Assignment 2 Report
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Data Structures

The graph topology is represented through two dimensional arrays, with the size being the number of nodes squared. These arrays include information relating to each path in the network such as number of hops, propagation delay, maximum virtual circuits and whether a path is busy. A two-dimensional array is also used to represent the routing table which show the shortest paths for each node in the network. Each node is given an integer identifier when it is read from the topology file and stored in a hash table. This makes it easier to program with integers rather than strings. An array is used to store all the incoming virtual circuit requests and are dealt with one by one. When implementing the routing algorithm a 2-dimensional array is used to store all the costs of each edge of the graph. An adjacency list is also used through a hash map by storing the integer corresponding to the node along with all the nodes neighbours.

Performance Metrics	Routing Protocols	
	SHP	SDP
Total number of virtual circuit requests	181951	181951
Total number of packets	132084	119580
Total number of successfully routed packets	72.59	65.72
Number of blocked packets	49867	62371
Percentage of blocked packets	27.41	34.28
Average number of hops per circuit	2.59	3.1
Average cumulative prop. delay of circuit	156.45	138.76

The two routing protocols produce fairly similar results, with the SDP protocol being slightly more effective. This is mainly due to the fact that the SHP protocol does not take into account the weights associated with each edge, this being the propagation delay and maximum virtual circuits. Therefore although the SHP protocol will result in less packets being blocked the overall propagation delay of each circuit is higher. The SDP protocol doesn't consider every node equal and therefore is able to find the shortest path depending on varying factors within the network. Although the SDP protocol results in more blocked packets and greater hops per circuit, nodes where propagation delay is high or maximum virtual circuits are low are avoided. Resulting in shorter propagation delay compared to the SHP protocol.