Network Administration/System Administration Homework #2

Professor: Hsin-Mu Tsai

b03502040 劉君猷

Network Administration

1 20%

CSMA/CD protocol, whose principle is "sense before transmit", is designed to solve the broadcast collision problem in the bus network model. With the modern Ethernet networks, it's more usual to use the star network model. Compared with bus network, it can be more reliable because if one computer or its connection breaks it doesn't affect the other computers and their connections, though it cost higher on the network layout.

REFERENCE:

(1) [http://www.cs.nthu.edu.tw/~nfhuang/chap04.htm]
(2) [https://en.wikipedia.org/wiki/Bus_network]
(3) [https://en.wikipedia.org/wiki/Star_network]
(4) [https://en.wikipedia.org/wiki/Carrier_sense_multiple_access]
(5) [https://en.wikipedia.org/wiki/10_Gigabit_Ethernet]

2 20%

a)

Hidden Terminal Problem: There's a node B in the intersection of transmitting range of node A and node C, but A and C are out of range to each other. Now, A and C are going to send a packet to B. While A is communicating to B, for C can not detect the transmission from A through CSMA, C is simultaneously communicating to B. So it will cause collision.

Exposed Terminal Problem: There's an alignment of node from left to right as A, B, C, D. A is out of range of C. D is out of range of B. Now C is prepared to communicate with D, it hear that B, which is in its range, is communicating with A through CSMA, so it stopped. However, the transmission between C and D is not conflicted to the transmission between A and B, the delay is redundant.

REFERENCE:

(1) [http://oilcut123.pixnet.net/blog/post/354490151-%5b整理%5d-hi#comment-119699030]
(2) [https://en.wikipedia.org/wiki/Hidden_node_problem]
(3) [https://en.wikipedia.org/wiki/Exposed_node_problem]

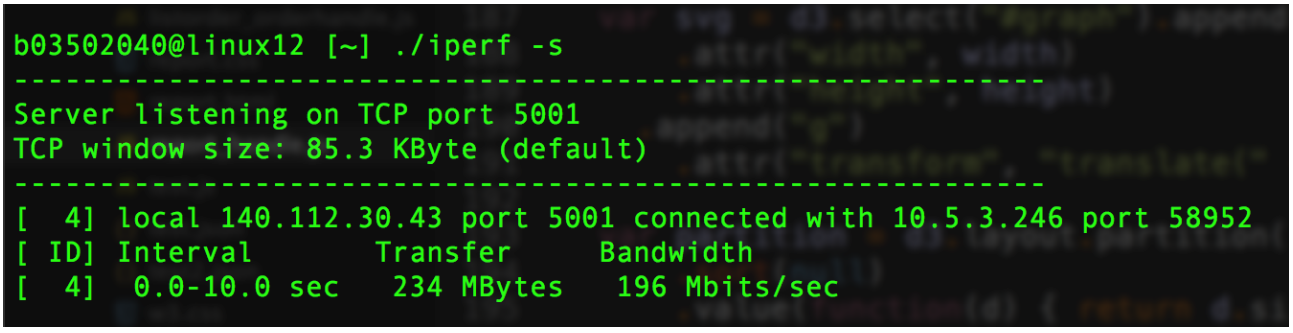
b)

The "RTS/CTS" method can solve both problems above. In hidden terminal problem, A send RTS to B, and B send CTS to all node going to communicate with it (including C) to stopped talking to it even if C is not in the range of A. In the exposed terminal problem, when C detect the RTS sent by B to A, it will not detect the corresponding CTS. As the result, C can continue communicate with D (but the prerequisite is that the nodes are synchronized and packet sizes and data rates are the same for both transmitting nodes).

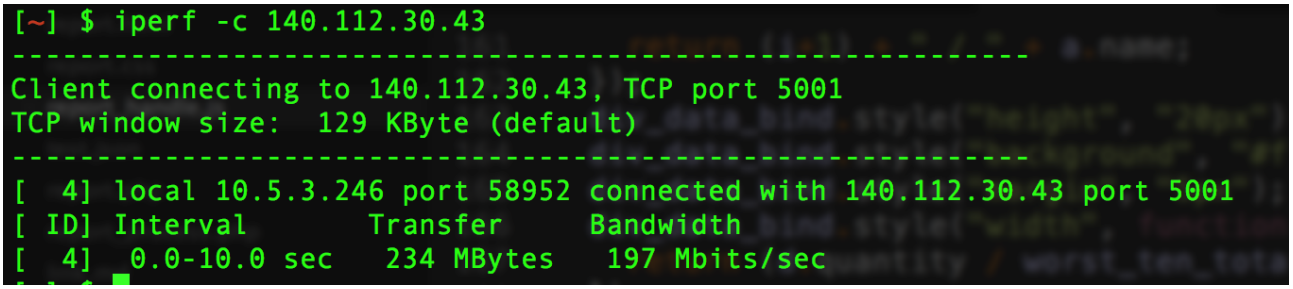
3 60%

At the beginning, I tried to apt-get install perf on workstation, but I don't have enough authority for I'm not a superuser. As the result, I copied the binary file of iperf in Debian to my workstation. I have perf on my Mac. And I did this operation on wireless 2.4G csie_5G. The following pictures are my results of using iperf to measure the bandwidth from my macbook to workstation.

[SERVER SIDE]



[CLIENT SIDE]



REFERENCE:

(1) [http://benjr.tw/462]