

Virtual Machine Instance

In Google Cloud

Stamatis Sideris

DATA MANAGEMENT & ANALYTICS CONSULTANT

Contents

Introduction	1
What is a Virtual Machine Instance (VM Instance).....	1
VM Instance Installation using Google Cloud	2
References	8

Introduction

The following Report aims at clarifying the use of Virtual Machines for businesses who want to take advantage of their capabilities and upgrade their Data Infrastructures and daily procedures. The suggested provider is Google Cloud.

What is a Virtual Machine Instance (VM Instance)

A Virtual Machine (VM) is a compute resource that uses software instead of a physical computer to run programs and deploy apps. One or more virtual guest machines run on a physical host machine. Each virtual machine runs its own operating system and functions separately from the other VMs, even when they are all running on the same host. This means that, for example, a MacOS virtual machine could run on a physical PC.

Virtual machines have historically been used for server virtualization, which enables IT teams to consolidate their computing resources and improve efficiency. Additionally, virtual machines can perform specific tasks considered too risky to carry out in a host environment, such as accessing virus-infected data or testing operating systems. Since the virtual machine is separated from the rest of the system, the software inside the virtual machine cannot tamper with the host computer.

An instance is a virtual machine (VM) hosted on Google's infrastructure. You can create an instance or create a group of managed instances by using the Google Cloud console, the Google Cloud CLI, or the Compute Engine API.


Compute Engine instances can run the public images for Linux and Windows Server that Google provides as well as private custom images that you can create or import from your existing systems. You can choose the machine properties of your instances, such as the number of virtual CPUs and the amount of memory, by using a set of predefined machine types or by creating your own custom machine types. Each instance belongs to a Google Cloud console project, and a project can have one or more instances. When you create an instance in a project, you specify the zone, operating system, and machine type of that instance. When you delete an instance, it is removed from the project. To create and manage instances, you can use a variety of tools, including the Google Cloud console, the gcloud command-line tool, and the REST API. To configure applications on your instances, connect to the instance using Secure Shell (SSH) for Linux instances or Remote Desktop Protocol (RDP) for Windows Server instances.

VM Instance Installation using Google Cloud


- Local OS: Windows 11
- VM Instance OS: Ubuntu

We visit the [Google Cloud webpage](#) and connect to our Google account. After that, we click on the Console. From there, we choose to create a new Project and we give it a name of our preference. Google offers 24 free projects to run per account as well as 300\$ of free credits for 3 months for every new account.


New Project

 You have 21 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[MANAGE QUOTAS](#)

Project name *
E-Commerce Shipping 

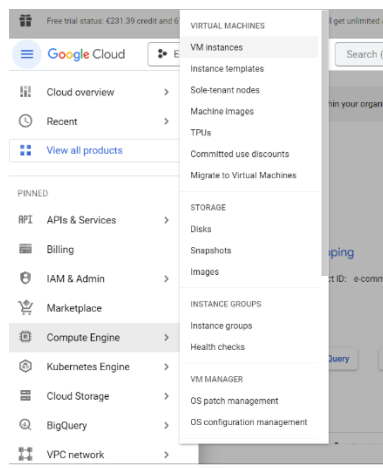
Project ID: e-commerce-shipping-379418. It cannot be changed later. [EDIT](#)

Location *
 No organization [BROWSE](#)

Parent organization or folder

[CREATE](#) [CANCEL](#)

Moving forward, we go Compute Engine -> VM Instance from the menu on the left.



We choose to create a new instance and we give it the name of our choice. We could also choose the region we want the server we connect to be located for better connectivity, the machine type to use as of its CPU and RAM requirements as well as the disk storage and the operating system. Here, we choose the Belgium region, on a 4 vCPU and 8gb RAM machine of 10gb disk storage, running Ubuntu.

Name *

ecommerce



! Name is already in use

Labels ?

+ ADD LABELS

Region *

europa-west1 (Belgium)



Region is permanent

Zone *

europa-west1-b



Zone is permanent

Machine type

e2-standard-4 (4 vCPU, 16 GB memory)



vCPU

4

Memory

16 GB

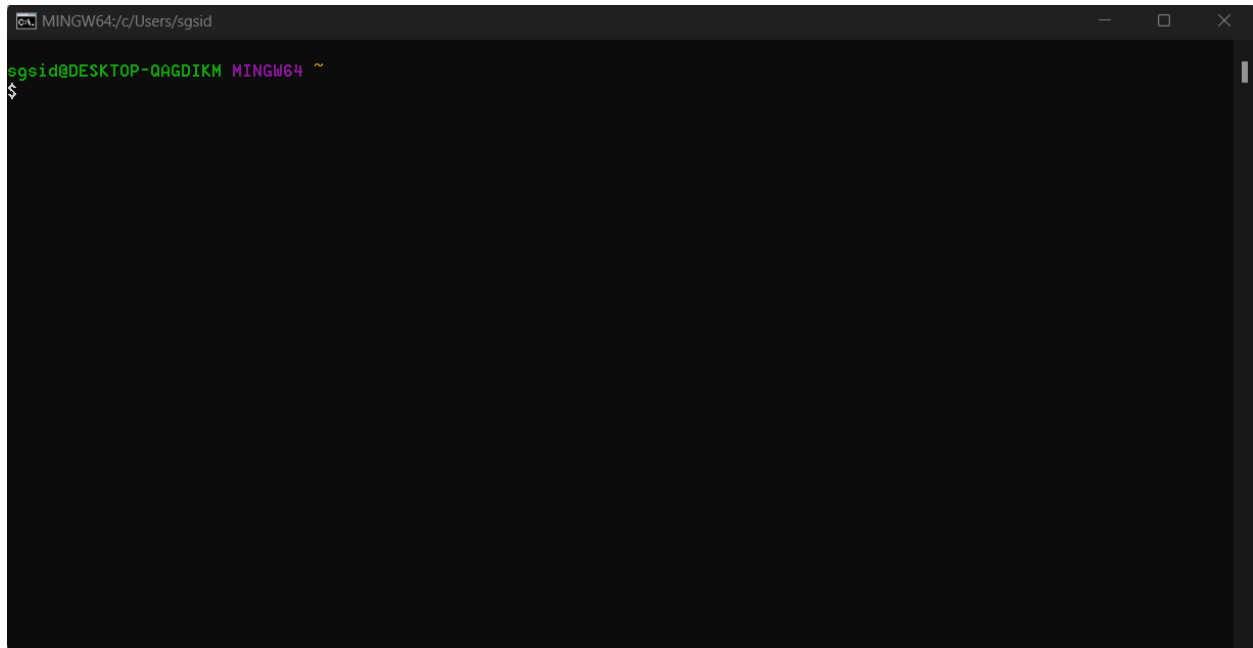
✓ CPU PLATFORM AND GPU

Boot disk ?

Name	ecommerce
Type	New balanced persistent disk
Size	10 GB
License type ?	Free
Image	Ubuntu 18.04 LTS

CHANGE

We continue on our terminal. Here, we use the GitBash terminal for windows offered by Git but you could use any other type of terminal in the operating system of your choice. Of course, some steps, paths and commands might vary depending on the operating system you are working with.



Firstly, we create a .ssh directory with the mkdir command. Here, we will store the ssh key. SSH keys are an authentication method used to gain access to an encrypted connection between systems and then ultimately use that connection to manage the remote system.



In order to generate the key we use the following command:

```
ssh-keygen -t rsa -f C:\Users\WINDOWS_USER\.ssh\KEY_FILENAME -C USERNAME -b 2048
```

where WINDOWS_USER is your username on the windows machine, KEY_FILENAME is the name for your SSH key file and USERNAME is your username in the VM.



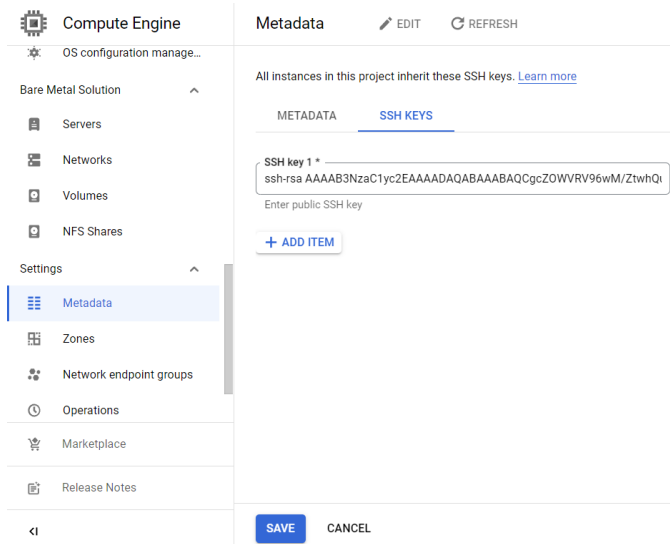
A private key file (gcp_1) and a public key file (gcp_1.pub) are generated inside the .ssh directory. Never share your private key file with anyone as it will provide someone with access to your VM instance. The one to be shared is the public key file gcp_1.pub where a hashed key is presented.



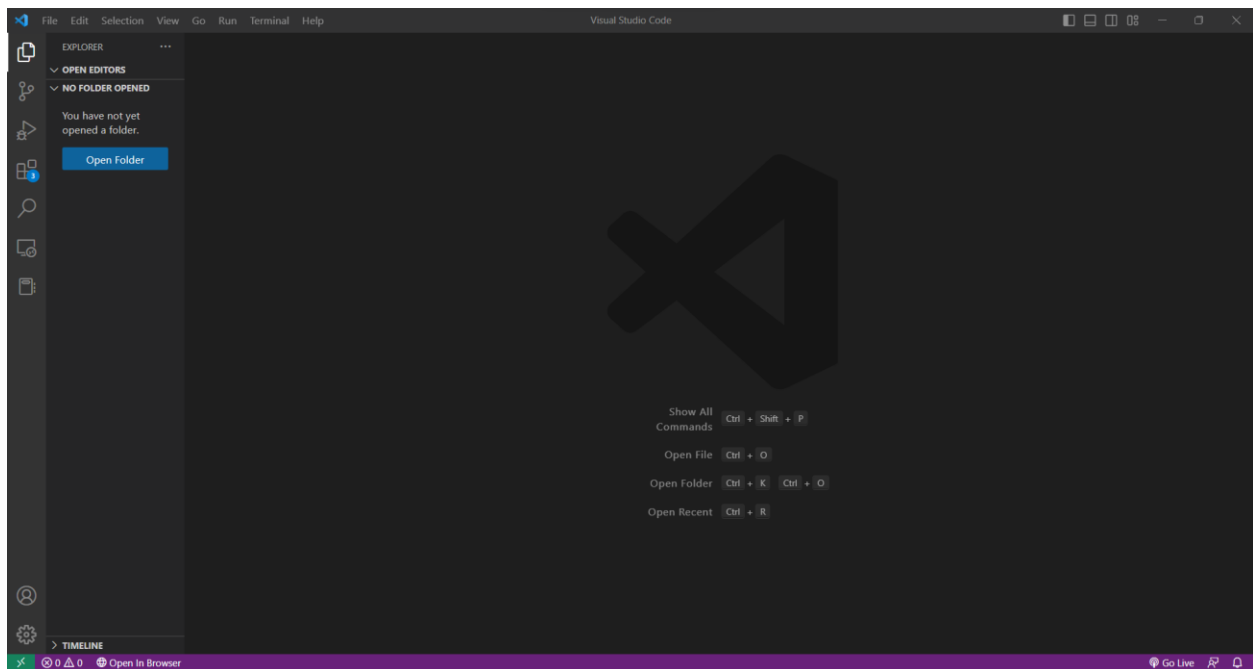
We open the public key file using the command cat and copy the public SSH key.

```
sgsid@DESKTOP-QAGDIKM MINGW64 ~/.ssh
$ cat gcp_1.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDoP16Hc5/FdrFiMhKD8t07KEcYnPimnAq8KzjujfibJ7Y7Q
j1PyJuI/U6CEhuq5uPRPLesH1c07iYeyz47Ya4FrrkSnuElxNw3qCQ+rOKYrbXKu6UCm8ZTieYPU+Z8119dCm
0uPUUp6GyTBWkaT5QqPcsMrn+QIyY25JiODGUNoMDzQUGco53r1WYu83dnk3uynai3m7k61R01JUdxqc4Ukm1
vFth0YokHuDYDt/UfN8/ stamatis
```

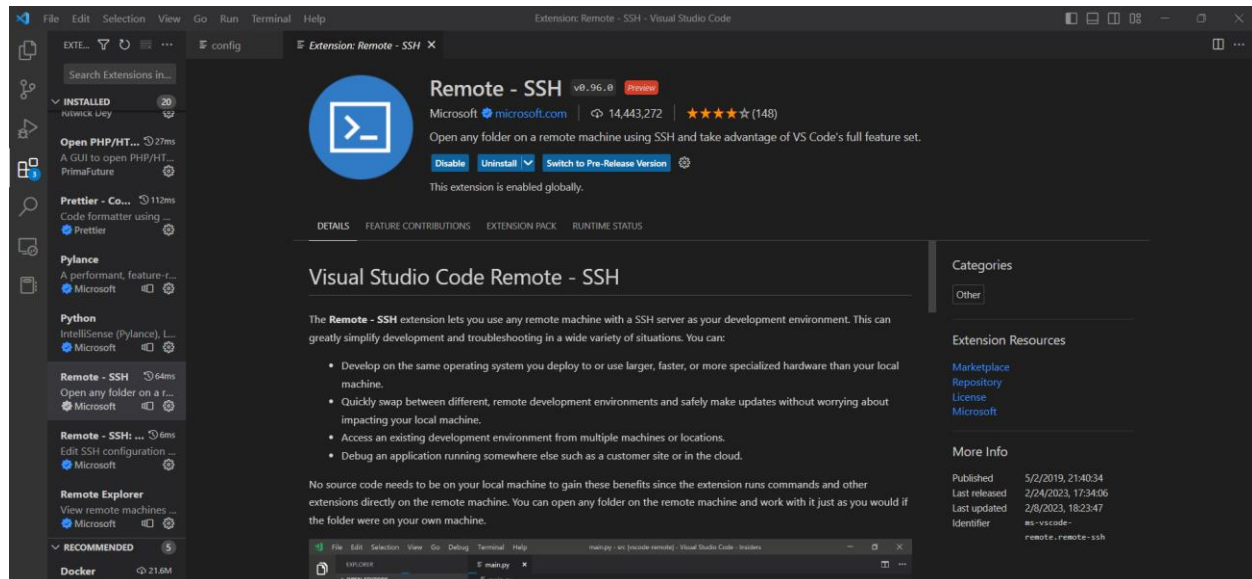
Next, we revisit our VM instance and this time we choose Metadata from the menu on the left. We choose the SSH KEYS option and add there our public SSH key we copied previously.



Now, we are ready to connect our local machine to the VM instance using the SSH network. To do so, we will use the code editor Visual Studio Code (VS).



We visit the extensions on the left and search for the Remote – SSH extension to install. The extension will help as configure the connection between our local machine and the virtual machine.



In order to configure we need a config directory that includes all the information needed. We create one via our terminal and open it with the command code.

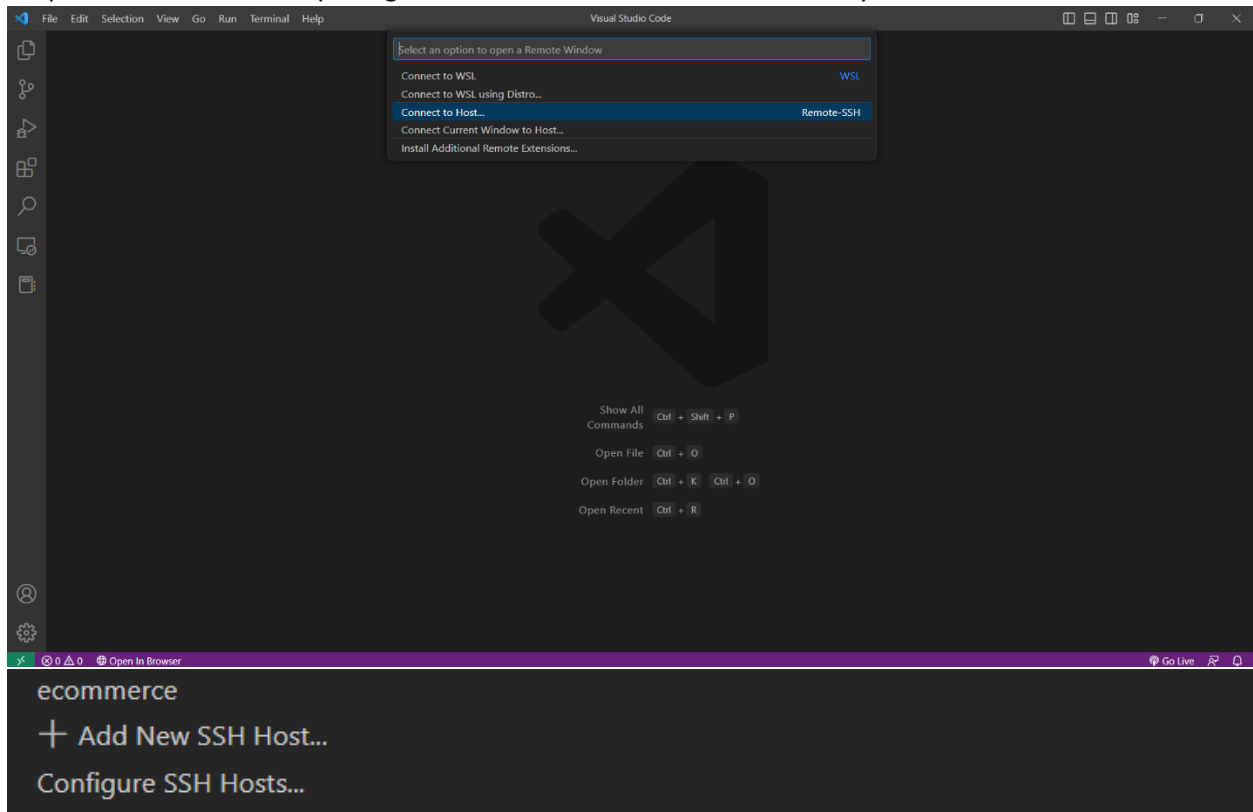
```
sgsid@DESKTOP-QAGDIKM MINGW64 ~/.ssh
$ mkdir config

sgsid@DESKTOP-QAGDIKM MINGW64 ~/.ssh
$ code config
```

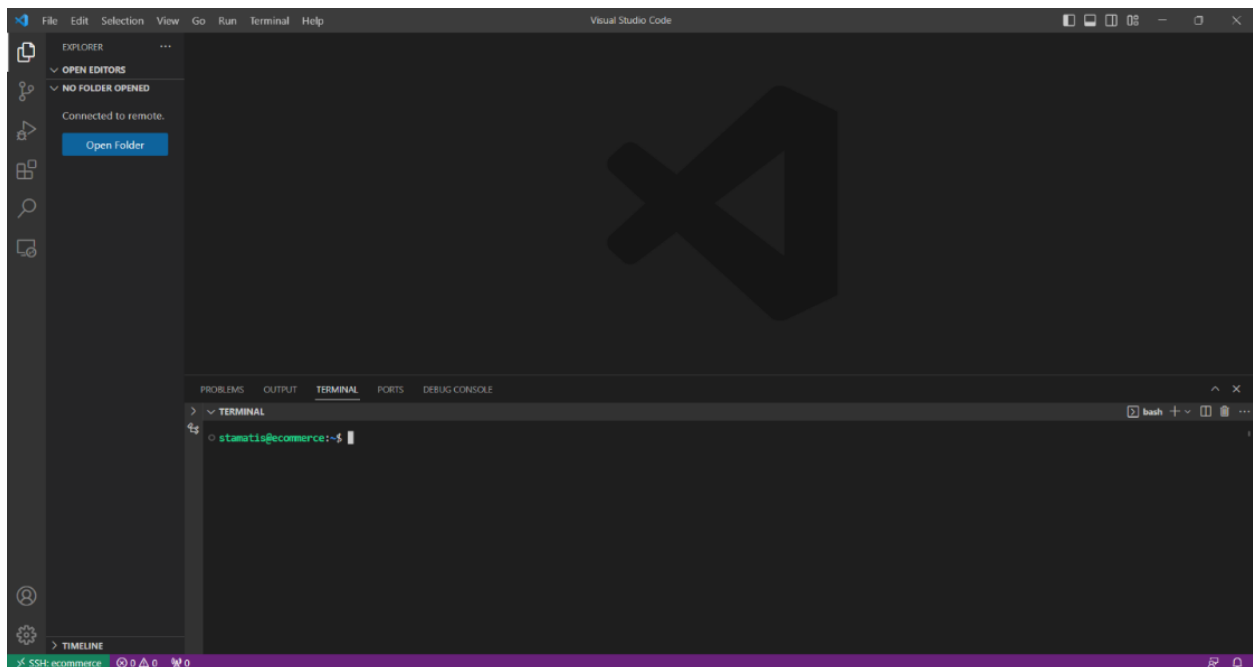
The directory opens via our default code editor which must be set as Visual Studio Code. Set the info with the following structure where Host is the name of the VM, HostName the external IP address of the VM, User the username you use as user for the VM and IdentityFile the local path to your private SSH key. Save the file.

```
config
C: > Users > sgsid > .ssh > config
1 Host ecommerce
2 HostName 34.78.127.107
3 User stamatis
4 IdentityFile c:/Users/sgsid/.ssh/gcp_1
```

Continue by choosing the green icon on the bottom left of VS and choose “Connect to host” from the drop-down menu opening. Choose the name of your Host and connect.



That's it! You are connected to a Virtual Machine Instance of your preference provided by Google.



References

<https://www.vmware.com/topics/glossary/content/virtual-machine.html>

<https://cloud.google.com/compute/docs/instances>