

Homework #2 Solution

Contact TAs: vegetable@csie.ntu.edu.tw

Network Administration

1

The modern Ethernet networks often use network switches to connect their links rather than network hub now. Since each link that connect to the switch has its own separate port, it doesn't use share media anymore hence CSMA is not necessary. Furthermore, some of the modern network application even remove this protocol, such as 10 Gigabit Ethernet which is define by IEEE 802.3ae-2002 standard. It used full duplex point-to-point links and those links are generally connected by network switches. Full duplex mean two side of a link can send message to each other simultaneously, the most common example is telephone.

(One of the best answers, written by B01201049.)

2

a)

Hidden Terminal Problem: When a terminal B is in the intersection of transferring range of terminal A and terminal C, and terminal A and terminal C are not in each others transferring range, this is called hidden terminal problem. While terminal A is transferring data to terminal B, terminal C cannot detect the data transfer and thoughts terminal B is now idling. If terminal C transferred data at the same time, there would cause a collision on terminal B.

Exposed Terminal Problem: When a terminal C wants to transfer data to terminal D, it finds out that in its transferring range Terminal B is transferring data to Terminal A. This would cause terminal C delaying to transmit. However, B to A and C to B are not collision.

(One of the best answers, written by B02705032.)

b)

Solving Hidden Terminal Problem by RTS/CTS: When a terminal A wants to transfer data to terminal B, terminal A send a RTS packet to terminal B first. Terminal B then sends CTS packets to others who want to transfer data to it. After RTS and CTS sending, terminal A starts to transfer data to terminal B.

Solving Exposed Terminal Problem by RTS/CTS: As the graph above, When B wants to transfer data to A, B sends RTS to A and A sends CTS to B. However, C can only get RTS from B to C. Therefore, C knows that A is not in its range. While B is transmitting with A, C wants to transmit with D. C sends RTS to D and D sends CTS back to C. However, B can only hear RTS of C. Therefore B knows that D is not in its range and it can continue transmitting with A. Also C can start transmitting with D.

(One of the best answers, written by B02705032.)

3

You can download iperf source code online. Configure the install path, such as, `./configure --prefix=...`. Compile and install according to the README or INSTALL guidance. Then the executable is generated. Use it to test the bandwidth. Please mind the version of iperf, different version of iperf might

not cowork successfully.
(Reference solution By TA)

System Administration

1 LVM setup

```
parted /dev/sda mklabel gpt
parted /dev/sda mkpart primary 0% 200GiB
parted /dev/sda mkpart primary 200GiB 100%
parted /dev/sda set 2 lvm on
pvcreate /dev/sda2 /dev/sdb
vgcreate nasavg /dev/sda2 /dev/sdb
lvcreate -n home_student -L 300G nasavg
lvcreate -n home_ta -l 100%FREE nasavg
mkfs -t vfat -F 32 /dev/sda1
mkfs -t ext4 /dev/nasavg/home_student
mkfs -t ext4 /dev/nasavg/home_ta
```

2 LVM resize

```
lvresize --resizefs -L -100G /dev/nasavg/home_ta
lvresize --resizefs -L +100G /dev/nasavg/home_student
```