

Organization of Questions

Sample Case Studies

MountKirk Games

Dress4Win

TerramEarth

Cloud Architect Practice Exam

CAPE

Business and Technical Experiences

EXP

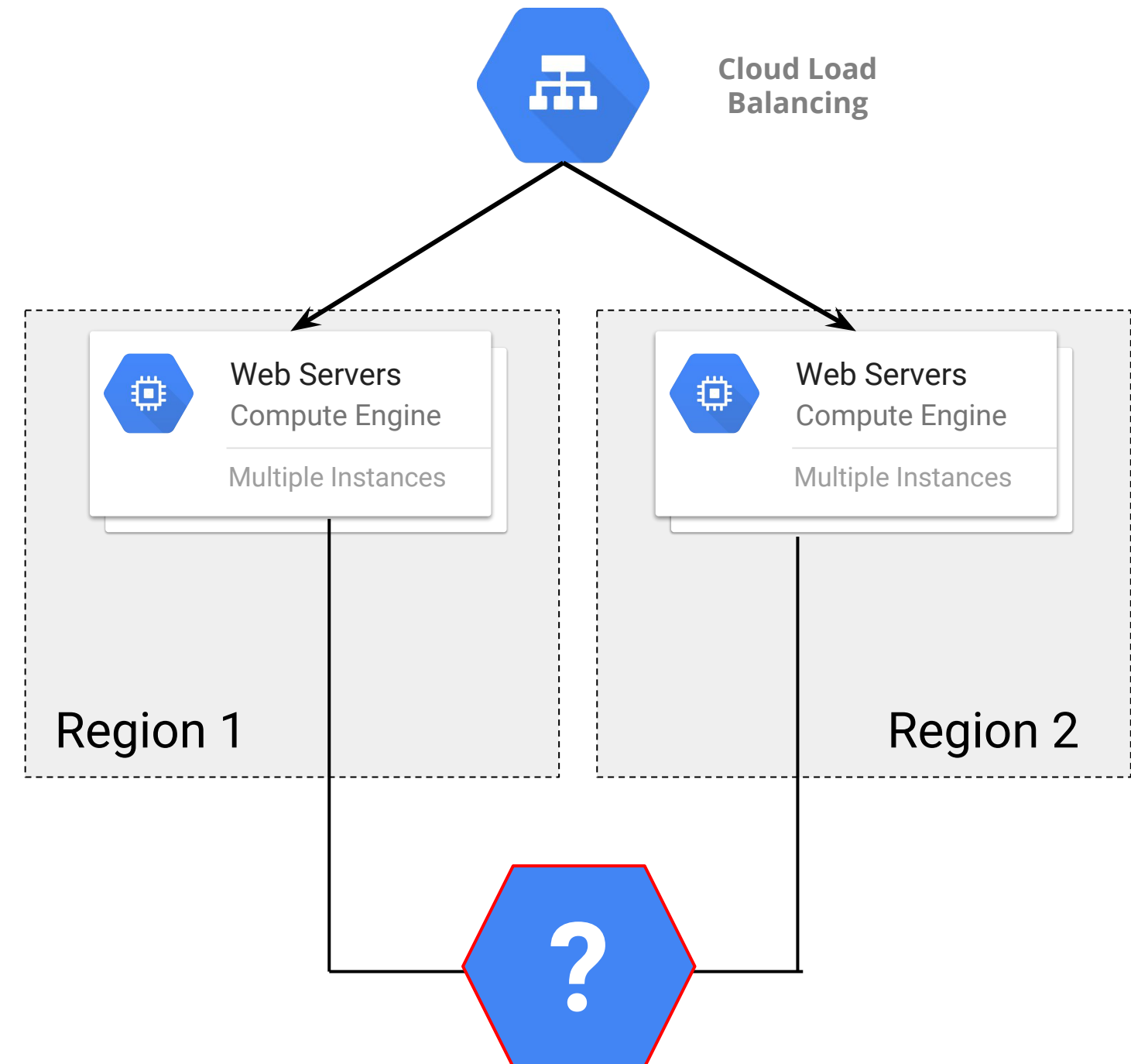


#1 Designing and planning a cloud solution architecture

Google Cloud

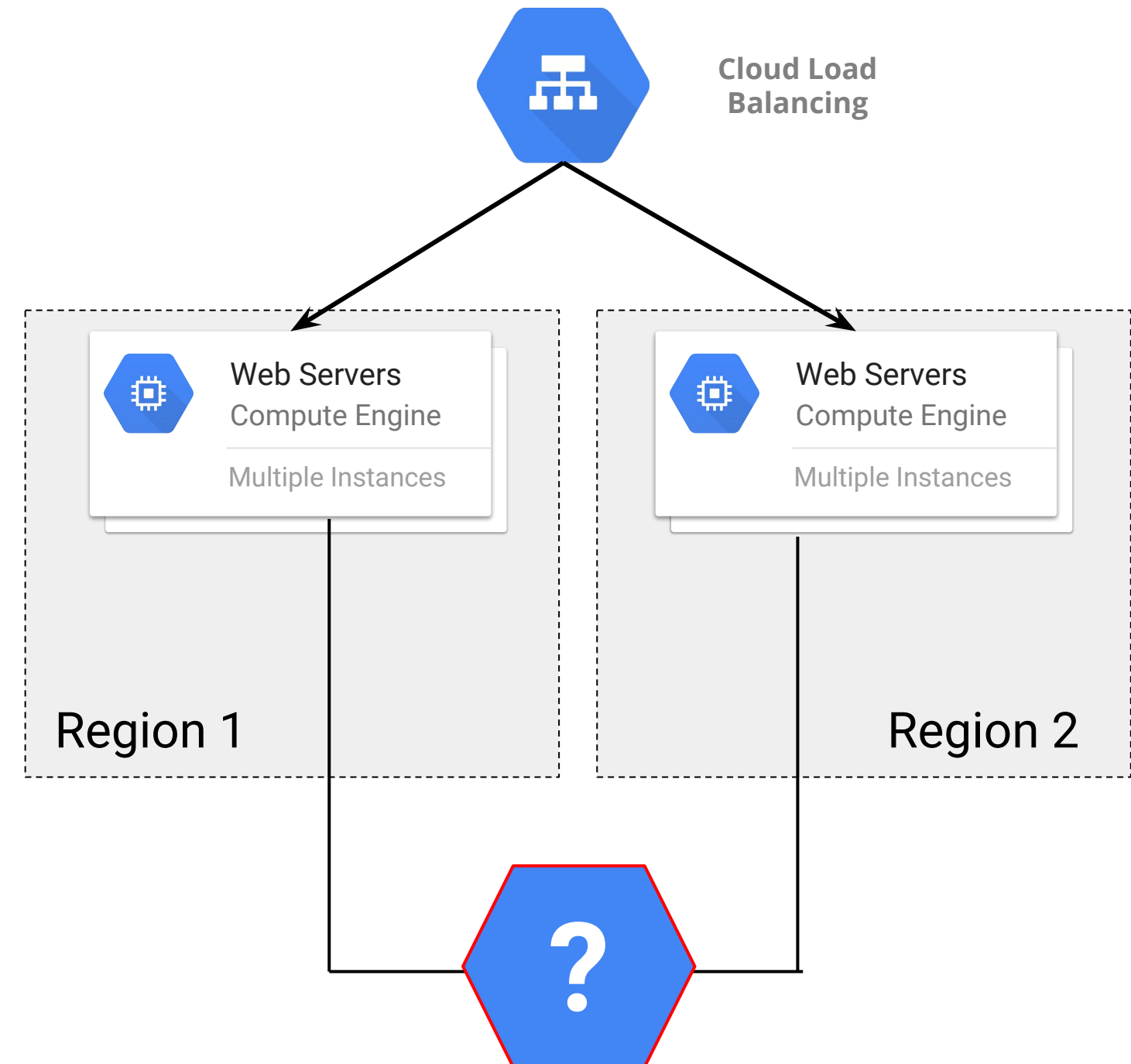
How to keep data in synch across regions?

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



How to keep data in synch across regions?

- A. Cloud SQL
- B. Cloud Bigtable
- C. Cloud Datastore
- D. Cloud Storage ✓**



Solution

D - Cloud Storage Multi-regional bucket stays in synch between regions automatically.

A, B, C - The other services listed are in a single region.

An existing application uses websockets. To help migrate the application to cloud you should:

- A. Redesign the application to use HTTP streaming.
- B. Redesign the application to use distributed sessions instead of websockets.
- C. Do nothing to the application. HTTP(S) load balancing natively supports websocket proxying.
- D. Review websocket encryption requirements with the security team.

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- C. Do nothing to the application. HTTP(S) load balancing natively supports websocket proxying. ✓
- D. Review websocket encryption requirements with the security team.

Solution

C - "HTTP(S) Load Balancing has native support for the WebSocket protocol. Backends that use WebSocket to communicate with clients can use the HTTP(S) load balancer as a front end, for scale and availability. The load balancer does not need any additional configuration to proxy WebSocket connections."

D - Irrelevant to the application migration.

A and B - There is nothing inherent about websockets that requires a redesign to run on Google Cloud.

documentation references

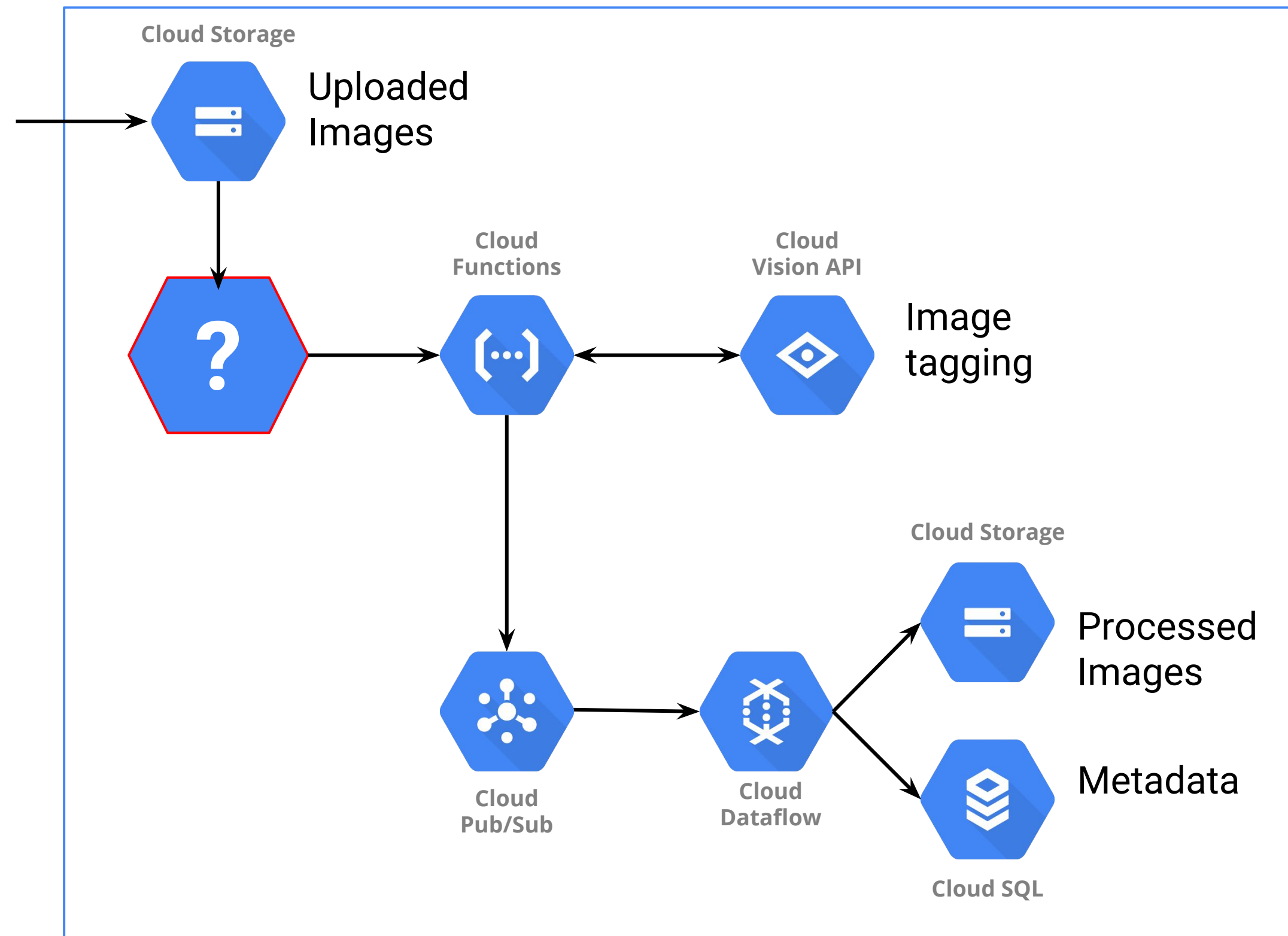


#2 Managing and provisioning solution infrastructure

Google Cloud

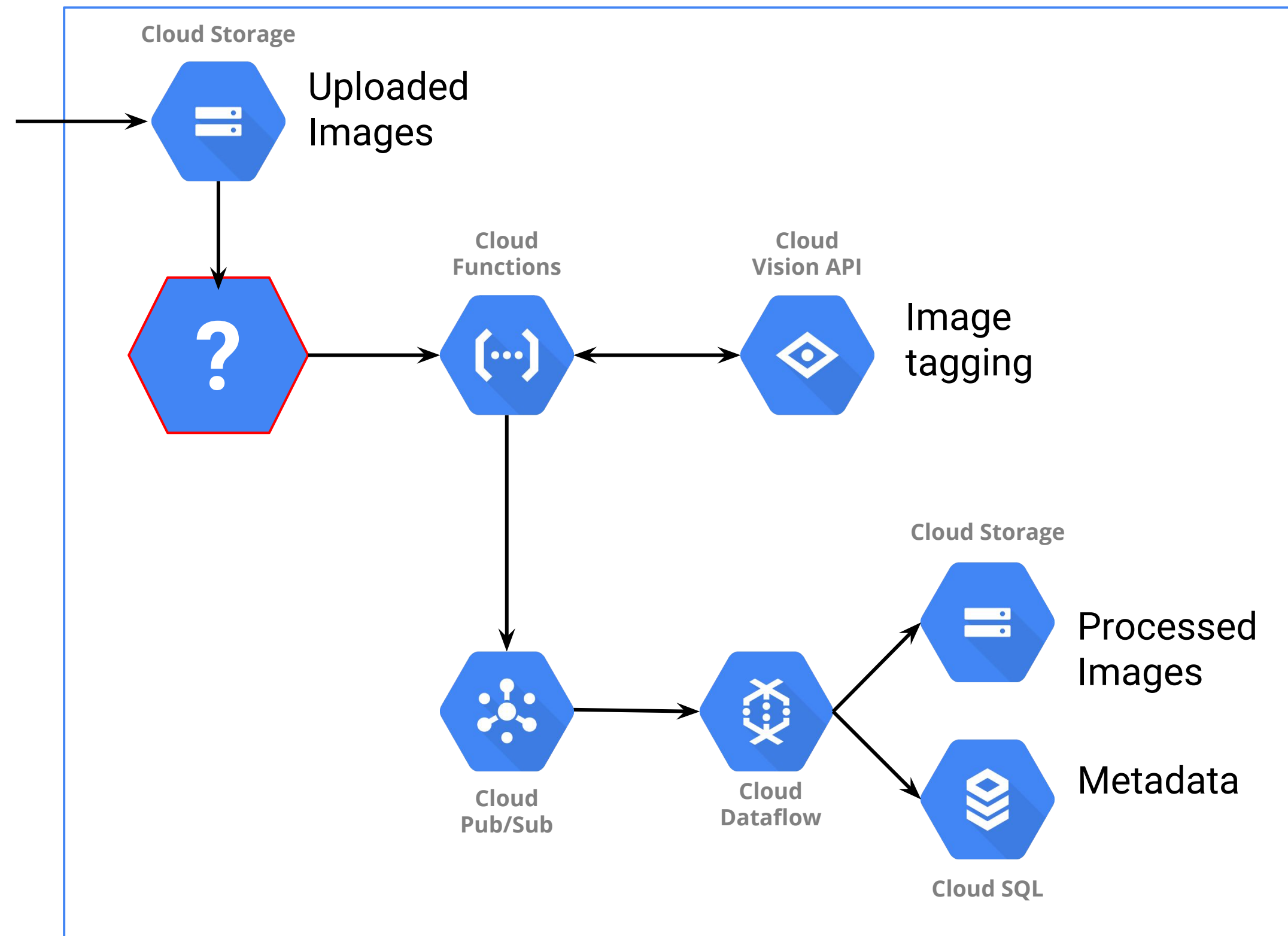
Dress4Win is building an image tagging pipeline.

- A. Cloud Datastore
- B. Cloud Dataflow
- C. Cloud Pub/Sub
- D. Cloud Bigtable



Dress4Win is building an image tagging pipeline.

- A. Cloud Datastore
- B. Cloud Dataflow
- C. Cloud Pub/Sub ✓**
- D. Cloud Bigtable



Solution

C - Cloud Storage upload events can push Cloud Pub/Sub to trigger a Cloud Function to ingest and process the image.

B - Cloud Dataflow would have nothing to do here but receive an image and call a Cloud Function.

A - Cloud Datastore is not for storing images.

D - Cloud Bigtable is not for storing images.

How to store data to be accessed once a month and not needed after five years.

- A. Multi-regional class, lifecycle policy to delete after 5 years.
- B. Multi-regional class, lifecycle policy change to Coldline after 5 years.
- C. Nearline class, lifecycle policy change to Coldline after 5 years.
- D. Nearline class, lifecycle policy to delete after 5 years.

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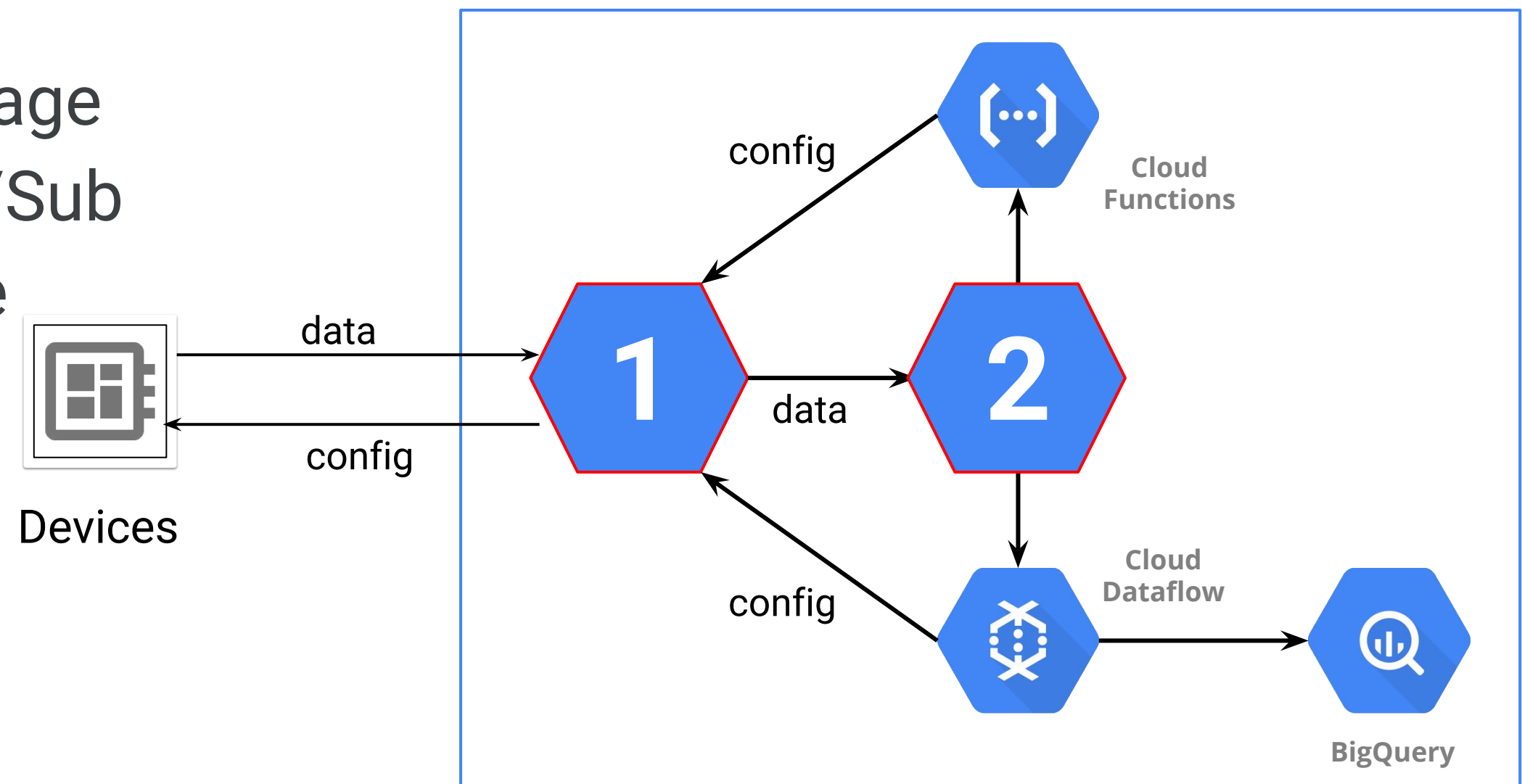
Solution

D - Access pattern is Nearline. "Not needed" means delete, not archive.

A, B, C - Wrong access pattern or "Coldline" (store) instead of delete.

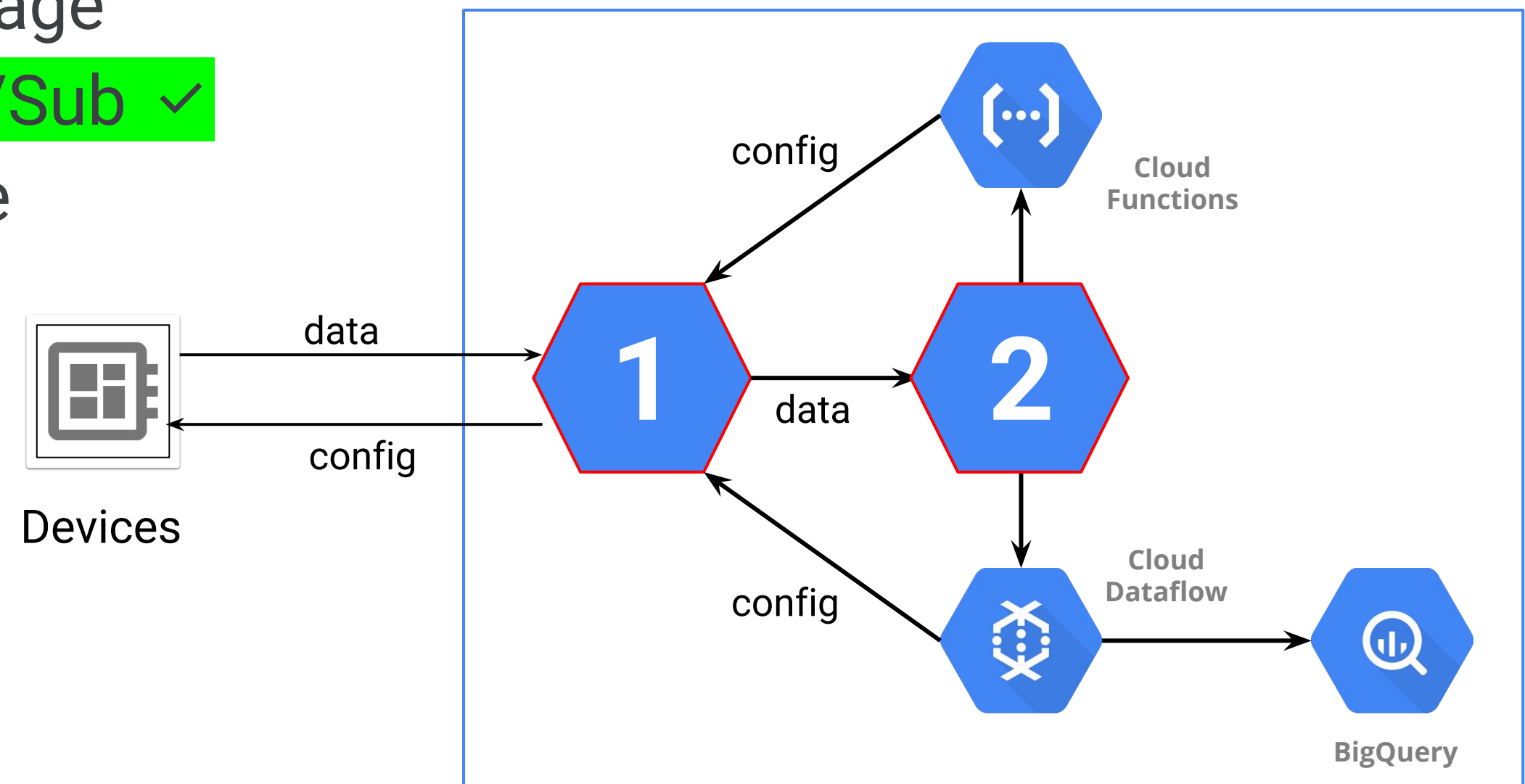
TerramEarth has a new IoT pipeline. Which services will make this design work?

- A. Cloud IoT Core, Cloud Datastore
- B. Cloud Pub/Sub, Cloud Storage
- C. Cloud IoT Core, Cloud Pub/Sub
- D. App Engine, Cloud IoT Core



TerramEarth has a new IoT pipeline. Which services will make this design work?

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- C. Cloud IoT Core, Cloud Pub/Sub ✓**
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Solution

C - "Device data captured by Cloud IoT Core gets published to Cloud Pub/Sub"

A - Cloud IoT Core does not publish to other services and it doesn't store data.

B - Cloud Pub/Sub does not do device management.

D - In theory, an App Engine application could duplicate the functions of Cloud IoT Core, but since Cloud IoT Core only publishes to Cloud Pub/Sub, in position 2, it would not communicate with either Cloud Functions or Cloud Dataflow.

documentation references

Multi-petabyte database for analysts that only know SQL and must be available 24 x 7.

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



Which service for a multi-petabyte database for analysts that only know SQL and must be available 24 x 7.

- A. Cloud Storage
- B. Cloud SQL
- C. BigQuery ✓**
- D. Cloud Datastore

Solution

C - BigQuery SLA is 99.9%, meeting the uptime requirement, and it has an SQL interface.

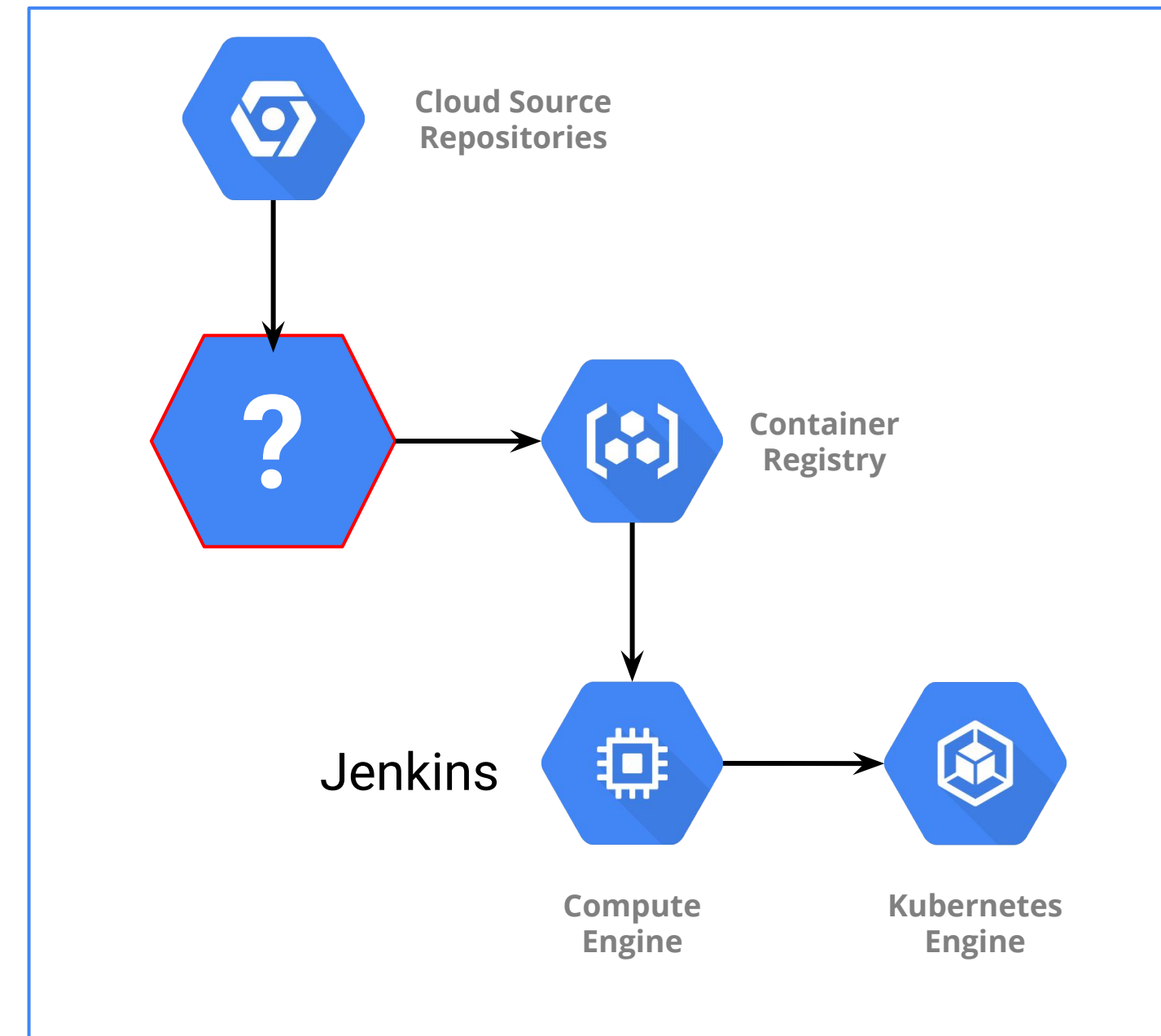
A - Cloud Storage has no SQL interface.

B - Cloud SQL has the SLA and SQL, but not the capacity.

D - Cloud Datastore has no SQL interface.

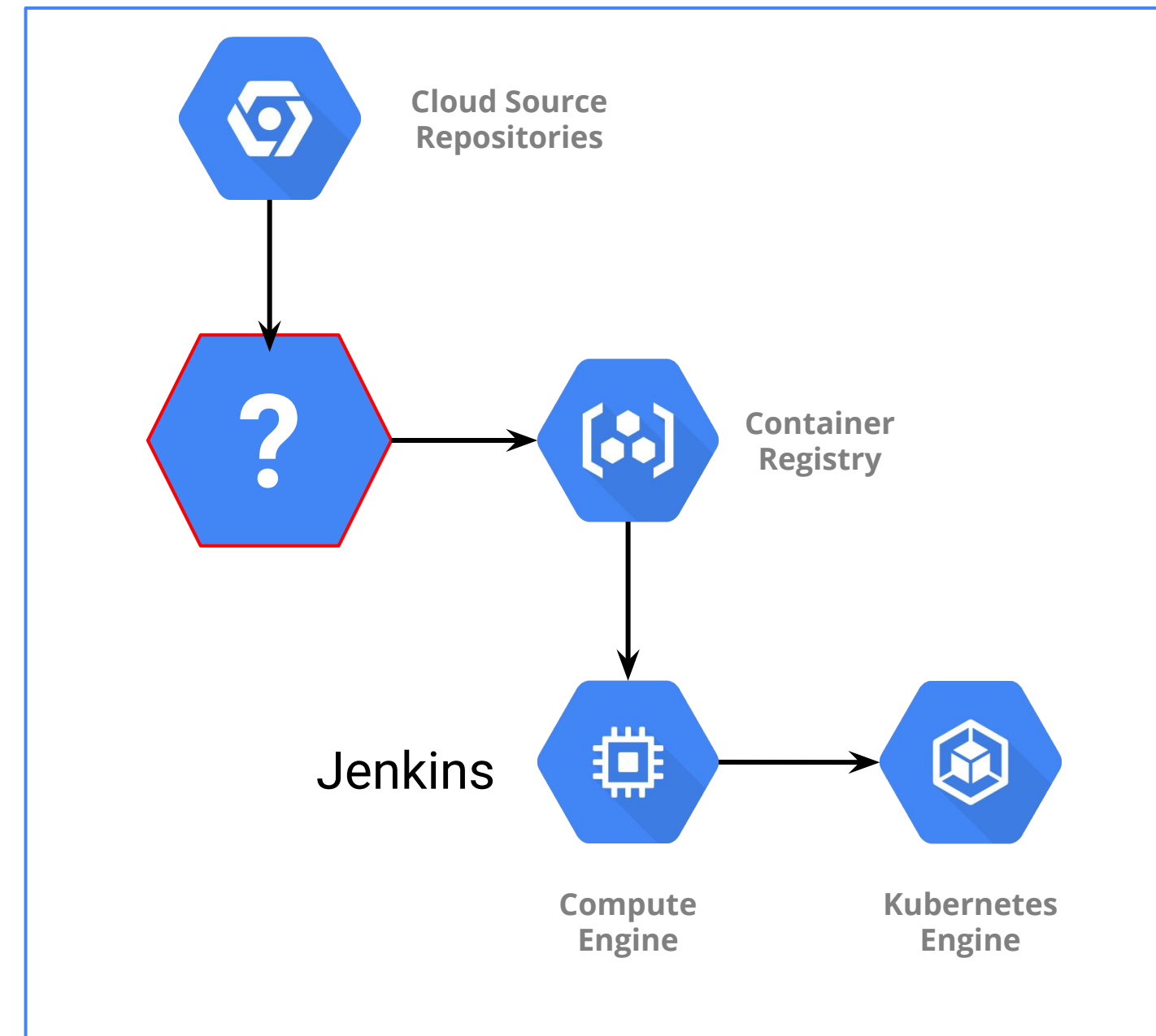
Which service completes the CI/CD pipeline?

- A. Cloud Pub/Sub
- B. Cloud Container Builder
- C. Cloud Storage
- D. Cloud Dataproc



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- C. Cloud Storage
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Solution

B - Container Builder

Container Builder builds docker images from source repositories.

A, C, D - None of the other services build docker images.

Simply and reliably clone a Linux VM to another project in another region.

- A. Use Linux dd and netcat to stream the root disk to the new VM.
- B. Snapshot the root disk and select it for the new VM.
- C. Create an image from the root disk with Linux dd, create a disk from the image, and use it in the new VM.
- D. Snapshot the root disk, create an image, and use the image for the new VM root disk.

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Solution

D - Will work across project and region, and it is a simple and reliable method.

A - incurs network costs and impacts performance of the original VM.

B - Snapshots are bound within the region.

C - dd won't work correctly on a mounted disk.



#3 Designing for security and compliance

Google Cloud

Dress4Win security has locked out SSH access to production VMs. How can operations manage the VMs?

- A. Configure a VPN to allow SSH access to VMs.
- B. Develop a Cloud API application for all operations actions.
- C. Grant operations team access to use Cloud Shell.
- D. Develop an application that grants temporary SSH access.



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Solution

C - The operations team doesn't actually need SSH access to manage VMs. All it needs is Cloud Shell with the Cloud SDK and gcloud tools. Cloud Shell provides all the tools for managing Compute Engine instances. In this case the assumption that SSH access is needed is incorrect.

Business requirement:

"Improve security by defining and adhering to a set of security and Identity and Access Management (IAM) best practices for cloud."

A - A VPN is a way to connect from remote to the internal IP of an instance. If SSH is blocked everywhere, this work-around won't help.

B - Developing an application that would use the Cloud API would be redundant with the gcloud command line tool.

D - An application that provides temporary access to SSH is basically just violating the security practices.

documentation references

What security strategy for PII data on Cloud Storage?

- A. Signed URL with expiration.
- B. Read-only access to users, and default ACL on bucket.
- C. No Cloud IAM roles to users, and granular ACLs on bucket.
- D. Public access, random names, and share URLs in confidence.

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Solution

C - most restrictive access.

A - Signed URL can be leaked.

B - Overly permissive.

D - "Security through obscurity" is no security at all.



#4 Analyzing and optimizing technical and business processes

Google Cloud

Dress4Win decided to use Cloud SDK tools to deploy to App Engine Flexible. Which requirement does this meet?

- A. Support failover of the production environment to the cloud during an emergency.
- B. Encrypt data on the wire and at rest.
- C. Use managed services whenever possible.
- D. Identify production services that can migrate to the cloud to save capacity.



Dress4Win decided to use Cloud SDK tools to deploy to App Engine Flexible. Which requirement does this meet?

- A. Support failover of the production environment to the cloud during an emergency.
- B. Encrypt data on the wire and at rest.
- C. Use managed services whenever possible. ✓
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Solution

C - App Engine Flexible is a managed service.

A - Requires additional components. If it is incomplete technically, then it isn't correct.

B - Requires additional components.

D - No capacity information provided. If the information isn't available, then it isn't correct.

Which Dress4Win business requirement can Cloud DNS help satisfy?

- A. Support multiple VPN connections between the production data center and cloud environment.
- B. Analyze and optimize architecture for performance in the cloud.
- C. Build a reliable and reproducible environment with scaled parity of production
- D. Support failover of the production environment to cloud during an emergency.

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- D. Support failover of the production environment to cloud during an emergency. ✓

Solution

D - Cloud DNS records can be used to redirect customer traffic from on prem to cloud, thereby implementing the failover switch.

A - Although DNS could be used to share and resolve external IP addresses for VPN, this is not necessary for multiple VPN connections.

B - Cloud DNS does not have anything to do with optimization of performance or building a reproducible environment. Using the reproducible environment, yes, but not building it.

C - Scaled parity of production? No.

documentation references

Which platform features of Google Cloud support TerramEarth's business requirements?

- A. Google has many years of experience with containers.
- B. GCP provides automatic discounts with increased usage.
- C. Cloud Machine Learning and BigQuery are designed for petabyte scale.
- D. GCP bills per minute, saving costs compared to hourly billing.

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Solution

C - TerramEarth already has 200TB+ of data and is in a growth phase. Therefore they must be concerned that the solution will be supportable as they "undergo the next wave of transformations in our industry". Also, TerramEarth seeks a competitive advantage through "incremental innovations" which can come from data insights using BigQuery and Machine Learning.

B and D -- TerramEarth is not price sensitive. It is more concerned with facing competitive threats.

A - Google's years of experience might be a persuasive reason for TerramEarth to choose Google Cloud, but time with any specific technology is not a stated business requirement.

documentation references



#5 Managing implementation

Google Cloud

How can MountKirk Games meet its scaling requirements while providing insights to investors?

- A. Import MySQL game statistics to BigQuery for provisioning analysis and indicator reporting.
- B. Use Stackdriver custom metrics for autoscaling and reporting.
- C. Autoscale based on CPU load and use Data Studio to share metrics.
- D. Autoscale based on network latency as a measure of user experience.

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Solution

B - Stackdriver custom metrics can be crafted to expose specific game activities, which can be useful for autoscaling and provide a more detailed source of indicators for the targeted marketing investors require. Stackdriver is a fully managed service.

Technical Requirements: **Game Backend** - "Dynamically scale up or down based on game activity." **Game Analytics** - "Dynamically scale up or down based on game activity." **Game Analytics** - "Use only fully managed services."

A - The current game statistics are not real-time, but loaded into MySQL by ETL, so they cannot be used for autoscaling. Using BigQuery for analysis may provide better insights, but since game activity is disconnected from resource provisioning (there is no feedback loop), the marketing insights might not be valid.

C - Data Studio might be a way to share metrics with investors so they can explore the data themselves. That is nice, but it does not satisfy business or technical requirements or solve any practical problems described in the case. Autoscaling on CPU has a poor correlation to user experience.

D - Network latency is a better measure of user experience for autoscaling than CPU load, but not as good as game activity.

documentation references

How to test a risky update to an App Engine application requiring live traffic?

- A. Deploy as default temporarily, then roll it back.
- B. Create a separate isolated test project and onboard users.
- C. Create a second App Engine project, then redirect a subset of users.
- D. Deploy a new version, use traffic splitting to test a percentage.

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Solution

D - Deploying a new version, but not as default, is easily reversed. Traffic splitting enables testing with some live traffic, meeting the requirement.

A - Deploying as default moves all traffic to it.

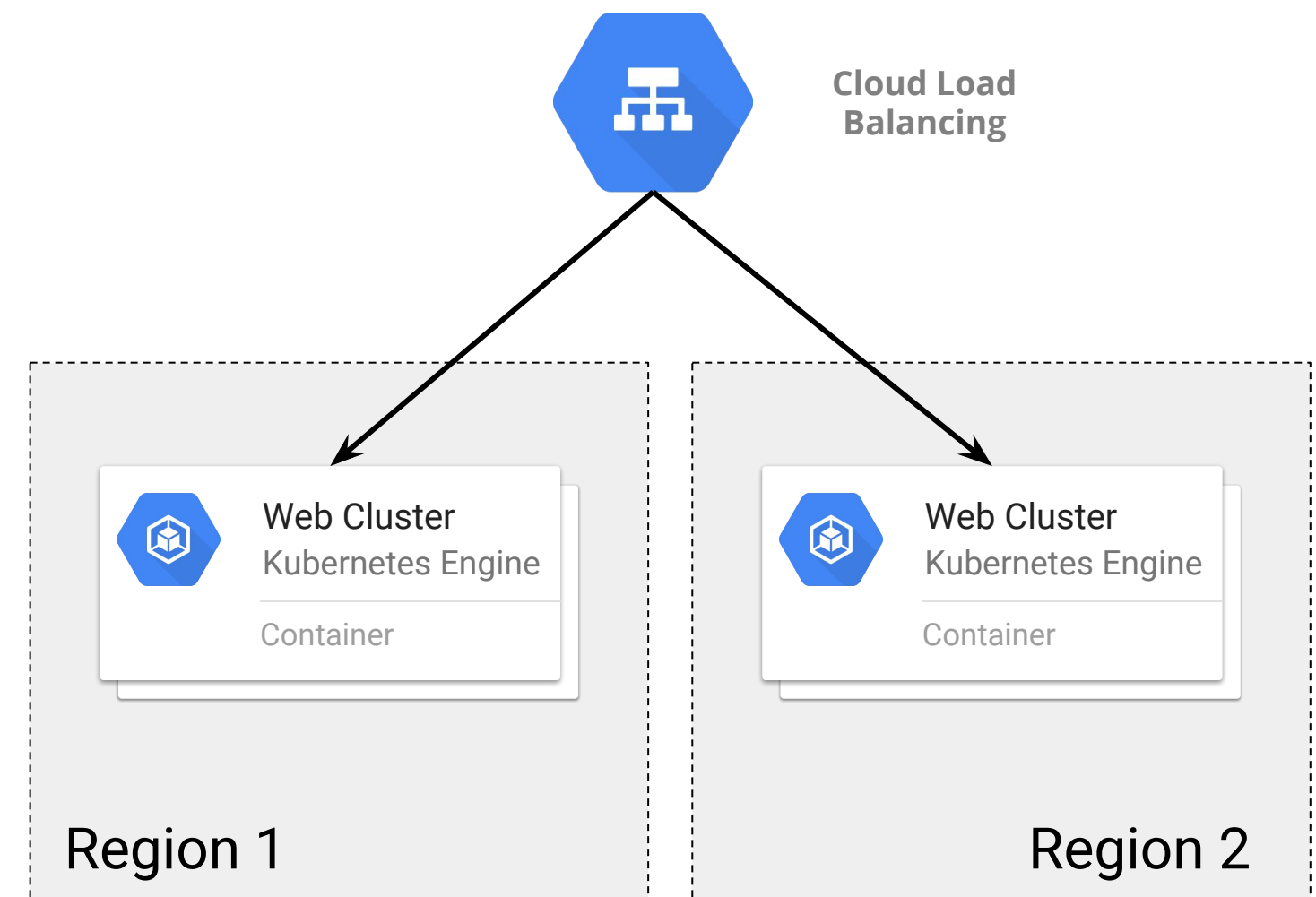
B - Possible, but requires data synchronization and separate traffic splitting. So this is a complicated approach.

C - App Engine services are intended for hosting different service logic. Using different services would require manual configuration of the consumers of services to be aware of the deployment process and manage from the consumer side who is accessing which service. A complicated approach.

documentation references

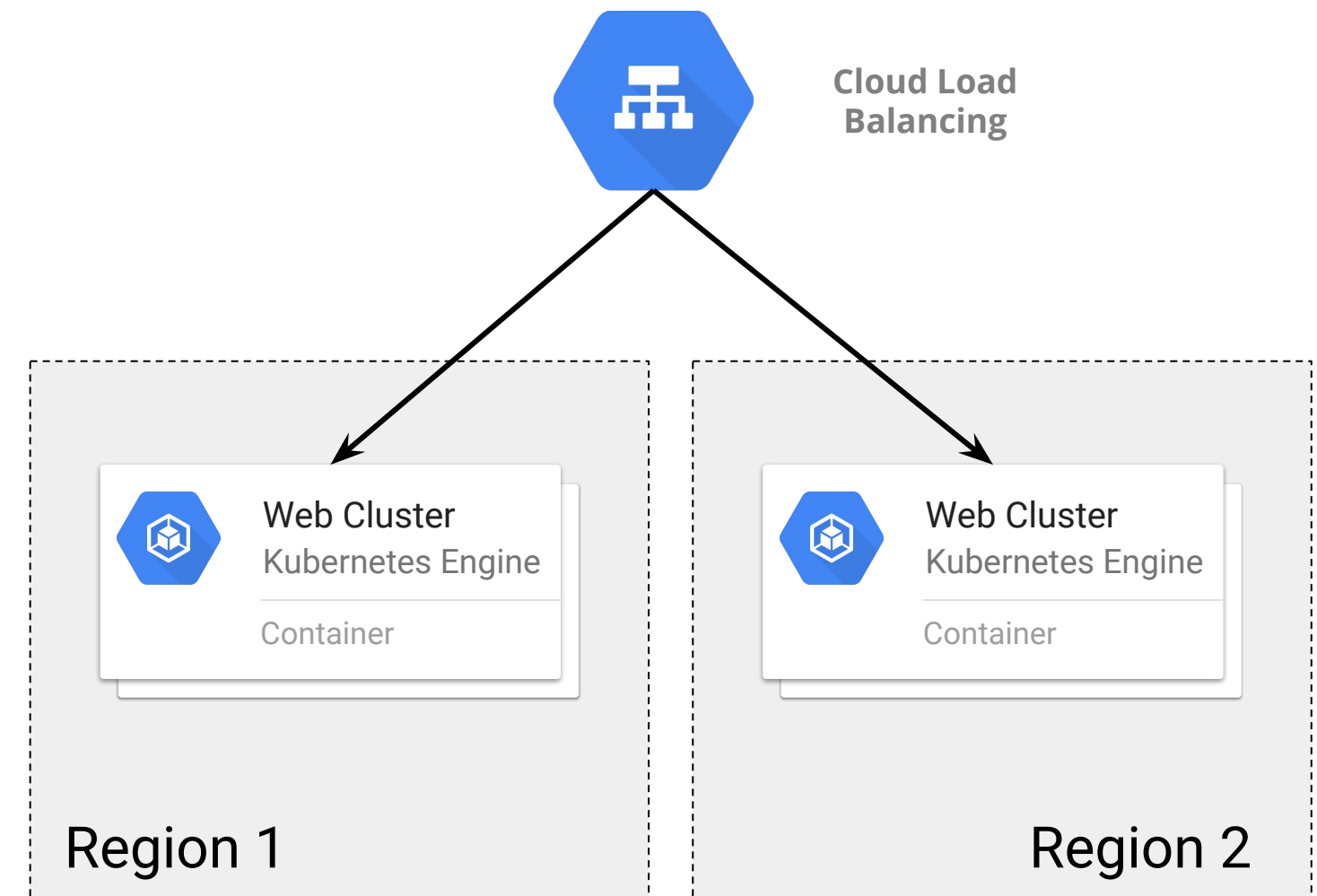
How to automatically and simultaneously deploy new code to each cluster?

- A. Use an automation tool, such as Jenkins.
- B. Change the clusters to activate federated mode.
- C. Use Parallel SSH with Google Cloud Shell and kubectl.
- D. Use Container Builder to publish the new images.



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Solution

- A - Jenkins handles automation and simultaneous deployment.
- B - Federated mode handles simultaneous, but not automation.
- C - Could work, but over-complicated, and will not scale well.
- D - Container Builder publishes to Container Registry, not to Clusters.



#6 Ensuring solution and operations reliability

Google Cloud

A microservice has intermittent problems that bursts logs. How can you trap it for live debugging?

- A. Log into machine with microservice and wait for the log messages.
- B. Look for error in Stackdriver Error Reporting dashboard.
- C. Configure microservice to send traces to Stackdriver Trace.
- D. Set a log metric in Stackdriver logging, alert on it past a threshold.



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Solution

D - A Stackdriver metric can identify a burst of log lines. You can set an alert. Then connect to the machine while the problem is happening.

A - Chances of catching it on one machine is low.

B - Error reporting won't necessarily catch the log lines unless they are stack traces in the proper format. Additionally just because there is a pattern doesn't mean you will know exactly when and where to log in to debug

C - Trace may tell you where time is being spent but won't let you hone in on the exact host that the problem is occurring on because you generally only send samples of traces. There is also no alerting on traces to notify exactly when the problem is happening.

documentation references

Dress4Win wants penetration security testing that primarily matches an end user perspective.

- A. Notify Google you are going to run a penetration test.
- B. Deploy scanners in the cloud and test from there.
- C. Use on prem scanners over VPN.
- D. Use on prem scanners over public Internet.



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- D. Use on prem scanners over public Internet. ✓**

Solution

D - on prem scanners will approach from outside, and over the public internet is where the users are.

A - Google doesn't require notification for this.

B - Scanners in the cloud wouldn't meet the "end user perspective"

C - VPN wouldn't match "end user perspective"

A sales company runs weekly resiliency tests of the current build in a separate environment by replaying the last holiday sales load. What can improve resiliency?

- A. Apply twice the load to the test.
- B. Run the resiliency tests daily instead of weekly.
- C. Use preemptible instances.
- D. Develop a script that mimics a zone outage and add it to the test.

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Solution

D - the goal is resiliency -- to see that the application continues to run and "bounces back" after the outage is over. Simulating a zone outage is one way to ensure that the application can really handle the loss of a zone.

A - Applying twice the load doesn't necessarily prove resiliency. That would be to test scale, which might be useful for future growth planning.

B - It is not clear why running the same tests more frequently would help with resilience. It might surface issues a few days earlier but at 7x the cost is it worthwhile?

C - Preemptible instances would reduce the cost of the test, but it doesn't prove that the application is resilient.

documentation references

Release failures keep causing rollbacks in a web application. Fixes to QA process reduced rollbacks by 80%. What additional steps can you take?

- A. Replace the platform's relational database systems with a NoSQL database.
- B. Fragment the monolithic platform into microservices.
- C. Remove the QA environment. Start executing canary releases.
- D. Remove the platform's dependency on relational database systems.

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- D. Remove the platform's dependency on relational database systems.

Solution

B - Smaller functional units means smaller releases with less "surface area" for problems to occur. More incremental rollouts. Fewer rollbacks.

C - Canary doesn't replace QA. It should be added. Plus, QA is proven to work.

A - NoSQL database offers no quality advantage over relational databases.

D - There is nothing inherent in a relational database that makes it impact the quality of releases.



Dress4Win

Business Requirements

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

Technical Requirements

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

MountKirk Games

Business Requirements

- ???
- More KPIs and Metrics and data

more key performance indicators (KPIs) to evaluate the speed and stability of the game, as well as other metrics that provide deeper insight into usage patterns so we can adapt the game to target users.

We are not capturing enough user demographic data, usage metrics, and other KPIs

Technical Requirements

Requirements for Game Backend Platform

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

Requirements for Game Analytics Platform

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

TerramEarth

Business Requirements

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

Technical Requirements

- ????
- Incremental innovations

