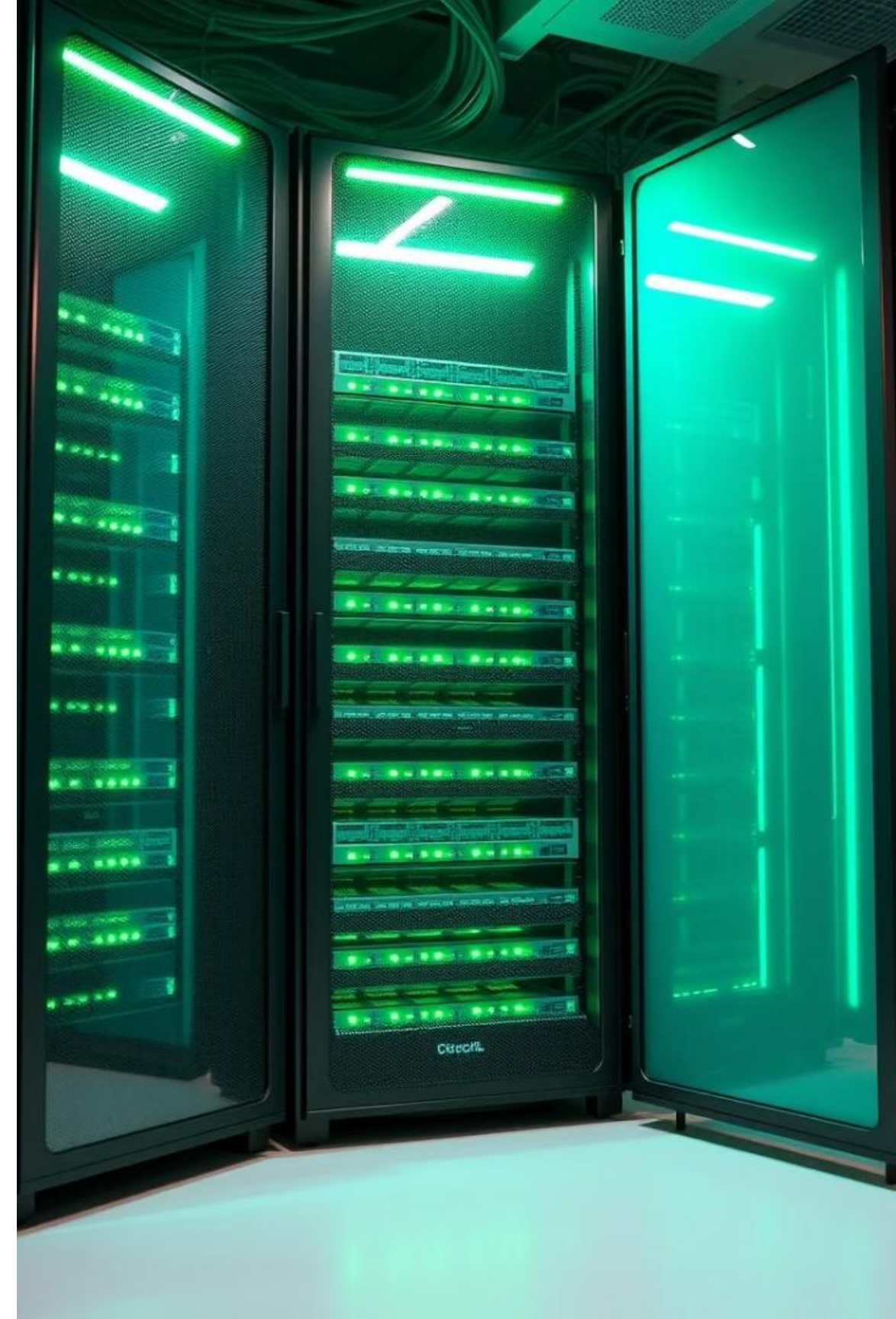# *What Are Computer Networks?*

A computer network is a collection of interconnected devices that can communicate with each other. It allows sharing data and resources, such as printers and files.

by JOHN RIB A.CANANGA

Types of Computer Networks

1 **Local Area Network (LAN)**

A LAN connects devices within a limited geographical area, such as a home or office.

2 **Wide Area Network (WAN)**

A WAN connects devices across a wider geographical area, such as a country or even the globe.

3 **Metropolitan Area Network (MAN)**

A MAN connects devices within a metropolitan area, typically using fiber optic cables for high-speed data transfer.

4 **Personal Area Network (PAN)**

A PAN connects devices within a small personal space, often using Bluetooth or Wi-Fi for wireless communication.
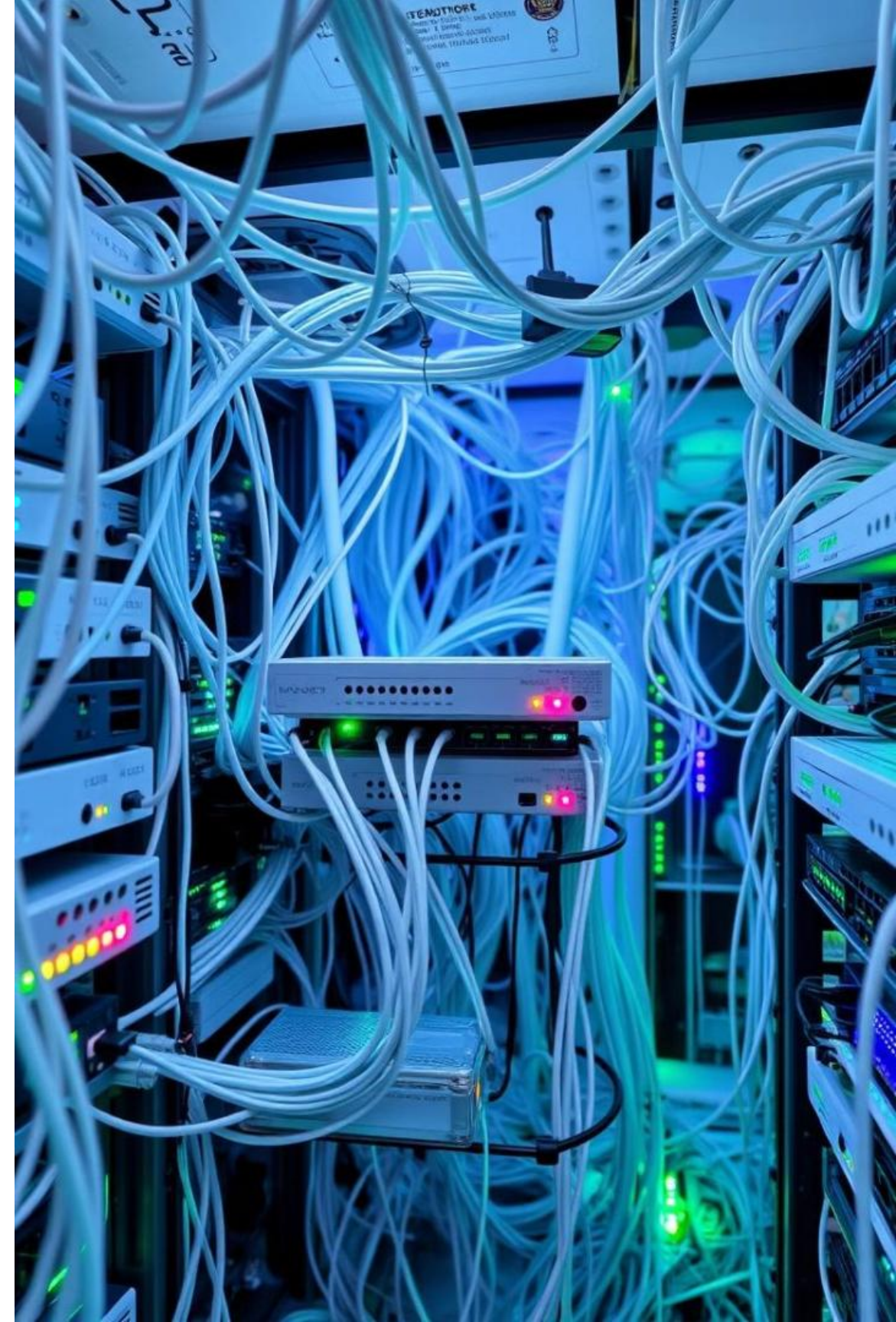
Network Topologies

Bus Topology

Devices are connected to a single cable, with data traveling in both directions.
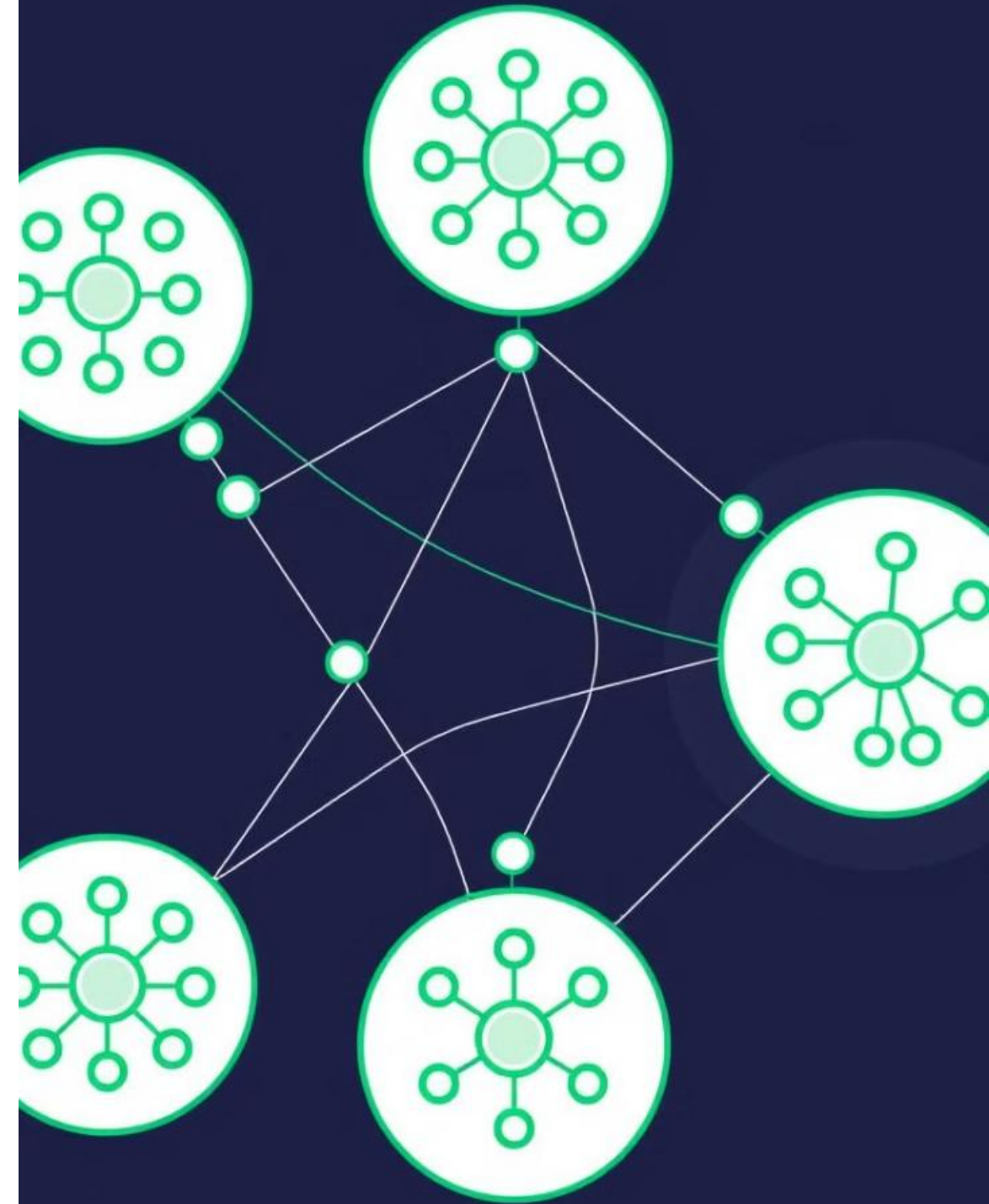
Star Topology

All devices are connected to a central hub or switch, which acts as a central point for data communication.
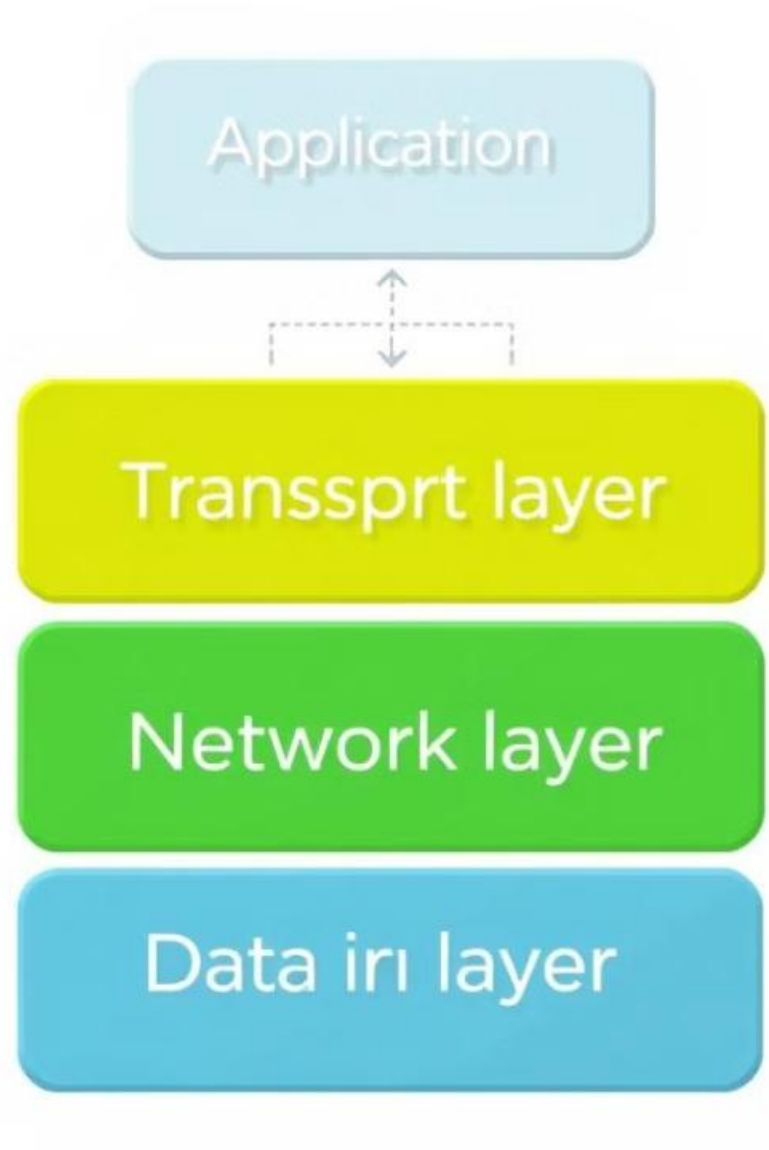
Ring Topology

Devices are connected in a closed loop, with data traveling in a single direction.

Mesh Topology

Each device has a direct connection to every other device in the network, providing high redundancy and fault tolerance.

Network Protocols and Standards

Protocol	Function
TCP/IP	Defines the rules for communication between devices on a network.
HTTP	Used for transferring files on the internet, particularly web pages.
FTP	Used for transferring files between computers over a network.
SMTP	Used for sending email messages.

Application

Transsprt layer

Network layer

Data irı layer

Network Hardware Components

Routers

Connect multiple networks and direct traffic between them.

Switches

Forward data packets between devices on a network.

Hubs

Simple devices that broadcast data packets to all connected devices.

Network Software and Services

1   *Network Operating System (NOS)*

Software that controls network resources and manages communication between devices.

2   *Firewall*

Software that protects a network from unauthorized access by filtering incoming and outgoing network traffic.

3   *Antivirus Software*

Protects devices from viruses and other malware threats.

4   *Remote Desktop Software*

Allows users to access and control another computer remotely.

Network Security Considerations

Firewall

A software or hardware barrier that protects a network from unauthorized access.

Encryption

Transforms data into an unreadable format, making it secure during transmission.

Antivirus Software

Detects and removes malware threats from devices and networks.

Strong Passwords

Use complex passwords with a mix of uppercase and lowercase letters, numbers, and symbols.

Trends and Future of Computer Networks

1 5G and Beyond

Next-generation wireless networks will offer faster speeds, lower latency, and wider coverage.

2 Internet of Things (IoT)

The increasing number of connected devices will create new opportunities for data collection, analysis, and automation.

3 Cloud Computing

Data storage and processing will increasingly shift to cloud platforms, offering scalability and flexibility.

4 Artificial Intelligence (AI)

AI will be used to optimize network performance, detect anomalies, and improve security.