

# LAB – 1

## REPORT



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- A Lossy Link file was created which extends Link file, for generating variation in delay
- As we can see below, a random number was generated and multiplied with the jitter value which is specified as 4 in the Run file.
- Probabilitypacketloss was set to 0.09 which is equivalent to 9% chance for a packet to get lost while travelling between two nodes.

```
public class Run {
    public static void main (String [] args)
    {
        //Creates two links
        //Link link1 = new Link();
        //Link link2 = new Link();
        LoosyLink link1 = new LoosyLink(0,0,0);
        LoosyLink link2 = new LoosyLink(0,0.4,0.09);
        // Create two end hosts that will be
        // communicating via the router
        Node host1 = new Node(1,1);
        Node host2 = new Node(2,1);
    }
}
```

- Below is the formula for seeing the variation in delay

```
public void recv(SimEnt src, Event ev) {
    if (ev instanceof Message)
    {
        Message recMessage = ((Message) ev);

        double s=randomGenerator.nextDouble();

        System.out.println(this.hashCode()+" s:"+s+" probDropPacket:"+probDropPacket);
        if (s<probDropPacket) {
            System.out.println(this.hashCode()+"s:"+s+" Loosy link recv msg from:"+recMessage.source().networkId()+"."+recMessage.source().networkId());
        }else {
            System.out.println(this.hashCode()+" Loosy link recv msg from:"+recMessage.source().networkId()+"."+recMessage.source().networkId());

            // calculating delay
            double total_delay;

            // variation in delay is seen
            total_delay = this.delay + (s * this.jitter);

            if (src == _connectorA)
            {
                send(_connectorB, ev, total_delay);
            }
            else
            {
                send(_connectorA, ev, total_delay);
            }
        }
    }
}
```

- The generated output

```

Console  Runjava  Linkjava  LoosyLinkjava  Messagejava
<terminated> Run [Java Application] C:\Program Files\Java\jre1.8.0_121\bin\javaw.exe (14 Feb 2018, 11:22:01)
Node 1.1 sent message with seq: 1 at time 0.0
Node 2.1 sent message with seq: 10 at time 0.0
527687162 s:0.2956755878904819 probDropPacket:0.0
527687162 Loosy link rcv msg from:1.1 to: 2.1 seq:1. Loosy link passes it through: 0.0
297021540 s:0.8298251908017268 probDropPacket:0.09
297021540 Loosy link rcv msg from:2.1 to: 1.1 seq:10. Loosy link passes it through: 0.0
Router handles packet with seq: 1 from node: 1.1
Router sends to node: 2.1
297021540 s:0.8128471902422882 probDropPacket:0.09
297021540 Loosy link rcv msg from:1.1 to: 2.1 seq:1. Loosy link passes it through: 0.0
Node 2.1 receives message with seq: 1 at time 0.32513887609691533
Router handles packet with seq: 10 from node: 2.1
Router sends to node: 1.1
527687162 s:0.11890791860440819 probDropPacket:0.0
527687162 Loosy link rcv msg from:2.1 to: 1.1 seq:10. Loosy link passes it through: 0.3319300763206907
Node 1.1 receives message with seq: 10 at time 0.3319300763206907
Node 1.1 sent message with seq: 2 at time 5.0
527687162 s:0.1397053056937375 probDropPacket:0.0
527687162 Loosy link rcv msg from:1.1 to: 2.1 seq:2. Loosy link passes it through: 5.0
Router handles packet with seq: 2 from node: 1.1
Router sends to node: 2.1
297021540 s:0.8712946878561445 probDropPacket:0.09
297021540 Loosy link rcv msg from:1.1 to: 2.1 seq:2. Loosy link passes it through: 5.0
Node 2.1 receives message with seq: 2 at time 5.348517875142457
Node 2.1 sent message with seq: 11 at time 10.0
Node 1.1 sent message with seq: 3 at time 10.0
297021540 s:0.032273901751095124 probDropPacket:0.09
297021540 s:0.032273901751095124 Loosy link rcv msg from:2.1 to: 1.1 seq:11. Packet dropped
527687162 s:0.9447532899514582 probDropPacket:0.0
527687162 Loosy link rcv msg from:1.1 to: 2.1 seq:3. Loosy link passes it through: 10.0
Router handles packet with seq: 3 from node: 1.1
Router sends to node: 2.1
297021540 s:0.24270331052397576 probDropPacket:0.09
297021540 Loosy link rcv msg from:1.1 to: 2.1 seq:3. Loosy link passes it through: 10.0
Node 2.1 receives message with seq: 3 at time 10.09708132420959
Node 1.1 sent message with seq: 4 at time 15.0
527687162 s:0.689983720968475 probDropPacket:0.0
527687162 Loosy link rcv msg from:1.1 to: 2.1 seq:4. Loosy link passes it through: 15.0
Router handles packet with seq: 4 from node: 1.1
Router sends to node: 2.1

```

- Here we can see the different jitter value calculated and the packet loss in the node2 seq:10

| Node1 Sequence | sender | receiver    | jitter     |  |  |  |  |  |  |  | node2seq | sender      | receiver    | jitter   |  |  |  |  |  |  |  |
|----------------|--------|-------------|------------|--|--|--|--|--|--|--|----------|-------------|-------------|----------|--|--|--|--|--|--|--|
| 1              |        | 0           | 2,19384443 |  |  |  |  |  |  |  | 10       | packet loss |             |          |  |  |  |  |  |  |  |
| 2              | 5      | 6,656896034 | 4,463052   |  |  |  |  |  |  |  | 11       | 10          | 13,87755897 | 13,87756 |  |  |  |  |  |  |  |
| 3              | 10     | 10,5681881  | 3,911292   |  |  |  |  |  |  |  | 12       | 20          | 23,2281207  | 9,350562 |  |  |  |  |  |  |  |
| 4              | 15     | 17,71414057 | 7,145952   |  |  |  |  |  |  |  | 13       | 30          | 31,71198245 | 8,483862 |  |  |  |  |  |  |  |
| 5              | 20     | 20,95035722 | 3,236217   |  |  |  |  |  |  |  | 14       | 40          | 40,69793181 | 8,985949 |  |  |  |  |  |  |  |
| 6              | 25     | 26,91357682 | 5,96322    |  |  |  |  |  |  |  | 15       | 50          | 52,8860803  | 12,18815 |  |  |  |  |  |  |  |
| 7              | 30     | 33,13372193 | 6,220145   |  |  |  |  |  |  |  | 16       | 60          | 62,24638546 | 9,360305 |  |  |  |  |  |  |  |
| 8              | 35     | 35,63344346 | 2,499722   |  |  |  |  |  |  |  | 17       | 70          | 73,80483905 | 11,55845 |  |  |  |  |  |  |  |
| 9              | 40     | 41,62790392 | 5,99446    |  |  |  |  |  |  |  | 18       | 80          | 80,69183506 | 6,886996 |  |  |  |  |  |  |  |
| 10             | 45     | 46,91556053 | 5,287657   |  |  |  |  |  |  |  | 19       | 90          | 93,97504261 | 13,28321 |  |  |  |  |  |  |  |

