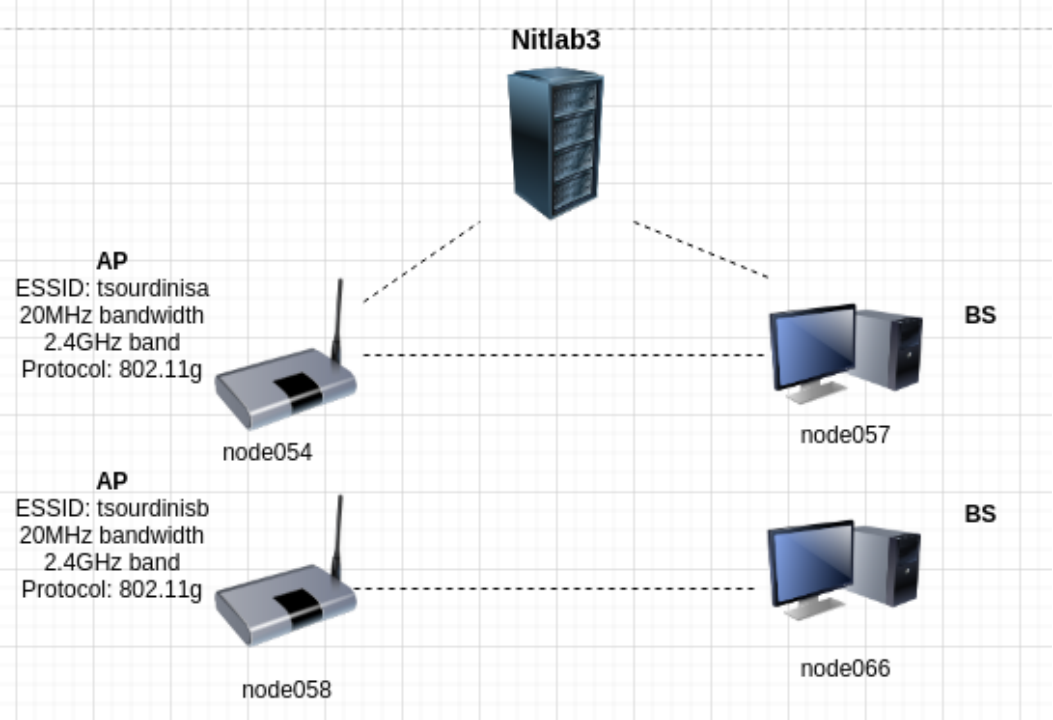
Ασύρματες Επικοινωνίες

2ο Σετ Εργασιών

Θεόδωρος Τσουρδίνης 2303



Concepts

1.

First pair : AP on channel 2. Generation of UDP traffic (via iperf) for 150 sec and bandwidth: 75 Mbps

Second pair : AP on channel 2 . Generation of UDP traffic for 125 sec and bandwidth :

$$(70+(2303/1000) + (2303 \bmod 2)) = 73.303 \text{ Mbps}$$

2.

First pair: same as concept 1

Second pair: same as concept 1 but now AP on channel 8

1) Lines Changed in configuration file (hostap.conf):

Access Point at node054:

ssid=tsourdinisa

channel=2

hw_mode=g

driver=nl80211

Access Point at node058:

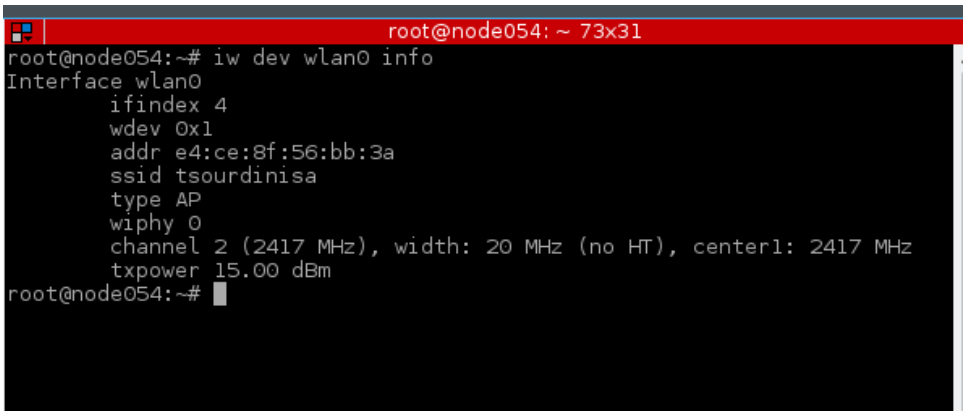
ssid=tsourdinisb

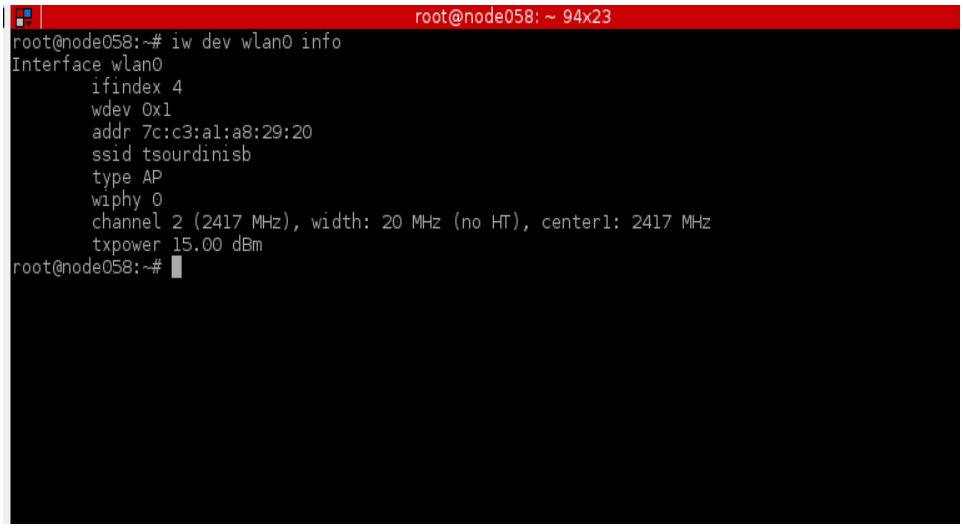
channel=2 / channel=8

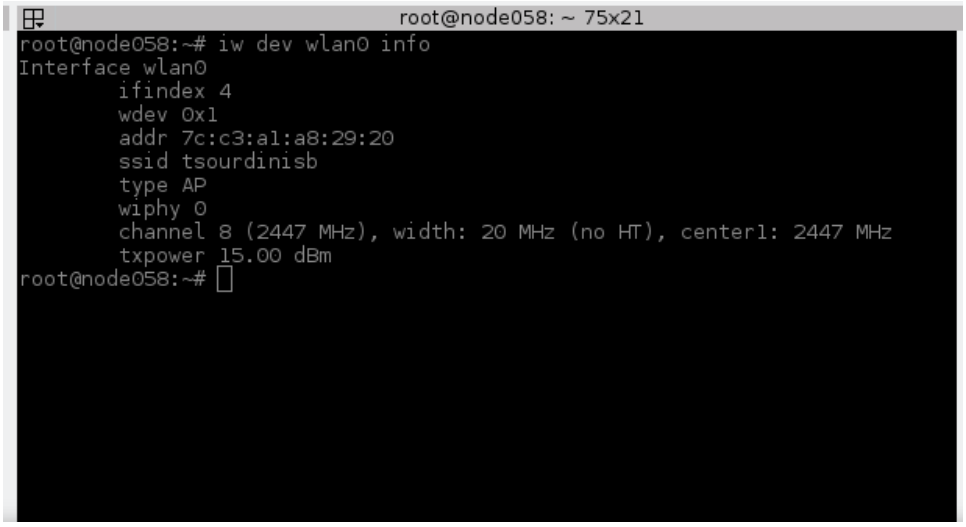
hw_mode=g

driver=nl80211

We can confirm our configurations by : **iw dev wlan0 info**







2) iperf commands for the 2 pairs

1st pair (node054 , node057) :

At base station : iperf -u -s -i 1

At AP : iperf -u –c 192.168.2.2 -t 150 –b 75M

2nd pair (node058 , node066) :

At base station : iperf -u -s -i 1

At AP : iperf -u –c 192.168.2.4 -t 125 –b 73.3M

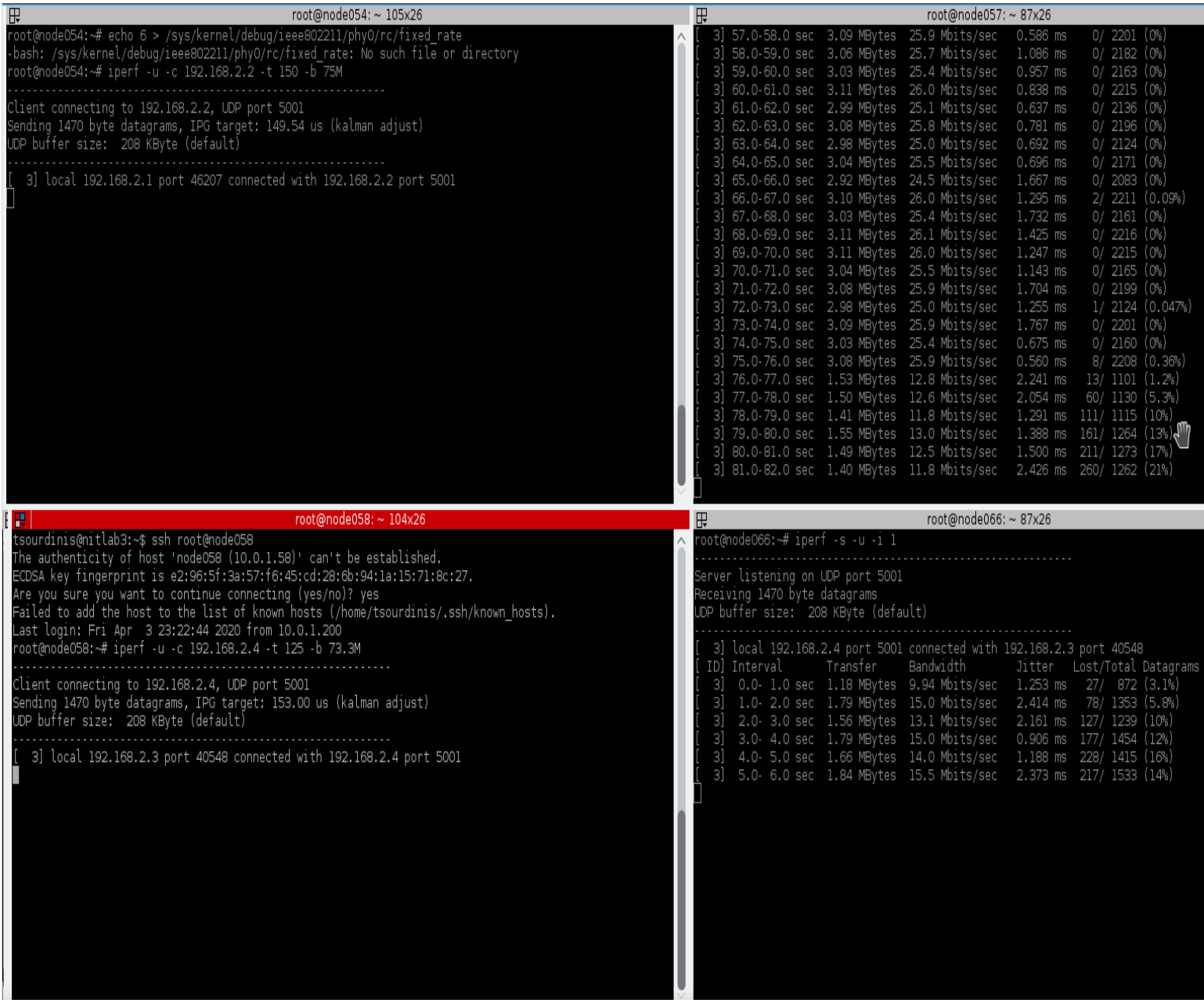
The bandwidth used in iperf at AP on the 2nd pair calculated as:

(70 + (2303/1000) + (2303 mod 2)) = 73.3

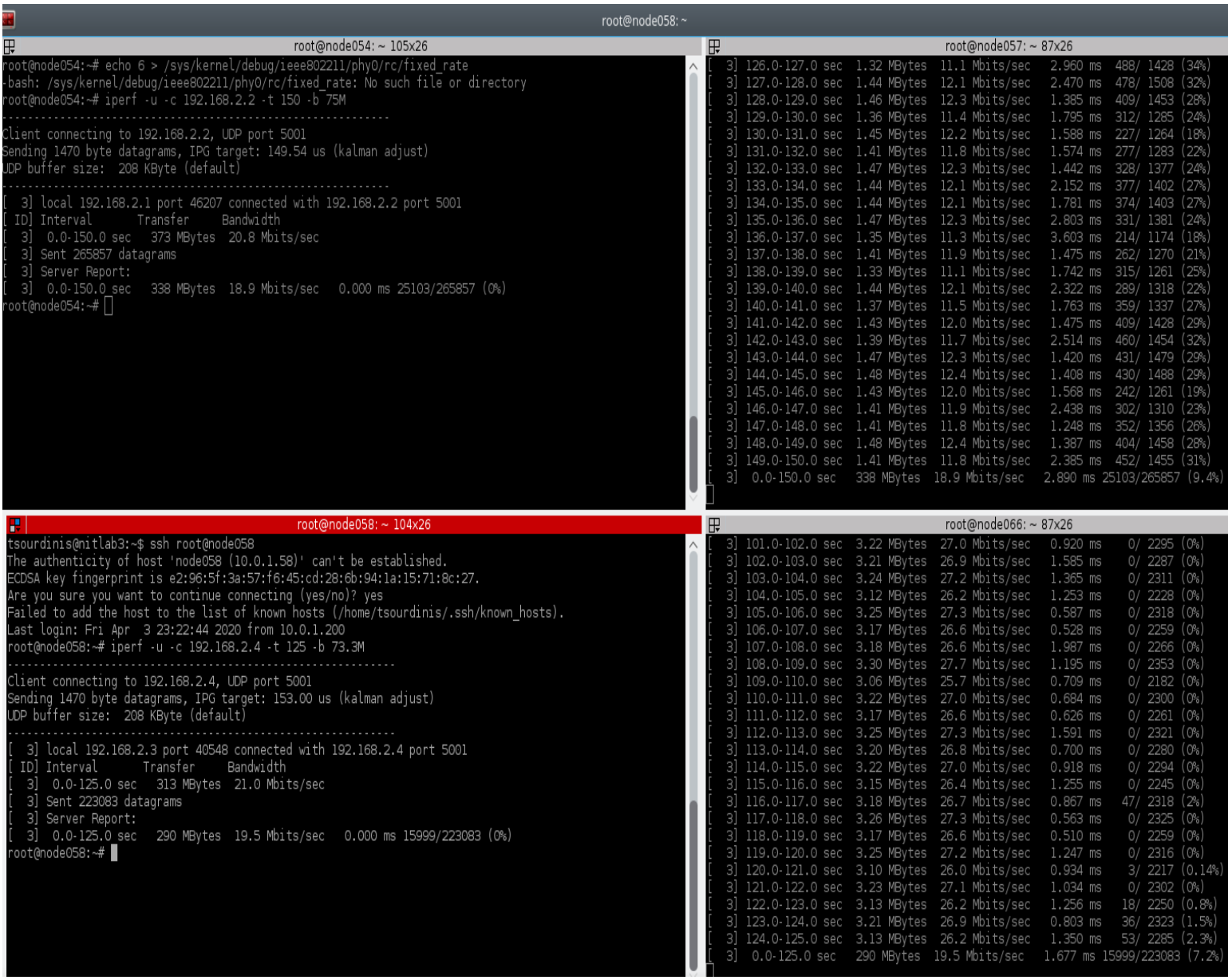
3) iperf logs

- **<u>All pairs on channel 2</u>**

Initial iperf logs (1st case) after starting the second pair as the first pair started running 75 seconds before

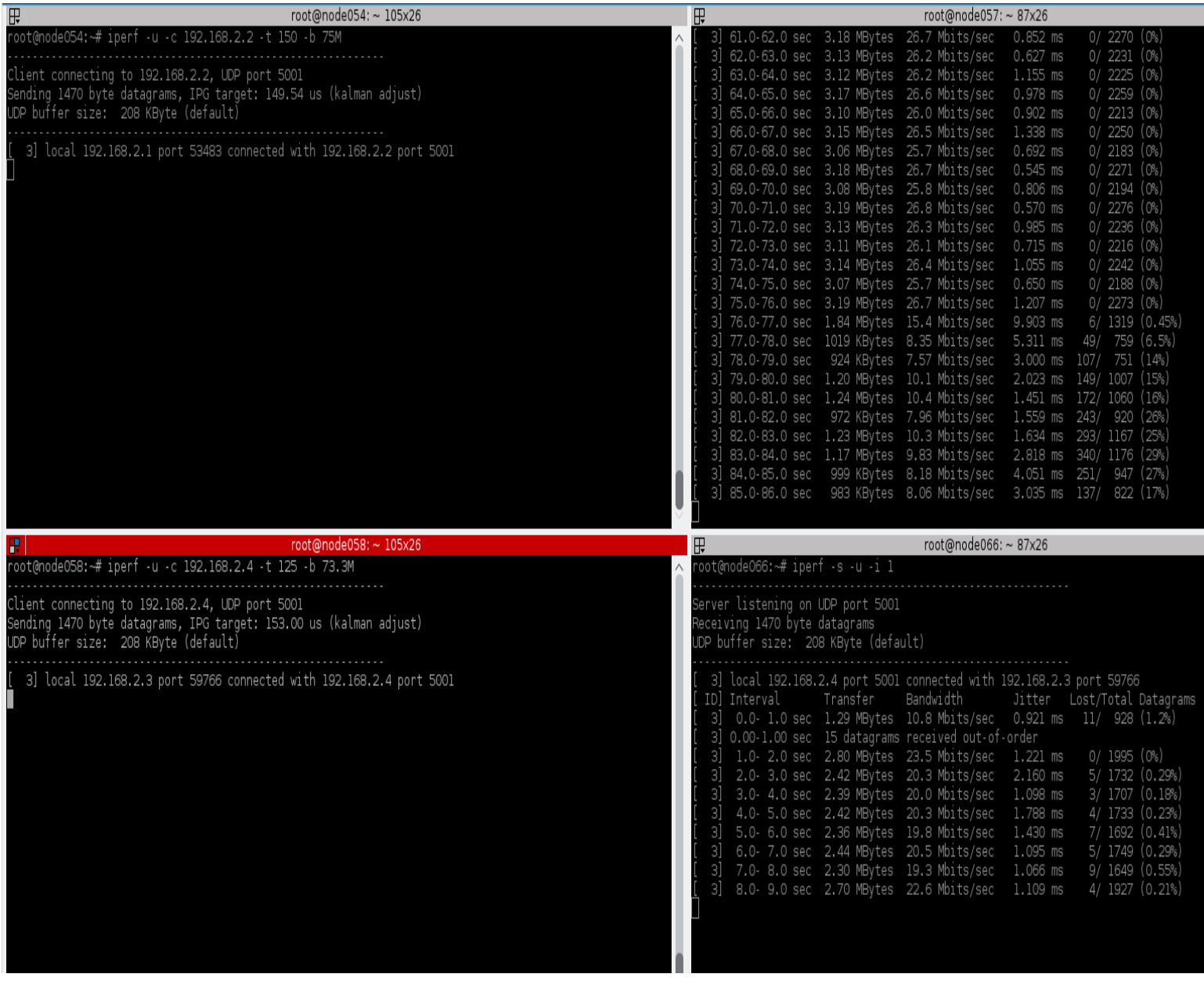


Final iperf logs for the first case (both AP , BS)

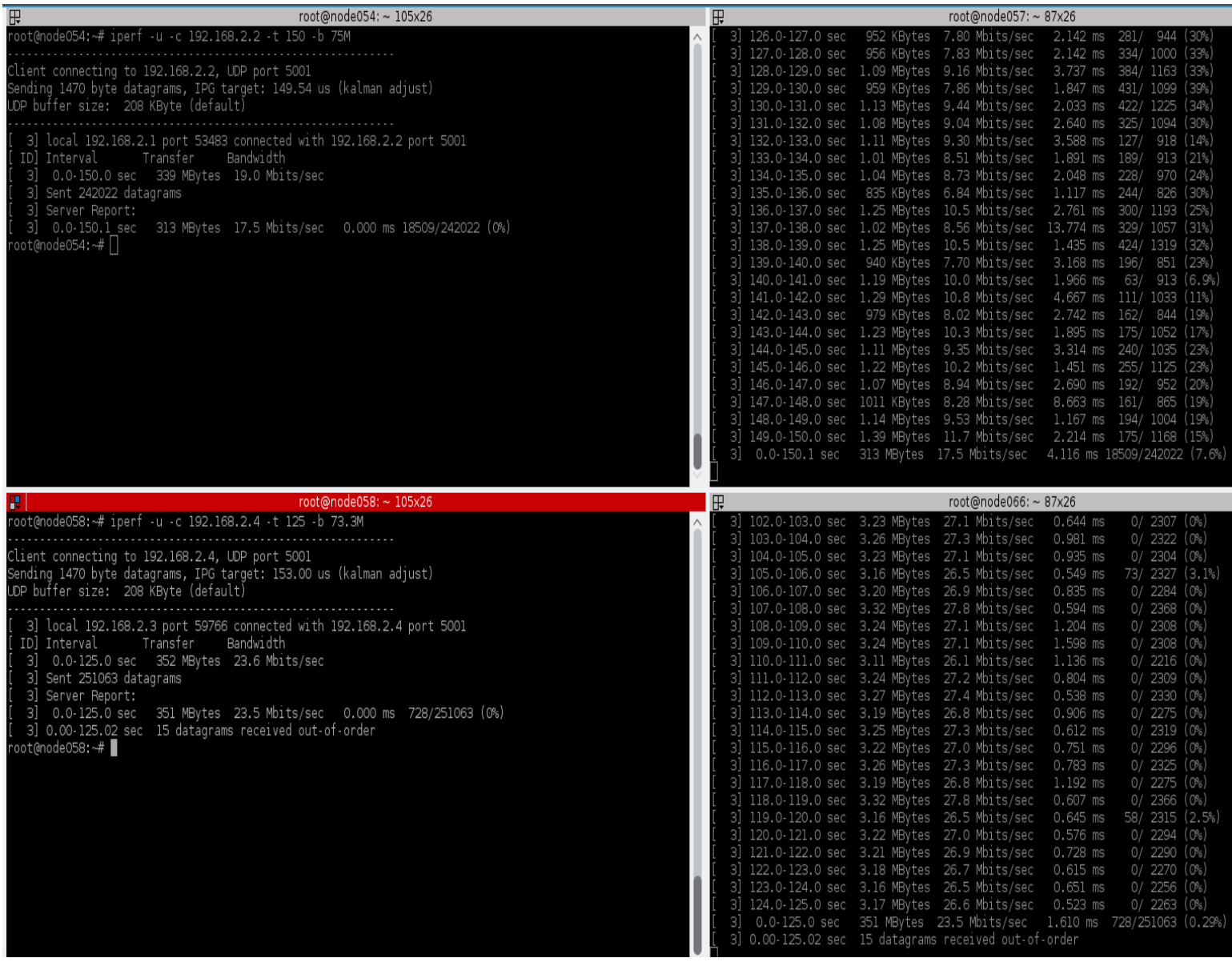


- **1st pair on channel 2 and 2nd pair on channel 8**

Initial iperf logs (2nd case) after starting the second pair as the first pair started running 75 seconds before



Final iperf logs for the second case (both AP ,BS)



3) Observations

- The bandwidth that the pairs had when they were running separately was nearly 25-27 Mbits/sec and the packet loss was nearly 0%. This is normal as the pairs don't share any channel as they were running separately thus they don't have any interference. Pairs don't have the bandwidth of the iperf command has , because of the capabilities of the wireless chipset and the complexity of the wireless communications as the contentions and the noise of the medium can be the bottleneck in some cases.

- In the first concept when all the pairs were on channel 2, in the first pair , the bandwidth we had was approximately 12 Mbits/sec while on the second pair the bandwidth was approximately 14 Mbits/sec and by seeing the final logs of iperf the packet loss was 9.4% for the 1st pair and 7.2% for the 2nd pair. This behavior can be explained as both pairs share the same channel so there is an interference between them and CSMA/CA works as we except, as the nodes sense the channel before they transmit so a lot of packets can be lost through a collision.

- In the second concept when the first pair was on channel 2 and the other pair on channel 8, we can see that the 2nd pair dropped his packet loss dramatically in relation with the first case (7.2% → 0.29%). Also the 2nd pair had approximately 20 Mbits/sec. This is because the pairs were running on a different channels in different frequencies that were not overlapping (channel 2: 2406 -2428 GHz and channel 8: 2436 -2458 GH) and based on CSMA/CA the nodes listen only themselves through carrier sensing. We should except the same results for the first pair but the packet loss dropped slightly in relation with the first case. (9.4% → 7.6%) but this can be caused by some interference that might node54 has with other nodes on different channels and CSMA/CA fails to detect it .