August 27, 2015

Assignment 1

Estimated time needed to complete the entire lab: 4-6 hours.

Course:
Applied Cloud Computing
Course-ID:
1TD265

Deadline: September 14, 2016.

Instructors:
Andreas Hellander, Andreas.Hellander@it.uu.se
Salman Toor, Salman.Toor@it.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 (OpenStack). The Smog cloud is an UPPMAX (Uppsala Multidisciplinary Center for Advanced Computational Science) resource that provide Infrastructure-as-a-Service (IaaS). It is based on the OpenStack cloud software (Kilo release) and Ceph storage and offers the following services:

1. Compute
2. Storage
3. Identity management
4. Image
5. Network

Important links:

1. Information page: http://www.uppmax.uu.se/smog-cloud
2. User Guide: http://www.uppmax.uu.se/smog-user-guide
3. Dashboard: http://smog.uppmax.uu.se/dashboard

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.

Good Luck!

Task-1 (Provisioning a Virtual Machine)

1. Start an instance of Ubuntu 14.04 with 2 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”
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 machin
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

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.
5. What is the name of the OpenStack service providing volumes?

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?

Task-3 (Network)

Questions:

1. Explain the picture in the tab “Network Topology”
2. What if 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 (Object Storage)

1. Find out the public url of the Container "Lab1".
2. Download the object NIST.pdf from the Horizon dashboard.
3. From your VM, download NIST.pdf using "curl"
4. Try to create a container named "testcontainer", did it work? If not, move on.

Questions:

1. Explain the difference between a folder on your UNIX filesystem and a pseudo-folder inside a container?
2. The corresponding system in Amazon Web Services is called "S3". Is there a principal difference between an "S3 bucket" and a container in OpenStack's object store?
3. What is the name of the OpenStack service providing the Object Store?

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/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