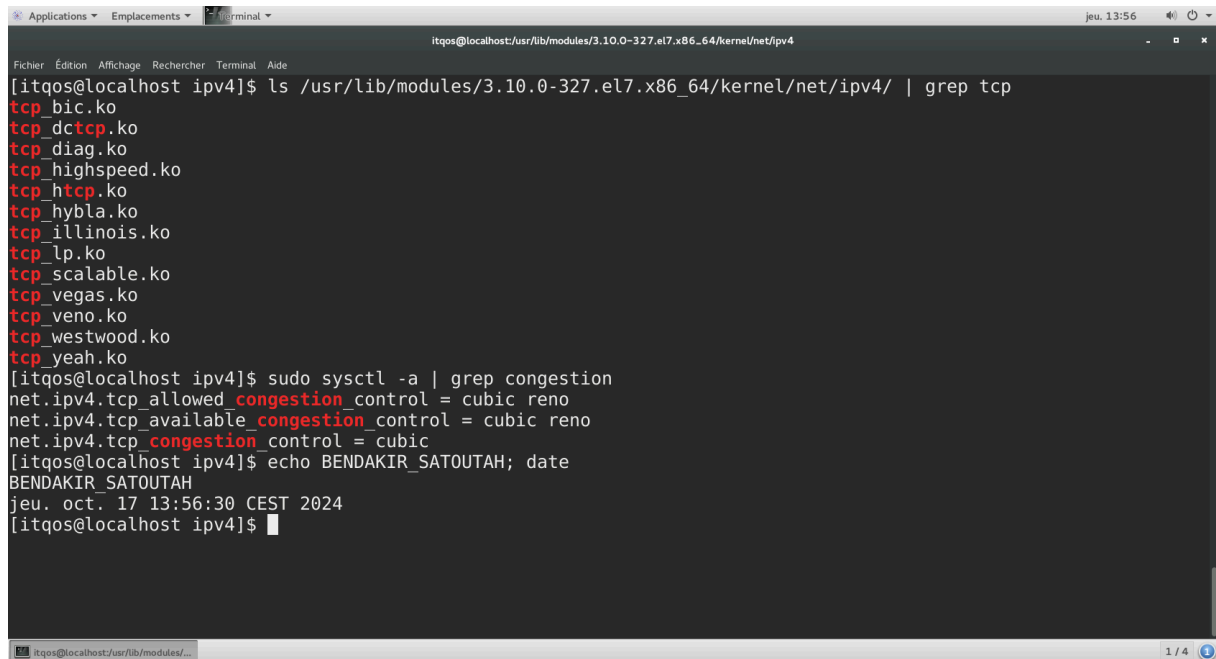


Compte Rendu ITQoS TME2

Response 1:

A terminal window titled 'Terminal' with a menu bar (Fichier, Edition, Affichage, Rechercher, Terminal, Aide) and a status bar (jeu. 13:56). The terminal shows the following commands and output:

```
[itqos@localhost ipv4]$ ls /usr/lib/modules/3.10.0-327.el7.x86_64/kernel/net/ipv4/ | grep tcp
tcp_bic.ko
tcp_dctcp.ko
tcp_diag.ko
tcp_highspeed.ko
tcp_htcp.ko
tcp_hybla.ko
tcp_illinois.ko
tcp_lp.ko
tcp_scalable.ko
tcp_vegas.ko
tcp_veno.ko
tcp_westwood.ko
tcp_yeah.ko
[itqos@localhost ipv4]$ sudo sysctl -a | grep congestion
net.ipv4.tcp_allowed_congestion_control = cubic reno
net.ipv4.tcp_available_congestion_control = cubic reno
net.ipv4.tcp_congestion_control = cubic
[itqos@localhost ipv4]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 13:56:30 CEST 2024
[itqos@localhost ipv4]$
```

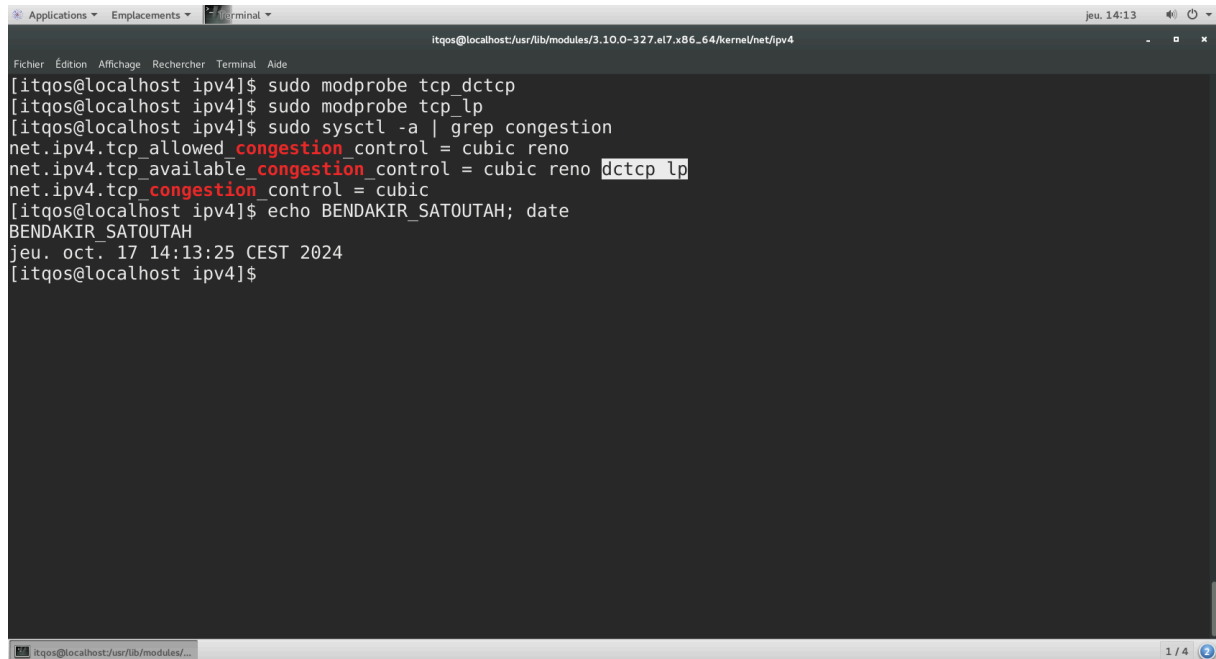
From the result of the first command, we can see that the machine uses a lot of congestion control protocols like **tcp_dctcp**, **tcp_lp**, **tcp_htcp**, **tcp_bic**, **tcp_hybla**, **tcp_scalable**, **tcp_vegas**...

From the result of the second command, we can see that the active protocols are **cubic** and **reno**.

Response 2:

2.1. From the previous capture (last line of the second command), the current congestion control protocol is **tcp_cubic** (**net.ipv4.tcp_congestion_control = cubic**).

2.2



```
itqos@localhost: /usr/lib/modules/3.10.0-327.el7.x86_64/kernel/net/ipv4
Fichier  Édition  Affichage  Recherche  Terminal  Aide
[itqos@localhost ipv4]$ sudo modprobe tcp_dctcp
[itqos@localhost ipv4]$ sudo modprobe tcp_lp
[itqos@localhost ipv4]$ sudo sysctl -a | grep congestion
net.ipv4.tcp_allowed_congestion_control = cubic reno
net.ipv4.tcp_available_congestion_control = cubic reno dctcp lp
net.ipv4.tcp_congestion_control = cubic
[itqos@localhost ipv4]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 14:13:25 CEST 2024
[itqos@localhost ipv4]$
```

After adding tcp_dctcp and tcp_lp as active congestion control protocols (the first two commands), we can see that they appear in the respective list (result of the third command).

Response 3:

3.1

The name of the function that calculates the congestion window in TCP cubic is called **bictcp_update**.

The value of the constant c is **41**.

3.2

The value of the multiplicative factor β is calculated in the program thanks to the beta variable, which is set to **717**. This means that $\beta = 717 / 1024$, approximately **0.7**.

Response 4:

4.1

During the transfer (first capture), we can see that the average output is **11.5MB/s = 96,46Mbit/s**. While at the end (second capture), it showed an average output of **11.8MB/s = 98.98Mbits/s**.

```
Applications Emplacements Terminal PC11
Fichier Édition Affichage Rechercher Terminal Aide
9387674624 octets (9.4 GB) copiés, 34.6279 s, 271 MB/s

Les options sont :
  --help      afficher l'aide et quitter
  --version   afficher des informations de version et quitter

Aide en ligne de GNU coreutils : <http://www.gnu.org/software/coreutils/>
Signalez les problèmes de traduction de « dd » à : <traduc@traduc.org>
Utilisez « info coreutils 'dd invocation' » pour toute la documentation
[itqos@localhost ipv4]$ telnet pc12
Trying pc12...
[PC12 /usr/lib/modules/3.10.0-327.el7.x86_64/kernel/net/ipv4]# cd
[PC12 ~]#
[PC12 ~]#
[PC12 ~]#
[PC12 ~]#
[PC12 ~]# sudo /usr/sbin/sshd
[PC12 ~]# telnet pc11
Trying pc11...
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier12
The authenticity of host 'pc12 (10.14.12.5)' can't be established.
ECDSA key fingerprint is 8a:9f:01:63:28:c3:2e:79:45:45:b0:00:70:30:dd:1c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'pc12,10.14.12.5' (ECDSA) to the list of known hosts.
itqos@pc12's password:
gfichier 19% 233MB 11.5MB/s 01:23 ETA
```

```
Applications Emplacements Terminal PC11
Fichier Édition Affichage Rechercher Terminal Aide
Aide en ligne de GNU coreutils : <http://www.gnu.org/software/coreutils/>
Signalez les problèmes de traduction de « dd » à : <traduc@traduc.org>
Utilisez « info coreutils 'dd invocation' » pour toute la documentation
[itqos@localhost ipv4]$ telnet pc12
Trying pc12...
[PC12 /usr/lib/modules/3.10.0-327.el7.x86_64/kernel/net/ipv4]# cd
[PC12 ~]#
[PC12 ~]#
[PC12 ~]#
[PC12 ~]#
[PC12 ~]# sudo /usr/sbin/sshd
[PC12 ~]# telnet pc11
Trying pc11...
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier12
The authenticity of host 'pc12 (10.14.12.5)' can't be established.
ECDSA key fingerprint is 8a:9f:01:63:28:c3:2e:79:45:45:b0:00:70:30:dd:1c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'pc12,10.14.12.5' (ECDSA) to the list of known hosts.
itqos@pc12's password:
gfichier 74% 885MB 1gfichier
93% 1110MB 11.9gfichier 100% 1192MB 11.8MB/s 01:41

[PC11 ~]#
[PC11 ~]# echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 14:56:34 CEST 2024
[PC11 ~]#
```

4.2

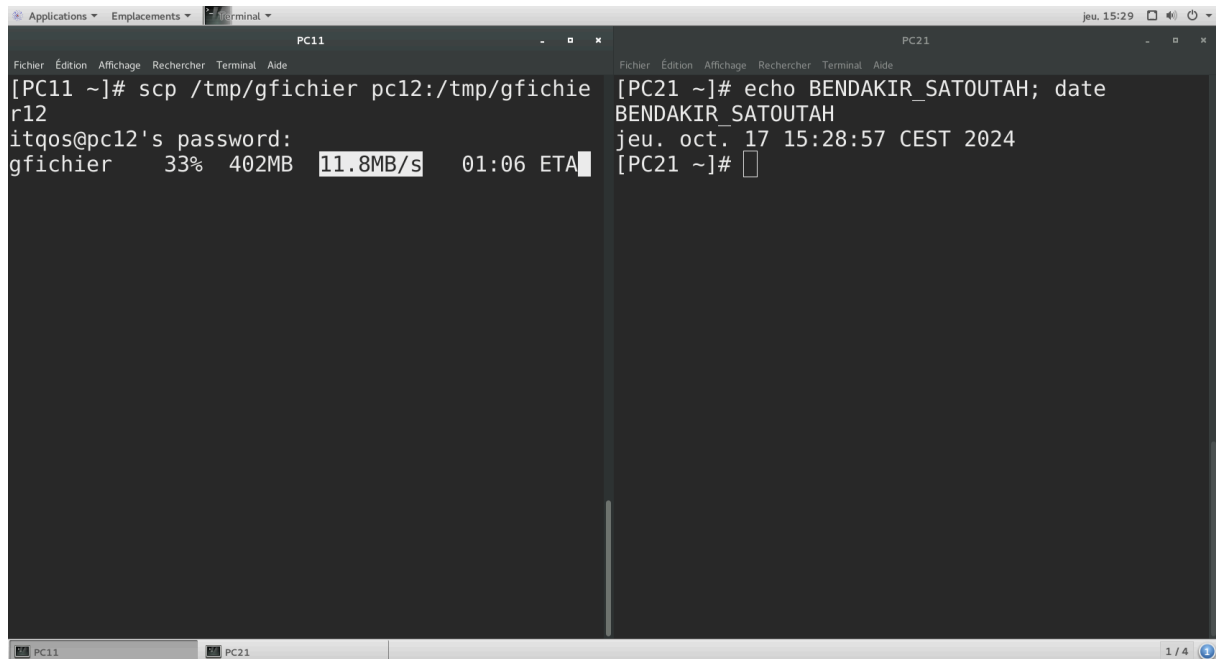
During the first transfer between PC11 -> PC12 (first capture), we can see that the average output is **11.8MB/s = 98.98Mbits/s**.

Then, when the transfer between PC21 -> PC22 begins (second capture), it has a weak output (**1.7MB/s = 14.26Mbits/s**) while the first transfer stills at a high output (**10.8MB/s = 90.59Mbits/s**).

However, after some time, the second transfer's output speed starts to increase while the first one's start to decrease in a linear way between them (third capture) i.e. the output of the first + the output of the second = the maximum output (approximately **11.8MB/s =**

98.98Mbits/s). We notice a convergence to the mean output ($11.8 / 2 = \mathbf{5.9MB/s = 49.49Mbit/s}$).

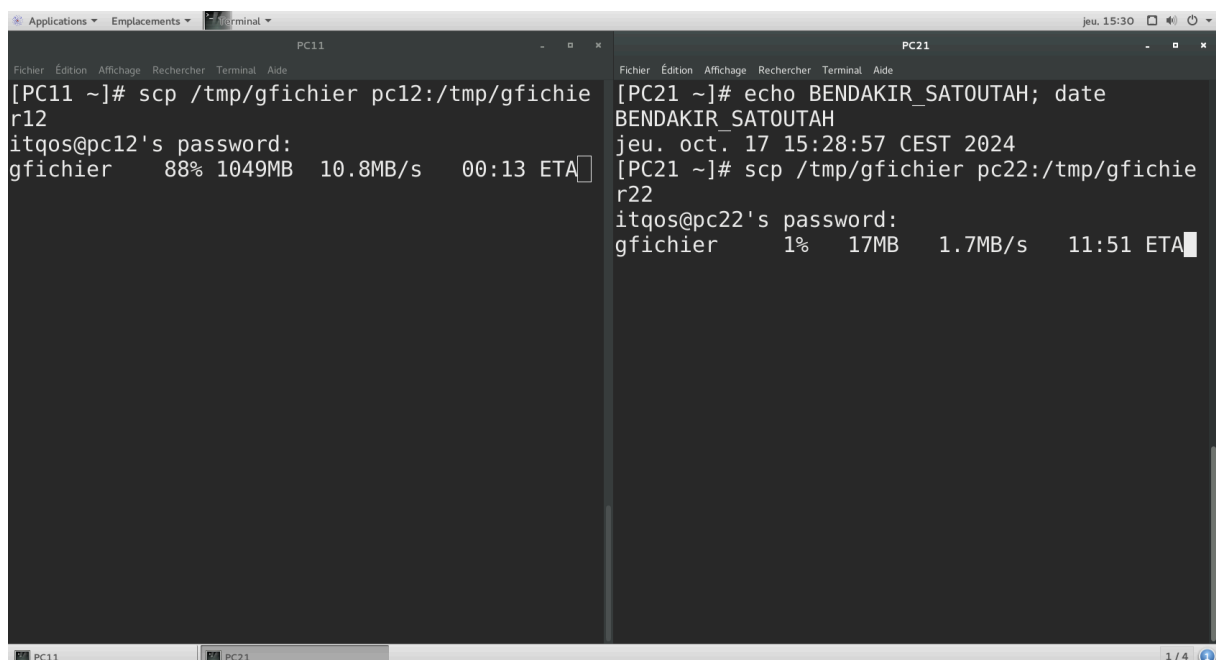
Then when the first transfer's finish (fourth capture), the output of the second output starts increasing until it reaches the maximum output (**11.8MB/s = 98.98Mbits/s**).



The screenshot shows two terminal windows side-by-side. The left window, titled 'PC11', displays the command `scp /tmp/gfichier pc12:/tmp/gfichier12` and the password prompt for 'itqos@pc12'. The progress bar shows 33% completion, 402MB transferred, a speed of 11.8MB/s, and 01:06 ETA. The right window, titled 'PC21', shows the command `echo BENDAKIR_SATOUTAH; date` and the output: `jeu. oct. 17 15:28:57 CEST 2024`.

```
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
gfichier 33% 402MB 11.8MB/s 01:06 ETA

[PC21 ~]# echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 15:28:57 CEST 2024
[PC21 ~]#
```



The screenshot shows two terminal windows side-by-side. The left window, titled 'PC11', displays the command `scp /tmp/gfichier pc12:/tmp/gfichier12` and the password prompt for 'itqos@pc12'. The progress bar shows 88% completion, 1049MB transferred, a speed of 10.8MB/s, and 00:13 ETA. The right window, titled 'PC21', shows the command `echo BENDAKIR_SATOUTAH; date` and the output: `jeu. oct. 17 15:28:57 CEST 2024`. Below that, it shows the command `scp /tmp/gfichier pc22:/tmp/gfichier22` and the password prompt for 'itqos@pc22'. The progress bar shows 1% completion, 17MB transferred, a speed of 1.7MB/s, and 11:51 ETA.

```
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
gfichier 88% 1049MB 10.8MB/s 00:13 ETA

[PC21 ~]# echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 15:28:57 CEST 2024
[PC21 ~]# scp /tmp/gfichier pc22:/tmp/gfichier22
itqos@pc22's password:
gfichier 1% 17MB 1.7MB/s 11:51 ETA
```

The screenshot shows two terminal windows side-by-side. The left window, titled 'PC11', displays the command `scp /tmp/gfichier pc12:/tmp/gfichier2` and the password prompt for `itqos@pc12`. The progress bar shows 99% completion, 1186MB transferred, 6.4MB/s speed, and 00:00 ETA. The right window, titled 'PC21', displays the command `echo BENDAKIR_SATOUTAH; date` followed by `scp /tmp/gfichier pc22:/tmp/gfichier2` and the password prompt for `itqos@pc22`. The progress bar shows 12% completion, 145MB transferred, 5.5MB/s speed, and 03:09 ETA. The system clock at the top right indicates 'jeu. 15:30'.

```
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier2
itqos@pc12's password:
gfichier  99% 1186MB  6.4MB/s  00:00 ETA

[PC21 ~]# echo BENDAKIR_SATOUTAH; date
jeu. oct. 17 15:28:57 CEST 2024
[PC21 ~]# scp /tmp/gfichier pc22:/tmp/gfichier2
itqos@pc22's password:
gfichier  12% 145MB  5.5MB/s  03:09 ETA
```

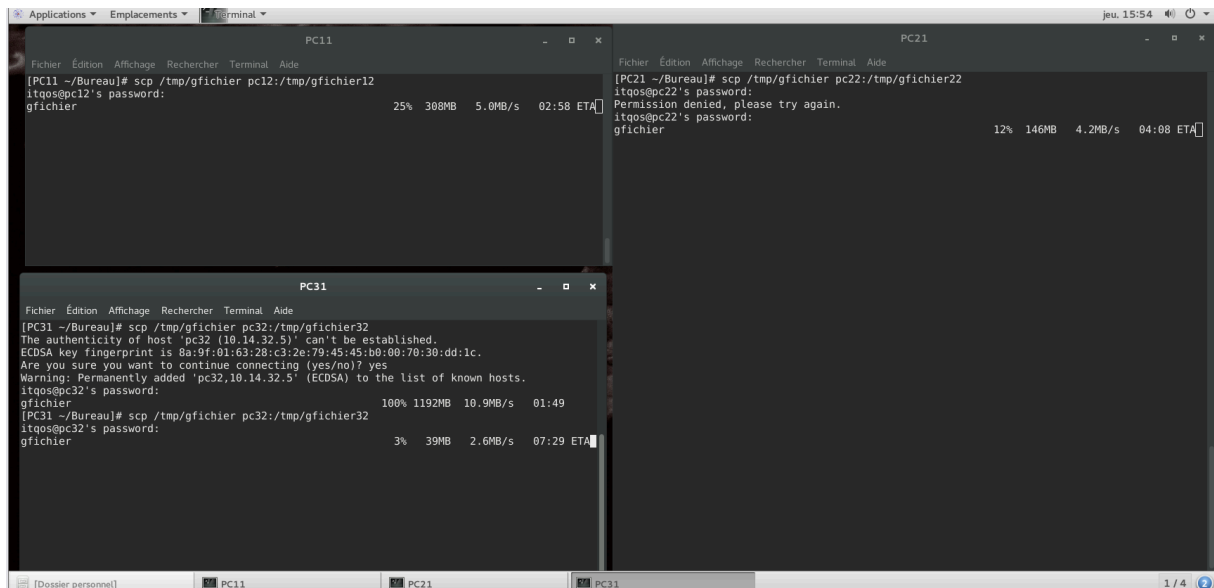
The screenshot shows two terminal windows side-by-side. The left window, titled 'PC11', displays the command `scp /tmp/gfichier pc12:/tmp/gfichier2` and the password prompt for `itqos@pc12`. The progress bar shows 100% completion, 1192MB transferred, 10.5MB/s speed, and 01:54 time. The right window, titled 'PC21', displays the command `echo BENDAKIR_SATOUTAH; date` followed by `scp /tmp/gfichier pc22:/tmp/gfichier2` and the password prompt for `itqos@pc22`. The progress bar shows 56% completion, 673MB transferred, 11.8MB/s speed, and 00:44 ETA. The system clock at the top right indicates 'jeu. 15:31'.

```
[PC11 ~]# scp /tmp/gfichier pc12:/tmp/gfichier2
itqos@pc12's password:
gfichier  100% 1192MB  10.5MB/s  01:54
[PC11 ~]# echo BENDAKIR_SATOUTAH; date
jeu. oct. 17 15:31:14 CEST 2024
[PC11 ~]#

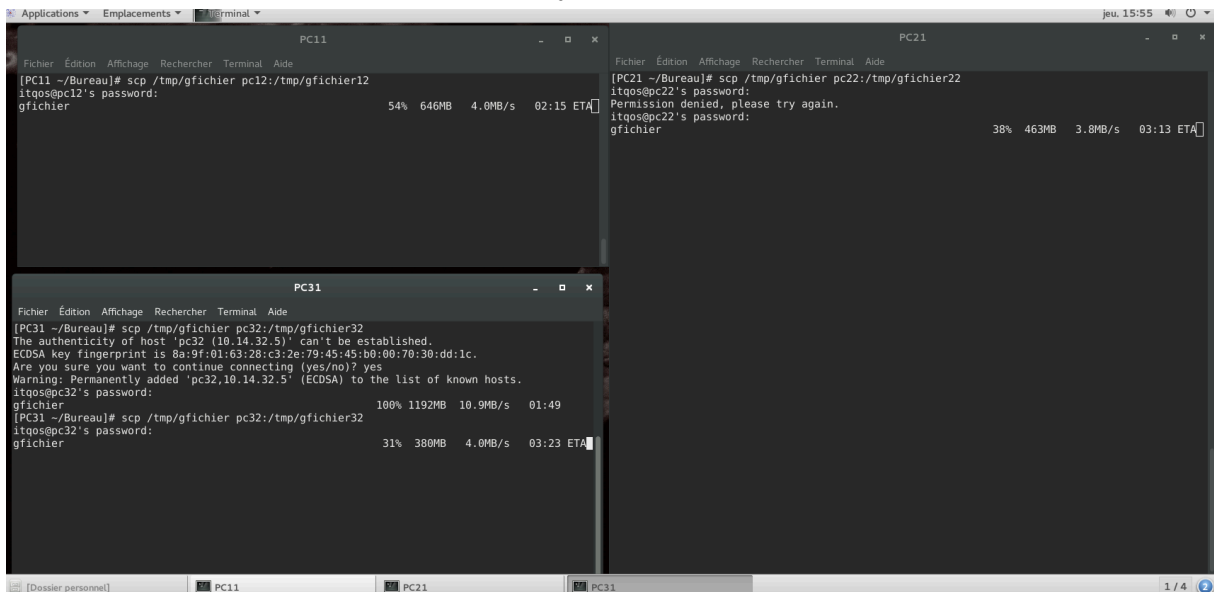
[PC21 ~]# echo BENDAKIR_SATOUTAH; date
jeu. oct. 17 15:28:57 CEST 2024
[PC21 ~]# scp /tmp/gfichier pc22:/tmp/gfichier2
itqos@pc22's password:
gfichier  56% 673MB  11.8MB/s  00:44 ETA
```

4.3

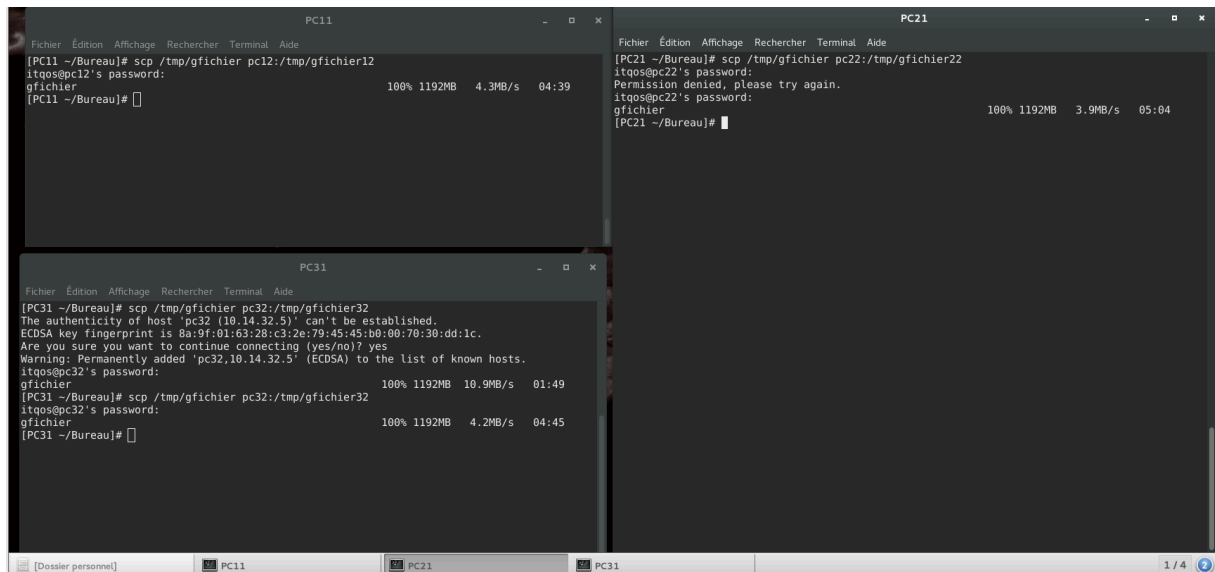
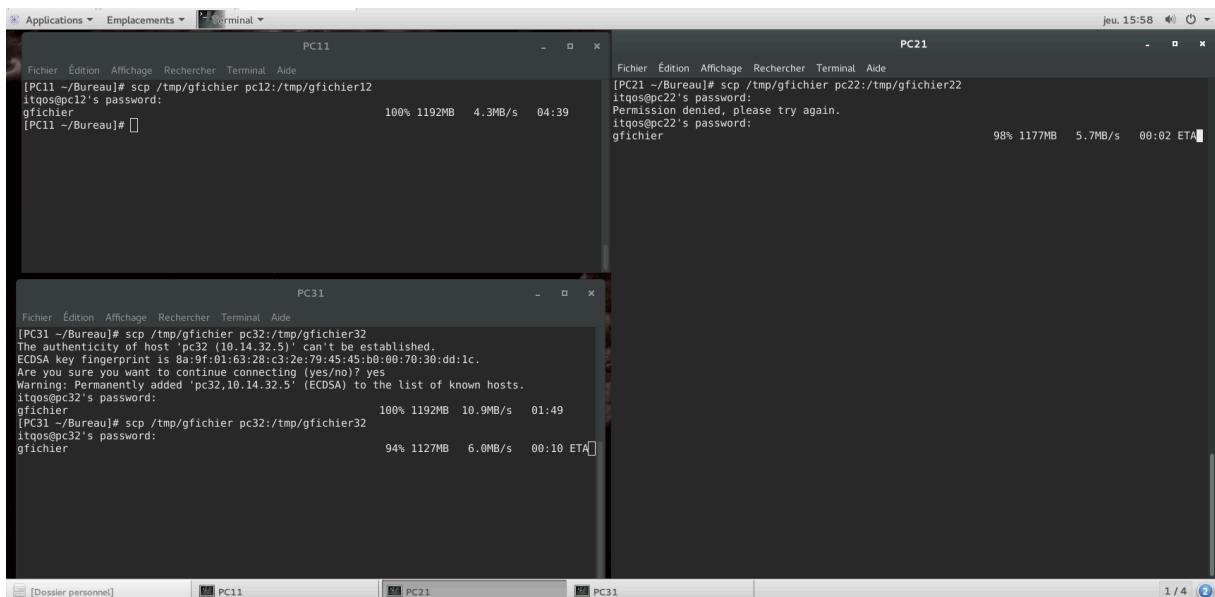
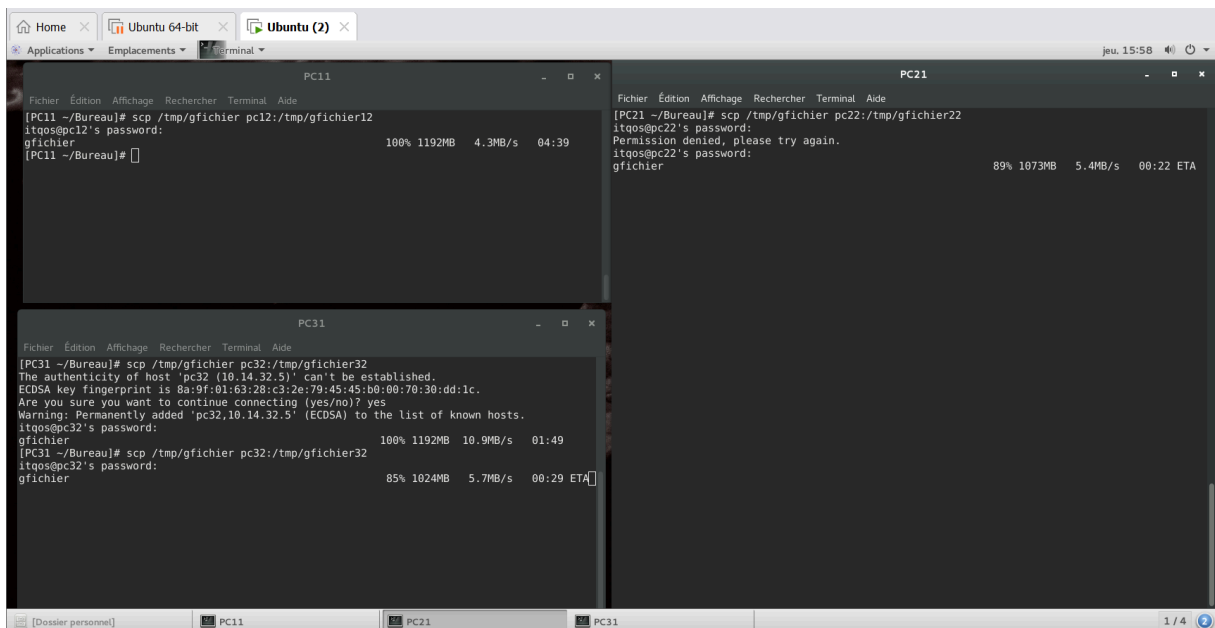
When we launch the three transfers (first capture, PC11 -> PC12 then PC21 -> PC22 then PC31 -> PC32), we notice how the first transfer had the highest output, while the second one had higher than the third.



Then after a while, we notice how the three transfers slowly converge to the mean value ($11.8 / 3 = 3.9\text{MB/s} = 32.71\text{Mbit/s}$) and stay there (second capture).

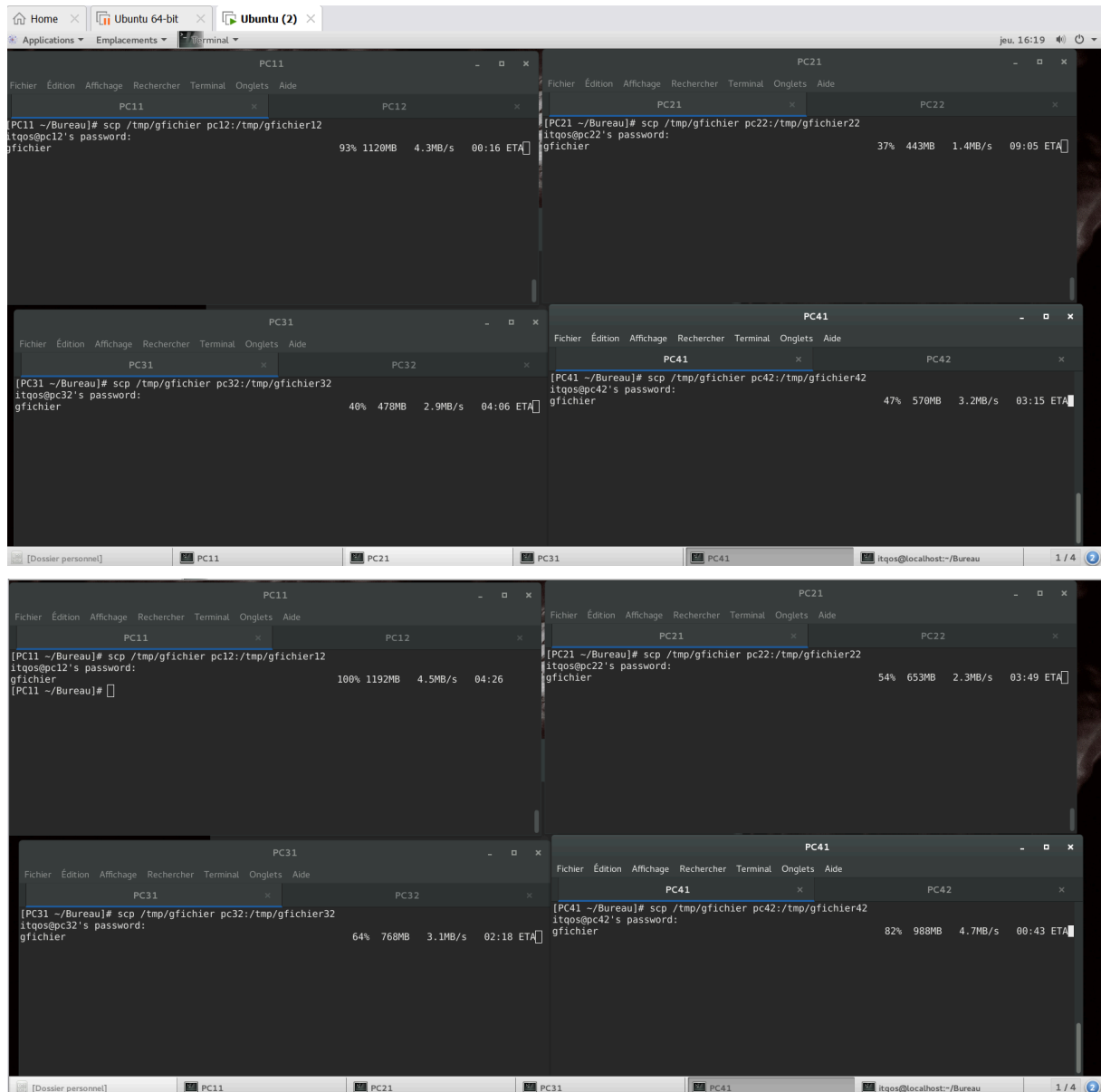


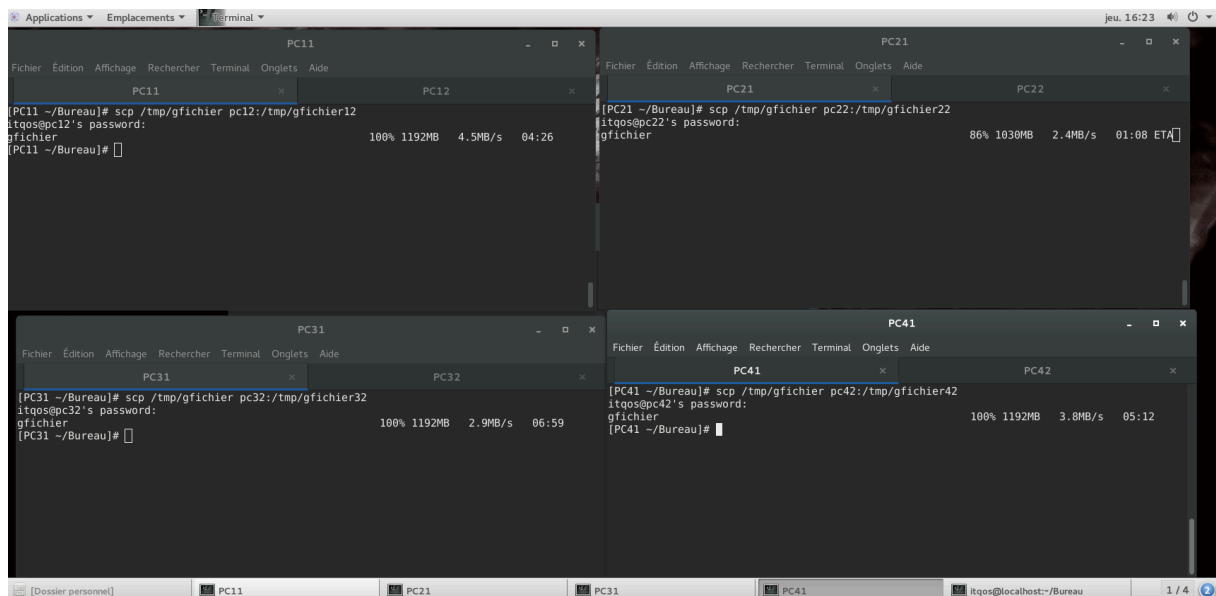
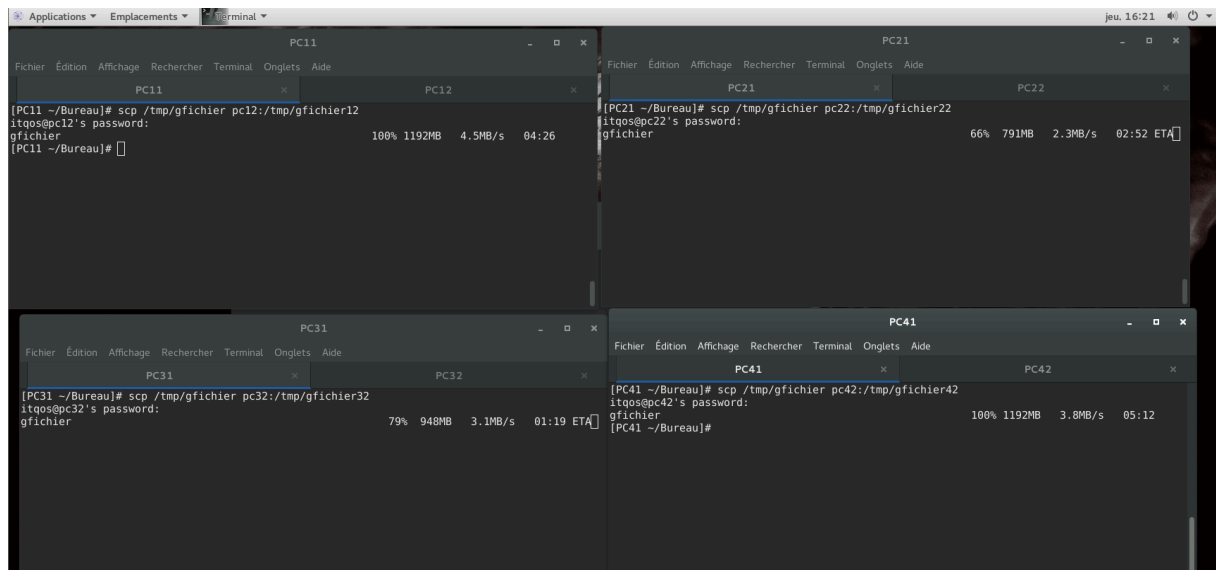
Then, when the first transfer finishes, the output of the other two transfers increases (third capture) until it reaches the new mean value ($11.8 / 2 = 5.9\text{MB/s} = 49.49\text{Mbit/s}$) (fourth capture)



4.4.1

We launch four transfers (PC11 -> PC12, PC21 -> PC22, PC31 -> PC32, PC41, PC42). The following table summarizes the output of each transfer during the experiment:





Step	Output PC11 -> PC12	Output PC21 -> PC22	Output PC31 -> PC32	Output PC41 -> PC42
All 4 transfers working (1st capture)	4.3MB/s = 36.07Mbit/s	1.4MB/s = 11.74Mbit/s	2.9MB/s = 24.32Mbit/s	3.2MB/s = 26.84Mbit/s
PC11 -> PC12 finished, 3 transfers working (2nd capture)		2.3MB/s = 19.29Mbit/s	3.1MB/s = 26.00Mbit/s	4.7MB/s = 39.42Mbit/s
PC41 -> PC42 finished, 2 transfers working (3rd capture)		2.3MB/s = 19.29Mbit/s	3.1MB/s = 26.00Mbit/s	

PC31 -> PC32 finished, 1 transfer working (4th capture)		2.3MB/s = 19.29Mbit/s		
--	--	--------------------------	--	--

4.4.2

To calculate Jain's fairness index, we use the transfers output of the first capture.

Term	Output PC11 -> PC12	Output PC21 -> PC22	Output PC31 -> PC32	Output PC41 -> PC42
Xi	4.3MB/s = 36.07Mbit/s	1.4MB/s = 11.74Mbit/s	2.9MB/s = 24.32Mbit/s	3.2MB/s = 26.84Mbit/s
Yi	50Mbit/s	20Mbit/s	26Mbit/s	40Mbit/s
Zi	0.7214	0.587	0.9354	0.671
Zi ²	0.52	0.34	0.875	0.45

$$\text{index} = 2.9148^2 / (4 * 2.19) = \mathbf{0.969}$$

We notice that the index is close to 1, indicating that TCP was able to achieve fairness max-min in this case.

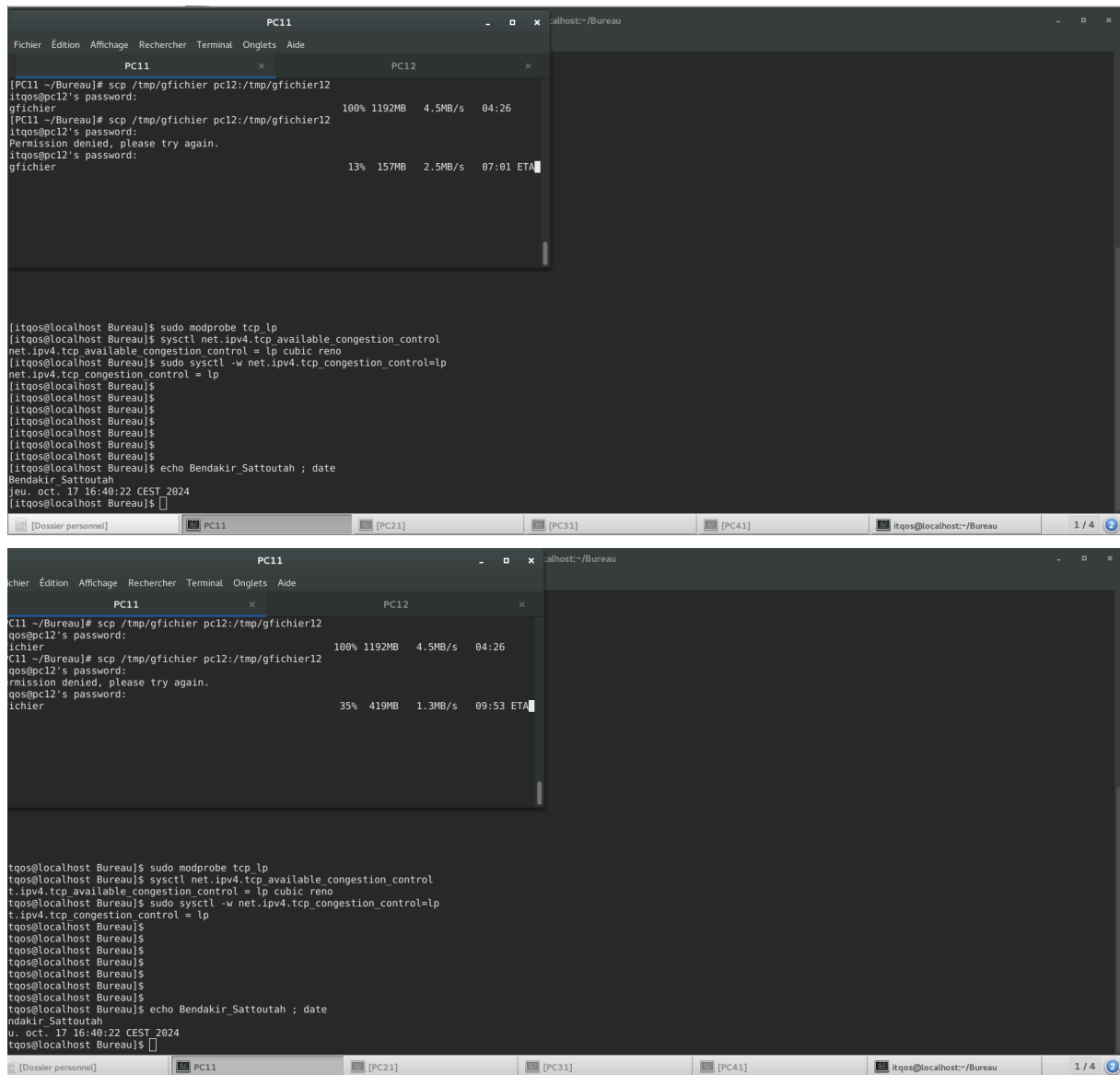
4.5

Activate Tcp_Lp

```
[itqos@localhost Bureau]$ sudo modprobe tcp_lp
[itqos@localhost Bureau]$ sysctl net.ipv4.tcp_available_congestion_control
net.ipv4.tcp_available_congestion_control = lp cubic reno
[itqos@localhost Bureau]$ sudo sysctl -w net.ipv4.tcp_congestion_control=lp
net.ipv4.tcp_congestion_control = lp
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$ echo Bendakir_Sattoutah ; date
Bendakir_Sattoutah
jeu. oct. 17 16:40:22 CEST 2024
[itqos@localhost Bureau]$
```

- When we initiated the transfer from PC11 to PC12 using TCP-LP as the congestion control mechanism, we observed that the throughput fluctuated, increasing and decreasing periodically. This behavior is characteristic of TCP-LP (Low Priority), which is designed to yield to regular TCP traffic and only use bandwidth when the

network is underutilized. The fluctuations in throughput are expected because TCP-LP actively adjusts its sending rate to avoid competing with higher-priority traffic, ensuring that it does not interfere with regular TCP flows. This behavior is normal for TCP-LP, as it aims to minimize its impact on the network's overall performance.



```
PC11
Fichier Édition Affichage Rechercher Terminal Onglets Aide

PC11 x PC12 x
[PC11 ~/Bureau]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
gfichier 100% 1192MB 4.5MB/s 04:26
[PC11 ~/Bureau]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
Permission denied, please try again.
itqos@pc12's password:
gfichier 13% 157MB 2.5MB/s 07:01 ETA

[itqos@localhost Bureau]$ sudo modprobe tcp_lp
[itqos@localhost Bureau]$ sysctl net.ipv4.tcp_available_congestion_control
net.ipv4.tcp_available_congestion_control = lp cubic reno
[itqos@localhost Bureau]$ sudo sysctl -w net.ipv4.tcp_congestion_control=lp
net.ipv4.tcp_congestion_control = lp
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$ echo Bendakir_Sattoutah ; date
Bendakir_Sattoutah
jeu. oct. 17 16:40:22 CEST 2024
[itqos@localhost Bureau]$

[Dossier personnel] PC11 PC21 PC31 PC41 itqos@localhost:~/Bureau 1 / 4
```

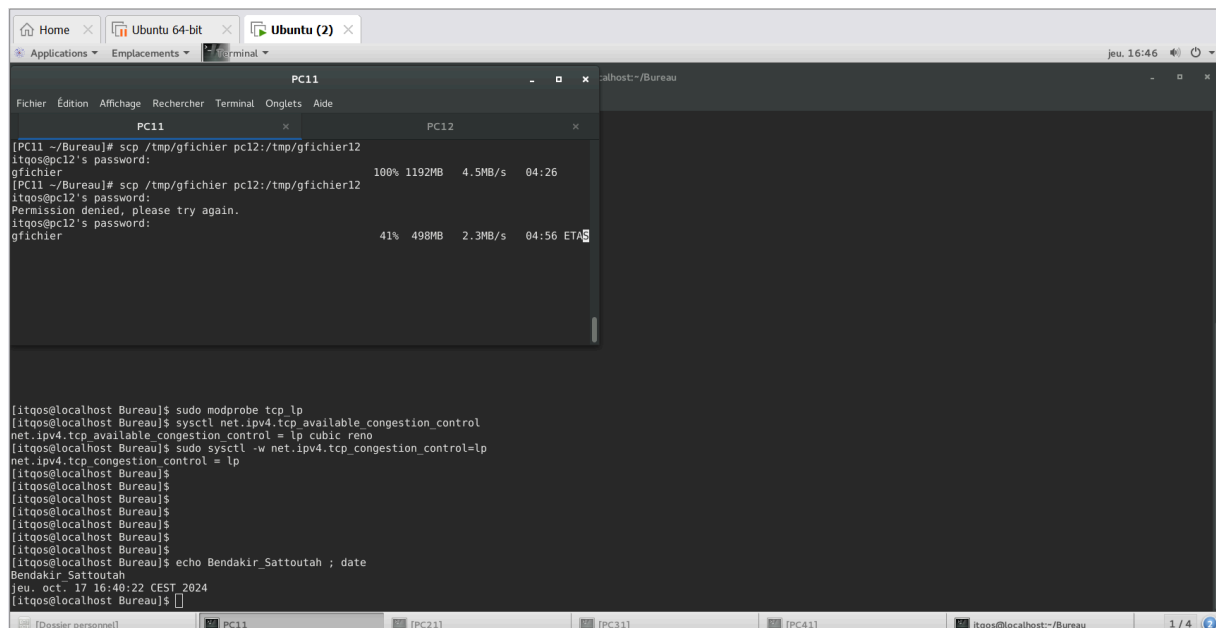


```
PC11
Fichier Édition Affichage Rechercher Terminal Onglets Aide

PC11 x PC12 x
[PC11 ~/Bureau]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
gfichier 100% 1192MB 4.5MB/s 04:26
[PC11 ~/Bureau]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
Permission denied, please try again.
itqos@pc12's password:
gfichier 35% 419MB 1.3MB/s 09:53 ETA

[itqos@localhost Bureau]$ sudo modprobe tcp_lp
[itqos@localhost Bureau]$ sysctl net.ipv4.tcp_available_congestion_control
net.ipv4.tcp_available_congestion_control = lp cubic reno
[itqos@localhost Bureau]$ sudo sysctl -w net.ipv4.tcp_congestion_control=lp
net.ipv4.tcp_congestion_control = lp
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$
[itqos@localhost Bureau]$ echo Bendakir_Sattoutah ; date
Bendakir_Sattoutah
jeu. oct. 17 16:40:22 CEST 2024
[itqos@localhost Bureau]$

[Dossier personnel] PC11 PC21 PC31 PC41 itqos@localhost:~/Bureau 1 / 4
```



Response 6:

6.1

The minimum threshold (min) should be set **lower than** the maximum threshold (max) to ensure sufficient space and time for managing packets, because we want to start marking packets once the queue exceeds the minimum threshold but before reaching the maximum threshold. If the minimum threshold is too close to the maximum threshold, packets may be marked too late, which could lead to congestion.

6.2

The maximum threshold (max) should be set **lower than** the physical buffer limit to prevent the queue from becoming completely full before congestion control mechanisms can be triggered. If the maximum threshold is equal to or too close to the physical limit, there won't be enough space and time to react to congestion, resulting in direct packet loss.

6.3

The maximum drop probability (max_p) should be set at a moderate level (e.g., 0.02 to 0.1). This is because a very low value would lead to ineffective congestion control (too few packets marked/dropped), while a very high value could lead to excessive packet loss and throughput degradation. The drop probability determines how aggressively RED responds to congestion.

6.4

From the command's result (in the capture), we can see that the minimum threshold (min) is set to **15000b** while the maximum threshold (max) is set to **37500b**. These thresholds respect the suggestions.

```

itqos@localhost:~$ sudo tc qdisc replace dev eno16777736 root red limit 150000 avpkt 1500
itqos@localhost:~$ sudo tc -d qdisc show dev eno16777736
qdisc red 800a: root refcnt 2 limit 150000b min 12500b max 37500b ewma 3 probability 0.02 Scell_log 14
itqos@localhost:~$ echo BENDAKIR_SATOUTAH; dat
BENDAKIR_SATOUTAH
bash: dat: commande inconnue...
itqos@localhost:~$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:23:54 CEST 2024
itqos@localhost:~$

```

6.5

Capture	ewma = wlog	les poids (w)
1	2	0.25
2	8	1/256 = 0.0039

```

itqos@localhost:~$ sudo tc qdisc replace dev eno16777736 root red limit 150000 avpkt 1500
itqos@localhost:~$ sudo tc -d qdisc show dev eno16777736
qdisc red 800a: root refcnt 2 limit 150000b min 12500b max 37500b ewma 2 probability 0.02 Scell_log 12
itqos@localhost:~$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:32:46 CEST 2024
itqos@localhost:~$

```

```
Applications Emplacements itqos@localhost:~
Fichier Édition Affichage Rechercher Terminal Aide
23: fastethernet00@if24: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
link/ether da:f6:b9:f0:f5:35 brd ff:ff:ff:ff:ff:ff link-netnsid 9
inet6 fe80::d8f6:b9ff:fef0:f535/64 scope link
valid_lft forever preferred_lft forever
25: fastethernet01@if26: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
link/ether 66:ef:4f:de:17:6f brd ff:ff:ff:ff:ff:ff link-netnsid 10
inet6 fe80::64ef:4fff:fede:176f/64 scope link
valid_lft forever preferred_lft forever
[itqos@localhost ~]$ sudo tc qdisc replace dev eno16777736 root red limit 150000 avpkt 1500
[itqos@localhost ~]$ sudo tc -d qdisc show dev eno16777736
qdisc red 800a: root refcnt 2 limit 150000b min 12500b max 37500b ewma 3 probability 0.02 Scell_log 14
[itqos@localhost ~]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
bash: date: commande inconnue...
[itqos@localhost ~]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:23:54 CEST 2024
[itqos@localhost ~]$ wireshark
[itqos@localhost ~]$ sudo tc qdisc replace dev eno16777736 root red limit 150000 avpkt 1500 burst 10
[itqos@localhost ~]$ sudo tc -d qdisc show dev eno16777736
qdisc red 800a: root refcnt 2 limit 150000b min 12500b max 37500b ewma 2 probability 0.02 Scell_log 12
[itqos@localhost ~]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:32:46 CEST 2024
[itqos@localhost ~]$ sudo tc qdisc replace dev eno16777736 root red limit 150000 avpkt 1500 burst 60
[itqos@localhost ~]$ sudo tc -d qdisc show dev eno16777736
qdisc red 800a: root refcnt 2 limit 150000b min 12500b max 37500b ewma 8 probability 0.02 Scell_log 19
[itqos@localhost ~]$ echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:33:40 CEST 2024
[itqos@localhost ~]$
```

6.6

Applications Emplacements Wireshark Network Analyzer

PC11

```
Fichier Édition Affichage Rechercher Terminal Onglets Aide
PC11 PC12 LR10
[PC11 ~/Bureau]# sudo sysctl net.ipv4.tcp_ecn=1
net.ipv4.tcp_ecn = 1
[PC11 ~/Bureau]# sudo sysctl net.ipv4.tcp_ecn=1
net.ipv4.tcp_ecn = 1
[PC11 ~/Bureau]# scp /tmp/gfichier pc12:/tmp/gfichier12
itqos@pc12's password:
Permission denied, please try again.
itqos@pc12's password:
gfichier 1% 17MB 20.6KB/s 16:12:54 ET
```

PC31

```
Fichier Édition Affichage Rechercher Terminal Onglets Aide
PC31 PC32
[PC31 ~/Bureau]# scp /tmp/gfichier pc32:/tmp/gfichier32
itqos@pc32's password:
gfichier 100% 1192MB 2.9MB/s 06:59
[PC31 ~/Bureau]# echo BENDAKIR_SATOUTAH; date
BENDAKIR_SATOUTAH
jeu. oct. 17 17:46:15 CEST 2024
[PC31 ~/Bureau]#
```

Capturing from eth11 [Wireshark 1.10.14 (Git Rev Unknown from unknown)]

Filter: `ip.dsfield.ecn == 0x2` Expression... Clear Apply Enregistrer

No.	Time	Source	Destination	Protocol	dscp	Length	Info
11212	148.833269938	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=2
11216	149.091194767	10.14.11.5	10.14.12.5	SSH	2	2962	Encrypted request packet len=2
11218	149.212822027	10.14.11.5	10.14.12.5	SSH	2	2962	Encrypted request packet len=2
11219	149.213197996	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11222	149.471185419	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11224	149.729645305	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11226	149.987191555	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11228	150.245480156	10.14.11.5	10.14.12.5	SSH	2	2962	Encrypted request packet len=2
11230	150.367349049	10.14.11.5	10.14.12.5	SSH	2	2962	Encrypted request packet len=2
11231	150.367365986	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11233	150.489107469	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1
11235	150.747925030	10.14.11.5	10.14.12.5	SSH	2	1514	Encrypted request packet len=1

Frame 1: 214 bytes on wire (1712 bits), 214 bytes captured (1712 bits) on interface 0
Ethernet II, Src: 12:ae:ef:a8:72:e6 (12:ae:ef:a8:72:e6), Dst: 1a:5c:d7:df:a4:02 (1a:5c:d7:df:a4:02)
Internet Protocol Version 4, Src: 10.14.11.5 (10.14.11.5), Dst: 10.14.12.5 (10.14.12.5)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x02 (DSCP 0x00: Default; ECN: 0x02: ECT(0) (ECN-Capable Transport))
0000 00... = Explicit Congestion Notification: ECT(0) (ECN-Capable Transport) (0x02)
Total Length: 200
Identification: 0x0762 (1898)
43 seq... 0x02 (Flow: 1, Fragment: 0)
0000 1a 5c d7 df a4 02 12 ae ef a8 72 e6 08 00 45 02f...E
0010 00 c8 07 62 40 00 00 06 07 a7 0a 0e 05 0a 0e ...b.e.....
0020 0c 05 d1 cd 00 16 6f 36 10 fe 9c 06 9c b7 00 10o.....
0030 01 28 2b e0 00 00 01 01 08 0a 00 ac 82 ca 00 ab .(+.....
0040 04 3a 00 00 00 80 83 5c e6 69 03 2e 1f ca 9a 03i.....
Explicit Congestion Notification (ip.ds: Pac: Profile: Default)