



BATCH :  
LESSON :  
DATE :  
SUBJECT :

**B107 AWS DevOps**  
**Network**  
**20.12.2022**  
**Introduction**

ZOOM GİRİŞLERİNİZİ LÜTFEN **LMS** SİSTEMİ ÜZERİNDEN YAPINIZ





# NETWORK Day 1

- Bugünkü dersin pre-class materyalini incelediniz mi?

## Contents

- What is a Computer Network
- Uses of Network
- Features of Network
- History of Internet
- Types of Network
- Important Terms

## İçerik

- Bilgisayar Ağı Nedir?
- Ağların kullanımı
- Ağlarla ilgili önemli hususlar
- İnternetin Tarihi
- Ağların Çeşitleri
- Önemli Terimler





# What is a Network?



A computer network is a group of computers that transmit, exchange or share data or resources. Computers or network devices use common communication protocols/rules.

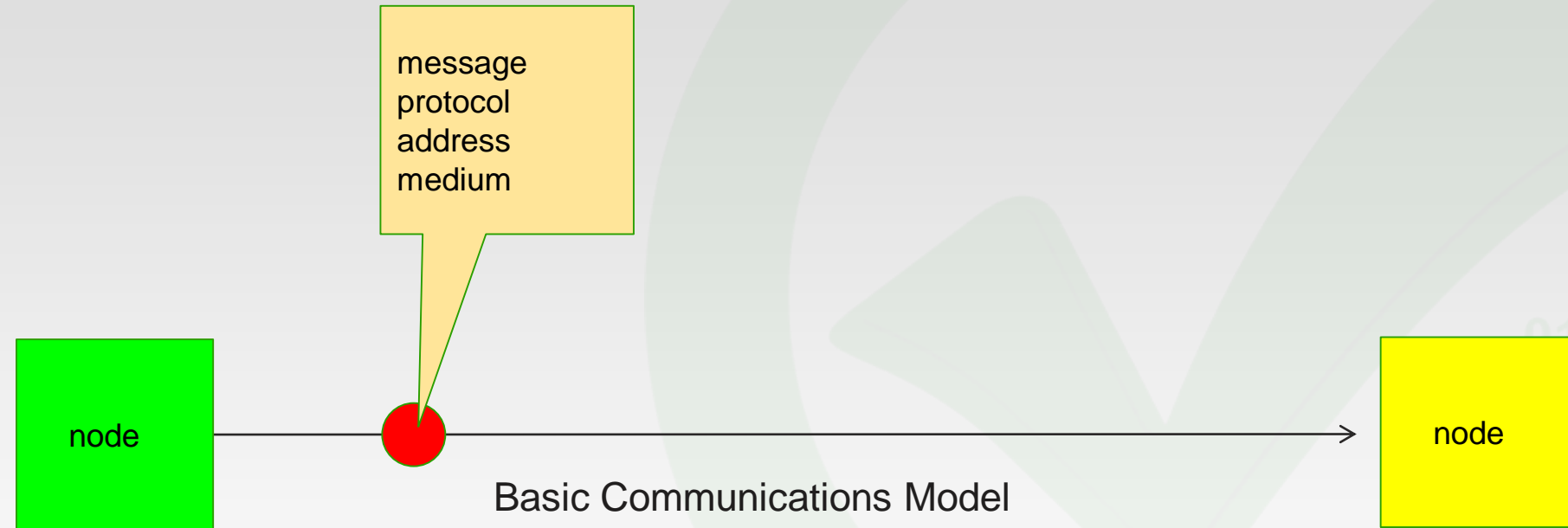
Network of networks is the Internet.



# What is a Network?

## Network Elements

- Nodes
- Protocol
- Medium
- Network Software



## How does a Network operate?

In a computer network, data (voice, video, text) is packed according to a set of rules named as protocol. Then these packets of data are converted to signals. These signals are sent to the other node by means of a medium such as a copper wire, a fiber optical cable or radio waves. The message goes to the address of the other node. Address can be a MAC address or IP address.



# What are Networks used for ?



Sharing programs and files



Sharing network resources - (printer -- fax etc.)



Establishing working groups



Central administration (Active Directory)



Cost reduction (Common disk space, Internet)



Communication and E-mail



Accessing resources / information from very remote locations







# Features of Computer Networks



## 3 Main Criteria for a Network

- Performance

Transit time

Response time

- Reliability

Failures

- Security



# Features of Computer Networks



Performance

Data Sharing

Backup

Security

Reliability

Scalability

Software & Hardware Sharing





# What is ARPANET?

The Advanced Research Projects Agency Network (ARPANET) was the first wide-area packet-switching network with distributed control and one of the first networks to implement the TCP/IP protocol suite. Both technologies became the technical foundation of the Internet. The ARPANET was established by the Advanced Research Projects Agency (ARPA) of the United States Department of Defense.





# Brief History of The Internet

- ☐ 1969 ARPANET LO-GIN
- ☐ 1972 E-mail
- ☐ 1981 IBM PC
- ☐ 1982-83 TCP/IP
- ☐ 1985 Internetwork - Internet
- ☐ 1990 WWW
- ☐ 1993 ODTU, 50 web sites
- ☐ 1994 web 1.0- static web sites- terravision
- ☐ 1996 hotmail
- ☐ 1998 google, napster, torrent

•1999 crypto mining, ekşisözlük

•2000 yemeksepeti

•2001 gittigidiyor, 350 m web sites

•2004 facebook, web 2.0, mobile devices, dynamic web pages, forums, blogs etc.

•Web 3.0 IA, Machine Learning. Still in progresss

Who manages the Internet?

IANA.org

ICANN

RFCs



# Types of Networks

## Geographical

- NANO
- BAN
- PAN
- LAN
- CAN
- MAN
- WAN

## Network Architecture

- Client – Server
- P2P

## Topological

- Ring
- Star
- Mesh
- Bus
- Line

## Transferring Mediums

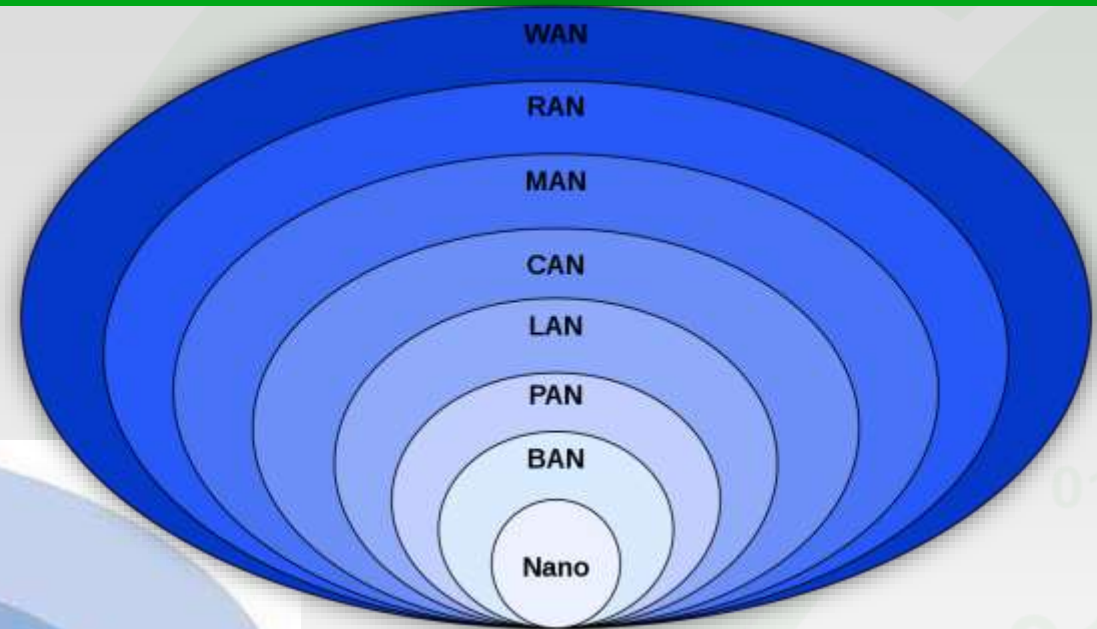
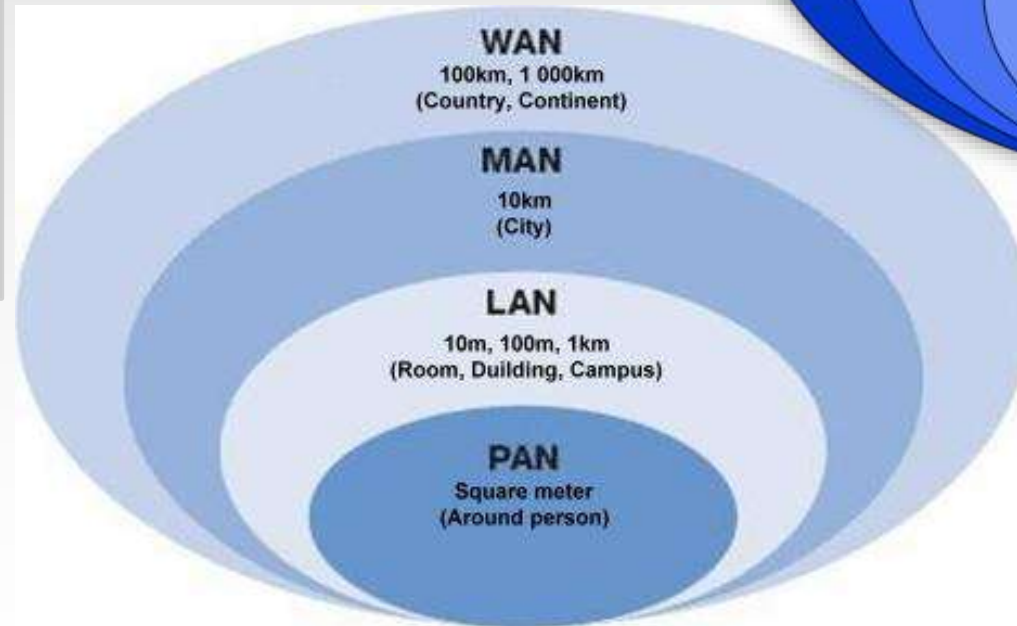
- Cable
- Wireless
  - RF
  - Laser
  - Microwaves



# Geographical

## Geographical

- NANO
- BAN
- PAN
- LAN
- CAN
- MAN
- WAN





# Geographical

## Geographical

- NANO
- BAN
- PAN
- LAN
- CAN
- MAN
- WAN

**TABLE II**  
**COMPARISON BETWEEN LAN, MAN AND WAN**

Network	Coverage area	Bandwidth	Links	Cost	Specialities
LAN	Typically, 1km; over a building, an institution, etc	Low	Ethernet cable	Low	<ul style="list-style-type: none"><li>• Fully-private network</li><li>• Shared media network</li><li>• Can support 100% resource sharing</li></ul>
MAN	Typically, 100km; over a city, zonal district, etc	Medium	Coaxial cable, microwave link	Medium	<ul style="list-style-type: none"><li>• Zonal public network</li><li>• Switched network</li></ul>
WAN	Typically, over 100km to 10,000km; over a country or province	Highest	Satellite links, telephonic links	Most expensive	<ul style="list-style-type: none"><li>• National public network</li><li>• Switched network</li></ul>
Internet	Beyond 10,000km; over multiple countries, intercontinental (planets)	Highest	Logical connectivity using physical networks	Not so expensive	<ul style="list-style-type: none"><li>• Logical connection across the globe</li></ul>





# Network Architecture

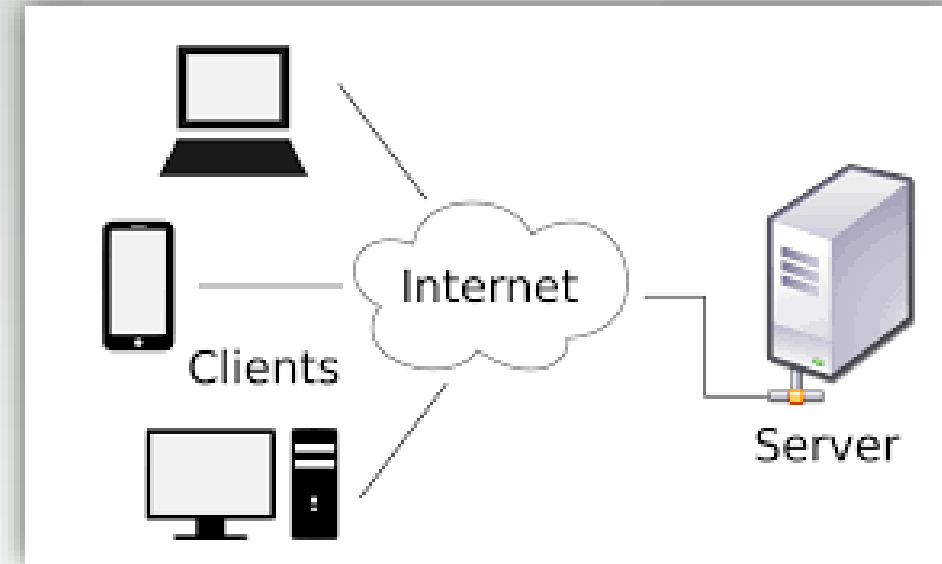
## Network Architecture

- Client –Server
- P2P

### Client-Server

- Resources are on a dedicated node(a server)
- Security and managment is easy
- Easy backup

- Network fails if server fails
- Expensive hardware for server
- Network traffic may get heavily loaded



### Client-Server

Examples are the WWW, Facebook, Twitter, Google search, a bank's website etc.



# Network Architecture

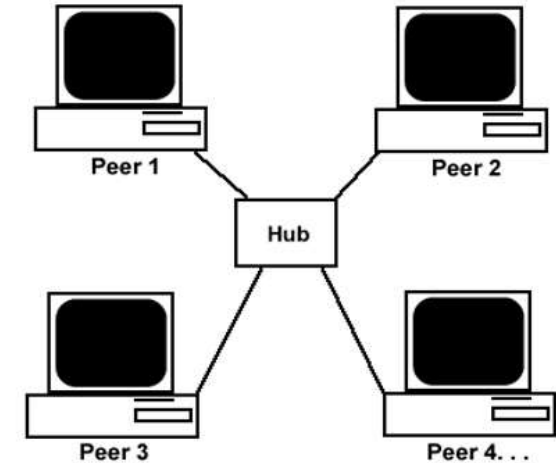
## Network Architecture

- Client –Server
- P2P

### P2P (Peer to Peer/ Point to Point)

- All nodes are equal
- Easy to set-up
- No administrator required
- Less expensive hardware

- Less secure
- Difficult to backup data



## P2P Network

### P2P

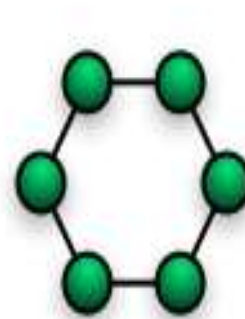
Examples are torrent networks used for file sharing such as BitTorrent.



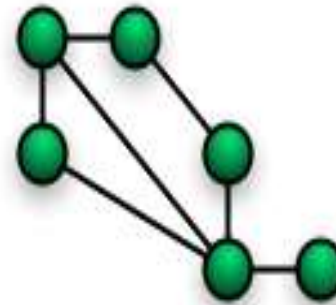
# Topological

## Topological

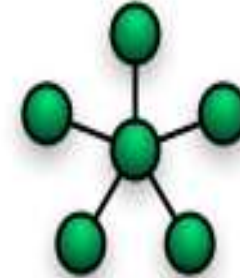
- Ring
- Star
- Mesh
- Bus (Line)
- Tree



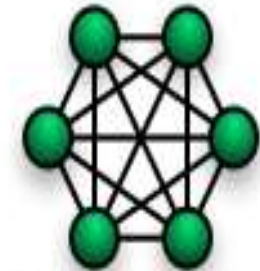
Ring



Mesh



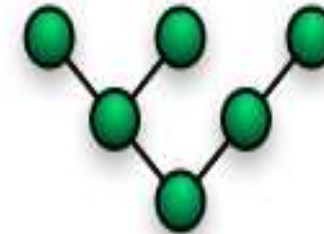
Star



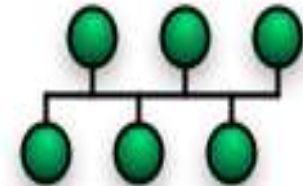
Fully Connected



Line



Tree



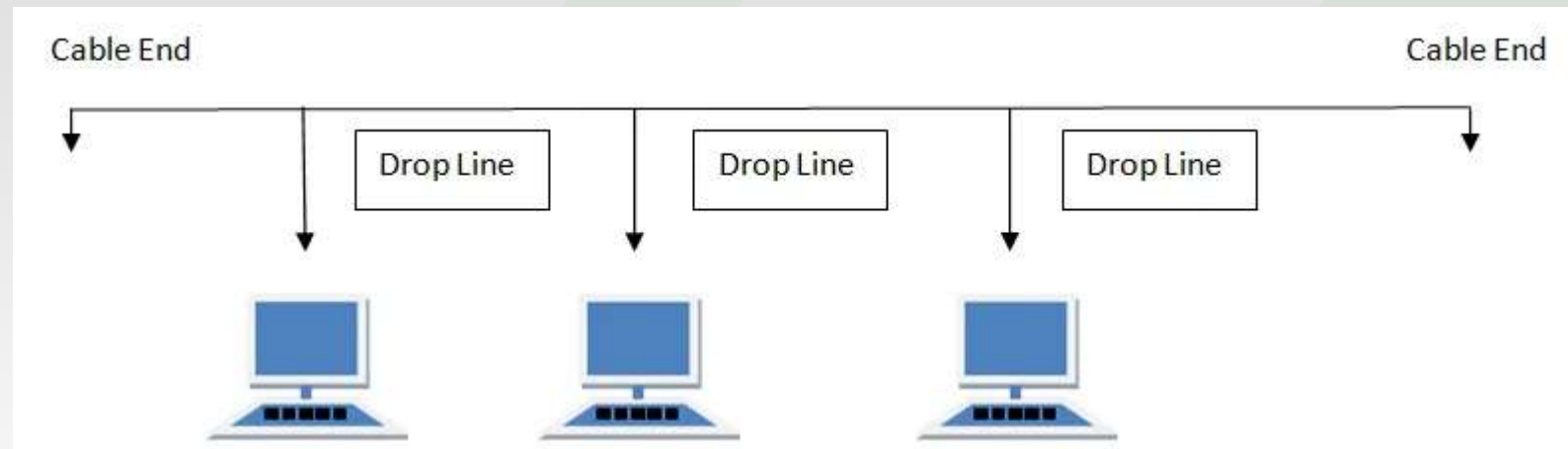
Bus



# Bus - Line

## Bus

- ✓ Minimal cost to install
- ❖ If the backbone fails whole network fails
- ❖ Security is low
- ❖ Low performance in heavy traffic
- ❖ Used in schools, laboratories, offices, not very common now

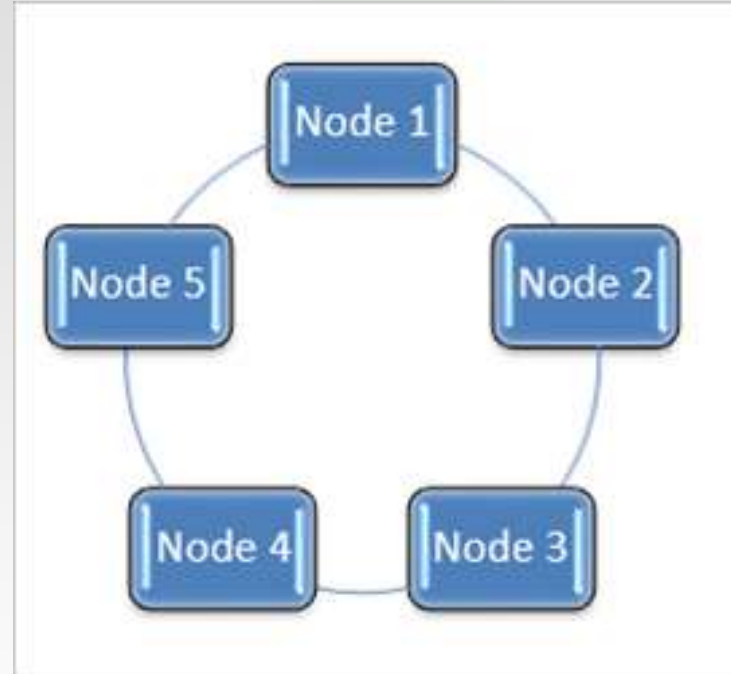




# Ring

## Ring

- ✓ Equal access to the resources
- ✓ No need server control
- ✓ Low risk of collision
- ❖ If one node down whole network down
- ❖ Used in offices, schools, not common now



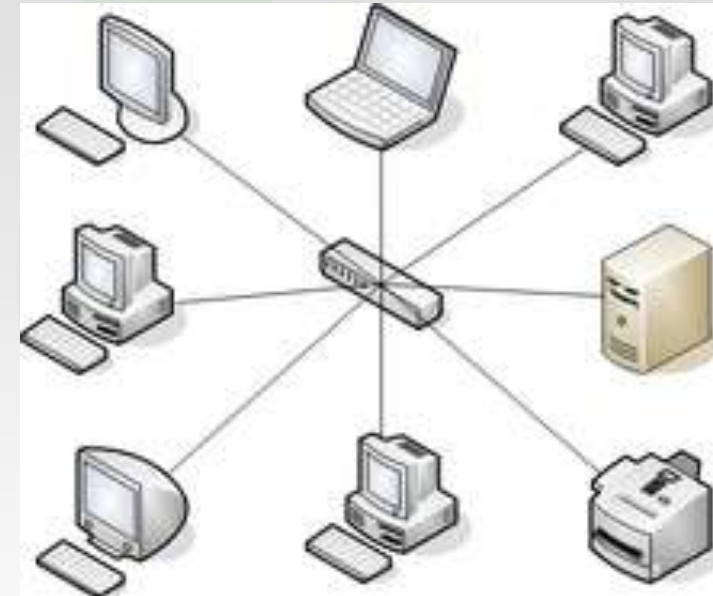




# Star

## Star

- ✓ Easy to connect new nodes or devices
- ✓ Centralized management
- ✓ Failure of one node or link doesn't affect the rest of **network**.
- ❖ If one node or connection breaks, the rest of the **network** remains unaffected
- ❖ The most used topology in offices, homes etc

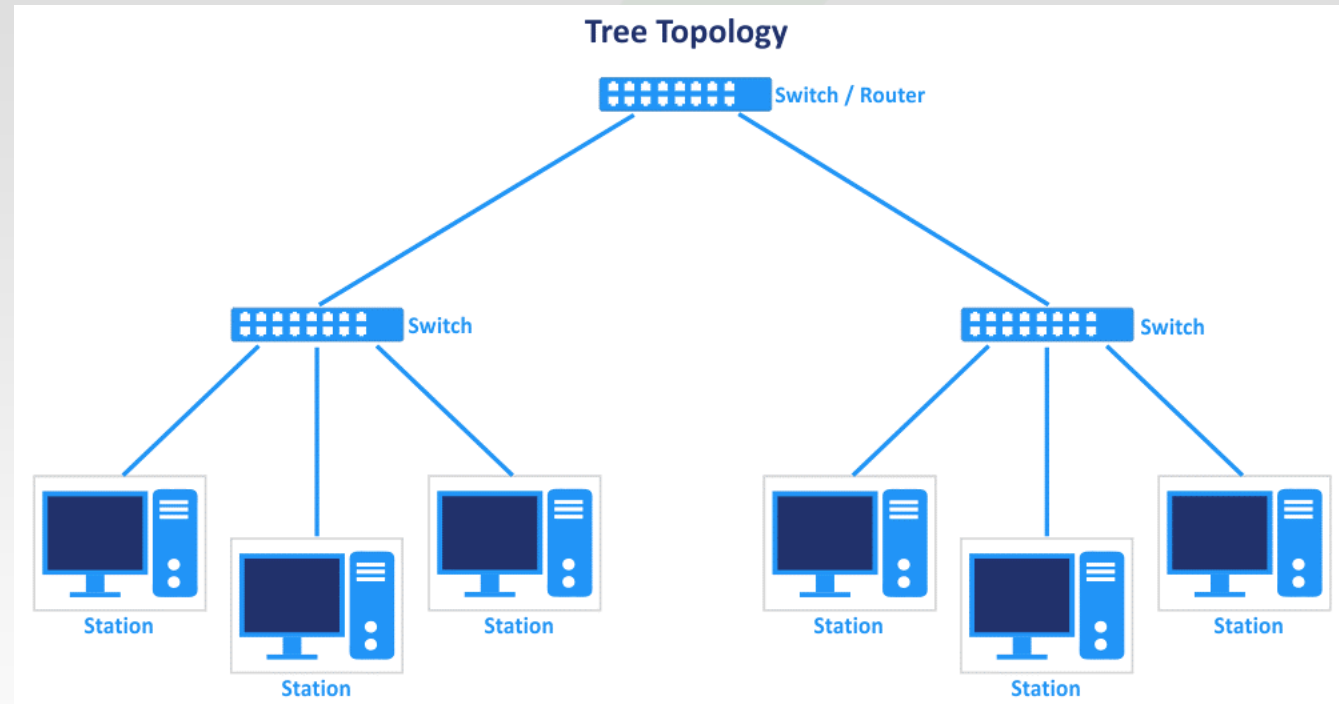




# Tree

## Tree

- ✓ Easy to expand
- ❖ Difficulty in error detection
- ❖ Failing in one node affects the big proportion of the network
- ❖ Used in hospitals, campuses

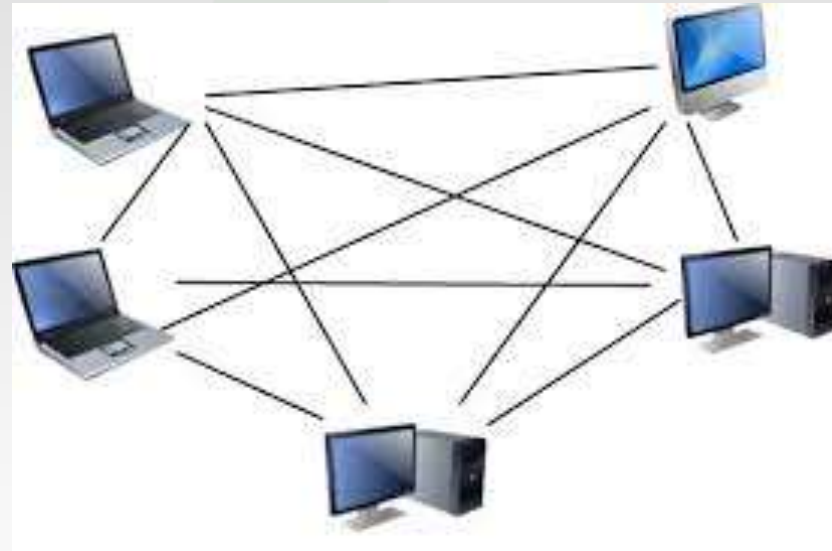




# Mesh

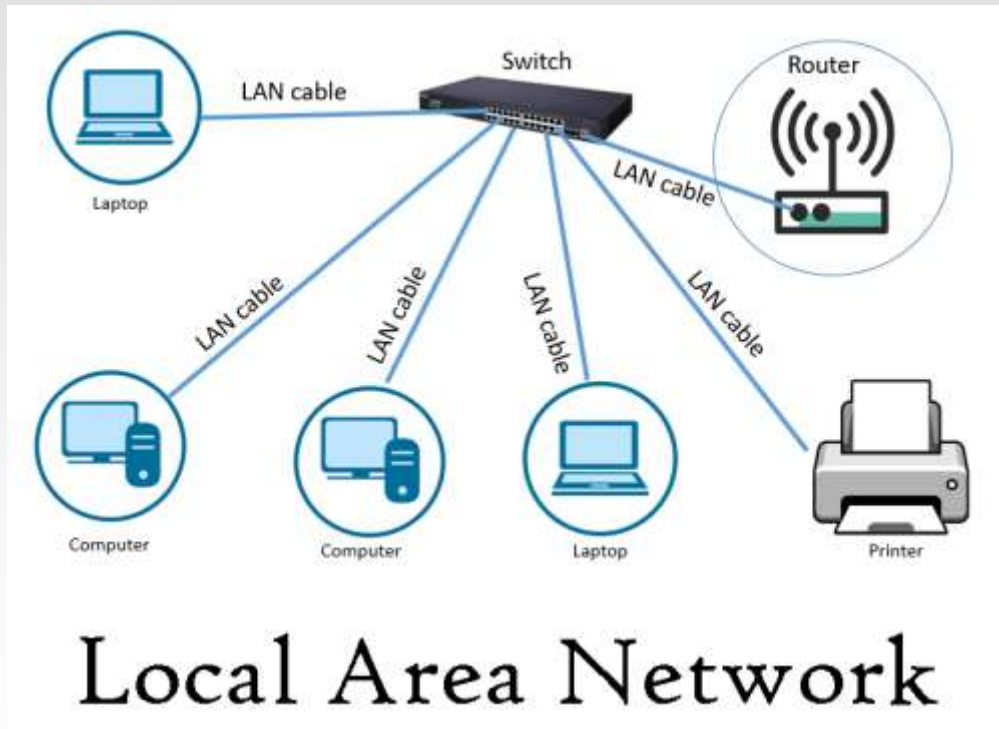
## Mesh

- ✓ Up time is high, reliable
- ❖ High cost in installation
- ❖ Configuration is difficult
- ❖ Increased Power Consumption for Each Node
- ❖ One of the most used, in military, traffic lights and city services, The Internet is a mesh network





# LOCAL AREA NETWORK (LAN)



A **Local Area Network (LAN)** is a group of computer and devices which are connected.

- It is a private network, so an outside regulatory body never controls it.
- LAN operates at a relatively higher speed compared to other WAN systems.
- There are various kinds of media access control methods like token ring and ethernet.



# WIRELESS LAN

Major Topologies for LAN

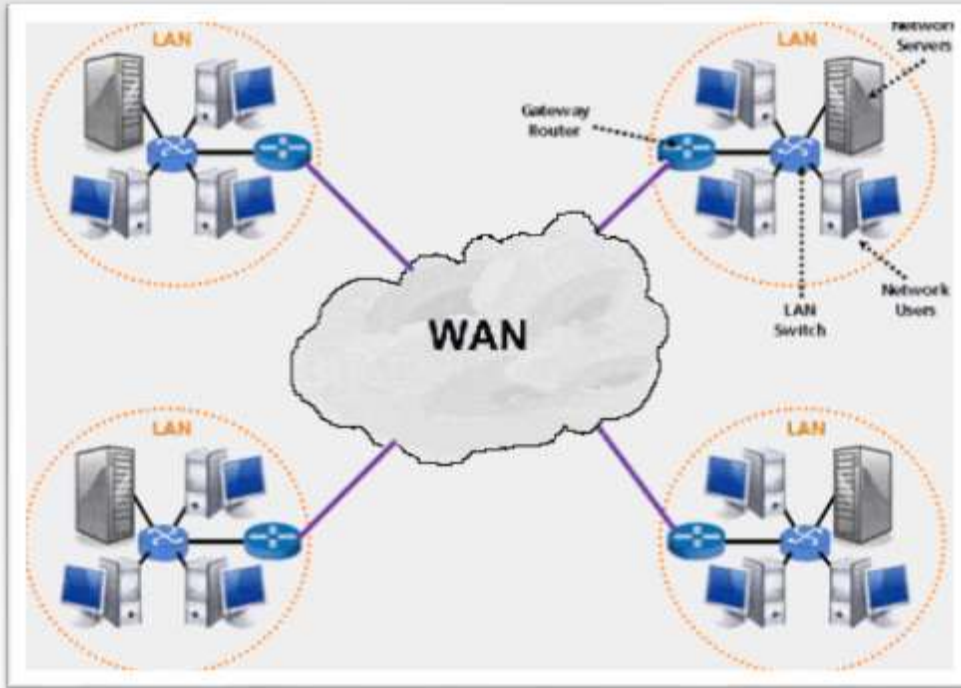
- Bus Topology
- Ring Topology
- Star Topology
- Mesh Topology







# WIDE AREA NETWORK (WAN)



A wide area network (WAN) is a telecommunications network that extends over a large geographic area for the primary purpose of computer networking.

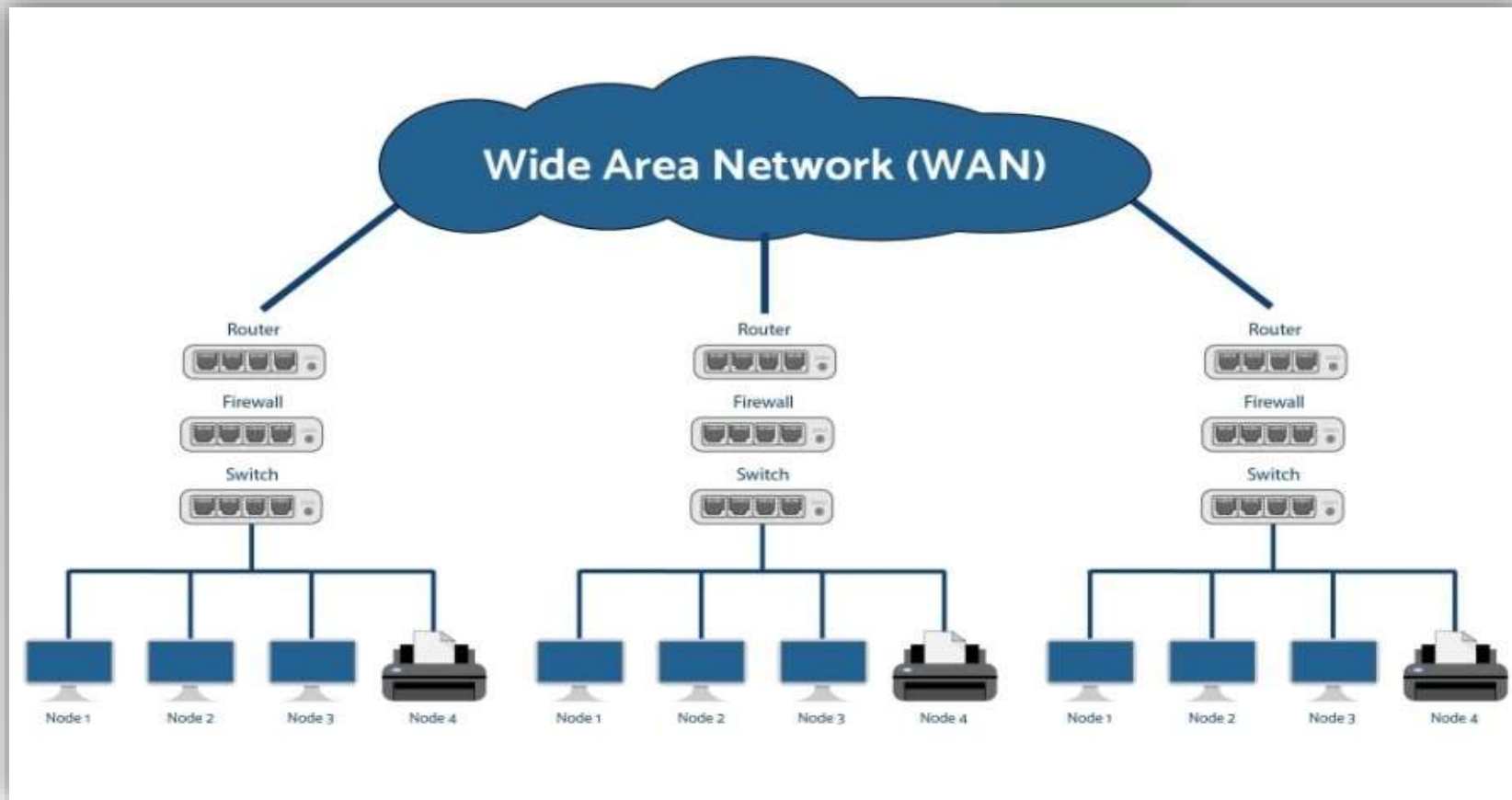
- Wide area networks are often established with leased telecommunication circuits.
- The Internet may be considered a WAN.



# WIDE AREA NETWORK (WAN)

Major Topologies for WAN

- Mesh Topology
- P2P
- All types can be seen





# Types of Networks

## Transferring Mediums

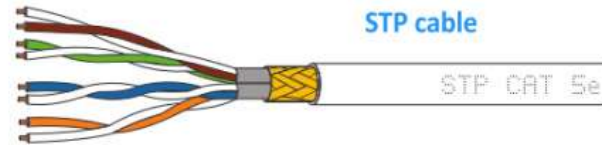
- Cable
  - RF
  - Laser/Infrared
  - Microwaves
- Wireless



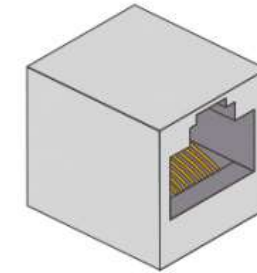
UTP cable



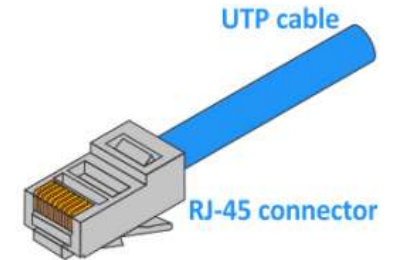
FTP cable



STP cable



RJ-45 port



UTP cable

RJ-45 connector



Coaxial cable  
RG-58

## Optical fiber cable



Multi mode fiber



Single mode fiber





# Types of Networks

## Transferring Mediums

- Cable
- Wireless
  - RF
  - Laser/Infrared
  - Microwaves

### Wireless Media Standards and Types





# Some Terms and Definitions

## node

A connection point or end point for the transmission of the data

## Hub, switch

These two nodes connect computers or other network devices. Hub broadcasts data to every computer, switch broadcasts to specific ones. Switch is smart.

## NOS

Network Operating System

## workstation

A special **computer** designed for technical or scientific applications. Intended primarily to be used by **one person at a time**, they are commonly connected to a **local area network**.

## MAC address

Identification number of a device on the network

## server

A **server** is a **computer** or system that provides resources, data, services, or programs to other computers

## client

Any device that makes request to servers

## multimode fiber

fast but short distance fiber cable

## segment

Dividing network devices into groups

## Packet-switching

Sending data as chunks, data broken into packets for a faster and secure communication.

## IP address

A unique number that defines a computer on the network

## Firewall

Network security device that controls incoming and outgoing network traffic

## Router

A router connects 2 or more networks. It controls network traffic by forwarding data packets to the correct address.

## proxy

Acts like gateway between user and Internet  
Caching  
Administrative control  
Security

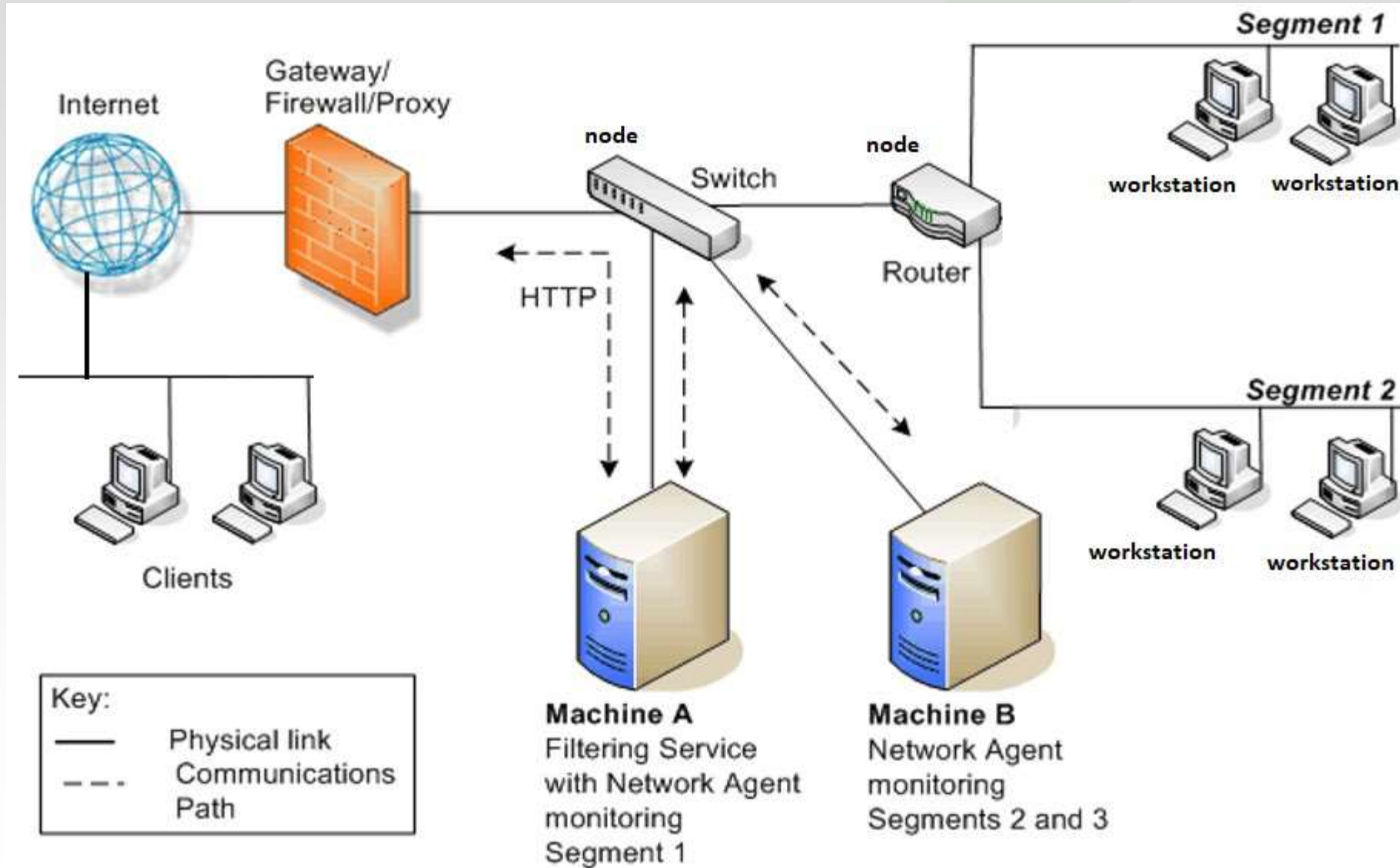
## gateway

A node between 2 networks, makes them understand each other





# Diagram





# Review

## İçerik

- Bilgisayar Ağı Nedir?
- Nasıl çalışır?
- Ağların kullanımı
- Ağlarla ilgili önemli hususlar
- İnternetin Tarihi
- Ağların Çeşitleri
- Önemli Terimler

**Gelecek ders öncesi ders materyallerini  
incelemeyi**

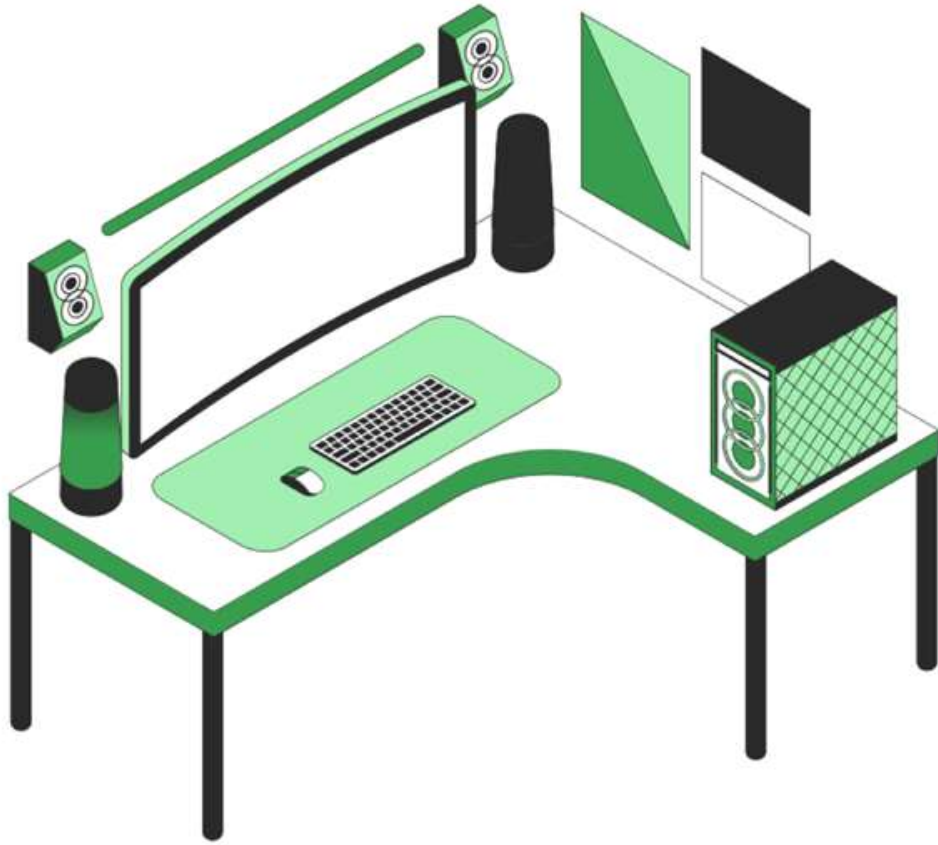
**Geçmiş dersin tekrarını yapmayı**

**Unutmayalım**



# Practice With Cisco Packet Tracer





Do you  
have any  
questions?

Send it to us! We hope you learned something new.