DOCUMENTATIE

Tema 3: Noduri Releu (Relay Nodes)

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CUPRINS

1. Obiectivul temei

Tema "Noduri Releu (Relay Nodes)" implică implementarea unui sistem de comunicare între patru noduri într-o topologie specifică, unde un nod expeditor trimite pachete către trei destinații posibile (D1, D2 și D3) prin intermediul unor noduri releu. Scopul este să se creeze un sistem care să gestioneze trimiterea și recepționarea pachetelor între aceste noduri.

2. Proiectare

Pentru implementarea temei, se propune următoarea proiectare:

- Se utilizează o arhitectură client-server pentru comunicația între nodurile din rețea.
- Se implementează patru tipuri de noduri: Expeditor, D1, D2 și D3, fiecare având funcționalități specifice.
- Nodul Expeditor trimite pachete către destinațiile D1, D2 și D3, iar aceste pachete sunt direcționate prin intermediul nodurilor releu.
- Comunicarea între nodurile releu și nodurile destinație se realizează prin socket-uri.

Primul nod destinatie

```
PS C:\Users\40749\Desktop\Java Socket cu thread\Socket cu thread> java RelayNode 8080 127.0.0.1 8081
RelayNode running on port: 8080
Socket info from server: Socket[addr=/127.0.0.1,port=65531,localport=8080]
```

Al doilea nod destinatie

```
PS C:\Users\40749\Desktop\Java Socket cu thread\Socket cu thread> java RelayNode 8081 127.0.0.2 8083
RelayNode running on port: 8081
Socket info from server: Socket[addr=/127.0.0.1,port=49158,localport=8081]
```

Si ultimul nod destinatie

```
PS C:\Users\40749\Desktop\Java Socket cu thread\Socket cu thread> java RelayNode 8083 127.0.0.3 8083
RelayNode running on port: 8083
Socket info from server: Socket[addr=/127.0.0.1,port=49624,localport=8083]
```

Nodul trimitator

```
PS C:\Users\40749\Desktop\Java Socket cu thread\Socket cu thread> java Sender 127.0.0.15 8080
Sender online! Sending 100 packets...
```

3. Testare

Voi copia cateva exemple din terminal :

RelayNode running on port: 8080

Socket info from server: Socket[addr=/127.0.0.1,port=65531,localport=8080]

Received from client: 1

Forwarded to the next hop: 2

Received response from next hop: 3

Received from client: 9

Forwarded to the next hop: 10

Received response from next hop: 11

Received from client: 16

Forwarded to the next hop: 17

Received response from next hop: 18

Received from client: 39

Forwarded to the next hop: 40

Received response from next hop: 41

Received from client: 61

Forwarded to the next hop: 62

Received response from next hop: 63

Received from client: 2

Forwarded to the next hop: 3

Received response from next hop: 4

Received from client: 94

Forwarded to the next hop: 95

Received response from next hop: 96

Received from client: 31

Forwarded to the next hop: 32

Received response from next hop: 33

Received from client: 76

Forwarded to the next hop: 77

Received response from next hop: 78

Received from client: 34

Forwarded to the next hop: 35

Received response from next hop: 36

Received from client: 53

Forwarded to the next hop: 54

Received response from next hop: 55

Received from client: 64

Forwarded to the next hop: 65

Received response from next hop: 66

RelayNode running on port: 8081

Socket info from server: Socket[addr=/127.0.0.1,port=49158,localport=8081]

Received from client: 2

Forwarded to the next hop: 3

Received response from next hop: 3

Received from client: 10

Forwarded to the next hop: 11

Received response from next hop: 11

Received from client: 17

Forwarded to the next hop: 18

Received response from next hop: 18

Received from client: 40

Forwarded to the next hop: 41

Received response from next hop: 41

Received from client: 62

Forwarded to the next hop: 63

Received response from next hop: 63

Received from client: 3

Forwarded to the next hop: 4

Received response from next hop: 4

Received from client: 95

Forwarded to the next hop: 96

Received response from next hop: 96

Received from client: 32

Forwarded to the next hop: 33

Received response from next hop: 33

Received from client: 77

Forwarded to the next hop: 78

Received response from next hop: 78

Received from client: 35

Forwarded to the next hop: 36

Received response from next hop: 36

Received from client: 54

Forwarded to the next hop: 55

Received response from next hop: 55

Received from client: 65

Forwarded to the next hop: 66

Received response from next hop: 66

Received from client: 34

Forwarded to the next hop: 35

Received response from next hop: 35

Received from client: 21

Forwarded to the next hop: 22

Received response from next hop: 22

Received from client: 15

Forwarded to the next hop: 16

Received response from next hop: 16

Received from client: 3

Forwarded to the next hop: 4

Received response from next hop: 4

Received from client: 51

Forwarded to the next hop: 52

Received response from next hop: 52

Received from client: 53

Forwarded to the next hop: 54

Received response from next hop: 54

Received from client: 56

Forwarded to the next hop: 57

Received response from next hop: 57

Received from client: 1

Forwarded to the next hop: 2

Received response from next hop: 2

Received from client: 13

Forwarded to the next hop: 14

Received response from next hop: 14

Received from client: 17

Forwarded to the next hop: 18

Received response from next hop: 18

Received from client: 82

Forwarded to the next hop: 83

Received response from next hop: 83

Received from client: 38

Forwarded to the next hop: 39

Received response from next hop: 39

Received from client: 14

Forwarded to the next hop: 15

Received response from next hop: 15

Received from client: 4

Forwarded to the next hop: 5

Received response from next hop: 5

Received from client: 53

Forwarded to the next hop: 54

Received response from next hop: 54

Received from client: 5

Forwarded to the next hop: 6

Received response from next hop: 6

Received from client: 32

Forwarded to the next hop: 33

Received response from next hop: 33

Received from client: 37

Forwarded to the next hop: 38

Received response from next hop: 38

Received from client: 95

Forwarded to the next hop: 96

Received response from next hop: 96

Received from client: 31

Forwarded to the next hop: 32

Received response from next hop: 32

Received from client: 66

Forwarded to the next hop: 67

Received response from next hop: 67

RelayNode running on port: 8083

Socket info from server: Socket[addr=/127.0.0.1,port=49624,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49625,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49626,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49627,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49628,localport=8083]

Received from client: 3

Socket info from server: Socket[addr=/127.0.0.1,port=49629,localport=8083]

Packet arrived at destination: 3

Socket info from server: Socket[addr=/127.0.0.1,port=49630,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49631,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49632,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49633,localport=8083]

Received from client: 11

Packet arrived at destination: 11

Socket info from server: Socket[addr=/127.0.0.1,port=49634,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49635,localport=8083]

Received from client: 18

Packet arrived at destination: 18

Socket info from server: Socket[addr=/127.0.0.1,port=49636,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49637,localport=8083]

Received from client: 41

Socket info from server: Socket[addr=/127.0.0.1,port=49638,localport=8083]

Packet arrived at destination: 41

Socket info from server: Socket[addr=/127.0.0.1,port=49639,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49640,localport=8083]

Received from client: 63

Packet arrived at destination: 63

Socket info from server: Socket[addr=/127.0.0.1,port=49641,localport=8083]

Received from client: 4

Packet arrived at destination: 4

Socket info from server: Socket[addr=/127.0.0.1,port=49642,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49643,localport=8083]

Received from client: 96

Socket info from server: Socket[addr=/127.0.0.1,port=49644,localport=8083]

Packet arrived at destination: 96

Socket info from server: Socket[addr=/127.0.0.1,port=49645,localport=8083]

Received from client: 33

Packet arrived at destination: 33

Socket info from server: Socket[addr=/127.0.0.1,port=49646,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49647,localport=8083]

Received from client: 78

Packet arrived at destination: 78

Socket info from server: Socket[addr=/127.0.0.1,port=49648,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49649,localport=8083]

Received from client: 36

Packet arrived at destination: 36

Socket info from server: Socket[addr=/127.0.0.1,port=49650,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49651,localport=8083]

Received from client: 55

Packet arrived at destination: 55

Socket info from server: Socket[addr=/127.0.0.1,port=49652,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49653,localport=8083]

Received from client: 66

Packet arrived at destination: 66

Socket info from server: Socket[addr=/127.0.0.1,port=49654,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49655,localport=8083]

Received from client: 35

Packet arrived at destination: 35

Socket info from server: Socket[addr=/127.0.0.1,port=49656,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49657,localport=8083]

Received from client: 22

Socket info from server: Socket[addr=/127.0.0.1,port=49658,localport=8083]

Packet arrived at destination: 22

Socket info from server: Socket[addr=/127.0.0.1,port=49659,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49660,localport=8083]

Received from client: 16

Packet arrived at destination: 16

Socket info from server: Socket[addr=/127.0.0.1,port=49661,localport=8083]

Socket info from server: Socket[addr=/127.0.0.1,port=49662,localport=8083]

Received from client: 4

Packet arrived at destination: 4

Socket info from server: Socket[addr=/127.0.0.1,port=49663,localport=8083]

Received from client: 52

Packet arrived at destination: 52

Received from client: 54

Socket info from server: Socket[addr=/127.0.0.1,port=49153,localport=8083]

Packet arrived at destination: 54

Received from client: 57

Packet arrived at destination: 57

Socket info from server: Socket[addr=/127.0.0.1,port=49159,localport=8083]

Received from client: 2

Packet arrived at destination: 2

Received from client: 14

Packet arrived at destination: 14

Socket info from server: Socket[addr=/127.0.0.1,port=49160,localport=8083]

Received from client: 18

Packet arrived at destination: 18

Received from client: 83

Socket info from server: Socket[addr=/127.0.0.1,port=49161,localport=8083]

Packet arrived at destination: 83

Received from client: 39

Packet arrived at destination: 39

Socket info from server: Socket[addr=/127.0.0.1,port=49670,localport=8083]

Received from client: 15

Packet arrived at destination: 15

Received from client: 5

Packet arrived at destination: 5

Socket info from server: Socket[addr=/127.0.0.1,port=49672,localport=8083]

Received from client: 54

Packet arrived at destination: 54

Received from client: 6

Packet arrived at destination: 6

Socket info from server: Socket[addr=/127.0.0.1,port=64043,localport=8083]

Received from client: 33

Packet arrived at destination: 33

Received from client: 38

Packet arrived at destination: 38

Socket info from server: Socket[addr=/127.0.0.1,port=64343,localport=8083]

Received from client: 96

Packet arrived at destination: 96

Received from client: 32

Packet arrived at destination: 32

Socket info from server: Socket[addr=/127.0.0.1,port=64615,localport=8083]

Received from client: 67

Packet arrived at destination: 67

Sender

Sent to the RelayNode: 1

Received response from RelayNode: 3

Sent to the RelayNode: 9

Received response from RelayNode: 11

Sent to the RelayNode: 16

Received response from RelayNode: 18

Sent to the RelayNode: 39

Received response from RelayNode: 41

Sent to the RelayNode: 61

Received response from RelayNode: 63

Sent to the RelayNode: 2

Received response from RelayNode: 4

Sent to the RelayNode: 94

Received response from RelayNode: 96

Sent to the RelayNode: 31

Received response from RelayNode: 33

Sent to the RelayNode: 76

Received response from RelayNode: 78

Sent to the RelayNode: 34

Received response from RelayNode: 36

Sent to the RelayNode: 53

Received response from RelayNode: 55

Sent to the RelayNode: 64

Received response from RelayNode: 66

Sent to the RelayNode: 33

Received response from RelayNode: 35

Sent to the RelayNode: 20

Received response from RelayNode: 22

Sent to the RelayNode: 14

Received response from RelayNode: 16

Sent to the RelayNode: 2

Received response from RelayNode: 4

Sent to the RelayNode: 50

Received response from RelayNode: 52

Sent to the RelayNode: 52

Received response from RelayNode: 54

Sent to the RelayNode: 55

Received response from RelayNode: 57

Sent to the RelayNode: 0

Received response from RelayNode: 2

Sent to the RelayNode: 12

Received response from RelayNode: 14

Sent to the RelayNode: 16

Received response from RelayNode: 18

Sent to the RelayNode: 81

Received response from RelayNode: 83

Sent to the RelayNode: 37

Received response from RelayNode: 39

Sent to the RelayNode: 13

Received response from RelayNode: 15

Sent to the RelayNode: 3

Received response from RelayNode: 5

Sent to the RelayNode: 52

Received response from RelayNode: 54

Sent to the RelayNode: 4

Received response from RelayNode: 6

Sent to the RelayNode: 31

Received response from RelayNode: 33

Sent to the RelayNode: 36

Received response from RelayNode: 38

Sent to the RelayNode: 94

Received response from RelayNode: 96

Sent to the RelayNode: 30

Received response from RelayNode: 32

Sent to the RelayNode: 65

Received response from RelayNode: 67

4. Observatii

Acest proiect este scris in acelasi proiect exemplu Socket cu thread, insa paginile importante sunt Sender.java si RelayNode.java

Din cauza testelor multiple si deschiderea terminalelor separate, la un moment portul 8082 a fost ocupat si nu l-am mai putut folosi, de aceea portul la ultimul e 8083

Si tot la ultimul nod, am pus nextPort sa fie tot el, de aceea, la afisari apar mai multe chestii decat ma asteptam, dar este functional si fara erori