Programming Assignment for COMP3331
2014 s2
Lecture: Sanjay Jha

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Explanation of Data Structure

The data structure used to for the COMP3331 Assignment was a graph. We had 2 graphs one for all the nodes from A to Z and another one for the nodes we read in. Both these graphs were Array Lists that stored the Node as their Array value. The graph that held the nodes from A to Z was called "allnodes" while the graph that stored values read in from topology and workload files was called "graph".

When a node was read in, we looped through the allnodes graph to find the node, and then we set the Source and destination node based on the value we found. The source and destination along with delay and capacity values, were used to create an edge. The edge represented connection between the two nodes. The edge class created and stored the values between two nodes on the graph.

Tabulation of Results

Note: A packet rate of "1" was used in these values

	Virtual Circuits	Number of packets	Successfully routed packets	Percentage of successfully routed packets	Number of blocked packets	Percentage of blocked packets	Number of hops	Propagation delay
Circuit SHP	8377	259106	236324	91.21	22782	8.79	2.66	168.68
Circuit SDP	8377	259106	239831	92.56	19275	7.44	3.35	140.86
Circuit LLP	8377	259106	243078	93.81	16028	6.19	2.77	175.50
PACKET SHP	259106	259106	258885	99.91	5066	0.09	2.70	171.90
PACKET SDP	259106	259106	258937	99.93	169	0.07	3.44	140.79
PACKET LLP	259106	259106	259036	99.97	70	0.03	2..97	191.36

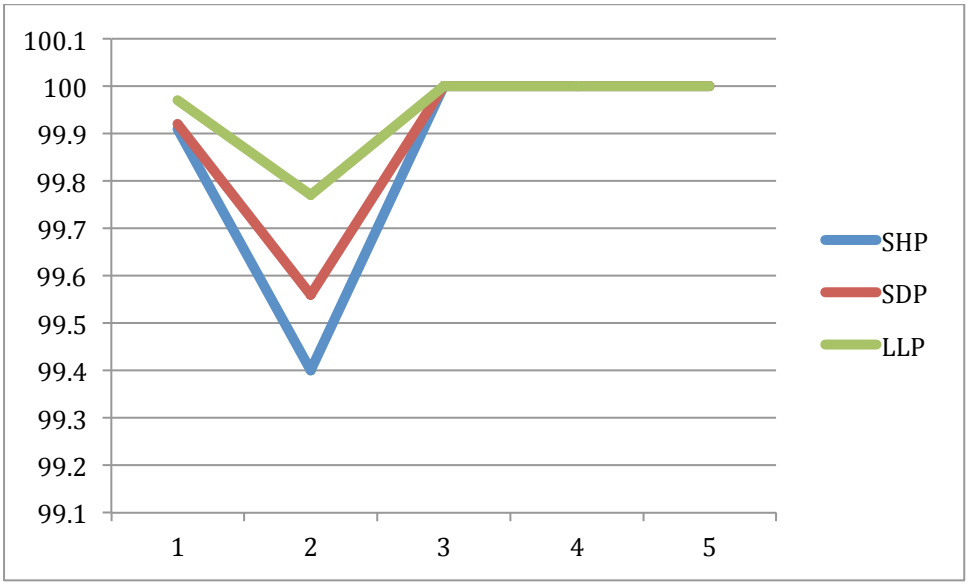
As we can see from the results the SHP has the lowest amount of hops per destination. This is due to the fact that the SHP algorithm looks for the path with the least amount of hops needed, hence it makes sense that SHP would have the least amount of hops.

We can see that the SDP algorithm has the least amount of propagation delay, as this should be expected. The SDP algorithm looks for the path with the least amount of the delay, hence SDP routing algorithm has the least propagation delay.

We can see that the LLP has the least amount of blocked packets compared to other algorithms. This can be down to the fact the LLP algorithm picks the least loaded path. By picking the least loaded path the chance of packets being blocked is being reduced.

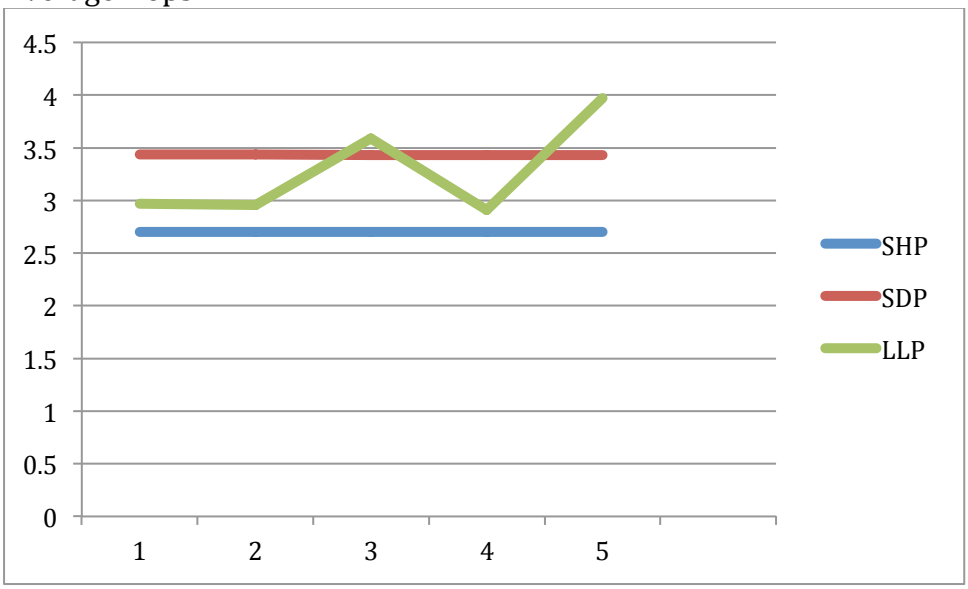
Packet Virtual Analysis

Percentage of Packet delivered successfully:



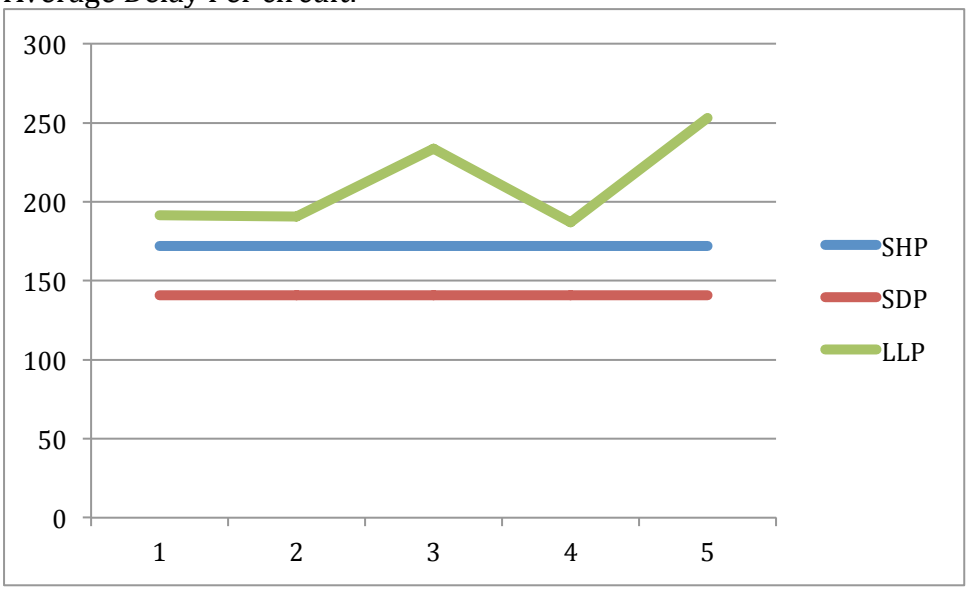
As we can see from the plot that the success rate that it slightly decreases for packet rate of two. Then from a packet rate of 3, it increases to success rate of 100%. With a higher packet rate, the transfer happens quicker and then we can see that it reaches to 100% success rate when packet rate goes 3 or higher.

Average Hops:



We can see that the SDP and SHP hops remain constant through out regardless of the packet rate. For the LLP we can see the hop count changes based on the packet rate. This can be due to the with higher packet rates, transfer increases quicker so hops will change as different path's will be used.

Average Delay Per circuit:



For the SHP and SDP we can see that the delay remains constant through regardless of the packet rate. For the LLP packet rate the delay changes for different packet rates. We can observe that LLP delay and hop follow similar path. When the hop count increases, the delay increases as the packets are going in a longer distance.