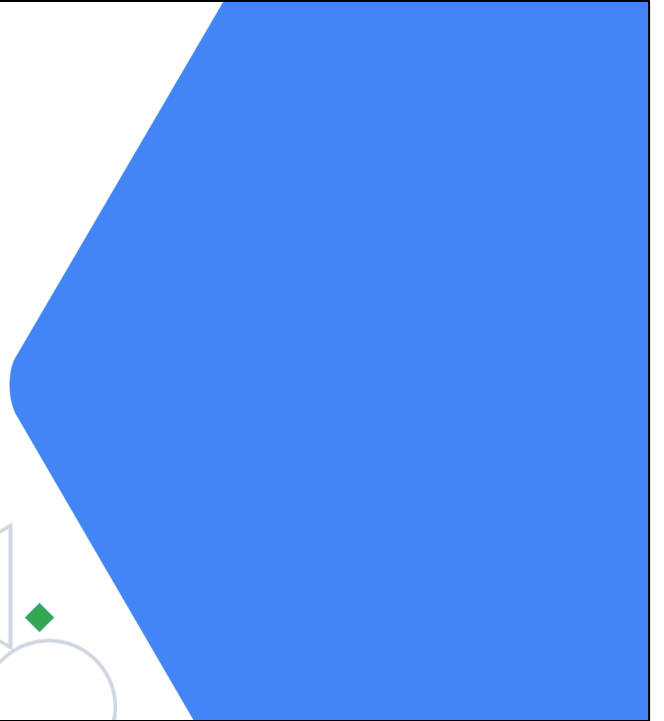




## Deploying and Implementing a Cloud Solution



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## Agenda

Section 3.1 - Deploying and implementing Compute Engine resources

Section 3.2 - Deploying and implementing Google Kubernetes Engine resources

Section 3.3 - Deploying and implementing App Engine and Cloud Functions resources

Section 3.4 - Deploying and implementing data solutions

Section 3.5 - Deploying and implementing networking resources

Section 3.6 - Deploying a Solution using Cloud Marketplace

Section 3.7 - Deploying an Application using Deployment Manager

---

## Exam Guide: Section 3.1

### 3.1 Deploying and implementing Compute Engine resources.

Tasks include:

- Launching a compute instance using Cloud Console and Cloud SDK (gcloud) (e.g., assign disks, availability policy, SSH keys).
- Creating an autoscaled managed instance group using an instance template.
- Generating/uploading a custom SSH key for instances.
- Configuring a VM for Cloud Monitoring and Cloud Logging.
- Assessing compute quotas and requesting increases.
- Installing the Cloud Monitoring agent and Cloud Logging agent.

---

## Exam Guide: Section 3.1

3.1 Deploying and implementing Compute Engine resources.

Tasks include:

- **Launching a compute instance using Cloud Console and Cloud SDK (gcloud) (e.g., assign disks, availability policy, SSH keys).**
- **Creating an autoscaled managed instance group using an instance template.**
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- Assessing compute quotas and requesting increases.
- Installing the Cloud Monitoring agent and Cloud Logging agent.

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## Compute Engine offers managed virtual machines

- No upfront investment.
- Fast and consistent performance.
- Create VMs with the Cloud Console or the `gcloud` command-line tool.
- Run images of Linux or Windows Server.



Compute Engine lets you create and run virtual machines on Google infrastructure. There are no upfront investments, and you can run thousands of virtual CPUs on a system that is designed to be fast and to offer consistent performance.

You can create a virtual machine instance by using the Google Cloud Console or the `gcloud` command-line tool. Your VM can run Linux and Windows Server images provided by Google or customized versions of these images, and you can even import images from many of your physical servers.

## Compute Engine offers managed virtual machines

- Pick memory and CPU: use predefined types, or make a custom VM.
- Pick GPUs if you need them.
- Pick persistent disks: standard or SSD.
- Pick local SSD for scratch space too if you need it.

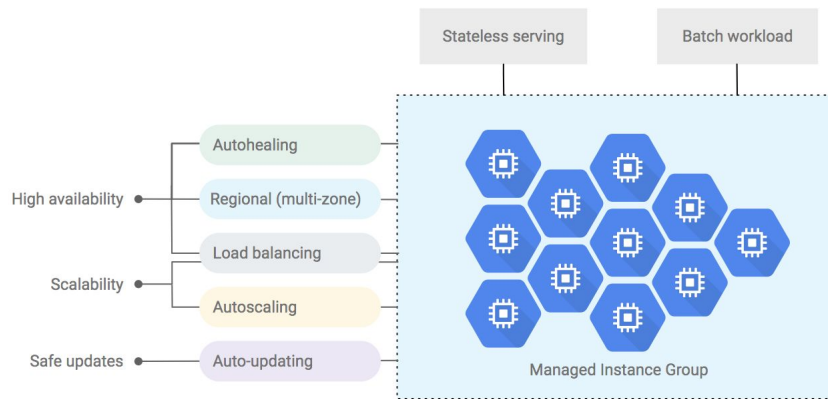


When you create a VM, pick a machine type, which determines how much memory and how many virtual CPUs it has. These types range from very small to very large indeed! And if you can't find a predefined type that meets your needs perfectly, you can make a custom VM.

Speaking of processing power, if you have workloads like machine learning and data processing that can take advantage of GPUs, many GCP zones have GPUs available for you.

Just like physical computers need disks, so do VMs. You can choose two kinds of persistent storage: standard or SSD. If your application needs high-performance scratch space, you can attach a local SSD, but be sure to store data of permanent value somewhere else, because local SSDs' content doesn't last past when the VM terminates. That's why the other kinds are called "persistent disks." Anyway, most people start off with standard persistent disks, and that's the default.

## Managed instance groups



There are two kinds of VM instance groups: unmanaged and managed.

**Managed instance groups** (MIGs) allow you to operate applications on multiple identical VMs. They offer high availability, scalability (using Autoscaling) and automated updates.

## Create VMs from instance templates

- Quickly create multiple VMs from pre-existing configurations.
- Templates pre-define machine type, boot disk image, labels and other properties.
- Create managed instance groups automatically for autoscaling.

Google Cloud Platform Test-sandbox-tcd

### Create an instance

To create a VM instance, select one of the options:

- New VM instance**  
Create a single VM instance from scratch
- New VM instance from template**  
Create a single VM instance from an existing template
- Marketplace**  
Deploy a ready-to-go solution onto a VM instance

**Name**  
instance-2

**Region**  
us-east1 (South Carolina)

**Machine type**  
Customize to select cores, memory, and disks  
1 vCPU

**Container**  
☐ Deploy a container image

**Boot disk**



You can use instance templates any time you want to quickly create VM instances based on a pre-existing configuration.

Instance templates define the machine type, boot disk image or container image, labels, and other instance properties.

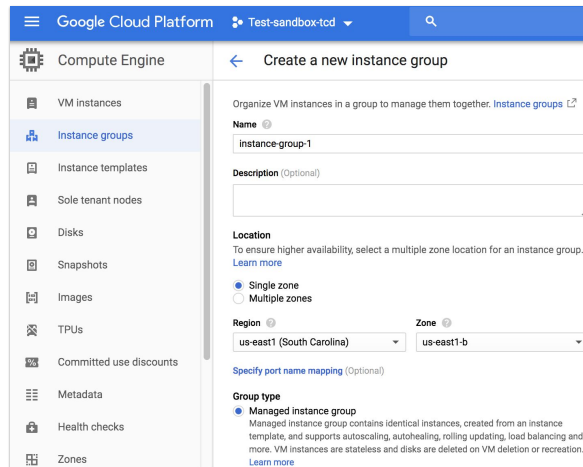
If you want to create a group of identical instances, you must use an instance template to create a managed instance group.

Instance templates are designed to create instances with identical configurations, so it is not possible to update an existing instance template or change an instance template after it has been created.

If an instance template goes out of date, or you need to make changes to the configuration, create a new instance template.



# Creating managed instance groups with templates



A managed instance group contains identical instances that you can manage as a single entity in a single zone.

Managed instance groups maintain high availability of your apps by proactively keeping your instances available, which means in **RUNNING** state.

Managed instance groups support autoscaling, load balancing, rolling updates, autohealing, and more.

You can also create regional managed instance groups, which contain instances across multiple zones within the same region.

1. Go to the Instance Groups page in the GCP Console, and click **Create an instance group**.
2. Enter a name for the managed instance group, and select the zone where you want to locate the group.
3. Under **Group type**, select **Managed instance group**.
4. Under **Instance template**, select an instance template. If no templates are available, create one.
5. Specify the number of instances that you want to create in the group. Optionally, you can enable **Autoscaling** so that the group will automatically add or remove based on instance CPU usage or autohealing to perform health checking on instances within the instance group.
6. Click **Create** to create the new group.

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## Agenda

Section 3.1 - Deploying and implementing Compute Engine resources

[Section 3.2 - Deploying and implementing Google Kubernetes Engine resources](#)

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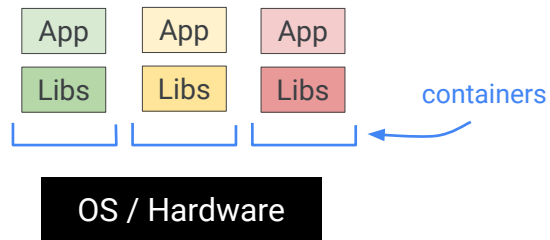
## Exam Guide: Section 3.2

### 3.2 Deploying and implementing Google Kubernetes Engine resources.

Tasks include:

- Deploying a Google Kubernetes Engine cluster.
- Deploying a container application to Google Kubernetes Engine using pods.
- Configuring Google Kubernetes Engine application monitoring and logging.

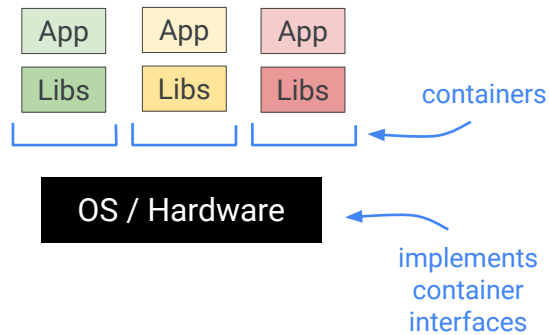
## What are containers?



Containers give you the independent scalability of workloads in Platform as a Service (PaaS) and an abstraction layer of the OS and hardware in Infrastructure as a Service (IaaS).

Containers give you an invisible “box” around your code and its dependencies, with limited access to its own partition of the file system and hardware. It only requires a few system calls to create and it starts as quickly as a process.

## What are containers?



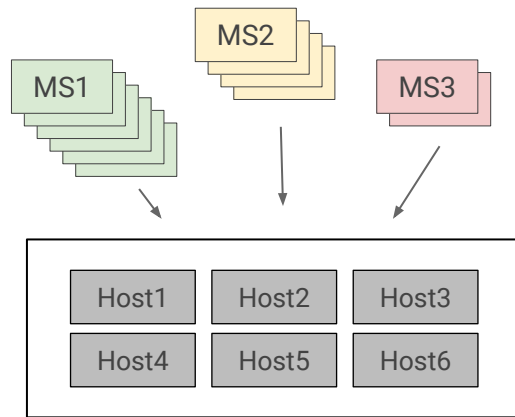
All you need on each host is an OS kernel that supports containers and a container runtime.

In essence, you are **virtualizing the OS**. It scales like PaaS, but gives you nearly the same flexibility as IaaS.

With this abstraction, your code is ultra portable and you can treat the OS and hardware as a black box.

So you can go from development, to staging, to production, or from your laptop to the cloud, without changing or rebuilding anything.

## Containers often implement microservices

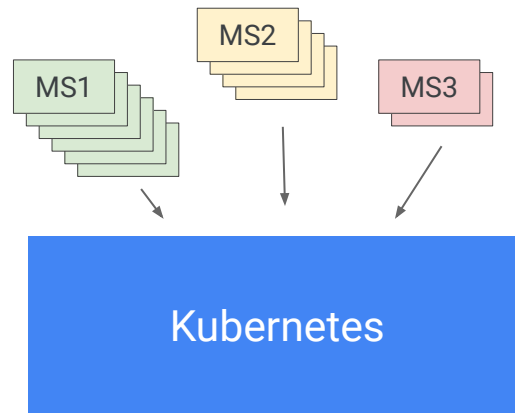


If you want to scale, for example, a web server, you can do so in seconds and deploy dozens or hundreds of them (depending on the size or your workload) on a single host.

Now that's a simple example of scaling one container running the whole application on a single host. You'll more likely want to build your applications using lots of containers, each performing their own function like microservices.

If you build applications this way, and connect them with network connections, you can make them modular, deploy easily, and scale independently across a group of hosts. The hosts can then scale up and down and start and stop containers as demand for your app changes or as hosts fail.

## Kubernetes manages your containers



A tool that helps you do this well is Kubernetes.

Kubernetes makes it easy to orchestrate many containers on many hosts, scale them as microservices, and deploy rollouts and rollbacks.

First, I'll show you how you build and run containers.

Many developers use an open-source tool called Docker that defines a format for bundling your application, its dependencies, and machine-specific settings into a container; you could also use a different tool like Cloud Build. It's up to you.

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## Exam Guide: Section 3.2

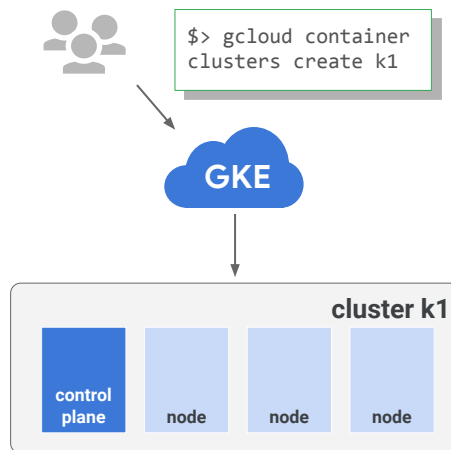
3.2 Deploying and implementing Google Kubernetes Engine resources.

Tasks include:

- **Deploying a Google Kubernetes Engine cluster.**
- **Deploying a container application to Google Kubernetes Engine using pods.**
- Configuring Google Kubernetes Engine application monitoring and logging.



## Kubernetes manages your containers



At the highest level, Kubernetes is a set of APIs that you can use to deploy containers on a set of **nodes** called a **cluster**.

The system is divided into a set of components that run as the control plane and a set of **nodes** that run containers. In Kubernetes, a node represents a computing instance, like a machine. In Google Cloud, nodes are virtual machines running in Compute Engine.

You can describe a set of applications and how they should interact with each other and Kubernetes figures how to make that happen

Now that you've built a container, you'll want to deploy one into a **cluster**.

Kubernetes can be configured with many options and add-ons, but can be time consuming to bootstrap from the ground up. Instead, you can bootstrap Kubernetes using **Google Kubernetes Engine** or (GKE).

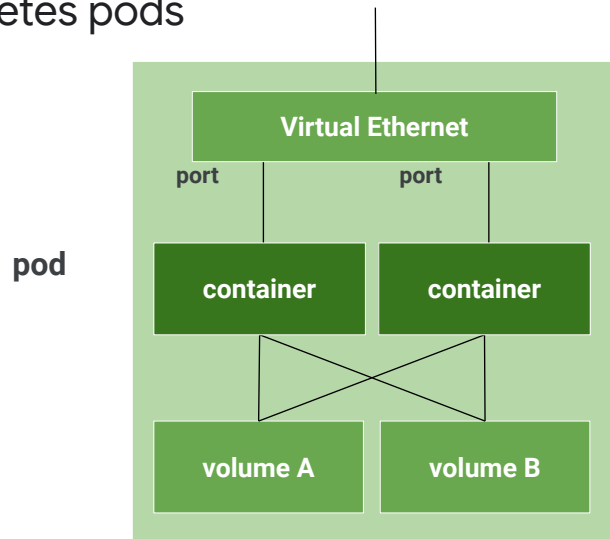
**GKE** is a hosted Kubernetes by Google. GKE clusters can be customized and they support different machine types, number of nodes, and network settings.

To start up Kubernetes on a **cluster** in GKE, all you do is run this command:

At this point, you should have a cluster called 'k1' configured and ready to go.

You can check its status in admin console.

## Kubernetes pods



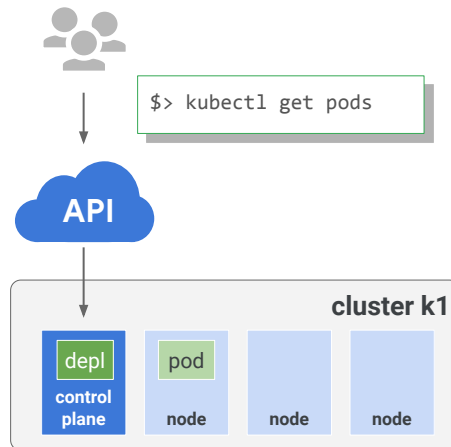
Then you deploy **containers** on nodes using a wrapper around one or more containers called a Pod.

A **Pod** is the smallest unit in Kubernetes that you create or deploy. A Pod represents a running process on your cluster as either a component of your application or an entire app.

Generally, you only have one container per pod, but if you have multiple containers with a hard dependency, you can package them into a single pod and share networking and storage. The Pod provides a unique network IP and set of ports for your containers, and options that govern how containers should run.

Containers inside a Pod can communicate with one another using localhost and ports that remain fixed as they're started and stopped on different nodes.

## Kubernetes pods



A **Deployment** represents a group of replicas of the same Pod and keeps your Pods running even when nodes they run on fail. It could represent a component of an application or an entire app. In this case, it's the nginx web server.

To see the running nginx Pods, run the command:

```
$ kubectl get pods
```

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## Agenda

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## Exam Guide: Section 3.3

### 3.3 Deploying and implementing App Engine and Cloud Functions resources.

Tasks include:

- Deploying an application to App Engine (e.g., scaling configuration, versions, and traffic splitting).
- Deploying a Cloud Function that receives Google Cloud events (e.g., Pub/Sub events, Cloud Storage object change notification events).

---

## Exam Guide: Section 3.3

3.3 Deploying and implementing App Engine and Cloud Functions resources.

Tasks include:

- **Deploying an application to App Engine (e.g., scaling configuration, versions, and traffic splitting).**
- Deploying a Cloud Function that receives Google Cloud events (e.g., Pub/Sub events, Cloud Storage object change notification events).

## App Engine standard environment

- Easily deploy your applications
- Autoscale workloads
- Free daily quota
- Usage-based pricing
- SDKs for development, testing and deployment



Of the two App Engine environments, standard and flexible, standard is the simpler. It offers a simpler deployment experience than the flexible environment, and finer-grained autoscaling. Like the standard environment, it also offers a free daily usage quota for the use of some services. What's distinctive about the standard environment, though is that low-utilization applications might be able to run at no charge.

Google provides App Engine Software Development Kits in several languages, so that you can test your application locally before you upload it to the real App Engine service. The SDKs also provide simple commands for doing the deployment.



## App Engine standard environment

### Requirements:

- Specific versions of Java, Python, PHP, and Go are supported

### Sandbox constraints:

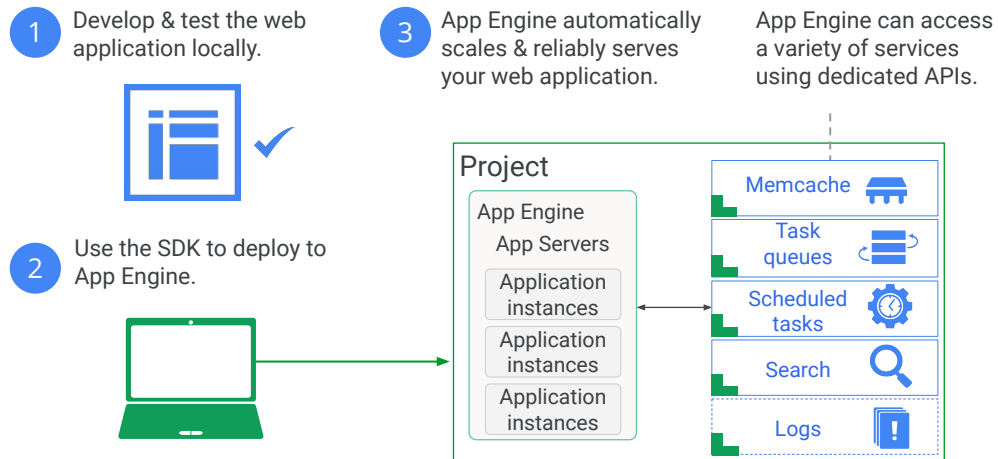
- No writing to local files
- All requests time out at 60s
- Limits on third-party software



App Engine standard environment provides runtimes for specific versions of Java, Python, PHP, and Go. The runtimes also include libraries that support App Engine APIs, and for many applications, the standard environment runtimes and libraries may be all you need. But if you want to code in another language, standard environment is not right for you, and you'll want to consider the flexible environment.

The standard environment also enforces restrictions on your code by making it run in a so-called sandbox. That's a software construct that's independent of the hardware, operating system, or physical location of the server it runs on. The sandbox is part of why App Engine standard environment can scale and manage your application in a very fine-grained way. Like all sandboxes, it imposes some constraints. For example, your application can't write to the local filesystem. It'll have to write to a database service instead if it needs to make data persistent. Also, all the requests your application gets, have a 60-second timeout, and you can't install arbitrary third-party software. If these constraints don't work for you, that would also be a reason to choose the flexible environment.

## Example App Engine standard workflow: Web apps



In this diagram we see App Engine standard environment in practice. You'll develop your application and run a test version of it locally using the App Engine SDK. Then, when you're ready, you'll use the SDK to deploy it.

Each App Engine application runs in a Google Cloud project. App Engine automatically provisions server instances and scales and load-balances them. Meanwhile, your application can make calls to a variety of services using dedicated APIs. For example, a NoSQL datastore to make data persistent; caching of that data using memcache; searching; logging; user login; and the ability to launch actions not triggered by direct user requests, like task queues and a task scheduler.

---

## Exam Guide: Section 3.3

3.3 Deploying and implementing App Engine and Cloud Functions resources.

Tasks include:

- Deploying an application to App Engine (e.g., scaling configuration, versions, and traffic splitting).
- **Deploying a Cloud Function that receives Google Cloud events (e.g., Pub/Sub events, Cloud Storage object change notification events).**

## Cloud Functions

- Create single-purpose functions that respond to events without a server or runtime.
  - Event examples: New instance created, file added to Cloud Storage
- Written in Javascript, Python or Go; execute in managed Node.js environment on Google Cloud.



Cloud Functions is a lightweight, event-based, asynchronous compute solution that allows you to create small, single-purpose functions that respond to cloud events without the need to manage a server or a runtime environment. You can use these functions to construct applications from bite-sized business logic. You can also use Cloud Functions to connect and extend cloud services.

You are billed, to the nearest 100 milliseconds, only while your code is running.

Cloud Functions are written in Javascript, Python or Go and execute in a managed Node.js environment on Google Cloud. Events from Cloud Storage and Pub/Sub can trigger Cloud Functions asynchronously, or you can use HTTP invocation for synchronous execution.

Cloud Events are things that happen in your cloud environment. These might be things like changes to data in a database, files added to a storage system, or a new virtual machine instance being created.

Events occur whether or not you choose to respond to them. Creating a response to an event is done with a trigger. A trigger is a declaration that you are interested in a certain event or set of events. You create triggers to capture events and act on them.

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## Exam Guide: Section 3.4

### 3.4 Deploying and implementing data solutions.

Tasks include:

- Initializing data systems with products (e.g., Cloud SQL, Datastore, BigQuery, Cloud Spanner, Pub/Sub, Cloud Bigtable, Dataproc, Cloud Storage).
- Loading data (e.g., Command line upload, API transfer, Import / export, load data from Cloud Storage, streaming data to Pub/Sub).

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## Exam Guide: Section 3.4

3.4 Deploying and implementing data solutions.

Tasks include:

- **Initializing data systems with products (e.g., Cloud SQL, Datastore, BigQuery, Cloud Spanner, Pub/Sub, Cloud Bigtable, Dataproc, Cloud Storage).**
- Loading data (e.g., Command line upload, API transfer, Import / export, load data from Cloud Storage, streaming data to Pub/Sub).

## Comparing data storage and database options

Relational		Non-relational		Object	Warehouse
					
Cloud SQL	Cloud Spanner	Datastore	Cloud Bigtable	Cloud Storage	BigQuery
<b>Good for:</b> Web frameworks	<b>Good for:</b> RDBMS+scale, HA, HTAP	<b>Good for:</b> Hierarchical, mobile, web	<b>Good for:</b> Heavy read + write, events	<b>Good for:</b> Binary or object data	<b>Good for:</b> Enterprise data warehouse
<b>Such as:</b> CMS, eCommerce	<b>Such as:</b> User metadata, Ad/Fin/MarTech	<b>Such as:</b> User profiles, Game State	<b>Such as:</b> AdTech, financial, IoT	<b>Such as:</b> Images, media serving, backups	<b>Such as:</b> Analytics, dashboards



Let's quickly review your options for data storage and databases.



## Comparing storage options: Technical details

	Datastore	Bigtable	Cloud Storage	Cloud SQL	Cloud Spanner	BigQuery
Type	NoSQL document	NoSQL wide column	Blobstore	Relational SQL for OLTP	Relational SQL for OLTP	Relational SQL for OLAP
Transactions	Yes	Single-row	No	Yes	Yes	No
Complex queries	No	No	No	Yes	Yes	Yes
Capacity	Terabytes+	Petabytes+	Petabytes+	Terabytes	Petabytes	Petabytes+
Unit size	1 MB/entity	~10 MB/cell ~100 MB/row	5 TB/object	Determined by DB engine	10,240 MiB/row	10 MB/row



This table focuses on the technical differentiators of the storage services. Each row is a technical specification and each column is a service. Let me cover each service from left to right.

Consider using Datastore, if you need to store structured objects, or if you require support for transactions and SQL-like queries. This storage services provides terabytes of capacity with a maximum unit size of 1 MB per entity.

Consider using Cloud Bigtable, if you need to store a large amount of structured objects. Cloud Bigtable does not support SQL queries, nor does it support multi-row transactions. This storage service provides petabytes of capacity with a maximum unit size of 10 MB per cell and 100 MB per row.

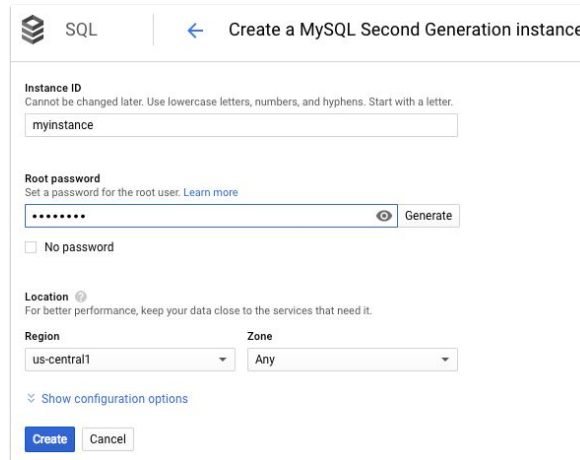
Consider using Cloud Storage, if you need to store immutable blobs larger than 10 MB, such as large images or movies. This storage service provides petabytes of capacity with a maximum unit size of 5 TB per object.

Consider using Cloud SQL or Cloud Spanner if you need full SQL support for an online transaction processing system. Cloud SQL provides terabytes of capacity, while Cloud Spanner provides petabytes. If Cloud SQL does not fit your requirements because you need horizontal scalability, not just through read replicas, consider using Cloud Spanner.

The usual reason to store data in BigQuery is to use its big data analysis and

interactive querying capabilities. You would not want to use BigQuery, for example, as the backing store for an online application.

## Creating a Cloud SQL instance, step by step



The screenshot shows the 'Create a MySQL Second Generation instance' page in the Google Cloud SQL console. The page has a breadcrumb trail: 'SQL' > 'Create a MySQL Second Generation instance'. The form includes the following fields and options:

- Instance ID:** A text input field containing 'myinstance'. A note below it states: 'Cannot be changed later. Use lowercase letters, numbers, and hyphens. Start with a letter.'
- Root password:** A password input field with a 'Generate' button. A note below it states: 'Set a password for the root user. [Learn more](#)'.
- No password:** An unchecked checkbox labeled 'No password'.
- Location:** A section with a help icon and the text: 'For better performance, keep your data close to the services that need it.'
- Region:** A dropdown menu showing 'us-central1'.
- Zone:** A dropdown menu showing 'Any'.
- Show configuration options:** A link with a chevron icon.
- Create/Cancel buttons:** A blue 'Create' button and a grey 'Cancel' button.



1. Select or create a Google Cloud project.
2. Make sure that billing is enabled for your Google Cloud project.
3. Go to the Cloud SQL Instances page in the Cloud Console.
4. Select your project and click **Continue**.
5. Click **Create Instance**.
6. Click **MySQL**.
7. Click **Choose Second Generation**.
8. Enter `myinstance` for **Instance ID**.
9. Enter a password for the root user.  
Use the default values for the other fields.
10. Click **Create**.  
You are returned to the instances list; your new instance is greyed out while it initializes and starts.

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## Agenda

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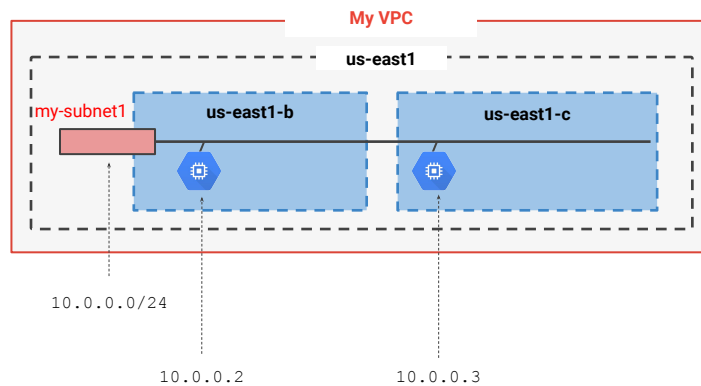
## Exam Guide: Section 3.5

### 3.5 Deploying and implementing networking resources.

Tasks include:

- Creating a VPC with subnets. (e.g., Custom-mode VPC, Shared VPC).
- Launching a Compute Engine instance with custom network configuration (e.g., Internal-only IP address, Google private access, Static external and private IP address, network tags).
- Creating ingress and egress firewall rules for a VPC (e.g., IP subnets, Tags, Service accounts).
- Creating a VPN between a Google VPC and an external network using Cloud VPN.
- Creating a load balancer to distribute application network traffic to an application (e.g., Global HTTP(S) load balancer, Global SSL Proxy load balancer, Global TCP Proxy load balancer, Regional Network load balancer, Regional Internal load balancer).

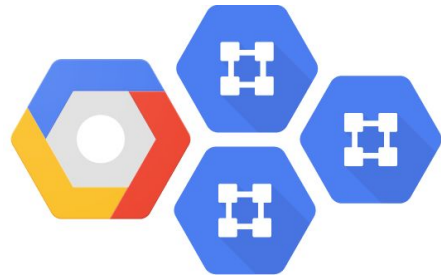
## Google Cloud VPC networks are global; subnets are regional



Here's something that surprises a lot of people who are new to Google Cloud. The Virtual Private Cloud networks that you define have global scope. They can have subnets in any Google Cloud region worldwide. Subnets can span the zones that make up a region. This architecture makes it easy for you to define your own network layout with global scope. You can also have resources in different zones on the same subnet.

## Virtual Private Cloud (VPC) Networking

- Each VPC network is contained in a Google Cloud project.
- You can provision Google Cloud resources, connect them to each other, and isolate them from one another.



The way a lot of people get started with Google Cloud is to define their own Virtual Private Cloud inside their first Google Cloud project. Or they can simply choose the default VPC and get started with that. Regardless, your VPC networks connect your Google Cloud resources to each other and to the internet. You can segment your networks, use firewall rules to restrict access to instances, and create static routes to forward traffic to specific destinations.

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## Exam Guide: Section 3.5

3.5 Deploying and implementing networking resources.

Tasks include:

- **Creating a VPC with subnets. (e.g., Custom-mode VPC, Shared VPC).**
- Launching a Compute Engine instance with custom network configuration (e.g., Internal-only IP address, Google private access, Static external and private IP address, network tags).
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- Creating a VPN between a Google VPC and an external network using Cloud VPN.
- Creating a load balancer to distribute application network traffic to an application (e.g., Global HTTP(S) load balancer, Global SSL Proxy load balancer, Global TCP Proxy load balancer, Regional Network load balancer, Regional Internal load balancer).



## Creating an automode VPC network with a subnet

Google Cloud Platform Test-sandbox-tcd

VPC network

VPC networks

External IP addresses

Firewall rules

Routes

VPC network peering

Shared VPC

Serverless VPC access

Create a VPC network

Name ?

lowercase, no spaces

Description (Optional)

Subnets

Subnets let you create your own private cloud topology within Google Cloud. Click Automatic to create a subnet in each region, or click Custom to manually define the subnets. [Learn more](#)

Subnet creation mode

Custom Automatic

New subnet

Name ?

lowercase, no spaces



You can choose to create an auto mode or custom mode VPC network. Each new network that you create must have a unique name within the same project.

Auto mode networks create one subnet in each Google Cloud region automatically when you create the network. As new regions become available, new subnets in those regions are automatically added to the auto mode network. IP ranges for the automatically created subnets come from a predetermined set of ranges. All auto mode networks use the same set of IP ranges.

# Demo

Auto Mode VPC Network  
with a Subnet

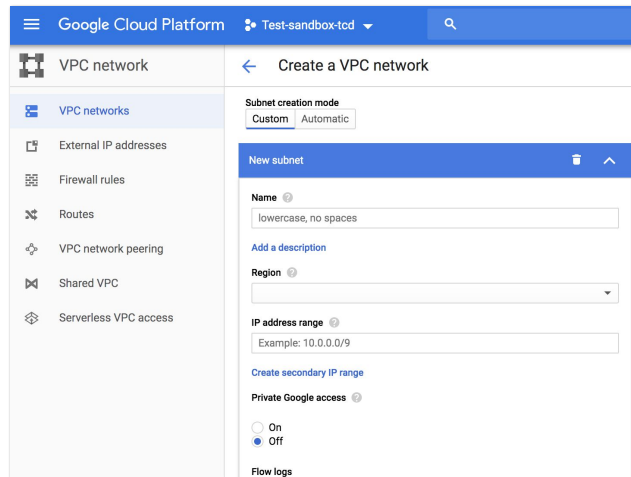


<https://cloud.google.com/vpc/docs/using-vpc>

To set up an auto mode VPC network:

1. Go to the VPC networks page in the Google Cloud Console.  
[GO TO THE VPC NETWORKS PAGE](#)
2. Click **Create VPC network**.
3. Enter a **Name** for the network.
4. Choose **Automatic** for the **Subnet creation mode**.
1. In the **Firewall rules** section, select one or more predefined firewall rules that address common use cases for connectivity to VMs. Choose the **Dynamic routing mode** for the VPC network.  
For more information, see dynamic routing mode. You can change the dynamic routing mode later.
2. Click **Create**.

## Creating a custom mode VPC network with a subnet



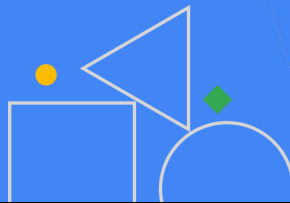
The screenshot shows the Google Cloud Platform console interface for creating a VPC network. The left sidebar lists various network-related services, with 'VPC networks' selected. The main panel is titled 'Create a VPC network'. Under 'Subnet creation mode', the 'Custom' option is selected. A 'New subnet' section is expanded, showing fields for 'Name' (with a hint 'lowercase, no spaces'), 'Region' (a dropdown menu), and 'IP address range' (with an example '10.0.0.0/9'). There are also links for 'Add a description', 'Create secondary IP range', and 'Private Google access' (with 'On' and 'Off' radio buttons). A 'Flow logs' link is at the bottom.



You can control the subnets created within a custom mode VPC network. With a custom mode vpc, you create subnets when you create the network, or you can add subnets later.

# Demo

## Custom Mode VPC Network with a Subnet



You can also control the subnets created within a custom mode VPC network. With a custom mode vpc, you create subnets when you create the network, or you can add subnets later.

<https://cloud.google.com/vpc/docs/using-vpc>

To create a custom mode VPC network with subnet:

1. Go to the VPC networks page in the Google Cloud Console.  
[GO TO THE VPC NETWORKS PAGE](#)
2. Click **Create VPC network**.
3. Enter a **Name** for the network.
4. Choose **Custom** for the **Subnet creation mode**.
5. In the **New subnet** section, specify the following configuration parameters for a subnet:
  1. Provide a **Name** for the subnet.
  2. Select a **Region**.
  3. Enter an **IP address range**. This is the primary IP range for the subnet.
  4. To define a secondary range for the subnet, click **Create secondary IP range**.
  5. **Private Google access**: Choose whether to enable Private Google Access for the subnet when you create it or later by editing it.
  6. **Flow logs**: Choose whether to enable VPC flow logs for the subnet when you create it or later by editing it.

1. Click **Done**.
2. To add more subnets, click **Add subnet** and repeat the previous steps. You can also add more subnets to the network after you have created the network.
3. Choose the **Dynamic routing mode** for the VPC network.  
For more information, see [dynamic routing mode](#). You can change the dynamic routing mode later.
4. Click **Create**.

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## Agenda

Section 3.1 - Deploying and implementing Compute Engine resources

Section 3.2 - Deploying and implementing Google Kubernetes Engine resources

Section 3.3 - Deploying and implementing App Engine and Cloud Functions resources

Section 3.4 - Deploying and implementing data solutions

Section 3.5 - Deploying and implementing networking resources

[Section 3.6 - Deploying a Solution using Cloud Marketplace](#)

Section 3.7 - Deploying an Application using Deployment Manager

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## Exam Guide: Section 3.6

### 3.6 Deploying a Solution using Google Cloud Marketplace.

Tasks include:

- Browsing Cloud Marketplace catalog and viewing solution details.
- Deploying a Cloud Marketplace solution.

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## Exam Guide: Section 3.6

3.6 Deploying a Solution using Google Cloud Marketplace.

Tasks include:

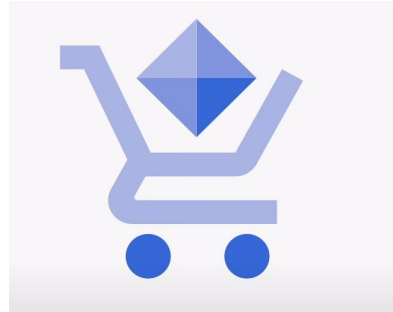
- **Browsing Cloud Marketplace catalog and viewing solution details.**
- **Deploying a Cloud Marketplace solution.**



## Cloud Marketplace gives quick access to solutions

A solution marketplace containing pre-packaged, ready-to-deploy solutions.

- Some offered by Google
- Others by third-party vendors
- You pay for the underlying Google Cloud resource usage.
  - Some solutions also assess third-party license fees.

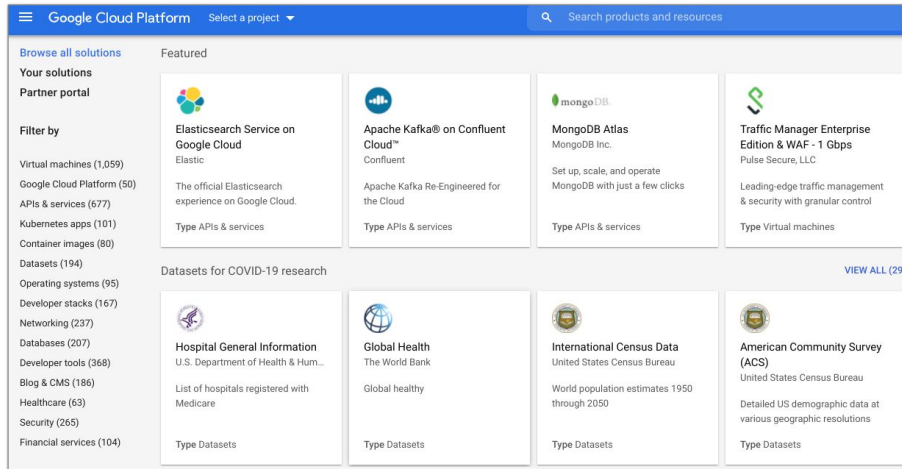


If you want a quick way to get started with Google Cloud, with minimal effort this is what Cloud Marketplace provides. It's a tool for quickly deploying functional software packages on Google Cloud. There's no need to manually configure the software, virtual machine instances, storage, or network settings, although you can modify many of them before you launch if you like.

Most software packages in Cloud Marketplace are at no additional charge beyond the normal usage fees for Google Cloud resources. Some Cloud Marketplace images charge usage fees, particularly those published by third parties, with commercially licensed software. But they all show you estimates of their monthly charges before you launch them. Do be aware that these estimates are just that--estimates--and in particular they don't attempt to estimate networking costs, since those will vary based on how you use the applications.

A second note of caution: Google Cloud updates the base images for these software packages to fix critical issues and vulnerabilities, but it doesn't update software after it's been deployed. Fortunately, you'll have access to the deployed systems so you can maintain them.

# Cloud Marketplace catalog



Cloud Marketplace offers ready-to-go development stacks, solutions, and services to accelerate development. So you spend less time installing and more time developing.

- Deploy production-grade solutions in a few clicks
- Single bill for all your Google Cloud and 3rd party services
- Manage solutions using Deployment Manager
- Notifications when a security update is available
- Direct access to partner support

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## Agenda

Section 3.1 - Deploying and implementing Compute Engine resources

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Section 3.5 - Deploying and implementing networking resources

Section 3.6 - Deploying a Solution using Cloud Marketplace

[Section 3.7 - Deploying an Application using Deployment Manager](#)

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## Exam Guide: Section 3.7

### 3.7 Deploying an Application using Deployment Manager.

Tasks include:

- Developing Deployment Manager templates to automate deployment of an application.
- Launching a Deployment Manager template to provision Google Cloud resources and configure an application automatically.

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## Exam Guide: Section 3.7

3.7 Deploying an Application using Deployment Manager.

Tasks include:

- Developing Deployment Manager templates to automate deployment of an application.
- **Launching a Deployment Manager template to provision Google Cloud resources and configure an application automatically.**

## Deployment Manager automates the creation and management of your Google Cloud resources

- Infrastructure management service.
- Create a .yaml template describing your environment and use Deployment Manager to create resources.
- Provides repeatable deployments.



Deployment Manager is an infrastructure management service that automates the creation and management of your Google Cloud resources for you.

Setting up your environment in Google Cloud can entail many steps: setting up compute, network, and storage resources and keeping track of their configurations. You can do it all by hand if you want to, taking an imperative approach. But it is more efficient to use a template. That means a specification of what the environment should look like, declarative rather than imperative.

Google Cloud provides Deployment Manager to let do just that. It's an infrastructure management service that automates the creation and management of your Google Cloud resources for you.

To use Deployment Manager, you create a template file, using either the YAML markup language or Python, that describes what you want the components of your environment to look like. Then you give the template to Deployment Manager, which figures out and does the actions needed to create the environment your template describes. If you need to change your environment, edit your template, and then tell Deployment Manager to update the environment to match the change.

Here's a tip: you can store and version-control your Deployment Manager templates in Cloud Source Repositories.

## Deploying an application with Deployment Manager

**GCLOUD** API

With the `gcloud` command-line tool, use the `deployments create` command:

```
gcloud deployment-manager deployments create my-first-deployment \
  --config vm.yaml
```

The `--config` flag is a relative path to your YAML configuration file.

By default, if your configuration includes resources that are already in your project, those resources are acquired by the deployment, and can be managed using the deployment. If you don't want to acquire a resource, you must use the `--create-policy` option, as in the following command:

```
gcloud beta deployment-manager deployments create my-first-deployment \
  --config vm.yaml --create-policy CREATE
```

For information on what policies you can use when you are creating deployments, see [Setting the policy for creating resources](#).

If your deployment is successfully created, you can get a description of the deployment:

```
gcloud deployment-manager deployments describe my-first-deployment
```



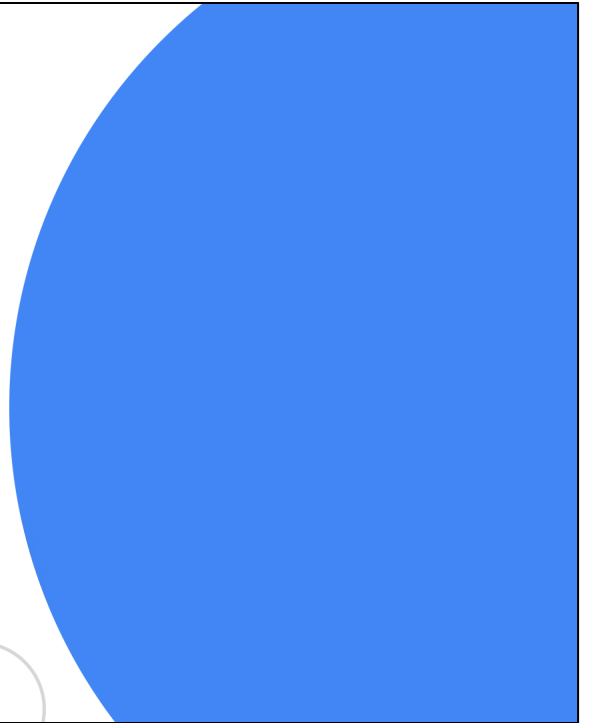
A deployment is an instantiation of a set of resources that are defined in a configuration. You provide a valid configuration in the request to create the deployment. A deployment can contain a number of resources, across a variety of Google Cloud services. When you create a deployment, Deployment Manager creates all of the described resources in the respective Google Cloud APIs.

When you create a deployment, you are creating a Deployment resource that contains a collection of resources. Each resource is explicitly defined in a configuration that you provide in your request.

When you create a new deployment, if a resource that you want to create already exists in your project, it is acquired by the deployment. In such cases, Deployment Manager does not create a new resource.

# Lab Intro

Deployment Manager:  
Full Production



Deployment Manager is an infrastructure deployment service that automates the creation and management of your Google Cloud resources for you. You can create flexible templates that deploy a variety of Google Cloud services, such as Google Cloud Storage, Google Compute Engine, and Cloud SQL.

In this lab, you will launch a service using an infrastructure orchestration tool called Deployment Manager and monitor the service using Cloud Monitoring. In Cloud Monitoring, you will set up basic black box monitoring with a Cloud Monitoring dashboard and establish an Uptime Check (alert notification) to trigger incident response.

This lab is part of the Qwiklabs Cloud Architecture Quest.



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## Suggested study resources for this section

Compute Engine: <https://cloud.google.com/compute/docs/>

Cloud Source Repositories: <https://cloud.google.com/source-repositories/docs/>

Deployment Manager: <https://cloud.google.com/deployment-manager/docs/>

Instance groups: <https://cloud.google.com/compute/docs/instance-groups/>

Autoscaling: <https://cloud.google.com/compute/docs/autoscaler/>

Instance templates: <https://cloud.google.com/compute/docs/instance-templates/>

Create VMs from instance template:

<https://cloud.google.com/compute/docs/instances/create-vm-from-instance-template>

Creating groups of managed instances with templates:

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

Using VPC networks: <https://cloud.google.com/vpc/docs/using-vpc>

Deployment Manager fundamentals: <https://cloud.google.com/deployment-manager/docs/fundamentals>

