Distributed Applications – session 3

Lecturer

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UDP (User Datagram Protocol)

- UDP is unreliable and connection-less.
- No connection establishment and data could be lost or arrive out of order.
- Mush faster than TCP but no error correction.
- UDP is used when speed is important.
- Examples of applications that use UDP are
- DNS (Domain Name System), real-time applications, etc.…
- These applications implement error correction at the application level and may tolerate some lost packets.

UDP Programming in Java

- No need for listening sockets and no streams are used.
- The sending socket creates a packet and send it to another host, the receiving host can read the packets.
- Two classes are used: DatagramSocket, DatagramPacket.
- A DatagramSocket is used to send a DatagramPacket.
- Each packet contains the address and port of the receiver.
- A single DatagramSocket can send to multiple other sockets.
- The DatagramSocket can be bound to the same port as a ServerSocket on the same host.

Datagram Sockets

- These sockets can be used to send and receive data.
- public DatagramSocket() throws SocketEcception is used at client side to send packets to the server.
- public DatagramSocket(int port) throws SocketEcception
- public DatagramSocket(int port, InetAddress addr) throws SocketEcception.
- These are used at the server side to wait for packets.
- Use these methods to send and receive data
- void send(DatagramPacket p), void receive(DatagramPacket p), void close()

Datagram Packets

- public DatagramPacket(byte[] buf, int len); for receiving.
- public DatagramPacket(byte[] buf, int len, InetAddress a, int port); for sedning.
- Methods include:
  - void setAddress(InetAddress iaddr), InetAddress getAddress().
  - void setPort(int iport), int getPort().
  - void setData(byte ibuf[]), byte[] getData().
  - void setLength(int ilength), int getLength().

Sending Datagram packets

- Convert data to a byte array.

- Pass the byte array, its length, IP address of receiver and port number to the DatagramPacket constructor.

- Create a DatagramSocket and pass the DatagramPacket to its send method.

Receiving Datagram packets

- Create DatagramSocket object on the port you want to listen on it.
- Pass an empty DatagramPacket to the receive method, which blocks until data is received.
- Once data is received the object is filled with data.
- You can use DatagramPacket methods to get the data.
- If received data was longer than the buffer length, the data is truncated.

Example Program

- Write a UDP Server that reads a sentence from the client, capitalize it and send it back to the client.
- Write a UDP Client that reads a sentence from the user and send it to the server, then reads the server's response and display it on the screen.
- Use threads to enable the processing of requests at the same time.

GOOD LUCK