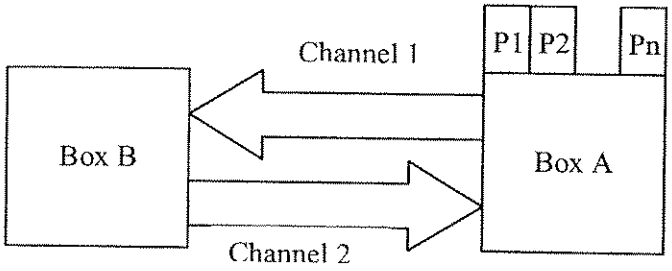
Professor Rosenblum EE quals questions – Jan 2008



Observation Points:
1) CPU-A Utilization
2) CPU-B Utilization
3) Channel 1 Utilization
4) Channel 2 Utilization

I assume you have given a system with to boxes (Box A and Box B) with communication channels between them. Channel 1 allows Box A to talk to Box B while Channel 2 allows Box B to talk to Box A. Processes (P1 … Pn) run on Box A send small request to Box B over Channel 1 and get replies back over Channel 2. A process blocks while waiting for the request to return. The system has 4 observation points where the utilizations of CPUs in Box A and Box B and the utilizations of the communication channels can be seen.

Questions

1) Someone studying the system claims that there is a bandwidth problem on Channel 2 that is causing the system to run slow. What would you expect to observe at each of the Observation points?

2) What if the claim was a latency problem on Channel 1? What would be seen at the observation points.

3) Suggest how you could fix a bandwidth problem by adding software to either box A or B. State what assumptions you fix requires.

4) Could increasing the value of n (the number of processes on Box A) help with a bandwidth problem? How about a latency problem?