Google Cloud Platform Compute Services

Learning Objectives

- 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

- 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

- 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 on1 year or 3 year contracts

Overview of Google Kubernetes Engine

Google Kubernetes Engine

- 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

- 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
```

```
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

Use Cases

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