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DECLARATION

I, **Naveen kumar** , hereby declare that the work which is being presented in this project/training titled "Setup of Linux with React and Node js" which is being presented by me, in partial fulfilment of the requirements for the award of Bachelor of Technology (B.Tech) Degree in "Computer Science and Engineering" is an authentic record of my own work carried out under the guidance of Mr. Gaurav sharma (Course Instructor). To the best of my knowledge, the matter embodied in this report has not been submitted to any other University/ Institute for the award of any degree or diploma.

ABSTRACT

Cloud computing has reshaped software development by offering scalable, flexible solutions for deploying applications efficiently. This abstract explores the integration of Linux, React, and Node.js within cloud environments, emphasizing their collective impact on development processes. Linux serves as a robust foundation for cloud deployments, providing stability, security, and compatibility with diverse development tools. It optimally hosts Node.js applications, leveraging its efficient resource management and performance capabilities.

Overall, integrating Linux, React, and Node.js in cloud environments enhances development agility, scalability, and collaboration, enabling organizations to innovate rapidly and deliver robust, secure applications to market efficiently.

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CHAPTER-1

INTRODUCTION

1.1 INTRODUCTION TO CLOUD COMPUTING

Cloud computing is an Internet-based computing method. In this way, shared hardware and software resources and information can be provided to computers and other devices on demand, just like water and electricity for everyday use, paid for on demand, without caring about their source. National Institute of Standards and Technology, NIST: Cloud computing is a pay-per-use model that provides usable, convenient, on-demand network access to configurable computing resource sharing pools (resources including storage, software, services) that can be delivered quickly with minimal administrative effort or little interaction with service providers.

In the past, engineers used to use clouds to abstractly describe telecommunications networks or the Internet and underlying infrastructure when drawing pictures. The name of cloud computing has an inextricable origin. The “cloud” in cloud computing can be seen as a vast pool of IT resources where users can purchase the services they need on demand and pay for what they use.

1.2 FEATURES OF CLOUD COMPUTING

Cloud computing is becoming popular day by day. Continuous business expansion and growth requires huge computational power and large-scale data storage systems. Cloud computing can help organizations expand and securely move data from physical locations to the 'cloud' that can be accessed anywhere.

Cloud computing has many features that make it one of the fastest growing industries at present. The flexibility offered by cloud services in the form of their growing set of tools and technologies has accelerated its deployment across industries. This blog will tell you about the essential features of cloud computing.

1 . Resources Pooling

Resource pooling is one of the essential features of cloud computing. Resource pooling means that a cloud service provider can share resources among multiple clients, each providing a different set o f services according to their needs. It is a multi-client strategy that can be applied to data storage, processing and bandwidth-delivered services. The administration process of allocating resources in real-time does not conflict with the client's experience.

2 . On-Demand Self-Service

It is one of the important and essential features of cloud computing. This enables the client to continuously monitor server uptime, capabilities and allocated network storage. This is a fundamental feature of cloud computing, and a customer can also control the computing capabilities according to their needs.

3. Easy Maintenance

This is one of the best cloud features. Servers are easily maintained, and downtime is minimal or sometimes zero. Cloud computing powered resources often undergo several updates to optimize their capabilities and potential. Updates are more viable with devices and perform faster than previous versions.

4. Scalability And Rapid Elasticity

A key feature and advantage of cloud computing is its rapid scalability. This cloud feature enables cost-effective handling of workloads that require a large number of servers but only for a short period. Many customers have workloads that can be run very cost-effectively due to the rapid scalability of cloud computing.

5. Economical

This cloud feature helps in reducing the IT expenditure of the organizations. In cloud computing, clients need to pay the administration for the space used by them. There is no cover-up or additional charges that need to be paid. Administration is economical, and more often than not, some space is allocated for free.

6 . Measured And Reporting Service

Reporting Services is one of the many cloud features that make it the best choice for organizations. The measurement and reporting service is helpful for both cloud providers and their customers. This enables both the provider and the customer to monitor and report which services have been used and for what purposes. It helps in monitoring billing and ensuring optimum utilization of resources.

7 . Security

Data security is one of the best features of cloud computing. Cloud services make a copy of the stored data to prevent any kind of data loss. If one server loses data by any chance, the copied version is restored from the other server. This feature comes in handy when multiple users are working on a particular file in real-time, and one file suddenly gets corrupted.

8. Automation

In simple words, it is the process of making the most of the technology and minimizing the manual effort. However, achieving automation in a cloud ecosystem is not that easy. This requires the installation and deployment of virtual machines, servers, and large storage. On successful deployment, these resources also require constant maintenance.

1.3 REGION OUTAGE AND AVAILABILITY ZONES

Many Azure regions provide availability zones, which are separated groups of datacenters within a region. Availability zones are close enough to have low-latency connections to other availability zones. They're connected by a high-performance network with a round-trip latency of less than 2ms. However, availability zones are far enough apart to reduce the likelihood that more than one will be affected by local outages or weather. Availability zones have independent power, cooling, and networking infrastructure. They're designed so that if one zone experiences an outage, then regional services, capacity, and high availability are supported by the remaining zones. The following diagram shows several example Azure regions. Regions 1 and 2 support availability zones.

1.3.1 . ZONAL AND ZONE-REDUNDANT SERVICES

When you deploy into an Azure region that contains availability zones, you can use multiple availability zones together. By using multiple availability zones, you can keep separate copies of your application and data within separate physical data centers in a large metropolitan area. There are two ways that Azure services use availability zones:

1. Zonal resources are pinned to a specific availability zone. You can combine multiple zonal deployments across different zones to meet high reliability requirements. You're responsible for managing data replication and distributing requests across zones. If an outage occurs in a single availability zone, you're responsible for failover to another availability zone.
2. Zone-redundant resources are spread across multiple availability zones. Microsoft manages spreading requests across zones and the replication of data across zones. If an outage occurs in a single availability zone, Microsoft manages failover automatically.

1.3.2. PHYSICAL AND LOGICAL AVAILABILITY ZONES

Each datacenter is assigned to a physical zone. Physical zones are mapped to logical zones in your Azure subscription, and different subscriptions might have a different mapping order. Azure subscriptions are automatically assigned their mapping at the time the subscription is created. Because of this, the zone mapping for one subscription could be different for other subscriptions. For example: Subscription A may have physical

zone X mapped to logical zone 1, while subscription B has physical zone X mapped to logical zone 3, instead.

To understand the mapping between logical and physical zones for your subscription, use the List Locations Azure Resource Manager API. You can use the Azure CLI or Azure PowerShell to retrieve the information from the API.

1.3.3 . AVAILABILITY ZONES AND AZURE UPDATES

Microsoft aims to deploy updates to Azure services to a single availability zone at a time. This approach reduces the impact that updates might have on an active workload, because the workload can continue to run in other zones while the update is in process. You need to run your workload across multiple zones to take advantage of this benefit. For more information about how Azure deploys updates, see Advancing safe deployment practices.

1.4 CLOUD BASED SERVICES

Cloud Computing can be defined as the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. Companies offering such kinds of cloud computing services are called cloud providers and typically charge for cloud computing services based on usage. Grids and clusters are the foundations for cloud computing.

Types of Cloud Computing

Most cloud computing services fall into five broad categories:

1. Software as a service (SaaS)
2. Platform as a service (PaaS)
3. Infrastructure as a service (IaaS)

These are sometimes called the cloud computing stack because they are built on top of one another. Knowing what they are and how they are different, makes it easier to accomplish your goals. These abstraction layers can also be viewed as a layered

architecture where services of a higher layer can be composed of services of the underlying layer i.e, SaaS can provide Infrastructure.

1 .Software as a Service (SaaS)

Software-as-a-Service (SaaS) is a way of delivering services and applications over the Internet. Instead of installing and maintaining software, we simply access it via the Internet, freeing ourselves from the complex software and hardware management. It removes the need to install and run applications on our own computers or in the data center eliminating the expenses of hardware as well as software maintenance. SaaS provides a complete software solution that you purchase on a pay-as-you-go basis from a cloud service provider. Most SaaS applications can be run directly from a web browser without any downloads or installations required. The SaaS applications are sometimes called Web-based software, on-demand software, or hosted software.

2 .Platform as a Service

PaaS is a category of cloud computing that provides a platform and environment to allow developers to build applications and services over the internet. PaaS services are hosted in the cloud and accessed by users simply via their web browser. A PaaS provider hosts the hardware and software on its own infrastructure. As a result, PaaS frees users from having to install in-house hardware and software to develop or run a new application. Thus, the development and deployment of the application take place independent of the hardware . The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment. To make it simple, take the example of an annual day function, you will have two options either to create a venue or to rent a venue but the function is the same.

3. Infrastructure as a Service

Infrastructure as a service (IaaS) is a service model that delivers computer infrastructure on an outsourced basis to support various operations. Typically IaaS is a service where infrastructure is provided as outsourcing to enterprises such as networking equipment, devices, database, and web servers. It is also known as **Hardware as a Service (Haas).** IaaS customers pay on a per-user basis, typically by the hour, week, or month. Some providers also charge customers based on the amount of virtual machine space they use.

It simply provides the underlying operating systems, security, networking, and servers for developing such applications, and services, and deploying development tools, databases, etc.

1.5 CLOUD DEPELOYMENT MODEL

Today, organizations have many exciting opportunities to reimagine, repurpose and reinvent their businesses with the cloud. The last decade has seen even more businesses rely on it for quicker time to market, better efficiency, and scalability. It helps them achieve lo ng-term digital goals as part of their digital strategy.

Though the answer to which cloud model is an ideal fit for a business depends on your organization's computing and business needs. Choosing the right one from the various types of cloud service deployment models is essential. It would ensure your business is equipped with the performance, scalability, privacy, security, compliance & cost-effectiveness it requires. It is important to learn and explore what different deployment types can offer - around what particular problems it can solve.

A.Public Cloud

The name says it all. It is accessible to the public. Public deployment models in the cloud are perfect for organizations with growing and fluctuating demands. It also makes a great choice for companies with low-security concerns. Thus, you pay a cloud service provider for networking services, compute virtualization & storage available on the public internet. It is also a great delivery model for the teams with development and

testing. Its configuration and deployment are quick and easy, making it an ideal choice for test environments.

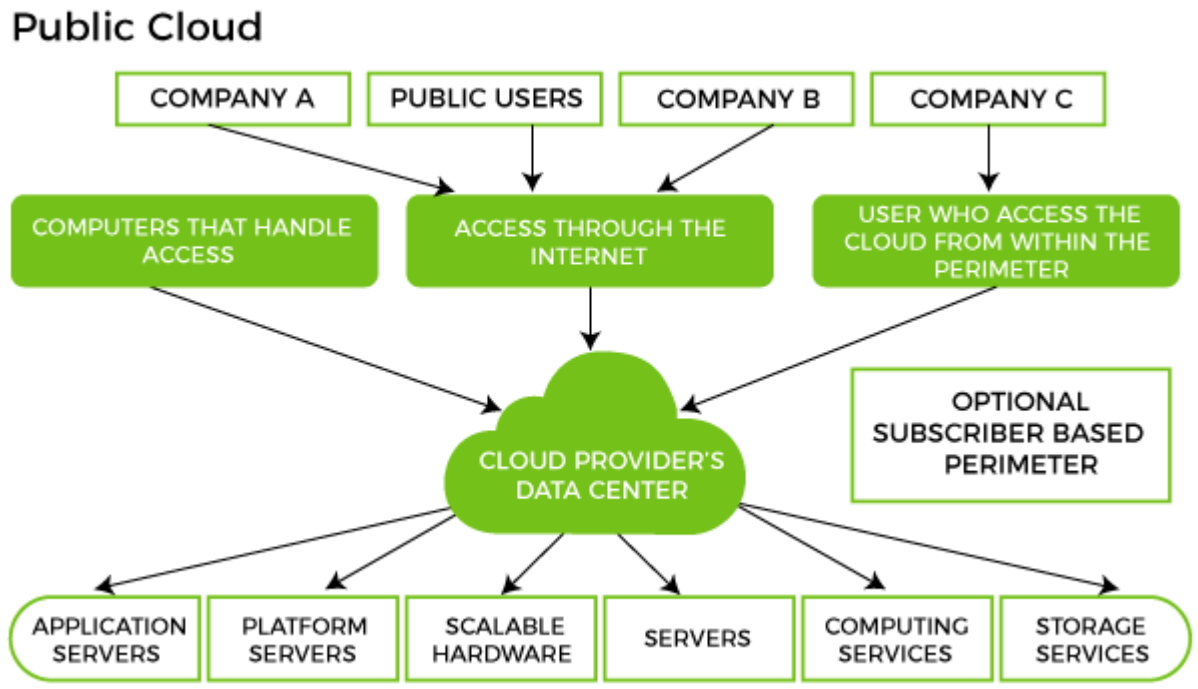

Fig 2.1(A): Public cloud

Benefits of Public Cloud

1. Minimal Investment - As a pay-per-use service, there is no large upfront cost and is ideal for businesses who need quick access to resources
2. No Hardware Setup - The cloud service providers fully fund the entire Infrastructure
3. No Infrastructure Management - This does not require an in-house team to utilize the public cloud.

Limitations of Public Cloud

1. Data Security and Privacy Concerns - Since it is accessible to all, it does not fully protect against cyber-attacks and could lead to vulnerabilities.
2. Reliability Issues - Since the same server network is open to a wide range of users, it can lead to malfunction and outages

3. Service/License Limitation - While there are many resources you can exchange with tenants, there is a usage cap.

B.Private Cloud

Now that you understand what the public cloud could offer you, of course, you are keen to know what a private cloud can do. Companies that look for cost efficiency and greater control over data & resources will find the private cloud a more suitable choice.

It means that it will be integrated with your data center and managed by your IT team. Alternatively, you can also choose to host it externally. The private cloud offers bigger opportunities that help meet specific organizations' requirements when it comes to customization. It's also a wise choice for mission-critical processes that may have frequently changing requirements.

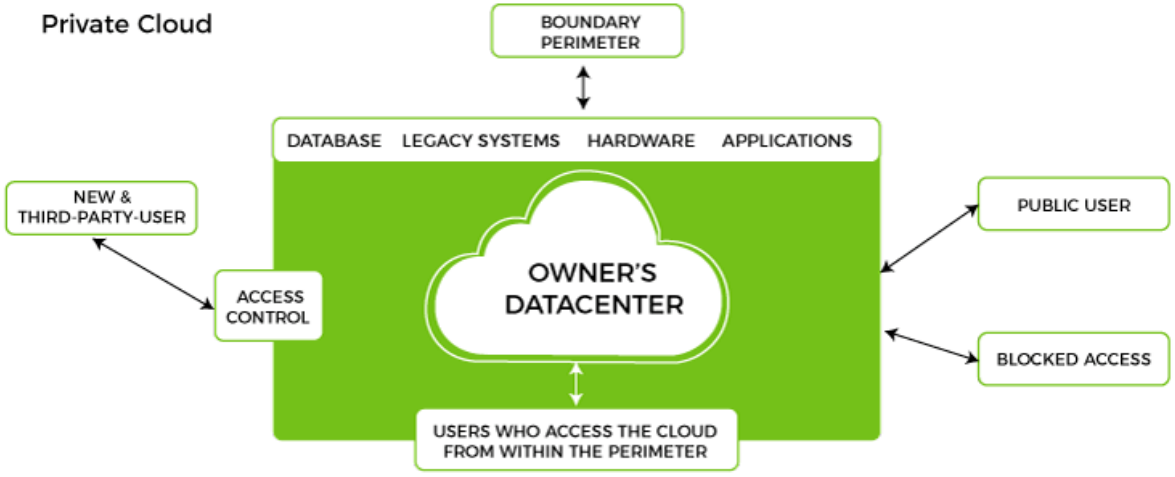

Fig 2.1(B): Private cloud

Benefits of Private Cloud

1. Data Privacy - It is ideal for storing corporate data where only authorized personnel gets access
2. Security - Segmentation of resources within the same Infrastructure can help with better access and higher levels of security.
3. Supports Legacy Systems - This model supports legacy systems that cannot access the public cloud.

Limitations of Private Cloud

1. Higher Cost - With the benefits you get, the investment will also be larger than the public cloud. Here, you will pay for software, hardware, and resources for staff and training.
2. Fixed Scalability - The hardware you choose will accordingly help you scale in a certain direction
3. High Maintenance - Since it is managed in-house, the maintenance costs also increase.

3 . Hybrid Cloud

As the name suggests, a hybrid cloud is a combination of two or more cloud architectures. While each model in the hybrid cloud functions differently, it is all part of the same architecture. Further, as part of this deployment of the cloud computing model, the internal or external providers can offer resources.

Let's understand the hybrid model better. A company with critical data will prefer storing on a private cloud, while less sensitive data can be stored on a public cloud. The hybrid cloud is also frequently used for 'cloud bursting'. It means, supposes an organization runs an application on-premises, but due to heavy load, it can burst into the public cloud

Benefits of Hybrid Cloud

1. Cost-Effectiveness - The overall cost of a hybrid solution decreases since it majorly uses the public cloud to store data.
2. Security - Since data is properly segmented, the chances of data theft from attackers are significantly reduced.
3. Flexibility - With higher levels of flexibility, businesses can create custom solutions that fit their exact requirements

Limitations of Hybrid Cloud

1. Complexity - It is complex setting up a hybrid cloud since it needs to integrate two or more cloud architectures
2. Specific Use Case - This model makes more sense for organizations that have multiple use cases or need to separate critical and sensitive data.

1.6 ARCHITECTURE OF CLOUD COMPUTING

As we know, cloud computing technology is used by both small and large organizations to store the information in cloud and access it from anywhere at anytime using the internet connection. Cloud computing architecture is a combination of service-oriented architecture and event-driven architecture.

Cloud computing architecture is divided into the following two parts -

- Front End
- Back End

The below diagram shows the architecture of cloud computing –

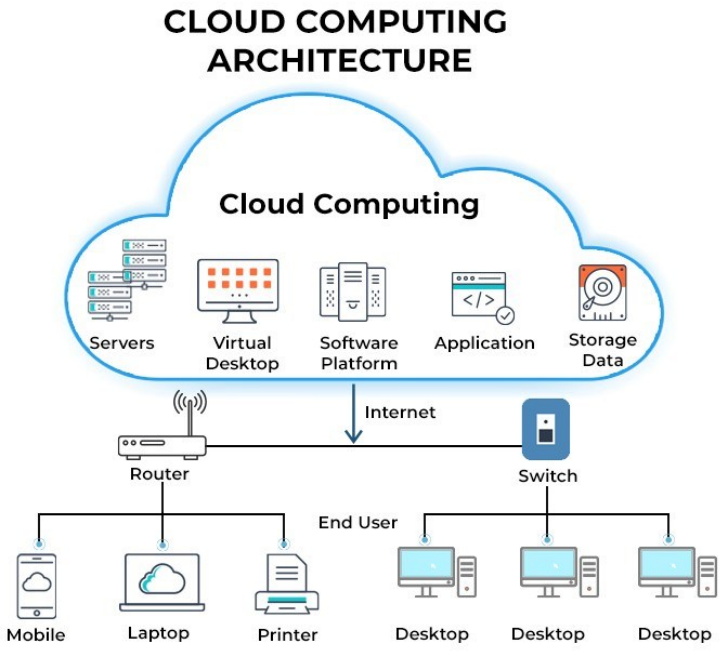

Fig 1.6: Architecture

Front End

The front end is used by the client. It contains client-side interfaces and applications that are required to access the cloud computing platforms. The front end includes web servers (including Chrome, Firefox, internet explorer, etc.), thin & fat clients, tablets, and mobile devices.

Back End

The back end is used by the service provider. It manages all the resources that are required to provide cloud computing services. It includes a huge amount of data storage, security mechanism, virtual machines, deploying models, servers, traffic control mechanisms, etc.

1.7 CHARACTERSTICS OF CLOUD COMPUTING

1 . **On-demand self-services:** The Cloud computing services does not require any human administrators, user themselves are able to provision, monitor and manage computing resources as needed.
2. **Broad network access:** The Computing services are generally provided over standard networks and heterogeneous devices.
3. **Rapid elasticity:** The Computing services should have IT resources that are able to scale out and in quickly and on a need basis. Whenever the user require services it is provided to him and it is scale out as soon as its requirement gets over.
4. **Resource pooling:** The IT resource (e.g., networks, servers, storage, applications, and services) present are shared across multiple applications and occupant in an uncommitted manner. Multiple clients are provided service from a same physical resource.
5. **Measured service:** The resource utilization is tracked for each application and occupant, it will provide both the user and the resource provider with

an account of what has been used. This is done for various reasons like monitoring billing and effective use of resource.

6. **Multi-tenancy:** Cloud computing providers can support multiple tenants (users or organizations) on a single set of shared resources.

7. **Virtualization:** Cloud computing providers use virtualization technology to abstract underlying hardware resources and present them as logical resources to users.

8 . **Resilient computing:** Cloud computing services are typically designed with redundancy and fault tolerance in mind, which ensures high availability and reliability.

9 . **Flexible pricing models:** Cloud providers offer a variety of pricing models, including pay-per-use, subscription-based, and spot pricing, allowing users to choose the option that best suits their needs.

10. **Security:** Cloud providers invest heavily in security measures to protect their users' data and ensure the privacy of sensitive information.

11. **Automation:** Cloud computing services are often highly automated, allowing users to deploy and manage resources with minimal manual intervention.

12. **Sustainability:** Cloud providers are increasingly focused on sustainable practices, such as energy-efficient data centers and the use of renewable energy sources, to reduce their environmental impact.

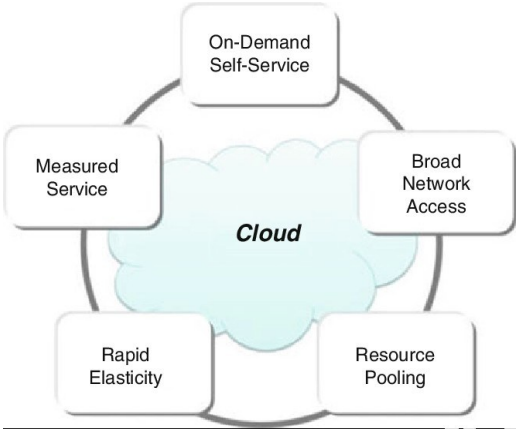

Fig 1.7: Characteristics of cloud computing

1.8 BENEFITS OF CLOUD COMPUTING

1.Faster time to market

You can spin up new instances or retire them in seconds, allowing developers to accelerate development with quick deployments. Cloud computing supports new innovations by making it easy to test new ideas and design new applications without hardware limitations or slow procurement processes.

2 .Scalability and flexibility

Cloud computing gives your business more flexibility. You can quickly scale resources and storage up to meet business demands without having to invest in physical infrastructure. Companies don't need to pay for or build the infrastructure needed to support their highest load levels. Likewise, they can quickly scale down if resources aren't being used.

3 .Cost savings

Whatever cloud service model you choose, you only pay for the resources you actually use. This helps you avoid overbuilding and overprovisioning your data center and gives your IT teams back valuable time to focus on more strategic work.

4 .Better collaboration

Cloud storage enables you to make data available anywhere you are, anytime you need it. Instead of being tied to a location or specific device, people can access data from anywhere in the world from any device—as long as they have an internet connection.

Advanced security

Despite popular perceptions, cloud computing can actually strengthen your security posture because of the depth and breadth of security features, automatic maintenance, and centralized management. Reputable cloud providers also hire top security experts and employ the most advanced solutions, providing more robust protection.

1.9 LIMITATION OF CLOUD COMPUTING

Limitations of Cloud Computing

The limitations of Cloud Computing can be quite daunting. Especially for businesses with budgets hanging below what's needed to set up the right IT infrastructure and resources for effective Cloud computing.

Cascading Effect

If one business accesses the resources of cloud computing and if there is any type of problem in their data center, then there are big issues because all virtual machines get affected and there might not be a backup of the data.

Network Connection

The first point considers before choosing cloud computing, the client must have an efficient and reliable network connection because if there is any problem with the network connection to accessing the cloud is also becomes a big problem, performing your cloud computing totally depends on the network connectivity at client-side the speed of download speed is slower as compared with the local server.

Control of Data Security

The third limitation is control of data security. You have limited control over the data security in a public cloud. There are more chances of phishing attacks and suspicious activity on data.

Additional Costs

Cloud computing offers various affordable cost benefits to access the data. It provides various additional services, but at an extra charge.

1.10 CLOUD COMPUTING CASE STUDY

Cloud computing case studies showcase real-world examples of how organizations have successfully adopted and leveraged cloud technologies to drive business growth, optimize

costs, and improve operational efficiency. Here are a few notable cloud computing case studies across various industries:

1. Netflix: Netflix, the leading online streaming service, relies on the Amazon Web Services (AWS) cloud infrastructure to support its massive scale and global reach. By adopting a cloud-first strategy, Netflix has been able to rapidly deploy new features, scale its infrastructure on demand, and provide a seamless streaming experience to millions of users worldwide.
2. Airbnb: Airbnb, the popular online marketplace for lodging, primarily uses AWS to host its applications and manage its massive amounts of data. By leveraging cloud services, Airbnb has scaled rapidly, streamlined its operations, and developed innovative features to enhance user experience and satisfaction.
3. Capital One: Capital One, a leading financial institution, migrated a significant portion of its infrastructure to AWS, enabling the company to reduce its data center footprint and focus on delivering innovative digital banking solutions. By adopting a cloud-first approach, Capital One has accelerated its software development lifecycle and enhanced its security posture.
4. General Electric (GE): GE, a multinational conglomerate, transitioned its on-premises IT infrastructure to the cloud using a mix of AWS and Microsoft Azure services. The migration helped GE improve efficiency, reduce costs, and accelerate its digital transformation efforts, allowing it to develop and deploy IoT and analytics solutions across various industries.
5. Coca-Cola: The global beverage giant Coca-Cola moved its customer engagement and collaboration platform to the Google Cloud Platform (GCP). By leveraging Google's cloud services, Coca-Cola has enhanced its global data analytics capabilities, improved its supply chain efficiency, and delivered personalized experiences to its customers.
6. Shell: The multinational oil and gas company Shell partnered with Microsoft Azure to optimize its business processes and accelerate its digital transformation initiatives. By migrating its applications and data to the cloud, Shell has improved operational efficiency, reduced IT costs, and enhanced its data analytics and AI capabilities.

CHAPTER-2
PROJECT OVERVIEW

2.1 PROJECT TITLE

KIZA

2.2 PROJECT OVERVIEW

2.3 FEATURES

CHAPTER-3

TECHNOLOGY AND SOFTWARE USED

3.1 TECHNOLOGY USED

3.1.1 . AZURE

Fig 3.1.1: Azure

Azure is Microsoft's cloud platform, just like Google has its Google Cloud and Amazon has its Amazon Web Service or AWS.000. Generally, it is a platform through which we can use Microsoft's resources. For example, to set up a huge server, we will require huge investment, effort, physical space, and so on. In such situations, Microsoft Azure comes to our rescue. It will provide us with virtual machines, fast processing of data, analytical and monitoring tools, and so on to make our work simpler. The pricing of Azure is also simpler and more cost-effective. Popularly termed as " Pay As You Go ", which means how much you use, pay only for that.

It is a private and public cloud platform that helps developers and IT professionals build deploy and manage applications. It uses the technology known as virtualization. Virtualization separates the tight coupling between the hardware and the operating system using an abstraction layer called a hypervisor. Hypervisor emulates all the functions of a computer in a virtual machine, it can run multiple virtual machines at the same time and each virtual machine can run any operating system, such as Windows or Linux.

Azure takes this virtualization technique and repeats it on a massive scale in the data center owned by Microsoft. Each data center has many racks filled with servers and each server includes a hypervisor to run multiple virtual machines. The network switch provides connectivity to all those servers.

3.1.2 LINUX

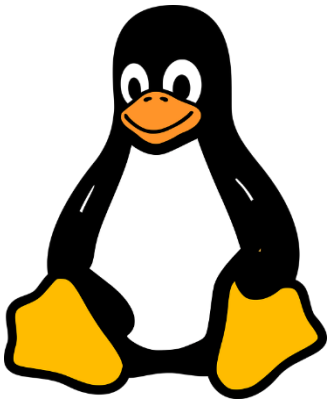

fig 3.1.2: Linux

In many ways, Linux is similar to other operating systems you may have used before, such as Windows, macOS (formerly OS X), or iOS. Like other operating systems, Linux has a graphical interface, and the same types of software you are accustomed to, such as word processors, photo editors, video editors, and so on. In many cases, a software's creator may have made a Linux version of the same program you use on other systems. In short: if you can use a computer or other electronic device, you can use Linux.

But Linux also is different from other operating systems in many important ways. First, and perhaps most importantly, Linux is open source software. The code used to create Linux is free and available to the public to view, edit, and—for users with the appropriate skills—to contribute to.

Linux is also different in that, although the core pieces of the Linux operating system are generally common, there are many distributions of Linux, which include different software options. This means that Linux is incredibly customizable, because not just applications, such as word processors and web browsers, can be swapped out. Linux users also can choose core components, such as which system displays graphics, and other user-interface components.

3.1.3 NGINX

Fig 3.1.3: Nginx

NGINX is open source software for web serving, reverse proxying, caching, load balancing, media streaming, and more. It started out as a web server designed for maximum performance and stability. In addition to its HTTP server capabilities, NGINX can also function as a proxy server for email (IMAP, POP3, and SMTP) and a reverse proxy and load balancer for HTTP, TCP, and UDP servers. Igor Sysoev originally wrote NGINX to solve the C10K problem , a term coined in 1999 to describe the difficulty that existing web servers experienced in handling large numbers (the 10K) of concurrent connections (the C). With its event-driven, asynchronous architecture, NGINX revolutionized how servers operate in high-performance contexts and became the fastest web server available.

The goal behind NGINX was to create the fastest web server around, and maintaining that excellence is still a central goal of the project. NGINX consistently beats Apache and other servers in benchmarks measuring web server performance . Since the original release of NGINX, however, websites have expanded from simple HTML pages to dynamic, multifaceted content. NGINX also is frequently placed between clients and a second web server, to serve as an SSL/TLS terminator or web accelerator. Acting as an intermediary, NGINX efficiently handles tasks that might slow down your web server, such as negotiating SSL/TLS or compressing and caching content to improve performance. Dynamic sites, built using anything from Node.js to PHP, commonly deploy NGINX as a content cache and reverse proxy to reduce load on application servers and make the most effective use of the underlying hardware.

3.1.4 JAVASCRIPT

Fig 3.1.4: Java script

JavaScript is a MUST for students and working professionals to become a great Software Engineer specially when they are working in Web Development Domain. I will list down some of the key advantages of learning JavaScript:

- JavaScript is the most popular programming language in the world and that makes it a programmer's great choice. Once you learnt JavaScript, it helps you developing great front-end as well as back-end software's using different JavaScript based frameworks like jQuery, Node.JS etc.

- JavaScript is everywhere, it comes installed on every modern web browser and so to learn JavaScript you really do not need any special environment setup. For example, Chrome, Mozilla Firefox, Safari and every browser you know as of today, supports JavaScript.

- Due to high demand, there is tons of job growth and high pay for those who know JavaScript. You can navigate over to different job sites to see what having JavaScript kills looks like in the job market.

- Great thing about JavaScript is that you will find tons of frameworks and Libraries already developed which can be used directly in your software development to reduce your time to market.

3.1.5 REACT

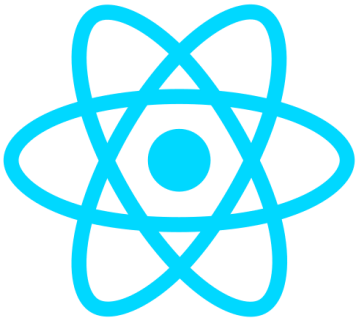

Fig 3.1.5: React

ReactJS tutorial provides basic and advanced concepts of ReactJS. Currently, ReactJS is one of the most popular JavaScript front-end libraries which has a strong foundation and a large community. ReactJS is a **declarative** , **efficient** , and flexible **JavaScript library** for building reusable UI components. It is an open-source, component-based front end library which is responsible only for the view layer of the application. It was initially developed and maintained by Facebook and later used in its products like WhatsApp & Instagram.

Our ReactJS tutorial includes all the topics which help to learn ReactJS. These are ReactJS

Introduction, ReactJS Features, ReactJS Installation, Pros and Cons of ReactJS, ReactJS JSX,

ReactJS Components, ReactJS State, ReactJS Props, ReactJS Forms, ReactJS Events,

ReactJS Animation and many more. The main objective of ReactJS is to develop User Interfaces (UI) that improves the speed of the apps. It uses virtual DOM (JavaScript object), which improves the performance of the app. The JavaScript virtual DOM is faster than the regular DOM. We can use ReactJS on the client and server-side as well as with other frameworks. It uses component and data patterns that improve readability and helps to maintain larger apps.

3.1.6 UBUNTU

Fig 3.1.6: ubuntu

Windows and macOS are widely recognized as popular operating systems today. Nevertheless, Linux has been steadily growing in popularity, gaining traction not only among developers but also among average consumers.

Linux is a great choice if you want to set up a VPS or try out a free operating system. It offers various distributions, such as Fedora , Debian , and CentOS , allowing you to choose the one that suits your needs best.

Also shortened as "distros" , these are operating systems that are based on the Linux kernel and Ubuntu is one of the most popular among them. It can be installed on personal computers , Linux VPS , and physical servers.

As an open-source software, Ubuntu offers users the freedom to modify its code, create multiple copies, and distribute customizations freely without the need for a license fee.

3.1.6 MongoDB

Fig 3.1.6: MongoDB

MongoDB is an open source NoSQL database management program. NoSQL (Not only SQL) is used as an alternative to traditional relational databases. NoSQL databases are quite useful for working with large sets of distributed data. MongoDB is a tool that can manage document-oriented information, store or retrieve information. MongoDB is used for high-volume data storage, helping organizations store large amounts of data while still performing rapidly. Organizations also use MongoDB for its ad-hoc queries, indexing, load balancing , aggregation, server-side JavaScript execution and other features.

Structured Query Language (SQL) is a standardized programming language that is used to manage relational databases. SQL normalizes data as schemas and tables, and every table has a fixed structure. Instead of using tables and rows as in relational databases , as a NoSQL database, the MongoDB architecture is made up of collections and documents. Documents are made up of Key-value pairs -- MongoDB's basic unit of data. Collections, the equivalent of SQL tables, contain document sets. MongoDB offers support for many programming languages, such as C, C++, C#, Go, Java, Python, Ruby and Swift.

MongoDB environments provide users with a server to create databases with MongoDB. MongoDB stores data as records that are made up of collections and documents.

Documents contain the data the user wants to store in the MongoDB database. Documents are composed of field and value pairs. They are the basic unit of data in MongoDB. The documents are similar to JavaScript Object Notation (JSON) but use a variant called Binary JSON (BSON). The benefit of using BSON is that it accommodates more data types. The fields in these documents are like the columns in a relational database. Values contained can be a variety of data types, including other documents, arrays and arrays of documents, according to the MongoDB user manual. Documents will also incorporate a primary key as a unique identifier. A document's structure is changed by adding or deleting new or existing fields.

Sets of documents are called collections, which function as the equivalent of relational database tables. Collections can contain any type of data, but the restriction is the data in a collection cannot be spread across different databases. Users of MongoDB can create multiple databases

The mongo shell is a standard component of the open-source distributions of MongoDB. Once MongoDB is installed, users connect the mongo shell to their running MongoDB instances. The mongo shell acts as an interactive JavaScript interface to MongoDB, which allows users to query or update data and conduct administrative operations

3.2 SOFTWARE USED

3.2.1 PUTTY

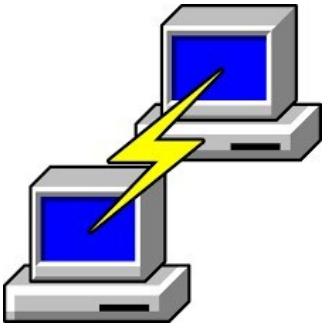

Fig3.2.1: PUTTY

Developed and primarily maintained by Simon Tatham, PuTTY is an open-source application making use of network protocols like Telnet and rlogin in Windows and UNIX platforms in conjunction with an xterm terminal emulator. Over a network, PuTTY makes use of all the above protocols to enable a remote session on a computer. It is a popular tool for text-based communication and is also a popular utility for connecting Linux servers from Microsoft operating system-based computers.The primary goal of PuTTY is to become a multi-platform application capable of executing in most operating systems. It can be considered like an xterm terminal for most purposes. It even specifies its terminal type as xterm to the server; although this can be reconfigured. Most features like port forwarding and public keys are available through the command line options. The main window of PuTTY has the session which runs on the remote computer and through which one can send the commands directly to the remote computer. For reducing the unpredictability of random data, PuTTY makes use of a random number seed file which is usually stored in PUTTY.RND file. With regards to cut and paste features, PuTTY can be customized to act similarly to xterm.

PuTTY provides some distinct advantages, especially when working remotely. It is easier to configure and is more stable. It is also more persistent in comparison to others, as a remote session can be resumed as soon the connection is restored after an interruption. It has an easy-to-use graphical user interface. Many variations on the secure remote terminal are supported by PuTTY. Some terminal control sequences like the Linux console sequences which are unsupported by xterm are supported by PuTTY. **3.2.1 WinSCP**

Fig 3.2.1: winscp

WinSCP (Windows Secure Copy) is a file manager , SSH File Transfer Protocol (SFTP), File Transfer Protocol (FTP), WebDAV , Amazon S3 , and secure copy protocol (SCP) client for Microsoft Windows . The WinSCP project has released its source code on GitHub under an open source license, while the program itself is distributed as proprietary freeware. Its main function is secure file transfer between a local computer and a remote server . Beyond this, WinSCP offers basic file manager and file synchronization functionality. For secure transfers, it uses the Secure Shell protocol (SSH) and supports the SCP protocol in addition to SFTP. [6]

Development of WinSCP started around March 2000 and continues. Originally it was hosted by the University of Economics in Prague , where its author worked at the time. Since July 16, 2003, the program and its source code is licensed under the GNU GPL . It is hosted on Source Forge and GitHub . WinSCP is based on the implementation of the SSH protocol from PuTTY and FTP protocol from FileZilla . It is also available as a plugin

for Altap Salamander file manager , and there exists a third-party plugin for the FAR file manager .

CHAPTER-4

CPANAL

4.1 INTRODUCTION

cPanel is quite a normal phrase in the web development and web hosting sectors. Defined as a control panel where the users can manage their web hosting tasks without much technical expertise with the benefits of cPanel hosting.

Gone are the days when a web developer with strong coding and development languages was required to handle even minor issues It offers a dashboard to do all the tasks, which is beginner-friendly and does not require the user to be a technical expert. In this blog, we will be discussing deeply what cPanel is, its features, cPanel hosting, what cPanel is used for, and finding answers to more such questions.

4.2 WHAT A CPANEL INA WEBSITE ?

cPanel is a control panel that helps non-technical users define their web hosting needs efficiently. During website management, you'll find cPanel paired with Web Host Manager (WHM), which streamlines your website management process. However, remember that both cPanel and WHM have two different functions. If WHM and cPanel are correlated, you'll find that the web hosting providers utilize WHM to operate the servers of the websites, and with the help of cPanel, the servers are controlled. In other words, cPanel helps to control the overall management of the website, whose administrative access is given by the web host manager. On a website, cPanel allows features like handling the website's files, MySQL, software installation, database search, analytics, and much more. Almost all shared hosting plans come with cPanel as the primary control panel. Additionally, it is compatible with advanced hosting solutions like dedicated servers , cloud hosting, cPanel VPS hosting , and managed WordPress hosting plans.

4.3 WHAT IS CPANEL HOSTING?

A Linux-based hosting solution that comes with pre-installed cPanel as a control panel is known as cPanel hosting . The pre-installed cPanel has an integrated cPanel account to handle the basic components of the hosting. In this hosting solution, hosting providers

use WHM to manage servers and create cPanel accounts for their customers. For example, the hosting provider will manage the server configurations and other details on the WHM, and at the same time, they will create multiple cPanel accounts and give access to those users to control the website. cPanel hosting acts as the connector between the user and the server complexity. Website owners prefer cPanel hosting because it mitigates the need to hire a professional web developer. cPanel lets users manage the website's data easily with minimal technical expertise and no coding knowledge.

4.4 PRIMARY CPANEL DASHBOARD SECTIONS

What's next after you log in to the cPanel dashboard? Well, the dashboard will show the major or primary sections of the control panel, highlighting the different features. Remember, the dashboard and the features on the cPanel may vary from provider to provider, as well as the theme chosen by the host.

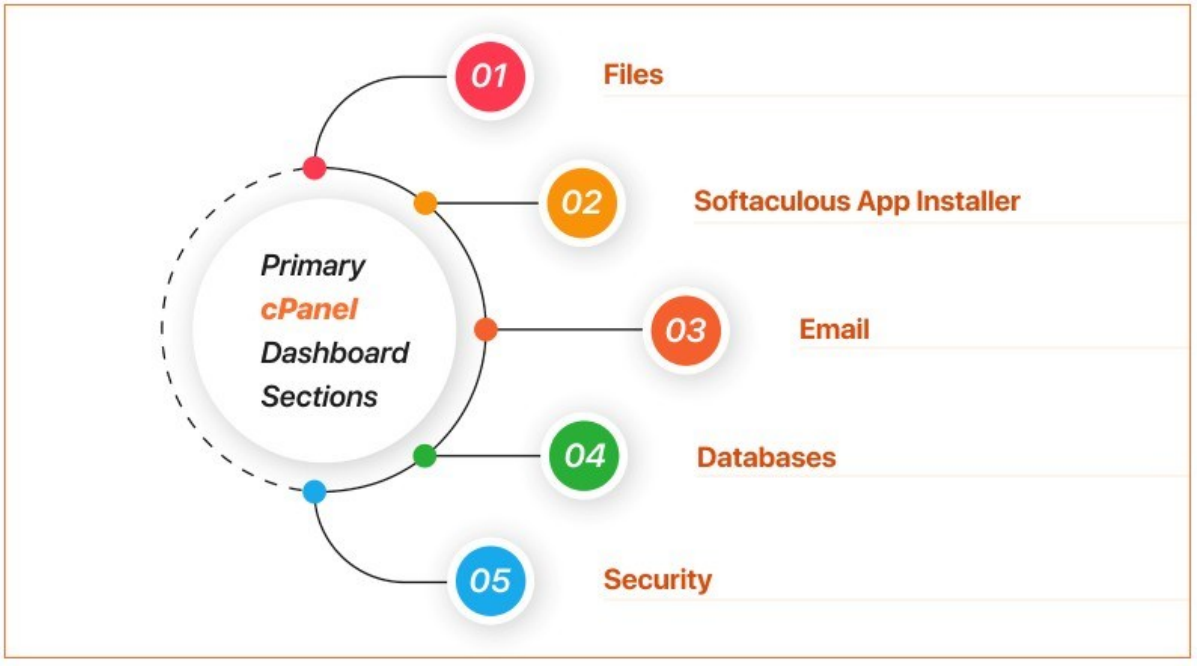

Fig 4.4: Primary cpanel dashboard sections

However, most of those have a general category that minimizes the huge differences. Let's have a look at each feature.

Files

It is a section for file management and has major options, such as:

1. File Manager: It gives you access to upload, download, manage, and edit files on your website.

2. Backup: It allows you to create and restore backups of your website and files.

3. Disk Usage: It helps to monitor your disk space usage and manage quotas.

App Installer

This section is essential for the websites. It gives the major options of:

1. Installation: You can install popular website applications like WordPress, Joomla, and Drupal with ease.
2. Website Builder: This option is available if you want to create basic websites without coding knowledge.

3. Subdomains: This allows you to create subdomains for different projects or websites within your main domain.

4. Addon Domains: This is an additional option for hosting multiple separate websites on one hosting account.

Email

As the name suggests, this section in the cPanel dashboard is responsible for managing the overall emails and related tasks. It includes:

1. Email Accounts: To create and manage email accounts for your domains.

2. Forwarders: You can set up email forwarding to other addresses.

3. Autoresponders: It makes it easy to manage and send automatic responses to incoming emails.

4. Spam Filters: It comes with a built-in configuration for the spam filters to protect and sort your inbox.

4.5 USES OF CPANEL

Many operations can be done using cPanel in the web hosting journey. A cPanel is used basically for streamlining website management tasks. All the below-mentioned actions are performed from the various sections of the cPanel dashboard.

Here are a few of the popular functions of cPanel that you can perform after logging into the dashboard:

- Manage and edit your website files. (Files Section)
- Create and manage email accounts. (Email Section)
- Install software with a few clicks. (Softaculous App Installer Section)
- Enable Cloudflare for better performance. (Software Section)
- Add and update DNS records. (Domains Section)
- Monitor key metrics on your site and server. (Metrics Section)
- Configure extra security layers. (Security Section)
- Activate various cron jobs. (Advanced Section)

CHAPTER-5

LINUX COMMANDS

5.1 BASIC COMMAND

1.mkdir: To create a folder/directory in linux cmd. For example: mkdir website.

2.ls: To check the list of directory.

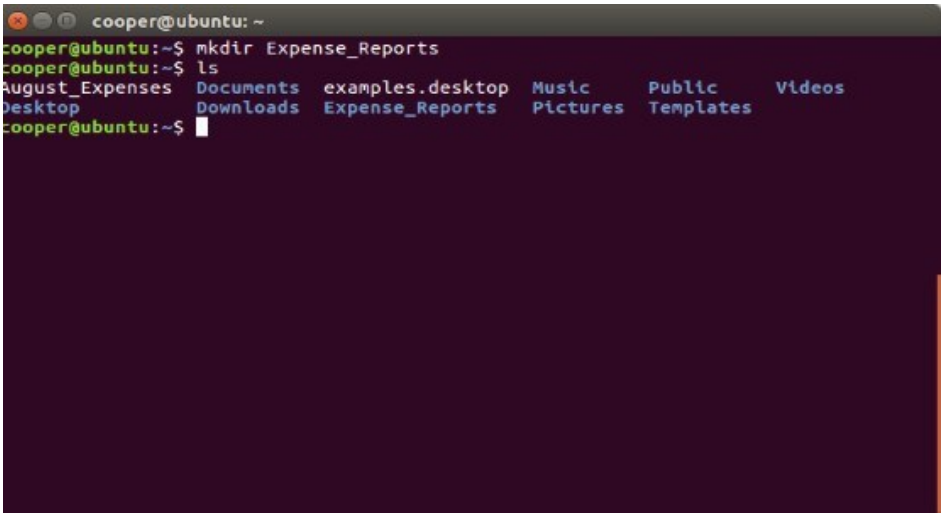

Fig:5.1.1: use mkdir and ls command

3 .touch: To create a file.

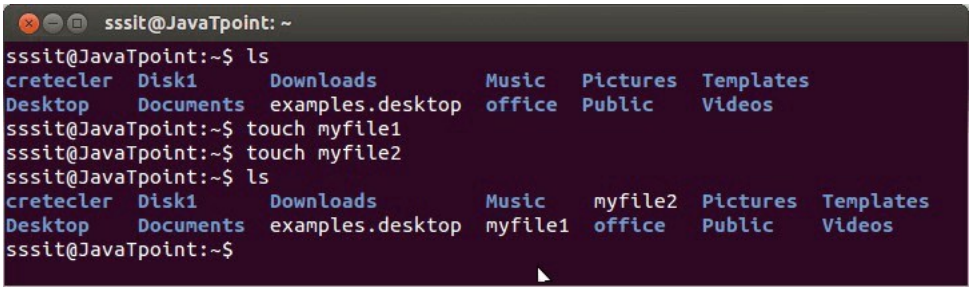

Fig5.1.2: touch command

4.cd: To open the folder. Example: cd website

5.cd .. : To exit from the current folder.

6.cp: To copy the file or folder

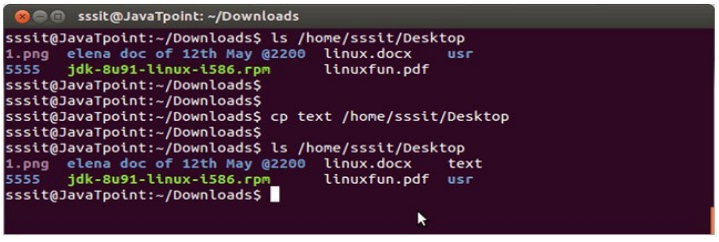

Fig5.1.3:cp command

7.vim: To open a file. Example vim file.txt

a. press i to insert in the file.
b. press wq(write and quit) after inserting in the file.
c. press q(quit) after reading the file.
d. press w(write) for in serting only.
e. press q! to quit without save the file.

8.rmdir: To delete the folder. Example: rmdir website

9.rm: To delete the file. Example: rm file.txt

10 .echo: To write in the file. Example: "hello world" > myprofile.txt **11 .scp:** To upload the file, ppt, document etc.

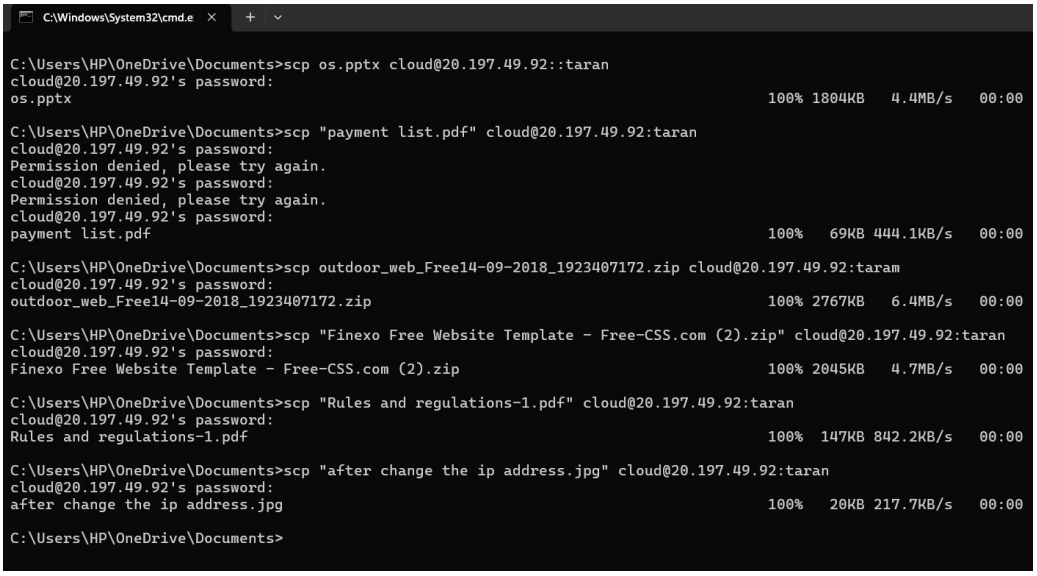

Fig5.1.4:scp command

12.rm-r: To delete or remove folder directory

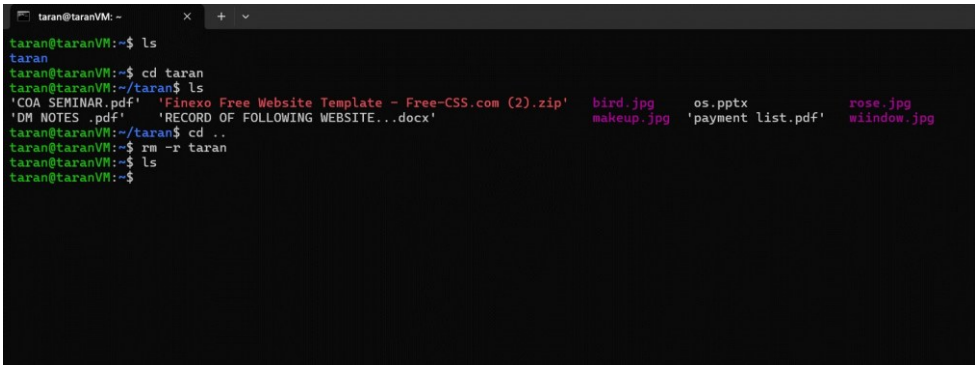

Fig 5.1.5: rm-r command

13.sudo: When we are not in home directory or when we are in root directory.
Example: sudo mkdir foldername.

14 .sudo apt install unzip: To unzip the folder or file.

Example: sudo apt install unzip package_name

5.2 LINUX COMMAND FOR INSTALL THE SOFTWARE

1 .sudo apt update: To update the system

```
gaurav@LINUX:~$ sudo apt update
Hit:1 http://azure.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://azure.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://azure.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:4 http://azure.archive.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
7 packages can be upgraded. Run 'apt list --upgradable' to see them.
gaurav@LINUX:~$ sudo apt install nginx
Reading package lists... Done
```

3.sudo apt install : To install the package or webserver .

Eg: sudo apt install webserver **4**

.enable the firewall:

a. **sudo ufw:** To change the setting.

b. **sudo ufw status:** Check the status of firewall.

c. **sudo ufw app list:** Check the app list in firewall.

d. **sudo ufw allow:** To allow the services.example: sudo ufw allow servicename.

e.**sudo ufw enable:** To activate the firewall.

5.sudo systemctl:

a. **sudo systemctl stop:** To stop the server.

b. **sudo systemctl restart:** To restart the server.

c. **sudo systemctl status:** To check the status.

6. Install the SSL:

a.install snapd: sudo apt install snapd

b. sudo snap install core; sudo snap refresh core

c . sudo snap install --classic certbot

d. sudo ln -s /snap/bin/certbot /usr/bin/certbot

e. sudo certbot –nginx

7 . Install pm2

a. sudo apt install pm2-g: Install pm2 by using command.

b. pm2 start filename –name: Open folder you want to execute and start pm2.

c. pm2 status: To check the status of pm2.

CHAPTER -6

HARDWARE AND SOFTWARE SPECIFICATIONS

6.1 RESOURCES NEEDED

Resources are the requirement of the system. It can also be defined as the environment within which a system can work efficiently. In order to implement the proposed system, the following various hardware and software requirements to achieve good performance:

6.1.1 Hardware Specialisation :

1 . **Computing Devices** :

○ Processor: 12th Gen Intel(R) Core(TM) i5-12450H 2.00 GHz

○ RAM: 16GB DDR4.

○ Storage: 256GB SSD.

○ Graphics Card: NVIDIA GEOFORCE RTX 3050

2 **. Peripheral Devices** :

○ Monitors: HP 24-inch Full HD.

○ Keyboards: Dell Wired Keyboard.

○ Mice: Logitech Wired Mouse.

6.1.2 Software Specialisation:

1. Operating Systems:

○ Windows 11 Home for development environments.

2. Development Tools:

○ IDEs: Visual Studio Code for coding.

○ Version Control Systems: Git with GitHub for code repository management.

3.Frameworks and Libraries:

CHAPTER-7

KIZA

CHAPTER-8
CONCLUSION AND FUTURE SCOPE

CHAPTER-9

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