

Homework 2

Due: 17 March 2009, In class

Problem 1

Describe two problems that CIDR (Classless Interdomain Routing) addresses. How does CIDR mitigate these problems?

Propose a lookup algorithm for a CIDR forwarding table that does not require a linear search of the routing table to find the longest match.

Problem 2

Consider the simplest possible three router network, A is connected to B, and B is connected to C. A distance vector routing protocol is being used, with the cost from A to B equal to 1 and the cost from B to C equal to 2.

Suppose the link between B and C fails.

- a. Give a sequence of routing-table updates that would lead to a routing loop.
- b. Estimate the probability of the loop assuming updates are sent every 60 seconds (starting from whatever moment the router happens to have booted).
- c. Now estimate the probability if, in addition to the above, routers send updates within one second of a link they are connected to going down.
- d. Now estimate the probability if Split Horizon is used.

Problem 3

Describe a network and a failure situation that would be handled better by Poison Reverse than Split Horizon. Diagrams would help.

Problem 4

What is livelock? Why does a polling architecture help to prevent livelock? What are the drawbacks to a polling architecture, assuming that polling occurs infrequently enough that there is sufficient CPU time to handle the other jobs the system must perform?

Problem 5

Nowadays, Gigabit Ethernet hardware is reasonably priced. In an effort to cut costs, Brown decides they can simplify their network infrastructure by creating a single, very fast switched LAN that encompasses the entire campus.

On the one hand, explain why such a choice would be ok, even if you fully expect there to be several simultaneous connections between pairs of machines on the LAN that require throughput over half a gigabyte per second.

Nonetheless, describe at least two reasons not to pursue this plan.