your migration. After the data is populated in BigQuery, use the connection to the Cloud Data Loss Prevention (Cloud DLP) API to de-identify the necessary data.
- C.Create your pipeline with Dataflow through the Apache Beam SDK for Python, customizing separate options within your code for streaming, batch processing, and Cloud DLP. Select BigQuery as your data sink.
- D.Set up Datastream to replicate your on-premise data on BigQuery.

**Answer: C**

**Explanation:**

Programmatic Flexibility: Apache Beam provides extensive control over pipeline design, allowing for

customization of data transformations, including integration with Cloud DLP for sensitive data masking.- Streaming and Batch Support: Beam seamlessly supports both streaming and batch data processing modes, enabling flexibility in data loading patterns.- Cost-Effective Processing: Dataflow offers a serverless model, scaling resources as needed, and only charging for resources used, helping optimize costs.- Integration with Cloud DLP: Beam integrates well with Cloud DLP for sensitive data masking, ensuring data privacy before loading into BigQuery.

### Question: 238

CertyIQ

You want to encrypt the customer data stored in BigQuery. You need to implement per-user crypto-deletion on data stored in your tables. You want to adopt native features in Google Cloud to avoid custom solutions. What should you do?

- A.Implement Authenticated Encryption with Associated Data (AEAD) BigQuery functions while storing your data in BigQuery.
- B.Create a customer-managed encryption key (CMEK) in Cloud KMS. Associate the key to the table while creating the table.
- C.Create a customer-managed encryption key (CMEK) in Cloud KMS. Use the key to encrypt data before storing in BigQuery.
- D.Encrypt your data during ingestion by using a cryptographic library supported by your ETL pipeline.

### Answer: A

#### Explanation:

AEAD cryptographic functions in BigQuery allow for encryption and decryption of data at the column level. - You can encrypt specific data fields using a unique key per user and manage these keys outside of BigQuery (for example, in your application or using a key management system). - By "deleting" or revoking access to the key for a specific user, you effectively make their data unreadable, achieving crypto-deletion. - This method provides fine-grained encryption control but requires careful key management and integration with your applications.

- A. Implement Authenticated Encryption with Associated Data (AEAD) BigQuery functions while storing your data in BigQuery.

### Question: 239

CertyIQ

The data analyst team at your company uses BigQuery for ad-hoc queries and scheduled SQL pipelines in a Google Cloud project with a slot reservation of 2000 slots. However, with the recent introduction of hundreds of new non time-sensitive SQL pipelines, the team is encountering frequent quota errors. You examine the logs and notice that approximately 1500 queries are being triggered concurrently during peak time. You need to resolve the concurrency issue. What should you do?

- A.Increase the slot capacity of the project with baseline as 0 and maximum reservation size as 3000.
- B.Update SQL pipelines to run as a batch query, and run ad-hoc queries as interactive query jobs.
- C.Increase the slot capacity of the project with baseline as 2000 and maximum reservation size as 3000.
- D.Update SQL pipelines and ad-hoc queries to run as interactive query jobs.

### Answer: B

#### Explanation:

Update SQL pipelines to run as a batch query, and run ad-hoc queries as interactive query jobs.

**Question: 240**

CertyIQ

You are designing a data mesh on Google Cloud by using Dataplex to manage data in BigQuery and Cloud Storage. You want to simplify data asset permissions. You are creating a customer virtual lake with two user groups:

- Data engineers, which require full data lake access
- Analytic users, which require access to curated data

You need to assign access rights to these two groups. What should you do?

- A.1. Grant the dataplex.dataOwner role to the data engineer group on the customer data lake.
- 2. Grant the dataplex.dataReader role to the analytic user group on the customer curated zone.
- B.1. Grant the dataplex.dataReader role to the data engineer group on the customer data lake.
- 2. Grant the dataplex.dataOwner to the analytic user group on the customer curated zone.
- C.1. Grant the bigquery.dataOwner role on BigQuery datasets and the storage.objectCreator role on Cloud Storage buckets to data engineers.
- 2. Grant the bigquery.dataViewer role on BigQuery datasets and the storage.objectViewer role on Cloud Storage buckets to analytic users.
- D.1. Grant the bigquery.dataViewer role on BigQuery datasets and the storage.objectViewer role on Cloud Storage buckets to data engineers.
- 2. Grant the bigquery.dataOwner role on BigQuery datasets and the storage.objectEditor role on Cloud Storage buckets to analytic users.

**Answer: A****Explanation:**

dataplex.dataOwner: Grants full control over data assets, including reading, writing, managing, and granting access to others.- dataplex.dataReader: Allows users to read data but not modify it.

**Question: 241**

CertyIQ

You are designing the architecture of your application to store data in Cloud Storage. Your application consists of pipelines that read data from a Cloud Storage bucket that contains raw data, and write the data to a second bucket after processing. You want to design an architecture with Cloud Storage resources that are capable of being resilient if a Google Cloud regional failure occurs. You want to minimize the recovery point objective (RPO) if a failure occurs, with no impact on applications that use the stored data. What should you do?

- A. Adopt multi-regional Cloud Storage buckets in your architecture.
- B. Adopt two regional Cloud Storage buckets, and update your application to write the output on both buckets.
- C. Adopt a dual-region Cloud Storage bucket, and enable turbo replication in your architecture.
- D. Adopt two regional Cloud Storage buckets, and create a daily task to copy from one bucket to the other.

**Answer: C****Explanation:**

- 1. Turbo replication provides faster redundancy across regions for data in your dual-region buckets, which reduces the risk of data loss exposure and helps support uninterrupted service following a regional outage.
- 2. - Dual-region buckets are a specific type of storage that automatically replicates data between two geographically distinct regions. - Turbo replication is an enhanced feature that provides faster replication between the two regions, thus minimizing RPO. - This option ensures that your data is resilient to regional failures and is replicated quickly, meeting the needs for low RPO and no impact on application performance.

**Question: 242**

You have designed an Apache Beam processing pipeline that reads from a Pub/Sub topic. The topic has a message retention duration of one day, and writes to a Cloud Storage bucket. You need to select a bucket location and processing strategy to prevent data loss in case of a regional outage with an RPO of 15 minutes. What should you do?

- A.1. Use a dual-region Cloud Storage bucket.
- 2. Monitor Dataflow metrics with Cloud Monitoring to determine when an outage occurs.
- 3. Seek the subscription back in time by 15 minutes to recover the acknowledged messages.
- 4. Start the Dataflow job in a secondary region.
  
- B.1. Use a multi-regional Cloud Storage bucket.
- 2. Monitor Dataflow metrics with Cloud Monitoring to determine when an outage occurs.
- 3. Seek the subscription back in time by 60 minutes to recover the acknowledged messages.
- 4. Start the Dataflow job in a secondary region.
  
- C.1. Use a regional Cloud Storage bucket.
- 2. Monitor Dataflow metrics with Cloud Monitoring to determine when an outage occurs.
- 3. Seek the subscription back in time by one day to recover the acknowledged messages.
- 4. Start the Dataflow job in a secondary region and write in a bucket in the same region.
  
- D.1. Use a dual-region Cloud Storage bucket with turbo replication enabled.
- 2. Monitor Dataflow metrics with Cloud Monitoring to determine when an outage occurs.
- 3. Seek the subscription back in time by 60 minutes to recover the acknowledged messages.
- 4. Start the Dataflow job in a secondary region.

**Answer: D****Explanation:**

- 1. Use a dual-region Cloud Storage bucket with turbo replication enabled.
- 2. Monitor Dataflow metrics with Cloud Monitoring to determine when an outage occurs.
- 3. Seek the subscription back in time by 60 minutes to recover the acknowledged messages.
- 4. Start the Dataflow job in a secondary region.

**Question: 243**

You are preparing data that your machine learning team will use to train a model using BigQueryML. They want to predict the price per square foot of real estate. The training data has a column for the price and a column for the number of square feet. Another feature column called ‘feature1’ contains null values due to missing data. You want to replace the nulls with zeros to keep more data points. Which query should you use?

- A.  

```
SELECT * EXCEPT(feature1),
       IFNULL(feature1, 0) AS feature1_cleaned
FROM training_data;
```
  
- B.

```
SELECT * EXCEPT(price, square_feet),  
    price/square_feet AS price_per_sqft  
FROM training_data  
WHERE feature1 IS NOT NULL;
```

C.

```
SELECT * EXCEPT(price, square_feet, feature1),  
    price/square_feet AS price_per_sqft,  
    IFNULL(feature1, 0) AS feature1_cleaned  
FROM training_data;
```

D.

```
SELECT *  
FROM training_data  
WHERE feature1 IS NOT NULL;
```

**Answer: A**

**Explanation:**

```
SELECT * EXCEPT(feature1),  
    IFNULL(feature1, 0) AS feature1_cleaned  
FROM training_data;
```

### Question: 244

CertyIQ

Different teams in your organization store customer and performance data in BigQuery. Each team needs to keep full control of their collected data, be able to query data within their projects, and be able to exchange their data with other teams. You need to implement an organization-wide solution, while minimizing operational tasks and costs. What should you do?

- A. Ask each team to create authorized views of their data. Grant the `biquery.jobUser` role to each team.
- B. Create a BigQuery scheduled query to replicate all customer data into team projects.
- C. Ask each team to publish their data in Analytics Hub. Direct the other teams to subscribe to them.
- D. Enable each team to create materialized views of the data they need to access in their projects.

**Answer: C**

**Explanation:**

Ask each team to publish their data in Analytics Hub. Direct the other teams to subscribe to them.

### Question: 245

CertyIQ

You are developing a model to identify the factors that lead to sales conversions for your customers. You have completed processing your data. You want to continue through the model development lifecycle. What should you do next?

- A.Use your model to run predictions on fresh customer input data.
- B.Monitor your model performance, and make any adjustments needed.
- C.Delineate what data will be used for testing and what will be used for training the model.
- D.Test and evaluate your model on your curated data to determine how well the model performs.

#### Answer: C

#### Explanation:

Delineate what data will be used for testing and what will be used for training the model.

### Question: 246

CertyIQ

You have one BigQuery dataset which includes customers' street addresses. You want to retrieve all occurrences of street addresses from the dataset. What should you do?

- A.Write a SQL query in BigQuery by using REGEXP\_CONTAINS on all tables in your dataset to find rows where the word "street" appears.
- B.Create a deep inspection job on each table in your dataset with Cloud Data Loss Prevention and create an inspection template that includes the STREET\_ADDRESS infoType.
- C.Create a discovery scan configuration on your organization with Cloud Data Loss Prevention and create an inspection template that includes the STREET\_ADDRESS infoType.
- D.Create a de-identification job in Cloud Data Loss Prevention and use the masking transformation.

#### Answer: B

#### Explanation:

- B. Create a deep inspection job on each table in your dataset with Cloud Data Loss Prevention and create an inspection template that includes the STREET\_ADDRESS info Type.

### Question: 247

CertyIQ

Your company operates in three domains: airlines, hotels, and ride-hailing services. Each domain has two teams: analytics and data science, which create data assets in BigQuery with the help of a central data platform team. However, as each domain is evolving rapidly, the central data platform team is becoming a bottleneck. This is causing delays in deriving insights from data, and resulting in stale data when pipelines are not kept up to date. You need to design a data mesh architecture by using Dataplex to eliminate the bottleneck. What should you do?

- A.1. Create one lake for each team. Inside each lake, create one zone for each domain.  
2. Attach each of the BigQuery datasets created by the individual teams as assets to the respective zone.  
3. Have the central data platform team manage all zones' data assets.
- B.1. Create one lake for each team. Inside each lake, create one zone for each domain.  
2. Attach each of the BigQuery datasets created by the individual teams as assets to the respective zone.

3. Direct each domain to manage their own zone's data assets.
  - C.1. Create one lake for each domain. Inside each lake, create one zone for each team.
  2. Attach each of the BigQuery datasets created by the individual teams as assets to the respective zone.
  3. Direct each domain to manage their own lake's data assets.

  - D.1. Create one lake for each domain. Inside each lake, create one zone for each team.
  2. Attach each of the BigQuery datasets created by the individual teams as assets to the respective zone.
  3. Have the central data platform team manage all lakes' data assets.

**Answer: C**

**Explanation:**

C. 1. Create one lake for each domain. Inside each lake, create one zone for each team.  
 2. Attach each of the BigQuery datasets created by the individual teams as assets to the respective zone.  
 3. Direct each domain to manage their own lake's data assets.

### Question: 248

CertyIQ

dataset.inventory\_vm sample records:

Row	id	name	components.name	components.qty
1	vm02781	d-jp-kfk-02-02	vcpu	2
			memory	8
			boot_disk	10
			disk_1	50
2	vm11490	i-jp-kfk-02-07	vcpu	16
			memory	64
			boot_disk	10
			disk_1	200
3	vm18130	i-jp-kfk-02-08	vcpu	8
			memory	8
			boot_disk	10

You have an inventory of VM data stored in the BigQuery table. You want to prepare the data for regular reporting in the most cost-effective way. You need to exclude VM rows with fewer than 8 vCPU in your report. What should you do?

- A.Create a view with a filter to drop rows with fewer than 8 vCPU, and use the UNNEST operator.
- B.Create a materialized view with a filter to drop rows with fewer than 8 vCPU, and use the WITH common table expression.
- C.Create a view with a filter to drop rows with fewer than 8 vCPU, and use the WITH common table expression.
- D.Use Dataflow to batch process and write the result to another BigQuery table.

**Answer: A**

**Explanation:**

A. Create a view with a filter to drop rows with fewer than 8 vCPU, and use the UNNEST operator.

### Question: 249

CertyIQ

Your team is building a data lake platform on Google Cloud. As a part of the data foundation design, you are planning to store all the raw data in Cloud Storage. You are expecting to ingest approximately 25 GB of data a day and your billing department is worried about the increasing cost of storing old data. The current business requirements are:

- The old data can be deleted anytime.
- There is no predefined access pattern of the old data.
- The old data should be available instantly when accessed.
- There should not be any charges for data retrieval.

What should you do to optimize for cost?

- A.Create the bucket with the Autoclass storage class feature.
- B.Create an Object Lifecycle Management policy to modify the storage class for data older than 30 days to nearline, 90 days to coldline, and 365 days to archive storage class. Delete old data as needed.
- C.Create an Object Lifecycle Management policy to modify the storage class for data older than 30 days to coldline, 90 days to nearline, and 365 days to archive storage class. Delete old data as needed.
- D.Create an Object Lifecycle Management policy to modify the storage class for data older than 30 days to nearline, 45 days to coldline, and 60 days to archive storage class. Delete old data as needed.

### Answer: A

#### Explanation:

Autoclass automatically moves objects between storage classes without impacting performance or availability, nor incurring retrieval costs. - It continuously optimizes storage costs based on access patterns without the need to set specific lifecycle management policies.

### Question: 250

CertyIQ

Your company's data platform ingests CSV file dumps of booking and user profile data from upstream sources into Cloud Storage. The data analyst team wants to join these datasets on the email field available in both the datasets to perform analysis. However, personally identifiable information (PII) should not be accessible to the analysts. You need to de-identify the email field in both the datasets before loading them into BigQuery for analysts. What should you do?

- A.1. Create a pipeline to de-identify the email field by using recordTransformations in Cloud Data Loss Prevention (Cloud DLP) with masking as the de-identification transformations type.  
2. Load the booking and user profile data into a BigQuery table.
- B.1. Create a pipeline to de-identify the email field by using recordTransformations in Cloud DLP with format-preserving encryption with FFX as the de-identification transformation type.  
2. Load the booking and user profile data into a BigQuery table.
- C.1. Load the CSV files from Cloud Storage into a BigQuery table, and enable dynamic data masking.  
2. Create a policy tag with the email mask as the data masking rule.  
3. Assign the policy to the email field in both tables. A  
4. Assign the Identity and Access Management bigquerydatapolicy.maskedReader role for the BigQuery tables to the analysts.
- D.1. Load the CSV files from Cloud Storage into a BigQuery table, and enable dynamic data masking.  
2. Create a policy tag with the default masking value as the data masking rule.  
3. Assign the policy to the email field in both tables.  
4. Assign the Identity and Access Management bigquerydatapolicy.maskedReader role for the BigQuery tables to the analysts

**Answer: B**

**Explanation:**

1. Create a pipeline to de-identify the email field by using recordTransformations in Cloud DLP with format-preserving encryption with FFX as the de-identification transformation type.
2. Load the booking and user profile data into a BigQuery table.

**CertyIQ**

**Question: 251**

You have important legal hold documents in a Cloud Storage bucket. You need to ensure that these documents are not deleted or modified. What should you do?

- A. Set a retention policy. Lock the retention policy.
- B. Set a retention policy. Set the default storage class to Archive for long-term digital preservation.
- C. Enable the Object Versioning feature. Add a lifecycle rule.
- D. Enable the Object Versioning feature. Create a copy in a bucket in a different region.

**Answer: A**

**Explanation:**

- A. Set a retention policy. Lock the retention policy.

**CertyIQ**

**Question: 252**

You are designing a data warehouse in BigQuery to analyze sales data for a telecommunication service provider. You need to create a data model for customers, products, and subscriptions. All customers, products, and subscriptions can be updated monthly, but you must maintain a historical record of all data. You plan to use the visualization layer for current and historical reporting. You need to ensure that the data model is simple, easy-to-use, and cost-effective. What should you do?

- A. Create a normalized model with tables for each entity. Use snapshots before updates to track historical data.
- B. Create a normalized model with tables for each entity. Keep all input files in a Cloud Storage bucket to track historical data.
- C. Create a denormalized model with nested and repeated fields. Update the table and use snapshots to track historical data.
- D. Create a denormalized, append-only model with nested and repeated fields. Use the ingestion timestamp to track historical data.

**Answer: D**

**Explanation:**

- D. Create a denormalized, append-only model with nested and repeated fields. Use the ingestion timestamp to track historical data.

**CertyIQ**

**Question: 253**

You are deploying a batch pipeline in Dataflow. This pipeline reads data from Cloud Storage, transforms the data,

and then writes the data into BigQuery. The security team has enabled an organizational constraint in Google Cloud, requiring all Compute Engine instances to use only internal IP addresses and no external IP addresses. What should you do?

- A. Ensure that your workers have network tags to access Cloud Storage and BigQuery. Use Dataflow with only internal IP addresses.
- B. Ensure that the firewall rules allow access to Cloud Storage and BigQuery. Use Dataflow with only internal IPs.
- C. Create a VPC Service Controls perimeter that contains the VPC network and add Dataflow, Cloud Storage, and BigQuery as allowed services in the perimeter. Use Dataflow with only internal IP addresses.
- D. Ensure that Private Google Access is enabled in the subnetwork. Use Dataflow with only internal IP addresses.

**Answer: D**

**Explanation:**

Private Google Access for services allows VM instances with only internal IP addresses in a VPC network or on-premises networks (via Cloud VPN or Cloud Interconnect) to reach Google APIs and services.

- When you launch a Dataflow job, you can specify that it should use worker instances without external IP addresses if Private Google Access is enabled on the subnetwork where these instances are launched.
- This way, your Dataflow workers will be able to access Cloud Storage and BigQuery without violating the organizational constraint of no external IPs.

**Question: 254**

**CertyIQ**

You are running a Dataflow streaming pipeline, with Streaming Engine and Horizontal Autoscaling enabled. You have set the maximum number of workers to 1000. The input of your pipeline is Pub/Sub messages with notifications from Cloud Storage. One of the pipeline transforms reads CSV files and emits an element for every CSV line. The job performance is low, the pipeline is using only 10 workers, and you notice that the autoscaler is not spinning up additional workers. What should you do to improve performance?

- A. Enable Vertical Autoscaling to let the pipeline use larger workers.
- B. Change the pipeline code, and introduce a Reshuffle step to prevent fusion.
- C. Update the job to increase the maximum number of workers.
- D. Use Dataflow Prime, and enable Right Fitting to increase the worker resources.

**Answer: B**

**Explanation:**

Fusion optimization in Dataflow can lead to steps being "fused" together, which can sometimes hinder parallelization.

Introducing a Reshuffle step can prevent fusion and force the distribution of work across more workers.

This can be an effective way to improve parallelism and potentially trigger the autoscaler to increase the number of workers.

**Question: 255**

**CertyIQ**

You have an Oracle database deployed in a VM as part of a Virtual Private Cloud (VPC) network. You want to

replicate and continuously synchronize 50 tables to BigQuery. You want to minimize the need to manage infrastructure. What should you do?

- A.Deploy Apache Kafka in the same VPC network, use Kafka Connect Oracle Change Data Capture (CDC), and Dataflow to stream the Kafka topic to BigQuery.
- B.Create a Pub/Sub subscription to write to BigQuery directly. Deploy the Debezium Oracle connector to capture changes in the Oracle database, and sink to the Pub/Sub topic.
- C.Deploy Apache Kafka in the same VPC network, use Kafka Connect Oracle change data capture (CDC), and the Kafka Connect Google BigQuery Sink Connector.
- D.Create a Datastream service from Oracle to BigQuery, use a private connectivity configuration to the same VPC network, and a connection profile to BigQuery.

**Answer: D**

**Explanation:**

- 1. - Datastream is a serverless and easy-to-use change data capture (CDC) and replication service. - You would create a Datastream service that sources from your Oracle database and targets BigQuery, with private connectivity configuration to the same VPC. - This option is designed to minimize the need to manage infrastructure and is a fully managed service.
- 2. D. Create a Datastream service from Oracle to BigQuery, use a private connectivity configuration to the same VPC network, and a connection profile to BigQuery.

**Question: 256**

**CertyIQ**

You are deploying an Apache Airflow directed acyclic graph (DAG) in a Cloud Composer 2 instance. You have incoming files in a Cloud Storage bucket that the DAG processes, one file at a time. The Cloud Composer instance is deployed in a subnetwork with no Internet access. Instead of running the DAG based on a schedule, you want to run the DAG in a reactive way every time a new file is received. What should you do?

- A.1. Enable Private Google Access in the subnetwork, and set up Cloud Storage notifications to a Pub/Sub topic.  
2. Create a push subscription that points to the web server URL.
- B.1. Enable the Cloud Composer API, and set up Cloud Storage notifications to trigger a Cloud Function.  
2. Write a Cloud Function instance to call the DAG by using the Cloud Composer API and the web server URL.  
3. Use VPC Serverless Access to reach the web server URL.
- C.1. Enable the Airflow REST API, and set up Cloud Storage notifications to trigger a Cloud Function instance.  
2. Create a Private Service Connect (PSC) endpoint.  
3. Write a Cloud Function that connects to the Cloud Composer cluster through the PSC endpoint.
- D.1. Enable the Airflow REST API, and set up Cloud Storage notifications to trigger a Cloud Function instance.  
2. Write a Cloud Function instance to call the DAG by using the Airflow REST API and the web server URL.  
3. Use VPC Serverless Access to reach the web server URL.

**Answer: C**

**Explanation:**

- 1. - Enable Airflow REST API: In Cloud Composer, enable the "Airflow web server" option.- Set Up Cloud Storage Notifications: Create a notification for new files, routing to a Cloud Function.- Create PSC Endpoint: Establish a PSC endpoint for Cloud Composer.- Write Cloud Function: Code the function to use the Airflow REST API (via PSC endpoint) to trigger the DAG.Why not Option D- Using the web server URL directly wouldn't work without internet access or a direct path to the web server.
- 2. C. 1. Enable the Airflow REST API, and set up Cloud Storage notifications to trigger a Cloud Function instance.2. Create a Private Service Connect (PSC) endpoint.3. Write a Cloud Function that connects to the Cloud Composer cluster through the PSC endpoint.

**Question: 257**

CertyIQ

You are planning to use Cloud Storage as part of your data lake solution. The Cloud Storage bucket will contain objects ingested from external systems. Each object will be ingested once, and the access patterns of individual objects will be random. You want to minimize the cost of storing and retrieving these objects. You want to ensure that any cost optimization efforts are transparent to the users and applications. What should you do?

- A.Create a Cloud Storage bucket with Autoclass enabled.
- B.Create a Cloud Storage bucket with an Object Lifecycle Management policy to transition objects from Standard to Coldline storage class if an object age reaches 30 days.
- C.Create a Cloud Storage bucket with an Object Lifecycle Management policy to transition objects from Standard to Coldline storage class if an object is not live.
- D.Create two Cloud Storage buckets. Use the Standard storage class for the first bucket, and use the Coldline storage class for the second bucket. Migrate objects from the first bucket to the second bucket after 30 days.

**Answer: A****Explanation:**

1. - Autoclass automatically analyzes access patterns of objects and automatically transitions them to the most cost-effective storage class within Standard, Nearline, Coldline, or Archive.- This eliminates the need for manual intervention or setting specific age thresholds.- No user or application interaction is required, ensuring transparency.

- 2. A. Create a Cloud Storage bucket with Autoclass enabled.

**Question: 258**

CertyIQ

You have several different file type data sources, such as Apache Parquet and CSV. You want to store the data in Cloud Storage. You need to set up an object sink for your data that allows you to use your own encryption keys. You want to use a GUI-based solution. What should you do?

- A.Use Storage Transfer Service to move files into Cloud Storage.
- B.Use Cloud Data Fusion to move files into Cloud Storage.
- C.Use Dataflow to move files into Cloud Storage.
- D.Use BigQuery Data Transfer Service to move files into BigQuery.

**Answer: B****Explanation:**

1. - Cloud Data Fusion is a fully managed, code-free, GUI-based data integration service that allows you to visually connect, transform, and move data between various sources and sinks. - It supports various file formats and can write to Cloud Storage. - You can configure it to use Customer-Managed Encryption Keys (CMEK) for the buckets where it writes data.

- 2. B. Use Cloud Data Fusion to move files into Cloud Storage.

**Question: 259**

CertyIQ

Your business users need a way to clean and prepare data before using the data for analysis. Your business users are less technically savvy and prefer to work with graphical user interfaces to define their transformations. After the data has been transformed, the business users want to perform their analysis directly in a spreadsheet. You need to recommend a solution that they can use. What should you do?

- A.Use Dataprep to clean the data, and write the results to BigQuery. Analyze the data by using Connected

Sheets.

- B.Use Dataprep to clean the data, and write the results to BigQuery. Analyze the data by using Looker Studio.
- C.Use Dataflow to clean the data, and write the results to BigQuery. Analyze the data by using Connected Sheets.
- D.Use Dataflow to clean the data, and write the results to BigQuery. Analyze the data by using Looker Studio.

#### Answer: A

#### Explanation:

- A. Use Dataprep to clean the data, and write the results to BigQuery. Analyze the data by using Connected Sheets.

### Question: 260

CertyIQ

You have two projects where you run BigQuery jobs:

- One project runs production jobs that have strict completion time SLAs. These are high priority jobs that must have the required compute resources available when needed. These jobs generally never go below a 300 slot utilization, but occasionally spike up an additional 500 slots.
- The other project is for users to run ad-hoc analytical queries. This project generally never uses more than 200 slots at a time. You want these ad-hoc queries to be billed based on how much data users scan rather than by slot capacity.

You need to ensure that both projects have the appropriate compute resources available. What should you do?

- A.Create a single Enterprise Edition reservation for both projects. Set a baseline of 300 slots. Enable autoscaling up to 700 slots.
- B.Create two reservations, one for each of the projects. For the SLA project, use an Enterprise Edition with a baseline of 300 slots and enable autoscaling up to 500 slots. For the ad-hoc project, configure on-demand billing.
- C.Create two Enterprise Edition reservations, one for each of the projects. For the SLA project, set a baseline of 300 slots and enable autoscaling up to 500 slots. For the ad-hoc project, set a reservation baseline of 0 slots and set the ignore idle slots flag to False.
- D.Create two Enterprise Edition reservations, one for each of the projects. For the SLA project, set a baseline of 800 slots. For the ad-hoc project, enable autoscaling up to 200 slots.

#### Answer: B

#### Explanation:

1. - The SLA project gets a dedicated reservation with autoscaling to handle spikes, ensuring it meets its strict completion time SLAs. - The ad-hoc project uses on-demand billing, which means it will be billed based on the amount of data scanned rather than slot capacity, fitting the billing preference for ad-hoc queries.
2. B. Create two reservations, one for each of the projects. For the SLA project, use an Enterprise Edition with a baseline of 300 slots and enable autoscaling up to 500 slots. For the ad-hoc project, configure on-demand billing.

### Question: 261

CertyIQ

You want to migrate your existing Teradata data warehouse to BigQuery. You want to move the historical data to BigQuery by using the most efficient method that requires the least amount of programming, but local storage space on your existing data warehouse is limited. What should you do?

- A.Use BigQuery Data Transfer Service by using the Java Database Connectivity (JDBC) driver with FastExport connection.

- B.Create a Teradata Parallel Transporter (TPT) export script to export the historical data, and import to BigQuery by using the bq command-line tool.
- C.Use BigQuery Data Transfer Service with the Teradata Parallel Transporter (TPT) tbuild utility.
- D.Create a script to export the historical data, and upload in batches to Cloud Storage. Set up a BigQuery Data Transfer Service instance from Cloud Storage to BigQuery.

**Answer: A****Explanation:**

Use BigQuery Data Transfer Service by using the Java Database Connectivity (JDBC) driver with FastExport connection.

Reduced Local Storage: By using FastExport, data is directly streamed from Teradata to BigQuery without the need for local storage, addressing your storage limitations.- Minimal Programming: BigQuery Data Transfer Service offers a user-friendly interface, eliminating the need for extensive scripting or coding.

**Question: 262****CertyIQ**

You are on the data governance team and are implementing security requirements. You need to encrypt all your data in BigQuery by using an encryption key managed by your team. You must implement a mechanism to generate and store encryption material only on your on-premises hardware security module (HSM). You want to rely on Google managed solutions. What should you do?

- A.Create the encryption key in the on-premises HSM, and import it into a Cloud Key Management Service (Cloud KMS) key. Associate the created Cloud KMS key while creating the BigQuery resources.
- B.Create the encryption key in the on-premises HSM and link it to a Cloud External Key Manager (Cloud EKM) key. Associate the created Cloud KMS key while creating the BigQuery resources.
- C.Create the encryption key in the on-premises HSM, and import it into Cloud Key Management Service (Cloud HSM) key. Associate the created Cloud HSM key while creating the BigQuery resources.
- D.Create the encryption key in the on-premises HSM. Create BigQuery resources and encrypt data while ingesting them into BigQuery.

**Answer: B****Explanation:**

Cloud EKM allows you to use encryption keys managed in external key management systems, including on-premises HSMs, while using Google Cloud services. - This means that the key material remains in your control and environment, and Google Cloud services use it via the Cloud EKM integration. - This approach aligns with the need to generate and store encryption material only on your on-premises HSM and is the correct way to integrate such keys with BigQuery.=====Why not Option C- Cloud HSM is a fully managed service by Google Cloud that provides HSMs for your cryptographic needs. However, it's a cloud-based solution, and the keys generated or managed in Cloud HSM are not stored on-premises. This option doesn't align with the requirement to use only on-premises HSM for key storage.

**Question: 263****CertyIQ**

You maintain ETL pipelines. You notice that a streaming pipeline running on Dataflow is taking a long time to process incoming data, which causes output delays. You also noticed that the pipeline graph was automatically optimized by Dataflow and merged into one step. You want to identify where the potential bottleneck is occurring. What should you do?

- A.Insert a Reshuffle operation after each processing step, and monitor the execution details in the Dataflow console.
- B.Insert output sinks after each key processing step, and observe the writing throughput of each block.
- C.Log debug information in each ParDo function, and analyze the logs at execution time.
- D.Verify that the Dataflow service accounts have appropriate permissions to write the processed data to the output sinks.

**Answer: A**

**Explanation:**

The Reshuffle operation is used in Dataflow pipelines to break fusion and redistribute elements, which can sometimes help improve parallelization and identify bottlenecks. - By inserting Reshuffle after each processing step and observing the pipeline's performance in the Dataflow console, you can potentially identify stages that are disproportionately slow or stalled. - This can help in pinpointing the step where the bottleneck might be occurring.

- A. Insert a Reshuffle operation after each processing step, and monitor the execution details in the Dataflow console.

**Question: 264**

**CertyIQ**

You are running your BigQuery project in the on-demand billing model and are executing a change data capture (CDC) process that ingests data. The CDC process loads 1 GB of data every 10 minutes into a temporary table, and then performs a merge into a 10 TB target table. This process is very scan intensive and you want to explore options to enable a predictable cost model. You need to create a BigQuery reservation based on utilization information gathered from BigQuery Monitoring and apply the reservation to the CDC process. What should you do?

- A.Create a BigQuery reservation for the dataset.
- B.Create a BigQuery reservation for the job.
- C.Create a BigQuery reservation for the service account running the job.
- D.Create a BigQuery reservation for the project.

**Answer: D**

**Explanation:**

- D. Create a BigQuery reservation for the project.

**Question: 265**

**CertyIQ**

You are designing a fault-tolerant architecture to store data in a regional BigQuery dataset. You need to ensure that your application is able to recover from a corruption event in your tables that occurred within the past seven days. You want to adopt managed services with the lowest RPO and most cost-effective solution. What should you do?

- A.Access historical data by using time travel in BigQuery.
- B.Export the data from BigQuery into a new table that excludes the corrupted data
- C.Create a BigQuery table snapshot on a daily basis.
- D.Migrate your data to multi-region BigQuery buckets.

**Answer: A****Explanation:**

Lowest RPO: Time travel offers point-in-time recovery for the past seven days by default, providing the shortest possible recovery point objective (RPO) among the given options. You can recover data to any state within that window.- No Additional Costs: Time travel is a built-in feature of BigQuery, incurring no extra storage or operational costs.- Managed Service: BigQuery handles time travel automatically, eliminating manual backup and restore processes.

- A. Access historical data by using time travel in BigQuery.

**CertyIQ****Question: 266**

You are building a streaming Dataflow pipeline that ingests noise level data from hundreds of sensors placed near construction sites across a city. The sensors measure noise level every ten seconds, and send that data to the pipeline when levels reach above 70 dBA. You need to detect the average noise level from a sensor when data is received for a duration of more than 30 minutes, but the window ends when no data has been received for 15 minutes. What should you do?

- A.Use session windows with a 15-minute gap duration.
- B.Use session windows with a 30-minute gap duration.
- C.Use hopping windows with a 15-minute window, and a thirty-minute period.
- D.Use tumbling windows with a 15-minute window and a fifteen-minute .withAllowedLateness operator.

**Answer: A****Explanation:**

Use session windows with a 15-minute gap duration.

**CertyIQ****Question: 267**

You are creating a data model in BigQuery that will hold retail transaction data. Your two largest tables, sales\_transaction\_header and sales\_transaction\_line, have a tightly coupled immutable relationship. These tables are rarely modified after load and are frequently joined when queried. You need to model the sales\_transaction\_header and sales\_transaction\_line tables to improve the performance of data analytics queries. What should you do?

- A.Create a sales\_transaction table that holds the sales\_transaction\_header information as rows and the sales\_transaction\_line rows as nested and repeated fields.
- B.Create a sales\_transaction table that holds the sales\_transaction\_header and sales\_transaction\_line information as rows, duplicating the sales\_transaction\_header data for each line.
- C.Create a sales\_transaction table that stores the sales\_transaction\_header and sales\_transaction\_line data as a JSON data type.
- D.Create separate sales\_transaction\_header and sales\_transaction\_line tables and, when querying, specify the sales\_transaction\_line first in the WHERE clause.

**Answer: A****Explanation:**

- A. Create a sales\_transaction table that holds the sales\_transaction\_header information as rows and the sales\_transaction\_line rows as nested and repeated fields.

**Question: 268****CertyIQ**

You created a new version of a Dataflow streaming data ingestion pipeline that reads from Pub/Sub and writes to BigQuery. The previous version of the pipeline that runs in production uses a 5-minute window for processing. You need to deploy the new version of the pipeline without losing any data, creating inconsistencies, or increasing the processing latency by more than 10 minutes. What should you do?

- A.Update the old pipeline with the new pipeline code.
- B.Snapshot the old pipeline, stop the old pipeline, and then start the new pipeline from the snapshot.
- C.Drain the old pipeline, then start the new pipeline.
- D.Cancel the old pipeline, then start the new pipeline.

**Answer: C****Explanation:**

C. Drain the old pipeline, then start the new pipeline.

**Question: 269****CertyIQ**

Your organization's data assets are stored in BigQuery, Pub/Sub, and a PostgreSQL instance running on Compute Engine. Because there are multiple domains and diverse teams using the data, teams in your organization are unable to discover existing data assets. You need to design a solution to improve data discoverability while keeping development and configuration efforts to a minimum. What should you do?

- A.Use Data Catalog to automatically catalog BigQuery datasets. Use Data Catalog APIs to manually catalog Pub/Sub topics and PostgreSQL tables.
- B.Use Data Catalog to automatically catalog BigQuery datasets and Pub/Sub topics. Use Data Catalog APIs to manually catalog PostgreSQL tables.
- C.Use Data Catalog to automatically catalog BigQuery datasets and Pub/Sub topics. Use custom connectors to manually catalog PostgreSQL tables.
- D.Use customer connectors to manually catalog BigQuery datasets, Pub/Sub topics, and PostgreSQL tables.

**Answer: B****Explanation:**

Use Data Catalog to automatically catalog BigQuery datasets and Pub/Sub topics. Use Data Catalog APIs to manually catalog PostgreSQL tables.

**Question: 270****CertyIQ**

You need to create a SQL pipeline. The pipeline runs an aggregate SQL transformation on a BigQuery table every two hours and appends the result to another existing BigQuery table. You need to configure the pipeline to retry if errors occur. You want the pipeline to send an email notification after three consecutive failures. What should you do?

- A.Use the BigQueryUpsertTableOperator in Cloud Composer, set the retry parameter to three, and set the email\_on\_failure parameter to true.
- B.Use the BigQueryInsertJobOperator in Cloud Composer, set the retry parameter to three, and set the email\_on\_failure parameter to true.

C.Create a BigQuery scheduled query to run the SQL transformation with schedule options that repeats every two hours, and enable email notifications.

D.Create a BigQuery scheduled query to run the SQL transformation with schedule options that repeats every two hours, and enable notification to Pub/Sub topic. Use Pub/Sub and Cloud Functions to send an email after three failed executions.

**Answer: B**

**Explanation:**

B. Use the BigQueryInsertJobOperator in Cloud Composer, set the retry parameter to three, and set the email\_on\_failure parameter to true.

**CertyIQ**

**Question: 271**

You are monitoring your organization's data lake hosted on BigQuery. The ingestion pipelines read data from Pub/Sub and write the data into tables on BigQuery. After a new version of the ingestion pipelines is deployed, the daily stored data increased by 50%. The volumes of data in Pub/Sub remained the same and only some tables had their daily partition data size doubled. You need to investigate and fix the cause of the data increase. What should you do?

- A.1. Check for duplicate rows in the BigQuery tables that have the daily partition data size doubled.
- 2. Schedule daily SQL jobs to deduplicate the affected tables.
- 3. Share the deduplication script with the other operational teams to reuse if this occurs to other tables.
- B.1. Check for code errors in the deployed pipelines.
- 2. Check for multiple writing to pipeline BigQuery sink.
- 3. Check for errors in Cloud Logging during the day of the release of the new pipelines.
- 4. If no errors, restore the BigQuery tables to their content before the last release by using time travel.
- C.1. Check for duplicate rows in the BigQuery tables that have the daily partition data size doubled.
- 2. Check the BigQuery Audit logs to find job IDs.
- 3. Use Cloud Monitoring to determine when the identified Dataflow jobs started and the pipeline code version.
- 4. When more than one pipeline ingests data into a table, stop all versions except the latest one.
- D.1. Roll back the last deployment.
- 2. Restore the BigQuery tables to their content before the last release by using time travel.
- 3. Restart the Dataflow jobs and replay the messages by seeking the subscription to the timestamp of the release.

**Answer: C**

**Explanation:**

Detailed Investigation of Logs and Jobs Checking for duplicate rows targets the potential immediate cause of the issue.- Checking the BigQuery Audit logs helps identify which jobs might be contributing to the increased data volume.- Using Cloud Monitoring to correlate job starts with pipeline versions helps identify if a specific version of the pipeline is responsible.- Managing multiple versions of pipelines ensures that only the intended version is active, addressing any versioning errors that might have occurred during deployment.=====Why not BWhile it addresses the symptom (excess data), it doesn't necessarily stop the problem from recurring.  
(The questions asked to investigate and fix)

**CertyIQ**

**Question: 272**

You have a BigQuery dataset named "customers". All tables will be tagged by using a Data Catalog tag template named "gdpr". The template contains one mandatory field, "has\_sensitive\_data", with a boolean value. All employees must be able to do a simple search and find tables in the dataset that have either true or false in the "has\_sensitive\_data" field. However, only the Human Resources (HR) group should be able to see the data inside

the tables for which “has\_sensitive\_data” is true. You give the all employees group the bigquery.metadataViewer and bigquery.connectionUser roles on the dataset. You want to minimize configuration overhead. What should you do next?

- A.Create the “gdpr” tag template with private visibility. Assign the bigquery.dataViewer role to the HR group on the tables that contain sensitive data.
- B.Create the “gdpr” tag template with private visibility. Assign the datacatalog.tagTemplateViewer role on this tag to the all employees group, and assign the bigquery.dataViewer role to the HR group on the tables that contain sensitive data.
- C.Create the “gdpr” tag template with public visibility. Assign the bigquery.dataViewer role to the HR group on the tables that contain sensitive data.
- D.Create the “gdpr” tag template with public visibility. Assign the datacatalog.tagTemplateViewer role on this tag to the all employees group, and assign the bigquery.dataViewer role to the HR group on the tables that contain sensitive data.

**Answer: C**

**Explanation:**

Create the “gdpr” tag template with public visibility. Assign the bigquery.dataViewer role to the HR group on the tables that contain sensitive data.

### Question: 273

CertyIQ

You are creating the CI/CD cycle for the code of the directed acyclic graphs (DAGs) running in Cloud Composer. Your team has two Cloud Composer instances: one instance for development and another instance for production. Your team is using a Git repository to maintain and develop the code of the DAGs. You want to deploy the DAGs automatically to Cloud Composer when a certain tag is pushed to the Git repository. What should you do?

- A.1. Use Cloud Build to copy the code of the DAG to the Cloud Storage bucket of the development instance for DAG testing.  
2. If the tests pass, use Cloud Build to copy the code to the bucket of the production instance.
- B.1. Use Cloud Build to build a container with the code of the DAG and the KubernetesPodOperator to deploy the code to the Google Kubernetes Engine (GKE) cluster of the development instance for testing.  
2. If the tests pass, use the KubernetesPodOperator to deploy the container to the GKE cluster of the production instance.
- C.1. Use Cloud Build to build a container and the KubernetesPodOperator to deploy the code of the DAG to the Google Kubernetes Engine (GKE) cluster of the development instance for testing.  
2. If the tests pass, copy the code to the Cloud Storage bucket of the production instance.
- D.1. Use Cloud Build to copy the code of the DAG to the Cloud Storage bucket of the development instance for DAG testing.  
2. If the tests pass, use Cloud Build to build a container with the code of the DAG and the KubernetesPodOperator to deploy the container to the Google Kubernetes Engine (GKE) cluster of the production instance.

**Answer: A**

**Explanation:**

The Answer is A. Given that there are two instances (development and production) already available, and the goal is to deploy DAGs to Cloud Composer not entire composer infra build. Explanation:- This approach leverages Cloud Build to manage the deployment process.- It first deploys the code to the Cloud Storage bucket of the development instance for testing purposes.- If the tests are successful in the development environment, the same Cloud Build process is used to copy the code to the Cloud Storage bucket of the production instance. B. GKE-based approach is not standard for Cloud Composer. C. GKE used for testing is unconventional for DAG deployments. D. Involves unnecessary GKE deployment for production. Testing DAGs should use Composer instances directly, not Kubernetes containers in GKE.

**Question: 274****CertyIQ**

You have a BigQuery table that ingests data directly from a Pub/Sub subscription. The ingested data is encrypted with a Google-managed encryption key. You need to meet a new organization policy that requires you to use keys from a centralized Cloud Key Management Service (Cloud KMS) project to encrypt data at rest. What should you do?

- A.Use Cloud KMS encryption key with Dataflow to ingest the existing Pub/Sub subscription to the existing BigQuery table.
- B.Create a new BigQuery table by using customer-managed encryption keys (CMEK), and migrate the data from the old BigQuery table.
- C.Create a new Pub/Sub topic with CMEK and use the existing BigQuery table by using Google-managed encryption key.
- D.Create a new BigQuery table and Pub/Sub topic by using customer-managed encryption keys (CMEK), and migrate the data from the old BigQuery table.

**Answer: B****Explanation:**

Create a new BigQuery table by using customer-managed encryption keys (CMEK), and migrate the data from the old BigQuery table.

**Question: 275****CertyIQ**

You created an analytics environment on Google Cloud so that your data scientist team can explore data without impacting the on-premises Apache Hadoop solution. The data in the on-premises Hadoop Distributed File System (HDFS) cluster is in Optimized Row Columnar (ORC) formatted files with multiple columns of Hive partitioning. The data scientist team needs to be able to explore the data in a similar way as they used the on-premises HDFS cluster with SQL on the Hive query engine. You need to choose the most cost-effective storage and processing solution. What should you do?

- A.Import the ORC files to Bigtable tables for the data scientist team.
- B.Import the ORC files to BigQuery tables for the data scientist team.
- C.Copy the ORC files on Cloud Storage, then deploy a Dataproc cluster for the data scientist team.
- D.Copy the ORC files on Cloud Storage, then create external BigQuery tables for the data scientist team.

**Answer: D****Explanation:**

Copy the ORC files on Cloud Storage, then create external BigQuery tables for the data scientist team.

**Question: 276****CertyIQ**

You are designing a Dataflow pipeline for a batch processing job. You want to mitigate multiple zonal failures at job submission time. What should you do?

- A.Submit duplicate pipelines in two different zones by using the --zone flag.
- B.Set the pipeline staging location as a regional Cloud Storage bucket.
- C.Specify a worker region by using the --region flag.

D.Create an Eventarc trigger to resubmit the job in case of zonal failure when submitting the job.

**Answer: C**

**Explanation:**

C. Specify a worker region by using the --region flag.

**CertyIQ**

You are designing a real-time system for a ride hailing app that identifies areas with high demand for rides to effectively reroute available drivers to meet the demand. The system ingests data from multiple sources to Pub/Sub, processes the data, and stores the results for visualization and analysis in real-time dashboards. The data sources include driver location updates every 5 seconds and app-based booking events from riders. The data processing involves real-time aggregation of supply and demand data for the last 30 seconds, every 2 seconds, and storing the results in a low-latency system for visualization. What should you do?

- A.Group the data by using a tumbling window in a Dataflow pipeline, and write the aggregated data to Memorystore.
- B.Group the data by using a hopping window in a Dataflow pipeline, and write the aggregated data to Memorystore.
- C.Group the data by using a session window in a Dataflow pipeline, and write the aggregated data to BigQuery.
- D.Group the data by using a hopping window in a Dataflow pipeline, and write the aggregated data to BigQuery.

**Answer: B**

**Explanation:**

B. Group the data by using a hopping window in a Dataflow pipeline, and write the aggregated data to Memorystore.

**CertyIQ**

**Question: 278**

Your car factory is pushing machine measurements as messages into a Pub/Sub topic in your Google Cloud project. A Dataflow streaming job, that you wrote with the Apache Beam SDK, reads these messages, sends acknowledgment to Pub/Sub, applies some custom business logic in a DoFn instance, and writes the result to BigQuery. You want to ensure that if your business logic fails on a message, the message will be sent to a Pub/Sub topic that you want to monitor for alerting purposes. What should you do?

- A.Enable retaining of acknowledged messages in your Pub/Sub pull subscription. Use Cloud Monitoring to monitor the subscription/num\_retained\_acked\_messages metric on this subscription.
- B.Use an exception handling block in your Dataflow's DoFn code to push the messages that failed to be transformed through a side output and to a new Pub/Sub topic. Use Cloud Monitoring to monitor the topic/num\_unacked\_messages\_by\_region metric on this new topic.
- C.Enable dead lettering in your Pub/Sub pull subscription, and specify a new Pub/Sub topic as the dead letter topic. Use Cloud Monitoring to monitor the subscription/dead\_letter\_message\_count metric on your pull subscription.
- D.Create a snapshot of your Pub/Sub pull subscription. Use Cloud Monitoring to monitor the snapshot/num\_messages metric on this snapshot.

**Answer: B**

**Explanation:**

B. Use an exception handling block in your Dataflow's DoFn code to push the messages that failed to be transformed through a side output and to a new Pub/Sub topic. Use Cloud Monitoring to monitor the topic/num\_unacked\_messages\_by\_region metric on this new topic.

### Question: 279

CertyIQ

You want to store your team's shared tables in a single dataset to make data easily accessible to various analysts. You want to make this data readable but unmodifiable by analysts. At the same time, you want to provide the analysts with individual workspaces in the same project, where they can create and store tables for their own use, without the tables being accessible by other analysts. What should you do?

- A. Give analysts the BigQuery Data Viewer role at the project level. Create one other dataset, and give the analysts the BigQuery Data Editor role on that dataset.
- B. Give analysts the BigQuery Data Viewer role at the project level. Create a dataset for each analyst, and give each analyst the BigQuery Data Editor role at the project level.
- C. Give analysts the BigQuery Data Viewer role on the shared dataset. Create a dataset for each analyst, and give each analyst the BigQuery Data Editor role at the dataset level for their assigned dataset.
- D. Give analysts the BigQuery Data Viewer role on the shared dataset. Create one other dataset and give the analysts the BigQuery Data Editor role on that dataset.

### Answer: C

#### Explanation:

C. Give analysts the BigQuery Data Viewer role on the shared dataset. Create a dataset for each analyst, and give each analyst the BigQuery Data Editor role at the dataset level for their assigned dataset.

### Question: 280

CertyIQ

You are running a streaming pipeline with Dataflow and are using hopping windows to group the data as the data arrives. You noticed that some data is arriving late but is not being marked as late data, which is resulting in inaccurate aggregations downstream. You need to find a solution that allows you to capture the late data in the appropriate window. What should you do?

- A. Use watermarks to define the expected data arrival window. Allow late data as it arrives.
- B. Change your windowing function to tumbling windows to avoid overlapping window periods.
- C. Change your windowing function to session windows to define your windows based on certain activity.
- D. Expand your hopping window so that the late data has more time to arrive within the grouping.

### Answer: A

#### Explanation:

A. Use watermarks to define the expected data arrival window. Allow late data as it arrives.

### Question: 281

CertyIQ

You work for a large ecommerce company. You store your customer's order data in Bigtable. You have a garbage collection policy set to delete the data after 30 days and the number of versions is set to 1. When the data analysts run a query to report total customer spending, the analysts sometimes see customer data that is older than 30 days. You need to ensure that the analysts do not see customer data older than 30 days while minimizing cost and overhead. What should you do?

- A.Set the expiring values of the column families to 29 days and keep the number of versions to 1.
- B.Use a timestamp range filter in the query to fetch the customer's data for a specific range.
- C.Schedule a job daily to scan the data in the table and delete data older than 30 days.
- D.Set the expiring values of the column families to 30 days and set the number of versions to 2.

**Answer: B**

**Explanation:**

- B. Use a timestamp range filter in the query to fetch the customer's data for a specific range.

### Question: 282

**CertyIQ**

You are using a Dataflow streaming job to read messages from a message bus that does not support exactly-once delivery. Your job then applies some transformations, and loads the result into BigQuery. You want to ensure that your data is being streamed into BigQuery with exactly-once delivery semantics. You expect your ingestion throughput into BigQuery to be about 1.5 GB per second. What should you do?

- A.Use the BigQuery Storage Write API and ensure that your target BigQuery table is regional.
- B.Use the BigQuery Storage Write API and ensure that your target BigQuery table is multiregional.
- C.Use the BigQuery Streaming API and ensure that your target BigQuery table is regional.
- D.Use the BigQuery Streaming API and ensure that your target BigQuery table is multiregional.

**Answer: A**

**Explanation:**

Use the BigQuery Storage Write API and ensure that your target BigQuery table is regional.

### Question: 283

**CertyIQ**

You have created an external table for Apache Hive partitioned data that resides in a Cloud Storage bucket, which contains a large number of files. You notice that queries against this table are slow. You want to improve the performance of these queries. What should you do?

- A.Change the storage class of the Hive partitioned data objects from Coldline to Standard.
- B.Create an individual external table for each Hive partition by using a common table name prefix. Use wildcard table queries to reference the partitioned data.
- C.Upgrade the external table to a BigLake table. Enable metadata caching for the table.
- D.Migrate the Hive partitioned data objects to a multi-region Cloud Storage bucket.

**Answer: C**

**Explanation:**

Upgrade the external table to a BigLake table. Enable metadata caching for the table.

### Question: 284

**CertyIQ**

You have a network of 1000 sensors. The sensors generate time series data: one metric per sensor per second,

along with a timestamp. You already have 1 TB of data, and expect the data to grow by 1 GB every day. You need to access this data in two ways. The first access pattern requires retrieving the metric from one specific sensor stored at a specific timestamp, with a median single-digit millisecond latency. The second access pattern requires running complex analytic queries on the data, including joins, once a day. How should you store this data?

- A.Store your data in BigQuery. Concatenate the sensor ID and timestamp, and use it as the primary key.
- B.Store your data in Bigtable. Concatenate the sensor ID and timestamp and use it as the row key. Perform an export to BigQuery every day.
- C.Store your data in Bigtable. Concatenate the sensor ID and metric, and use it as the row key. Perform an export to BigQuery every day.
- D.Store your data in BigQuery. Use the metric as a primary key.

**Answer: B**

**Explanation:**

- B. Store your data in Bigtable. Concatenate the sensor ID and timestamp and use it as the row key. Perform an export to BigQuery every day.

**Question: 285**

CertyIQ

You have 100 GB of data stored in a BigQuery table. This data is outdated and will only be accessed one or two times a year for analytics with SQL. For backup purposes, you want to store this data to be immutable for 3 years. You want to minimize storage costs. What should you do?

- A.1. Create a BigQuery table clone.  
2. Query the clone when you need to perform analytics.
- B.1. Create a BigQuery table snapshot.  
2. Restore the snapshot when you need to perform analytics.
- C.1. Perform a BigQuery export to a Cloud Storage bucket with archive storage class.  
2. Enable versioning on the bucket.  
3. Create a BigQuery external table on the exported files.
- D.1. Perform a BigQuery export to a Cloud Storage bucket with archive storage class.  
2. Set a locked retention policy on the bucket.  
3. Create a BigQuery external table on the exported files.

**Answer: D**

**Explanation:**

- 1. Perform a BigQuery export to a Cloud Storage bucket with archive storage class.
- 2. Set a locked retention policy on the bucket.
- 3. Create a BigQuery external table on the exported files.

**Question: 286**

CertyIQ

You have thousands of Apache Spark jobs running in your on-premises Apache Hadoop cluster. You want to migrate the jobs to Google Cloud. You want to use managed services to run your jobs instead of maintaining a long-lived Hadoop cluster yourself. You have a tight timeline and want to keep code changes to a minimum. What should you do?

- A.Move your data to BigQuery. Convert your Spark scripts to a SQL-based processing approach.
- B.Rewrite your jobs in Apache Beam. Run your jobs in Dataflow.

- C.Copy your data to Compute Engine disks. Manage and run your jobs directly on those instances.
- D.Move your data to Cloud Storage. Run your jobs on Dataproc.

**Answer: D**

**Explanation:**

- D. Move your data to Cloud Storage. Run your jobs on Dataproc.

### Question: 287

**CertyIQ**

You are administering shared BigQuery datasets that contain views used by multiple teams in your organization. The marketing team is concerned about the variability of their monthly BigQuery analytics spend using the on-demand billing model. You need to help the marketing team establish a consistent BigQuery analytics spend each month. What should you do?

- A.Create a BigQuery Enterprise reservation with a baseline of 250 slots and autoscaling set to 500 for the marketing team, and bill them back accordingly.
- B.Establish a BigQuery quota for the marketing team, and limit the maximum number of bytes scanned each day.
- C.Create a BigQuery reservation with a baseline of 500 slots with no autoscaling for the marketing team, and bill them back accordingly.
- D.Create a BigQuery Standard pay-as-you go reservation with a baseline of 0 slots and autoscaling set to 500 for the marketing team, and bill them back accordingly.

**Answer: C**

**Explanation:**

- C. Create a Big Query reservation with a baseline of 500 slots with no autoscaling for the marketing team, and bill them back accordingly.

### Question: 288

**CertyIQ**

You are part of a healthcare organization where data is organized and managed by respective data owners in various storage services. As a result of this decentralized ecosystem, discovering and managing data has become difficult. You need to quickly identify and implement a cost-optimized solution to assist your organization with the following:

- Data management and discovery
- Data lineage tracking
- Data quality validation

How should you build the solution?

- A.Use BigLake to convert the current solution into a data lake architecture.
- B.Build a new data discovery tool on Google Kubernetes Engine that helps with new source onboarding and data lineage tracking.
- C.Use BigQuery to track data lineage, and use Dataprep to manage data and perform data quality validation.
- D.Use Dataplex to manage data, track data lineage, and perform data quality validation.

**Answer: D**

**Explanation:**

D. Use Dataplex to manage data, track data lineage, and perform data quality validation.

### Question: 289

CertyIQ

You have data located in BigQuery that is used to generate reports for your company. You have noticed some weekly executive report fields do not correspond to format according to company standards. For example, report errors include different telephone formats and different country code identifiers. This is a frequent issue, so you need to create a recurring job to normalize the data. You want a quick solution that requires no coding. What should you do?

- A. Use Cloud Data Fusion and Wrangler to normalize the data, and set up a recurring job.
- B. Use Dataflow SQL to create a job that normalizes the data, and that after the first run of the job, schedule the pipeline to execute recurrently.
- C. Create a Spark job and submit it to Dataproc Serverless.
- D. Use BigQuery and GoogleSQL to normalize the data, and schedule recurring queries in BigQuery.

### Answer: A

#### Explanation:

A. Use Cloud Data Fusion and Wrangler to normalize the data, and set up a recurring job.

### Question: 290

CertyIQ

You are designing a messaging system by using Pub/Sub to process clickstream data with an event-driven consumer app that relies on a push subscription. You need to configure the messaging system that is reliable enough to handle temporary downtime of the consumer app. You also need the messaging system to store the input messages that cannot be consumed by the subscriber. The system needs to retry failed messages gradually, avoiding overloading the consumer app, and store the failed messages after a maximum of 10 retries in a topic. How should you configure the Pub/Sub subscription?

- A. Increase the acknowledgement deadline to 10 minutes.
- B. Use immediate redelivery as the subscription retry policy, and configure dead lettering to a different topic with maximum delivery attempts set to 10.
- C. Use exponential backoff as the subscription retry policy, and configure dead lettering to the same source topic with maximum delivery attempts set to 10.
- D. Use exponential backoff as the subscription retry policy, and configure dead lettering to a different topic with maximum delivery attempts set to 10.

### Answer: D

#### Explanation:

D. Use exponential backoff as the subscription retry policy, and configure dead lettering to a different topic with maximum delivery attempts set to 10.

### Question: 291

CertyIQ

You designed a data warehouse in BigQuery to analyze sales data. You want a self-serving, low-maintenance, and cost-effective solution to share the sales dataset to other business units in your organization. What should you do?

- A. Create an Analytics Hub private exchange, and publish the sales dataset.

- B.Enable the other business units' projects to access the authorized views of the sales dataset.
- C.Create and share views with the users in the other business units.
- D.Use the BigQuery Data Transfer Service to create a schedule that copies the sales dataset to the other business units' projects.

**Answer: A**

**Explanation:**

- A. Create an Analytics Hub private exchange, and publish the sales dataset.

**CertyIQ**

You have terabytes of customer behavioral data streaming from Google Analytics into BigQuery daily. Your customers' information, such as their preferences, is hosted on a Cloud SQL for MySQL database. Your CRM database is hosted on a Cloud SQL for PostgreSQL instance. The marketing team wants to use your customers' information from the two databases and the customer behavioral data to create marketing campaigns for yearly active customers. You need to ensure that the marketing team can run the campaigns over 100 times a day on typical days and up to 300 during sales. At the same time, you want to keep the load on the Cloud SQL databases to a minimum. What should you do?

- A.Create BigQuery connections to both Cloud SQL databases. Use BigQuery federated queries on the two databases and the Google Analytics data on BigQuery to run these queries.
- B.Create a job on Apache Spark with Dataproc Serverless to query both Cloud SQL databases and the Google Analytics data on BigQuery for these queries.
- C.Create streams in Datastream to replicate the required tables from both Cloud SQL databases to BigQuery for these queries.
- D.Create a Dataproc cluster with Trino to establish connections to both Cloud SQL databases and BigQuery, to execute the queries.

**Answer: C**

**Explanation:**

- C. Create streams in Data stream to replicate the required tables from both Cloud SQL databases to Big Query for these queries.

**CertyIQ**

Your organization is modernizing their IT services and migrating to Google Cloud. You need to organize the data that will be stored in Cloud Storage and BigQuery. You need to enable a data mesh approach to share the data between sales, product design, and marketing departments. What should you do?

- A.1. Create a project for storage of the data for each of your departments.
- 2. Enable each department to create Cloud Storage buckets and BigQuery datasets.
- 3. Create user groups for authorized readers for each bucket and dataset.
- 4. Enable the IT team to administer the user groups to add or remove users as the departments' request.
- B.1. Create multiple projects for storage of the data for each of your departments' applications.
- 2. Enable each department to create Cloud Storage buckets and BigQuery datasets.
- 3. Publish the data that each department shared in Analytics Hub.
- 4. Enable all departments to discover and subscribe to the data they need in Analytics Hub.
- C.1. Create a project for storage of the data for your organization.
- 2. Create a central Cloud Storage bucket with three folders to store the files for each department.
- 3. Create a central BigQuery dataset with tables prefixed with the department name.
- 4. Give viewer rights for the storage project for the users of your departments.

- D.1. Create multiple projects for storage of the data for each of your departments' applications.
2. Enable each department to create Cloud Storage buckets and BigQuery datasets.
3. In Dataplex, map each department to a data lake and the Cloud Storage buckets, and map the BigQuery datasets to zones.
4. Enable each department to own and share the data of their data lakes.

**Answer: D****Explanation:**

Decentralized ownership: Each department controls its data lake, aligning with the core principle of data ownership in a data mesh.- Self-service data access: Departments can create and manage their own Cloud Storage buckets and BigQuery datasets within their data lakes, enabling self-service data access.-

Interdepartmental sharing: Dataplex facilitates data sharing by enabling departments to publish their data products from their data lakes, making it easily discoverable and usable by other departments.

**Question: 294****CertyIQ**

You work for a large ecommerce company. You are using Pub/Sub to ingest the clickstream data to Google Cloud for analytics. You observe that when a new subscriber connects to an existing topic to analyze data, they are unable to subscribe to older data. For an upcoming yearly sale event in two months, you need a solution that, once implemented, will enable any new subscriber to read the last 30 days of data. What should you do?

- A.Create a new topic, and publish the last 30 days of data each time a new subscriber connects to an existing topic.
- B.Set the topic retention policy to 30 days.
- C.Set the subscriber retention policy to 30 days.
- D.Ask the source system to re-push the data to Pub/Sub, and subscribe to it.

**Answer: B****Explanation:**

- B. Set the topic retention policy to 30 days.

**Question: 295****CertyIQ**

You are designing the architecture to process your data from Cloud Storage to BigQuery by using Dataflow. The network team provided you with the Shared VPC network and subnetwork to be used by your pipelines. You need to enable the deployment of the pipeline on the Shared VPC network. What should you do?

- A.Assign the compute.networkUser role to the Dataflow service agent.
- B.Assign the compute.networkUser role to the service account that executes the Dataflow pipeline.
- C.Assign the dataflow.admin role to the Dataflow service agent.
- D.Assign the dataflow.admin role to the service account that executes the Dataflow pipeline.

**Answer: A****Explanation:**

Assign the compute.networkUser role to the Dataflow service agent.

**Question: 296**

CertyIQ

Your infrastructure team has set up an interconnect link between Google Cloud and the on-premises network. You are designing a high-throughput streaming pipeline to ingest data in streaming from an Apache Kafka cluster hosted on-premises. You want to store the data in BigQuery, with as minimal latency as possible. What should you do?

- A. Setup a Kafka Connect bridge between Kafka and Pub/Sub. Use a Google-provided Dataflow template to read the data from Pub/Sub, and write the data to BigQuery.
- B. Use a proxy host in the VPC in Google Cloud connecting to Kafka. Write a Dataflow pipeline, read data from the proxy host, and write the data to BigQuery.
- C. Use Dataflow, write a pipeline that reads the data from Kafka, and writes the data to BigQuery.
- D. Setup a Kafka Connect bridge between Kafka and Pub/Sub. Write a Dataflow pipeline, read the data from Pub/Sub, and write the data to BigQuery.

**Answer: C****Explanation:**

Use Dataflow, write a pipeline that reads the data from Kafka, and writes the data to BigQuery.

**Question: 297**

CertyIQ

You migrated your on-premises Apache Hadoop Distributed File System (HDFS) data lake to Cloud Storage. The data scientist team needs to process the data by using Apache Spark and SQL. Security policies need to be enforced at the column level. You need a cost-effective solution that can scale into a data mesh. What should you do?

- A.1. Deploy a long-living Dataproc cluster with Apache Hive and Ranger enabled.  
2. Configure Ranger for column level security.  
3. Process with Dataproc Spark or Hive SQL.
- B.1. Define a BigLake table.  
2. Create a taxonomy of policy tags in Data Catalog.  
3. Add policy tags to columns.  
4. Process with the Spark-BigQuery connector or BigQuery SQL.
- C.1. Load the data to BigQuery tables.  
2. Create a taxonomy of policy tags in Data Catalog.  
3. Add policy tags to columns.  
4. Process with the Spark-BigQuery connector or BigQuery SQL.
- D.1. Apply an Identity and Access Management (IAM) policy at the file level in Cloud Storage.  
2. Define a BigQuery external table for SQL processing.  
3. Use Dataproc Spark to process the Cloud Storage files.

**Answer: B****Explanation:**

- 1. Define a BigLake table.
- 2. Create a taxonomy of policy tags in Data Catalog.
- 3. Add policy tags to columns.
- 4. Process with the Spark-BigQuery connector or BigQuery SQL.

## Question: 298

CertyIQ

One of your encryption keys stored in Cloud Key Management Service (Cloud KMS) was exposed. You need to re-encrypt all of your CMEK-protected Cloud Storage data that used that key, and then delete the compromised key. You also want to reduce the risk of objects getting written without customer-managed encryption key (CMEK) protection in the future. What should you do?

- A.Rotate the Cloud KMS key version. Continue to use the same Cloud Storage bucket.
- B.Create a new Cloud KMS key. Set the default CMEK key on the existing Cloud Storage bucket to the new one.
- C.Create a new Cloud KMS key. Create a new Cloud Storage bucket. Copy all objects from the old bucket to the new one bucket while specifying the new Cloud KMS key in the copy command.
- D.Create a new Cloud KMS key. Create a new Cloud Storage bucket configured to use the new key as the default CMEK key. Copy all objects from the old bucket to the new bucket without specifying a key.

**Answer: D**

**Explanation:**

Create a new Cloud KMS key. Create a new Cloud Storage bucket configured to use the new key as the default CMEK key. Copy all objects from the old bucket to the new bucket without specifying a key.

## Question: 299

CertyIQ

You have an upstream process that writes data to Cloud Storage. This data is then read by an Apache Spark job that runs on Dataproc. These jobs are run in the us-central1 region, but the data could be stored anywhere in the United States. You need to have a recovery process in place in case of a catastrophic single region failure. You need an approach with a maximum of 15 minutes of data loss (RPO=15 mins). You want to ensure that there is minimal latency when reading the data. What should you do?

- A.1. Create two regional Cloud Storage buckets, one in the us-central1 region and one in the us-south1 region.  
2. Have the upstream process write data to the us-central1 bucket. Use the Storage Transfer Service to copy data hourly from the us-central1 bucket to the us-south1 bucket.  
3. Run the Dataproc cluster in a zone in the us-central1 region, reading from the bucket in that region.  
4. In case of regional failure, redeploy your Dataproc clusters to the us-south1 region and read from the bucket in that region instead.
- B.1. Create a Cloud Storage bucket in the US multi-region.  
2. Run the Dataproc cluster in a zone in the us-central1 region, reading data from the US multi-region bucket.  
3. In case of a regional failure, redeploy the Dataproc cluster to the us-central2 region and continue reading from the same bucket.
- C.1. Create a dual-region Cloud Storage bucket in the us-central1 and us-south1 regions.  
2. Enable turbo replication.  
3. Run the Dataproc cluster in a zone in the us-central1 region, reading from the bucket in the us-south1 region.  
4. In case of a regional failure, redeploy your Dataproc cluster to the us-south1 region and continue reading from the same bucket.
- D.1. Create a dual-region Cloud Storage bucket in the us-central1 and us-south1 regions.  
2. Enable turbo replication.  
3. Run the Dataproc cluster in a zone in the us-central1 region, reading from the bucket in the same region.  
4. In case of a regional failure, redeploy the Dataproc clusters to the us-south1 region and read from the same bucket.

**Answer: D**

**Explanation:**

1. - Rapid Replication: Turbo replication ensures near-real-time data synchronization between regions, achieving an RPO of 15 minutes or less.- Minimal Latency: Dataproc clusters can read from the bucket in the same region, minimizing data transfer latency and optimizing performance.- Disaster Recovery: In case of regional failure, Dataproc clusters can seamlessly redeploy to the other region and continue reading from the

same bucket, ensuring business continuity.

2. D. 1. Create a dual-region Cloud Storage bucket in the us-central1 and us-south1 regions.
2. Enable turbo replication.
3. Run the Dataproc cluster in a zone in the us-central1 region, reading from the bucket in the same region.
4. In case of a regional failure, redeploy the Dataproc clusters to the us-south1 region and read from the same bucket.

### Question: 300

CertyIQ

You currently have transactional data stored on-premises in a PostgreSQL database. To modernize your data environment, you want to run transactional workloads and support analytics needs with a single database. You need to move to Google Cloud without changing database management systems, and minimize cost and complexity. What should you do?

- A. Migrate and modernize your database with Cloud Spanner.
- B. Migrate your workloads to AlloyDB for PostgreSQL.
- C. Migrate to BigQuery to optimize analytics.
- D. Migrate your PostgreSQL database to Cloud SQL for PostgreSQL.

#### Answer: D

#### Explanation:

Migrate your PostgreSQL database to Cloud SQL for PostgreSQL.

### Question: 301

CertyIQ

You are architecting a data transformation solution for BigQuery. Your developers are proficient with SQL and want to use the ELT development technique. In addition, your developers need an intuitive coding environment and the ability to manage SQL as code. You need to identify a solution for your developers to build these pipelines. What should you do?

- A. Use Dataform to build, manage, and schedule SQL pipelines.
- B. Use Dataflow jobs to read data from Pub/Sub, transform the data, and load the data to BigQuery.
- C. Use Data Fusion to build and execute ETL pipelines.
- D. Use Cloud Composer to load data and run SQL pipelines by using the BigQuery job operators.

#### Answer: A

#### Explanation:

A. Use Dataform to build, manage, and schedule SQL pipelines.

### Question: 302

CertyIQ

You work for a farming company. You have one BigQuery table named sensors, which is about 500 MB and contains the list of your 5000 sensors, with columns for id, name, and location. This table is updated every hour. Each sensor generates one metric every 30 seconds along with a timestamp, which you want to store in BigQuery. You want to run an analytical query on the data once a week for monitoring purposes. You also want to minimize costs. What data model should you use?

- A.1. Create a metrics column in the sensors table.
- 2. Set RECORD type and REPEATED mode for the metrics column.

3. Use an UPDATE statement every 30 seconds to add new metrics.
  - B.1. Create a metrics column in the sensors table.
  2. Set RECORD type and REPEATED mode for the metrics column.
  3. Use an INSERT statement every 30 seconds to add new metrics.
- C.1. Create a metrics table partitioned by timestamp.
2. Create a sensorId column in the metrics table, that points to the id column in the sensors table.
3. Use an INSERT statement every 30 seconds to append new metrics to the metrics table.
4. Join the two tables, if needed, when running the analytical query.
- D.1. Create a metrics table partitioned by timestamp.
2. Create a sensorId column in the metrics table, which points to the id column in the sensors table.
3. Use an UPDATE statement every 30 seconds to append new metrics to the metrics table.
4. Join the two tables, if needed, when running the analytical query.

**Answer: C**

**Explanation:**

C. 1. Create a metrics table partitioned by timestamp.2. Create a sensorId column in the metrics table, that points to the id column in the sensors table.3. Use an INSERT statement every 30 seconds to append new metrics to the metrics table.4. Join the two tables, if needed, when running the analytical query.

**Question: 303**

**CertyIQ**

You are managing a Dataplex environment with raw and curated zones. A data engineering team is uploading JSON and CSV files to a bucket asset in the curated zone but the files are not being automatically discovered by Dataplex. What should you do to ensure that the files are discovered by Dataplex?

- A.Move the JSON and CSV files to the raw zone.
- B.Enable auto-discovery of files for the curated zone.
- C.Use the bg command-line tool to load the JSON and CSV files into BigQuery tables.
- D.Grant object level access to the CSV and JSON files in Cloud Storage.

**Answer: A**

**Explanation:**

Move the JSON and CSV files to the raw zone.

**Question: 304**

**CertyIQ**

You have a table that contains millions of rows of sales data, partitioned by date. Various applications and users query this data many times a minute. The query requires aggregating values by using AVG, MAX, and SUM, and does not require joining to other tables. The required aggregations are only computed over the past year of data, though you need to retain full historical data in the base tables. You want to ensure that the query results always include the latest data from the tables, while also reducing computation cost, maintenance overhead, and duration. What should you do?

- A.Create a materialized view to aggregate the base table data. Include a filter clause to specify the last one year of partitions.
- B.Create a materialized view to aggregate the base table data. Configure a partition expiration on the base table to retain only the last one year of partitions.
- C.Create a view to aggregate the base table data. Include a filter clause to specify the last year of partitions.
- D.Create a new table that aggregates the base table data. Include a filter clause to specify the last year of partitions. Set up a scheduled query to recreate the new table every hour.

**Answer: A****Explanation:**

Create a materialized view to aggregate the base table data. Include a filter clause to specify the last one year of partitions.

**CertyIQ****Question: 305**

Your organization uses a multi-cloud data storage strategy, storing data in Cloud Storage, and data in Amazon Web Services' (AWS) S3 storage buckets. All data resides in US regions. You want to query up-to-date data by using BigQuery, regardless of which cloud the data is stored in. You need to allow users to query the tables from BigQuery without giving direct access to the data in the storage buckets. What should you do?

- A. Setup a BigQuery Omni connection to the AWS S3 bucket data. Create BigLake tables over the Cloud Storage and S3 data and query the data using BigQuery directly.
- B. Set up a BigQuery Omni connection to the AWS S3 bucket data. Create external tables over the Cloud Storage and S3 data and query the data using BigQuery directly.
- C. Use the Storage Transfer Service to copy data from the AWS S3 buckets to Cloud Storage buckets. Create BigLake tables over the Cloud Storage data and query the data using BigQuery directly.
- D. Use the Storage Transfer Service to copy data from the AWS S3 buckets to Cloud Storage buckets. Create external tables over the Cloud Storage data and query the data using BigQuery directly.

**Answer: A****Explanation:**

BigQuery Omni: This is an extension of BigQuery that allows you to analyze data across Google Cloud, AWS, and Azure without having to manage the infrastructure or move data across clouds. It's suitable for querying data stored in AWS S3 buckets directly.- BigLake: Allows you to create a logical abstraction (table) over data stored in Cloud Storage and S3, so you can query data using BigQuery without moving it.- Unified Querying: By setting up BigQuery Omni to connect to AWS S3 and creating BigLake tables over both Cloud Storage and S3 data, you can query all data using BigQuery directly.

**CertyIQ****Question: 306**

You are preparing an organization-wide dataset. You need to preprocess customer data stored in a restricted bucket in Cloud Storage. The data will be used to create consumer analyses. You need to comply with data privacy requirements.

What should you do?

- A. Use Dataflow and the Cloud Data Loss Prevention API to mask sensitive data. Write the processed data in BigQuery.
- B. Use customer-managed encryption keys (CMEK) to directly encrypt the data in Cloud Storage. Use federated queries from BigQuery. Share the encryption key by following the principle of least privilege.
- C. Use the Cloud Data Loss Prevention API and Dataflow to detect and remove sensitive fields from the data in Cloud Storage. Write the filtered data in BigQuery.
- D. Use Dataflow and Cloud KMS to encrypt sensitive fields and write the encrypted data in BigQuery. Share the encryption key by following the principle of least privilege.

**Answer: A****Explanation:**

A. Use Dataflow and the Cloud Data Loss Prevention API to mask sensitive data. Write the processed data in BigQuery.

### Question: 307

CertyIQ

You need to connect multiple applications with dynamic public IP addresses to a Cloud SQL instance. You configured users with strong passwords and enforced the SSL connection to your Cloud SQL instance. You want to use Cloud SQL public IP and ensure that you have secured connections. What should you do?

- A.Add CIDR 0.0.0.0/0 network to Authorized Network. Use Identity and Access Management (IAM) to add users.
- B.Add all application networks to Authorized Network and regularly update them.
- C.Leave the Authorized Network empty. Use Cloud SQL Auth proxy on all applications.
- D.Add CIDR 0.0.0.0/0 network to Authorized Network. Use Cloud SQL Auth proxy on all applications.

**Answer: C**

**Explanation:**

C. Leave the Authorized Network empty. Use Cloud SQL Auth proxy on all applications.

### Question: 308

CertyIQ

You are migrating a large number of files from a public HTTPS endpoint to Cloud Storage. The files are protected from unauthorized access using signed URLs. You created a TSV file that contains the list of object URLs and started a transfer job by using Storage Transfer Service. You notice that the job has run for a long time and eventually failed. Checking the logs of the transfer job reveals that the job was running fine until one point, and then it failed due to HTTP 403 errors on the remaining files. You verified that there were no changes to the source system. You need to fix the problem to resume the migration process. What should you do?

- A.Set up Cloud Storage FUSE, and mount the Cloud Storage bucket on a Compute Engine instance. Remove the completed files from the TSV file. Use a shell script to iterate through the TSV file and download the remaining URLs to the FUSE mount point.
- B.Renew the TLS certificate of the HTTPS endpoint. Remove the completed files from the TSV file and rerun the Storage Transfer Service job.
- C.Create a new TSV file for the remaining files by generating signed URLs with a longer validity period. Split the TSV file into multiple smaller files and submit them as separate Storage Transfer Service jobs in parallel.
- D.Update the file checksums in the TSV file from using MD5 to SHA256. Remove the completed files from the TSV file and rerun the Storage Transfer Service job.

**Answer: C**

**Explanation:**

C. Create a new TSV file for the remaining files by generating signed URLs with a longer validity period. Split the TSV file into multiple smaller files and submit them as separate Storage Transfer Service jobs in parallel.

### Question: 309

CertyIQ

You work for an airline and you need to store weather data in a BigQuery table. Weather data will be used as input to a machine learning model. The model only uses the last 30 days of weather data. You want to avoid storing unnecessary data and minimize costs. What should you do?

- A.Create a BigQuery table where each record has an ingestion timestamp. Run a scheduled query to delete all the rows with an ingestion timestamp older than 30 days.
- B.Create a BigQuery table partitioned by datetime value of the weather date. Set up partition expiration to 30 days.
- C.Create a BigQuery table partitioned by ingestion time. Set up partition expiration to 30 days.
- D.Create a BigQuery table with a datetime column for the day the weather data refers to. Run a scheduled query to delete rows with a datetime value older than 30 days.

**Answer: B**

**Explanation:**

Create a BigQuery table partitioned by datetime value of the weather date. Set up partition expiration to 30 days.

### Question: 310

**CertyIQ**

You need to look at BigQuery data from a specific table multiple times a day. The underlying table you are querying is several petabytes in size, but you want to filter your data and provide simple aggregations to downstream users. You want to run queries faster and get up-to-date insights quicker. What should you do?

- A.Run a scheduled query to pull the necessary data at specific intervals daily.
- B.Use a cached query to accelerate time to results.
- C.Limit the query columns being pulled in the final result.
- D.Create a materialized view based off of the query being run.

**Answer: D**

**Explanation:**

Create a materialized view based off of the query being run.

### Question: 311

**CertyIQ**

Your chemical company needs to manually check documentation for customer order. You use a pull subscription in Pub/Sub so that sales agents get details from the order. You must ensure that you do not process orders twice with different sales agents and that you do not add more complexity to this workflow. What should you do?

- A.Use a Deduplicate PTransform in Dataflow before sending the messages to the sales agents.
- B.Create a transactional database that monitors the pending messages.
- C.Use Pub/Sub exactly-once delivery in your pull subscription.
- D.Create a new Pub/Sub push subscription to monitor the orders processed in the agent's system.

**Answer: C**

**Explanation:**

Use Pub/Sub exactly-once delivery in your pull subscription.

### Question: 312

**CertyIQ**

Suppose you have a table that includes a nested column called "city" inside a column called "person", but when you try to submit the following query in BigQuery, it gives you an error.  
SELECT person FROM `project1.example.table1` WHERE city = "London"  
How would you correct the error?

- A. Add ", UNNEST(person)" before the WHERE clause.
- B. Change "person" to "person.city".
- C. Change "person" to "city.person".
- D. Add ", UNNEST(city)" before the WHERE clause.

**Answer: B**

**Explanation:**

They are referring to a struct and not a repeated field. No need to unnest

### Question: 313

CertyIQ

What are two of the benefits of using denormalized data structures in BigQuery?

- A. Reduces the amount of data processed, reduces the amount of storage required
- B. Increases query speed, makes queries simpler
- C. Reduces the amount of storage required, increases query speed
- D. Reduces the amount of data processed, increases query speed

**Answer: B**

**Explanation:**

Denormalization increases query speed for tables with billions of rows because BigQuery's performance degrades when doing JOINs on large tables, but with a denormalized data structure, you don't have to use JOINs, since all of the data has been combined into one table. Denormalization also makes queries simpler because you do not have to use JOIN clauses.

Denormalization increases the amount of data processed and the amount of storage required because it creates redundant data.

Reference: [https://cloud.google.com/solutions/bigquery-data-warehouse#denormalizing\\_data](https://cloud.google.com/solutions/bigquery-data-warehouse#denormalizing_data)

### Question: 314

CertyIQ

Which of these statements about exporting data from BigQuery is false?

- A. To export more than 1 GB of data, you need to put a wildcard in the destination filename.
- B. The only supported export destination is Google Cloud Storage.
- C. Data can only be exported in JSON or Avro format.
- D. The only compression option available is GZIP.

**Answer: C**

**Explanation:**

Data can be exported in CSV, JSON, or Avro format. If you are exporting nested or repeated data, then CSV format is not supported.

Reference:

<https://cloud.google.com/bigquery/docs/exporting-data>

CertyIQ

### Question: 315

What are all of the BigQuery operations that Google charges for?

- A. Storage, queries, and streaming inserts
- B. Storage, queries, and loading data from a file
- C. Storage, queries, and exporting data
- D. Queries and streaming inserts

Answer: A

Explanation:

Google charges for storage, queries, and streaming inserts. Loading data from a file and exporting data are free operations.

Reference: <https://cloud.google.com/bigquery/pricing>

CertyIQ

### Question: 316

Which of the following is not possible using primitive roles?

- A. Give a user viewer access to BigQuery and owner access to Google Compute Engine instances.
- B. Give UserA owner access and UserB editor access for all datasets in a project.
- C. Give a user access to view all datasets in a project, but not run queries on them.
- D. Give GroupA owner access and GroupB editor access for all datasets in a project.

Answer: C

Explanation:

Primitive roles can be used to give owner, editor, or viewer access to a user or group, but they can't be used to separate data access permissions from job-running permissions.

Reference:

[https://cloud.google.com/bigquery/docs/access-control#primitive\\_iam\\_roles](https://cloud.google.com/bigquery/docs/access-control#primitive_iam_roles)

CertyIQ

### Question: 317

Which of these statements about BigQuery caching is true?

- A. By default, a query's results are not cached.
- B. BigQuery caches query results for 48 hours.
- C. Query results are cached even if you specify a destination table.
- D. There is no charge for a query that retrieves its results from cache.

Answer: D

**Explanation:**

When query results are retrieved from a cached results table, you are not charged for the query.

BigQuery caches query results for 24 hours, not 48 hours.

Query results are not cached if you specify a destination table.

A query's results are always cached except under certain conditions, such as if you specify a destination table.

**Reference:**

<https://cloud.google.com/bigquery/querying-data#query-caching>

**CertyIQ****Question: 318**

Which of these sources can you not load data into BigQuery from?

- A. File upload
- B. Google Drive
- C. Google Cloud Storage
- D. Google Cloud SQL

**Answer: D****Explanation:**

You can load data into BigQuery from a file upload, Google Cloud Storage, Google Drive, or Google Cloud Bigtable. It is not possible to load data into BigQuery directly from Google Cloud SQL. One way to get data from Cloud SQL to BigQuery would be to export data from Cloud SQL to Cloud Storage and then load it from there.

**Reference:**

<https://cloud.google.com/bigquery/loading-data>

**CertyIQ****Question: 319**

Which of the following statements about Legacy SQL and Standard SQL is not true?

- A. Standard SQL is the preferred query language for BigQuery.
- B. If you write a query in Legacy SQL, it might generate an error if you try to run it with Standard SQL.
- C. One difference between the two query languages is how you specify fully-qualified table names (i.e. table names that include their associated project name).
- D. You need to set a query language for each dataset and the default is Standard SQL.

**Answer: D****Explanation:**

You do not set a query language for each dataset. It is set each time you run a query and the default query language is Legacy SQL.

Standard SQL has been the preferred query language since BigQuery 2.0 was released.

In legacy SQL, to query a table with a project-qualified name, you use a colon, :, as a separator. In standard SQL, you use a period, ., instead.

Due to the differences in syntax between the two query languages (such as with project-qualified table names), if you write a query in Legacy SQL, it might generate an error if you try to run it with Standard SQL.

Reference:

<https://cloud.google.com/bigquery/docs/reference/standard-sql/migrating-from-legacy-sql>

CertyIQ

### Question: 320

How would you query specific partitions in a BigQuery table?

- A. Use the DAY column in the WHERE clause
- B. Use the EXTRACT(DAY) clause
- C. Use the \_\_PARTITIONTIME pseudo-column in the WHERE clause
- D. Use DATE BETWEEN in the WHERE clause

**Answer: C**

**Explanation:**

Partitioned tables include a pseudo column named \_\_PARTITIONTIME that contains a date-based timestamp for data loaded into the table. To limit a query to particular partitions (such as Jan 1st and 2nd of 2017), use a clause similar to this:

```
WHERE __PARTITIONTIME BETWEEN TIMESTAMP('2017-01-01') AND TIMESTAMP('2017-01-02')
```

Reference:

[https://cloud.google.com/bigquery/docs/partitioned-tables#the\\_partitiontime\\_pseudo\\_column](https://cloud.google.com/bigquery/docs/partitioned-tables#the_partitiontime_pseudo_column)

CertyIQ

### Question: 321

Which SQL keyword can be used to reduce the number of columns processed by BigQuery?

- A. BETWEEN
- B. WHERE
- C. SELECT
- D. LIMIT

**Answer: C**

**Explanation:**

SELECT allows you to query specific columns rather than the whole table.

LIMIT, BETWEEN, and WHERE clauses will not reduce the number of columns processed by BigQuery.

Reference: [https://cloud.google.com/bigquery/launch-checklist#architecture\\_design\\_and\\_development\\_checklist](https://cloud.google.com/bigquery/launch-checklist#architecture_design_and_development_checklist)

CertyIQ

### Question: 322

To give a user read permission for only the first three columns of a table, which access control method would you use?

- A. Primitive role
- B. Predefined role
- C. Authorized view
- D. It's not possible to give access to only the first three columns of a table.

**Answer: C**

**Explanation:**

An authorized view allows you to share query results with particular users and groups without giving them read access to the underlying tables. Authorized views can only be created in a dataset that does not contain the tables queried by the view.

When you create an authorized view, you use the view's SQL query to restrict access to only the rows and columns you want the users to see.

Reference:

<https://cloud.google.com/bigquery/docs/views#authorized-views>

**CertyIQ**

**Question: 323**

What are two methods that can be used to denormalize tables in BigQuery?

- A. 1) Split table into multiple tables; 2) Use a partitioned table
- B. 1) Join tables into one table; 2) Use nested repeated fields
- C. 1) Use a partitioned table; 2) Join tables into one table
- D. 1) Use nested repeated fields; 2) Use a partitioned table

**Answer: B**

**Explanation:**

The conventional method of denormalizing data involves simply writing a fact, along with all its dimensions, into a flat table structure. For example, if you are dealing with sales transactions, you would write each individual fact to a record, along with the accompanying dimensions such as order and customer information.

The other method for denormalizing data takes advantage of BigQuery's native support for nested and repeated structures in JSON or Avro input data. Expressing records using nested and repeated structures can provide a more natural representation of the underlying data. In the case of the sales order, the outer part of a

JSON structure would contain the order and customer information, and the inner part of the structure would contain the individual line items of the order, which would be represented as nested, repeated elements.

Reference:

[https://cloud.google.com/solutions/bigquery-data-warehouse#denormalizing\\_data](https://cloud.google.com/solutions/bigquery-data-warehouse#denormalizing_data)

**CertyIQ**

**Question: 324**

Which of these is not a supported method of putting data into a partitioned table?

- A. If you have existing data in a separate file for each day, then create a partitioned table and upload each file into the appropriate partition.
- B. Run a query to get the records for a specific day from an existing table and for the destination table, specify a partitioned table ending with the day in the format "\$YYYYMMDD".
- C. Create a partitioned table and stream new records to it every day.
- D. Use ORDER BY to put a table's rows into chronological order and then change the table's type to "Partitioned".

**Answer: D**

**Explanation:**

You cannot change an existing table into a partitioned table. You must create a partitioned table from scratch. Then you can either stream data into it every day and the data will automatically be put in the right partition, or you can load data into a specific partition by using "\$YYYYMMDD" at the end of the table name.

Reference: <https://cloud.google.com/bigquery/docs/partitioned-tables>

**Question: 325**

**CertyIQ**

Which of these operations can you perform from the BigQuery Web UI?

- A. Upload a file in SQL format.
- B. Load data with nested and repeated fields.
- C. Upload a 20 MB file.
- D. Upload multiple files using a wildcard.

**Answer: B**

**Explanation:**

You can load data with nested and repeated fields using the Web UI.

You cannot use the Web UI to:

- Upload a file greater than 10 MB in size
- Upload multiple files at the same time
- Upload a file in SQL format

All three of the above operations can be performed using the "bq" command.

Reference: <https://cloud.google.com/bigquery/loading-data>

**Question: 326**

**CertyIQ**

Which methods can be used to reduce the number of rows processed by BigQuery?

- A. Splitting tables into multiple tables; putting data in partitions
- B. Splitting tables into multiple tables; putting data in partitions; using the LIMIT clause
- C. Putting data in partitions; using the LIMIT clause
- D. Splitting tables into multiple tables; using the LIMIT clause

**Answer: A**

**Explanation:**

If you split a table into multiple tables (such as one table for each day), then you can limit your query to the data in specific tables (such as for particular days). A better method is to use a partitioned table, as long as

your data can be separated by the day.

If you use the LIMIT clause, BigQuery will still process the entire table.

Reference: <https://cloud.google.com/bigquery/docs/partitioned-tables>

CertyIQ

### Question: 327

Why do you need to split a machine learning dataset into training data and test data?

- A. So you can try two different sets of features
- B. To make sure your model is generalized for more than just the training data
- C. To allow you to create unit tests in your code
- D. So you can use one dataset for a wide model and one for a deep model

### Answer: B

#### Explanation:

The flaw with evaluating a predictive model on training data is that it does not inform you on how well the model has generalized to new unseen data. A model that is selected for its accuracy on the training dataset rather than its accuracy on an unseen test dataset is very likely to have lower accuracy on an unseen test dataset. The reason is that the model is not as generalized. It has specialized to the structure in the training dataset. This is called overfitting.

Reference: <https://machinelearningmastery.com/a-simple-intuition-for-overfitting/>

CertyIQ

### Question: 328

Which of these numbers are adjusted by a neural network as it learns from a training dataset (select 2 answers)?

- A. Weights
- B. Biases
- C. Continuous features
- D. Input values

### Answer: AB

#### Explanation:

A neural network is a simple mechanism that's implemented with basic math. The only difference between the traditional programming model and a neural network is that you let the computer determine the parameters (weights and bias) by learning from training datasets.

Reference: <https://cloud.google.com/blog/big-data/2016/07/understanding-neural-networks-with-tensorflow-playground>

CertyIQ

### Question: 329

The CUSTOM tier for Cloud Machine Learning Engine allows you to specify the number of which types of cluster nodes?

- A. Workers
- B. Masters, workers, and parameter servers
- C. Workers and parameter servers
- D. Parameter servers

**Answer: C****Explanation:**

The CUSTOM tier is not a set tier, but rather enables you to use your own cluster specification. When you use this tier, set values to configure your processing cluster according to these guidelines:

You must set TrainingInput.masterType to specify the type of machine to use for your master node.

You may set TrainingInput.workerCount to specify the number of workers to use.

You may set TrainingInput.parameterServerCount to specify the number of parameter servers to use.

You can specify the type of machine for the master node, but you can't specify more than one master node.

Reference: [https://cloud.google.com/ml-engine/docs/training-overview#job\\_configuration\\_parameters](https://cloud.google.com/ml-engine/docs/training-overview#job_configuration_parameters)

**CertyIQ****Question: 330**

Which software libraries are supported by Cloud Machine Learning Engine?

- A. Theano and TensorFlow
- B. Theano and Torch
- C. TensorFlow
- D. TensorFlow and Torch

**Answer: C****Explanation:**

Cloud ML Engine mainly does two things:

Enables you to train machine learning models at scale by running TensorFlow training applications in the cloud.

Hosts those trained models for you in the cloud so that you can use them to get predictions about new data.

Reference: [https://cloud.google.com/ml-engine/docs/technical-overview#what\\_it\\_does](https://cloud.google.com/ml-engine/docs/technical-overview#what_it_does)

**CertyIQ****Question: 331**

Which TensorFlow function can you use to configure a categorical column if you don't know all of the possible values for that column?

- A. categorical\_column\_with\_vocabulary\_list
- B. categorical\_column\_with\_hash\_bucket
- C. categorical\_column\_with\_unknown\_values
- D. sparse\_column\_with\_keys

**Answer: B****Explanation:**

If you know the set of all possible feature values of a column and there are only a few of them, you can use categorical\_column\_with\_vocabulary\_list. Each key in the list will get assigned an auto-incremental ID starting from 0.

What if we don't know the set of possible values in advance? Not a problem. We can use categorical\_column\_with\_hash\_bucket instead. What will happen is that each possible value in the feature column occupation will be hashed to an integer ID as we encounter them in training.

Reference: <https://www.tensorflow.org/tutorials/wide>

**Question: 332**

CertyIQ

Which of the following statements about the Wide & Deep Learning model are true? (Select 2 answers.)

- A. The wide model is used for memorization, while the deep model is used for generalization.
- B. A good use for the wide and deep model is a recommender system.
- C. The wide model is used for generalization, while the deep model is used for memorization.
- D. A good use for the wide and deep model is a small-scale linear regression problem.

**Answer: AB****Explanation:**

Can we teach computers to learn like humans do, by combining the power of memorization and generalization? It's not an easy question to answer, but by jointly training a wide linear model (for memorization) alongside a deep neural network (for generalization), one can combine the strengths of both to bring us one step closer. At Google, we call it Wide & Deep Learning. It's useful for generic large-scale regression and classification problems with sparse inputs (categorical features with a large number of possible feature values), such as recommender systems, search, and ranking problems.

Reference: <https://research.googleblog.com/2016/06/wide-deep-learning-better-together-with.html>

**Question: 333**

CertyIQ

To run a TensorFlow training job on your own computer using Cloud Machine Learning Engine, what would your command start with?

- A. gcloud ml-engine local train
- B. gcloud ml-engine jobs submit training
- C. gcloud ml-engine jobs submit training local
- D. You can't run a TensorFlow program on your own computer using Cloud ML Engine .

**Answer: A****Explanation:**

gcloud ml-engine local train - run a Cloud ML Engine training job locally

This command runs the specified module in an environment similar to that of a live Cloud ML Engine Training Job.

This is especially useful in the case of testing distributed models, as it allows you to validate that you are properly interacting with the Cloud ML Engine cluster configuration.

Reference: <https://cloud.google.com/sdk/gcloud/reference/ml-engine/local/train>

**Question: 334**

CertyIQ

If you want to create a machine learning model that predicts the price of a particular stock based on its recent price history, what type of estimator should you use?

- A. Unsupervised learning
- B. Regressor
- C. Classifier
- D. Clustering estimator

**Answer: B**

**Explanation:**

Regression is the supervised learning task for modeling and predicting continuous, numeric variables.

Examples include predicting real-estate prices, stock price movements, or student test scores.

Classification is the supervised learning task for modeling and predicting categorical variables. Examples include predicting employee churn, email spam, financial fraud, or student letter grades.

Clustering is an unsupervised learning task for finding natural groupings of observations (i.e. clusters) based on the inherent structure within your dataset.

Examples include customer segmentation, grouping similar items in e-commerce, and social network analysis.

Reference: <https://elitedatascience.com/machine-learning-algorithms>

**CertyIQ****Question: 335**

Suppose you have a dataset of images that are each labeled as to whether or not they contain a human face. To create a neural network that recognizes human faces in images using this labeled dataset, what approach would likely be the most effective?

- A. Use K-means Clustering to detect faces in the pixels.
- B. Use feature engineering to add features for eyes, noses, and mouths to the input data.
- C. Use deep learning by creating a neural network with multiple hidden layers to automatically detect features of faces.
- D. Build a neural network with an input layer of pixels, a hidden layer, and an output layer with two categories.

**Answer: C****Explanation:**

Traditional machine learning relies on shallow nets, composed of one input and one output layer, and at most one hidden layer in between. More than three layers

(including input and output) qualifies as "deep" learning. So deep is a strictly defined, technical term that means more than one hidden layer.

In deep-learning networks, each layer of nodes trains on a distinct set of features based on the previous layers output. The further you advance into the neural net, the more complex the features your nodes can recognize, since they aggregate and recombine features from the previous layer.

A neural network with only one hidden layer would be unable to automatically recognize high-level features of faces, such as eyes, because it wouldn't be able to

"build" these features using previous hidden layers that detect low-level features, such as lines.

Feature engineering is difficult to perform on raw image data.

K-means Clustering is an unsupervised learning method used to categorize unlabeled data.

Reference: <https://deeplearning4j.org/neuralnet-overview>

**CertyIQ****Question: 336**

What are two of the characteristics of using online prediction rather than batch prediction?

- A. It is optimized to handle a high volume of data instances in a job and to run more complex models.
- B. Predictions are returned in the response message.
- C. Predictions are written to output files in a Cloud Storage location that you specify.

D. It is optimized to minimize the latency of serving predictions.

**Answer: BD**

**Explanation:**

Online prediction -

.Optimized to minimize the latency of serving predictions.

.Predictions returned in the response message.

Batch prediction -

.Optimized to handle a high volume of instances in a job and to run more complex models.

.Predictions written to output files in a Cloud Storage location that you specify.

Reference: [https://cloud.google.com/ml-engine/docs/prediction-overview#online\\_prediction\\_vs\\_batch\\_prediction](https://cloud.google.com/ml-engine/docs/prediction-overview#online_prediction_vs_batch_prediction)

**CertyIQ**

**Question: 337**

Which of these are examples of a value in a sparse vector? (Select 2 answers.)

- A. [0, 5, 0, 0, 0, 0]
- B. [0, 0, 0, 1, 0, 0, 1]
- C. [0, 1]
- D. [1, 0, 0, 0, 0, 0, 0]

**Answer: CD**

**Explanation:**

Categorical features in linear models are typically translated into a sparse vector in which each possible value has a corresponding index or id. For example, if there are only three possible eye colors you can represent 'eye\_color' as a length 3 vector: 'brown' would become [1, 0, 0], 'blue' would become [0, 1, 0] and

'green' would become [0, 0, 1]. These vectors are called "sparse" because they may be very long, with many zeros, when the set of possible values is very large

(such as all English words).

[0, 0, 0, 1, 0, 0, 1] is not a sparse vector because it has two 1s in it. A sparse vector contains only a single 1.

[0, 5, 0, 0, 0, 0] is not a sparse vector because it has a 5 in it. Sparse vectors only contain 0s and 1s.

Reference: [https://www.tensorflow.org/tutorials/linear#feature\\_columns\\_and\\_transformations](https://www.tensorflow.org/tutorials/linear#feature_columns_and_transformations)

**CertyIQ**

**Question: 338**

How can you get a neural network to learn about relationships between categories in a categorical feature?

- A. Create a multi-hot column
- B. Create a one-hot column
- C. Create a hash bucket
- D. Create an embedding column

**Answer: D****Explanation:**

There are two problems with one-hot encoding. First, it has high dimensionality, meaning that instead of having just one value, like a continuous feature, it has many values, or dimensions. This makes computation more time-consuming, especially if a feature has a very large number of categories. The second problem is that it doesn't encode any relationships between the categories. They are completely independent from each other, so the network has no way of knowing which ones are similar to each other.

Both of these problems can be solved by representing a categorical feature with an embedding column. The idea is that each category has a smaller vector with, let's say, 5 values in it. But unlike a one-hot vector, the values are not usually 0. The values are weights, similar to the weights that are used for basic features in a neural network. The difference is that each category has a set of weights (5 of them in this case).

You can think of each value in the embedding vector as a feature of the category. So, if two categories are very similar to each other, then their embedding vectors should be very similar too.

Reference: <https://cloudacademy.com/google/introduction-to-google-cloud-machine-learning-engine-course/a-wide-and-deep-model.html>

**CertyIQ****Question: 339**

If a dataset contains rows with individual people and columns for year of birth, country, and income, how many of the columns are continuous and how many are categorical?

- A. 1 continuous and 2 categorical
- B. 3 categorical
- C. 3 continuous
- D. 2 continuous and 1 categorical

**Answer: A****Explanation:**

It does not make sense for year to be "2022.5" so it has to be categorical.

Reference:

<https://cloud.google.com/automl-tables/docs/data-types#bq> It does not make sense for year to be "2022.5" so it has to be categorical.

**CertyIQ****Question: 340**

Which of the following are examples of hyperparameters? (Select 2 answers.)

- A. Number of hidden layers
- B. Number of nodes in each hidden layer
- C. Biases
- D. Weights

**Answer: AB****Explanation:**

If model parameters are variables that get adjusted by training with existing data, your hyperparameters are the variables about the training process itself. For example, part of setting up a deep neural network is

deciding how many "hidden" layers of nodes to use between the input layer and the output layer, as well as how many nodes each layer should use. These variables are not directly related to the training data at all. They are configuration variables. Another difference is that parameters change during a training job, while the hyperparameters are usually constant during a job.

Weights and biases are variables that get adjusted during the training process, so they are not hyperparameters.

Reference: <https://cloud.google.com/ml-engine/docs/hyperparameter-tuning-overview>

### Question: 341

CertyIQ

Which of the following are feature engineering techniques? (Select 2 answers)

- A. Hidden feature layers
- B. Feature prioritization
- C. Crossed feature columns
- D. Bucketization of a continuous feature

**Answer: CD**

**Explanation:**

Selecting and crafting the right set of feature columns is key to learning an effective model. Bucketization is a process of dividing the entire range of a continuous feature into a set of consecutive bins/buckets, and then converting the original numerical feature into a bucket ID (as a categorical feature) depending on which bucket that value falls into. Using each base feature column separately may not be enough to explain the data. To learn the differences between different feature combinations, we can add crossed feature columns to the model.

Reference:

[https://www.tensorflow.org/tutorials/wide#selecting\\_and\\_engineering\\_features\\_for\\_the\\_model](https://www.tensorflow.org/tutorials/wide#selecting_and_engineering_features_for_the_model)

### Question: 342

CertyIQ

You want to use a BigQuery table as a data sink. In which writing mode(s) can you use BigQuery as a sink?

- A. Both batch and streaming
- B. BigQuery cannot be used as a sink
- C. Only batch
- D. Only streaming

**Answer: A**

**Explanation:**

When you apply a BigQueryIO.Write transform in batch mode to write to a single table, Dataflow invokes a BigQuery load job. When you apply a BigQueryIO.Write transform in streaming mode or in batch mode using a function to specify the destination table, Dataflow uses BigQuery's streaming inserts

Reference: <https://cloud.google.com/dataflow/model/bigquery-io>

### Question: 343

CertyIQ

You have a job that you want to cancel. It is a streaming pipeline, and you want to ensure that any data that is in-

flight is processed and written to the output.

Which of the following commands can you use on the Dataflow monitoring console to stop the pipeline job?

- A. Cancel
- B. Drain
- C. Stop
- D. Finish

**Answer: B**

**Explanation:**

Using the Drain option to stop your job tells the Dataflow service to finish your job in its current state. Your job will immediately stop ingesting new data from input sources, but the Dataflow service will preserve any existing resources (such as worker instances) to finish processing and writing any buffered data in your pipeline.

Reference: <https://cloud.google.com/dataflow/pipelines/stopping-a-pipeline>

### Question: 344

CertyIQ

When running a pipeline that has a BigQuery source, on your local machine, you continue to get permission denied errors. What could be the reason for that?

- A. Your gcloud does not have access to the BigQuery resources
- B. BigQuery cannot be accessed from local machines
- C. You are missing gcloud on your machine
- D. Pipelines cannot be run locally

**Answer: A**

**Explanation:**

When reading from a Dataflow source or writing to a Dataflow sink using DirectPipelineRunner, the Cloud Platform account that you configured with the gcloud executable will need access to the corresponding source/sink

Reference: <https://cloud.google.com/dataflow/java-sdk/JavaDoc/com/google/cloud/dataflow/sdk/runners/DirectPipelineRunner>

### Question: 345

CertyIQ

What Dataflow concept determines when a Window's contents should be output based on certain criteria being met?

- A. Sessions
- B. OutputCriteria
- C. Windows
- D. Triggers

**Answer: D**

**Explanation:**

Triggers control when the elements for a specific key and window are output. As elements arrive, they are put into one or more windows by a Window transform and its associated WindowFn, and then passed to the associated Trigger to determine if the Windows contents should be output.

Reference: <https://cloud.google.com/dataflow/java-sdk/JavaDoc/com/google/cloud/dataflow/sdk/transforms/windowing/Trigger>

### Question: 346

CertyIQ

Which of the following is NOT one of the three main types of triggers that Dataflow supports?

- A. Trigger based on element size in bytes
- B. Trigger that is a combination of other triggers
- C. Trigger based on element count
- D. Trigger based on time

**Answer: A**

**Explanation:**

There are three major kinds of triggers that Dataflow supports: 1. Time-based triggers 2. Data-driven triggers. You can set a trigger to emit results from a window when that window has received a certain number of data elements. 3. Composite triggers. These triggers combine multiple time-based or data-driven triggers in some logical way

Reference: <https://cloud.google.com/dataflow/model/triggers>

### Question: 347

CertyIQ

Which Java SDK class can you use to run your Dataflow programs locally?

- A. LocalRunner
- B. DirectPipelineRunner
- C. MachineRunner
- D. LocalPipelineRunner

**Answer: B**

**Explanation:**

DirectPipelineRunner allows you to execute operations in the pipeline directly, without any optimization. Useful for small local execution and tests

Reference: <https://cloud.google.com/dataflow/java-sdk/JavaDoc/com/google/cloud/dataflow/sdk/runners/DirectPipelineRunner>

### Question: 348

CertyIQ

The Dataflow SDKs have been recently transitioned into which Apache service?

- A. Apache Spark
- B. Apache Hadoop
- C. Apache Kafka
- D. Apache Beam

**Answer: D**

**Explanation:**

**Question: 349**

The \_\_\_\_\_ for Cloud Bigtable makes it possible to use Cloud Bigtable in a Cloud Dataflow pipeline.

- A. Cloud Dataflow connector
- B. DataFlow SDK
- C. BigQuery API
- D. BigQuery Data Transfer Service

**Answer: A**

**Explanation:**

The Cloud Dataflow connector for Cloud Bigtable makes it possible to use Cloud Bigtable in a Cloud Dataflow pipeline. You can use the connector for both batch and streaming operations.

Reference: <https://cloud.google.com/bigtable/docs/dataflow-hbase>

**Question: 350**

Does Dataflow process batch data pipelines or streaming data pipelines?

- A. Only Batch Data Pipelines
- B. Both Batch and Streaming Data Pipelines
- C. Only Streaming Data Pipelines
- D. None of the above

**Answer: B**

**Explanation:**

Dataflow is a unified processing model, and can execute both streaming and batch data pipelines

Reference: <https://cloud.google.com/dataflow/>

**Question: 351**

You are planning to use Google's Dataflow SDK to analyze customer data such as displayed below. Your project requirement is to extract only the customer name from the data source and then write to an output PCollection.

Tom,555 X street -

Tim,553 Y street -

Sam, 111 Z street -

Which operation is best suited for the above data processing requirement?

- A. ParDo
- B. Sink API
- C. Source API
- D. Data extraction

**Answer: A****Explanation:**

In Google Cloud dataflow SDK, you can use the ParDo to extract only a customer name of each element in your PCollection.

Reference: <https://cloud.google.com/dataflow/model/par-do>

**CertyIQ****Question: 352**

Which Cloud Dataflow / Beam feature should you use to aggregate data in an unbounded data source every hour based on the time when the data entered the pipeline?

- A. An hourly watermark
- B. An event time trigger
- C. The with Allowed Lateness method
- D. A processing time trigger

**Answer: D****Explanation:**

When collecting and grouping data into windows, Beam uses triggers to determine when to emit the aggregated results of each window.

Processing time triggers. These triggers operate on the processing time the time when the data element is processed at any given stage in the pipeline.

Event time triggers. These triggers operate on the event time, as indicated by the timestamp on each data element. Beams default trigger is event time-based.

Reference: <https://beam.apache.org/documentation/programming-guide/#triggers>

**CertyIQ****Question: 353**

Which of the following is NOT true about Dataflow pipelines?

- A. Dataflow pipelines are tied to Dataflow, and cannot be run on any other runner
- B. Dataflow pipelines can consume data from other Google Cloud services
- C. Dataflow pipelines can be programmed in Java
- D. Dataflow pipelines use a unified programming model, so can work both with streaming and batch data sources

**Answer: A****Explanation:**

Dataflow pipelines can also run on alternate runtimes like Spark and Flink, as they are built using the Apache Beam SDKs

Reference: <https://cloud.google.com/dataflow/>

**CertyIQ****Question: 354**

You are developing a software application using Google's Dataflow SDK, and want to use conditional, for loops and other complex programming structures to create a branching pipeline. Which component will be used for the data processing operation?

- A. PCollection
- B. Transform
- C. Pipeline
- D. Sink API

**Answer: B**

**Explanation:**

In Google Cloud, the Dataflow SDK provides a transform component. It is responsible for the data processing operation. You can use conditional, for loops, and other complex programming structure to create a branching pipeline.

Reference: <https://cloud.google.com/dataflow/model/programming-model>

### Question: 355

CertyIQ

Which of the following IAM roles does your Compute Engine account require to be able to run pipeline jobs?

- A. dataflow.worker
- B. dataflow.compute
- C. dataflow.developer
- D. dataflow.viewer

**Answer: A**

**Explanation:**

The dataflow.worker role provides the permissions necessary for a Compute Engine service account to execute work units for a Dataflow pipeline

Reference: <https://cloud.google.com/dataflow/access-control>

### Question: 356

CertyIQ

Which of the following is not true about Dataflow pipelines?

- A. Pipelines are a set of operations
- B. Pipelines represent a data processing job
- C. Pipelines represent a directed graph of steps
- D. Pipelines can share data between instances

**Answer: D**

**Explanation:**

The data and transforms in a pipeline are unique to, and owned by, that pipeline. While your program can create multiple pipelines, pipelines cannot share data or transforms

Reference: <https://cloud.google.com/dataflow/model/pipelines>

### Question: 357

CertyIQ

By default, which of the following windowing behavior does Dataflow apply to unbounded data sets?

- A. Windows at every 100 MB of data

- B. Single, Global Window
- C. Windows at every 1 minute
- D. Windows at every 10 minutes

**Answer: B**

**Explanation:**

Dataflow's default windowing behavior is to assign all elements of a PCollection to a single, global window, even for unbounded PCollections

Reference: <https://cloud.google.com/dataflow/model/pcollection>

**CertyIQ**

**Question: 358**

Which of the following job types are supported by Cloud Dataproc (select 3 answers)?

- A. Hive
- B. Pig
- C. YARN
- D. Spark

**Answer: ABD**

**Explanation:**

Cloud Dataproc provides out-of-the box and end-to-end support for many of the most popular job types, including Spark, Spark SQL, PySpark, MapReduce, Hive, and Pig jobs.

Reference: [https://cloud.google.com/dataproc/docs/resources/faq#what\\_type\\_of\\_jobs\\_can\\_i\\_run](https://cloud.google.com/dataproc/docs/resources/faq#what_type_of_jobs_can_i_run)

**CertyIQ**

**Question: 359**

What are the minimum permissions needed for a service account used with Google Dataproc?

- A. Execute to Google Cloud Storage; write to Google Cloud Logging
- B. Write to Google Cloud Storage; read to Google Cloud Logging
- C. Execute to Google Cloud Storage; execute to Google Cloud Logging
- D. Read and write to Google Cloud Storage; write to Google Cloud Logging

**Answer: D**

**Explanation:**

Service accounts authenticate applications running on your virtual machine instances to other Google Cloud Platform services. For example, if you write an application that reads and writes files on Google Cloud Storage, it must first authenticate to the Google Cloud Storage API. At a minimum, service accounts used with Cloud Dataproc need permissions to read and write to Google Cloud Storage, and to write to Google Cloud Logging.

Reference: [https://cloud.google.com/dataproc/docs/concepts/service-accounts#important\\_notes](https://cloud.google.com/dataproc/docs/concepts/service-accounts#important_notes)

**CertyIQ**

**Question: 360**

Which role must be assigned to a service account used by the virtual machines in a Dataproc cluster so they can execute jobs?

- A. Dataproc Worker
- B. Dataproc Viewer
- C. Dataproc Runner
- D. Dataproc Editor

**Answer: A**

**Explanation:**

Service accounts used with Cloud Dataproc must have Dataproc/Dataproc Worker role (or have all the permissions granted by Dataproc Worker role).

Reference: [https://cloud.google.com/dataproc/docs/concepts/service-accounts#important\\_notes](https://cloud.google.com/dataproc/docs/concepts/service-accounts#important_notes)

### Question: 361

CertyIQ

When creating a new Cloud Dataproc cluster with the projects.regions.clusters.create operation, these four values are required: project, region, name, and \_\_\_\_.

- A. zone
- B. node
- C. label
- D. type

**Answer: A**

**Explanation:**

At a minimum, you must specify four values when creating a new cluster with the projects.regions.clusters.create operation:

The project in which the cluster will be created

The region to use -

The name of the cluster -

The zone in which the cluster will be created

You can specify many more details beyond these minimum requirements. For example, you can also specify the number of workers, whether preemptible compute should be used, and the network settings.

Reference: [https://cloud.google.com/dataproc/docs/tutorials/python-library-example#create\\_a\\_new\\_cloud\\_dataproc\\_cluste](https://cloud.google.com/dataproc/docs/tutorials/python-library-example#create_a_new_cloud_dataproc_cluste)

### Question: 362

CertyIQ

Which Google Cloud Platform service is an alternative to Hadoop with Hive?

- A. Cloud Dataflow
- B. Cloud Bigtable
- C. BigQuery
- D. Cloud Datastore

**Answer: C****Explanation:**

Apache Hive is a data warehouse software project built on top of Apache Hadoop for providing data summarization, query, and analysis.

Google BigQuery is an enterprise data warehouse.

Reference: [https://en.wikipedia.org/wiki/Apache\\_Hive](https://en.wikipedia.org/wiki/Apache_Hive)

**CertyIQ****Question: 363**

Which of these rules apply when you add preemptible workers to a Dataproc cluster (select 2 answers)?

- A. Preemptible workers cannot use persistent disk.
- B. Preemptible workers cannot store data.
- C. If a preemptible worker is reclaimed, then a replacement worker must be added manually.
- D. A Dataproc cluster cannot have only preemptible workers.

**Answer: BD****Explanation:**

The following rules will apply when you use preemptible workers with a Cloud Dataproc cluster:

- . Processing onlySince preemptibles can be reclaimed at any time, preemptible workers do not store data.
- Preemptibles added to a Cloud Dataproc cluster only function as processing nodes.
- . No preemptible-only clustersTo ensure clusters do not lose all workers, Cloud Dataproc cannot create preemptible-only clusters.
- . Persistent disk sizeAs a default, all preemptible workers are created with the smaller of 100GB or the primary worker boot disk size. This disk space is used for local caching of data and is not available through HDFS.

The managed group automatically re-adds workers lost due to reclamation as capacity permits.

Reference: <https://cloud.google.com/dataproc/docs/concepts/preemptible-vms>

**CertyIQ****Question: 364**

When using Cloud Dataproc clusters, you can access the YARN web interface by configuring a browser to connect through a \_\_\_\_ proxy.

- A. HTTPS
- B. VPN
- C. SOCKS
- D. HTTP

**Answer: C****Explanation:**

When using Cloud Dataproc clusters, configure your browser to use the SOCKS proxy. The SOCKS proxy routes data intended for the Cloud Dataproc cluster through an SSH tunnel.

Reference: <https://cloud.google.com/dataproc/docs/concepts/cluster-web-interfaces#interfaces>

**CertyIQ****Question: 365**

Cloud Dataproc is a managed Apache Hadoop and Apache \_\_\_\_\_ service.

- A. Blaze
- B. Spark
- C. Fire
- D. Ignite

**Answer: B**

**Explanation:**

Cloud Dataproc is a managed Apache Spark and Apache Hadoop service that lets you use open source data tools for batch processing, querying, streaming, and machine learning.

Reference: <https://cloud.google.com/dataproc/docs/>

**CertyIQ**

**Question: 366**

Which action can a Cloud Dataproc Viewer perform?

- A. Submit a job.
- B. Create a cluster.
- C. Delete a cluster.
- D. List the jobs.

**Answer: D**

**Explanation:**

A Cloud Dataproc Viewer is limited in its actions based on its role. A viewer can only list clusters, get cluster details, list jobs, get job details, list operations, and get operation details.

Reference:

[https://cloud.google.com/dataproc/docs/concepts/iam#iam\\_roles\\_and\\_cloud\\_dataproc\\_operations\\_summary](https://cloud.google.com/dataproc/docs/concepts/iam#iam_roles_and_cloud_dataproc_operations_summary)

**CertyIQ**

**Question: 367**

Dataproc clusters contain many configuration files. To update these files, you will need to use the --properties option. The format for the option is: file\_prefix:property=\_\_\_\_\_.

- A. details
- B. value
- C. null
- D. id

**Answer: B**

**Explanation:**

To make updating files and properties easy, the --properties command uses a special format to specify the configuration file and the property and value within the file that should be updated. The formatting is as follows: file\_prefix:property=value.

Reference: <https://cloud.google.com/dataproc/docs/concepts/cluster-properties#formatting>

**CertyIQ**

**Question: 368**

Scaling a Cloud Dataproc cluster typically involves \_\_\_\_.

- A. increasing or decreasing the number of worker nodes
- B. increasing or decreasing the number of master nodes
- C. moving memory to run more applications on a single node
- D. deleting applications from unused nodes periodically

**Answer: A**

**Explanation:**

After creating a Cloud Dataproc cluster, you can scale the cluster by increasing or decreasing the number of worker nodes in the cluster at any time, even when jobs are running on the cluster. Cloud Dataproc clusters are typically scaled to:

- 1) increase the number of workers to make a job run faster
- 2) decrease the number of workers to save money
- 3) increase the number of nodes to expand available Hadoop Distributed Filesystem (HDFS) storage

Reference: <https://cloud.google.com/dataproc/docs/concepts/scaling-clusters>

**Question: 369**

**CertyIQ**

Cloud Dataproc charges you only for what you really use with \_\_\_\_\_ billing.

- A. month-by-month
- B. minute-by-minute
- C. week-by-week
- D. hour-by-hour

**Answer: B**

**Explanation:**

One of the advantages of Cloud Dataproc is its low cost. Dataproc charges for what you really use with minute-by-minute billing and a low, ten-minute-minimum billing period.

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

**Question: 370**

**CertyIQ**

The YARN ResourceManager and the HDFS NameNode interfaces are available on a Cloud Dataproc cluster \_\_\_\_.

- A. application node
- B. conditional node
- C. master node
- D. worker node

**Answer: C**

**Explanation:**

The YARN ResourceManager and the HDFS NameNode interfaces are available on a Cloud Dataproc cluster master node. The cluster master-host-name is the name of your Cloud Dataproc cluster followed by an -m suffix for example, if your cluster is named "my-cluster", the master-host-name would be "my-cluster-m".

Reference: <https://cloud.google.com/dataproc/docs/concepts/cluster-web-interfaces#interfaces>

**Question: 371**

CertyIQ

Which of these is NOT a way to customize the software on Dataproc cluster instances?

- A. Set initialization actions
- B. Modify configuration files using cluster properties
- C. Configure the cluster using Cloud Deployment Manager
- D. Log into the master node and make changes from there

**Answer: C****Explanation:**

You can access the master node of the cluster by clicking the SSH button next to it in the Cloud Console.

You can easily use the --properties option of the dataproc command in the Google Cloud SDK to modify many common configuration files when creating a cluster.

When creating a Cloud Dataproc cluster, you can specify initialization actions in executables and/or scripts that Cloud Dataproc will run on all nodes in your Cloud

Dataproc cluster immediately after the cluster is set up.

[<https://cloud.google.com/dataproc/docs/concepts/configuring-clusters/init-actions>]

Reference: <https://cloud.google.com/dataproc/docs/concepts/configuring-clusters/cluster-properties>

**Question: 372**

CertyIQ

In order to securely transfer web traffic data from your computer's web browser to the Cloud Dataproc cluster you should use a(n) \_\_\_\_\_.

- A. VPN connection
- B. Special browser
- C. SSH tunnel
- D. FTP connection

**Answer: C****Explanation:**

To connect to the web interfaces, it is recommended to use an SSH tunnel to create a secure connection to the master node.

Reference: [https://cloud.google.com/dataproc/docs/concepts/cluster-web-interfaces#connecting\\_to\\_the\\_web\\_interfaces](https://cloud.google.com/dataproc/docs/concepts/cluster-web-interfaces#connecting_to_the_web_interfaces)

**Question: 373**

CertyIQ

All Google Cloud Bigtable client requests go through a front-end server \_\_\_\_\_ they are sent to a Cloud Bigtable node.

- A. before
- B. after
- C. only if
- D. once

**Answer: A****Explanation:**

In a Cloud Bigtable architecture all client requests go through a front-end server before they are sent to a Cloud Bigtable node.

The nodes are organized into a Cloud Bigtable cluster, which belongs to a Cloud Bigtable instance, which is a container for the cluster. Each node in the cluster handles a subset of the requests to the cluster.

When additional nodes are added to a cluster, you can increase the number of simultaneous requests that the cluster can handle, as well as the maximum throughput for the entire cluster.

Reference: <https://cloud.google.com/bigtable/docs/overview>

CertyIQ

### Question: 374

What is the general recommendation when designing your row keys for a Cloud Bigtable schema?

- A. Include multiple time series values within the row key
- B. Keep the row key as an 8 bit integer
- C. Keep your row key reasonably short
- D. Keep your row key as long as the field permits

**Answer: C**

**Explanation:**

A general guide is to, keep your row keys reasonably short. Long row keys take up additional memory and storage and increase the time it takes to get responses from the Cloud Bigtable server.

Reference: <https://cloud.google.com/bigtable/docs/schema-design#row-keys>

CertyIQ

### Question: 375

Which of the following statements is NOT true regarding Bigtable access roles?

- A. Using IAM roles, you cannot give a user access to only one table in a project, rather than all tables in a project.
- B. To give a user access to only one table in a project, grant the user the Bigtable Editor role for that table.
- C. You can configure access control only at the project level.
- D. To give a user access to only one table in a project, you must configure access through your application.

**Answer: B**

**Explanation:**

For Cloud Bigtable, you can configure access control at the project level. For example, you can grant the ability to:

Read from, but not write to, any table within the project.

Read from and write to any table within the project, but not manage instances.

Read from and write to any table within the project, and manage instances.

Reference: <https://cloud.google.com/bigtable/docs/access-control>

CertyIQ

### Question: 376

For the best possible performance, what is the recommended zone for your Compute Engine instance and Cloud Bigtable instance?

- A. Have the Compute Engine instance in the furthest zone from the Cloud Bigtable instance.
- B. Have both the Compute Engine instance and the Cloud Bigtable instance to be in different zones.

- C. Have both the Compute Engine instance and the Cloud Bigtable instance to be in the same zone.
- D. Have the Cloud Bigtable instance to be in the same zone as all of the consumers of your data.

**Answer: C**

**Explanation:**

It is recommended to create your Compute Engine instance in the same zone as your Cloud Bigtable instance for the best possible performance,

If it's not possible to create a instance in the same zone, you should create your instance in another zone within the same region. For example, if your Cloud

Bigtable instance is located in us-central1-b, you could create your instance in us-central1-f. This change may result in several milliseconds of additional latency for each Cloud Bigtable request.

It is recommended to avoid creating your Compute Engine instance in a different region from your Cloud Bigtable instance, which can add hundreds of milliseconds of latency to each Cloud Bigtable request.

Reference: <https://cloud.google.com/bigtable/docs/creating-compute-instance>

**CertyIQ**

**Question: 377**

Which row keys are likely to cause a disproportionate number of reads and/or writes on a particular node in a Bigtable cluster (select 2 answers)?

- A. A sequential numeric ID
- B. A timestamp followed by a stock symbol
- C. A non-sequential numeric ID
- D. A stock symbol followed by a timestamp

**Answer: AB**

**Explanation:**

...using a timestamp as the first element of a row key can cause a variety of problems.

In brief, when a row key for a time series includes a timestamp, all of your writes will target a single node; fill that node; and then move onto the next node in the cluster, resulting in hotspotting.

Suppose your system assigns a numeric ID to each of your application's users. You might be tempted to use the user's numeric ID as the row key for your table.

However, since new users are more likely to be active users, this approach is likely to push most of your traffic to a small number of nodes. [<https://cloud.google.com/bigtable/docs/schema-design>]

Reference: [https://cloud.google.com/bigtable/docs/schema-design-time-series#ensure\\_that\\_your\\_row\\_key\\_avoids\\_hotspotting](https://cloud.google.com/bigtable/docs/schema-design-time-series#ensure_that_your_row_key_avoids_hotspotting)

**CertyIQ**

**Question: 378**

When a Cloud Bigtable node fails, \_\_\_\_ is lost.

- A. all data
- B. no data
- C. the last transaction
- D. the time dimension

**Answer: B**

**Explanation:**

A Cloud Bigtable table is sharded into blocks of contiguous rows, called tablets, to help balance the workload of queries. Tablets are stored on Colossus, Google's file system, in SSTable format. Each tablet is associated with a specific Cloud Bigtable node.

Data is never stored in Cloud Bigtable nodes themselves; each node has pointers to a set of tablets that are stored on Colossus. As a result:

Rebalancing tablets from one node to another is very fast, because the actual data is not copied. Cloud Bigtable simply updates the pointers for each node.

Recovery from the failure of a Cloud Bigtable node is very fast, because only metadata needs to be migrated to the replacement node.

When a Cloud Bigtable node fails, no data is lost

Reference: <https://cloud.google.com/bigtable/docs/overview>

CertyIQ

### Question: 379

Which is not a valid reason for poor Cloud Bigtable performance?

- A. The workload isn't appropriate for Cloud Bigtable.
- B. The table's schema is not designed correctly.
- C. The Cloud Bigtable cluster has too many nodes.
- D. There are issues with the network connection.

### Answer: C

#### Explanation:

The Cloud Bigtable cluster doesn't have enough nodes. If your Cloud Bigtable cluster is overloaded, adding more nodes can improve performance. Use the monitoring tools to check whether the cluster is overloaded.  
Reference: <https://cloud.google.com/bigtable/docs/performance>

CertyIQ

### Question: 380

Which is the preferred method to use to avoid hotspotting in time series data in Bigtable?

- A. Field promotion
- B. Randomization
- C. Salting
- D. Hashing

### Answer: A

#### Explanation:

By default, prefer field promotion. Field promotion avoids hotspotting in almost all cases, and it tends to make it easier to design a row key that facilitates queries.

Reference: [https://cloud.google.com/bigtable/docs/schema-design-time-series#ensure\\_that\\_your\\_row\\_key\\_avoids\\_hotspotting](https://cloud.google.com/bigtable/docs/schema-design-time-series#ensure_that_your_row_key_avoids_hotspotting)

**Question: 381**

CertyIQ

When you design a Google Cloud Bigtable schema it is recommended that you \_\_\_\_\_.

- A. Avoid schema designs that are based on NoSQL concepts
- B. Create schema designs that are based on a relational database design
- C. Avoid schema designs that require atomicity across rows
- D. Create schema designs that require atomicity across rows

**Answer: C****Explanation:**

All operations are atomic at the row level. For example, if you update two rows in a table, it's possible that one row will be updated successfully and the other update will fail. Avoid schema designs that require atomicity across rows.

Reference: <https://cloud.google.com/bigtable/docs/schema-design#row-keys>

**Question: 382**

CertyIQ

Which of the following is NOT a valid use case to select HDD (hard disk drives) as the storage for Google Cloud Bigtable?

- A. You expect to store at least 10 TB of data.
- B. You will mostly run batch workloads with scans and writes, rather than frequently executing random reads of a small number of rows.
- C. You need to integrate with Google BigQuery.
- D. You will not use the data to back a user-facing or latency-sensitive application.

**Answer: C****Explanation:**

For example, if you plan to store extensive historical data for a large number of remote-sensing devices and then use the data to generate daily reports, the cost savings for HDD storage may justify the performance tradeoff. On the other hand, if you plan to use the data to display a real-time dashboard, it probably would not make sense to use HDD storage; reads would be much more frequent in this case, and reads are much slower with HDD storage.

Reference: <https://cloud.google.com/bigtable/docs/choosing-ssd-hdd>

**Question: 383**

CertyIQ

Cloud Bigtable is Google's \_\_\_\_\_ Big Data database service.

- A. Relational
- B. mySQL
- C. NoSQL
- D. SQL Server

**Answer: C****Explanation:**

Cloud Bigtable is Google's NoSQL Big Data database service. It is the same database that Google uses for services, such as Search, Analytics, Maps, and Gmail.

It is used for requirements that are low latency and high throughput including Internet of Things (IoT), user analytics, and financial data analysis.

Reference: <https://cloud.google.com/bigtable/>

### Question: 384

CertyIQ

When you store data in Cloud Bigtable, what is the recommended minimum amount of stored data?

- A. 500 TB
- B. 1 GB
- C. 1 TB
- D. 500 GB

### Answer: C

#### Explanation:

Cloud Bigtable is not a relational database. It does not support SQL queries, joins, or multi-row transactions. It is not a good solution for less than 1 TB of data.

Reference: [https://cloud.google.com/bigtable/docs/overview#title\\_short\\_and\\_other\\_storage\\_options](https://cloud.google.com/bigtable/docs/overview#title_short_and_other_storage_options)

### Question: 385

CertyIQ

If you're running a performance test that depends upon Cloud Bigtable, all the choices except one below are recommended steps. Which is NOT a recommended step to follow?

- A. Do not use a production instance.
- B. Run your test for at least 10 minutes.
- C. Before you test, run a heavy pre-test for several minutes.
- D. Use at least 300 GB of data.

### Answer: A

#### Explanation:

If you're running a performance test that depends upon Cloud Bigtable, be sure to follow these steps as you plan and execute your test:

Use a production instance. A development instance will not give you an accurate sense of how a production instance performs under load.

Use at least 300 GB of data. Cloud Bigtable performs best with 1 TB or more of data. However, 300 GB of data is enough to provide reasonable results in a performance test on a 3-node cluster. On larger clusters, use 100 GB of data per node.

Before you test, run a heavy pre-test for several minutes. This step gives Cloud Bigtable a chance to balance data across your nodes based on the access patterns it observes.

Run your test for at least 10 minutes. This step lets Cloud Bigtable further optimize your data, and it helps ensure that you will test reads from disk as well as cached reads from memory.

Reference: <https://cloud.google.com/bigtable/docs/performance>

### Question: 386

CertyIQ

Cloud Bigtable is a recommended option for storing very large amounts of \_\_\_\_\_?

- A. multi-keyed data with very high latency

- B. multi-keyed data with very low latency
- C. single-keyed data with very low latency
- D. single-keyed data with very high latency

**Answer: C****Explanation:**

Cloud Bigtable is a sparsely populated table that can scale to billions of rows and thousands of columns, allowing you to store terabytes or even petabytes of data.

A single value in each row is indexed; this value is known as the row key. Cloud Bigtable is ideal for storing very large amounts of single-keyed data with very low latency. It supports high read and write throughput at low latency, and it is an ideal data source for MapReduce operations.

Reference: <https://cloud.google.com/bigtable/docs/overview>

**CertyIQ****Question: 387**

Google Cloud Bigtable indexes a single value in each row. This value is called the \_\_\_\_\_.

- A. primary key
- B. unique key
- C. row key
- D. master key

**Answer: C****Explanation:**

Cloud Bigtable is a sparsely populated table that can scale to billions of rows and thousands of columns, allowing you to store terabytes or even petabytes of data.

A single value in each row is indexed; this value is known as the row key.

Reference: <https://cloud.google.com/bigtable/docs/overview>

**CertyIQ****Question: 388**

What is the HBase Shell for Cloud Bigtable?

- A. The HBase shell is a GUI based interface that performs administrative tasks, such as creating and deleting tables.
- B. The HBase shell is a command-line tool that performs administrative tasks, such as creating and deleting tables.
- C. The HBase shell is a hypervisor based shell that performs administrative tasks, such as creating and deleting new virtualized instances.
- D. The HBase shell is a command-line tool that performs only user account management functions to grant access to Cloud Bigtable instances.

**Answer: B****Explanation:**

The HBase shell is a command-line tool that performs administrative tasks, such as creating and deleting tables. The Cloud Bigtable HBase client for Java makes it possible to use the HBase shell to connect to Cloud Bigtable.

Reference: <https://cloud.google.com/bigtable/docs/installing-hbase-shell>

**Question: 389**

CertyIQ

What is the recommended action to do in order to switch between SSD and HDD storage for your Google Cloud Bigtable instance?

- A. create a third instance and sync the data from the two storage types via batch jobs
- B. export the data from the existing instance and import the data into a new instance
- C. run parallel instances where one is HDD and the other is SDD
- D. the selection is final and you must resume using the same storage type

**Answer: B****Explanation:**

When you create a Cloud Bigtable instance and cluster, your choice of SSD or HDD storage for the cluster is permanent. You cannot use the Google Cloud

Platform Console to change the type of storage that is used for the cluster.

If you need to convert an existing HDD cluster to SSD, or vice-versa, you can export the data from the existing instance and import the data into a new instance.

Alternatively, you can write -

a Cloud Dataflow or Hadoop MapReduce job that copies the data from one instance to another.

Reference: <https://cloud.google.com/bigtable/docs/choosing-ssd-hdd>

# Thank you

Thank you for being so interested in the premium exam material.

I'm glad to hear that you found it informative and helpful.

If you have any feedback or thoughts on the bumps, I would love to hear them.  
Your insights can help me improve our writing and better understand our readers.

## Best of Luck

You have worked hard to get to this point, and you are well-prepared for the exam  
Keep your head up, stay positive, and go show that exam what you're made of!

[Feedback](#)

[More Papers](#)



Future is Secured  
100% Pass Guarantee



24/7 Customer Support  
Mail us - [certyiqofficial@gmail.com](mailto:certyiqofficial@gmail.com)



Free Updates  
Lifetime Free Updates!

Total: **389 Questions**

Link: <https://certyiq.com/papers/google/professional-data-engineer>