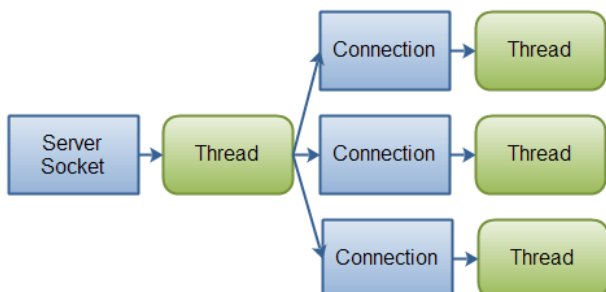
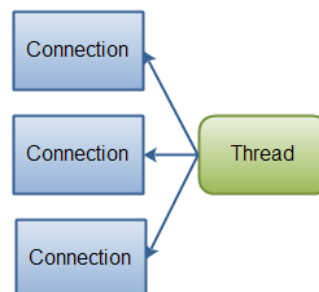


Elvi különbség a blokkolt és nem-blokkolt megközelítés között

Hagyományos többszálú socket

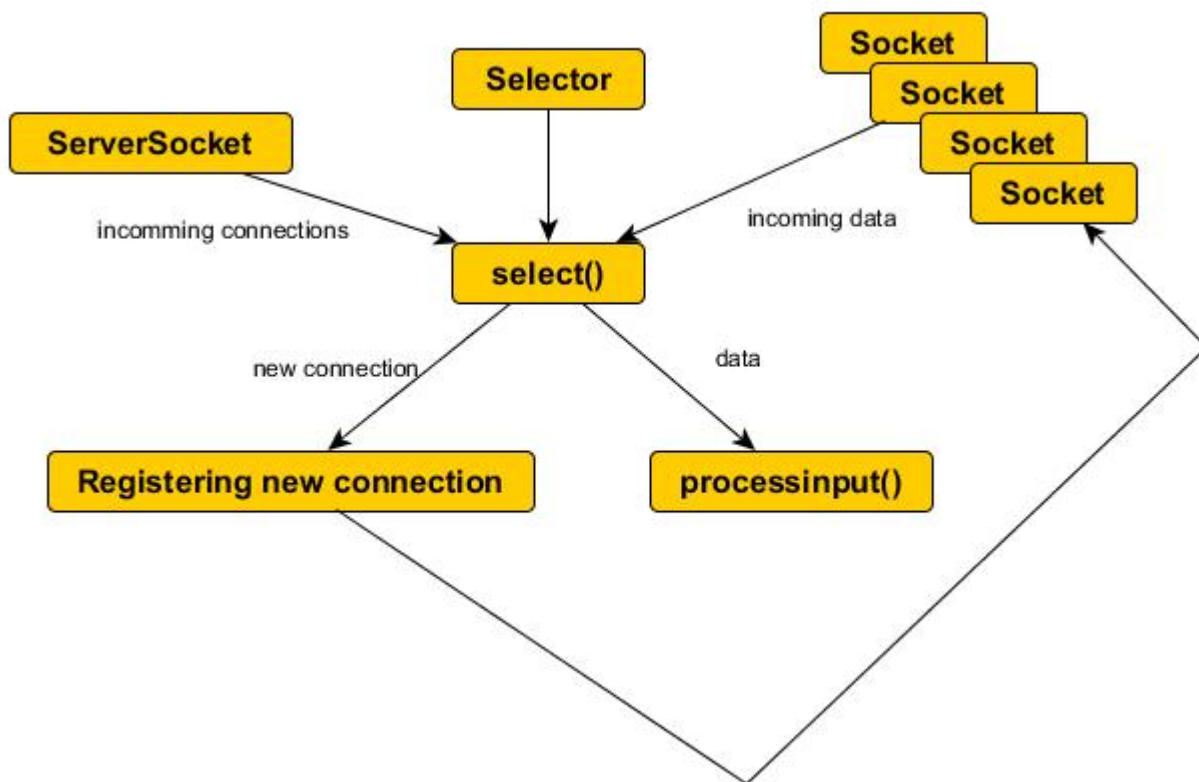


Nem blokkolt 1 szálú socket



Olvasnivaló:

- <http://tutorials.jenkov.com/java-nio/nio-vs-io.html>
- <https://www.infoworld.com/article/2159108/use-select-for-high-speed-networking.html>



Elvi váz

```
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){
        // az összeköttetés létrejött
    }
}
```

Nem blokkolt kliens példa

```
import java.io.IOException;
import java.io.InputStream;
import java.io.OutputStream;
import java.net.Socket;
import java.util.Random;

public class Client implements Runnable {
    private String host;
    private int port;

    // Bounds on how much we write per cycle
    private static final int minWriteSize = 1024;
    private static final int maxWriteSize = 65536;

    // Bounds on how long we wait between cycles
    private static final int minPause = (int) (0.05 * 1000);
    private static final int maxPause = (int) (0.5 * 1000);

    // Random number generator
    Random rand = new Random();

    public Client(String host, int port, int numThreads) {
        this.host = host;
        this.port = port;

        for (int i = 0; i < numThreads; ++i) {
            new Thread(this).start();
        }
    }

    public void run() {
        byte buffer[] = new byte[maxWriteSize];
        try {
            Socket s = new Socket(host, port);
```

```
InputStream in = s.getInputStream();
OutputStream out = s.getOutputStream();

while (true) {
    int numToWrite = minWriteSize
        + (int) (rand.nextDouble() * (maxWriteSize -
minWriteSize));
    for (int i = 0; i < numToWrite; ++i) {
        buffer[i] = (byte) rand.nextInt(256);
    }
    out.write(buffer, 0, numToWrite);
    intsofar = 0;
    while (sofar < numToWrite) {
        sofar += in.read(buffer, sofar, numToWrite - sofar);
    }
    System.out.println(Thread.currentThread() + " wrote " +
numToWrite);

    int pause = minPause + (int) (rand.nextDouble() * (maxPause
- minPause));
    try {
        Thread.sleep(pause);
    } catch (InterruptedException ie) {
    }
}
} catch (IOException ie) {
    ie.printStackTrace();
}
}

static public void main(String args[]) throws Exception {
    new Client("localhost", 4444, 3);
}
}
```

Nem blokkolt szerver példa

```
public class Server implements Runnable {
    // The port we will listen on
    private int port;
    // A pre-allocated buffer for encrypting data
    private final ByteBuffer buffer = ByteBuffer.allocate(16384);
    public Server(int port) {
        this.port = port;
        new Thread(this).start();
    }
    public void run() {
        try {
            // Instead of creating a ServerSocket,
```

```
// create a ServerSocketChannel
ServerSocketChannel ssc = ServerSocketChannel.open();
// Set it to non-blocking, so we can use select
ssc.configureBlocking(false);
// Get the Socket connected to this channel, and bind it
// to the listening port
ServerSocket ss = ssc.socket();
InetSocketAddress isa = new InetSocketAddress(port);
ss.bind(isa);
// Create a new Selector for selecting
Selector selector = Selector.open();
// Register the ServerSocketChannel, so we can
// listen for incoming connections
ssc.register(selector, SelectionKey.OP_ACCEPT);
System.out.println("Listening on port " + port);
while (true) {
    // See if we've had any activity -- either
    // an incoming connection, or incoming data on an
    // existing connection
    int num = selector.select();
    // If we don't have any activity, loop around and wait
    // again
    if (num == 0) {
        continue;
    }
    // Get the keys corresponding to the activity
    // that has been detected, and process them
    // one by one
    Set keys = selector.selectedKeys();
    Iterator it = keys.iterator();
    while (it.hasNext()) {
        // Get a key representing one of bits of I/O
        // activity
        SelectionKey key = (SelectionKey) it.next();
        // What kind of activity is it?
        if ((key.readyOps() & SelectionKey.OP_ACCEPT) ==
SelectionKey.OP_ACCEPT) {
            System.out.println("acc");
            // It's an incoming connection.
            // Register this socket with the Selector
            // so we can listen for input on it
            Socket s = ss.accept();
            System.out.println("Got connection from " + s);
            // Make sure to make it non-blocking, so we can
            // use a selector on it.
            SocketChannel sc = s.getChannel();
            sc.configureBlocking(false);
            // Register it with the selector, for reading
            sc.register(selector, SelectionKey.OP_READ);
        } else if ((key.readyOps() & SelectionKey.OP_READ) ==
```

```
SelectionKey.OP_READ) {
    SocketChannel sc = null;
    try {
        // It's incoming data on a connection, so
        // process it
        sc = (SocketChannel) key.channel();
        boolean ok = processInput(sc);
        // If the connection is dead, then remove it
        // from the selector and close it
        if (!ok) {
            key.cancel();
            Socket s = null;
            try {
                s = sc.socket();
                s.close();
            } catch (IOException ie) {
                System.err.println("Error closing socket
"
                                + s + ": " + ie);
            }
        }
    } catch (IOException ie) {
        // On exception, remove this channel from the
        // selector
        key.cancel();
        try {
            sc.close();
        } catch (IOException ie2) {
            System.out.println(ie2);
        }
        System.out.println("Closed " + sc);
    }
}

// We remove the selected keys, because we've dealt
// with them.
keys.clear();
}
} catch (IOException ie) {
    System.err.println(ie);
}
}

// Do some cheesy encryption on the incoming data,
// and send it back out
private boolean processInput(SocketChannel sc) throws IOException {
    buffer.clear();
    sc.read(buffer);
    buffer.flip();
    // If no data, close the connection
    if (buffer.limit() == 0) {
        return false;
    }
}
```

```
}  
// Simple rot-13 encryption  
for (int i = 0; i < buffer.limit(); ++i) {  
    byte b = buffer.get(i);  
    if ((b >= 'a' && b <= 'm') || (b >= 'A' && b <= 'M')) {  
        b += 13;  
    } else if ((b >= 'n' && b <= 'z') || (b >= 'N' && b <= 'Z')) {  
        b -= 13;  
    }  
    buffer.put(i, b);  
}  
sc.write(buffer);  
System.out.println("Processed " + buffer.limit() + " from " + sc);  
return true;  
}  
static public void main(String args[]) throws Exception {  
    new Server(4444);  
}  
}
```

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

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