COMP9331 Computer Networks and Application
Assignment 2 Report for Session 2, 2017
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Part 1 Description of the Data Structures

1) A v*v matrix is created for internal representation of the newwork topology.
2) Specifically, edges represented by this matrix.
3) In addtion, the weight/cost is also added into the the graph.

Part 2 Tabulated Comparison

Table 1: Comparison of the three routing protocols *

Performance Metrics	SHP	SDP	LLP
Total number of virtual circuit requests	5884	5884	5884
Total number of packets	176067	176067	176067
Number of successfully routed packets	156344	159927	172621
Percentage of successfully routed packets	88.80	90.83	98.04
Number of blocked packets	19723	16140	3446
Percentage of blocked packets	11.20	9.17	1.96
Average number of hops per circuit	2.65	3.31	4.09
Average cumulative propagation delay per circuit	168.93	140.21	251.94

* Virtual circuit network with frequency of 1 packet/sec

Part 3 Explanation of the Performance Reuslts

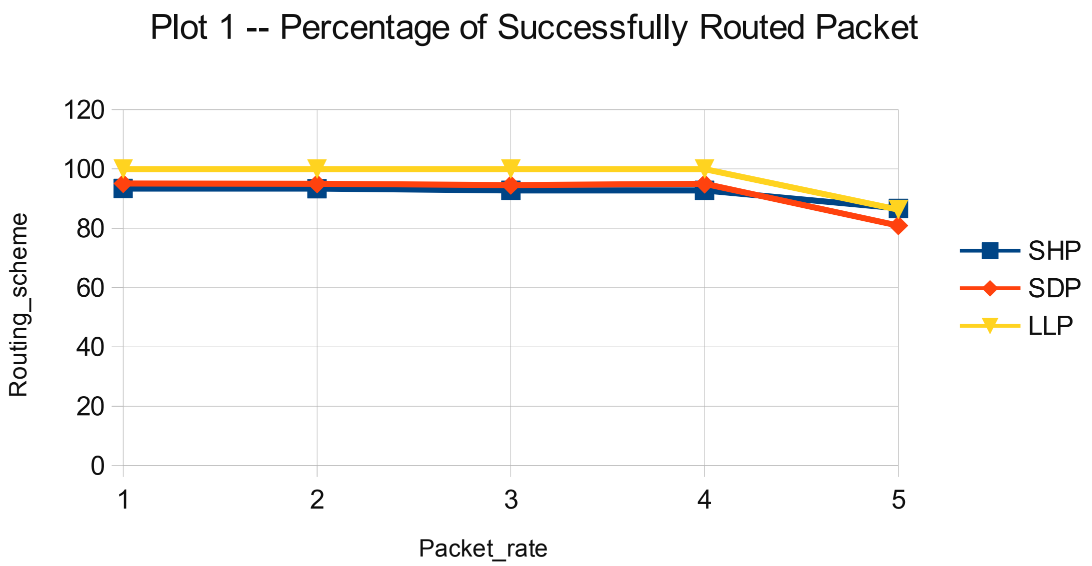
According to the table above(provided for Part 2), it can be concluded that SHP and SDP have almost similar percentage of successfully routed packets which are 88.80 and 90.83 respectively while this percentage of LLP is the highest one which is 98.04.

To explain this performance result,

1) For SHP and SDP – As we set the number of hops (e.g, links) for SHP and the cumulative propagation delay for SDP as the cost in Dijkstra's algorithm, there would be less number of hops (2.65 and 3.31 respectively) visited in SHP and less culmulative propagation delay (168.93 and 140.21 respectively) in SDP. In addtion,the more nodes visited, the more propagation delay would generate so that they have the similar result. Futhermore, the successful percentage shoud be lower than LLP sinceSHP and SDP all ignore the load associated with each link.
2) For LLP – as what provided in the assignment document, it is clear that LLP tries to find the least loased path. From that we know that LLP is hard to be blocked unless all paths to

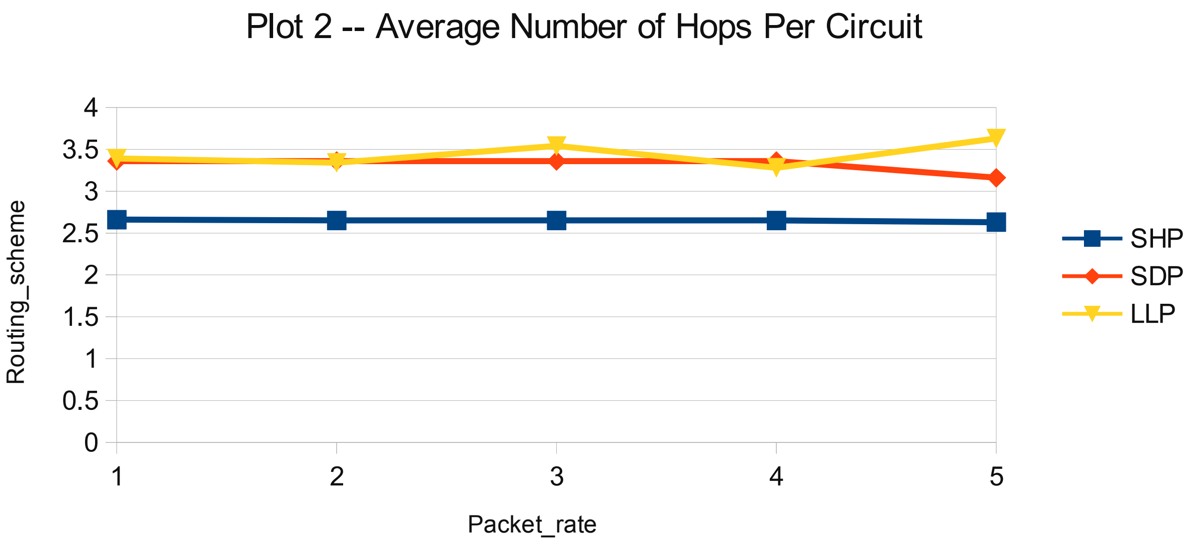
destination are blocked. As LLP ignores the hops and delay associated with each link, it can have the highest propagation whch is far more than other two paths.

Part 4 Plots for Performance (Packet) and Explanation



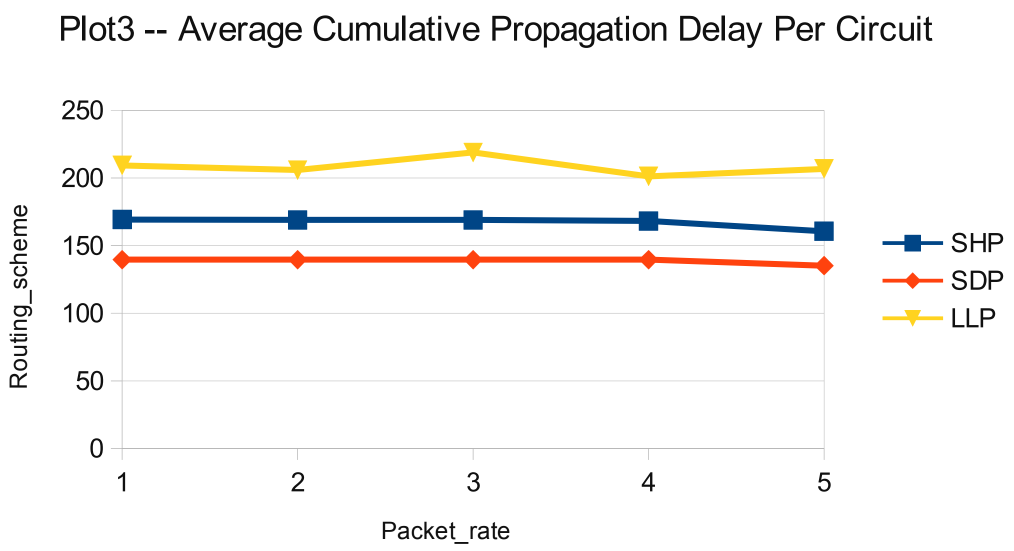
Percentage of Successfully Routed Packet

	SHP	SDP	LLP
1	93.42	95.08	99.99
2	93.36	94.99	99.99
3	92.78	94.56	99.96
4	92.78	94.96	99.99
5	86.68	80.91	86.32



Average Number of Hops Per Circuit

	SHP	SDP	LLP
1	2.66	3.36	3.39
2	2.65	3.36	3.34
3	2.65	3.36	3.54
4	2.65	3.36	3.28
5	2.63	3.16	3.63



Average Cumulative Propagation Delay Per Circuit

	SHP	SDP	LLP
1	169.27	139.55	209.25
2	168.92	139.53	205.77
3	168.89	139.55	218.88
4	168.12	139.55	201.22
5	160.61	135.14	206.74

Part 5 Explanation of Plots

For Plot 1, it can be seen that almost every type of routing_scheme is stable between 1 and 4. However, as the packets increase heavily, the circuit cannot deal with too many packets. Thus, after 5, all numbers of successful pakcets go down.

According to Plot 2, SHP doest not be influenced so much under differetent rate because of its definition. However, with the increasement of packets, the propagation could become more difficult so SDP becoms lower while LLP goes high.

From Plot 3, SDP does not be influenced so much under different rate because of its definition. Since the propagation delay is mainly caused by the number of packets, those three scheme alomost have the same increasement and decreasement.

Part 6 Demo (URL) – use CSE computer to screencast

https://youtu.be/CPPtrHBwfdE

--- NOTE: Please use the 1080HD to see all information clearly.

Thank you!