

1.Case Study on Microsoft Azure

Cloud computing is an emerging paradigm that provides a promise to revolutionize the way the software development industry operates. Microsoft Azure is one of the leading cloud service providers and a strong competitor of Amazon Web Services. Microsoft Azure has plenty of features that make it one of the crowd's favourites. Microsoft Azure, formerly known as Windows Azure, is Microsoft's public cloud computing platform.

Working of Microsoft Azure

Once customers subscribe to Azure, they have access to all the services included in the Azure portal. Subscribers can use these services to create cloud-based resources, such as VMs and databases. Azure resources and services can then be assembled into running environments used to host workloads and store data.

Microsoft provides the following five different customer support options for Azure:

- Basic
- Developer
- Standard
- Professional Direct
- Enterprise (Premier).

Benefits of Microsoft Azure

1. Scalability on Demand: Microsoft Azure is able to easily adapt to the ever-changing circumstances of your business. Its flexible features can work both on a manual and auto scaling basis, in line with the demands of application usage. Unlike traditional hosting, scaling in Azure is much easier because you can change to different service plans depending on your needs.

2. Cost-efficiency: Microsoft's pay-as-you-go model enables businesses to only spend for what they use. Essentially, Azure allows you to access more resources as and when you need them, loading them as a cluster. This means that when you experience the sought-after periods of high volume transactions, you won't need to spend money on additional hardware and IT maintenance.

3. Data Backup and Disaster Recovery With over 50 world-class compliance certifications and 99 years of retention, Azure can protect your data like no other cloud computing platform. It offers single click backup support for SQL database and virtual machines running in Azure. In the event of service disruption or data loss, Microsoft Azure can recover your data 66% quicker than an on-premise IT solution.

4. Bespoke Industry Applications High-risk industries like healthcare, financial services and government often require a specific set of applications with unique compliance and security features. With Microsoft Azure, you can address individual challenges from implementing remote access and modernising your financial systems, to optimising customer relationships and enhancing engagement.

5. Improved IT Infrastructure Through IaaS and PaaS, enterprises can outsource their IT infrastructure and create web applications without having to spend money on infrastructure maintenance. You can partner with a Microsoft Cloud service provider to leverage IaaS and PaaS and build custom enterprise apps on Azure to scale up your business faster.

6. Secure Identity & Access Management (IAM) You can considerably reduce hacking risks with Azure Active Directory and its IAM capabilities. Identity and Access Management solutions protect your resources and applications with additional features including Multi-Factor Authentication, Application Proxy and Conditional Access policies.

Azure products and services

Mobile. These products help developers build cloud applications for mobile devices, providing notification services, support for back-end tasks, tools for building application program interfaces (APIs) and the ability to couple geospatial context with data.

Web. These services support the development and deployment of web applications. They also offer features for search, content delivery, API management, notification and reporting.

Case Study on Google Cloud Platform

Google Cloud Platform, offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Registration requires a credit card or bank account details.

Google Cloud Platform provides Infrastructure as a service, Platform as a service, and Serverless computing environments. In April 2008, Google announced App Engine, a platform for developing and hosting web applications in Google-managed data centers, which was the first cloud computing service from the company. The service became generally available in November 2011. Since the announcement of App Engine, Google added multiple cloud services to the platform. Google Cloud Platform is a part of Google Cloud, which includes the Google Cloud Platform public cloud infrastructure, as well as G Suite, enterprise versions of Android and Chrome OS, and application programming interfaces (APIs) for machine learning and enterprise mapping services.

Functionalities:

Networking creates large compute clusters that benefit from strong and consistent cross-machine bandwidth. Connect to machines in other data centres and to other Google services using Google's private global fibre network. Create an instance, check the network configs, and run some tests.

1) Easy to ramp up - no need to ramp up on Kubernetes or App Engine, just reuse Compute Engine directly.

2) Complete control - you can leverage many Compute Engine features directly and install the latest of all your favourite stuff to stay on the bleeding edge.

3) No need for public IPs. Some legacy software may be too hard to lock down if anything is exposed on public IPs.

4) You can leverage the Container-Optimized OS for running Docker containers.

Products and Services offered By Google:

AI Platform Notebooks: AI Platform Notebooks is a managed service that offers an integrated JupyterLab environment in which machine learning developers and data scientists can create instances running JupyterLab that come pre-installed with the latest data science and machine learning frameworks in a single click. **AI Platform Training and Prediction:** AI Platform Training and Prediction is a managed service that enables you to easily build machine learning models with the powerful TensorFlow framework. It provides scalable training and prediction services that work on large scale datasets. **Deep Learning Containers:** Deep Learning Containers are prepackaged and optimized deep learning containers for developing, testing, and deploying AI applications on TensorFlow, PyTorch, scikit learn, and other machine learning frameworks. **Google Cloud Build:** Google Cloud Build is a service that executes your builds on Google Cloud Platform infrastructure. Google Cloud Build can import source code from Google Cloud Storage, Cloud Source Repositories, GitHub, or Bitbucket; execute a build to your specifications; and produce artefacts such as Docker containers or Java archives.

Google Cloud Dataflow: Google Cloud Dataflow is a fully managed service for strongly consistent, parallel data-processing pipelines. It provides an SDK for Java with composable primitives for building data-processing pipelines for batch or continuous processing. This service manages the life cycle of Google Compute Engine resources of the processing pipeline(s). It also provides a monitoring user interface for understanding pipeline health. **Google Cloud Data lab:** Google Cloud Data lab is an interactive tool for exploration, transformation, analysis and visualization of your data on Google Cloud Platform. It runs in your cloud project and enables you to write code to use other Big Data and storage services using a rich set of Google-authored and third party libraries.

Case Study on Amazon EC2:

Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

Amazon EC2 is a central part of AWS:

Amazon Elastic Compute Cloud (EC2) forms a central part of Amazon.com's cloud-computing platform, Amazon Web Services (AWS) by allowing users to rent virtual computers on which to run their own computer applications. EC2 encourages scalable deployment of applications by providing a web service through which a user can boot an Amazon Machine Image (AMI) to configure a virtual machine, which Amazon calls an "instance", containing any software desired. A user can create, launch, and terminate server-instances as needed, paying by the second for active servers – hence the term "elastic". EC2 provides users with control over the geographical location of instances that allows for latency optimization and high levels of redundancy.

In November 2010, Amazon switched its own retail website to use EC2 and AWS.

Features of EC2:

Amazon EC2 provides the following features:

- Virtual computing environments, known as instances
- Preconfigured templates for your instances, known as Amazon Machine Images (AMIs), that package the bits you need for your server (including the operating system and additional software)
- Various configurations of CPU, memory, storage, and networking capacity for your instances, known as instance types
- Secure login information for your instances using key pairs (AWS stores the public key, and you store the private key in a secure place)
- Storage volumes for temporary data that's deleted when you stop or terminate your instance, known as instance store volumes
- Persistent storage volumes for your data using Amazon Elastic Block Store (Amazon EBS), known as Amazon EBS volumes
- Multiple physical locations for your resources, such as instances and Amazon EBS volumes, known as Regions and Availability Zones
- A firewall that enables you to specify the protocols, ports, and source IP ranges that can reach your instances using security groups
- Static IPv4 addresses for dynamic cloud computing, known as Elastic IP addresses
- Metadata, known as tags, that you can create and assign to your Amazon EC2 resources
- Virtual networks you can create that are logically isolated from the rest of the AWS cloud, and that you can optionally connect to your own network, known as virtual private clouds (VPCs)

Aim:To study cloud architecture and cloud computing model.

2. Objectives: From this experiment, the student will be able to
 - provide an overview of concepts of Cloud Computing .
 - To encourage students to indulge into research in Cloud Computing.
3. Outcomes: The learner will be able to
 - understand and appreciate cloud architecture.
 - analyze the local and global impact of computing on individuals, organizations, and society.
 - recognize the need for, and an ability to engage in life-long learning.
4. Hardware / Software Required:Ubuntu operating system, Internet
5. Theory: Cloud computing enables companies to consume compute resources as a utility -- just like electricity -- rather than having to build and maintain computing infrastructures in-house. Cloud computing promises several attractive benefits for businesses and end users.

Three of the main benefits of cloud computing include:

- Self-service provisioning: End users can spin up computing resources for almost anytype of workload on-demand.
- Elasticity: Companies can scale up as computing needs increase and then scale down again as demands decreases.
- Pay per use: Computing resources are measured at a granular level, allowing users to pay only for the resources and workloads they use.

Cloud computing services can be Private, Public or Hybrid. Private cloud services are delivered from a business' data center to internal users. This model offers versatility and convenience, while preserving management, control and security. Internal customers may or may not be billed for services through IT chargeback. In the Public cloud model, a third-party provider delivers the cloud service over the Internet. Public cloud services are sold on-demand, typically by the minute or the hour. Customers only pay for the CPU cycles, storage or bandwidth they consume. Leading public cloud providers include Amazon Web Services (AWS), Microsoft Azure, IBM/SoftLayer and Google Compute Engine. Hybrid cloud is a combination of public cloud services and on-premises private cloud – with orchestration and automation between the two. Companies can run mission-critical workloads or sensitive applications on the private cloud while using the public cloud for workloads that must scale on-demand. The goal of hybrid cloud is to create a unified, automated, scalable environment which takes advantage of all that a public cloud infrastructure can provide, while still maintaining control over mission-critical data.

Types of cloud computing: IT people talk about three different kinds of cloud computing, where different services are being provided for you. Note that there's a certain amount of vagueness about how these things are defined and some overlap between them.

- Infrastructure as a Service (IaaS) means you're buying access to raw computing hardware over the Net, such as servers or storage. Since you buy what you need and pay-as-you-go, this is often referred to as utility computing. Ordinary web hosting is a simple example of IaaS: you pay a monthly subscription or a per megabyte/gigabyte fee to have a hosting company serve up files for your website from their servers.
- Software as a Service (SaaS) means you use a complete application running on someone else's system. Web-based email and Google Documents are perhaps the best-known examples. Zoho is another well-known SaaS provider offering a variety of office applications online.
- Platform as a Service (PaaS) means you develop applications using Web-based tools so they run on systems software and hardware provided by another company. So, for example, you might develop your own ecommerce website but have the whole thing, including the shopping cart, checkout, and payment mechanism running on a merchant's server. Force.com (from salesforce.com) and the Google App Engine are examples of PaaS.

• Advantages and disadvantages of cloud computing

Advantages: The pros of cloud computing are obvious and compelling. If your business is selling books or repairing shoes, why get involved in the nitty gritty of buying and maintaining a complex computer system? If you run an insurance office, do you really want your sales agents wasting time running anti-virus software, upgrading word processors, or worrying about hard-drive crashes? Do you really want them cluttering your expensive

computers with their personal emails, illegally shared MP3 files, and naughty YouTube videos—when you could leave that responsibility to someone else? Cloud computing allows you to buy in only the services you want, when you want them, cutting the upfront capital costs of computers and peripherals. You avoid equipment going out of date and other familiar IT problems like ensuring system security and reliability. You can add extra services (or take them away) at a moment's notice as your business needs change. It's really quick and easy to add new applications or services to your business without waiting weeks or months for the new computer (and its software) to arrive.

Disadvantages:

Instant convenience comes at a price. Instead of purchasing computers and software, cloud computing means you buy services, so one-off, upfront capital costs become ongoing operating costs instead. That might work out much more expensive in the long-term. If you're using software as a service (for example, writing a report using an online word processor or sending emails through webmail), you need a reliable, high-speed, broadband Internet connection functioning the whole time you're working. That's something we take for granted in countries such as the United States, but it's much more of an issue in developing countries or rural areas where broadband is unavailable. If you're buying in services, you can buy only what people are providing, so you may be restricted to off-the-peg solutions rather than ones that precisely meet your needs. Not only that, but you're completely at the mercy of your suppliers if they suddenly decide to stop supporting a product you've come to depend on. (Google, for example, upset many users when it announced in September 2012 that its cloud-based Google Docs would drop support for old but de facto standard Microsoft Office file formats such as .DOC, .XLS, and .PPT, giving a mere one week's notice of the change—although, after public pressure, it later extended the deadline by three months.) Critics charge that cloud-computing is a return to the bad-old days of mainframes and proprietary systems, where businesses are locked into unsuitable, long-term arrangements with big, inflexible companies. Instead of using "generative" systems (ones that can be added to and extended in exciting ways the developers never envisaged), you're effectively using "dumb terminals" whose uses are severely limited by the supplier. Good for convenience and security, perhaps, but what will you lose in flexibility? And is such a restrained approach good for the future of the Internet as a whole? (To see why it may not be, take a look at Jonathan Zittrain's eloquent book *The Future of the Internet—And How to Stop It*.)

Conclusion:

Cloud computing enables a convenient and on-demand network access to a wide range of resources. The different services and also the deployment models allow flexible service provider interaction with minimal human intervention. It saves costs but also can lead to risk issues and suspension of resources when in huge quantity.

Installation and Configuration of virtualization using KVM.

1. Aim: Installation and Configuration of virtualization using KVM
2. Objectives: From this experiment, the student will be able to,
 - Understand the concepts of virtualization.
 - Understand KVM architecture and its configuration.
3. Outcomes: The learner will be able,
 - To analyze user models and develop user centric interfaces
 - To analyze the local and global impact of computing on individuals, organizations, and society.
 - To engage in life-long learning development and higher studies.
 - To understand, identify, analyze and design the problem, implement and validate the solution including both hardware and software.
4. Hardware / Software Required: Ubuntu operating system, open source software KVM, Internet.
5. Theory: Virtualization is software that separates physical infrastructures to create various dedicated resources. It is the fundamental technology that powers cloud computing. The technology behind virtualization is known as a virtual machine monitor(VMM) or virtual manager, which separates compute environments from the actual physical infrastructure. Virtualization makes servers, workstations, storage and other systems independent of the physical hardware layer. This is done by installing a Hypervisor on top of the hardware layer, where the systems are then installed. There are three areas of IT where virtualization is making headroads, network virtualization, storage virtualization and server virtualization:
 - Network virtualization is a method of combining the available resources in a network by splitting up the available bandwidth into channels, each of which is independent from the others, and each of which can be assigned (or reassigned) to a particular server or device in real time. The idea is that virtualization disguises the true complexity of the network by separating it into manageable parts, much like your partitioned hard drive makes it easier to manage your files.
 - Storage virtualization is the pooling of physical storage from multiple network storage devices into what appears to be a single storage device that is managed from a central console. Storage virtualization is commonly used in storage area networks (SANs).
 - Server virtualization is the masking of server resources (including the number and identity of individual physical servers, processors, and operating systems) from server users. The intention is to spare the user from having to understand and manage complicated details of server resources while increasing resource sharing and utilization and maintaining the capacity to expand later. Virtualization can be viewed as part of an overall trend in enterprise IT that includes autonomic computing, a scenario in which the IT environment will be able to manage itself based on perceived activity, and utility computing, in which computer processing power is seen as a utility that clients can pay for only as needed. The usual goal of virtualization is to centralize administrative tasks while improving scalability and work loads.

Procedure:

Installation Steps :

1. sudo grep -c "svm\|vmx" /proc/cpuinfo
2. sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager
3. sudo adduser rait
4. sudo adduser rait
libvирtd
5. virsh -c qemu://system list
(Run following command after logging back in as rait and you should see an empty list of virtual machines. This indicates that everything is working correctly.)
6. virt-manager
(Open Virtual Machine Manager application and Create Virtual Machine)

Result:

SNAPSHOTS

Step 1 : #sudo grep -c "svm\|vmx" /proc/cpuinfo

Step 2 : #sudo apt-get install qemu-kvm libvirt-bin bridge-utils virt-manager.

Step 3 : #sudo adduser rait

After running this command, log out and log back in as rait

Step 4 : #sudo adduser rait libvирtd

After running this command, log out and log back in as rait

Step 5 : Open Virtual Machine Manager application and Create Virtual Machine
#virt-manager as shown below

Step 6 : Create a new virtual machine as shown below

Step 7 : Install windows operating system on virtual machine

Step 9: Installation of windows 7 on virtual machine

Step 10: Initialization of windows on virtual machine

Conclusion: Installation and configuration of KVM have been done successfully onto Ubuntu and users added. Like this we can create as many virtual machines as possible on OS and install any windows.

Aim: Study and implementation of Storage as a Service.

Description: Storage as a Service is a business model in which a large company rents space in their storage infrastructure to a smaller company or individual. In the enterprise, SaaS vendors are targeting secondary storage applications by promoting SaaS as a convenient way to manage backups. The key advantage to SaaS in the enterprise is in cost savings -- in personnel, in hardware and in physical storage space. For instance, instead of maintaining a large tape library and arranging to vault (store) tapes offsite, a network administrator that used SaaS for backups could specify what data on the network should be backed up and how often it should be backed up. His company would sign a service level agreement (SLA) whereby the SaaS provider agreed to rent storage space on a cost-per-gigabyte stored and cost-per-data-transfer basis and the company's data would be automatically transferred at the specified time over the storage provider's proprietary wide area network (WAN) or the Internet. If the company's data ever became corrupt or got lost, the network administrator could contact the SaaS provider and request a copy of the data. Storage as a Service is generally seen as a good alternative for a small or mid-sized business that lacks the capital budget and/or technical personnel to implement and maintain their own storage infrastructure. SaaS is also being promoted as a way for all businesses to mitigate risks in disaster recovery, provide long-term retention for records and enhance both business continuity and availability.

Procedure:

Step 1: open chrome->search for google drive

Step 2: now click on **GO TO DRVIE**

now **sign in** with google account and this interface will appear.

Step 3: Now click **New** to upload file on drive->select the file that you have to upload from yourComputer.And click on open. If the file is uploaded then it will show successfully uploaded as shown in image

4.Now sharing that file with your friends.

Select that doc which you have uploaded right click on that and click on share

5.Now enter the email of your friend and provide subject

name and click done.

Your friend will receive the mail as shown in image.

6.Now click on open that document will open which you have share to your friend.

Aim: Study and implementation of Identity Management

Description: Identity management's primary goal in cloud computing is managing personal identity information so that access to computer resources, applications, data, and services is controlled properly. Identity management is the one area of IT security that offers genuine benefits beyond reducing the risk of security breaches. Identity management helps prevent security breaches and plays a significant role in helping your company meet IT security compliance regulations. The benefits of keeping your customer or company financial data safe from unauthorized access can be huge. In addition, you reap many benefits from identity management that occurs every day, not just during a major threat.

- Improved user productivity: Productivity improvement comes from simplifying the sign-on interface and the ability to quickly change access rights. Productivity is likely to improve further where you provide user self-service.
- Improved customer and partner service: Customers and partners also benefit from a more streamlined, secure process when accessing applications and data.
- Reduced help desk costs: IT help desks typically experience fewer calls about forgotten passwords when an identity management process is implemented.
- Reduced IT costs: Identity management enables automatic provisioning, providing or revoking users' access rights to systems and applications. Provisioning happens whether you automate it or not.

Procedure:

1.Click on link below.

<https://aws.amazon.com/console/>

2.Go to "My Account" > "AWS Management Console".

3.Create AWS account(fill the required details)

NOTE:- Do not provide any kind of credit/debit card details or bank details.)

Click on next

4.Click on My Account, Select AWS Management Console.

Enter your aws account userid and password click on sign in button

5.Now it will redirect you to home page without asking any other details. Now we have to add user and group and assign them privileges.

6.Go to "My Security

Credentials".Click on "Users".

7.Click on "Add user".

Enter the name for the user. Check the check box in front of "Programmatic access" and "AWS Management Console access".

8.Scroll down and select "Custom password" and enter the password for the new user and click on "Next: Permissions".Next

9.Next it allow you to create group or you can just pass it. We are going to create group click on"Create group".

10.Following window will appear.

11.Give name to group, assign the their permissions and click on"Create group".

12.Your group is created now click on "Next: Tags".

13.Click on "Next: Review".

14.Check the Review for the user and click on "Create user".

Click on

15.Click on "Close".

16.Click on "Group". You will see the group you just created.

17.Now log out of admin account and try to login as user (newly created).

Navigate to link below. <https://aws.amazon.com/console/>

Go to "My Account" > "AWS Management Console".

Procedure:

1: Go to aws.amazon.com

2: Click On My Account.

3: Select aws management console and click on it.

4: Create AWS account(fill the required details)

NOTE:- Do not provide any kind of credit/debit card details or bank details.)**5:** Click on next (open your gmail check you will get message from amazon).

6: Click on My Account, Select **AWS Management Console**.

7: Enter your aws account userid and password click on sign in button.

8: Click on Services tab

9: Click on Security, identity & AppliancesSelect IAM

10: Click on Users From Dashboard

11: Click on Add User and Add the users.

12: Goto Select AWS access type check both the rediobutton. And click on next permission

13: Click on Attach Existing Policy Directly. Attach Policy to the users. And press Next Tab.

14: Click On Create User(Here Users are created.)

15: Now download the csvfile . and click on close.

16: Now Goto Account and select My Security Credential tab > Click on Continue to securitycredentials .

17: Click on Multi-factor authentication(MFA)

18: Click On Active MFA

19: Select Virtual MFA device and Click on Continue tab

Note: Download Barcode Scanner and Google Authentication App in your Mobile Phone.

20: Scan the QR code and enter the MFA code from ur mobile phone and then click on assignAssign MFA tab

21: Now the page look like this.

22: Click On Dashboard Go to Additional Information Select Policy Simulator

23: Select The User select services and service action and click on Run Simulator Tab.

Aim: Study Cloud Security Management Description: 1. Ensure effective governance and compliance Most organizations have security, privacy and compliance policies and procedures to protect their IP and assets. In addition to this, organizations should establish a formal governance framework that outlines chains of responsibility, authority and communication. This describes the roles and responsibilities of those involved, how they interact and communicate, and general rules and policies. 2. Audit operation and business processes It is important to audit the compliance of IT system vendors that host the applications and data in the cloud. There are three important areas that need to be audited by cloud service customers: internal control environment of a cloud service provider, access to the corporate audit trail, and the cloud service facility's security. 3. Manage people, roles, and identities Using the cloud means there will be employees from the cloud service provider that can access the data and applications, as well as employees of the organization that perform operations on the providers system. The provider must allow the customer to assign and manage roles and authorization for each of their users. The provide must also have a secure system in place to managing the unique identifies for users and services. 4. Proper protection of data Data is the core of all IT security concerns for any organization. Cloud computing does not change this concern but brings new challenges because of the nature of cloud computing.The security and protection of data both at rest and in transit needs to be ensured.

Aim: Study and implementation of Single-Sign-On

Description: Single sign-on (SSO) is a session and user authentication service that permits a user to use one set of login credentials (e.g., name and password) to access multiple applications. The service authenticates the end user for all the applications the user has been given rights to and eliminates further prompts when the user switches applications during the same session. On the back end, SSO is helpful for logging user activities as well as monitoring user accounts. In a basic web SSO service, an agent module on the application server retrieves the specific authentication credentials for an individual user from a dedicated SSO policy server, while authenticating the user against a user repository such as a lightweight directory access protocol (LDAP) directory. Some SSO services use protocols such as Kerberos and the security assertion markup language (SAML). SAML is an XML standard that facilitates the exchange of user authentication and authorization data across secure domains. SAML-based SSO services involve communications between the user, an identity provider that maintains a user directory, and a service provider. When a user attempts to access an application from the service provider, the service provider will send a request to the identity provider for authentication. The service provider will then verify the authentication and log the user in. The user will not have to log in again for the rest of his session. In a Kerberos-based setup, once the user credentials are provided, a ticket-granting ticket (TGT) is issued. The TGT fetches service tickets for other applications the user wishes to access, without asking the user to re-enter credentials. Although single sign-on is a convenience to users, it presents risks to enterprise security. An attacker who gains control over a user's SSO credentials will be granted access to every application the user has rights to, increasing the amount of potential damage. In order to avoid malicious access, it's essential that every aspect of SSO implementation be coupled with identity governance. Organizations can also use two factor authentication (2FA) or multifactor authentication (MFA) with SSO to improve security.

Procedure:

1: Open chrome->go to the URL-> <https://auth0.com/learn/how-to-implement-single-sign-on/>

And this page will appear

2: Click on **TRY AUTH FOR FREE** -> now sign up -> provide user name(Click on next)->select

1-account type(personal)

2-Role(Non developer)

3-Project(just playing around)

3: Click on CREATE ACCOUNT->Dashboard will appear

4: Click on Connection-> select (**Social**)-> click on google try as shown in Image

5.Sign in with same account n you will get this output.

Aim: User management in cloud. Description: User management describes the ability for administrators to manage user access to various IT resources like systems, devices, applications, storage systems, networks, SaaS services, and more. User management is a core part to any directory service and is a basic security essential for any organization. User management enables admins to control user access and on-board and off-board users to and from IT resources. Subsequently a directory service will then authenticate, authorize, and audit user access to IT resources based on what the IT admin had dictated. Traditionally, user management has been grounded with on-prem servers, databases, and closed virtual private networks (VPN). However, recent trends are seeing a shift towards cloud-based identity and access management (IAM), granting administrators even greater control over digital assets.

Procedure:

- 1: Adding a user on
ubuntu**

```
sudo adduser rjcs
```

To Add a system user rjcs run the following command

Login as rjcs user by using following command

- 2: Adding a group on ubuntu**

- 3: Adding a User to a group on ubuntu**

You can login as a rjcs and run the following command.

- 4: Removing the user from a group on ubuntu**

- 5: Removing a user on ubuntu**

- 6: Deleting a group on ubuntu**

- 7: Listing all the users on ubuntu**

- 8: Listing all the groups on ubuntu**

- 9: Listing all the user in a group on ubuntu**

Procedure:

STEPS:

1. Open any browser and type <https://cloud.google.com/> and then click on TRY GCP FREE.
2. After click on TRY GCP FREE your email page is open for sign in , enter your email-id and password.
3. After Login your account it will ask to accept the service, then click on AGREE AND CONTINUE.
4. Enter the details here as show here
5. Enter the card detail here to make payment and then click on START MY FREE TRIAL.
6. After doing the above steps your free tryer gcp window appear.
7. To check Payment Overview, go to Billing
8. Now Click on Payment Overview.
9. Click on verify Now.
10. After it will ask for CVV number. Enter cvc number, click on CONTINUE.
11. It send the OTP on your registered mobile number, enter number click on SUBMIT
12. Now come back to HOME→Compute Engine→click on VM Instances.
13. Now click on CREATE.
14. Give your instance name and you can give your Machine CPU to 2vCPUs to running better ,then click on CREATE.
15. Now here your instance is created, select the instance and from SSH select Open in new Window.
16. Now new Command line window will appear. Here I had done some simple command of linux you can try more command here.
17. For stopping the instance click square symbol.

Aim: Case Study on Google Cloud Platform. Description: Google Cloud Platform, offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Registration requires a credit card or bank account details. Google Cloud Platform provides Infrastructure as a service, Platform as a service, and Serverless computing environments. In April 2008, Google announced App Engine, a platform for developing and hosting web applications in Google-managed data centers, which was the first cloud computing service from the company. The service became generally available in November 2011. Since the announcement of App Engine, Google added multiple cloud services to the platform. Google Cloud Platform is a part of Google Cloud, which includes the Google Cloud Platform public cloud infrastructure, as well as G Suite, enterprise versions of Android and Chrome OS, and application programming interfaces (APIs) for machine learning and enterprise mapping services.