[computer network - freeCodeCamp.org](https://www.freecodecamp.org/news/tag/computer-network/)

Types

Here's a tabular format outlining various types of networks, including their use cases, applications, and key components:

| **Type of Network** | **Use Case** | **Application** | **Key Component** |
| --- | --- | --- | --- |
| Telecommunications | Transmission of signals for communication over a distance | Telephone networks, mobile networks, satellite communication, broadcasting networks | Transmission infrastructure (e.g., towers, satellites), switching equipment |
| Computer Networks | Facilitate communication and data exchange between computers and devices within a limited geographic area | Local Area Networks (LANs), Wide Area Networks (WANs) | Routers, switches, cables, network interface cards (NICs) |
| Internet Networks | Global network of interconnected computer networks for communication and resource sharing | Access to websites, email, online services, cloud computing | Routers, switches, servers, domain name systems (DNS) |
| Wireless Networks | Transmit data between devices without physical cables | Wi-Fi networks, cellular networks, Bluetooth networks | Access points, base stations, antennas, radio transceivers |
| Data Networks | Transmission of digital data between computers and devices | File sharing, email communication, database access | Network cables (e.g., Ethernet), routers, switches, protocols (e.g., TCP/IP) |
| Social Networks | Online platforms for connecting and interacting with others | Social media platforms (e.g., Facebook, Twitter, LinkedIn) | Servers, databases, user profiles, communication features |
| Cloud Networks | On-demand access to computing resources over the internet | Cloud computing services, storage solutions, SaaS applications | Virtualized servers, storage systems, networking infrastructure |
| Sensor Networks | Collect, monitor, and transmit data from the physical environment | Environmental monitoring, industrial automation, healthcare | Sensors, actuators, gateways, communication protocols |
| IoT Networks | Connect and enable communication between Internet of Things (IoT) devices | Smart homes, smart cities, industrial IoT, wearable devices | IoT devices (sensors, actuators), gateways, communication protocols |

This table provides a structured overview of different types of networks, including their use cases, applications, and key components, highlighting their roles and significance in modern communication and technology.

Basic difference Internet Networks, Wireless Networks, Computer Networks, Cloud Networks, Data Networks:

Here's a breakdown of the basic differences between Internet Networks, Wireless Networks, Computer Networks, Cloud Networks, and Data Networks:

**Internet Networks:**

* **Definition:** Internet Networks refer to the global network of interconnected computer networks that use standardized protocols to enable communication and resource sharing.
* **Characteristics:**
  + **Global Reach:** Internet Networks span the entire globe, connecting millions of devices and networks worldwide.
  + **Public Access:** The internet is accessible to the public, allowing users to access a vast array of services, information, and resources.
* **Key Components:**
  + Routers, switches, servers, domain name systems (DNS), internet service providers (ISPs).

**Wireless Networks:**

* **Definition:** Wireless Networks utilize wireless communication technologies, such as radio waves, microwaves, and infrared, to transmit data between devices without physical cables.
* **Characteristics:**
  + **Mobility:** Wireless Networks enable mobile communication, allowing users to connect and communicate from anywhere within the network coverage area.
  + **Flexibility:** Wireless Networks provide flexibility in device placement and connectivity, eliminating the need for wired connections.
* **Key Components:**
  + Access points, base stations, antennas, radio transceivers.

**Computer Networks:**

* **Definition:** Computer Networks are interconnected systems that facilitate communication and data exchange between computers and devices within a limited geographic area.
* **Characteristics:**
  + **Local Scope:** Computer Networks typically operate within a limited geographic area, such as a home, office, or campus.
  + **Resource Sharing:** Computer Networks enable sharing of resources, such as files, printers, and internet access, among connected devices.
* **Key Components:**
  + Routers, switches, cables, network interface cards (NICs).

**Cloud Networks:**

* **Definition:** Cloud Networks refer to distributed computing infrastructure that provides on-demand access to computing resources, such as servers, storage, and applications, over the internet.
* **Characteristics:**
  + **Scalability:** Cloud Networks offer scalable resources that can be rapidly provisioned and scaled up or down based on demand.
  + **Accessibility:** Cloud Networks provide ubiquitous access to computing resources from any location with internet connectivity.
* **Key Components:**
  + Virtualized servers, storage systems, networking infrastructure, cloud service providers (e.g., AWS, Azure, Google Cloud).

**Data Networks:**

* **Definition:** Data Networks are designed for the transmission of digital data between computers and devices, facilitating the exchange of information, files, and resources among connected systems.
* **Characteristics:**
  + **Data Transmission:** Data Networks facilitate the transmission of digital data packets using standardized protocols.
  + **Efficiency:** Data Networks optimize data transmission to ensure efficient and reliable communication between devices.
* **Key Components:**
  + Network cables (e.g., Ethernet), routers, switches, protocols (e.g., TCP/IP).

In summary, while these networks share some similarities, such as facilitating communication and data exchange, they differ in terms of their scope, functionality, and key components. Internet Networks provide global connectivity, Wireless Networks enable mobile communication, Computer Networks facilitate local communication, Cloud Networks offer scalable computing resources, and Data Networks focus on efficient data transmission.

Sure, here's a table summarizing the basic differences between Internet Networks, Wireless Networks, Computer Networks, Cloud Networks, and Data Networks:

| **Network Type** | **Definition** | **Characteristics** | **Key Components** |
| --- | --- | --- | --- |
| Internet Networks | Global network of interconnected computer networks that use standardized protocols to enable communication and resource sharing. | - Global Reach: Spans the entire globe, connecting millions of devices and networks worldwide. - Public Access: Accessible to the public, allowing users to access a vast array of services, information, and resources. | Routers, switches, servers, domain name systems (DNS), internet service providers (ISPs) |
| Wireless Networks | Utilize wireless communication technologies, such as radio waves, microwaves, and infrared, to transmit data between devices without physical cables. | - Mobility: Enable mobile communication, allowing users to connect and communicate from anywhere within the network coverage area. - Flexibility: Provide flexibility in device placement and connectivity, eliminating the need for wired connections. | Access points, base stations, antennas, radio transceivers |
| Computer Networks | Interconnected systems that facilitate communication and data exchange between computers and devices within a limited geographic area. | - Local Scope: Typically operate within a limited geographic area, such as a home, office, or campus. - Resource Sharing: Enable sharing of resources, such as files, printers, and internet access, among connected devices. | Routers, switches, cables, network interface cards (NICs) |
| Cloud Networks | Distributed computing infrastructure that provides on-demand access to computing resources, such as servers, storage, and applications, over the internet. | - Scalability: Offer scalable resources that can be rapidly provisioned and scaled up or down based on demand. - Accessibility: Provide ubiquitous access to computing resources from any location with internet connectivity. | Virtualized servers, storage systems, networking infrastructure, cloud service providers (e.g., AWS, Azure, Google Cloud) |
| Data Networks | Designed for the transmission of digital data between computers and devices, facilitating the exchange of information, files, and resources among connected systems. | - Data Transmission: Facilitate the transmission of digital data packets using standardized protocols. - Efficiency: Optimize data transmission to ensure efficient and reliable communication between devices. | Network cables (e.g., Ethernet), routers, switches, protocols (e.g., TCP/IP) |

This table provides a clear overview of the basic differences between Internet Networks, Wireless Networks, Computer Networks, Cloud Networks, and Data Networks, including their definitions, characteristics, and key components.

Network Data Flow

A Data Flow Diagram (DFD) for a network illustrates the flow of data between various components within the network. Here's a simplified DFD for a basic network:

**Network Data Flow Diagram:**

sql

Copy code

+-----------------+

| User Device |

+--------+--------+

|

| Data Input/Output

|

+--------v--------+

| Network Hub |

+--------+--------+

|

| Data Transmission

|

+-------------v-------------+

| Router/Switch |

+-------------+-------------+

|

| Routing/Switching

|

+-------------v-------------+

| Server/Cloud Service |

+-------------+-------------+

|

| Data Processing/Storage

|

+-------------v-------------+

| User Device/External |

+--------------------------+

**Explanation:**

1. **User Device:**
   * Represents devices such as computers, smartphones, or IoT devices that interact with the network.
   * Sends and receives data to and from the network.
2. **Network Hub:**
   * Acts as a central point for connecting multiple devices within the network.
   * Distributes data to connected devices.
3. **Router/Switch:**
   * Routes or switches data packets between different devices and network segments.
   * Manages data traffic within the network.
4. **Server/Cloud Service:**
   * Stores and processes data.
   * Provides services such as file storage, email, web hosting, etc.
5. **User Device/External:**
   * Represents external devices or services interacting with the network.
   * Sends and receives data to and from the network.

**Data Flow:**

* Data flows from user devices to the network hub, then to the router/switch for routing or switching.
* The router/switch directs data to the appropriate destination, such as servers/cloud services or other user devices.
* Data processed or stored by servers/cloud services may be sent back to user devices or external entities.

This simplified DFD illustrates the basic flow of data within a network, showing how user devices interact with network components to send and receive data for processing, storage, or communication purposes.