

## Prerequisites :

- Java 8 installed
- VS Code IDE.

# 1: UDP-Go Back N Protocol

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[Github link](#) There are two Subfolders associated with UDP - Go back N

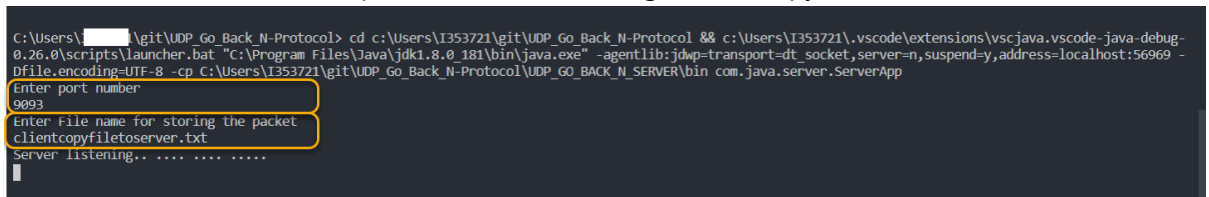
1. UDP\_GO\_BACK\_N\_CLIENT
2. UDP\_GO\_BACK\_N\_SERVER

Always run server first and then run the client

### 1.1: UDP\_GO\_BACK\_N\_SERVER :

The job of this module is to accept packet and store it in the file and also send ACK back for the packet received. Following are the step to be followed to run the UDP\_GO\_BACK\_N\_SERVER

1. Click on the Run and Debug icon on the IDE.
2. Select **ServerApp<UDP\_GO\_BACK\_N\_SERVER>** from the launch config file.
3. As the you select and run new terminal will pop
  - Enter server port number (eg: 9093)
  - Enter file name to where the packets to be stored (eg : serverCopyFile)



```
C:\Users\I353721\git\UDP_Go_Back_N-Protocol> cd c:\Users\I353721\git\UDP_Go_Back_N-Protocol && c:\Users\I353721\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:56969 -Dfile.encoding=UTF-8 -cp C:\Users\I353721\git\UDP_Go_Back_N-Protocol\UDP_GO_BACK_N_SERVER\bin com.java.server.ServerApp
Enter port number
9093
Enter File name for storing the packet
clientcopyfiletoServer.txt
Server listening.. ....
```

### 1.2: UDP\_GO\_BACK\_N\_CLIENT :

Job of this module is to transfer the file packets to UDP server and also makes sure that within the time limit if ACK is not received for the packet sent current window packets are retransmitted. Following are the steps to be followed to run the UDPClient

1. Click on the Run and Debug icon on the IDE
2. Select **ClientApp<UDP\_GO\_BACK\_N\_CLIENT>** from the launch config file.
3. As the you select and run new terminal will pop there
  - Enter the server HostName as localhost if the server is running with in the server if not please pass valid hostname (eg : localhost)
  - Enter Server port number (eg: 9093)
  - Enter the window size (eg: 5)

- Enter the Max Segment size ( < 2001) (eg: 2000)

```
C:\Users\I353721\git\UDP_Go_Back_N-Protocol> cd c:\Users\I353721\git\UDP_Go_Back_N-Protocol && c:\Users\I353721\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:58214 -Dfile.encoding=UTF-8 -cp C:\Users\I353721\git\UDP_Go_Back_N-Protocol\UDP_GO_BACK_N_CLIENT\bin com.java.client.ClientApp
Enter the server hostname
localhost
Enter the server port number
9093
Enter the file name with extension
clientsidefile.txt
Enter the window size
5
Enter the Max Segment size
2000
```

**\*\*Note : observe the terminal for packet transmission and ACK \*\***

```
Window Pointer start and end : 1018 - 1022
Packet No: 1018 Status : Sent Time : 1589710932392
ACK Received for packet :1018
Packet No: 1019 Status : Sent Time : 1589710932424
ACK Received for packet :1019
Packet No: 1020 Status : Sent Time : 1589710932463
ACK Received for packet :1020
Packet No: 1021 Status : Sent Time : 1589710932494
ACK Received for packet :1021
Packet No: 1022 Status : Sent Time : 1589710932525
ACK Received for packet :1022

Window Pointer start and end : 1023 - 1023
Packet No: 1023 Status : Sent Time : 1589710932557
ACK Received for packet :1023
Client program terminated!
Total time in seconds : 60
```

Client :

Server :

```
Packet No : 1017 Status : Received Time : 1589710283537
Packet No : 1017 ACK : Sent
Packet No : 1018 Status : Received Time : 1589710283568
Packet No : 1018 ACK : Sent
Packet No : 1019 Status : Received Time : 1589710283600
Packet No : 1019 ACK : Sent
Packet No : 1020 Status : Received Time : 1589710283631
Packet No : 1020 ACK : Sent
Packet No : 1021 Status : Received Time : 1589710283667
Packet No : 1021 ACK : Sent
Packet No : 1022 Status : Received Time : 1589710283699
Packet No : 1022 ACK : Sent
Packet No : 1023 Status : Received Time : 1589710283736
Packet No : 1023 ACK : Sent
```

### 1.3: Output:

At the end of file transmission you can find file created in the UDP\_GO\_BACK\_N\_SERVER/resources/serverfiles/<filename that you gave> with data in it.

## 2: UDP SELECTIVE REPEAT:

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There are two Subfolders associated with UDP SELECTIVE REPEAT

1. UDP\_SELECTIVE\_REPEAT\_CLIENT
2. UDP\_SELECTIVE\_REPEAT\_SERVER

Always run server first and then run the client

### 2.1: UDP\_SELECTIVE\_REPEAT\_SERVER :

The job of this module is to accept packet and store it in the file and also send ACK back for the packet received. Following are the step to be followed to run the UDP\_SELECTIVE\_REPEAT\_SERVER

1. Click on the Run and Debug icon on the IDE.
2. Select `ServerApp<UDP_SELECTIVE_REPEAT_SERVER>` from the launch config file.
3. As the you select and run new terminal will pop. In the terminal you can observe the packets getting received.

```
C:\Users\I353721\git\UDP_Go_Back_N-Protocol> cd c:\Users\I353721\git\UDP_Go_Back_N-Protocol && c:\Users\I353721\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:60523 -Dfile.encoding=UTF-8 -cp C:\Users\I353721\git\UDP_Go_Back_N-Protocol\UDP_SELECTIVE_REPEAT_SERVER\bin com.java.selectiverepeat.server.ServerApp 9091 clientcop y 0.1 5  
Server listening.. ....  
█
```

### 2.2: UDP\_SELECTIVE\_REPEAT\_CLIENT :

Job of this module is to transfer the file packets to UDP server and also makes sure that within the time limit if ACK is not received for the packet sent the packets lost are retransmitted. Following are the step to be followed to run the UDPClient

1. Click on the Run and Debug icon on the IDE
2. Select `ClientApp<UDP_SELECTIVE_REPEAT_CLIENT>` from the launch config file.
3. As the you select and run new terminal will pop. In the terminal you can observe the packets getting transferred.

```
c:\Users\I353721\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:60344 -Dfile.encoding=UTF-8 -cp C:\Users\I353721\git\UDP_Go_Back_N-Protocol\UDP_SELECTIVE_REPEAT_CLIENT\bin com.java.selectiverepeat.client.ClientApp localhost 9091 clientfile 5 2000  
█
```

**\*\*Note : observe the terminal for packet transmission and ACK \*\***

```
Packet No : 1014
Received Duplicate packet 1014
Packet loss, sequence number:1015
TotalPacketLoss: 203
Packet No : 1016
Packet No : 1017
Packet No : 1018
Received Duplicate packet 1018
Packet No : 1019
Packet loss, sequence number:1020
TotalPacketLoss: 204
Packet No : 1021
Packet No : 1022
Received Duplicate packet 1022
```

**Output:**

At the end of file transmission you can find file created in the UDP\_SELECTIVE\_REPEAT\_SERVER/resources/serverfiles/<filename that you gave in arguments> with data in it.

## 3: Standard TCP and UDP Implementation

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### 3.1.1: TCP Standard

There are two subfolders associated with TCP - Standard

1. TCP\_STANDARD\_CLIENT
2. TCP\_STANDARD\_SERVER

Always run server first and then run the client

**TCP\_STANDARD\_SERVER:**

The job of this module is to accept a filename from the request and serve the file in response to the request. Following are the steps to be followed to run the TCP\_STANDARD\_SERVER:

1. Click on the Run and Debug icon on the IDE.
2. Select <TCP\_STANDARD\_SERVER> from the launch config file.
3. As you select and run, a new terminal will pop. You can see that the server is now serving files in the resources folder in the directory TCP\_STANDARD\_SERVER.

**TCP\_STANDARD\_CLIENT:**

The job of this module is to request for a file from the server and accept the file received as response and store it.

Following are the step to be followed to run the TCP\_STANDARD\_CLIENT:

1. Click on the Run and Debug icon on the IDE.
2. Select <TCP\_STANDARD\_CLIENT> from the launch config file.
3. As the you select and run new terminal will pop. You can see that the client is requesting for a file 'demo\_file.txt' from the server.

### 3.1.2: Output:

At the end of file transmission you can find the file transferred and written into the 'received' directory as 'received\_file.txt'

## Screenshots - TCP

Server:

```
C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol> c:\Users\I353257\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:58195 -Dfile.encoding=UTF-8 -cp C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\TCP_STANDARD_SERVER\bin com.java.standard.tcp.server.ServerApp 9894
Serving directory 'C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\TCP_STANDARD_SERVER\bin\..\resources' on port 9894...
Accepted connection : Socket[addr=/127.0.0.1,port=58286,localport=9894]
Sending demo_file.txt...
Done.
```

Client:

```
C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol> c:\Users\I353257\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:58283 -Dfile.encoding=UTF-8 -cp C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\TCP_STANDARD_CLIENT\bin com.java.standard.tcp.client.ClientApp localhost 9894 demo_file.txt
File demo_file.txt downloaded successfully
```

### 3.2.1: UDP Standard

There are two subfolders associated with TCP - Standard

1. UDP\_STANDARD\_CLIENT
2. UDP\_STANDARD\_SERVER

Always run server first and then run the client

### UDP\_STANDARD\_SERVER:

The job of this module is to accept a filename from the request and serve the file in response to the request.

Following are the step to be followed to run the UDP\_STANDARD\_SERVER:

1. Click on the Run and Debug icon on the IDE.
2. Select <UDP\_STANDARD\_SERVER> from the launch config file.
3. As the you select and run new terminal will pop. You can see that the server is now serving files in the resources folder in the directory UDP\_STANDARD\_SERVER.

### UDP\_STANDARD\_CLIENT:

The job of this module is to request for a file from the server and accept the file received as response and store it.

Following are the step to be followed to run the UDP\_STANDARD\_CLIENT:

1. Click on the Run and Debug icon on the IDE.
2. Select <UDP\_STANDARD\_CLIENT> from the launch config file.
3. As the you select and run new terminal will pop. You can see that the client is requesting for a file 'demo\_file.txt' from the server.

### 3.2.2: Output:

At the end of file transmission you can find the file transferred and written into the 'received' directory as 'received\_file.txt'

### Screenshots - UDP

#### Server:

```
C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol> cd c:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol && c:\Users\I353257\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:50994 -Dfile.encoding=UTF-8 -cp C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\UDP_STANDARD_SERVER\bin com.java.standard.udp.server.ServerApp 9095
Serving directory 'C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\UDP_STANDARD_SERVER\resources' on port 9095...
Sending C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\UDP_STANDARD_SERVER\resources\demo_file.txt...
Done.
```

#### Client:

```
C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol> c:\Users\I353257\.vscode\extensions\vscjava.vscode-java-debug-0.26.0\scripts\launcher.bat "C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:65457 -Dfile.encoding=UTF-8 -cp C:\Users\I353257\Desktop\UDP_Go_Back_N-Protocol\UDP_STANDARD_CLIENT\bin com.java.standard.udp.client.ClientApp localhost 9095 demo_file.txt
File demo_file.txt downloaded successfully
```