TCP - Socket communication

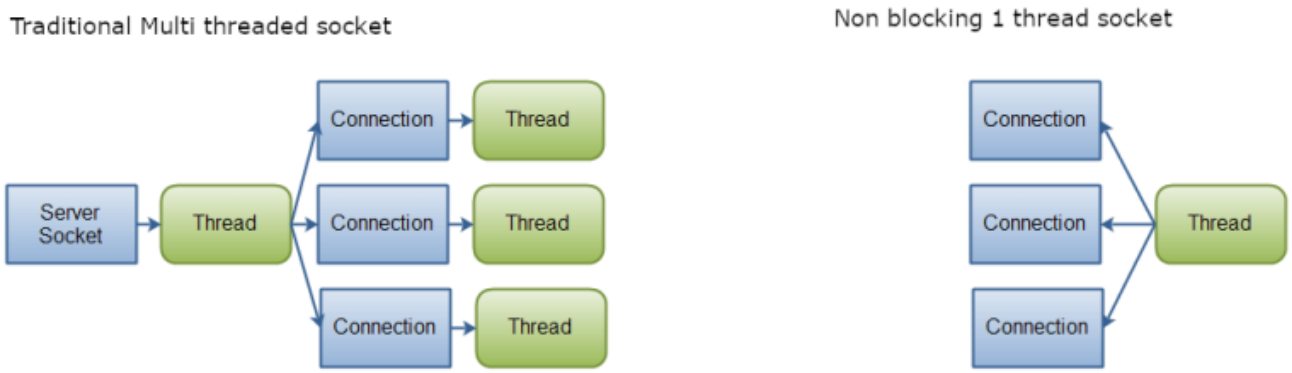
The client sends requests to the server over a TCP socket connection, and the server responds to these requests. Here are the basic steps involved in integrating software systems or components using TCP socket communication:

1. **Select a protocol**: TCP/IP is a common protocol for socket communication, but other protocols like UDP can also be used depending on the requirements.
2. **Determine the message format**: Decide on the format of the messages that will be exchanged between the client and server. This could be a simple text-based format or a more complex binary format.
3. **Define the communication interface**: Define the functions or APIs that will be used for communication between the client and server.
4. **Create the server**: Write the code for the server that listens for incoming client connections and handles incoming requests.
5. **Create the client**: Write the code for the client that connects to the server and sends requests.
6. **Handle errors**: Implement error handling mechanisms to ensure that communication errors are handled gracefully and do not cause the system to crash or become unstable.
7. **Test and iterate**: Test the system thoroughly and make any necessary changes or improvements to ensure that it is functioning correctly.

Features:

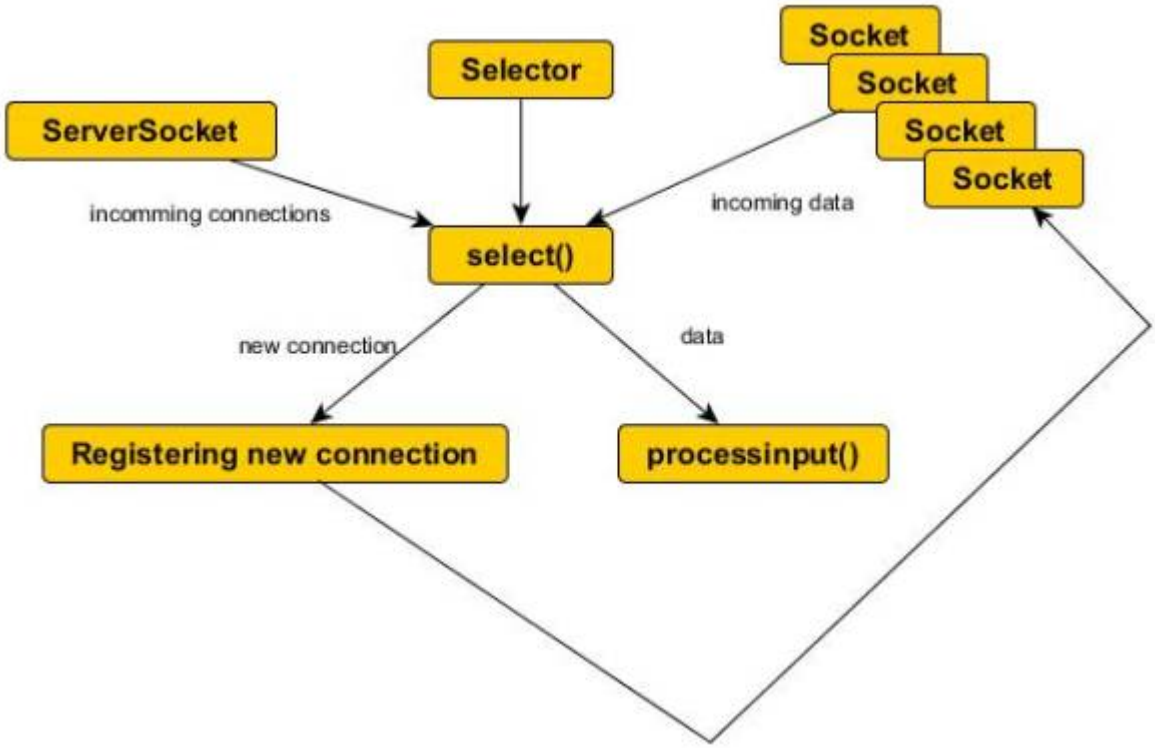
- Socket ::= IP address + (TCP/UPD) port number. A Socket is a combination of ip address and port number.
- TCP Sockets provides 'real-time' data transfer
    - binary data transfer but can be normal text or JSON, XML as well
    - no direct method sharing (can be implemented by hand)
    - TCP and UDP connections are possible. UDP is min 3 times quicker but one-way communication
- Persistent or On-Demand communication channel
    - because of connection time-loss usually persistent channels are better, but periodically 'ping' messages should be sent. (in order to avoid connection closing). In case of any problems reconnection is possible
    - in case of UDP channels an extra TCP channel is available for synchronizing - in online games
- Results in the fastest possible transmission:
    - Where the number of transactions per second up to ~ 50 transactions, there should have been applied. (20ms / sec transfer)

Blocking and non-blocking TCP sockets in Java



Reading:

- http://tutorials.jenkov.com/java-nio/nio-vs-io.html
- http://www.javaworld.com/article/2073344/core-java/use-select-for-high-speed-networking.html



Non-blocking loop

```
   ServerSocketChannel serverSocketChannel = ServerSocketChannel.open();

   serverSocketChannel.socket().bind(new InetSocketAddress(9999));
   serverSocketChannel.configureBlocking(false);  // ez a sor jelzi a
blokkolásmentes működést

   while(true){
    SocketChannel socketChannel = serverSocketChannel.accept();
```

```
    if(socketChannel != null){
        // the connection is accepted
    }
   }
```

Java examples

Java example for Blocking and Non-Blocking Socket

HTTP server

From:
https://edu.iit.uni-miskolc.hu/ - **Institute of Information Science - University of Miskolc**

Permanent link:
https://edu.iit.uni-miskolc.hu/tanszek:oktatas:iss_t:integration_based_on_tcp_ip_sockets?rev=1683572022

Last update: **2023/05/08 18:53**