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<b>Subject Name &amp; Code:</b> Cloud Computing			
<b>Title of Assignment:</b> Assignment 2: Study and implementation of Infrastructure as a Service			
<b>Date of Performance:</b> 5/12/2022		<b>Date of Submission:</b> 5/12/2022	

**Aim:** Study and implementation of Infrastructure as a Service

**Problem Statement:** Study and implementation of Infrastructure as a Service

**Background Information:**

### **Infrastructure as a Service**

- IaaS is also known as Hardware as a Service (HaaS). It is one of the layers of the cloud computing platform.
- It allows customers to outsource their IT infrastructures such as servers, networking, processing, storage, virtual machines, and other resources.
- Customers access these resources on the Internet using a pay-as-per use model.
- In traditional hosting services, IT infrastructure was rented out for a specific period of time, with pre-determined hardware configuration. The client paid for the configuration and time, regardless of the actual use.

- With the help of the IaaS cloud computing platform layer, clients can dynamically scale the configuration to meet changing requirements and are billed only for the services actually used.
- IaaS cloud computing platform layer eliminates the need for every organization to maintain the IT infrastructure.

IaaS is offered in three models: public, private, and hybrid cloud. The private cloud implies that the infrastructure resides at the customer-premise. In the case of public cloud, it is located at the cloud computing platform vendor's data center, and the hybrid cloud is a combination of the two in which the customer selects the best of both public cloud or private cloud.

### **IaaS Services -**

- **Compute:** Computing as a Service includes virtual central processing units and virtual main memory for the Vms that is provisioned to the end- users.
- **Storage:** IaaS provider provides back-end storage for storing files.
- **Network:** Network as a Service (NaaS) provides networking components such as routers, switches, and bridges for the Vms.
- **Load balancers:** It provides load balancing capability at the infrastructure layer.

### **How to Implement:**

The implementation of the IaaS service is achieved on multiple platforms. It can be done on the public, private, community, or hybrid cloud services. There are many things to consider before choosing the IaaS companies and implementing the system. Some of the points to ponder over before deciding on moving to the IaaS cloud computing platform and choosing the IaaS provider are listed below.

- **A Reason** – You must have a compelling business basis and purpose that makes you decide on moving to the IaaS bandwagon.
- **A strategy** – Once you decide, you need to have a clear strategy on moving forward by thinking ahead regarding any potential disruptions to any part of the business operation.
- **An Estimate** – You have to work out a proper estimate of the cost and savings due to the migration.
- **Testing** – Once decided, run a test on a small part of the project to check its reliability and functioning to forestall any potential bottlenecks.
- **Full understanding** – There should be full convergence and clarity between the provider and user regarding the requirements and terms of the agreement.
- **Information** – Keep all relevant parties, from employees, vendors, clients, and investors, informed about the schedule.
- **Backup** – Have multiple back-ups of all data before the switch over.

## Procedure:

### Installation Steps:

(<https://docs.openstack.org/devstack/latest/guides/singlemachine.html>)

#### 1. Add user

```
useradd -s /bin/bash -d /opt/stack -m stack
```

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

```
echo "stack ALL=(ALL) NOPASSWD: ALL" >> /etc/sudoers
```

```
login as stack user
```

## 2. Download DevStack

```
sudo apt-get install git -y || sudo yum install -y git
```

```
git clone https://git.openstack.org/openstack-dev/devstack
```

```
cd devstack
```

## 3. Run DevStack

Now to configure stack.sh. DevStack includes a sample in devstack/samples/local.conf. Create local.conf as shown below to do the following:

- Set FLOATING\_RANGE to a range not used on the local network, i.e. 192.168.1.224/27. This configures IP addresses ending in 225-254 to be used as floating IPs.
- Set FIXED\_RANGE and FIXED\_NETWORK\_SIZE to configure the internal address space used by the instances.
- Set FLAT\_INTERFACE to the Ethernet interface that connects the host to your local network. This is the interface that should be configured with the static IP address mentioned above.
- Set the administrative password. This password is used for the admin and demo accounts set up as OpenStack users.
- Set the MySQL administrative password. The default here is a random hex string which is inconvenient if you need to look at the database directly for anything.
- Set the RabbitMQ password.
- Set the service password. This is used by the OpenStack services (Nova, Glance, etc) to authenticate with Keystone.

local.conf should look something like this:

```
[[local|localrc]]

FLOATING_RANGE=192.168.1.224/27

FIXED_RANGE=10.11.12.0/24

FIXED_NETWORK_SIZE=256

FLAT_INTERFACE=eth0

ADMIN_PASSWORD=supersecret

DATABASE_PASSWORD=iheartdatabases

RABBIT_PASSWORD=flopsymopsy

SERVICE_PASSWORD=iheartksl
```

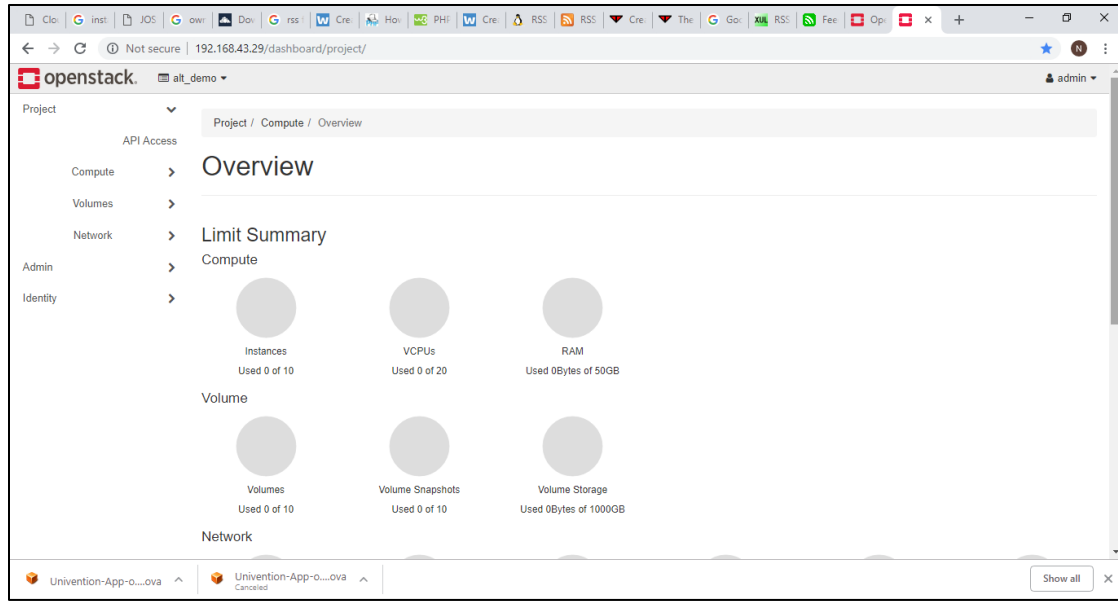
#### **4. Run DevStack:**

```
./stack.sh
```

A seemingly endless stream of activity ensues. When complete you will see a summary of stack.sh's work, including the relevant URLs, accounts and passwords to poke at your shiny new OpenStack.

#### **5. Using OpenStack**

At this point you should be able to access the dashboard from other computers on the local network. In this example that would be <http://192.168.43.29/> for the dashboard (aka Horizon). Launch VMs and if you give them floating IPs and security group access those VMs will be accessible from other machines on your network.



GitHub Repo Link:

<https://github.com/Vidhyapati/CCA-Assignments>

Conclusion:

IaaS cloud computing platform layer eliminates the need for every organization to maintain the IT infrastructure. AWS has significantly more services, and more features within those services, than any other cloud provider.