

# Google Cloud Platform Compute Services

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# Learning Objectives

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- Overview of GCP Compute Services
- App Engine
- Compute Engine
- Kubernetes Engine
- Cloud Functions

**Demo: Launching a VM in GCE**

- Use Cases of Compute Services

# Overview of GCP Compute Services

# Overview of GCP Compute Services

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- Compute services are a critical component of the cloud
- Code is deployed and executed in one of the compute services
- GCP offers a wide range of compute choices
  - App Engine
  - Compute Engine
  - Kubernetes Engine
  - Cloud Functions

# Overview of Google App Engine

# Google App Engine

- One of the first compute services from Google (PaaS)
- Fully managed platform for deploying web apps at scale
- Supports multiple languages, frameworks, and libraries
- App Engine is available in two environments
  - Standard
  - Flexible
- Applications deployed in standard environment run in a sandbox
- Flexible environment uses Docker containers to deploy and scale apps



**Resource link:** <https://cloud.google.com/appengine/docs/the-appengine-environments>

# Overview of Google Compute Engine

# Google Compute Engine

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- GCE enables Linux and Windows VMs to run on Google's global infrastructure
- VMs are based on machine types with varied CPU and RAM configuration
- Persistence is available through standard and SSD disks
- VMs are charged a minimum of 1 minute and in 1 second increments after that
- Sustained use discounts are offered for running VMs for a significant portion of the billing month
- Committed use discounts are offered for purchases based on 1 year or 3 year contracts



# Overview of Google Kubernetes Engine

# Google Kubernetes Engine

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- GKE is a managed environment for deploying containerized applications managed by Kubernetes
- Kubernetes has a control plane and worker node
- GKE provisions worker nodes as GCE VMs
- Node pools enable mixing and matching different VM configurations
- The service is tightly integrated with GCP resources such as networking, storage, and monitoring
- Auto scaling, automatic upgrades, and node auto-repair are some of the unique features of GKE

# Overview of Google Cloud Functions

# Google Cloud Functions

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- Cloud Functions is a serverless execution environment for building and connecting cloud services
- Serverless compute environments execute code in response to an event
- Cloud Functions supports JavaScript, Python 3, and Go
- GCP events fire a Cloud Function through a trigger
- An example event includes adding an object to a storage bucket
- Trigger connects the event to the function

# Google Cloud Platform Fundamentals

## Lab Guide for Google Compute Engine

```
# Get a list of images
gcloud compute images list
```

```
PROJECT=<PROJECT_ID> # Replace this with your project id
ZONE=asia-south1-a    # Replace this with a GCP zone of your choice
```

```
# Launch a GCE instance
gcloud compute instances create gcp-lab1 \
  --project=$PROJECT \
  --zone=$ZONE \
  --machine-type=f1-micro \
  --tags=http-server \
  --image=ubuntu-1804-bionic-v20190722a \
  --image-project=ubuntu-os-cloud
```

```
# Open port 80 for HTTP access
gcloud compute firewall-rules create default-allow-http \
  --project=$PROJECT \
  --direction=INGRESS \
  --action=ALLOW \
  --rules=tcp:80 \
  --source-ranges=0.0.0.0/0 \
  --target-tags=http-server
```

```
# SSH into the VM
```



# Google Cloud Platform Fundamentals

```
gcloud compute ssh gcp-lab1 --zone=$ZONE
```

```
# Run these commands within the VM
```

```
sudo apt-get install -y apache2
```

```
sudo systemctl start apache2
```

```
# List instances
```

```
gcloud compute instances list --zone=$ZONE
```

```
# Access Apache through the public IP
```

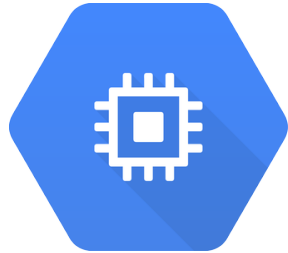
```
# Terminate the instance
```

```
gcloud compute instances delete gcp-lab1 --zone $ZONE
```



# GCP Compute – Use Cases

# The Choice of Compute on GCP



Google Compute  
Engine (GCE)



Google Kubernetes  
Engine (GKE)



Google App  
Engine (GAE)



Google Cloud  
Functions



Highly customizable / Highly managed



# Use Cases

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Product	Delivery Model	Key Feature	Use Case
Google Compute Engine	IaaS	Virtual Machines	Highly customized workloads
Google Kubernetes Engine	CaaS	Containers & Microservices	Containerized workloads
Google App Engine	PaaS	Managed Runtime	Line-of-business applications
Google Cloud Functions	FaaS	Functions	Event-driven applications