## Connection vs. Connection-less Protocols

The book code in fig28\_03\_06 and client\_server\_no\_GUI demonstrate the use of **stream sockets**. In these examples, a connection is established between the server process and the client process. Stream sockets provide a **connection-oriented service**. The transmission protocol used is **TCP** (**Transmission Control Protocol**). This protocol is reliable. Packets are guaranteed to arrive and arrive in order or they will be re-sent.

In contrast with connection-oriented service is the protocol used with **datagram sockets**, demonstrated in book code fig28\_07\_10. Datagrams provide a **connectionless-service**, in which information is sent back and forth, but otherwise no connection is established. The protocol used is **UDP** (**User Datagram Protocol**). Packets sent using UDP may arrive out of order, may be lost, or may not arrive at all.

TCP is more appropriate for things like file transmissions, in which all the data must arrive in order and uncorrupted.

UDP is more appropriate for things like video chat and many online computer games in which low ping is more important.

Hint: You can remember that UDP is the unreliable one since unreliable begins with U.

**TCP (connection-oriented) is like a phone call**. A connection is in place even if no one is talking.

**UDP (connectionless) is like sending one or more letters** via the postal service.

## Sockets

A **socket** is one endpoint of a two-way communication link between two programs running on the network. A socket is bound to a port number so that the TCP layer can identify the application that data is destined to be sent to. An endpoint is a combination of an IP address and a port number. Source: docs.oracle.com/javase/tutorial/networking/sockets/definition.html

## Circuit-switched vs Packet-switched Networks

**Circuit-switched networks** are a type of network in which a connection must be established before communication begins. Circuit switching should therefore be associated with **TCP and Stream Sockets**.

In contrast, **packet-switched networks** break down the information to be transmitted into packets. Packet-switching is associated with **UDP and datagrams**.

## Packets

In networking, a **packet** is a small segment of a larger message. Data sent over computer networks, such as the Internet, is divided into packets. These packets are then recombined by the computer or device that receives them.

## TCP Three-Way handshake

THREE-WAY HANDSHAKE or a TCP 3-way handshake is a process which is used in a TCP/IP network to make a connection between the server and client. It is a three-step process that requires both the client and server to exchange **synchronization and acknowledgment packets** before the real data communication process starts.

**Step 1**: In the first step, the client establishes a connection with a server. The client sends a **SYN** (synchronize), indicating that it would like to begin communicating with the server.

**Step 2**: In this step server responds to the client request with **SYN-ACK** (synchronize acknowledgement).

**Step 3**: In the final step, the client acknowledges the response of the Server by sending back an **ACK** (acknowledge) message, and they both create a stable connection. Now the actual data transfer process can begin.

Source: www.guru99.com/tcp-3-way-handshake.html

## Differences between private IP and public IP

A **public IP** address is an IP address that **can be accessed over the Internet**. Like postal address used to deliver a postal mail to your home, a public IP address is the globally unique IP address assigned to a computing device.

**Private IP address**, on the other hand, is used to assign computers within your private space without letting them directly expose to the Internet. For example, if you have multiple computers within your home you may want to use private IP addresses to address each computer within your home. In this scenario, your router gets the public IP address, and each of the computers, tablets and smartphones connected to your router (via wired or wifi) gets a private IP address from your router.

Source: www.iplocation.net/public-vs-private-ip-address