COL334 - Assignment 4 - Report - Part B - Harshit Mawandia - 2020CS10348
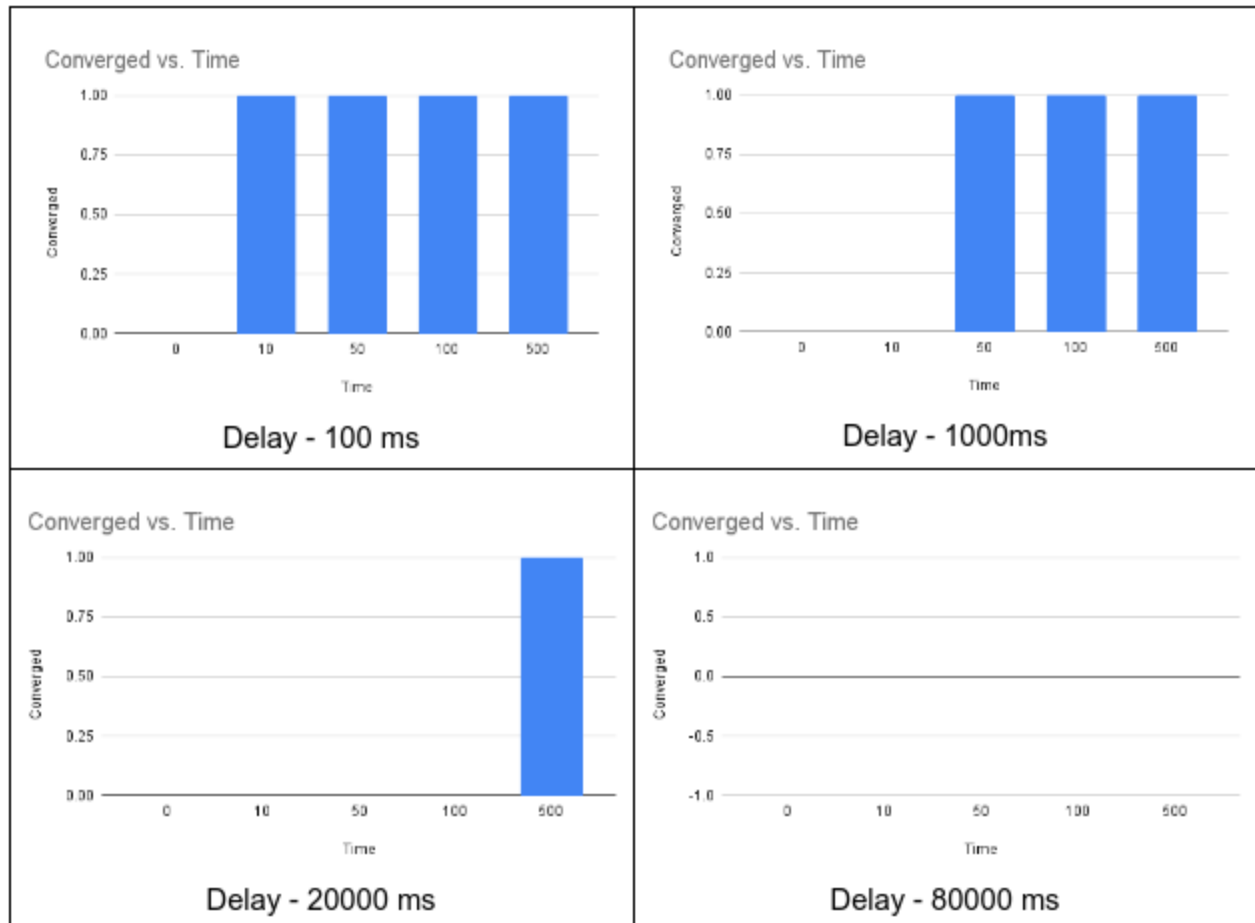
I. Questions

A. On Running the simulation of different values for delays in CSMA channels we get the following plots

Delay - 100 ms

Delay - 1000ms

Delay - 20000 ms

Delay - 80000 ms

B. As the delays increase the routing protocol information is transmitted more slowly across different routers and there for this trend is observed where the time at which Routing Tables converge increases with increase in delays across the CSMA channels increase.

II. The link between R1 and R2 goes down at t=50 sec. The link between R1 and R3 goes down at t=120 sec.

   a. Routing Tables for R1,R2,R3 at different times are
- At T = 121 Routing tables for R1,R2,R3 are:

For R1 :

```
Node: 2, Time: +121.0s, Local time: +121.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        0.0.0.0         255.255.255.0   U     1      -      -   1
```

For R2 :

```
Node: 3, Time: +121.0s, Local time: +121.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.4.0        10.0.3.2        255.255.255.0   UGS   2      -      -   2
10.0.2.0        10.0.3.2        255.255.255.0   UGS   2      -      -   2
10.0.0.0        10.0.3.2        255.255.255.0   UGS   3      -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
```

For R3 :

```
Node: 4, Time: +121.0s, Local time: +121.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.1.0        10.0.3.1        255.255.255.0   UGS   16     -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
10.0.4.0        0.0.0.0         255.255.255.0   U     1      -      -   3
```
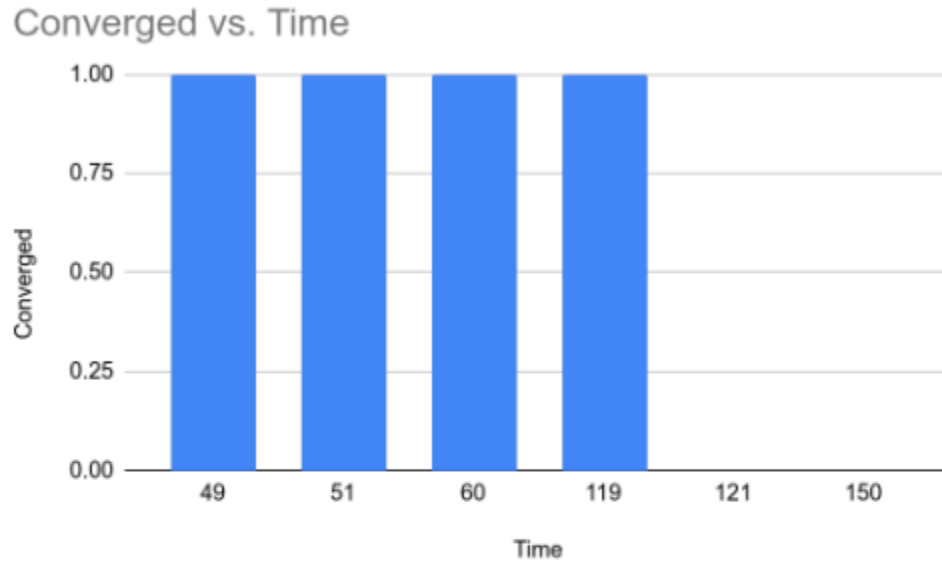
- At T = 180 Routing tables for R1,R2,R3 are:

For R1 :

```
Node: 2, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        0.0.0.0         255.255.255.0   U     1      -      -   1
```

For R2 :

```
Node: 3, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.4.0        10.0.3.2        255.255.255.0   UGS   2      -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
```

For R3 :

```
Node: 4, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.1.0        10.0.3.1        255.255.255.0   UGS   16     -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
10.0.4.0        0.0.0.0         255.255.255.0   U     1      -      -   3
```

b. Plot of Reachability of Dest from Src at different times(1-reachable 0-Not reachable)

Converged vs. Time

c. T=51 is similar to T=119 as at both these times Src can reach Destination from atleast 1 path, i.e., through R1-R3 link. While at T=121 Src can not reach Dest as there is no link that connects R1 to any other node, so src can reach only R1 and any further nodes are not reachable.

III. The link between R1 and R2 goes down at t=50sec. The link between R1 and R3also goes down at t=50sec. The link between (R1 and R2) and between (R1 and R3) comes up at t= 120sec.

a. Routing Tables for R1,R2,R3 at different times are
   - At T = 70 Routing tables for R1,R2,R3 are:

For R1 :

```
Node: 2, Time: +70.0s, Local time: +70.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        0.0.0.0         255.255.255.0   U     1      -      -   1
```

For R2 :

```
Node: 3, Time: +70.0s, Local time: +70.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.4.0        10.0.3.2        255.255.255.0   UGS   2      -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
```

For R3 :

```
Node: 4, Time: +70.0s, Local time: +70.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
10.0.4.0        0.0.0.0         255.255.255.0   U     1      -      -   3
```
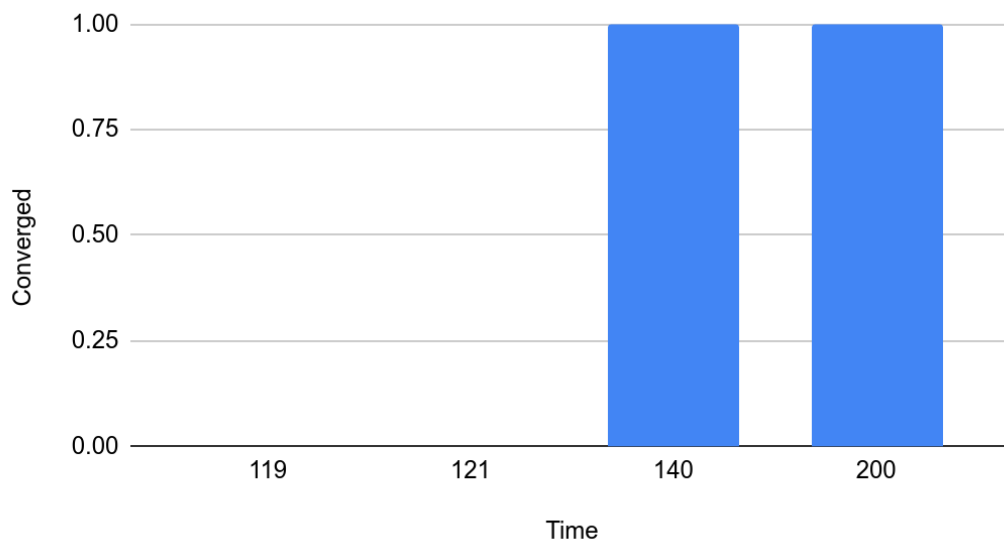
   - At T = 180 Routing tables for R1,R2,R3 are:

For R1 :

```
Node: 2, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.4.0        10.0.2.2        255.255.255.0   UGS   2      -      -   3
10.0.3.0        10.0.1.2        255.255.255.0   UGS   2      -      -   2
10.0.0.0        0.0.0.0         255.255.255.0   U     1      -      -   1
10.0.1.0        0.0.0.0         255.255.255.0   U     1      -      -   2
10.0.2.0        0.0.0.0         255.255.255.0   U     1      -      -   3
```

For R2 :

```
Node: 3, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.4.0        10.0.3.2        255.255.255.0   UGS   2      -      -   2
10.0.2.0        10.0.1.1        255.255.255.0   UGS   2      -      -   1
10.0.0.0        10.0.1.1        255.255.255.0   UGS   2      -      -   1
10.0.1.0        10.0.3.2        255.255.255.0   UGS   3      -      -   2
10.0.3.0        0.0.0.0         255.255.255.0   U     1      -      -   2
10.0.1.0        0.0.0.0         255.255.255.0   U     1      -      -   1
```

For R3 :

```
Node: 4, Time: +180.0s, Local time: +180.0s, IPv4 RIP table
Destination     Gateway         Genmask             Flags Metric Ref     Use Iface
10.0.1.0        10.0.2.1        255.255.255.0    UGS  2      -      -    1
10.0.0.0        10.0.2.1        255.255.255.0    UGS  2      -      -    1
10.0.2.0        10.0.3.1        255.255.255.0    UGS  3      -      -    2
10.0.3.0        0.0.0.0         255.255.255.0    U    1      -      -    2
10.0.4.0        0.0.0.0         255.255.255.0    U    1      -      -    3
10.0.2.0        0.0.0.0         255.255.255.0    U    1      -      -    1
```

b. Plot of Reachability of Dest from Src at different times(1-reachable 0-Not reachable)

Files submitted :
1. 2020CS10348_Report_PartB - Report for Part B of the assignment
2. task1.cc - The Network Topology File for the first task
3. task2.cc - The Network Topology File for the second task
4. task3.cc - The Network Topology File for the third task
5. 4 png files for the plots of Routing tables convergence with time for the first task