

Data Networks WS 18/19

INTERNET ARCHITECTURE:

Assignment 3

Chirag Bhuvaneshwara - 2571703

Florena Raja - 2566418

Question 1: Socket Basics

a)

Internet sockets:

1. Stream Sockets –SOCK_STREAM:

Connection Oriented; providing a reliable byte stream channel through which data flows between two communicating end systems.

Rely on TCP- Transmission Control Protocol; to provide reliable two-way connected communication.

Upon failure of delivery of data, an error message is displayed.

2. Datagram Sockets -SOCK_DGRAM :

Rely on UDP-User Datagram Protocol

Connection is unreliable; no guarantee on the delivery of the packets.

3. Raw Sockets:

Raw sockets help in providing the users access to the underlying communication protocols, which support socket abstractions. They sockets are not intended for the general users, rather for users who would like to develop new communicating protocols.

4. Sequenced Packet Socket:

Sequenced packet sockets allows the user to write a prototype header along with the data which the user wants to send. This is done by manipulating the headers of either the Sequence Packet Protocol or the Internet Datagram Protocol of a packet.

b)

The handshake phase: three-way handshake

- The client process initiates a TCP connection to the server. The server has to be ready for this initial contact and this is done by defining a specific port on the server where it is always listening. The client process is expected to initiate the contact and this is done by defining a socket on the client. Through this socket, the welcoming socket of the server is contacted through the transport layer.
- The server passes on the client's socket and IP address to a new socket within the same server. The server then uses the new socket to signal the client that it has assigned this socket for communication with that particular client.
- The client upon receiving this information (on the same socket that was used to contact the server) sends an acknowledgement to the server's new socket to confirm reception of the new socket information. This process is known as the 3 way handshake.

c)

Blocking and Non-blocking sockets:

In sockets with blocking mode enabled, a call `recv()` to read a stream of data, makes sure that the control to program is returned only after at least one byte of data is read. The connection is blocked until the operation is complete.

In sockets with non-blocking mode enabled, we need not wait for the operation to complete. Useful when one needs to switch between many different connected sockets.

d)

As with file access, user processes ask the operating system to create a socket when needed. The system returns an integer, the socket descriptor can be used by the application each time it wants to refer to that socket. The difference between sockets and files is that the operating system binds file descriptors to a file or device when the `open()` call creates the file descriptor. With sockets, application programs can choose to either specify the destination each time they use the socket—for example, when sending datagram, or to bind the destination address to the socket.

