September 2, 2020

Assignment 1

Estimated time needed to complete the entire lab: 4-10 hours.

Course:
Applied Cloud Computing
Course-ID:
1TD265

Instructors:
Salman Toor, Salman.Toor@it.uu.se

Teacher Assistants:
Areeb Asad, Hafizareeb.Asad.7965@student.uu.se
Hamza Saeed, Hamzaimran.Saeed.8603@student.uu.se

Introduction:

The aim of this computer assignment is to give you hands-on experience with the cloud computing infrastructure used in this course, the SNIC Science Cloud (SSC) (https://cloud.snic.se). SSC is a resource that provide Infrastructure-as-a-Service (IaaS) based on the OpenStack cloud software (Newton release) and Ceph storage and offers the following basic services:

1. Compute
2. Storage (Volume and Object)
3. Identity management
4. Image
5. Network
6. Orchestration

Important links:

1. Cloud portal link: https://east-1.cloud.snic.se/
2. Information page: https://cloud.snic.se
3. User Guide: https://docs.openstack.org/newton/user-guide/

Your goal is to follow the User Guide and complete the following tasks. All tasks are compulsory. Each task consists of two parts, Hands-On and Questions. Both are mandatory. We expect brief answers to the questions, handed in writing.

Important:

- You are only allowed to launch two virtual machines at a time.
- For this Lab you are only allowed to launch "SSC.xsmall" virtual machines. Please note that administrators have the right to turn-off VMs running with "medium", "large" or "xlarge" flavors.
- We will not allow long running VMs. Please terminate your VMs within 48 hours and relaunch new VMs when needed. After 48hours, administrators have the right to terminate the VMs.

Good Luck!

Task-1 (Provisioning a Virtual Machine)

1. Start an instance of Ubuntu 16.04 with 1 VCPUs.
2. Assign a floating IPs to the instance.
3. Access the instance using the SSH client (or if you are using Windows, using Putty) and install the program "cowsay"
   The user name used on the Ubuntu images is "ubuntu"
4. Open port 4567 on the instance.
5. Create a snapshot of the instance.

Questions:

1. What is the difference between the private IP and the floating IP?
2. Can you access the Internet from the VM without assigning a floating IP to the machine?
3. What is the difference between image, instance and snapshot?
4. What is the name of the OpenStack service responsible for providing the:
   a. Image Service
   b. Compute Service

Delete the snapshot you just created.

Task-2 (Block Storage)

1. Create a volume of size 1GB.
2. Attach your newly created volume to your instance.
3. Access the volume and Copy a file to the attached volume.
4. Modify the size of the volume created in step 1.

Questions:

1. What is the technology used to provide volumes in OpenStack? Is it RAID or LVM?
2. What is LVM? Explain the advantage(s) of using LVM?
3. Can one volume be attached to multiple instances or vice versa?
4. Explain the main difference between Ephemeral Storage and Block-Storage. What are the major use-cases for the different storage types?
5. Does your VM have ephemeral storage?
6. What is the name of the OpenStack service providing volumes?

Task-3 (Network)

Questions:

1. Explain the picture in the tab “Network Topology”
2. What is the subnet used by the Tenant?
3. What is the role of the router?
4. Explain the path of the traffic of the VM to the Internet?
5. Find out the unique ID of the external network.
6. What is the name of the OpenStack service handling Networks?

Task-4 (Cowsay as a Service)

In this task you will deploy a simple service to the benefit to the world.

Access your VM and start by installing the program “cowsay” (use ‘apt-get’). Then proceed to use ‘git’ to clone the repository

https://www.github.com/TDB-UU/csaas

cd into the folder csaas/cowsay and then execute

$ screen python app.py

If you get any messages about missing packages, just go ahead and install them using ‘pip’ (a Python package management system)

Test that things are working by executing (from your client)
$ curl -i http://<your public ip>:5000/cowsay/api/v1.0/saysomething

(if you are using Windows, use a Linux VM or install a cURL client for Windows) Include the output of the above command with your answers.

Questions:

1. Examine the code in app.py. What Python framework is used to provide the (extremely simplistic) RESTful service?
2. What problem does “screen” solve?
3. Write a short description of the steps you followed to complete the Task-5.
4. Is SCC a Public, Community, Private or Hybrid cloud, and why?