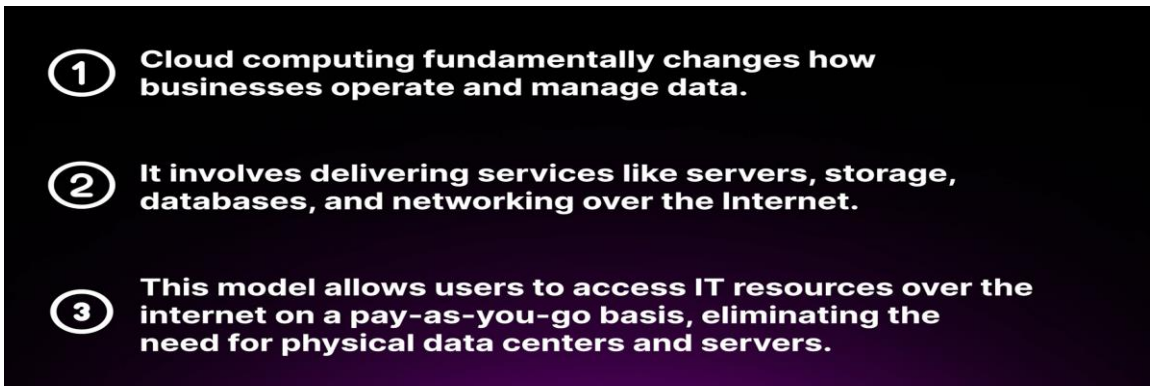
Week 1. Cloud Fundamentals

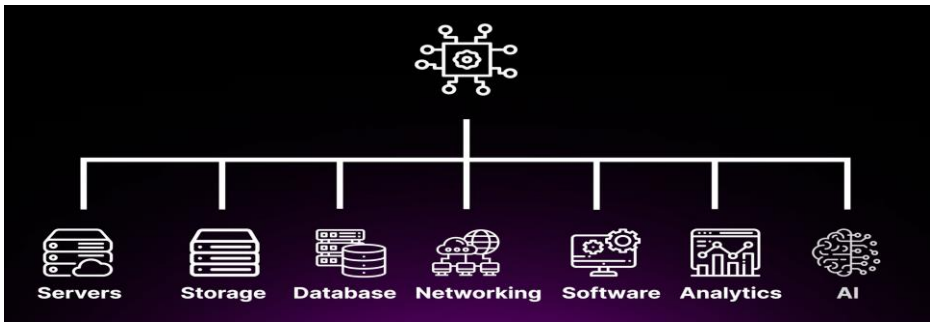
제 1강. What is Cloud computing?

Summary



1. What is Cloud Computing

- Cloud computing changed the landscapes of how businesses operate and manage data. Cloud computing is the delivery of computing services including servers, storage, database, networking, software, analytics and AI over the Internet.



- You can imagine a virtual computer running in the cloud where you can use its servers, storage, database and networking.

- The cloud allows users to access and use IT resources via the Internet on a pay as you go basis rather than owning, managing and maintaining physical data centers and servers.

- Cloud services can range from web-based email services and databases, software development platforms and virtual computing power.

2. There are three common cloud computing models:

(1) IaaS (Infrastructure as a Service) providing basic infrastructure like servers, storage space and networks and the example of this is Amazon EC2. The cloud provider handles your hardware, servers, storage and other infrastructure resources.

- We can think of IaaS as renting in an apartment. You can control over your house and use it but the landlord owns the condo itself and building, which is your cloud provider. You can use your own house, live in it but you do not need to worry about the building itself.

(2) PaaS (Platform as a Service) offering an environment (platform) for developers to build, test and deploy software applications without worrying about underlying infrastructure so you can build your own web

applications and a cloud platform like AWS will handle everything else for you such as scaling, maintenance, patching.

- The example of PaaS is AWS Elastic Beanstalk.

- It seems that you sign a lease with a landlord for the property of land to build your own house including foundations, electricity and plumbing built in which are necessary to build the house. The property of land is a kind of platform where developers build web applications but do not need to worry about anything that happens under the hood.

(3) SaaS (Software as a Service) delivers software applications over the Internet on a subscription basis.

- The example of SaaS is Netflix where you do not need to own contents that you watch but you need to pay to watch them over the Internet on your devices.

- Other examples are office 365 and Google Workspace.

3. History and Evolution of Cloud Computing

- They do not have the overhead (**간접비용**) of running a physical data center and just use AWS data centers for their own infrastructure and their own applications.

- The latest advancement in cloud computing includes serverless architectures, where the cloud provider manages the infrastructure and allowing developers to focus purely on code.

- AI and machine learning integration, Internet of Things and Edge computing will shape the future of cloud computing.

제 2강. Cloud Computing Benefits

1. Key characteristics of Cloud Computing

(1) On-Demand Self-Service

- Users can automatically provision computing resources such as server, storage and network as needed without requiring human interaction with each service provider.

(2) Resource Pooling

- The cloud provider's computing resources are pooled to serve multiple customers with different physical resources and virtual resources dynamically assigned and reassigned according to customers' demand.

(3) Rapid Elasticity or Scalability

- Cloud computing allows you to quickly increase or decrease the amount of computing resources you use based on your needs.

- When you need more resources like storage or computing power, you can get it almost instantly as if you are in endless supply. And when you don't need as much, you can reduce them just as quickly.

(4) Measured service

- Cloud services measure and manage how much of their services you are using such as storage space, processing power, Internet bandwidth or the number of active user accounts. This allows to adjust cloud resources to fit your needs, see and control over the usage and what you are being charged for.

2. Why is moving to the Cloud important for businesses?

(1) One of the biggest benefits is cost efficiency.

- Users do not need to pay a huge amount of money to maintain their own data centers but cloud computing lets you use and pay for only the computer services you need. This can be cheaper than buying and taking care of your own computer systems.

(2) Easily able to adjust to your needs.

- Businesses can easily grow and shrink their usage. Cloud computing lets you use more or less computer power based on your business needs. The cloud can quickly change to fit what your business needs which is great for businesses that are constantly changing and hard to predict their computing needs.

(3) Moving to the Cloud also keeps businesses running smoothly

- Cloud computing keeps your data safe by storing it in multiple places, making it easy to recover your data even in the event of computer crashes.

- Cloud services are usually very reliable meaning that they do not stop working often that helps you ensure that your business does not have any unexpected breaks and problems.

(4) Moving to the cloud enables better collaboration

- People can easily work together, even if they are in different places. They can share information and work on it at the same time.

3. Benefits of Cloud Computing for Businesses

- The shift to the cloud computing is crucial for businesses looking to remain competitive, agile and efficient in today's dynamic market environment, propelling them toward sustained growth and success.

(1) Innovation and agility

- Businesses can leverage the cloud to experiment and implement new ideas easily with lower risk and much faster pace compared to traditional IT solutions. The ability to quickly provision IT resources enables businesses to respond more swiftly to opportunities and challenges.

(2) Business can Focus on company goals

- Businesses can reduce the time and resources spent on IT maintenance tasks such as software and hardware upgrades. This allows them to focus more on strategic business initiatives.

(3) Global Reach

- The cloud enables businesses to deploy their service in multiple regions around the world, reducing latency and improving the customer experience.

제 3강. Cloud Deployment Models

There are 3 cloud deployment models: public cloud, private cloud and hybrid cloud.

- Cloud deployment models are crucial to determine how data is managed, the level of control over resources, cost implications and scalability.

(1) Public Cloud

- In a public cloud, cloud services such as servers, storage, databases, networking and software are provided over the public Internet.

- The public cloud is available to anyone who want to use cloud services and purchase them.

- These cloud services are shared across multiple businesses and users, offering vast scalability making it hard to achieve private setups.

- The public cloud services are owned and operated by the 3rd party cloud service providers who are maintaining and managing the cloud resources ensuring their availability and security.

- Users only pay for what they are using.

- AWS has a pay-as-you-go pricing for their customers only paying for the server resources and bandwidth they actually use.

- The public cloud services provide accessible, cost-effective and scalable solutions for businesses and individuals, eliminating the needs for significant capital investment in hardware and infrastructure making advanced computing resources more available than ever before.

(2) Private Cloud

- A private cloud is a cloud computing environment dedicated to a single organization.

- Unlike the public cloud where multiple resources are shared across multiple organizations, private cloud services are exclusively used by one organization.

- The private cloud can be hosted in several ways, either internally within an organization's data centers or externally by the 3rd party cloud service providers.

- With a private cloud, the organization has greater control over the configuration and customization of the computing environment to meet specific needs because the cloud resources are not shared with other users.

- The private cloud service is ideal for businesses with sensitive data, regulatory requirements and high security needs.

(3) Hybrid Cloud

- A hybrid cloud is a combination of both public and private cloud services, blending the features of each.

- It creates an environment where an organization can use the public cloud for some services and the private cloud for others depending on their specific needs.

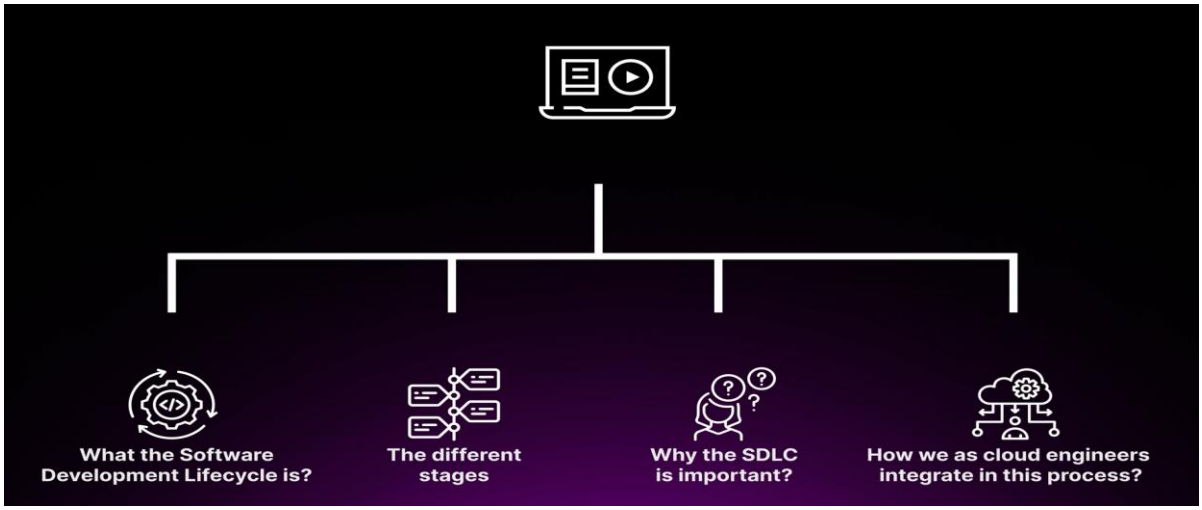
- One key characteristic of a hybrid cloud is that data can be transitioned seamlessly between the public and private clouds.

- This mobility offers flexibility in resource usage and operational efficiency, combining the scalability and cost-effectiveness of public clouds with the security and control of the private clouds, that is perfect for businesses with a mix of IT environments and varying workload requirements.

- It offers customized solutions that organizations tailor their cloud environment to their specific needs, using the public cloud for less sensitive and more dynamic workloads, and the private cloud for more critical

and sensitive operations.

제 4강. Software Delivery Lifecycle (SDLC)



(1) What is software development lifecycle (SDLC)?

- SDLC is the methodology of building and delivering software projects.

- Any software ideas, projects or features need to go through a development process where they are conceptualized, designed, developed, tested, launched and maintained once deployed to customers.

- SDLC is a process intended to produce high-quality software in the shortest time and at the lowest cost possible.

(2) How does the SDLC work?

- There are a number of popular SDLC models, with Waterfall and Agile being the most well-known.

- Software Development Lifecycle Stages:

① Planning stage

- This stage involves determining what the software should do and what the team wants to achieve with the software, including identifying requirements, defining the purpose of the software projects and assessing the resources needed, such as time and money.

② Requirement analysis

- You need to gather all the necessary resources to start building the software, involving a clear understanding of what users need from it.

- In this stage, the team collects detailed information on what features the software needs.

③ Design

- It creates a design for how the software will work and what it will look like including architecture, user interface and databases.

- This stage consists of two separate parts of the user interface of the application and software architecture design that should not be mixed up.

1. The user interface of the website is created by a UI/UX designer who designs the blueprint for how it will look like and how different parts, such as the website and the check-out page, will connect.

2. The software architecture is done by a software architect, designing the integrations with other systems, APIs and database schemas.

④ Implementation/development stage

- In this stage, developers write code to build the software according to the design plan, turning the blueprint into a functional product that can be used by users.

⑤ Testing stage

- All the software should be tested to check for bugs, issues, ensuring that all the requirements from the planning stage are met.

⑥ Deployment

- Once the software is tested and ready for users, it is deployed for real users, publishing it on the Internet to allow users or customers to access it.

⑦ Maintenance

- Software needs ongoing maintenance including making updates, fixing issues that come up and ensuring software continues to function well.

(3) What is the importance of SDLC for software teams?

1. Structured process

- SDLC provides a structured approach to software development, ensuring all essential phases such as planning, designing, coding, testing and deployment systematically follow. This reduces chaos, overlaps and redundancies in the development process.

2. Quality Assurance

- With phases such as requirements analysis, design and testing, SDLC ensures that the final product is of high quality, meets users' needs and is free of critical bugs.

3. Risk management

- SDLC enables the identification of potential risks at an early stage, allowing teams to resolve issues before they escalate into bigger problems.

4. Adaptability

- Modern SDLC methodologies like Agile allow for adaptability and flexibility, accommodating changes in requirements even at later stage of development.

(4) How cloud engineers integrate within the SDLC process

1. Planning and requirement analysis

- Cloud engineers contribute their expertise in assessing how cloud resources can best support the software's requirements.

- They help in deciding the cloud infrastructure needed for the project, considering factors such as scalability, data processing and storage needs.

2. Design

- Cloud Engineers are crucial in shaping the software's cloud architecture, planning the deployment models, choosing appropriate cloud services and ensuring the architecture is scalable, secure and compliant with regulations.

3. Development and Implementation

- Cloud engineers set up cloud environments suitable for development and testing.

- They implement Infrastructure as Code to automate and replicate development environments, ensuring consistency across all stages.

4. Testing

In cloud base SDLC, testing includes performance testing and load testing in a cloud environment. Cloud engineers prepare the environment for these tests, ensuring the application can handle real-world scenarios effectively.

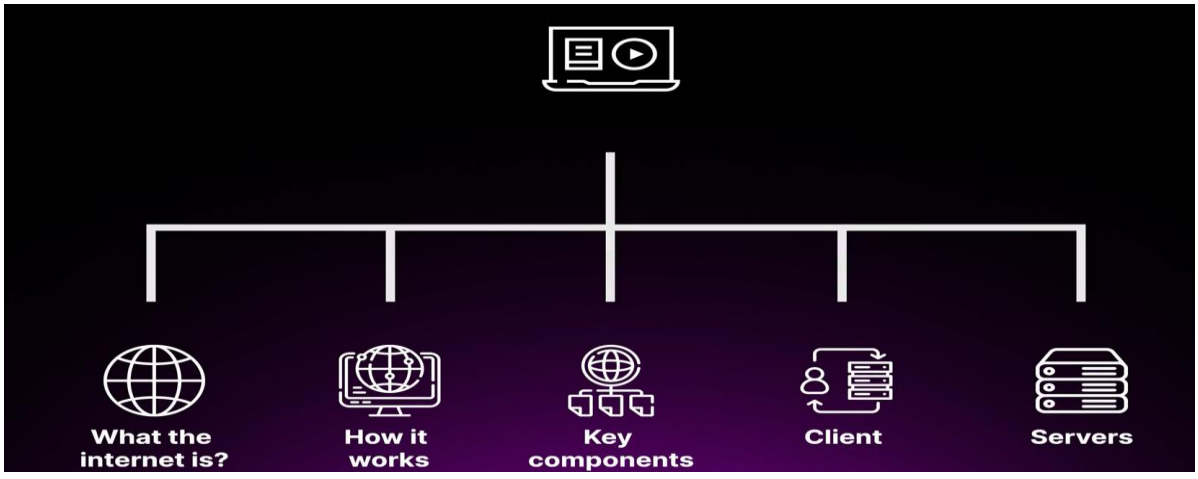
5. Deployment

- Cloud engineers play a key role in deploying the software in the cloud, utilizing cloud services for a smooth transition while managing and monitoring the deployment process to ensure that the deployment aligns with the cloud's scalability and resource management features.

6. Maintenance and updates

- Cloud engineers monitor the application's performance, manage resources and implement necessary updates and patches.

제 8강. How the Internet works



(1) What is the Internet?

- The Internet is a massive network of interconnected computers while linking different cities.

- Each computer is like a home or business located in a big city, exchanging data across the network.

(2) Key components of the Internet?

1. Computers and devices

- These are endpoints within the network, which can be smartphones, laptops and servers in data centers, sending and receiving data, accessing web services, hosting websites and performing other online tasks.

2. Routers and Switches

- Routers direct data between different networks, controlling and managing the movement of data packets to determine the best path for the data packets.

- Switches manage data flow within a local network.

- Both help data packets find the most appropriate path to their destination.

3. Wires and Wireless signals

- These are the pathways that data travels on. Wires are composed of Ethernet and Fiber optics, while wireless pathways consist of Wi-Fi and cellular networks.

- These are the physical mediums through which digital communication happens.

3. Data packets

- Every piece of information transferred over the Internet is divided into several smaller units called data packets.

- Data packets travel along different routes to the destination and reassemble into the complete information.

4. Transmission protocols

- Protocols are rules or standards that govern how data is transmitted over the Internet, ensuring that the data packets are sent, received and reassembled correctly. These protocols include Transmission Control Protocol (TCP) and Internet Protocol (IP).

(3) Clients and Servers?

- Clients are devices that request data such as computers and smartphones.

- Servers are devices that provide data such as web servers or hosting websites.

(4) HTTP/HTTPS Requests

- These are types of requests made over the Internet.

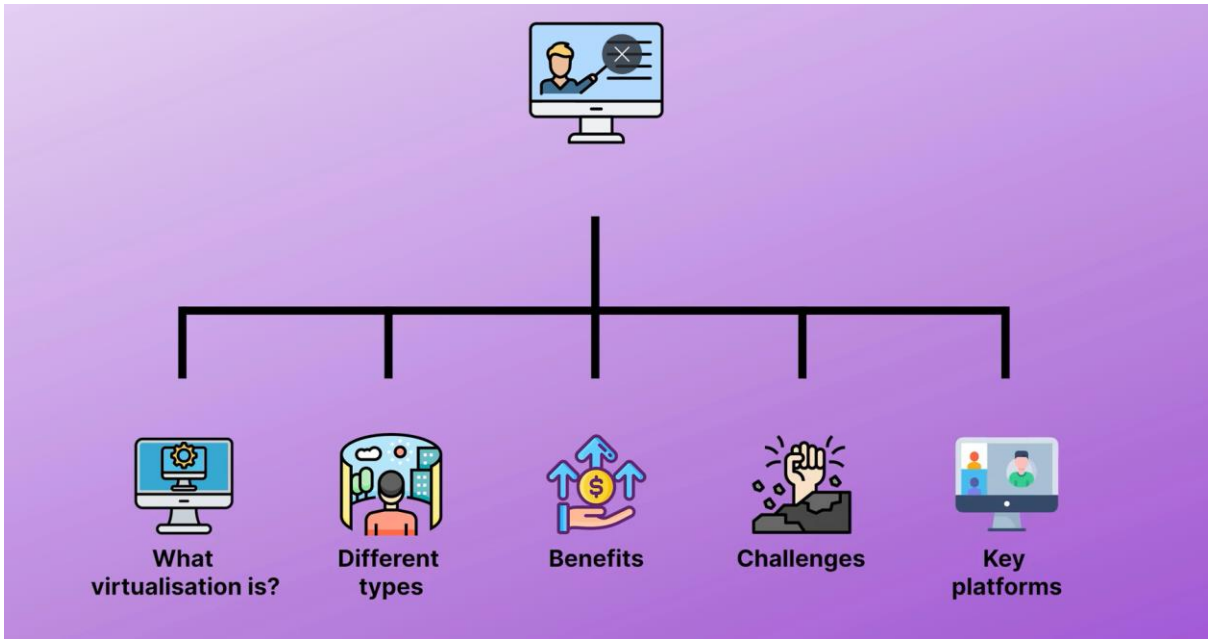
- HTTP stands for Hypertext Transfer Protocol which is the set of rules for transferring web pages.

- HTTPS is the secure version of HTTP, encrypting data for safe transfer.

- When you visit a website, your web browser sends HTTP/HTTPS requests to a web server. The server responds to the requests and display the web pages on your browser.

(5) Understanding the Internet is crucial in today's digital world

제 9강. Virtualization



(1) What is virtualization?

- Virtualization is the process of converting physical components, such as servers, storage devices, networks and entire operating systems into virtual versions.

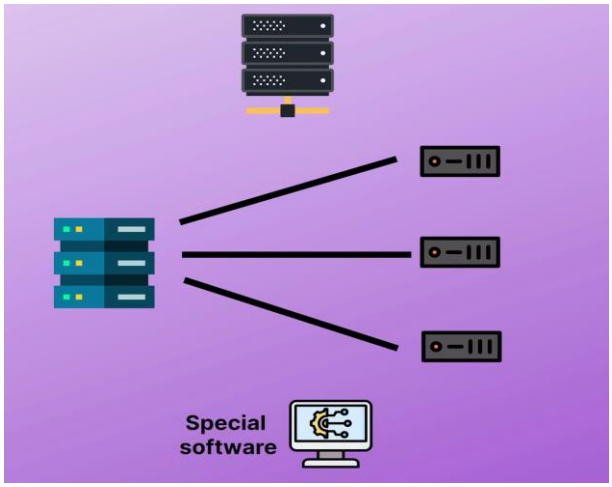
- Virtual machines provide various services for applications or users without the need to build physical servers.

(2) Different types of virtualization

- There are four types of virtualization, including servers, storage devices, networks and desktop virtualization.

1. Server virtualization

- It converts a physical server into several smaller virtual servers using special software. This virtual servers act independently.



- The special software called a hypervisor separates the physical server into smaller virtual servers.

- The virtual servers can run their own operating system and applications independently, as if they are standalone computers with the ability to allocate CPU, memory and storage resources.

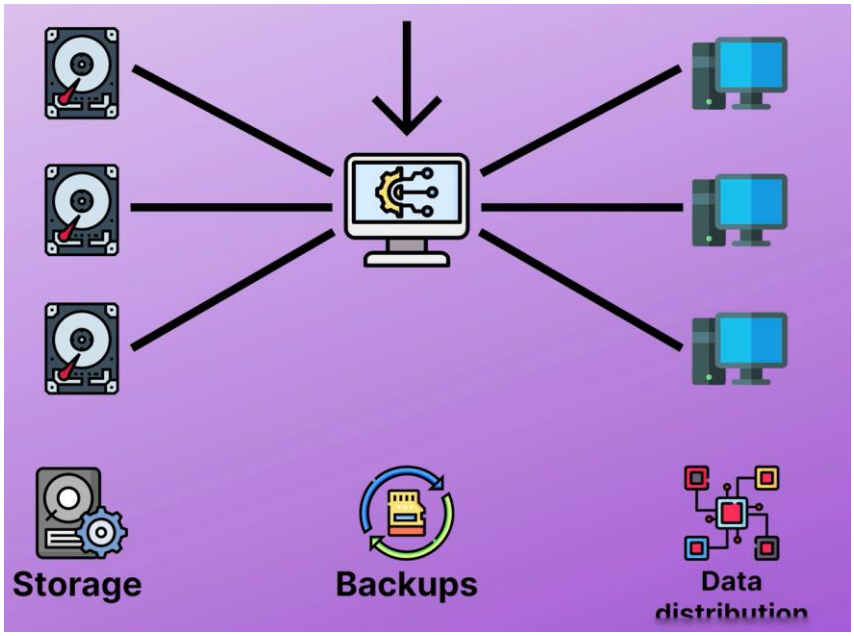
- Virtual servers are isolated from each other, meaning that any impact on one virtual server does not affect the others.

- They only need one physical server saving money on hardware to get multiple servers.

2. Storage virtualization

- Storage virtualization combines the storage capacity from multiple physical storage devices, such as HDDs or SSDs to create a single cohesive virtual storage drive that is managed by a single point, which is more efficient to oversee and utilize the storage capacity.

- Special hardware or software combines the capacity of different physical storage devices and distribute it across all virtual servers while performing backups and evenly distributing data.



- It is easier to scale up and down as needed and allocate storage resources to different applications or departments based on their requirements.

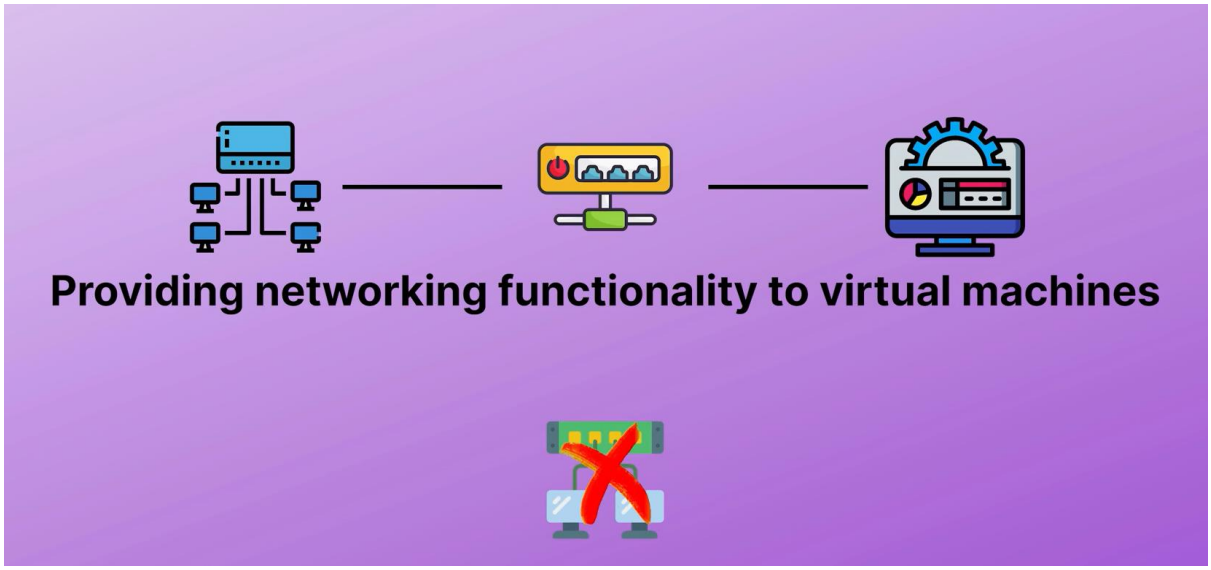
3. Network virtualization

- Network virtualization combines hardware and software network into a single virtual network.

- Special software aggregates and manages physical network hardware, combining it with software network to create a single virtualized network environment, which functions as a unified network entity.

- In the network virtualization, a single centralized virtual network switch provides networking functionality to virtual machines without using multiple physical network switches for each connection.

- This makes it easy to adjust and scale the network as needed, which is ideal for rapidly changing network demands and environments.

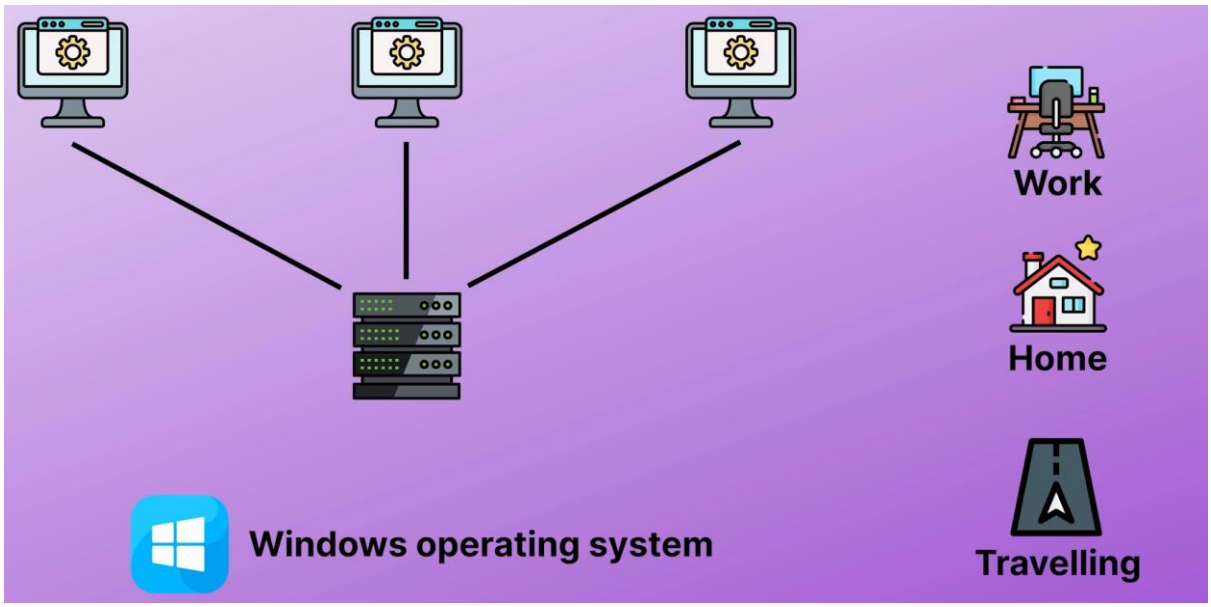


4. Desktop virtualization

- Virtual desktop, which includes operating system, applications and data, can be accessed by different physical devices. You can access your entire desktop with all its applications and files regardless of devices you are using.

- A virtual desktop is hosted in a virtual environment not on physical computers that can be accessed by PC, laptop, tablet and smartphone.

- The virtual desktop is managed and controlled by servers in a data center and delivered over a network to end-users' devices.



- Companies can setup their virtual desktops on their own servers in a data center using a specific operating system like windows, allowing employees to access applications or files in any situations.

- Managing virtual desktops centrally is more efficient and secure than managing and updating individual physical desktops and can enhance productivity and flexibility of their employees.

5. The benefits of virtualization

1. cost-efficiency

- Virtualization reduces the need to invest in numerous physical machines, leading to cost savings in hardware and maintenance.

2. Efficient resource utilization

- It maximizes the use of computing resources leading to enhanced efficiency.

3. Scalability and flexibility

- It facilitates easy scaling of IT resources and quick deployment of new applications.

4. Improved disaster recovery

- It simplifies backup and disaster recovery processes.

5. Isolation

- It ensures that problems in one virtual environment do not affect others.

6. The challenges of virtualization

1. Security

- Sharing resources in a virtual environment may lead to security vulnerabilities.

2. Complexity in Management

- Managing a virtualized environment can be complex and requires specialized skills.

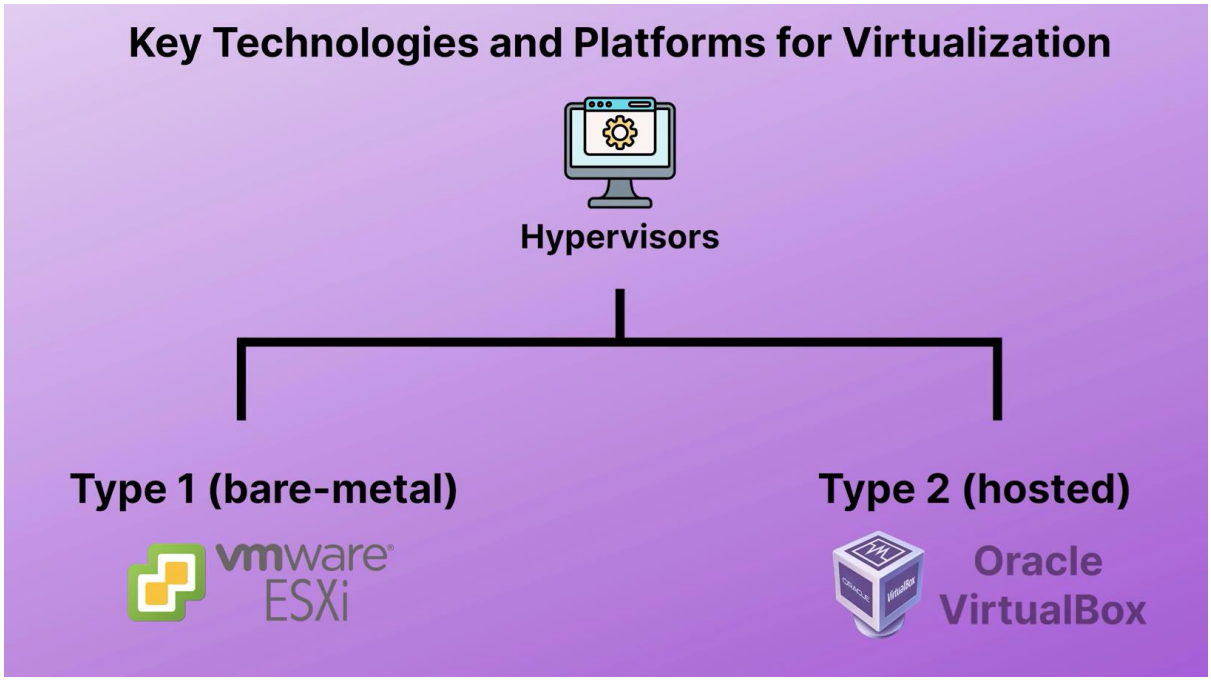
3. Performance overhead (성능 저하와 관련된 것)

- Virtualization induces performance overhead due to the additional layer (hypervisor) between physical hardware and virtual machines leading to reduced efficiencies or delays.

7. Key technologies and platforms for virtualization

1. hypervisor

- A hypervisor or virtual machine monitor (VMM) is software that creates and runs virtual machines.

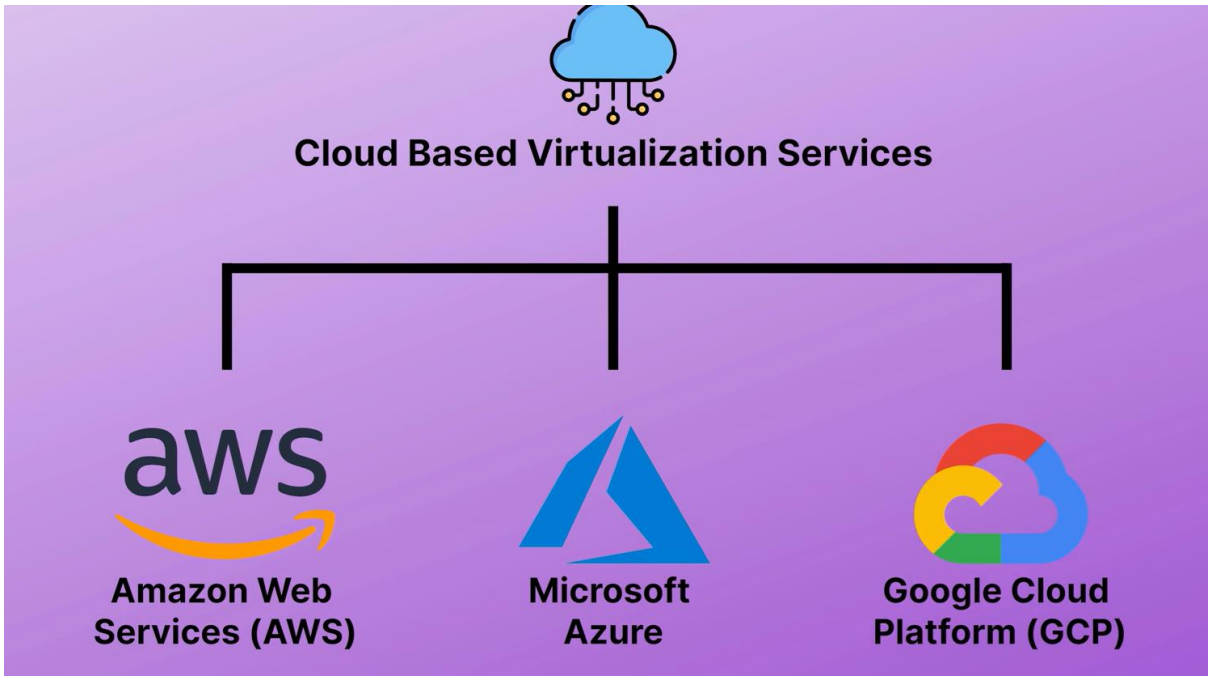


2. Virtualization platforms

- VMware, vSphere, Microsoft Hyper-V, Citrix Xenserver and KVM (Kernel-based Virtual Machine)

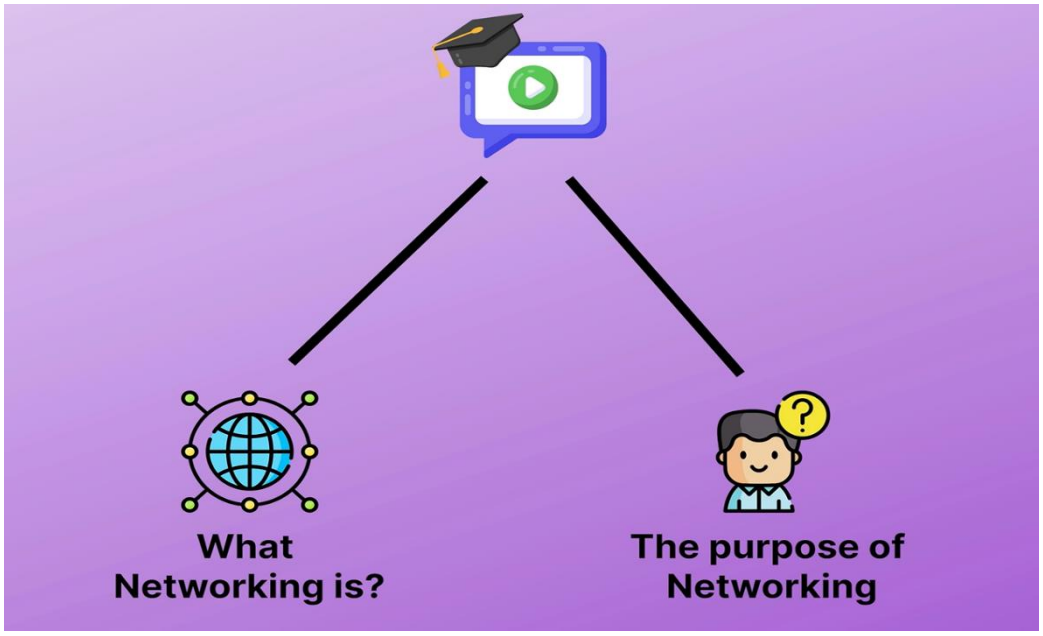
- These platforms offer tools for creating and managing virtual machines, storage and networks.

3. Cloud based virtualization services



- They offer serverless computing, virtual networks and scalable storage solutions.

제 10강. Networking



1. What is networking?

- Networking enables different devices to communicate with each other to exchange information and share hardware and software resources.

- The elements of networking are data transmission, resources sharing, communication channels and connectivity protocols.

- There are 3 main purposes in networks.

(1) Resource sharing

- Multiple devices can share the same physical resources such as printers, scanners and external devices within the same network.

- These resources can be accessed by any device without needing physical proximity.

- A single network provides the Internet access to multiple devices through Ethernet connection and wireless Wi-Fi. The network facilitates sharing files and software applications. A file stored in one computer can be revised and modified from other computers within the same network.

(2) Communication

- Networking enables multiple devices to communicate with each other similar to digital conversation.

- Information is divided into several data packets, each containing a portion of the overall message and the address of its destination.

- What are the types of communication?

1. Emails

2. Instant messaging

3. Video conferencing

- HTTP/HTTPS for web traffic, SMTP for email and FTP for file transfer govern how different types of communication occur over a network.

(3) Data Exchange and Collaboration

- Networks are essential for collaboration in both personal and professional environments.

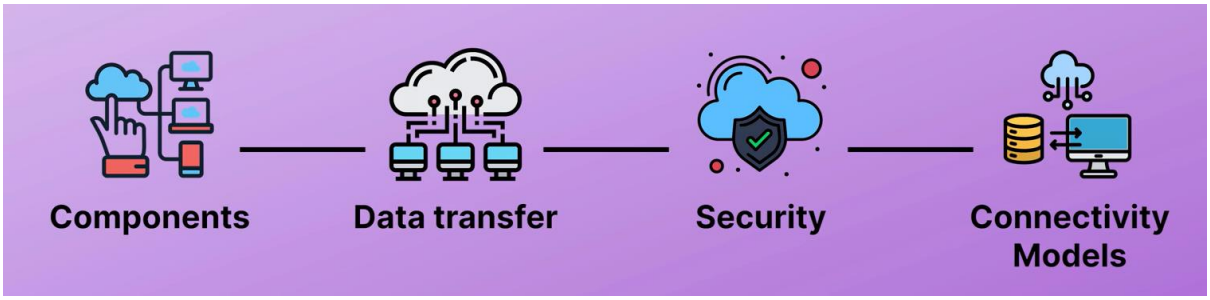
- Networks allow multiple users to share projects, documents and databases regardless of their physical locations.

- Cloud based applications, such as Google Workspace and Microsoft 365 enhance collaborative work through the Internet.

- Networks utilize various methods for data exchange, such as file transfers, streaming of multimedia content, remote desktop control and collaborative editing of documents.

- Secure data exchange can be achieved through encryption protocols and secure network configurations, which are vital for organizations where sensitive information is shared.

제 11강. Networking Components



- Networking involves linking cloud-based resources, such as servers, storage systems and applications over the Internet. This connectivity enables the delivery of data and files between different devices and allows for global scalability.

(1) What are key components of cloud network?

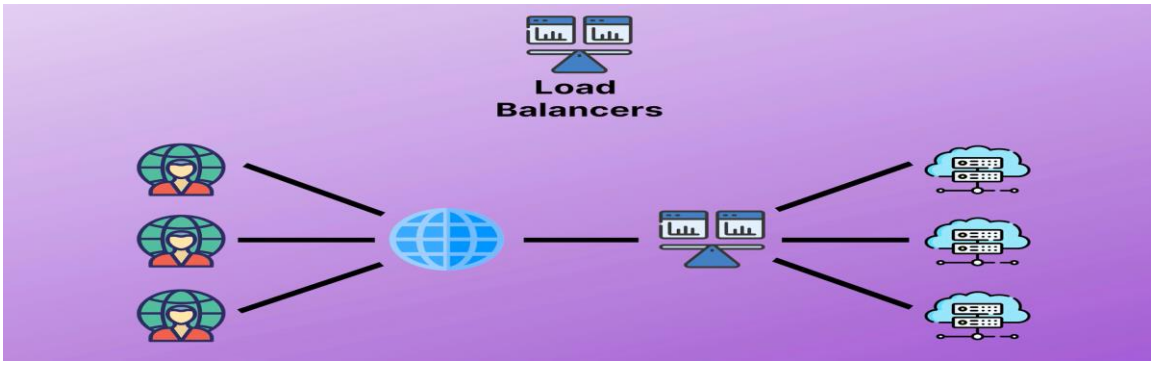
1. Virtual network

- Software defined networks that emulate physical network functionality, connecting virtual machines, containers and other cloud-based resources.

2. Routers and load balancers

- Cloud-based routers connect cloud services with the external Internet, determining the best pathways for data packets.

- Load balancers distribute user traffic across multiple cloud-based servers when directed to the Internet.



- This prevents any single server from being a bottleneck.

3. Internet gateway and VPNs

- An Internet gateway acts as a bridge, allowing external resources to access cloud-based services.

- Virtual Private Networks (VPNs) extends a private network across the public Internet and are commonly used for secure remote access to the cloud services.

(2) Data transfer in the cloud

1. packet-based communication

- A Data packet contains a segment of the entire information, containing its own source (origin) and destination address.

2. IP addresses

- Cloud-based services use both public IP addresses for external network communication and private networks for internal network communication.

- Data packets use IP addresses to reach their correct destination.

(3) Network protocols

1. TCP/IP protocols

- TCP and IP protocols are used to routing and managing data packets.

2. Amazon S3's RESTful API

- It handles the cloud-based storage specific operations.

- Developers use S3 API to interact with Amazon S3 cloud storage service to upload, download and list files into the storage.

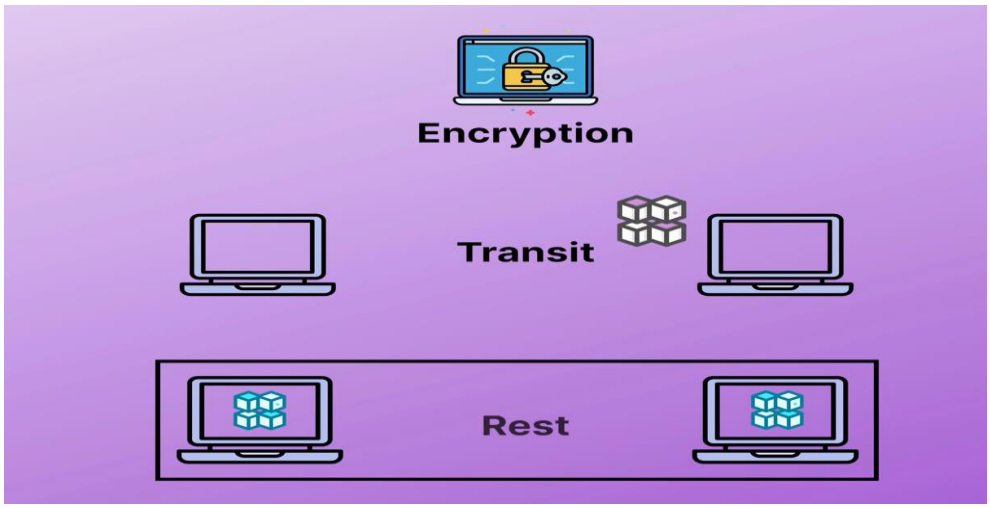
4. Cloud network security

- Firewalls

- Encryption

- Cloud firewalls control incoming and outcoming network traffic based on pre-determined security rules.

- Encryption means that data in transit and data at rest are encrypted for security.

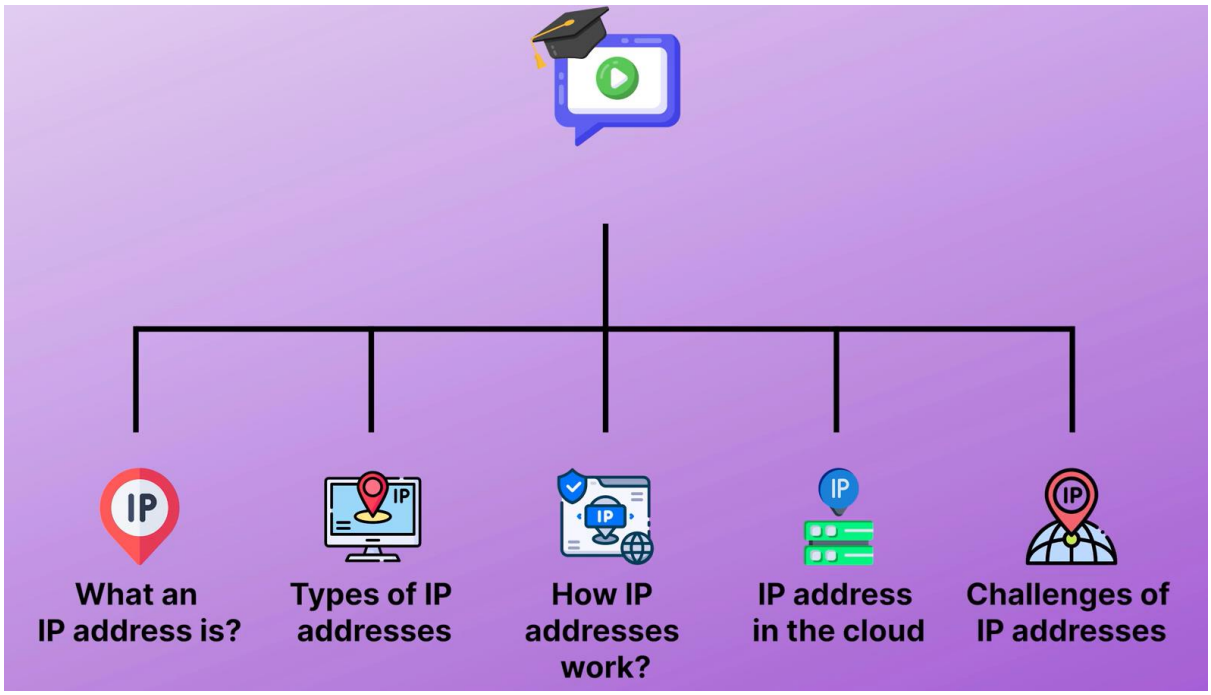


4. Connectivity models in cloud networking

- Direct connect is a dedicated network connection from companies' on-premises infrastructure to the cloud, offering more reliable and lower latency connection than the standard internet connectivity.

- Hybrid networking connects on-premises infrastructure with cloud-based services, crucial for flexibility of the cloud and control of on-premises resources.

제 12강. IP addresses



(1) What is an IP address

- An IP address is the Internet Protocol address assigned to each device connected to a computer network for communication.

- An IP address serves two main functions which are host/network interface identification and location addressing.

- An IP address uniquely identifies a device on a network, allowing data packets to be delivered to the correct destination over the Internet.

(2) Why are IP addresses important in Networking?

- They are fundamental to the operation of the Internet and IP-based networks, facilitating the connection and communication between different devices.

- IP addresses are crucial for routing and delivery, ensuring that data packets are sent to the correct destination across the most appropriate pathways.

(3) Types of IP addresses

- There are IPv4 and IPv6. IPv4 has a 32-bit address space, providing 4.3 billion unique addresses, whereas IPv6 has a 128-bit address space, providing 340 undecillion unique addresses, which are notated in Hexadecimal.

- IPv6 addresses the limitations of IPv4 and provides enhanced features like improved routing and security.

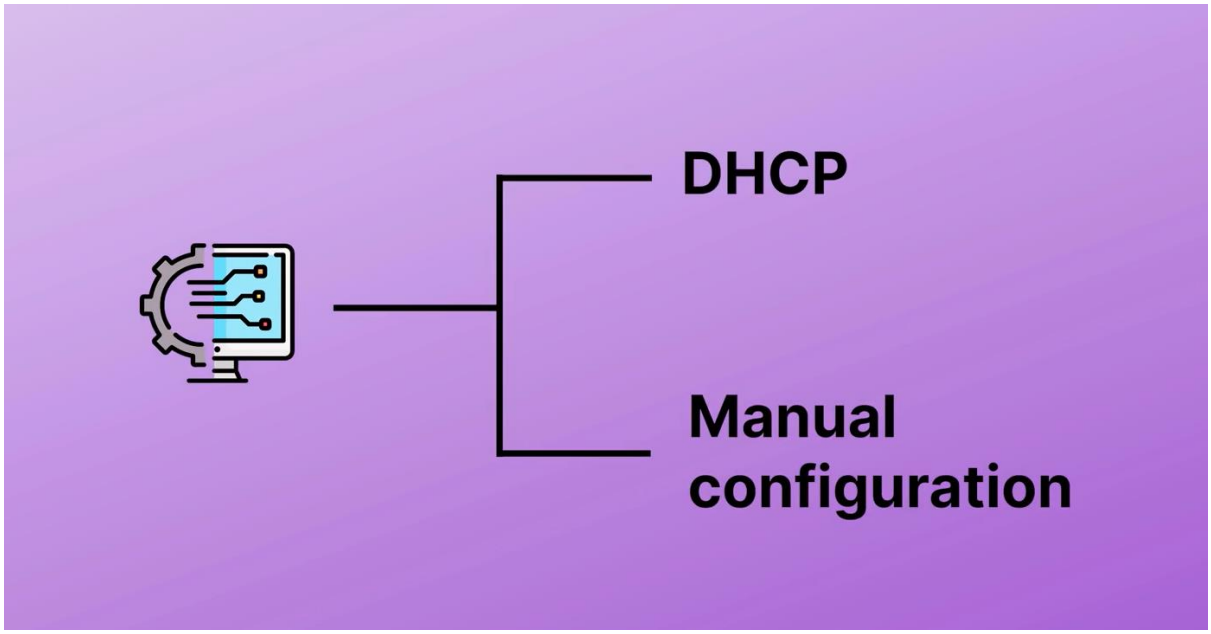
- There are static and dynamic IP addresses.

- Static IP addresses are permanently assigned to a device, providing a constant address for hosting servers, email systems and managing remote access. They are crucial for devices that require consistent and predictable external communication.

- Dynamic IP addresses are temporarily assigned to a device from a pool of available addresses by a DHCP server, without the need of manual configuration, and they help manage the limited address space.

(4) IP address configuration and management

1. assignment and configuration



- Devices can obtain IP addresses automatically from a DHCP server, simplifying network management and connectivity.

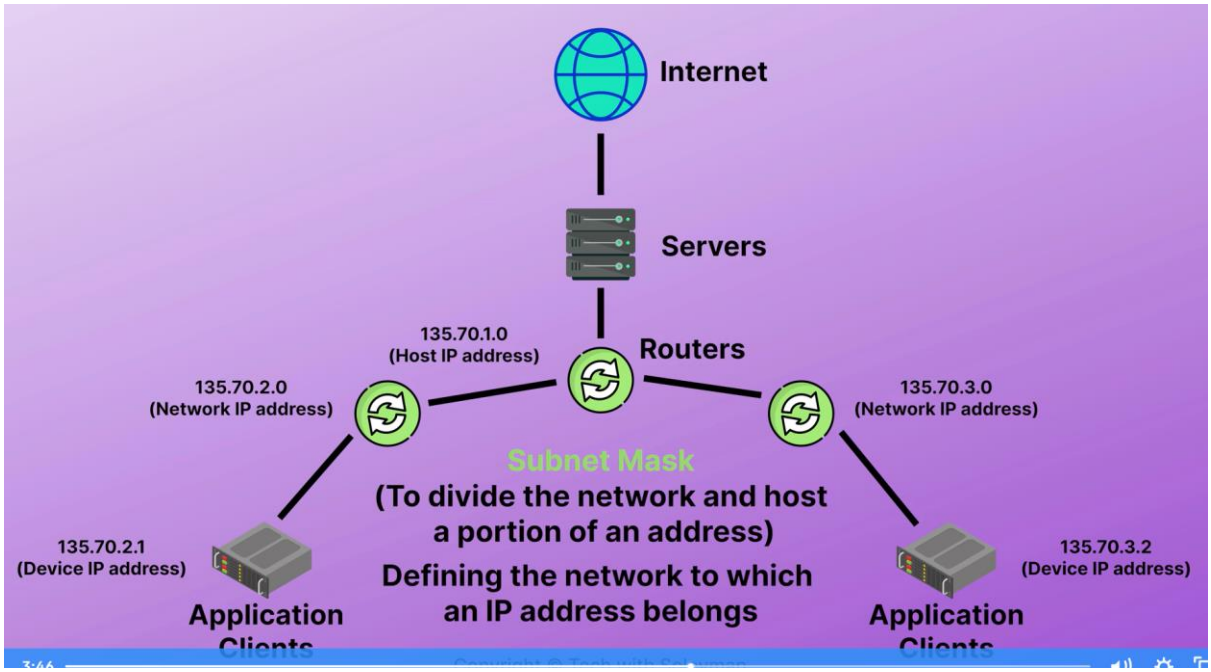
- Static IP addresses require manual assignment and configuration, often used in server setups or when specific network behavior is needed.

2. Subnetting and network segmentation

- The purpose of subnetting is to divide a larger network into smaller, manageable segments or subnetworks, improving performance, simplifying management and enhancing security.

3. Subnet mask

- A subnet mask divides an IP address into two parts which are the network portion and the host portion of an address and defines the network to which an IP address belongs.



(5) What is the role of IP addresses in the cloud

- In the cloud, IP addresses connect virtual resources to virtual machines, cloud databases and applications. It facilitates communication within and across cloud networks.

- Cloud services provide assign public IP for Internet-facing services and private IP for internal communication within the cloud.

(6) Management of IP Addresses in the Cloud

- AWS provides elastic or floating IP addresses, which are static IP addresses designed for dynamic cloud environments, which can be assigned to different resources, providing flexibility and resilience.

(7) Challenges and future of IP addressing

- We need to address the exhaustion of IPv4 by using Network Address Translation (NAT) and adopting IPv6, which is critical for the future scalability of the Internet and cloud services.

- Security and privacy concerns:

1) IP Spoofing is the act of disguising unknow sources as being known, trusted sources

2) Privacy considerations

- IP addresses can be used to identify user behavior and track users' locations, requiring careful considerations of privacy implications in network design.

제 13강. DNS

- We are going to learn about the role and crucial functions of Domain Name System (DNS).

(1) What is DNS?

- DNS is a kind of phone book on the Internet.

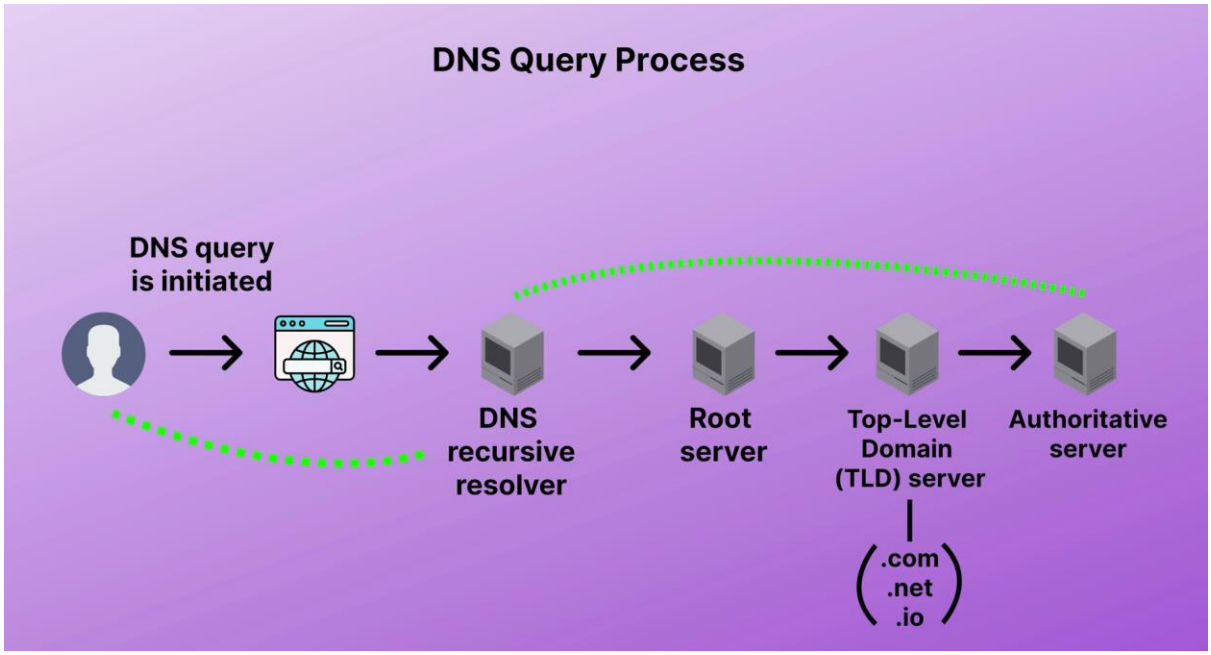
- DNS translate human readable domain name such as www.google.com into numerical IP addresses that computers use to locate with each other on the network.

(2) What is the importance of DNS in Networking?

- DNS allows users to access websites using simple domain names instead of complicated numerical IP addresses.

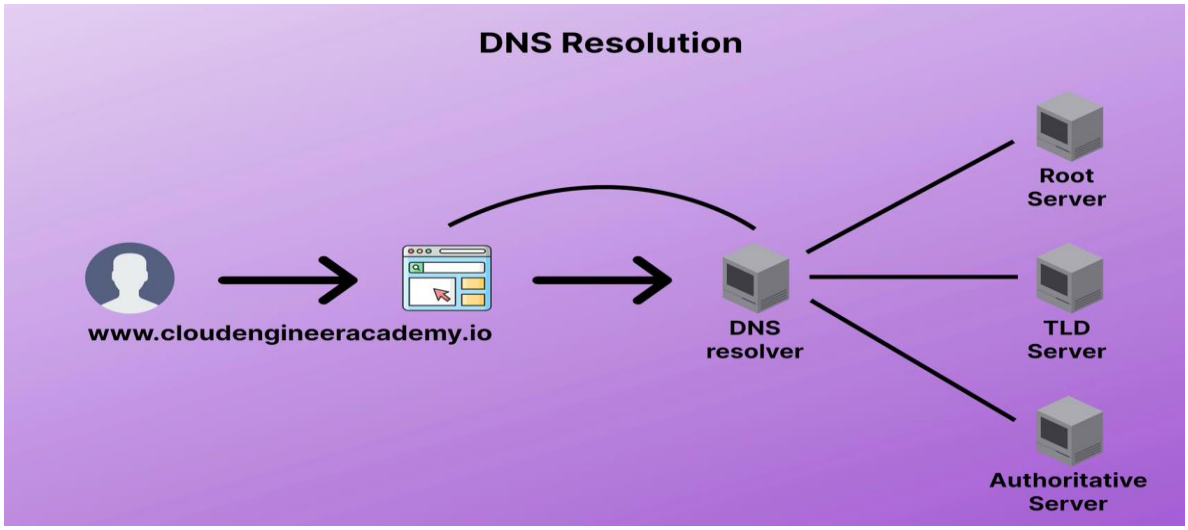
(3) How does the DNS work?

- When users enter a specific domain name in a web browser, a DNS query is initiated. This query is sent to the DNS recursive resolver, which then forwards it to the root server, the Top-Level Domain (TLD) server (such as .com, .net, .io) and finally to the Authoritative server. The Authoritative server sends back the numerical IP address associated with the domain name to the DNS recursive resolver, which then sends the IP address to the users' device.



(4) DNS resolution

- When users enter the domain name, www.cloudengineeracademy.io into a browser and the browser send a query to the DNS resolver. The DNS resolver forwards the query to Root server, which then direct it to the TLD server and finally to the Authoritative server to retrieve the full numerical IP address and send it back to the browser for users to access the website.



(5) DNS in the Cloud

- In the cloud, virtual machines and storage services are often scaled and relocated, resulting in changes to their IP addresses. DNS helps manage these changes seamlessly for end users.

- DNS is used for load balancing and failover mechanisms, redirecting users to the nearest optimal servers.

- The cloud providers provide Route 53 as a DNS service, which can be integrated with other services to enhance performance and reliability while supporting cloud architectures and services.

제 14강. Operating systems

- We are going to learn about fundamental operating system and cloud operating system characteristics.

(1) What is an operating system?

- An Operating system is the foundational software layer managing physical hardware resources and virtualized hardware resources by orchestrating CPU, Memory, Storage and Networking. This helps various cloud applications function effectively and efficiently.

- An Operating system manages the underlying hardware resources such as CPU, Memory, Storage and Networking to support the operations of high-level software applications. It acts as a platform that supports these software applications by offering data storage, networking and security.

(2) Cloud specific operating system characteristics?

1. Virtualization support

- The modern cloud operating system manages virtual machines, optimizing the overall performance by enhancing virtualization capabilities.

2. Scalability and elasticity

- The operating system allocates resources (such as CPU, Memory and Storage) based on demand, scaling up and down for optimal performance and resource utilization in the cloud.

3. Security and Isolation

- The operating system isolates cloud resources and applications from each other to ensure consistent performance without interference.

4. User Interface

- Users interact with cloud resources through web interfaces or APIs, rather than directly with the physical operating system as in traditional computing.

Cloud infrastructure – CPU, Memory, Storage, Virtualization an Security.

Cloud architecture – microservices and containerization (Kubernetes, Docker)

제 15강. Cloud operating systems and features –

- Most popular cloud operating systems are windows server and Linux distributions.

- Windows server is known as user-friendly interface, broad application compatibility and robust support structures, integrated effortlessly with Microsoft Azure, enhancing identity management and data protection. This is appropriate for hybrid cloud architectures and support companies to transit their on-premise infrastructure to Microsoft Azure.

- Linux distributions, such as Ubuntu, CentOS and Red hat, offering user friendliness, stability and

commercial support.

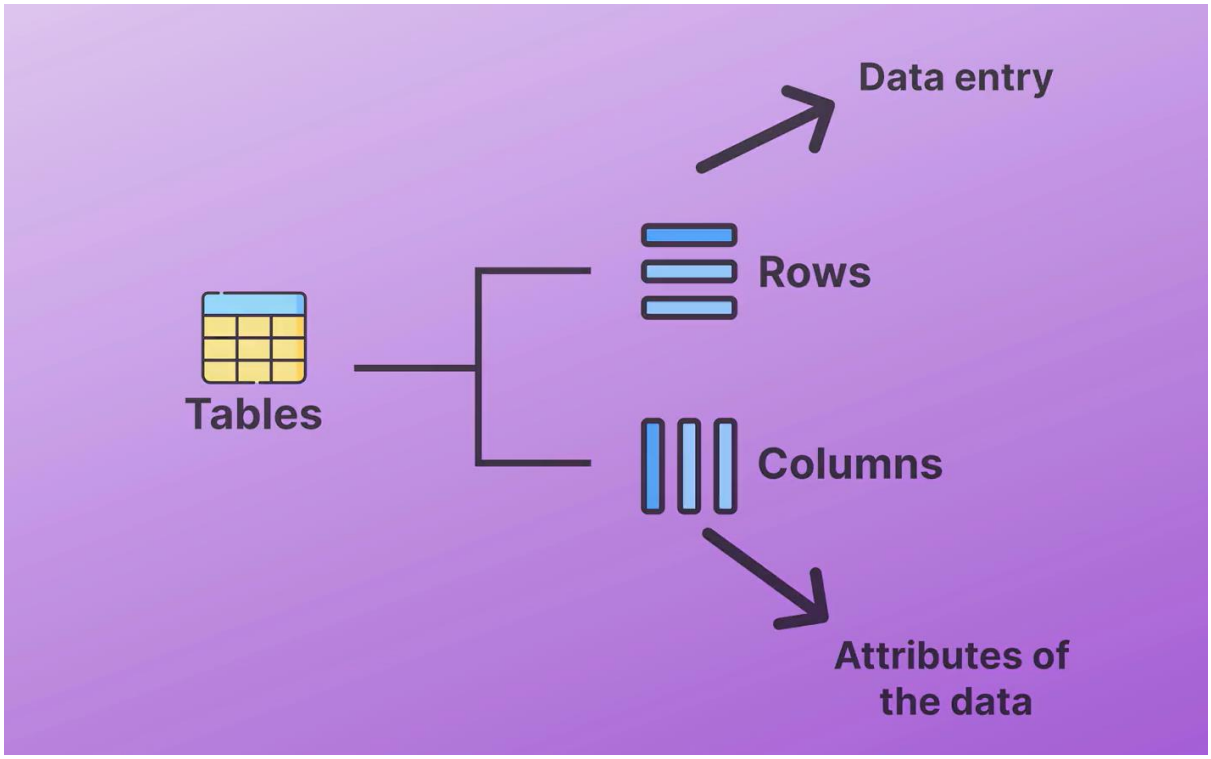
- All three are open-source, allowing for community-driven development, which provides customization, flexibility, cost-effective due to the absence of licensing fees.

- They include robust security measures like SELinux and AppArmor.

제 16강. Databases

(1) What is a database?

- A database is the structured collection of data, electronically stored in a computer, designed to facilitate access, manipulation, updating and retrieval of the data.



- There are many types of databases such as relational and non-relational databases (NoSQL).

- Data stored in Relational databases is structured into tables (referred to as relations), designed to efficiently identify and access data.

- Non-relational databases are more flexible, storing data not in tables but in formats like document-oriented collections, key value pairs, graph databases and wide column stores.

- Databases ensure data integrity and consistency, crucial for maintaining the accuracy and reliability of information in various applications.

- Software applications interact with databases through Application Programming Interfaces (APIs) and database drivers which are software that enables software applications to interact with the database, sending queries and receiving responses.

- Connection strings, such as database type, credentials, server name, specific database to access, are used to define these parameters needed to interact with databases.

- Most software applications perform CRUD (Create, Read, Update and Delete) to manage data.

- SQL (Structured Query Language) executes commands like Select, Insert, Update and Delete.