Process Communication Channels

Processes typically have three media through which they can communicate with each other. These are:

- Network
- Disk
- Pipes

Processes can communicate with each other via computer networks. Through this medium a process can communicate with processes running on the same computer as itself, or with processes running on a different computer, provided that the two computers running the processes are connected with a computer network.

Processes running on the same computer can also communicate with each other via the computer's hard disk (or other disks like USB disks etc.). Processe A can write files to the disk which are processed by Process B. A reply can also be sent back from Process B in a file written to disk which Process A then reads.

Processes can also communicate via network storage, which is essentially a hard disk connected to the computer network. This way processes can also communicate with processes running on different computers, via the combination of network and disk communication.

Depending on the operating system the processes are running on, processes running on the same machine can also communicate with each other through pipes. Pipes are channels of communication provided by the operating systems for processes. The communication takes place like network communication, but the messages exchanged are kept internally in the RAM of the computer. Pipes can be faster than network communication, because a lot of network protocol overhead can be eliminated when the communicating processes run on the same computer.

Processes could also communicate via a RAM disk, which is a virtual hard disk allocated in the RAM of a computer. A RAM disk looks like a disk to the process, but is much faster than a disk because the data is only stored in RAM.

Process Communication Modes

Processes can communicate with each other in either:

- Synchronous mode.
- Asynchronous mode.

When a process A communicates with a process B synchronously, it means that process A sends a message to process B and waits for B to reply. Process A does not do anything until it gets a reply from process B.

When two processes communicates asynchronously, the processes sends messages to each other without waiting for each other to reply. Process A may send a message to process B and then continue with some other work. At some point process B sends a message back to process A, and process A processes that message when process A has time for it.

Synchronous and asynchronous communication has different advantages and use cases. You can use asynchronous communication to implement synchronous communication, or use synchronous communication to implement asynchronous communication.

The synchronous and asynchronous communication modes are illustrated here: