

Assignment 2 Report

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1. Data structure explanation

In our program, we use an undirected graph (Two-dimensional dictionary specific in python3) to represent the topology structure. We first set nodes as the keys of Two-dimensional dictionary and relations of each node as values. Then initializing all values to zero. If there is a relation between two nodes, we change the value corresponding its position in the graph (1 in SHP, weight value in SDP and rate value in LLP). That's our implementation.

2. Comparison form

performance metrics	SHP	SDP	LLP
<i>total number of virtual circuit requests</i>	5884	5884	5884
<i>number of successfully routed requests</i>	5210	5325	5784
<i>percentage of routed request</i>	88.55	90.50	98.30
<i>number of blocked requests</i>	674	559	100
<i>percentage of blocked request</i>	11.45	9.50	1.70
<i>average number of hops per circuit</i>	2.65	3.32	2.83
<i>average cumulative propagation delay per circuit</i>	168.37	140.67	174.22

3. Analysis of the results

When program run as **SHP**, the weights of each link between two nodes are equal (I set it to 1 in my program). This means in Dijkstra search function, a shortest path will be found from start node to destination. **In this situation, the average hops per circuit should be the lowest.** As the result above, SHP indeed has the lowest hops/circuit (2.65).

In **SDP** model, the program is expected to take delay as consideration when looking for next node(link). **A link with minimum delay will be found from node to node.** This may increase total hops because search is greedy for a lower delay each time, it ignores the number of hops in the path. The table shows the average delay per circuit of SDP is the lowest, it also has a highest result of average hops.

For the situation of LLP, search function will take the ratio of link's current carrying amount and total capacity(current/total). This weight setting will lead the program to find a path with lowest possibility of blocking circuit. Because the program attempts

to avoid blocking each time, the total number of blocked circuit should be the minimum between these three models. As the table shows, the number of blocked circuit is just 100.

Mandatory Screencast Demo:

<https://youtu.be/OeOqO9AJB7c>

Or

<https://www.youtube.com/watch?v=OeOqO9AJB7c&feature=youtu.be>