

TCP/IP Networking

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CMPT166

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Sockets

- **Sockets** are a protocol-independent way of **communicating** between processes
 - Foundation of the **Internet**, including HTTP, FTP, IM, streaming media, etc.
- **Local** or **Internet**: same host or diff hosts?
- **Connection**-based or **connectionless**: does each packet need to specify destination?
- **Packets** or **streams**: message boundaries?
- **Reliable** or **unreliable**: Can messages be lost, duplicated, reordered, or corrupted?



TCP vs. UDP

- All data on the Internet is sent via **packets** conforming to the Internet Protocol (**IP**)
 - Specify host and port (0-65535)
- Two most common types of packets:
 - **TCP**: Transmission Control Protocol:
 - ◆ Virtual **circuit**: **connection**-based
 - ◆ **Client-server** model
 - **UDP**: User Datagram Protocol:
 - ◆ Connectionless: **peer-to-peer**, less **overhead**
 - ◆ Packets might **disappear**, or be out of **order**, or get **duplicated**

TCP client-server



- TCP is **connection-based**:
 - **Phone** analogy
 - Initial **setup**, but subsequent packets do not need to specify **destination** again
 - **Server**: waits, **listens** for client
 - **Client**: **initiates** connection (phone call)
 - Once connection is established, communication may be **two-way** (**send/receive**)
 - Either client or server may **terminate**