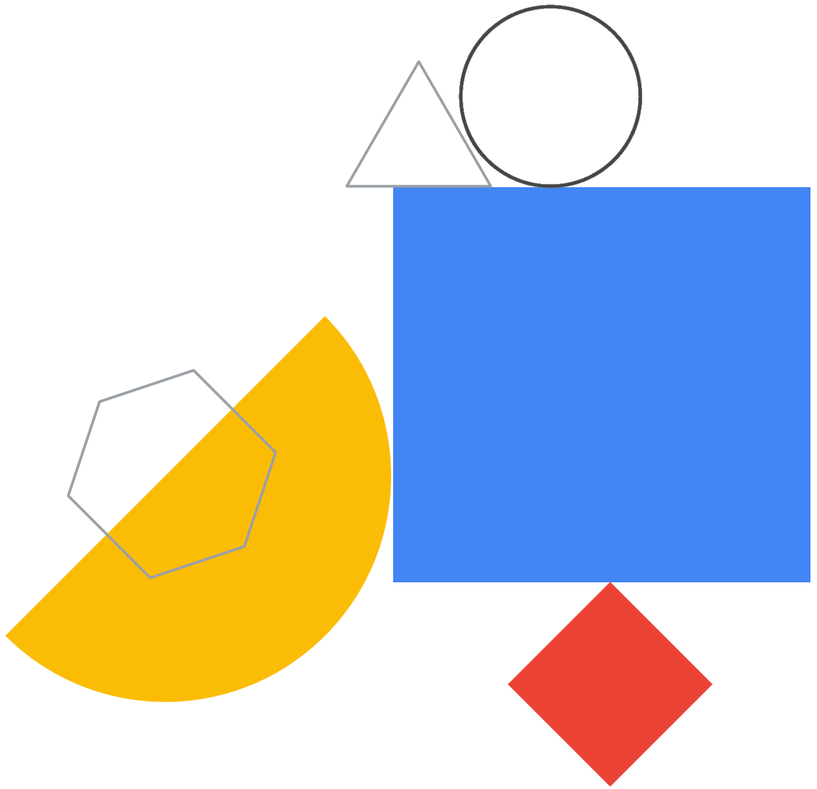
Google Cloud

Preparing for Your Associate Cloud Engineer Journey



Module 3: Deploying and Implementing a Cloud Solution

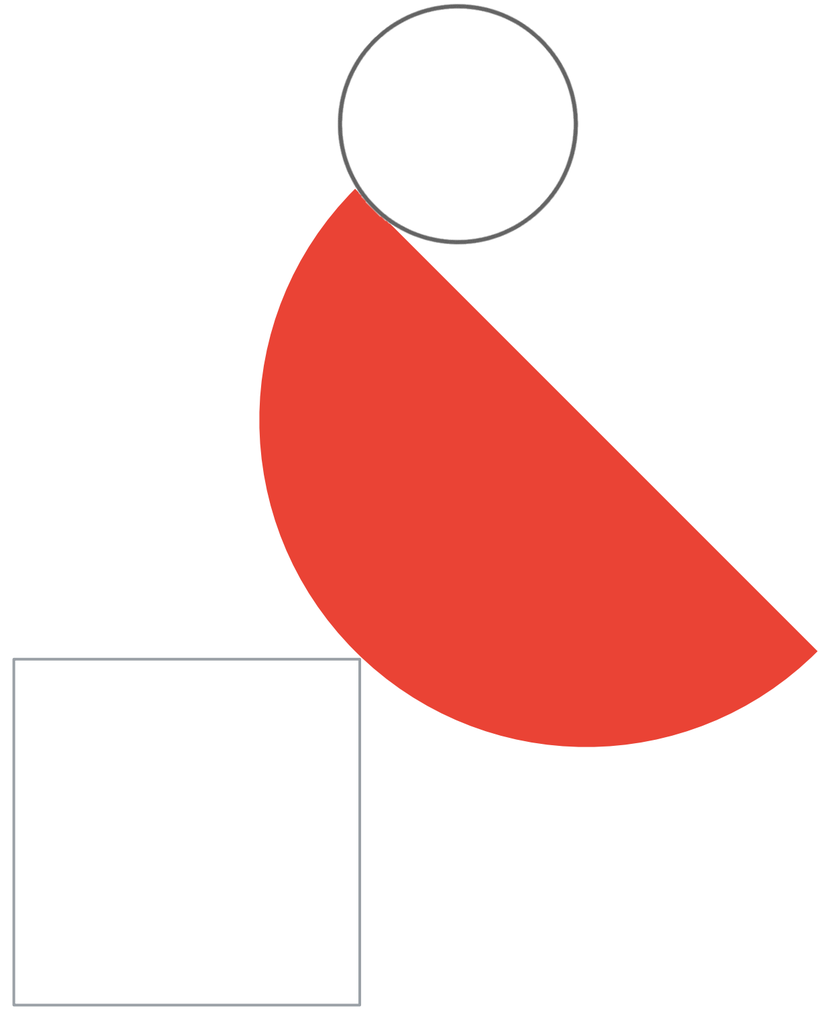
Module agenda

01 Deploying and implementing Cymbal Superstore’s cloud solutions

02 Diagnostic questions

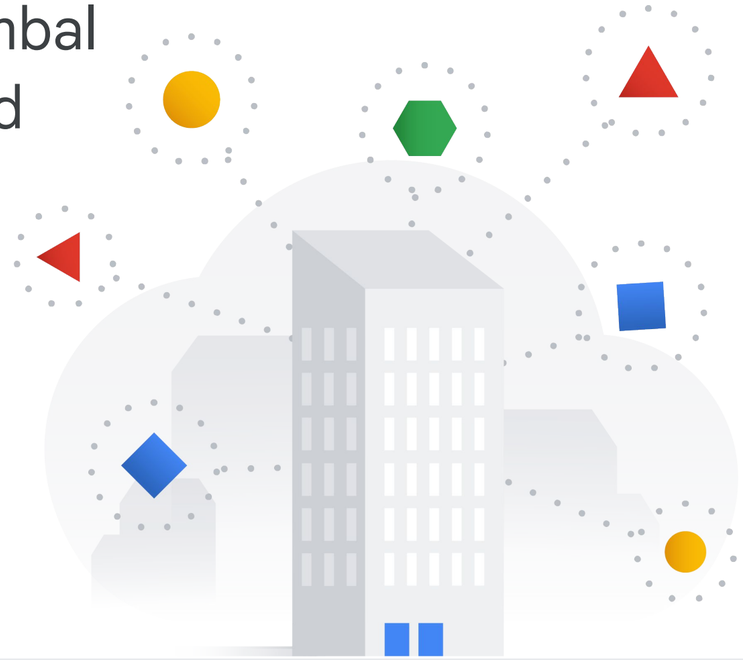
03 Review and study planning

Deploying and implementing Cymbal Superstore's cloud solutions



The next step:

Deploying and implementing Cymbal Superstore's cloud solutions



- Deploying and implementing Compute Engine resources
- Deploying and implementing Google Kubernetes Engine resources
- Deploying and implementing Cloud Run and Cloud Functions resources
- Deploying and implementing data solutions
- Deploying and implementing networking resources
- Implementing resources through infrastructure as code

Cymbal Superstore

Cymbal Superstore: Review our solutions

Ecommerce Cloud Solution

- Compute: Google Kubernetes Engine
- Data: Spanner
- Networking: Application Load Balancer
- Feed historic sales data to BigQuery

Transportation Management Cloud Solution

- Delivery: Pub/Sub
- Compute: Cloud Run functions
- Orchestration: Dataflow
- Storage: Bigtable
- Network: Regional

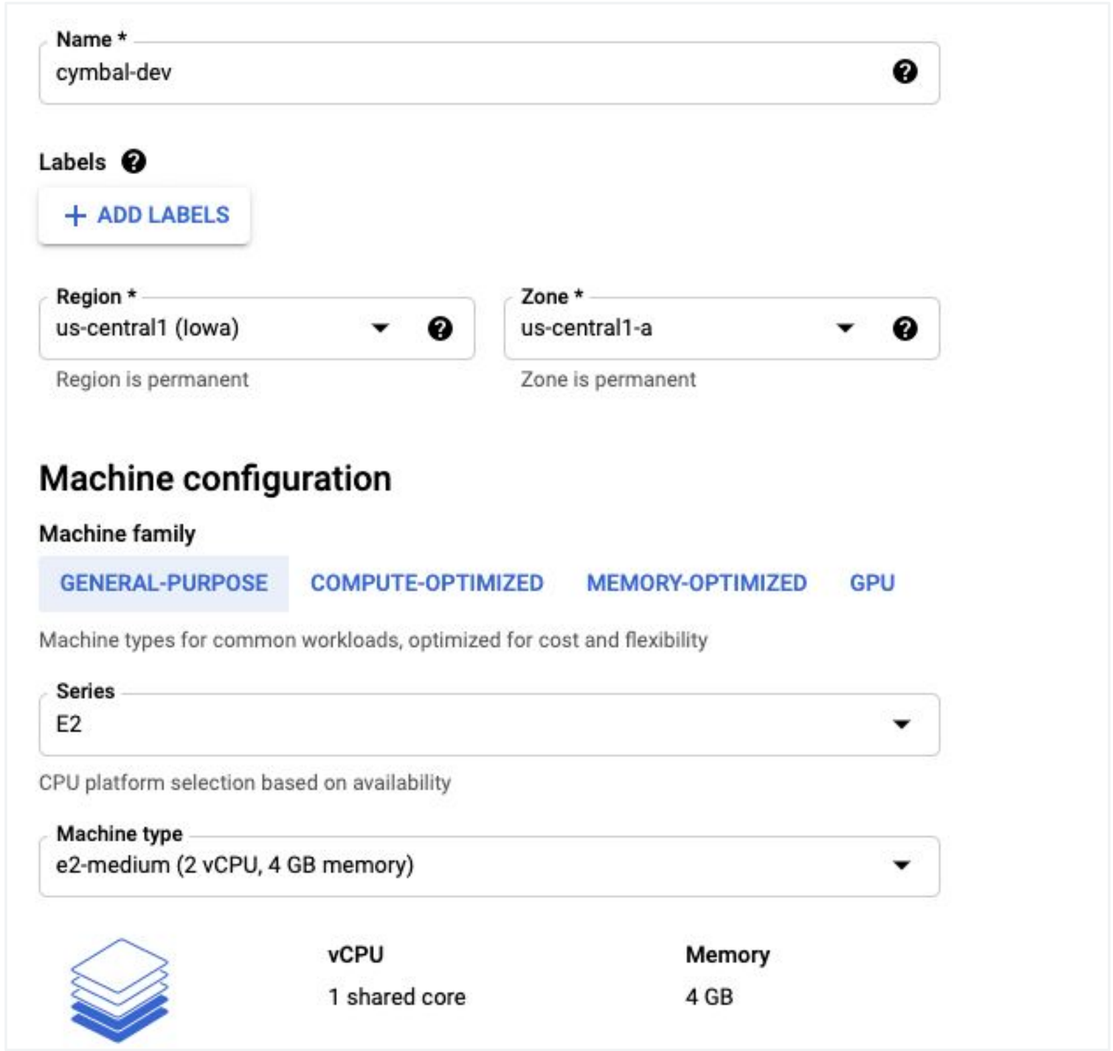
Supply Chain Cloud Solution

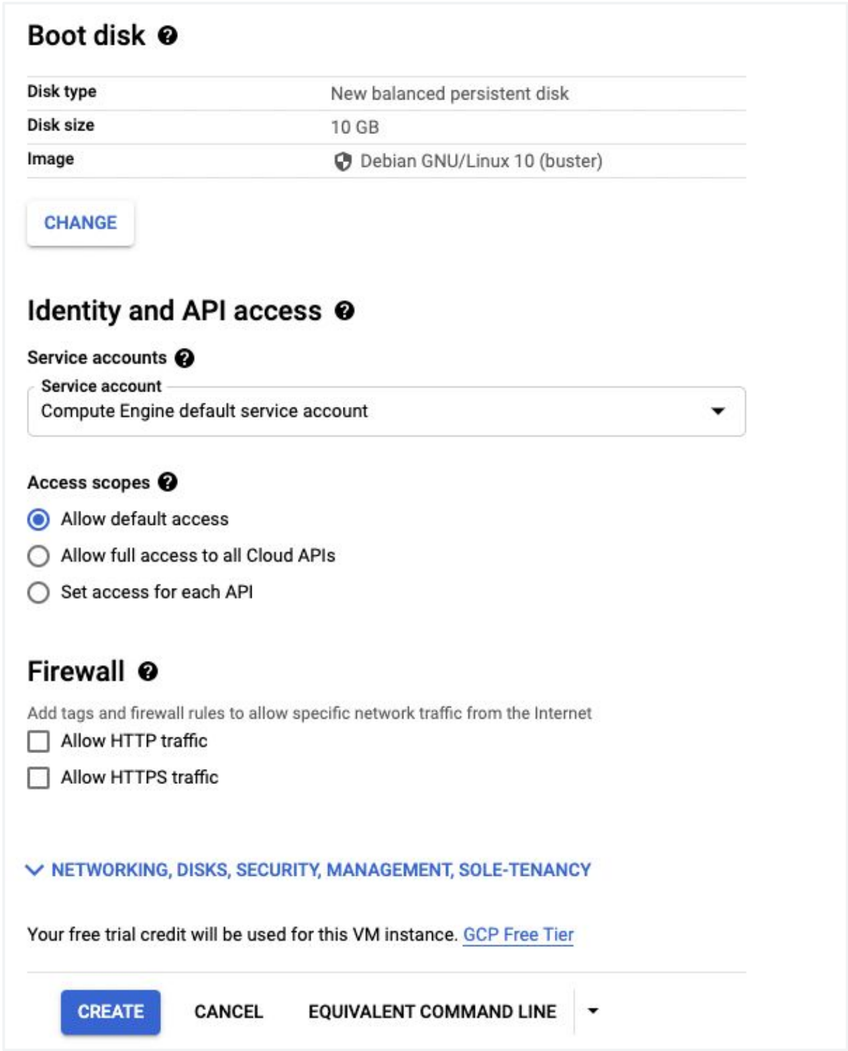
- Compute: Compute Engine
- Data: Cloud SQL
- Networking:
  - Internal to VPC for backing database
  - Regional External https access

Ways to interact

- Cloud Console
- Command line
- Programmatically

Implementing a compute instance





Ways to connect: CLI

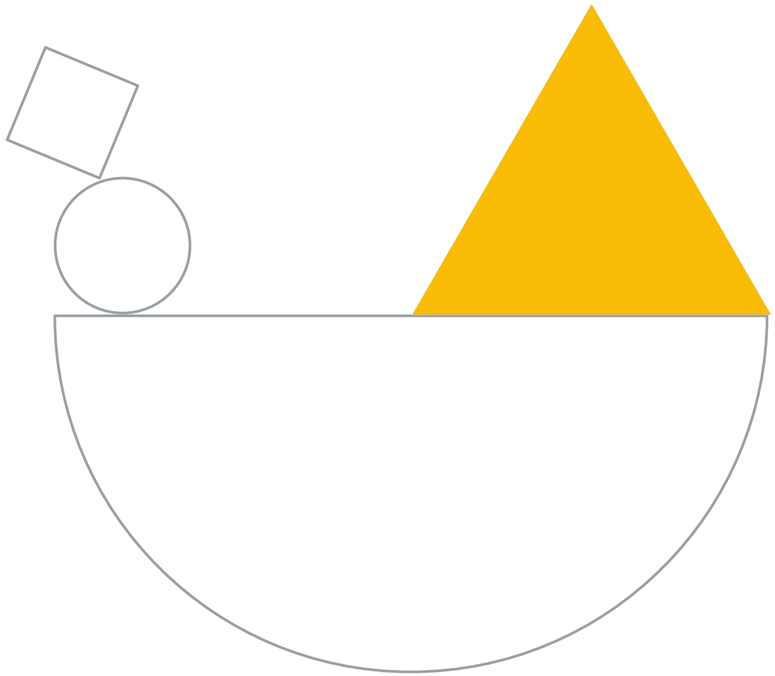
```
$ gcloud sql instances create
cymbal_supplychain_db --cpu 8 --memory
512MB --region us-central
```

Using serverless technologies:

Deploying code to Cloud Run functions

```
gcloud functions deploy trans_mg_function
--runtime python39 --trigger-topic
truck_data
```

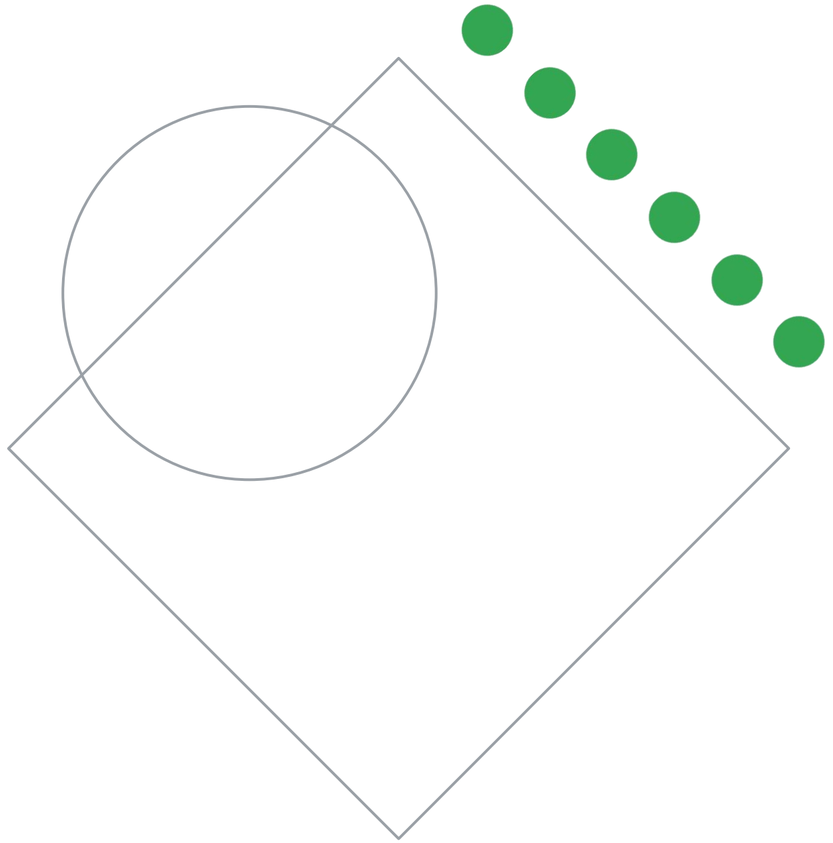
Diagnostic questions



Please complete the diagnostic questions now

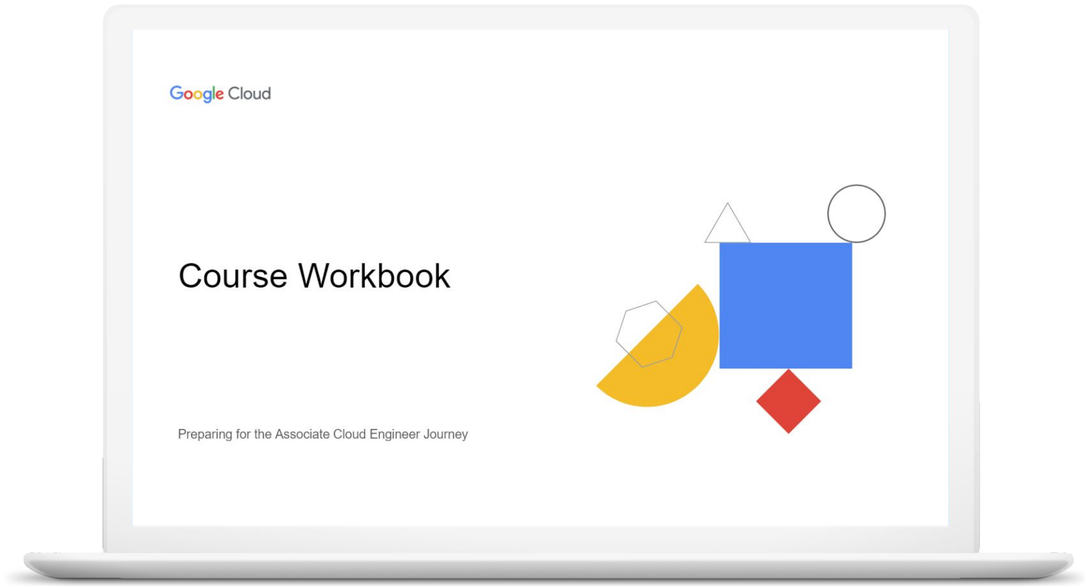
- The diagnostic questions are available in the workbook.

Review and study planning



Your study plan:

Deploying and implementing a cloud solution



3.1 Deploying and implementing Compute Engine resources

3.2 Deploying and implementing Google Kubernetes Engine resources

3.3 Deploying and implementing Cloud Run and Cloud Functions resources

3.4 Deploying and implementing data solutions

3.5 Deploying and implementing networking resources

3.6 Implementing resources via infrastructure as code

3.1 Deploying and implementing Compute Engine resources

Considerations include:

- Launching a compute instance (gcloud - e.g., assign disks, availability policy, SSH keys)
- Creating an autoscaled managed instance group using an instance template
- Configuring OS Login
- Configuring VM Manager

3.1 Diagnostic Question 01 Discussion

Cymbal Superstore's sales department has a medium-sized MySQL database. This database includes user-defined functions and is used internally by the marketing department at Cymbal Superstore HQ. The sales department asks you to migrate the database to Google Cloud in the most timely and economical way.

What should you do?

A. Find a MySQL machine image in Cloud Marketplace and configure it to meet your needs.

B. Implement a database instance using Cloud SQL, back up your local data, and restore it to the new instance.

C. Configure a Compute Engine VM with an N2 machine type, install MySQL, and restore your data to the new instance.

D. Use gcloud to implement a Compute Engine instance with an E2-standard-8 machine type, install, and configure MySQL.

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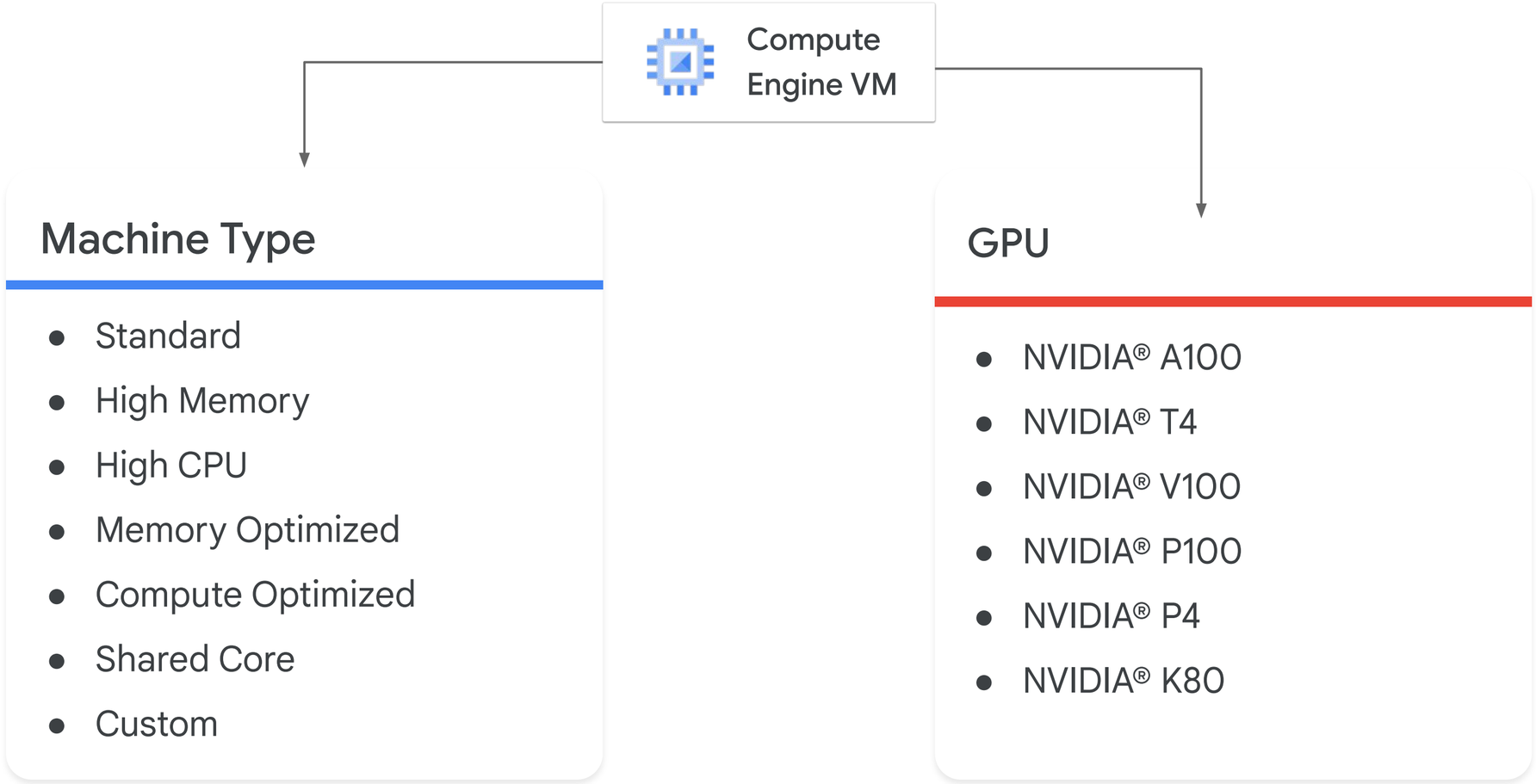
Compute Engine options



Summary of disk options

	Persistent disk HDD	Persistent disk SSD	Local SSD disk	RAM disk
Data redundancy	Yes	Yes	No	No
Encryption at rest	Yes	Yes	Yes	N/A
Snapshotting	Yes	Yes	No	No
Bootable	Yes	Yes	No	Not
Use case	General, bulk file storage	Very random IOPS	High IOPS and low latency	low latency and risk of data loss

3.1 Diagnostic Question 02 Discussion

The backend of Cymbal Superstore's e-commerce system consists of managed instance groups. You need to update the operating system of the instances in an automated way using minimal resources.

What should you do?

A. Create a new instance template. Click **Update VMs**. Set the update type to Opportunistic. Click **Start**.

B. Create a new instance template, then click **Update VMs**. Set the update type to PROACTIVE. Click **Start**.

C. Create a new instance template. Click **Update VMs**. Set max surge to 5. Click **Start**.

D. Abandon each of the instances in the managed instance group. Delete the instance template, replace it with a new one, and recreate the instances in the managed group.

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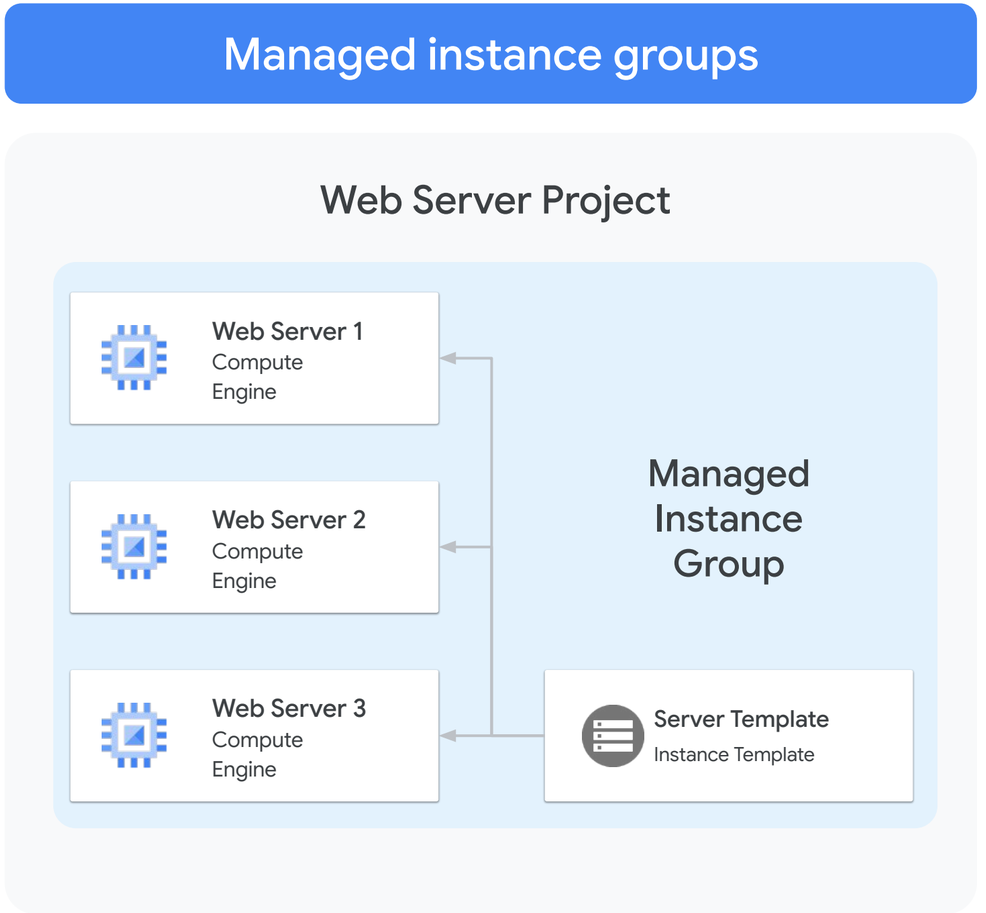
D. Abandon each of the instances in the managed instance group. Delete the instance template, replace it with a new one, and recreate the instances in the managed group.

Managed instance groups

- Deploy identical instances based on instance template
- Instance group can be resized
- Manager ensures all instances are RUNNING
- Typically used with autoscaler
- Can be single zone or regional



3.1 Deploying and implementing Compute Engine resources

Courses

[Google Cloud Fundamentals: Core Infrastructure](#)

- M3 Virtual Machines and Networks in the Cloud

[Architecting with Google Compute Engine](#)

- M3 Virtual Machines
- M9 Load Balancing and Autoscaling
- M10 Infrastructure Automation

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[Essential Google Cloud Infrastructure: Foundation](#)

- M3 Virtual Machines

[Elastic Google Cloud](#) [Infrastructure: Scaling and Automation](#)

- M2 Load Balancing and Autoscaling
- M3 Infrastructure Automation

Documentation

[Compute Engine documentation | Compute Engine Documentation](#)

[Creating managed instance groups | Compute Engine Documentation](#)

3.2 Deploying and Implementing Google Kubernetes Engine resources

Considerations include:

- Installing and configuring the command line interface (CLI) for Kubernetes (kubectl)
- Deploying a Google Kubernetes Engine cluster with different configurations (e.g., AutoPilot, regional clusters, private clusters, GKE Enterprise)
- Deploying a containerized application to Google Kubernetes Engine

3.2 Diagnostic Question 03 Discussion

The development team for the supply chain project is ready to start building their new cloud app using a small Kubernetes cluster for the pilot. The cluster should only be available to team members and does not need to be highly available. The developers also need the ability to change the cluster architecture as they deploy new capabilities.

How would you implement this?

A. Implement an autopilot cluster in us-central1-a with a default pool and an Ubuntu image.

B. Implement a private standard zonal cluster in us-central1-a with a default pool and an Ubuntu image.

C. Implement a private standard regional cluster in us-central1 with a default pool and container-optimized image type.

D. Implement an autopilot cluster in us-central1 with an Ubuntu image type.

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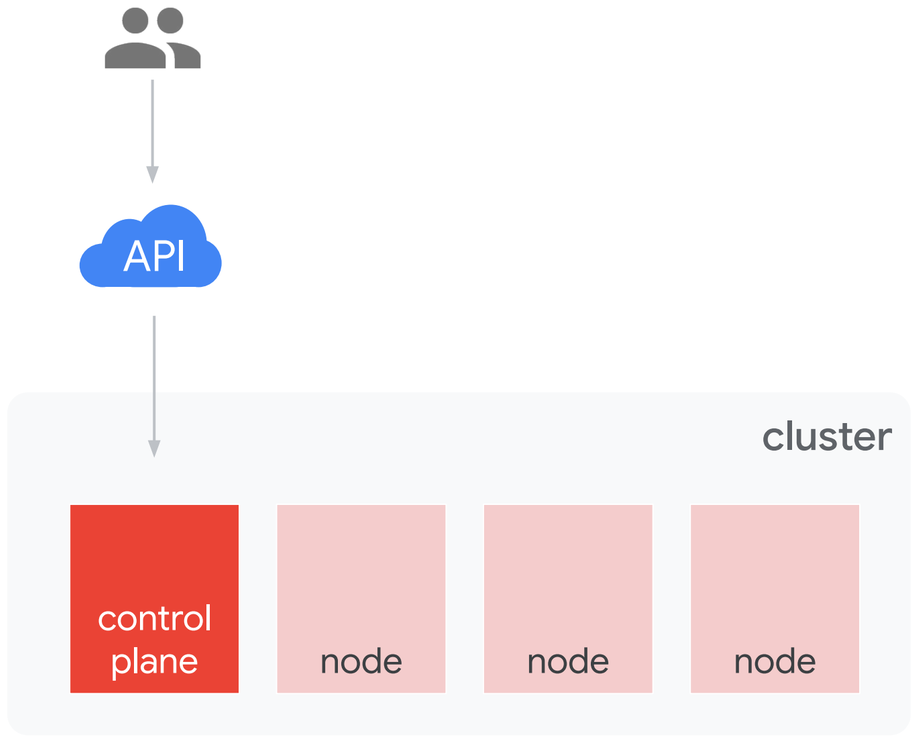
D. Implement an autopilot cluster in us-central1 with an Ubuntu image type.

You use Kubernetes APIs to deploy containers on a set of nodes called a cluster

- Nodes run containers.
- Nodes are VMs (in GKE they're Compute Engine instances).
- You describe the apps, Kubernetes figures out how to make that happen.



3.2 Deploying and Implementing Google Kubernetes Engine resources

Courses

[Google Cloud Fundamentals: Core Infrastructure](#)

- M5 Containers in the Cloud

[Getting Started with Google Kubernetes Engine](#)

- M2 Introduction to Containers and Kubernetes
- M3 Kubernetes Architecture

Skill Badge

Google Cloud

[Develop your Google Cloud Network](#)

Documentation

[Types of clusters | Kubernetes Engine Documentation](#)

3.3 Deploying and implementing Cloud Run and Cloud Run functions resources

Considerations include:

- Deploying an application
- Deploying an application for receiving Google Cloud events (e.g., Pub/Sub events, Cloud Storage object change notification events, Eventarc)

3.3 Diagnostic Question 04 Discussion

You need to quickly deploy a containerized web application on Google Cloud. You know the services you want to be exposed. You do not want to manage infrastructure. You only want to pay when requests are being handled and need support for custom packages.

What technology meets these needs?

A. App Engine flexible environment
B. App Engine standard environment
C. Cloud Run
D. Cloud Run functions

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What technology meets these needs?

A. App Engine flexible environment
B. App Engine standard environment
C. **Cloud Run** ✓
D. Cloud Run functions

Cloud Run capabilities

- Serverless Container management
- Based on a service resource
- A service exposes an endpoint
  - Regional
  - Replicated across zones
- Scales based on incoming requests

3.3 Diagnostic Question 05 Discussion

You need to analyze and act on files being added to a Cloud Storage bucket. Your programming team is proficient in Python. The analysis you need to do takes at most 5 minutes. You implement a Cloud Run function to accomplish your processing and specify a trigger resource pointing to your bucket.

How should you configure the --trigger-event parameter using gcloud?

A. --trigger-event google.storage.object.finalize
B. --trigger-event google.storage.object.create
C. --trigger-event google.storage.object.change
D. --trigger-event google.storage.object.add

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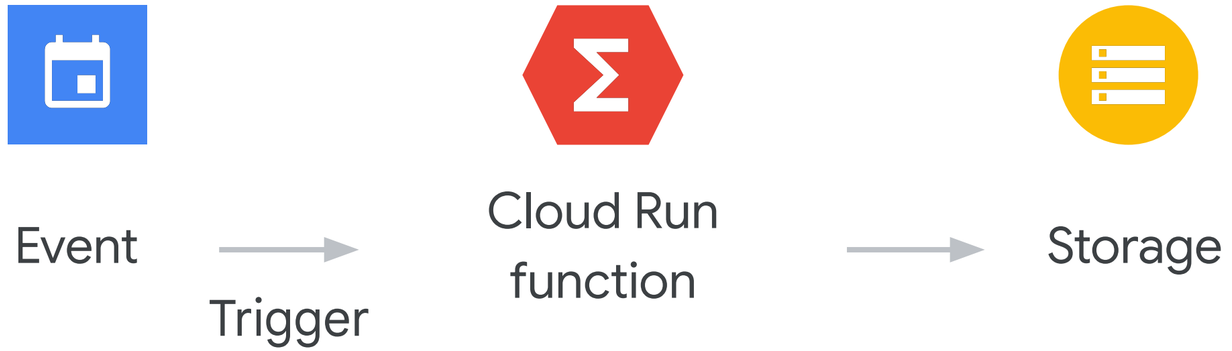
Cloud Run functions capabilities

- Serverless function execution
- Event based
- Functions trigger when an event occurs
- Scales by number of events received
- Functions are stateless - need to persist data if you need to share it outside the function



3.3 Deploying and implementing Cloud Run and Cloud Functions resources

Courses

Google Cloud Fundamentals: Core Infrastructure

- M6 Applications in the Cloud
- M7 Developing and Deploying in the Cloud

Documentation

Choose an App Engine environment | App Engine Documentation

Application Hosting Options

Cloud Run: What no one tells you about Serverless (and how it's done)

Cloud Run functions

3.4 Deploying and implementing data solutions

Considerations include:

- Deploying data products (e.g., Cloud SQL, Firestore, BigQuery, Spanner, Pub/Sub, Dataflow, Cloud Storage, AlloyDB)
- Loading data (e.g., command line upload, load data from Cloud Storage, Storage Transfer Service)

3.4 Diagnostic Question 06 Discussion

You require a Cloud Storage bucket serving users in New York City and San Francisco. Users in London will not use this bucket. You do not plan on using ACLs.

What CLI command do you use?

A. Run a ***gcloud storage objects*** command and specify --remove-acl-grant.

B. Run a ***gsutil mb*** command specifying a multi-regional location and an option to turn ACL evaluation off.

C. Run a ***gcloud storage buckets create*** command, but do not specify –-location.

D. Run a ***gcloud storage buckets create*** command specifying –-placement us-east1, europe-west2.

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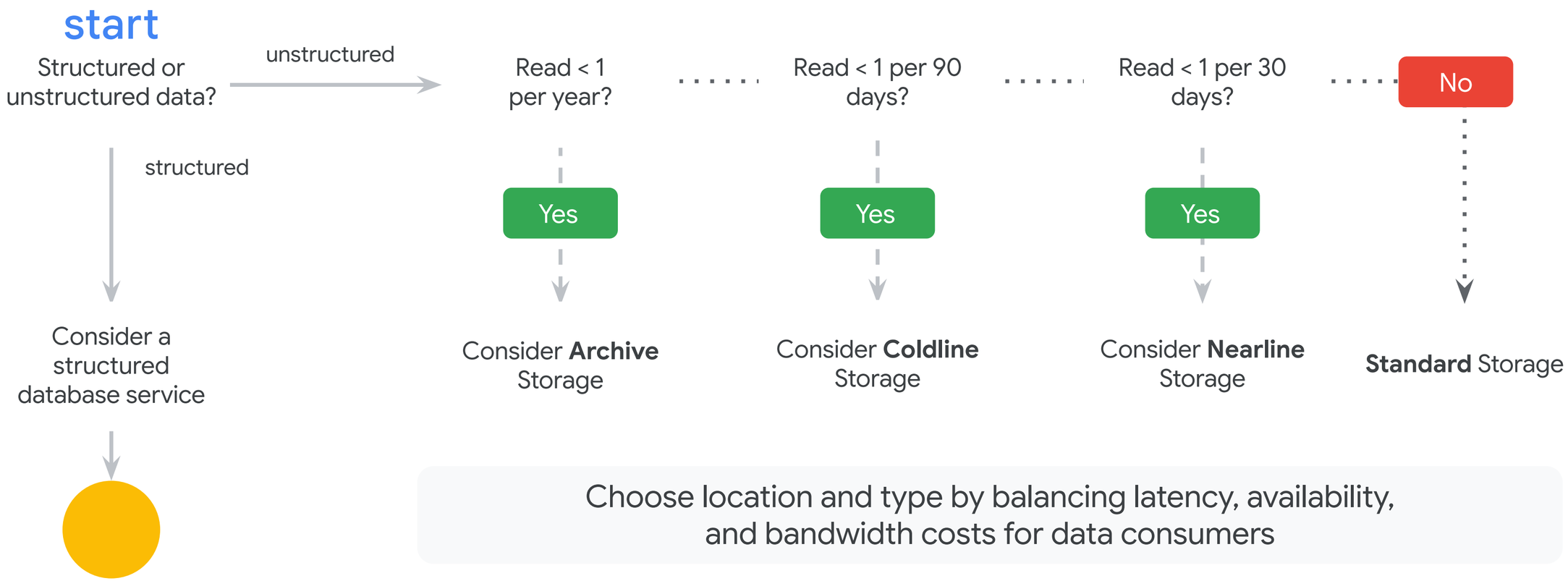
Choosing a storage class



Choose location and type by balancing latency, availability, and bandwidth costs for data consumers

3.4 Diagnostic Question 07 Discussion

Cymbal Superstore asks you to implement Cloud SQL as a database backend to their supply chain application. You want to configure automatic failover in case of a zone outage. You decide to use the ***gcloud sql instances create*** command set to accomplish this.

Which gcloud command line argument is required to configure the stated failover capability as you create the required instances?

A. --availability-type
B. --replica-type
C. --secondary-zone
D. --master-instance-name

3.4 Diagnostic Question 07 Discussion

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Which gcloud command line argument is required to configure the stated failover capability as you create the required instances?

A. **--availability-type**
B. --replica-type
C. --secondary-zone
D. --master-instance-name

Setting up a Cloud SQL instance

Cloud SQL is a Google Cloud service that manages a database instance for you.

These are the **steps** for setting up a Cloud SQL instance:

1. Create instance
2. Select database type
3. Enter name
4. Enter password for root user
5. Select proper version
6. Select region and zone
7. Select primary and secondary zone
8. Config settings

3.4 Diagnostic Question 08 Discussion

Cymbal Superstore's marketing department needs to load some slowly changing data into BigQuery. The data arrives hourly in a Cloud Storage bucket. You want to minimize cost and implement this in the fewest steps.

What should you do?

A. Implement a ***bq load*** command in a command line script and schedule it with cron.

B. Read the data from your bucket by using the BigQuery streaming API in a program.

C. Create a Cloud Run function to push data to BigQuery through a Dataflow pipeline.

D. Use the BigQuery Data Transfer Service to schedule a transfer between your bucket and BigQuery.

3.4 Diagnostic Question 08 Discussion

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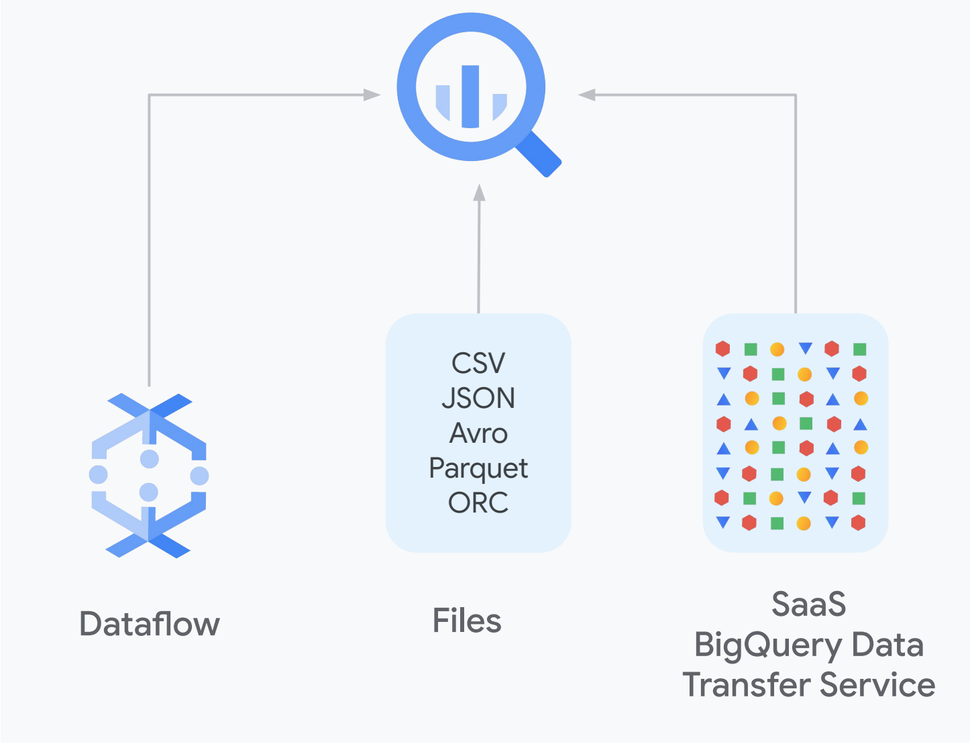
Ways to batch load data into BigQuery

Loading data into BigQuery tables (batch, periodic) offers the best performance.



3.4 Deploying and implementing data solutions

Courses

[Google Cloud Fundamentals: Core Infrastructure](#)

- M4 Storage in the Cloud

[Architecting with Google Compute Engine](#)

- M5 Storage and Database Services

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[Essential Google Cloud Infrastructure: Core Services](#)

- M2 Storage and Database Services

Skill Badges

Google Cloud

[Set Up an App Dev Environment on Google Cloud](#)

Google Cloud

[Develop your Google Cloud Network](#)

Documentation

[Creating storage buckets | Cloud Storage](#)

[What is Cloud Storage?](#)

[Cloud SQL for MySQL features](#)

[Creating instances | Cloud SQL for MySQL](#)

[How to load, import, or ingest data into BigQuery for analysis](#)

[Introduction to loading data | BigQuery](#)

3.5 Deploying and implementing networking resources

Considerations include:

- Creating a VPC with subnets (e.g., custom-mode VPC, shared VPC)
- Creating ingress and egress firewall rules and policies (e.g., IP subnets, network tags, service accounts)
- Peering external networks (e.g., Cloud VPN, VPC Network Peering)

3.5 Diagnostic Question 09 Discussion

Which Virtual Private Cloud (VPC) network type allows you to fully control IP ranges and the definition of regional subnets?

A. Default Project network
B. Auto mode network
C. Custom mode network
D. An auto mode network converted to a custom network

3.5 Diagnostic Question 09 Discussion

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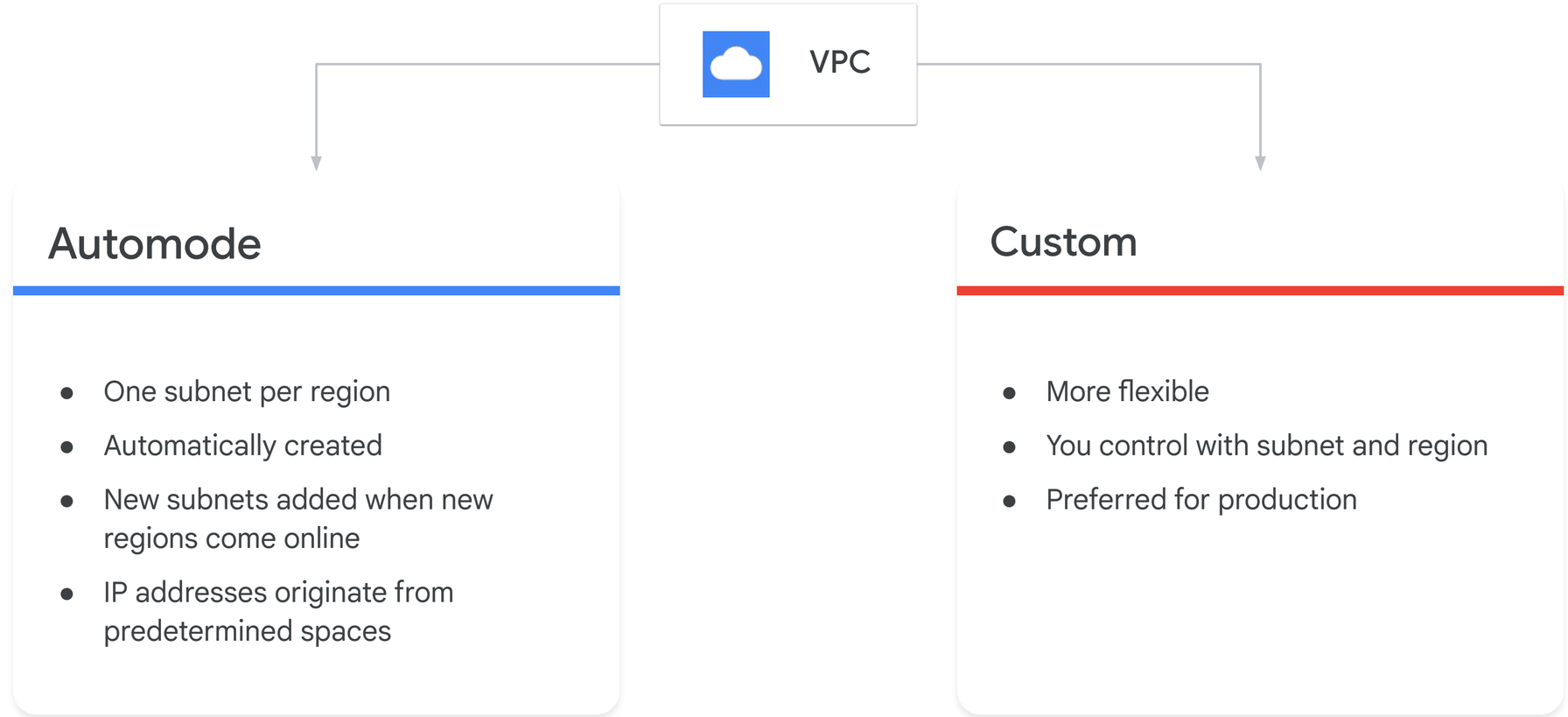
Compute Engine options



3.5 Deploying and implementing networking resources

Courses

[Architecting with Google Compute Engine](#)

- M2 Virtual Networks

=

[Essential Google Cloud Infrastructure: Foundation](#)

- M2 Virtual Networks

Skill Badge

Google Cloud

[Develop your Google Cloud Network](#)

Documentation

[VPC network overview](#)

3.6 Implementing resources through infrastructure as code

- Infrastructure as code tooling (e.g., Cloud Foundation Toolkit, Config Connector, Terraform, Helm)

3.6 Diagnostic Question 10 Discussion

What action does the ***terraform*** apply command perform?

A. Downloads the latest version of the terraform provider.

B. Verifies syntax of terraform config file.

C. Shows a preview of resources that will be created.

D. Sets up resources requested in the terraform config file.

3.6 Diagnostic Question 10 Discussion

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Terraform lifecycle

3.6 Implementing resources through infrastructure as code

Courses

[Architecting with Google Compute Engine](#)

- M10 Infrastructure Automation

=

[Elastic Google Cloud Infrastructure: Scaling and Automation](#)

- M3 Infrastructure Automation

Skill Badge

Google Cloud

[Build Infrastructure with Terraform on Google Cloud](#)

Documentation

[Introduction](#)

[Using Terraform with Google Cloud](#)

Knowledge Check 1

Which data storage service is a unique globally available, horizontally scalable database with relational semantics?

A. BigQuery

B. Cloud SQL

C. Spanner

D. Bigtable

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Knowledge Check 2

Which services are based on logic implemented in containers? (Pick two.)

A. Cloud Run functions

B. Cloud Run

C. Google Kubernetes Engine

D. Compute Engine

E. Managed instance groups

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