

Introduction to Networking

1. Introduction

This lesson provides a beginner's guide to the fundamentals of computer networking. It explains what a network is, why it's essential, and the basic components that allow devices to communicate.

Understanding these core concepts is the first step toward grasping how the Internet works and how our digital world is interconnected.

2. What is a Computer Network?

A **computer network** is a collection of two or more interconnected computing devices that can exchange data and share resources. This can be as simple as two laptops sharing files wirelessly or as complex as the entire Internet, which connects billions of devices worldwide.

The purpose of a network is to enable communication and resource sharing. Instead of needing a separate printer for every computer, for example, a network allows multiple devices to share a single printer, which improves efficiency and reduces costs. Networks are the backbone of modern life, enabling services like email, online banking, video streaming, and social media.

3. Key Components of a NetworkCommon Security Risks

To function, a network relies on a few core components:

Nodes and Hosts: A **node** is any device connected to the network that can send or receive data, such as a computer, a smartphone, or a printer. A **host** is a type of node that is a source or destination of information, like your laptop.

Links and Media: A **link** is the connection between two nodes. This connection can be a physical medium, such as an **Ethernet cable** or **fiber-optic cable**, or a wireless medium, such as **Wi-Fi** or **Bluetooth**.

Networking Devices: These devices help manage the flow of data across the network.

- **Hubs and Switches** are used to connect multiple devices within a network. A switch is more intelligent than a hub because it can direct data to a specific device, rather than broadcasting it to all connected devices.
 - **Routers** are used to connect different networks. They direct data to its correct destination on the Internet, which is just a massive collection of interconnected networks.
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4. The Importance of Protocols

For devices to communicate, they must "speak the same language." This language is a set of rules called a **protocol**. Protocols define how data is formatted, addressed, and transmitted.

- **TCP/IP (Transmission Control Protocol/Internet Protocol)** is the foundational protocol suite of the Internet. **IP** handles the addressing and routing of data packets, while **TCP** ensures that the data arrives reliably and in the correct order.
- **HTTP (Hypertext Transfer Protocol)** is the protocol used to transfer web pages and other web content. It's what allows your browser to communicate with a website's server.