

# CS4222 Assignment 3 Report

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## Task 1. Comparison Result

The transmitted file and the received file are identical.

```
r-66-106-25-172:compare natsuyuu$ diff received_data.txt transmitted_data.txt
r-66-106-25-172:compare natsuyuu$
```

## Task 2.1 WiFi Channel Occupancy at NUS SoC Level 2

124 stations were detected at SoC COM1 level 2 on a Friday afternoon. Most of them were using channel 1, 7 and 13 which are common channels to avoid overlapping signals(Figure 1). Given the fact that 20MHz bandwidth of a channel also cover the closest two channels, we calculate the number of overlapping stations(Table 1) at each channel as the indicator for channel crowdedness. The result suggests that channel 4, 13 and 14(802.11b/g) are less crowded and could theoretically allow us to have a better transmission rate.

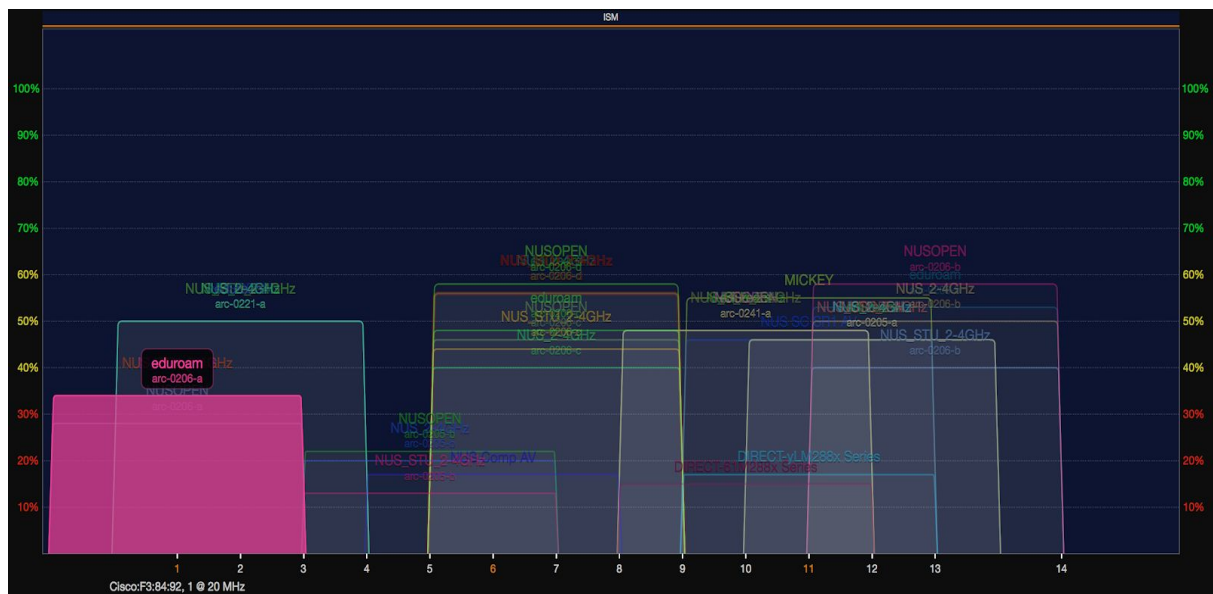


Figure 1, WiFi channel occupancy status at NUS SoC, measured using WiFi Analyser(OS X) at 16:50, 23/3/2018

Channel	1	2	3	4	5	6	7
Number of Stations	10	5	4	0	4	1	10
*Number of Overlapping Stations	19	19	23	14	19	20	23
Channel	8	9	10	11	12	13	14
Number of Stations	6	2	6	2	4	9	0
*Number of Overlapping Stations	19	26	20	23	21	15	13

*Table 1. Number of stations per channel at 2.4GHz (802.11b/g channel number ).\*Number of overlapping station counts all stations in  $\pm 2$  channels.*

## Task 2.2 Test of Transmission Rate

For different channel settings: the less congested the channel, the faster the transmission rate. For instance, channel 26 (802.15.4) does not share its frequency band with any other channels in 802.11b/g and is free from interference of WiFi devices. Therefore, the data transfer rate is obviously higher in channel 26.

For different payload settings: the larger the payload, the faster the transmission rate.

Location: SoC COM1 level 2

Time: 23/3/2018 6:00pm

File Size / KB	Channel	Payload Size / B	Data Rate / Byte per sec
32	11	50	8,200
32	20	50	10,030
32	26	50	17,500
32	26	100	16,040
32	26	10	3,040

*Table 2. Peak hour throughput*

### Task 3 Test of Transmission Rate

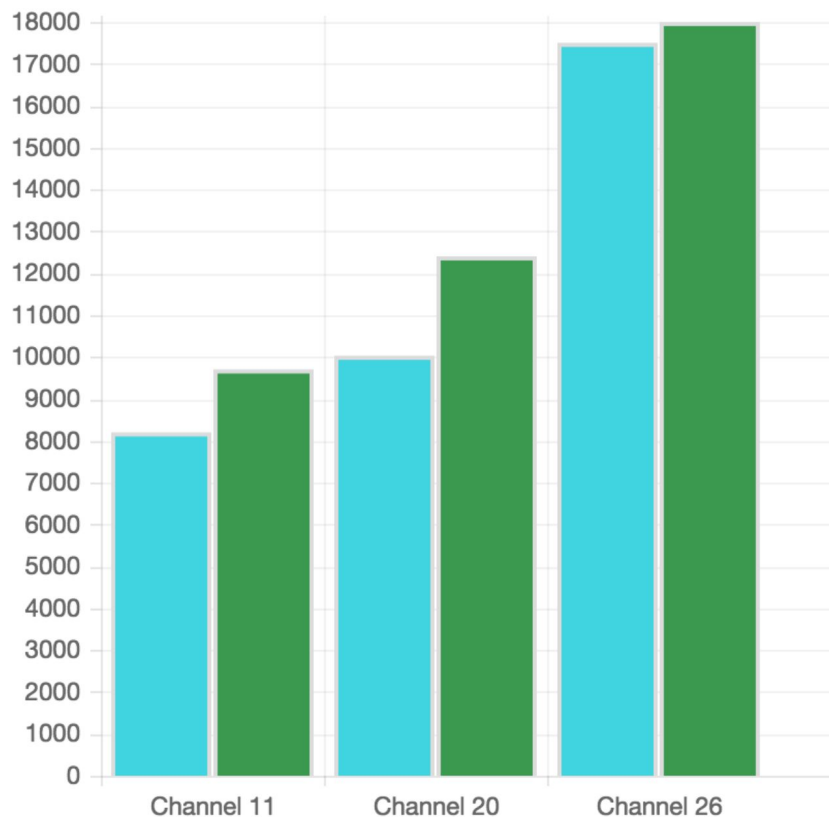
During off-peak hours, there were less devices sharing the channel. This generally gave us a slight boost in the transmission speed(+3~5%).

Location: SoC COM1 level 2

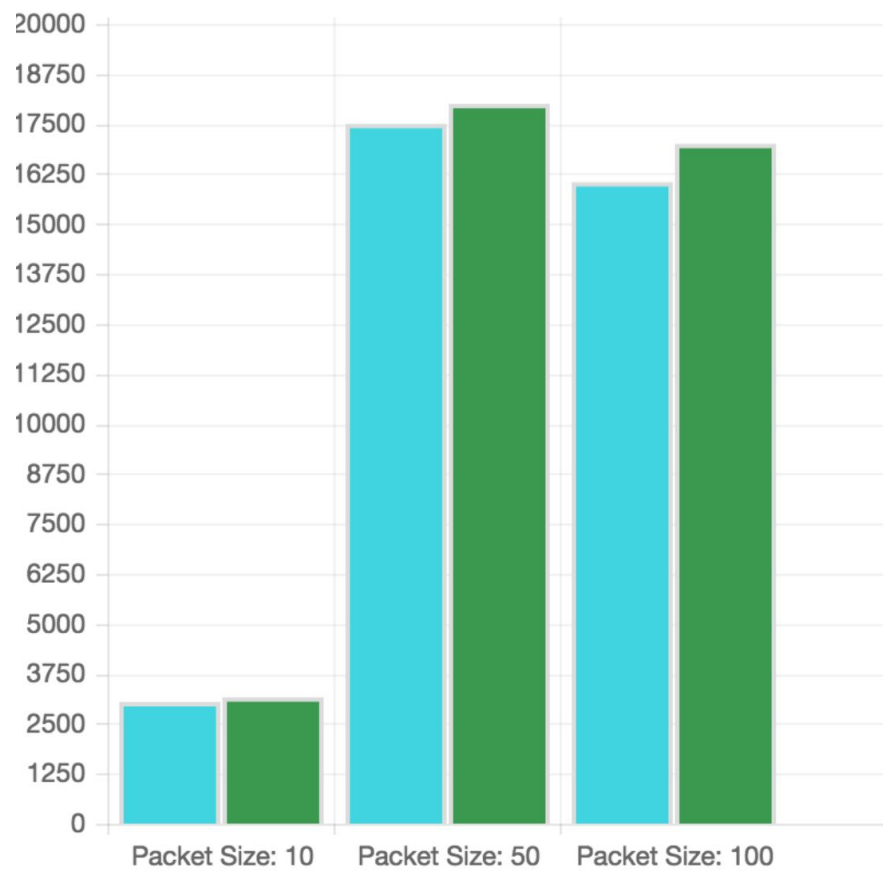
Time: 23/3/2018 11:00pm

File Size / KB	Channel	Payload Size / B	Data Rate / Byte per sec
32	11	50	9,700
32	20	50	12,400
32	26	50	18,000
32	26	100	17,000
32	26	10	3,160

*Table 3. Non-peak hour throughput*



*Figure 3: Throughput vs Channel Selection (at 50B Packet Size)(Blue: Peak Hour; Green: Non-Peak Hour)*



*Figure 4: Throughput vs Packet Size at Channel 26 (Blue: Peak Hour; Green: Non-Peak Hour)*