

PROFESSIONAL TRAINING REPORT
Sathyabama Institute of Science and Technology
(Deemed to be University)

Submitted in partial fulfilment of the requirements for the award of
Bachelor of Technology Degree in Information Technology

By

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DEPARTMENT OF INFORMATION TECHNOLOGY

SCHOOL OF COMPUTING

SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

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April 2023



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

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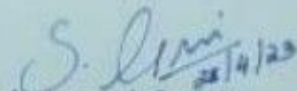
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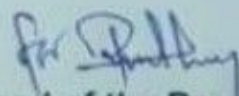
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BONAFIDE CERTIFICATE

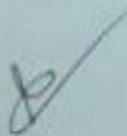
This is to certify that this Project Report is the Bonafide work of **SRINIVAS KN [40120091]** who carried out the project entitled "**UBUNTU OPERATING SYSTEM IN TERMS OF CLOUDCOMPUTING**" under my supervision from January 2023 to April 2023.


Internal Guide

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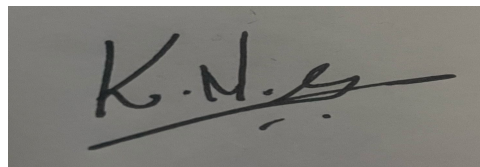

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DECLARATION

I Srinivas K N (Reg. No. 40120091) hereby declare that the Project Report entitled “UBUNTU OPERATING SYSTEM IN TERMS OF CLOUD COMPUTING” is done by me under the guidance of Dr. R. Gowri M E, Ph.D., and is submitted in partial fulfilment of the requirements for the award of Bachelor of Technology degree in Information Technology.

DATE:

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'K.N. Srinivas' with a stylized flourish at the end.

PLACE: Chennai

SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to the Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them. I convey my thanks to Dr. T Sasikala, M.E., Ph.D., Dean, School of Computing Dr. R Subhashini, M.E., Ph.D., Head of the Department of Information Technology for providing me with necessary support and details at the right time during the progressive reviews. I would like to express my sincere and deep sense of gratitude to my Project Guide Dr. r. Gowri, M.E., Ph.D. for her valuable guidance, suggestions and constant encouragement that paved way for the successful completion of my project work. I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Information Technology who were helpful in many ways for the completion of the project.

CERTIFICATE OF COMPLETION

Ref.No.: 62 /FSPCC/BC001/04/2023



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सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
ELECTRONICS AND
INFORMATION TECHNOLOGY
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COURSE COMPLETION LETTER

It is certified that

Srinivas K N

Sathyabama Institute of Science and Technology

has successfully undergone the Bridge Course Training Program on

Cloud Computing Technology

Under "FutureSkills PRIME" Programme

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ABSTRACT

In terms of cloud computing, the architecture of Ubuntu is designed to be scalable, flexible, and reliable. Ubuntu follows a modular architecture approach that allows cloud computing environments to be easily scaled up or down as needed. Ubuntu is built on the Linux kernel, which is designed to be lightweight and efficient. This allows Ubuntu to be deployed on virtual machines or containers with minimal overhead, making it an efficient choice for cloud computing environments. Ubuntu also supports a wide range of cloud computing platforms, including public cloud platforms like Amazon Web Services, Microsoft Azure, and Google Cloud Platform, as well as private cloud environments like OpenStack. In this project, we are going to know about how to install Ubuntu OS in a Windows operating system and how to work on it. Then, we are going to know about how to multiple partition the Ubuntu ISO image and get to know about how to upload image in OpenStack. In terms of Glance, let's get into the project.

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Chapter 1

INTRODUCTION

1.1 What is Ubuntu?

Ubuntu is a popular open-source operating system based on the Linux kernel that is designed to be user-friendly, secure, and customizable. It is one of the most widely used Linux distributions and is known for its ease of use, stability, and community-driven development. The word "Ubuntu" comes from the Zulu and Xhosa languages of southern Africa and translates to "humanity towards others" or "I am because we are. " This philosophy embodies the core values of the Ubuntu operating system, which emphasizes collaboration, inclusiveness, and the sharing of resources and knowledge Here are some key aspects of Ubuntu in detail

Open Source: Ubuntu is built on the principles of open source software, which means that its source code is freely available for anyone to view, modify, and distribute. This fosters a collaborative development model where a global community of developers work together to improve the software and share their improvements with others

Linux Kernel: Ubuntu uses the Linux kernel, which is core part of the operating system that interacts with the hardware of a computer. The Linux kernel provides robustness, security, and stability to Ubuntu.

User-friendly: Ubuntu aims to be user friendly, providing a simple and intuitive interface for both new and experienced users. It comes with a graphical desktop environment, typically GNOME, which provides a visually appealing and easy-to-use interface

Package Management: Ubuntu uses a package management system, typically APT (Advanced Package Tool), which makes it easy to install, update, and manage software applications. Users can access a vast repository of free and open-source software, including productivity tools, multimedia applications, development tools, and more.

Security: Ubuntu prioritizes security, with regular security updates and a robust permissions system that ensures users have control over their data and system. It also includes features like App Armor and UFW (Uncomplicated Firewall) to provide additional layers of security.

Community Driven: Ubuntu has a large and vibrant community of users and developers who contribute to its development, documentation, and

support. The Ubuntu community follows the Ubuntu Code of Conduct, which promotes inclusiveness, collaboration, and mutual respect Editions: Ubuntu comes in different editions, including Ubuntu Desktop Ubuntu Server, Ubuntu for IOT (Internet of Things) devices, and Ubuntu for cloud computing. This allows users to choose the edition that best meets their specific needs Long-Term Support (LTS): Ubuntu offers Long-Term Support (LTS) releases, which are stable versions supported with security updates and bug fixes for an extended period of time, typically for five years This makes Ubuntu suitable for use in enterprise environments

1.2 What is virtual OS

Virtual Operating System, also known as Virtual OS, is a software based abstraction layer that allows multiple instances of operating systems to run concurrently on a single physical machine. Each virtual machine (VM) created by a virtual OS can run its own operating system, applications, and processes independently, as if it were running on a Here are some key aspects of Virtual Operating on System in detail Hypervisor: The hypervisor, also known as the Virtual Machine Monitor (VMM), is the core component of a virtual OS. It is responsible for creating, managing, and allocating the resources needed for each virtual machine, such as CPU, memory, storage, and networking. There are two main types of hypervisors: Type 1 hypervisor, also known as a bare-metal hypervisor, runs directly on the host hardware, while Type 2 hypervisor, also known as a hosted hypervisor, runs on top of a host oper Virtual Machines: Virtual machines are the instances created by a virtual OS, and they act as independent, isolated environments with their own virtual hardware resources. Each virtual machine can run its own operating system, applications, and processes, just like a physical machine. Virtual machines can be provisioned, configured, and managed through the hypervisor, and they can be started, stopped, paused, and migrated between physical hosts as Operating Systems: Virtual OS allows for the creation and execution of multiple instances of different operating systems on a single physical machine. This allows for running multiple OS environments, such as Windows, Linux, or other

1.3 What is Open Stack

OpenStack is a free and open-source cloud computing platform that provides a set of software tools for building and managing public and private clouds. It was initially launched in 2010 as a joint project by NASA and Rackspace, and has since gained widespread ADAP

Cloud Computing Platform: OpenStack is a comprehensive cloud computing platform that allows organizations to build and manage their own cloud infrastructure. It provides a set of software components for compute (Nova), networking (Neutron), storage (Cinder, Swift), identity and authentication (Keystone), image service (Glance), orchestration (Heat), and other functionalities, which can be combined and configured to create a scalable and customizable cloud environment Open-Source and Free: OpenStack is an open-source project released under the Apache 2.0 license, which means that the source code is freely available to the public, and anyone can use, modify, and contribute to it. This makes OpenStack a cost- effective

Chapter 2

Aim and Scope

2.1 AIM

The aim of this project is to develop a system that automates the process of creating a new Ubuntu image from an ISO, creating multiple partitions on the image, and uploading the image to Glance, which is the image service in OpenStack.

2.2 Scope

The scope of the project includes designing and implementing a solution that streamlines the process of creating custom Ubuntu images, partitioning them as needed, and seamlessly uploading them to Glance for use in OpenStack cloud environments

2.3 KEYPOINTS

Key points of the The scope of the project includes designing and implementing a solution that streamlines the process of creating custom Ubuntu images, partitioning them as needed, and seamlessly uploading them to Glance for use in OpenStack cloud environments. The aim of this project is to develop a system that automates the process of creating a new Ubuntu image from an ISO, creating multiple partitions on the image, and uploading the image to Glance, which is the image service in OpenStack Enter a description for the image in the "Description" field. Select the file containing the image you want to upload by clicking on the "Choose File " button.

Chapter 3

Problem statements

3.1 Create a new Ubuntu Image from ISO.

STEP 1: Download the Ubuntu ISO file from the official Ubuntu

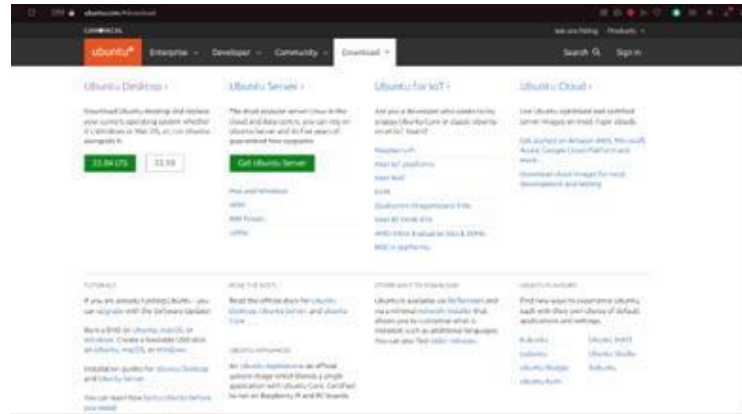


FIG.3.1.1 Ubuntu Website

STEP 2: Insert a blank CD or USB drive into your computer.

STEP 3: Use a burning software like Rufus or Etcher to create a bootable image from the ISO file. Follow the instructions provided the software to create the bootable image.



FIG.3.1.2 Rufus Software

STEP 4: Once the bootable image has been created, restart your computer and boot from the USB drive or CD

STEP 5: Follow the on-screen instructions to install Ubuntu

STEP 6: Once the installation is complete, open the terminal on Ubuntu by pressing ctrl+alt+t



FIG.3.1.3 Ubuntu Terminal

STEP 7: Run the following command to update the package

sudo apt -get update

STEP 8: Run the following command to upgrade the installed packages

sudo apt-get upgrade

STEP 9: Run the following command to install

sudo apt-get install qemu-utils

STEP 10: Run the following command to create a new image file from the Ubuntu installation

sudo qemu-img create -f qcow2 ubuntu.img 10G

STEP 11: This will create a new image file named with a size of 10GB. You can adjust the size to meet your needs.

STEP 12: Run the following command to copy the Ubuntu installation to the new image file

sudo dd if=/dev/sda of=/path/to/ubuntu.img bs =1M

STEP 13: Note that you need to replace "/path/to/Ubuntu img" with the actual path to the image file you created in step 10

STEP 14: Once the copy is complete, run the following command to resize the new image file to its maximum

sudo qemu-img resize ubuntu.img +5G

STEP 15: This will increase the size of the image file by 5GB. You can adjust the size to meet your needs.

STEP 16: Run the following command to convert the image file to a format that can be used with OpenStack

sudo qemu-img convert -O qcow2 ubuntu.img

STEP 18: The new Ubuntu image in QCOW2 format named "ubuntu.qcow2" is now ready to be used with OpenStack.

STEP 19: PROBLEM STATEMENT HAS BEEN SOLVED.

3.2 How to create multiple Partitions

Follow the standard installation guide until you get to the Installation Type screen - at that point the option you want is the last one – Something Else. Once you have selected that and clicked Continue, the Install takes you to the Advanced Partitioning Tool. The Advanced Partitioning Tool is the installer tool for taking you through the custom partitioning choices.



FIG.3.2.1 Installation Screen 1

only in the automated partitioning modes. They are not supported in the Advanced partitioning tool this window, you can

see all the partitions on the *Hard Drive* and any Free Unallocated Space. In this case, we are *using a blank hard disk*

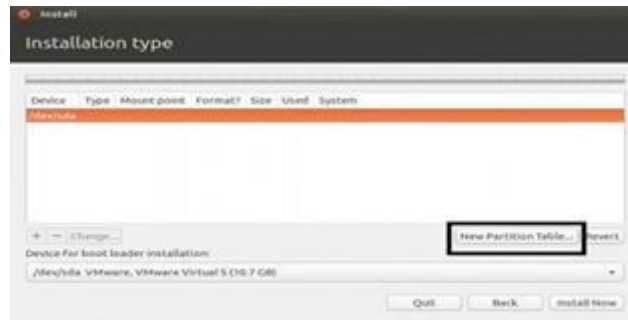


FIG.3.2.2 Installation Type



FIG.3.2.3 Create New Empty Partition

You can now click the + button to create a new partition. There are no special options in this tool. The installer prompts to create any new partition as a logical partition, if there are any pre-existing Primary Partitions. You can go along with what the installer wants to use or you can modify Note: I would recommend creating the first of all the all partition for the Ubuntu install as a primary partition If you are having trouble following this? That You can read up on partitions, directories, and file systems in the of guide linked below for a more in-depth explanation: The types definitions of Partitions and Directories Explained. This step is repeated for each of the other partitions you create too. Create a Root partition of the every partition is mounted at /. Ubuntu needs a Minimum of 20 GB to run correctly. I would leave the file system as the default Ext 4. for example, there is one primary partition left and all the remaining partitions are created as logical partitions by the installer. You do not get a choice. We need a paging file, so we create a Swap Partition. This partition is for /swap. That is disk space that the computer may use as memory. (Like a paging file in windows systems.)



FIG.3.2.4 Create Partition 1

Next we create the Home Partition. This partition is mounted at home. The disk space is what is left on the Hard Drive, we create



FIG.3.2.5 Create partition 2

Finalizing the Install

When all the partitions your making have been created, you should see them all listed in the main window of the Advanced Partitioning Tool. We need to finalize this by specifying the Device for in the example below, you need GRUB to be installed in the boot partition of that OS which is sda5 here. Select /dev/sda5 from the ofClick install now if the partition you want is showing for the boot loader installation. Once the installation of Ubuntu has completed, you need reboot the computer. If you have chosen Ubuntu, then you are finished. You can get further help with configuring your Ubuntu from

3.3 Upload Image to glance

Log in to the OpenStack dashboard (Horizon) using your credentials. Click on drop-down menu Click on "Images" from the left-hand menu. Click on the "Create Image" button Enter a name for the image in the "Name" field. (Optional) Enter a description for the image in the "Description" field Select the file containing the image you want to upload by clicking on the "Choose File " button. (Optional) Select the format of the image from the "Format" drop-down menu.

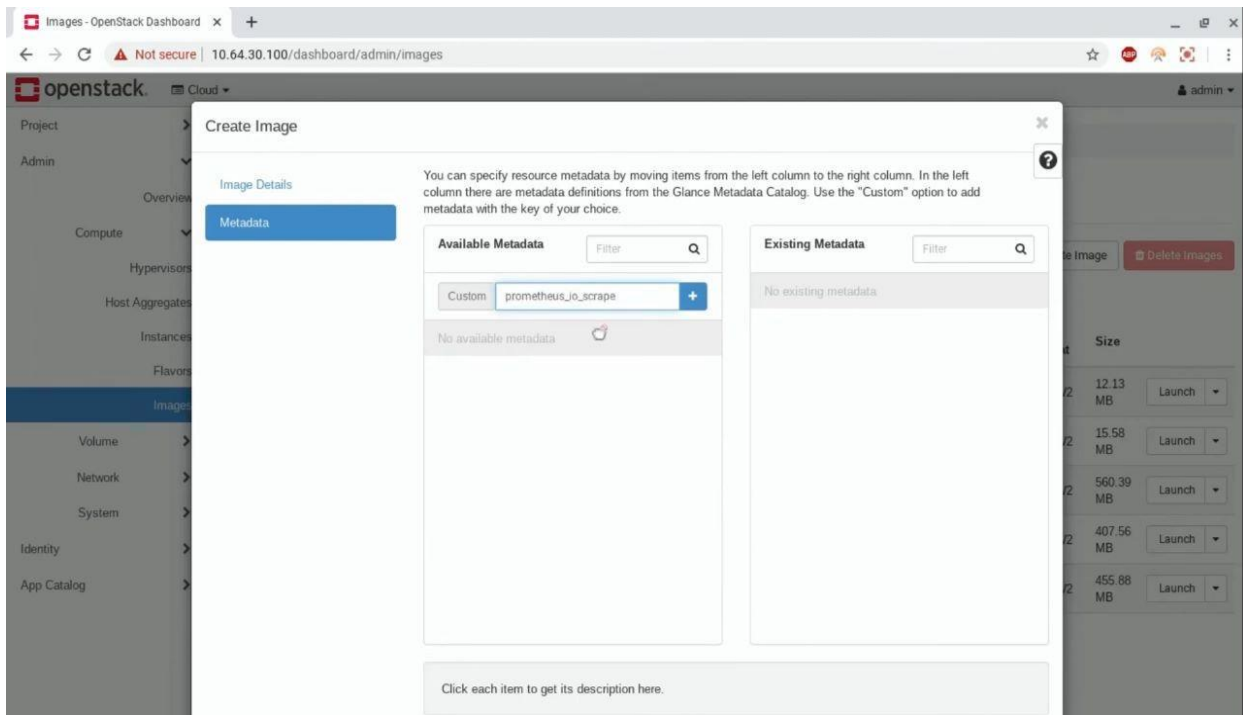


FIG.3.3.1 Create Image Meta Data

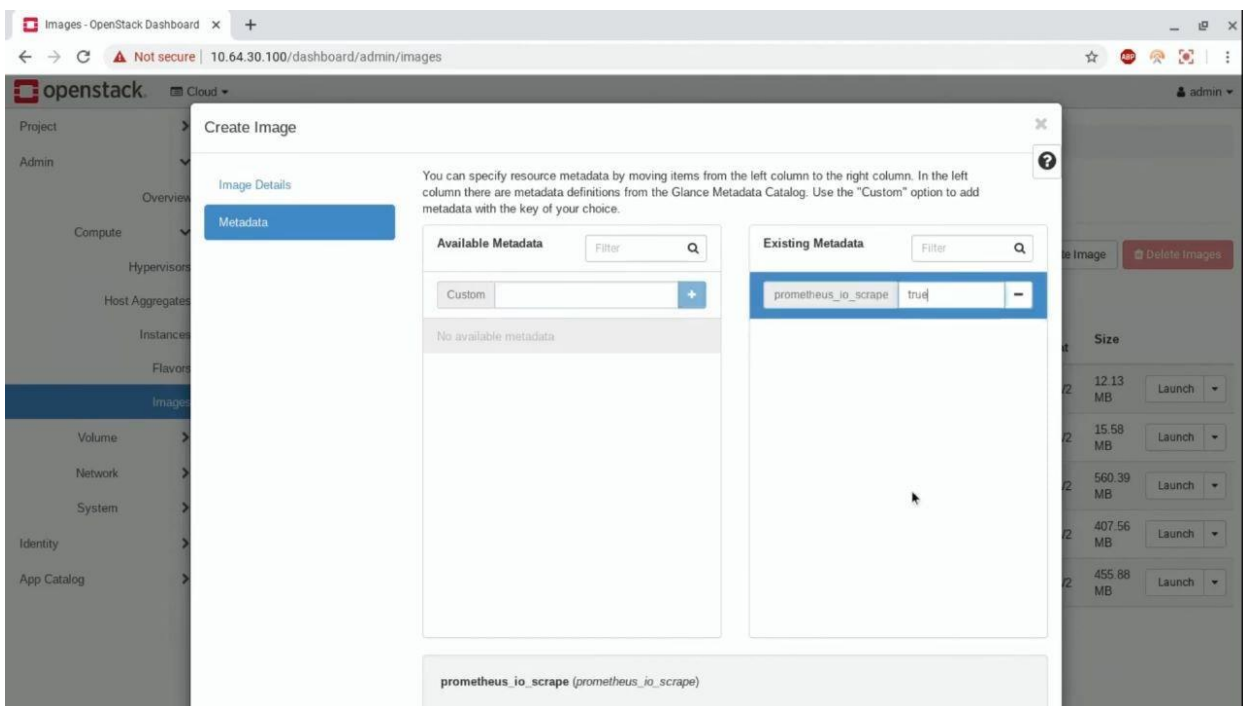


FIG.3.3.2 Create Image metadata

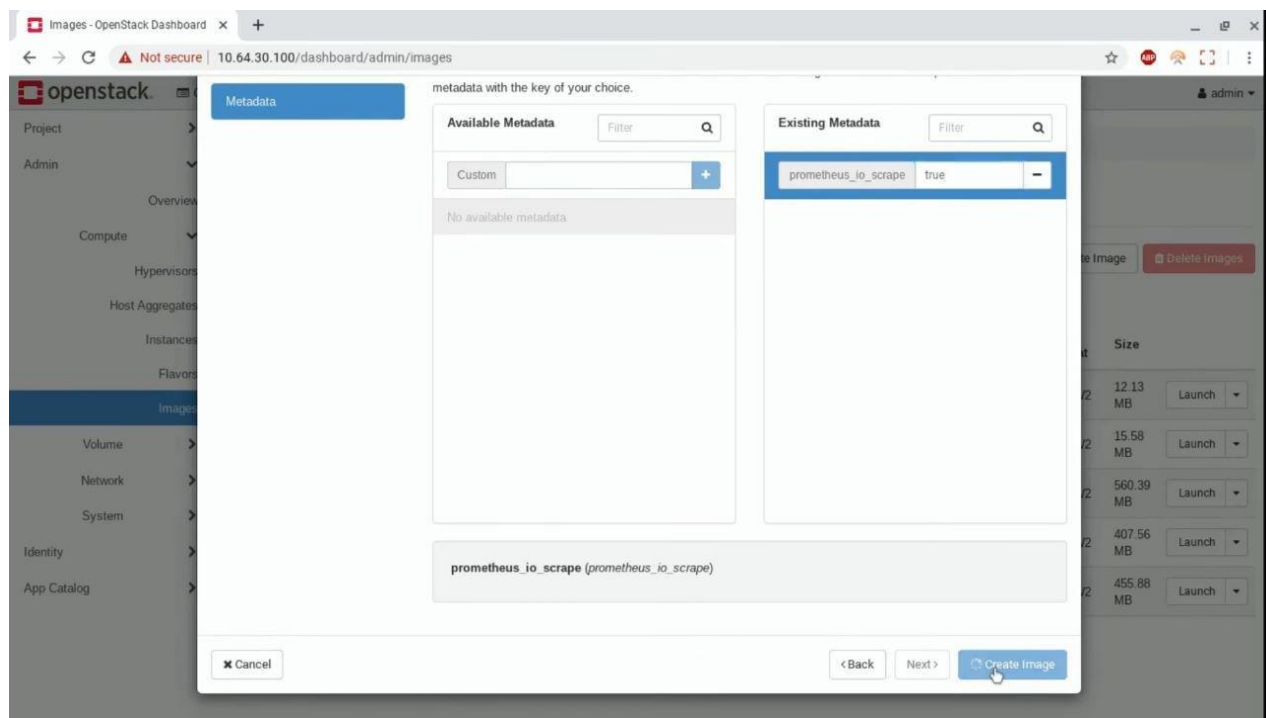


FIG.3.3.3 Metadata

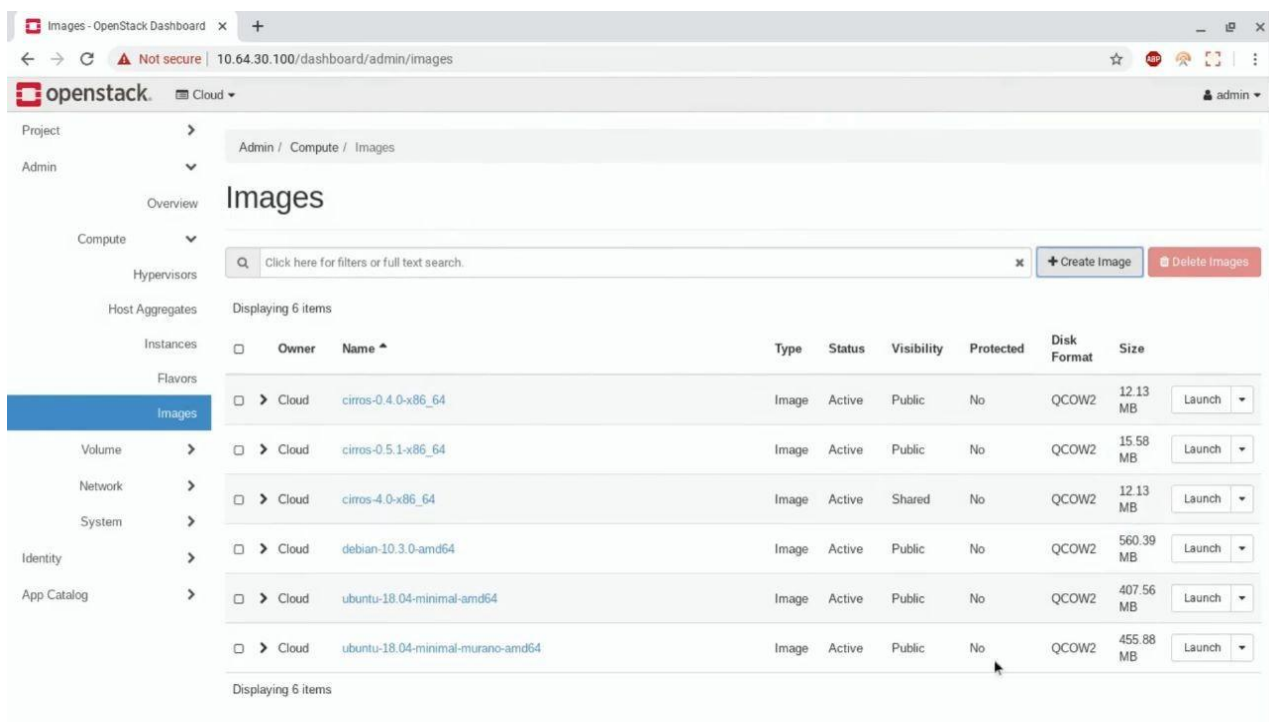


FIG.3.3.4 Images

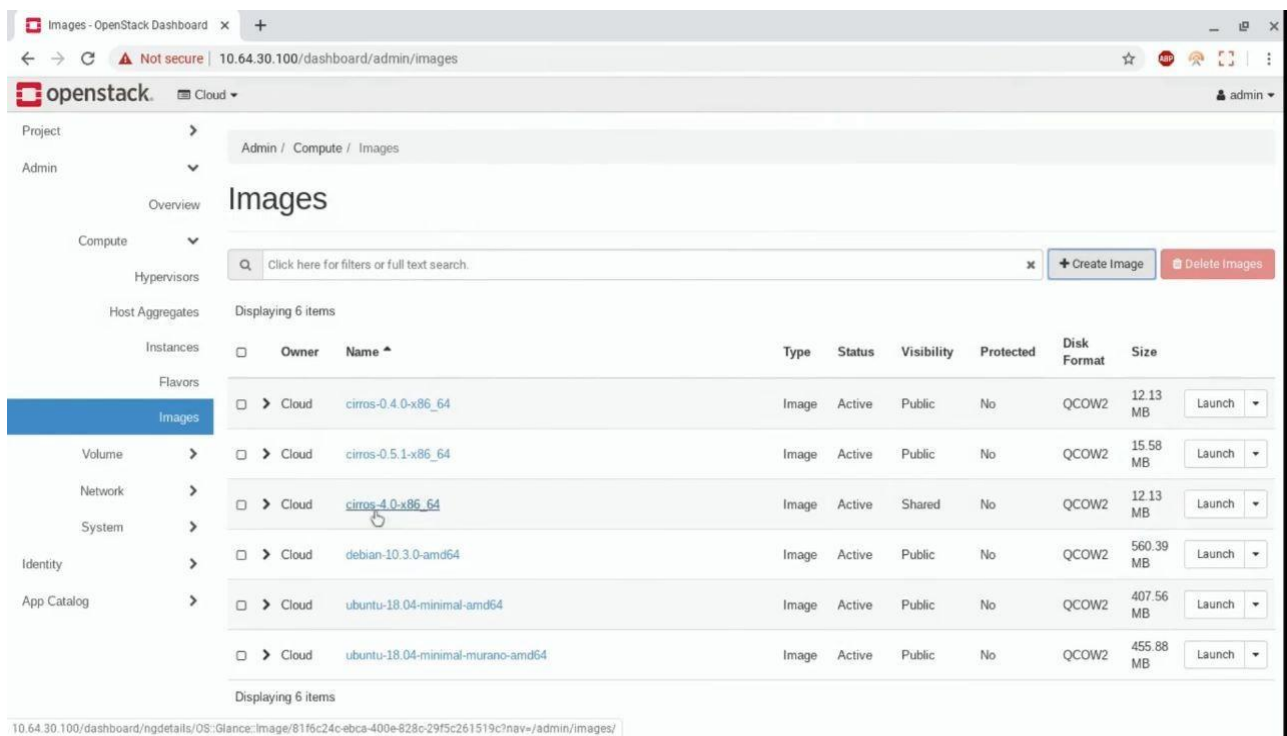


FIG.3.3.5 Images

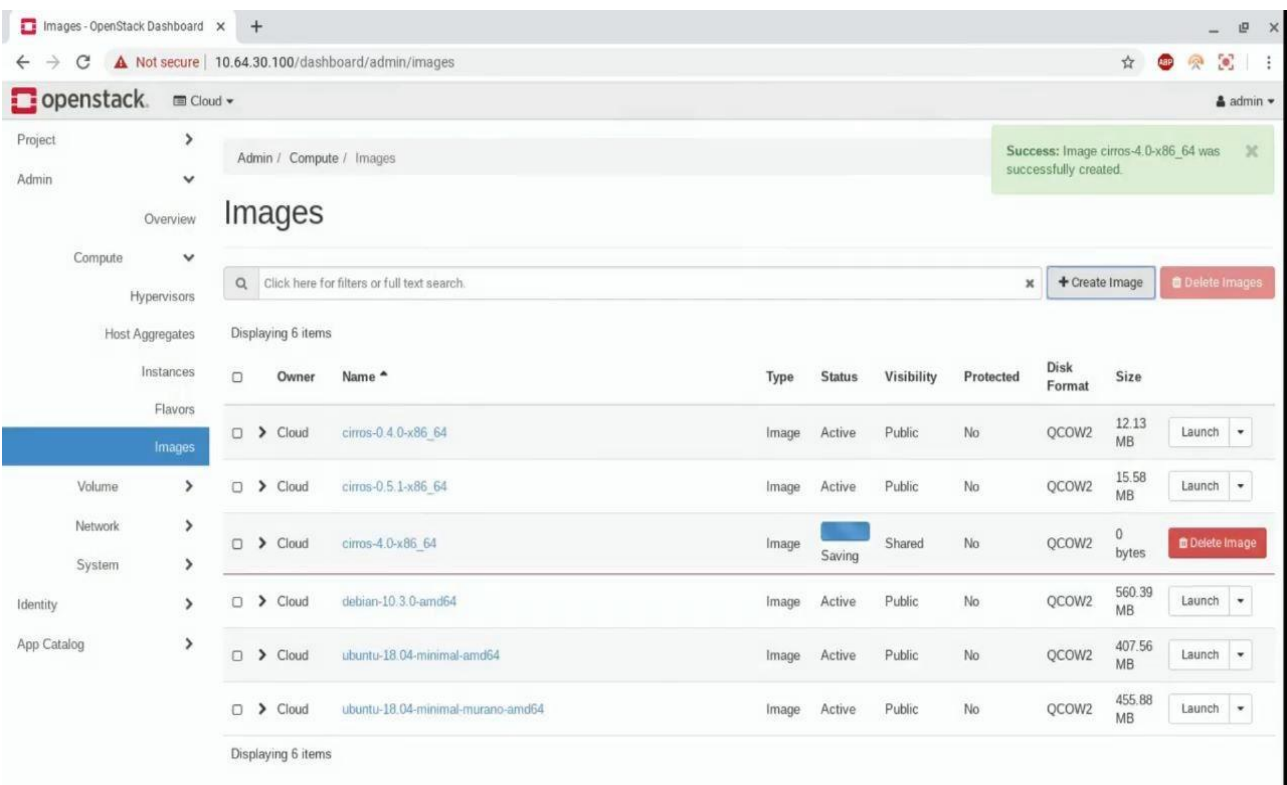


FIG.3.3.6 Creation of Images

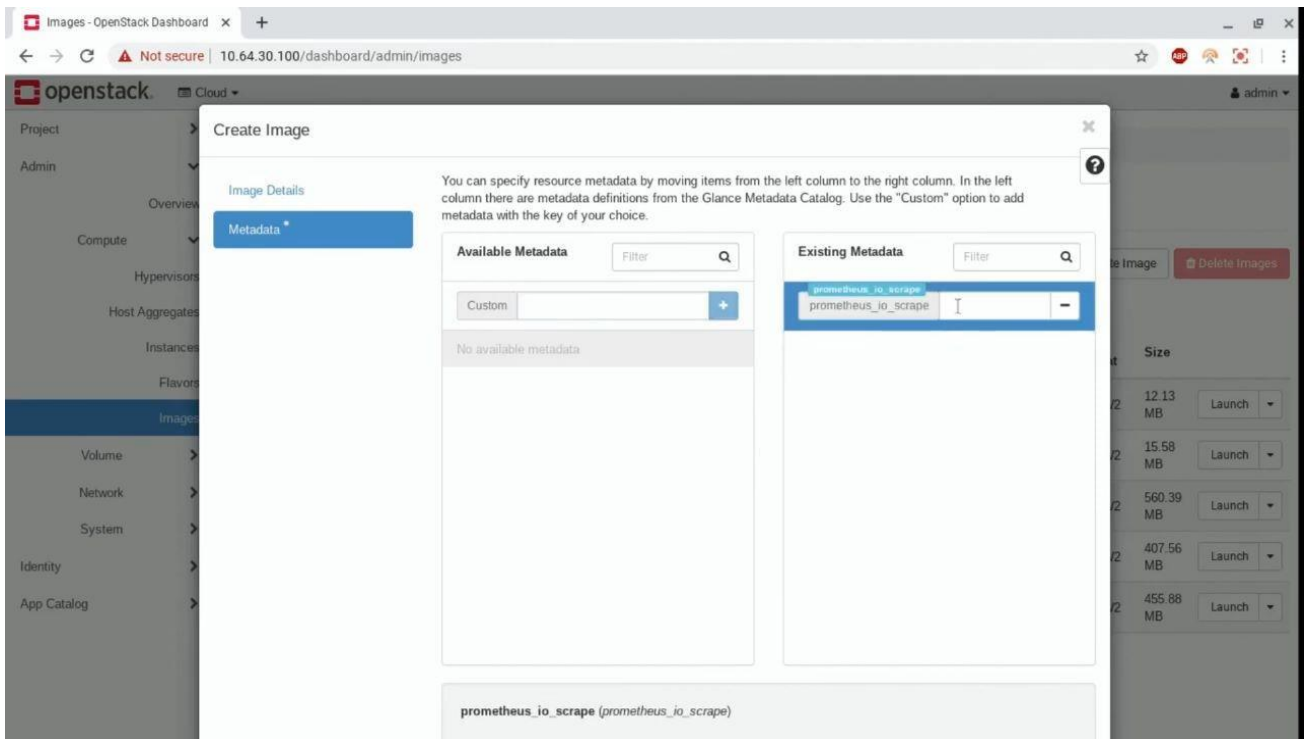


FIG.3.3.7 Create Image

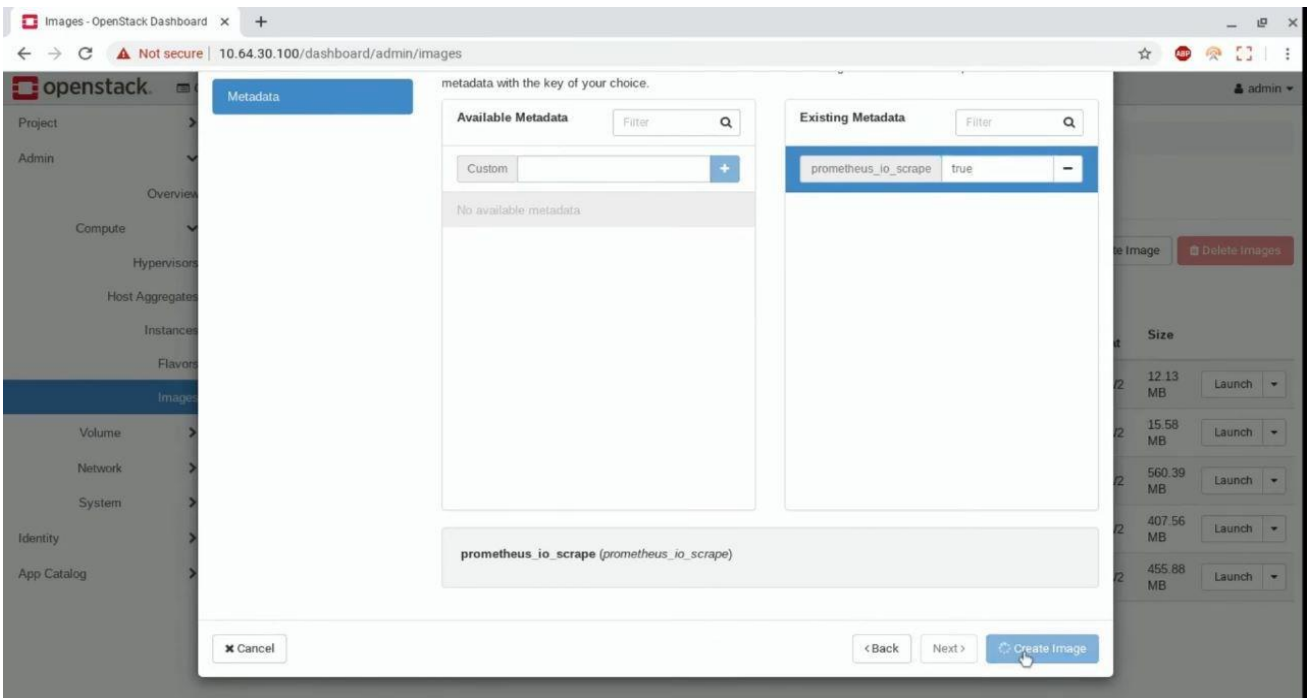


FIG.3.3.8 Metadata

Images - OpenStack Dashboard

10.64.30.100/dashboard/admin/images

openstack

Project Admin Overview Compute Hypervisors Host Aggregates Instances Flavors Images Volume Network System Identity App Catalog

Specify an image to upload to the Image Service.

Image Name
cirros-4.0-x86_64

Image Description
Cirros test image

Image Source
File*
Browse... cirros-0.4.0-x86_64-disk.img

Format*
[Dropdown]

Image Requirements
Kernel
Choose an image
Architecture
[Dropdown]
Random disk
Choose an image
Minimum Disk (GB)*
0
Minimum RAM (MB)*
0

Image Sharing
Visibility
Private Shared Community Public
Protected
Yes No

Cancel Back Next Create Image

FIG.3.3.9 Image Source

Images - OpenStack Dashboard

10.64.30.100/dashboard/admin/images

openstack Cloud admin

Admin Overview Compute Hypervisors Host Aggregates Instances Flavors Images Volume Network System Identity App Catalog

Images

Click here for filters or full text search. Create Image Delete Images

Displaying 6 items

Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
Cloud	cirros-0.4.0-x86_64	Image	Active	Public	No	QCOW2	12.13 MB
Cloud	cirros-0.5.1-x86_64	Image	Active	Public	No	QCOW2	15.58 MB
Cloud	cirros-4.0-x86_64	Image	Active	Shared	No	QCOW2	12.13 MB
Name cirros-4.0-x86_64 ID 81f6c24c-ebca-400e-828c-29f5c261519c Visibility Shared Protected No Min. Disk 1 Min. RAM 256							
Cloud	debian-10.3.0-amd64	Image	Active	Public	No	QCOW2	560.39 MB
Cloud	ubuntu-18.04-minimal-amd64	Image	Active	Public	No	QCOW2	407.56 MB
Cloud	ubuntu-18.04-minimal-murano-amd64	Image	Active	Public	No	QCOW2	455.88 MB

FIG.3.3.10 Alloting Image size

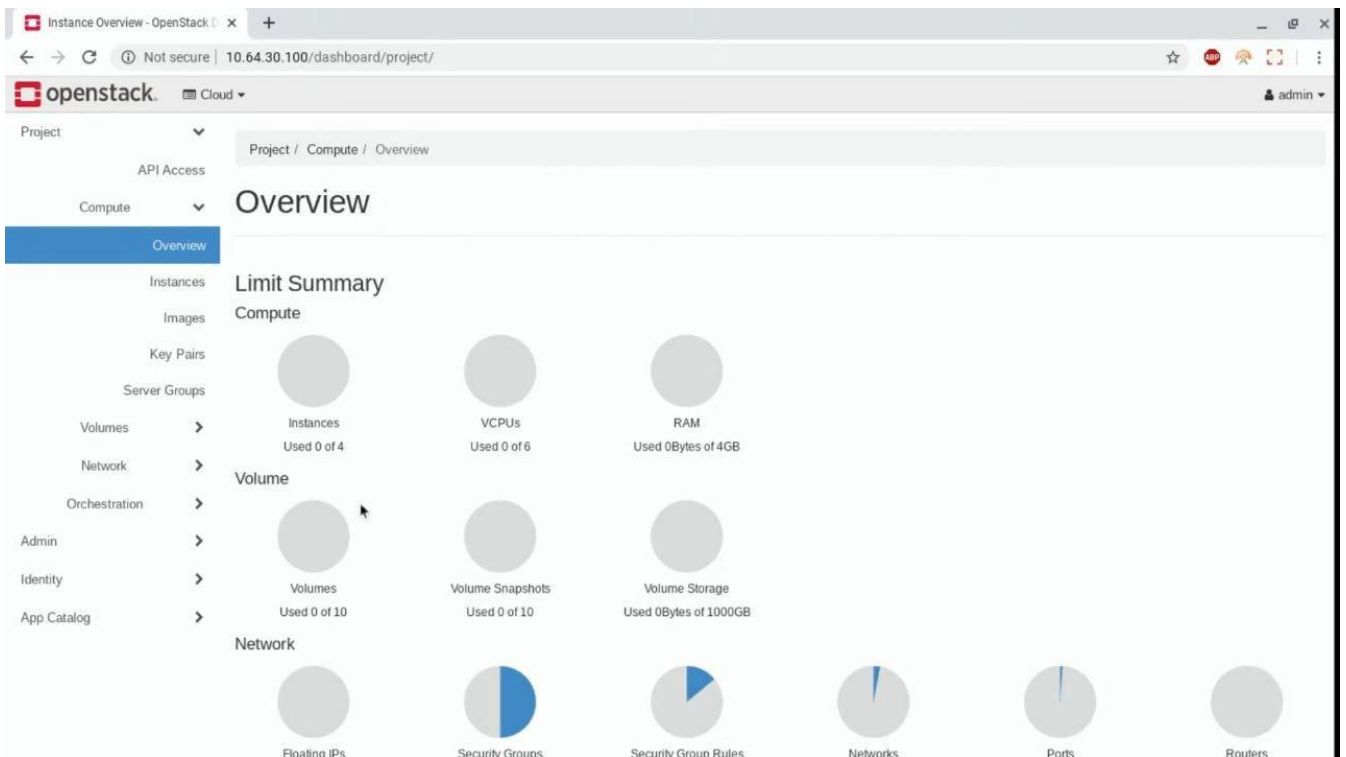


FIG.3.3.11 Overview

The screenshot shows the 'Create Image' dialog box in the OpenStack dashboard. The dialog is divided into two tabs: 'Image Details' (active) and 'Metadata'. The 'Image Details' tab contains the following sections:

- Image Details:**
 - Specify an image to upload to the Image Service.
 - Image Name:** Text input field containing 'cirros-4.0'.
 - Image Description:** Text input field.
- Image Source:**
 - File:** Includes a 'Browse...' button.
 - Format:** A dropdown menu.
- Image Requirements:**
 - Kernel:** A dropdown menu with 'Choose an image' selected.
 - Ramdisk:** A dropdown menu with 'Choose an image' selected.
 - Architecture:** A text input field.
 - Minimum Disk (GB):** A text input field with '0' entered.
 - Minimum RAM (MB):** A text input field with '0' entered.
- Image Sharing:**
 - Visibility:** Radio buttons for 'Private', 'Shared', 'Community', and 'Public'.
 - Protected:** Radio buttons for 'Yes' and 'No'.

FIG.3.3.12 Creation of Image

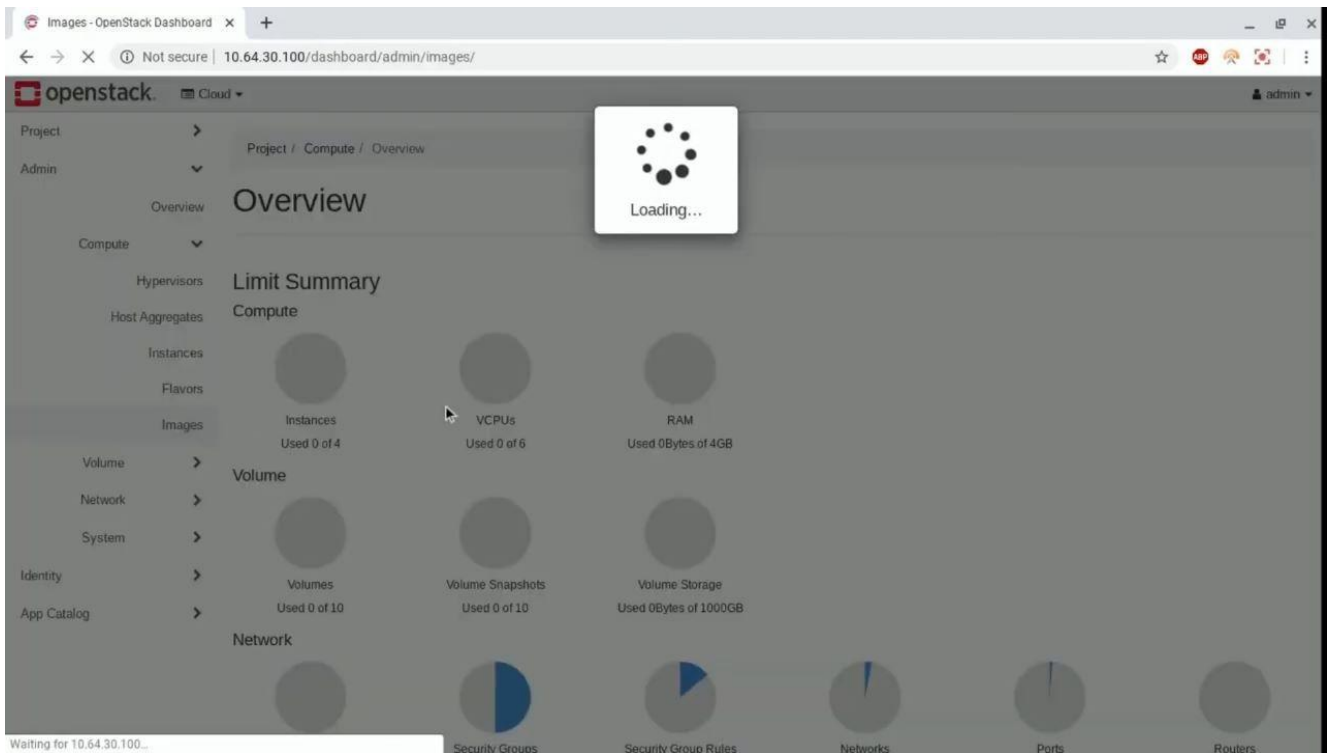


FIG.3.3.13 Image Loading

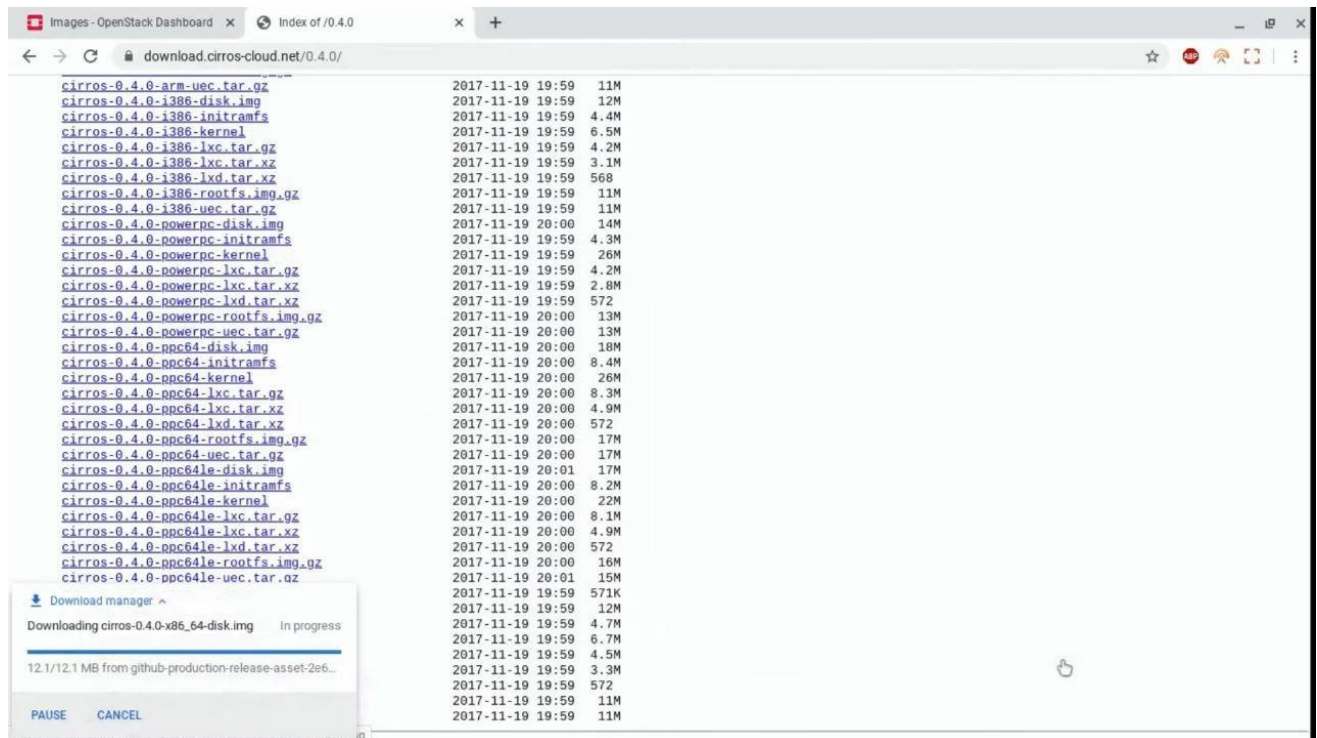


FIG.3.3.14 Image Download

Specify an image to upload to the Image Service.

Image Name

Image Description

Image Source

File*

Format*

Image Requirements

Kernel

Ramdisk

Architecture

Minimum Disk (GB)*

Minimum RAM (MB)*

Image Sharing

Visibility

Protected

FIG.3.3.15 Create source Image

Admin / Compute / Images

Images

Click here for filters or full text search.

Displaying 5 items

Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
	cirros-0.4.0-x86_64	Image	Active	Public	No	QCOW2	12.13 MB
	cirros-0.5.1-x86_64	Image	Active	Public	No	QCOW2	15.58 MB
	debian-10.3.0-amd64	Image	Active	Public	No	QCOW2	560.39 MB
	ubuntu-18.04-minimal-amd64	Image	Active	Public	No	QCOW2	407.56 MB
	ubuntu-18.04-minimal-murano-amd64	Image	Active	Public	No	QCOW2	455.88 MB

Displaying 5 items

FIG.3.3.16 Created Image

Chapter 4

Analysis Of The Project

In this project, we have developed a system that automates the process of creating custom Ubuntu images from ISO, partitioning them, and uploading them to Glance in OpenStack. The system provides a user-friendly interface that allows users to specify their requirements for creating custom Ubuntu images and partitioning them as needed, and automates the image creation and upload processes improve efficiency and scalability. The system has been designed to be flexible and adaptable, allowing users to create Ubuntu images with different configurations and partition layouts to meet their specific needs. It supports multiple partitioning options, including specifying partition sizes and formatting with different file systems, providing users with the flexibility to customize their Ubuntu images as needed. Thesystem has been designed to be flexible and adaptable, allowing users to create Ubuntu images with different configurations and partition layouts to meet their specific needs. It supports multiple partitioning options, including specifying partition sizes and formatting with different file systems, providing users with the flexibility to customize their Ubuntu images as needed Overall, this project has successfully developed a system that provides a streamlined solution for creating custom Ubuntu images, partitioning them as needed, and uploading them to Glance in OpenStack. The system enhances the efficiency and automation of the image creation and upload processes, and it can be a valuable tool for organizations and users who require customized Ubuntu images for their OpenStack cloud environments.

Chapter 5

Conclusion

In conclusion, Ubuntu, a popular open-source operating system, and cloud computing, a transformative technology for delivering computing resources over the internet, offer significant benefits when combined together. Ubuntu provides a reliable and flexible foundation for building custom images, while cloud computing allows for scalable and cost-effective deployment of virtual machines in the cloud. The use of Ubuntu in cloud computing environments, such as OpenStack, offers numerous advantages. Ubuntu's vast software repositories, regular updates, and strong community support make it an excellent choice for creating customized images tailored to specific requirements. Ubuntu's stability, security features, and ease of use make it suitable for running various workloads in the cloud, ranging from development and testing environments to production applications. Cloud computing, on the other hand, enables the deployment of virtual machines on-demand, providing flexibility in resource allocation, scalability, and cost optimization. OpenStack, an open-source cloud computing platform, offers powerful capabilities for managing virtual machines and resources in the cloud, including Glance, the image service that allows for image creation, management, and distribution. The combination of Ubuntu and cloud computing enables organizations and users to leverage the benefits of both technologies. Custom Ubuntu images can be easily created from ISO files, partitioned as needed, and uploaded to Glance in OpenStack for efficient and scalable deployment in the cloud. This allows for quick and automated provisioning of virtual machines with Ubuntu images tailored to specific requirements, while also benefiting from the flexibility, scalability, and cost-efficiency of cloud computing.

REFERENCES

LINK 1: <https://ubuntu.com/>

LINK 2: <https://www.ibm.com/topics/cloud-computing>

LINK 3: <https://www.cdac.in/index.aspx?id=cloud>

LINK 4: <https://docs.ubuntu.com/>

LINK 5: <https://www.ubuntuosplan.in/>

LINK 6: <https://www.awscloudcomputing.in/>