LE 1: Communication Basics

OSI model: Physical, Data link, Network, Transport, Session, Presentation, Application

Protocols: specifies data transfer between computing end-points

TCP: Connection oriented protocol, slow but provides reliability, ensures that data arrives sequentially and error-free

UDP: Connectionless, best effort, fast

Sockets:

* Client: requests to servers (send & receive)
* Server: listens for connections, requests, sends & receives
* Functions: socket(), bind(), listen(), accept(), connect(), send(), receive(), close()
* Types:
  + Stream socket: TCP based
  + Datagram socket: UDP based

Java NIO: Asynchronous socket handling

Java NIO Channels:

* All IO operations can be done with channels (File, TCP, UDP)
* Read into a buffer
* Write from a buffer

Fallacies of network programming:

* The “Latency is Zero” fallacy
  + Latency is the time it takes to move data from client to storage server vs amount of data transferred (bandwidth)
  + Typical WAN round trip times are 30ms+
* “The Network is Reliable”
  + Power supply failures, disk failures, CPU / power fan failures
  + Loose messages (acknowledgements, time-outs & retries)

Advantages and disadvantages of asynchronous socket handling compared to synchronous socket handling:

* Advantage: Scalability
* Advantage: Slow consumers cannot block the server for a long time
* Advantage: One thread can handle multiple sockets
* Disadvantage: Complex handling code
* Disadvantage: Requires different kind of architecture, Eventloops