

# Operating Systems

## COMS W4118

### Lecture 11

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## 1 `select` in a Web Server

- `select` will block until there is something to return on a socket.
- Socket being closed on one end is an activity, so the `select` will return that.
- Context switches are something that should be avoided as they are costly and expensive.
- `select` is simpler, but slower, no concurrent execution.

## 2 Domain Sockets

### 2.1 Summary of UNIX IPC so far

- Shared memory, there are two kinds of shared memory, purely written memory not backed by a file and memory that is mapped to a file.
- File-backed `mmap` maps a region of memory to a file. Thus, unrelated processes can map regions of memory to a file and access these regions.
- Between multiple threads and processes, we have to think about synchronization.
- With multiple threads and processes sharing a memory region, we should use unnamed POSIX semaphores.
- Use a semaphore in a process context, use mutex lock, and condition variables in a threading context.
- Pipe returns a descriptor, while FIFO returns a name to the pipe
- TCP sockets intended for networking, so high overhead. No boundaries as per TCP protocol of splitting up packets.
- UDP sockets create a pipeline, unreliable.

## 2.2 UNIX Domain Sockets

- Cross between pipes and sockets
- Uses the socket API
- Behaves like a socket
- You can only do local communication, this is **NOT** networking.
- Used as a socket between two processes running on the same machine.
- Thus, we do not have any overhead related to network sockets.
- There is a stream and datagram mode, but it will always be reliable.
- No protocol overhead.
- Full duplex.
- Preserves the message boundaries unlike regular TCP.
- Convenient, reliable, fast, and preserves message boundaries. The message can be as long as it wants, but it will only accept the specified number of bytes.