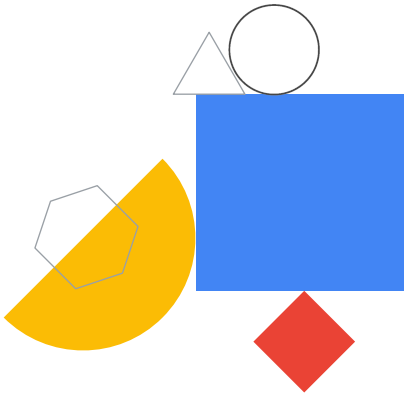
Google Cloud

Preparing for Your Associate Cloud Engineer Journey



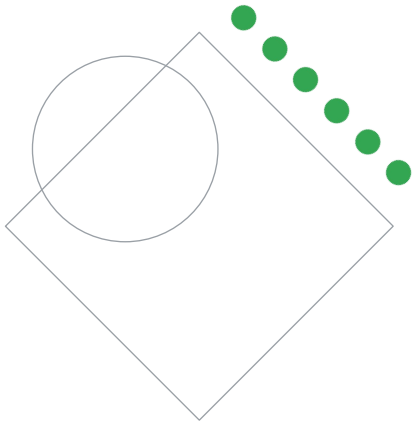
Module 3: Deploying and Implementing Cloud Solutions

Welcome to Module 3: Deploying and Implementing Cloud Solutions.

Please complete the diagnostic questions now

- Forms are provided for you to answer the diagnostic questions
- The instructor will provide you a link to the forms
- The diagnostic questions are also available in the workbook

Review and study planning

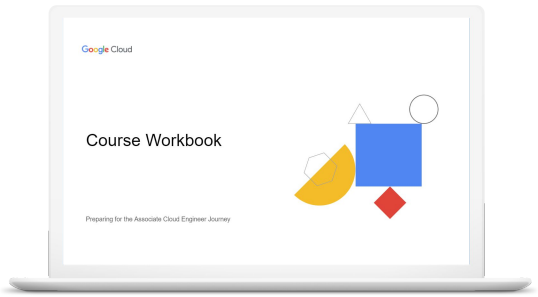


Google Cloud

There’s much to cover in this section of the exam guide just as there’s much for an Associate Cloud Engineer to do when deploying and implementing cloud solutions. Let’s review the diagnostic questions to help you target your study time to focus on the areas you need to develop your skills the most.

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	Deploying a solution using Cloud Marketplace
3.7	Implementing resources via infrastructure as code

Google Cloud

We'll approach this review by looking at the objectives of this exam section and the questions you just answered about each one. We'll introduce an objective, briefly review the answers to the related questions, then talk about where you can find out more in the learning resources and/or in Google Cloud documentation. As we go through each section objective, use the page in your workbook to mark the specific documentation, courses (and modules!), and quests you'll want to emphasize in your study plan.

As you can see, there are multiple objectives in this section that have many related tasks so you will probably need to plan for more study time.

3.1 Deploying and implementing Compute Engine resources

Tasks include:

- Launching a compute instance using Cloud Console and Cloud SDK (GCloud - for example, assign disks, availability policy, SSH keys)
- Creating an autoscaled managed instance group using an instance template
- Generating/uploading a custom SSH key for instances
- Installing and configuring the Cloud Monitoring and Logging Agent
- Assessing compute quotas and requesting increases

Google Cloud

Cymbal Superstore uses Compute Engine for their supply chain application to Google Cloud because they need control over the operating system used by VMs.

Deploying Compute Engine resources can include a range of tasks such as launching compute instances through the console or cloud sdk and creating identical managed groups of instances based on an image template. Access requirements might have you implement SSH keys for you instances. Knowing how to deploy a monitoring agent on your instances is important to know so you can track performance and make changes when needed. Finally, if the number of instances starts bumping up against your project quotas you might need to request increases.

These are the diagnostic questions you answered that relate to this area:
Question 1: Describe how to configure VMs using Compute Engine machine types (settings such as memory and CPU, GPU if necessary, disk type, temp space)
Question 2: Apply concepts of managed instance groups, such as availability, scalability, and automated updates

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.

Google Cloud

Question:
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.
Feedback: Incorrect. This meets the requirements but is not the most timely way to implement a solution because it requires additional manual configuration.

B. Implement a database instance using Cloud SQL, back up your local data, and restore it to the new instance.
Feedback: Incorrect. Cloud SQL does not support user-defined functions, which are used in the database being migrated.

*C. Configure a Compute Engine VM with an N2 machine type, install MySQL, and restore your data to the new instance.
Feedback: Correct! N2 is a balanced machine type, which is recommended for medium-large databases.

D. Use gcloud to implement a Compute Engine instance with an E2-standard-8

machine type, install, and configure MySQL.
Feedback: Incorrect. E2 is a cost-optimized machine type. A recommended machine type for a medium-sized database is a balanced machine type.

Where to look: https://cloud.google.com/compute/docs/

Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M3 Virtual Machines in the Cloud
  - Architecting with Google Compute Engine
    - M3 Virtual Machines

Summary:
Explanation/summary on the following slides.

Memory, CPU and GPU

Machine type	CPU/Memory Ratio
Standard	1 vCPU/3.75 GB memory
High Memory	1 vCPU/6.5 GB memory
High CPU	1 vCPU/.9 GB memory
Memory optimized	1 vCPU/>14 GB memory
Compute optimized	3.8 GHz all-core turbo
Shared Core	.2 vCPU/0.6 GB memory (f1)
Custom	Even # of CPU's/memory in increments of 256 MB

GPU for compute workloads:
NVIDIA® A100
NVIDIA® T4
NVIDIA® V100
NVIDIA® P100
NVIDIA® P4
NVIDIA® K80

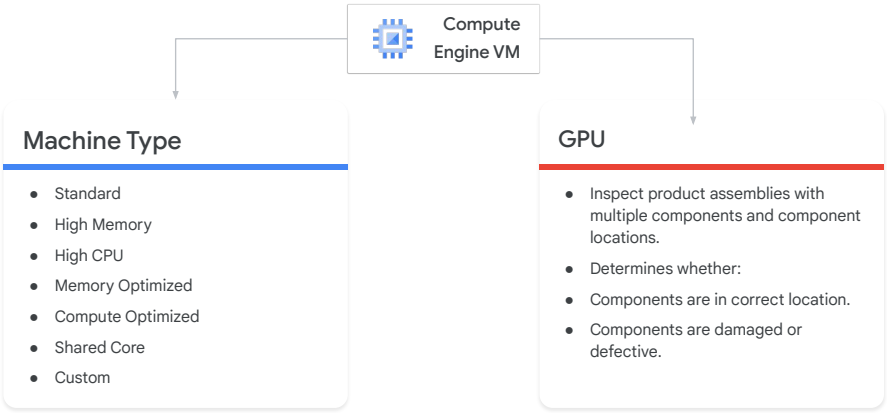
can be attached to predefined or custom machine types

Google Cloud

Compute Engine allows you to pick the amount of memory and CPU from predefined machine types. Machine types are divided into standard, high memory, high cpu, memory-optimized, compute-optimized or shared-core categories. If none of these meet your needs, you can also create a VM with the specific resources you need.

If you need GPU support for a compute-heavy workload, you can choose to attach GPUs to certain machine types. You can only use GPUs with general-purpose N1 VMs or accelerator-optimized A2 VMs. Availability of these machine types varies by zone, so make sure you pick a zone that has GPU capability.

Compute Engine options



Google Cloud

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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

Google Cloud

Storage options for your instances include zonal persistent disks, regional persistent disks, and local SSD. Persistent disks are built on network storage devices that are separate from the physical hardware your instance is running on. Each persistent disk references data distributed across several physical disks. Regional persistent disks share replicas of the physical disks across two zones, so you are protected from a single zone outage. Disk types you can attach to your virtual machine include standard (HDD), SSD, or local SSD. When you create a virtual machine instance in the console it uses balanced SSD, while when you create one via a gcloud command, it uses standard HDD. Balanced SSD gives you higher I/O than standard HDD, but less cost and I/O than fully capable SSD disks.

Local SSDs can be added to your instances based on machine type. They provide very high I/O since they are physically connected to the server your VM is running on. They are ephemeral, and thus go away when your VM is stopped or terminated. Data on your local SSD will survive a reboot. You are responsible for formatting and striping the local SSD per your requirements.

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.

Google Cloud

Questions:
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 do you do?

A. Create a new instance template. Click **Update VMs**. Set the update type to Opportunistic. Click **Start**.
Feedback: Incorrect. Opportunistic updates are not interactive.

*B. Create a new instance template, then click **Update VMs**. Set the update type to PROACTIVE. Click **Start**.
Feedback: Correct! This institutes a rolling update where the surge is set to 1 automatically, which minimizes resources as requested.

C. Create a new instance template. Click **Update VMs**. Set max surge to 5. Click **Start**.
Feedback: Incorrect. Max surge creates 5 new machines at a time. It does not use minimal resources.

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.
Feedback: Incorrect. This is not an automated approach. The abandoned instances

are not deleted or replaced. It does not minimize resource use.

Where to look:
https://cloud.google.com/compute/docs/instance-groups/creating-groups-of-managed-instances

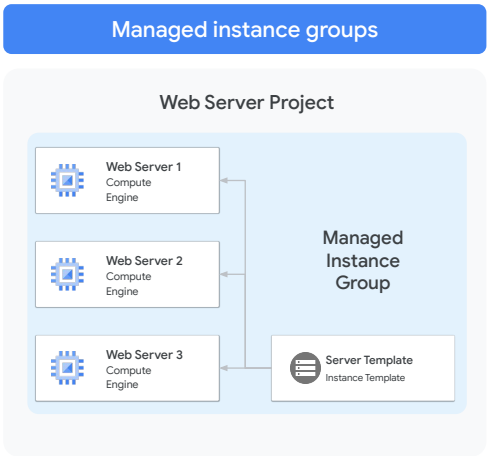
Content mapping:

- Instructor-led Training/OnDemand
  - Architecting with Google Compute Engine
    - M9 Load Balancing and Autoscaling
    - M10 Infrastructure Automation

Summary:
Explanation/summary on the following slide.

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



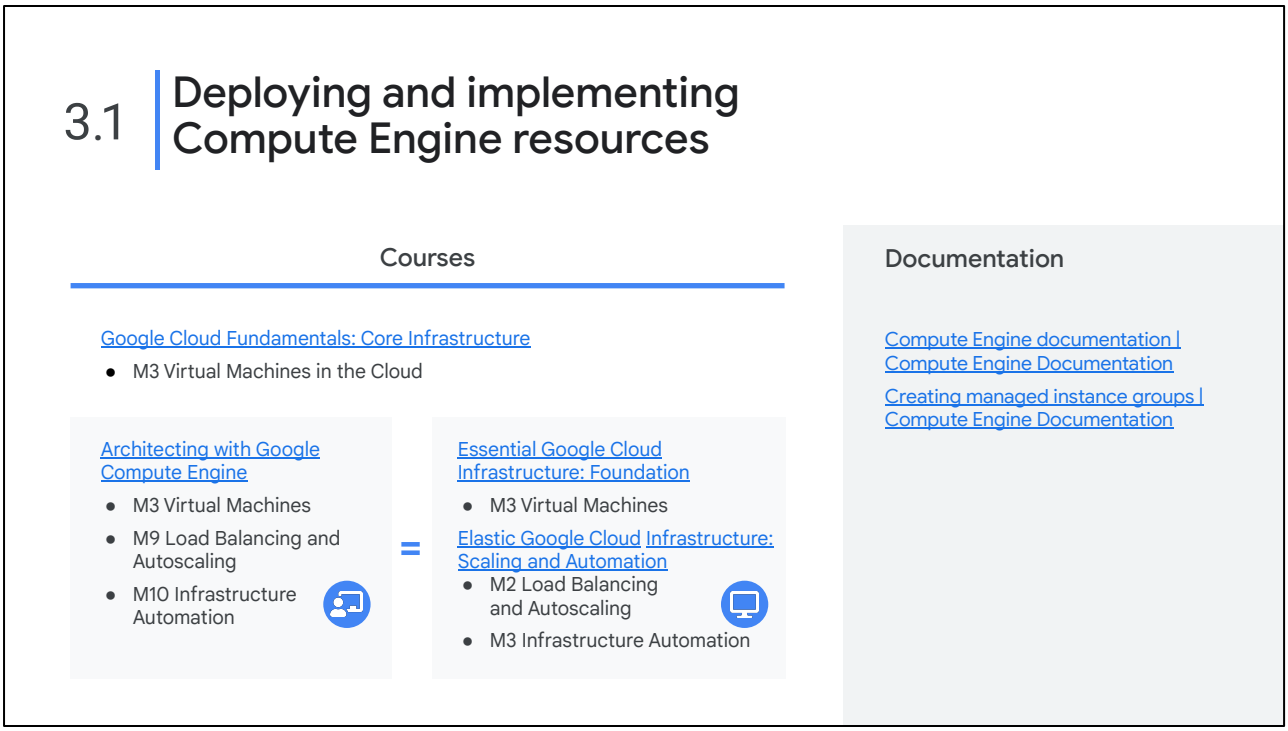
Google Cloud

Summary: Concepts

- Availability - a managed instance group ensures availability by keeping VM instances running. If a VM fails or stops, the MIG recreates it based on the instance template. You can make your MIG health checks application-based, which looks for an expected response from your application. The MIG will automatically recreate VMs that are not responding correctly. Another availability feature is spreading load across multiple zones using a regional MIG. Finally, you can use a load balancer to evenly distribute traffic across all instances in the group.

- Scalability - you can define autoscaling policies to grow instances in the group to meet demand. They can also scale back down when load drops which reduces cost.

- Automated updates - when it comes time to update software, automated updates lets you define how you will upgrade the instances in a group. You can specify how many resources to use and how many instances can be unavailable at the same time. Available update scenarios include rolling updates and canary updates. Rolling updates define how you want all instances eventually upgraded to the new template. Canary updates let you specify a certain number of instances to upgrade for testing purposes.



Let's take a moment to consider resources that can help you build your knowledge and skills in this area.

The concepts in the diagnostic questions we just reviewed are covered in these modules and documentation. You'll find this list in your workbook so you can take a note of what you want to include later when you build your study plan. Based on your experience with the diagnostic questions, you may want to include some or all of these.

https://cloud.google.com/compute/docs/
https://cloud.google.com/compute/docs/instance-groups/creating-groups-of-managed-instances

3.2 Deploying and Implementing Google Kubernetes Engine resources

Tasks include:

- Installing and configuring the command line interface (CLI) for Kubernetes (kubectl)
- Deploying a Kubernetes Engine cluster with different configurations including AutoPilot, regional clusters, private clusters, etc.
- Deploying a containerized application to Kubernetes Engine
- Configuring Google Kubernetes Engine monitoring and logging

Google Cloud

Cymbal Superstore opted to migrate their on-premises, container-based e-commerce application to GKE. As an Associate Cloud Engineer, you should be comfortable with the Kubernetes CLI, kubectl, and the steps to deploy clusters and applications to GKE. You'll also need to configure monitoring and logging in GKE.

This diagnostic question addressed GKE deployments:
Question 3 Create a container development and management environment using 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.

Google Cloud

Question:
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.
Feedback: Incorrect. Autopilot clusters are regional and us-central1-a specifies a zone. Also, autopilot clusters are managed at the pod level.

*B. Implement a private standard zonal cluster in us-central1-a with a default pool and an Ubuntu image.
Feedback: Correct! Standard clusters can be zonal. The default pool provides nodes used by the cluster.

C. Implement a private standard regional cluster in us-central1 with a default pool and container-optimized image type.
Feedback: Incorrect. The container-optimized image that supports autopilot type does not support custom packages.

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

Feedback: Incorrect. Autopilot doesn't support Ubuntu image types.

Where to look:
https://cloud.google.com/kubernetes-engine/docs/concepts/types-of-clusters

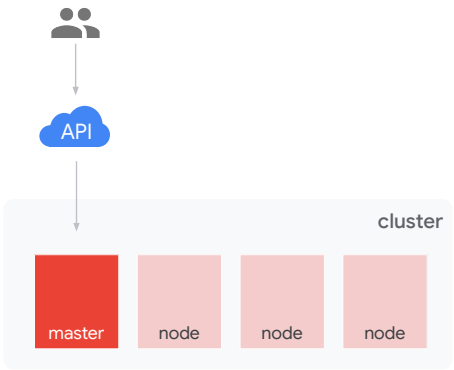
Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M5 Containers in the Cloud
  - Getting Started with GKE
    - M2 Introduction to Containers and Kubernetes
    - M3 Kubernetes Architecture
- Quests
  - Set Up and Configure a Cloud Environment in Google Cloud (https://www.qwiklabs.com/quests/119)

Summary:
Explanation/summary on the following slide.

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

- Masters run the control plane.
- 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.



- Mode - GKE has to modes to choose from: autopilot mode and standard mode. Autopilot is fully-provisioned and managed. You are charged according to the resources pods use as you deploy and replicate them based on the pod spec. Standard mode provides you flexibility to define and manage the cluster structure yourself.

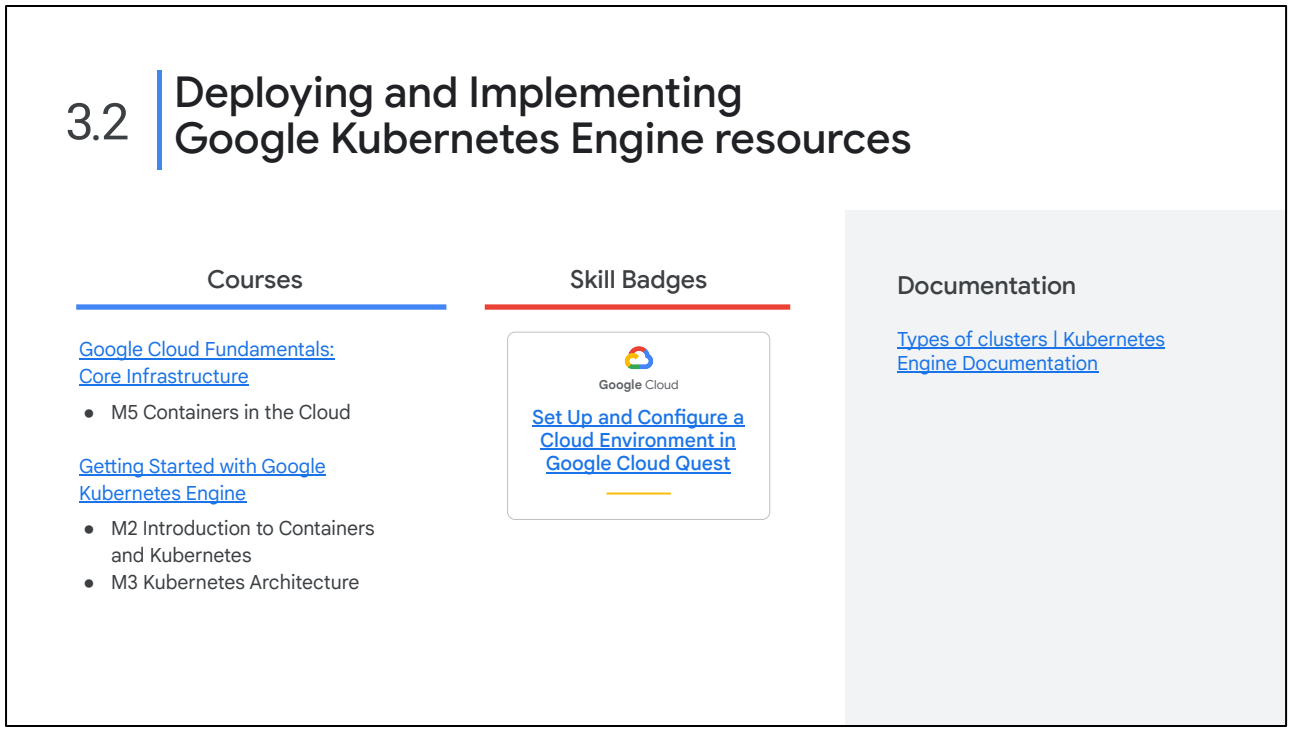
- Availability - in a GKE cluster, availability deals with both the control plane and the distribution of your nodes. A zonal cluster has a single control plane in a single zone. You can distribute the nodes of a zonal cluster across multiple zones, providing node availability in case of a node outage. A regional cluster, on the other hand, has multiple replicas of the control plane in multiple zones with a given region. Nodes in a regional cluster are replicated across three zones, though you can change this behavior as you add new node pools.

Version: At setup you can choose to load a specific version of GKE or enroll in a release channel. If you don't specify either one of those, the current default version is chosen. It is a best practice to enable auto-upgrade for cluster nodes and the cluster itself.

Network routing: Routing between pods in GKE can be accomplished using alias IPs or Google Cloud Routes. The first option is also known as a VPC-native cluster, and the second one is called a routes-based cluster.

Network Isolation: Public GKE networks let you set up routing from public networks to your cluster. Private networks use internal addresses for pods and nodes and are isolated from public networks.

Features: Cluster features for Kubernetes will be either Alpha, Beta, or Stable, depending on their development status.



Let's take a moment to consider resources that can help you build your knowledge and skills in this area.

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https://cloud.google.com/kubernetes-engine/docs/concepts/types-of-clusters

3.3 Deploying and implementing Cloud Run and Cloud Functions resources

Tasks include, where applicable:

- Deploying an application and updating scaling configuration, versions, and traffic splitting
- Deploying an application that receives Google Cloud events (for example, Pub/Sub events, Cloud Storage object change notification events)

Google Cloud

Cymbal Superstore's transportation management application uses Cloud Functions. An Associate Cloud Engineer should be able to deploy and implement serverless solutions, such as this one which receives Google Cloud events.

These types of tasks were covered in the following questions:
Question 4.) Differentiate among serverless options including App Engine standard and flexible environment, and Cloud Run.
Question 5.) Describe event function as a service capabilities of Cloud Functions.

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
B. App Engine Standard
C. Cloud Run
D. Cloud Functions

Google Cloud

Question:
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
Feedback: Incorrect. App Engine Flexible does not scale to zero.

B. App Engine Standard
Feedback: Incorrect. App Engine Standard does not allow custom packages.

*C. Cloud Run
Feedback: Correct! Cloud Run is serverless, exposes your services as an endpoint, and abstracts all infrastructure.

D. Cloud Functions
Feedback: Incorrect. You do not deploy your logic using containers when developing for Cloud Functions. Cloud Functions executes small snippets of code in a serverless way.

Where to look:
https://cloud.google.com/appengine/docs/the-appengine-environments

https://cloud.google.com/hosting-options
https://cloud.google.com/blog/topics/developers-practitioners/cloud-run-story-serverless-containers

Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M6 Applications in the Cloud

Summary:
Explanation/summary on the following slide.

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

Google Cloud

- Cloud Run provides a service to manage containers in a serverless way, which means you don't need to manage infrastructure when you deploy an application. The main resource container for Cloud Run is a service. A service is a regional resource that is replicated in multiple zones and exposed as an endpoint. Underlying infrastructure scales automatically based on incoming requests. If there are no requests coming in it can scale to zero to save you money.
- Changes to containers or environment settings create new revisions. Revisions can be rolled out in a way that supports canary testing by splitting traffic according to your specifications.
- Cloud Run is built using an open source initiative called knative. It is billed to the nearest 100 MS as you deploy containers to it.
- Cloud Run can use system libraries and tools made available to the container environment. It has a timeout of 60 minutes for longer running requests. Cloud Run can send multiple concurrent requests to each container instance, improving latency, and saving costs for large volumes of incoming traffic.

Another traditional serverless application manager available in Google Cloud is App Engine. App Engine has two management environments: standard and flexible.

In the standard environment, apps run in a sandbox using a specific language runtime. Standard environment is good for rapid scaling. It is limited to specific languages. It can scale to 0 when there is no incoming traffic. It starts up in seconds. In the standard environment you are not allowed to make changes to the runtime.

In contrast to the standard environment, App Engine flexible runs in Docker containers in Compute Engine VMs. Flexible supports more programming languages. It can use native code and you can access and manage the underlying Compute Engine resource base.

App Engine flexible does not scale to 0. Startup is in minutes. Deployment time is in minutes (longer than standard). It does allow you to modify the runtime environment.

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 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

Google Cloud

Question:
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 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`
Feedback: Correct! Finalize event trigger when a write to Cloud Storage is complete.

B. `--trigger-event google.storage.object.create`
Feedback: Incorrect. This is not a cloud storage notification event.

C. `--trigger-event google.storage.object.change`
Feedback: Incorrect. This is not a cloud storage notification event.

D. `--trigger-event google.storage.object.add`
Feedback: Incorrect. This is not a cloud storage notification event.

Where to look:
https://cloud.google.com/blog/topics/developers-practitioners/learn-cloud-functions-snap
https://cloud.google.com/functions

Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M7 Developing, Deploying, and Monitoring in the Cloud

Summary:

Explanation/summary on the following slide.

Cloud 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

Google Cloud

- Cloud Functions is Google Cloud's answer to serverless functions. It is a fully managed service based on events that happen across your cloud environment, including services and infrastructure. The functions you develop run in response to those events. There are no servers to manage or scaling to configure. The service provides the underlying resources required to execute your function.
- A trigger sends an https request to an endpoint the service is listening on. This endpoint then responds by deploying and executing the function and returning the results specified in your code. Pricing is based on the number of events, compute time, and memory required in network ingress/egress. If no requests are coming in, your function doesn't cost anything.
- Cloud Functions use cases include IoT processing and lightweight ETL.
- Depending on the programming language you choose, the Cloud Functions service provides a base image and runtime that will be updated and patched automatically. This helps keeps execution of your deployed functions secure.
- By design, functions you write for use by the Cloud Functions service are stateless. If you need to share and persist data across function runs, you should consider using Datastore or Cloud Storage. Each Cloud Function instance handles only one concurrent request at a time. If, while handling a request, another one comes in, Cloud Functions will ask for more instances to be created. This is another reason functions need to be stateless, because they can run on different instances. You can implement minimum instance limits to avoid latency associated with cold starts.

3.3 Deploying and implementing Cloud Run and Cloud Functions resources

Courses

Google Cloud Fundamentals: Core Infrastructure

- M6 Applications in the Cloud
- M7 Developing, Deploying, and Monitoring 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)

Learn Cloud Functions in a snap!

Cloud Functions

Now that we've reviewed the diagnostic questions related to Section 3.3 Deploying and implementing Cloud Run and Cloud Functions resources, let's take a moment to consider resources that can help you build your knowledge and skills in this area.

The concepts in the diagnostic questions we just reviewed are covered in these modules and documentation. You'll find this list in your workbook so you can take a note of what you want to include later when you build your study plan. Based on your experience with the diagnostic questions, you may want to include some or all of these.

https://cloud.google.com/appengine/docs/the-appengine-environments
https://cloud.google.com/hosting-options
https://cloud.google.com/blog/topics/developers-practitioners/cloud-run-story-serverless-containers
https://cloud.google.com/blog/topics/developers-practitioners/learn-cloud-functions-snap
https://cloud.google.com/functions

3.4 Deploying and implementing data solutions

Tasks include:

- Initializing data systems with products (for example, Cloud SQL, Firestore, BigQuery, Cloud Spanner, Pub/Sub, Cloud Bigtable, Cloud Dataproc, Cloud Dataflow, Cloud Storage)
- Loading data (for example, command line upload, API transfer, import/export, load data from Cloud Storage, streaming data to Pub/Sub)

Google Cloud

Cymbal Superstore has several different data requirements based on the storage needs of their different applications. Their e-commerce system is slated to use Cloud Spanner. They need to do analytics on historical data using BigQuery. They need to store their IOT truck data in BigTable. Their supply chain management system needs a Cloud SQL store. As an Associate Cloud Engineer, you'll need to be able to deploy and implement a wide range of data solutions.

Question tested your knowledge of the steps for setting up a Cloud Storage bucket, question 7 the steps for setting up an instance using Cloud SQL, and question 8 the steps to load data to a BigQuery table.

3.4 Diagnostic Question 06 Discussion

You require a Cloud Storage bucket serving users in New York City. There is a need for geo-redundancy. You do not plan on using ACLs.

What CLI command do you use?

A. Run a ***gcloud mb*** command specifying the name of the bucket and accepting defaults for the other mb settings.

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

C. Run a ***gsutil mb*** command specifying a dual-region bucket and an option to turn ACL evaluation off.

D. Run a ***gsutil mb*** command specifying a dual-region bucket and accepting defaults for the other mb settings.

Google Cloud

Question:
You require a Cloud Storage bucket serving users in New York City. There is a need for geo-redundancy. You do not plan on using ACLs. What CLI command do you use?

A. Run a gcloud mb command specifying the name of the bucket and accepting defaults for the other mb settings.
Feedback: Incorrect. gcloud is not used to create buckets.

B. Run a gsutil mb command specifying a multi-regional location and an option to turn ACL evaluation off. Feedback: Incorrect. Most users are in NY. Multi-regional location availability of “US” is not required.

*C. Run a gsutil mb command specifying a dual-region bucket and an option to turn ACL evaluation off. Feedback: Correct! NAM4 implements a dual-region bucket with us-east1 and us-central1 as the configured regions.

D. Run a gsutil mb command specifying a dual-region bucket and accepting defaults for the other mb settings Feedback: Incorrect. This command is missing the -b option that disables ACLs as required in the example.

Where to look:

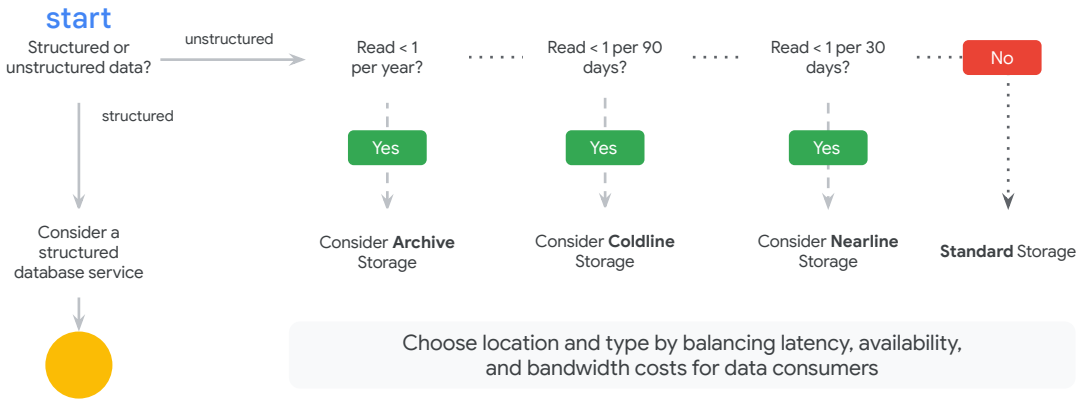
https://cloud.google.com/storage/docs/creating-buckets
https://cloud.google.com/storage/docs/introduction

Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M4 Storage in the Cloud
- Quests
  - Perform Foundational Infrastructure Tasks in Google Cloud Quest (https://www.qwiklabs.com/quests/118)

Summary:
Explanation/summary on the following slide.

Choosing a storage class



Cloud Storage helps you store binary objects in Google Cloud. It can house data in any format as an immutable object. In Cloud Storage, objects are stored in containers called buckets.

Buckets can be used to upload and download objects, and permissions can be assigned to specify who has access to them.

You can manage and interact with Cloud Storage via the console, via the command line and the gsutil command set, via client libraries, or through APIs.
Steps for creating a cloud bucket include:

1. Naming your bucket - has to be globally unique, and not contain any sensitive information
2. Choose location type and option:
    - Regional is a specific geographical area where a datacenter campus resides. It minimizes latency and network bandwidth for consumers grouped in a specific region
    - Dual-region is a a specific pair or regions. It provides geo-redundancy
    - Multi-region is a disbursed geographic area, such as the US or Europe. You can use it to serve content to consumers outside of Google and distributed over large areas.
3. Pick a default storage class for bucket. You can override this per object.
    - Standard is for immediate access and has no minimum storage

- duration
- Nearline has a 30 day minimum duration and data retrieval charges
- Coldline has a 90 day min duration and data retrieval charges
- Archive has a 365 day min duration and data retrieval charges

4. Click **Create** or submit the command.

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

Google Cloud

Question:
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`
Feedback: Correct! This option allows you to specify zonal or regional availability, with regional providing automatic failover to a standby node in another region.

B. `--replica-type`
Feedback: Incorrect. If you have --master-instance-name, this option allows you to define the replica type: a default of read, or a legacy MySQL replica type of failover, which has been deprecated.

C. `--secondary-zone`
Feedback: Incorrect. This is an optional argument that is valid only when you have a specified availability type: regional.

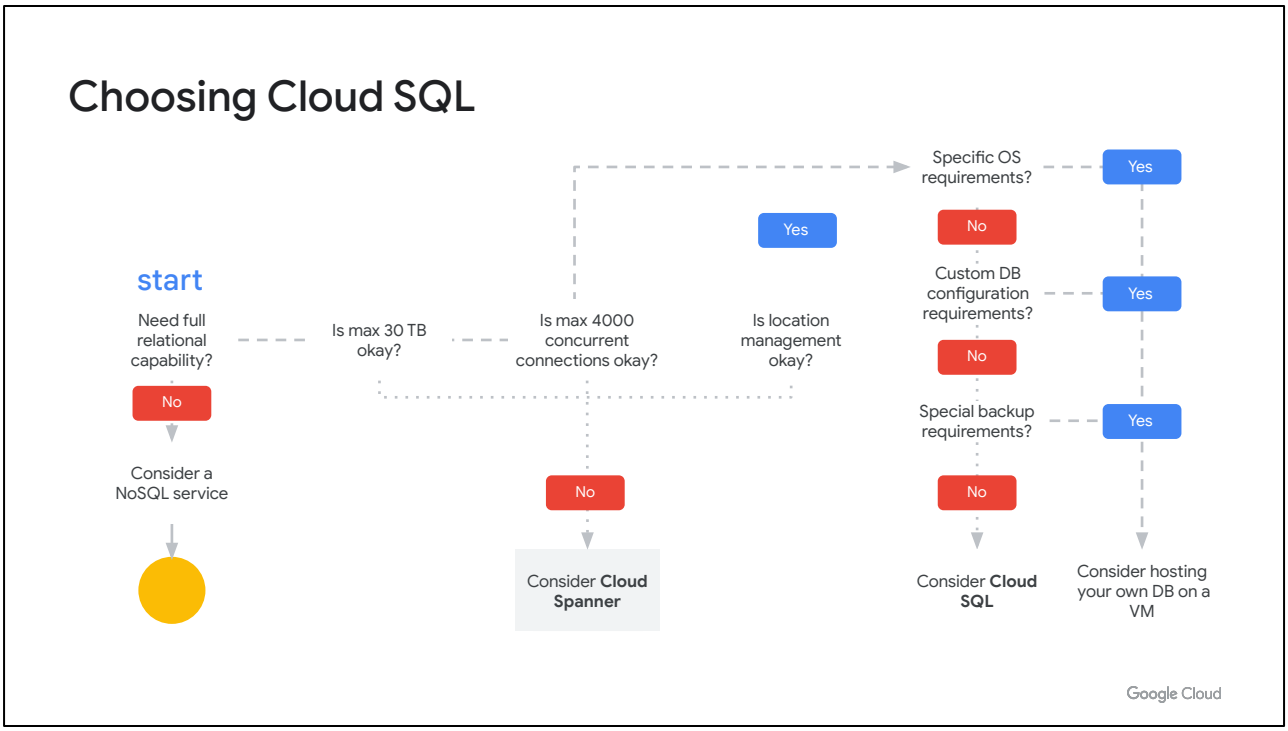
D. `--master-instance-name`
Feedback: Incorrect. This option creates a read replica based on the master instance. It replicates data but does not automate failover.

Where to look:
https://cloud.google.com/sql/docs/mysql/features
https://cloud.google.com/sql/docs/mysql/create-instance

Content mapping:

- Instructor-led Training/OnDemand
  - Google Cloud Fundamentals: Core Infrastructure
    - M4 Storage in the Cloud
  - Architecting with Google Compute Engine
    - M5 Storage and Database Services
- Quests
  - Set Up and Configure a Cloud Environment in Google Cloud (https://www.qwiklabs.com/quests/119)

Summary:
Explanation/summary on the following slide.



Cloud SQL is a Google Cloud service that manages a database instance for you. You are responsible for how you structure your data within it. Cloud SQL can handle common database tasks for you, such as automating backups, implementing high availability, handling data encryption, updating infrastructure and software, and providing logging and monitoring services. You can use it to deploy MySQL, PostgreSQL, or SQL Server databases to Google Cloud. It uses persistent disks attached to underlying Compute Engine instances to house your database, and implements a static IP address for you to connect to it.

Steps for setting up a Cloud SQL instance:

1. Create Instance.
2. Select database type.
3. Enter name: do not use sensitive or personally identifiable information. Your instance name can be publicly available.
4. Enter password for root user.
5. Select proper version: choose carefully, it cannot be edited.
6. Regional and zonal availability settings. Can't be modified. Pick a region where most people will access. You can also choose multi-region.
7. Select both primary and secondary zone. Both default to any with secondary being different than the primary.
8. Config settings include machine type, private or public ip, storage type, storage capacity, threshold for automated storage increase, as well as an increase setting to specify a limit on how big your database grows.