Answers:

1) Draw a line graph that shows transactions as a function of time interval. Your graph should have one line for each CPU and a line for the total (4 lines total) plotted on the same axis.

A close up of a map

Description automatically generated

2) At the end of Interval 5, which CPU has processed the largest total number of transactions? Please explain how you arrived at your answer and show all calculations you made to determine your answer.

* By the end of interval 5, cpu2 has processed maximum transactions:
* cpu1 tps=665
* cpu2 tps=706
* cpu3 tps=599

3) Your boss believes “performance is bad - one or more of the CPUs must be slow”. Does the data suggest this to be the case? If yes, which CPU is slow? Please explain how you arrived at your answer and show all calculations you made to determine your answer.

- CPU 2 performance degraded with time after 2 intervals as seen from the graph; so boss is thinking that performance of this CPU is bad and has gone down.

Part 2 Answers:

4) Suppose Node E is transmitting data to the network, and you may assume Node E is the only node transmitting data. What is the maximum number of bytes Node E can transmit to the network in 1 minute? Please explain how you arrived at your answers and show all calculations you made to determine your answer.

* The maximum number of bytes can be transmitted by utilizing the maximum bandwidth of each link from Node E. Node E has three links, with the bandwidths being:
* B(D) = 1 megabyte
* B(B) = 2 megabytes
* B(C) = 1 megabyte
* So, maximum data that can be transmitted = B(D) + B(B) + B(C) = 1 + 2 + 1 = 4 megabytes = 4 \* 106 bytes.

5) Your boss says, “It’s taking forever to get data from Node E to Node C - something must be wrong!”. Unfortunately, “something must be wrong” is a little vague. How would you rephrase your boss’ statement as a question that can be answered by network performance data? State your question precisely.

The question could be rephrased precisely in terms of the network bandwidth. In a steady flow, with only Node E sending data, the data could be reaching C from at least three independent paths (provided the network allows multiple paths based on congestion in the network). These are as follows (along with the maximum data that can be transmitted per second).

* E - C : 1 megabyte
* E - D - C : 1 megabyte
* E - B - C : 2 megabytes
* So the total that can be transmitted per second from E to C is 1 + 1 + 2 = 4 megabytes.
* If the network design does not allow for multiple paths to be used, only the path E-C can be used, which implies a maximum of 1 megabyte per second.
* The question could thus be phrased: "Data from node E to node C is going at a low rate. What is the maximum bandwidth possible?"
* The answer to the question would be 4 megabytes per second or 1 megabyte per second depending on whether multiple paths can be used to send data from one node to another or not.

6) Slow Internet connections often are inconvenient to users, many of whom are willing to pay premium prices for fast Internet links. Is network performance just an issue of convenience? How does Internet performance affect the wider community or the environment?

* In the context of accessing data whether it be documents or audio-visual content, network performance may just be an issue of convenience. It would merely take a longer time to access the content.
* But there are other services where slow internet links may make the application unusable. This would be the case for any application that requires live inputs. For instance, live video conferencing would require a minimum bandwidth in order to be usable. If it is not available, live video conferencing would not be possible at all. Other such applications could be live audio, or games played over the internet.
* Therefore, internet performance is not merely a question of convenience. It also dictates what applications can be used.