Assignment 3

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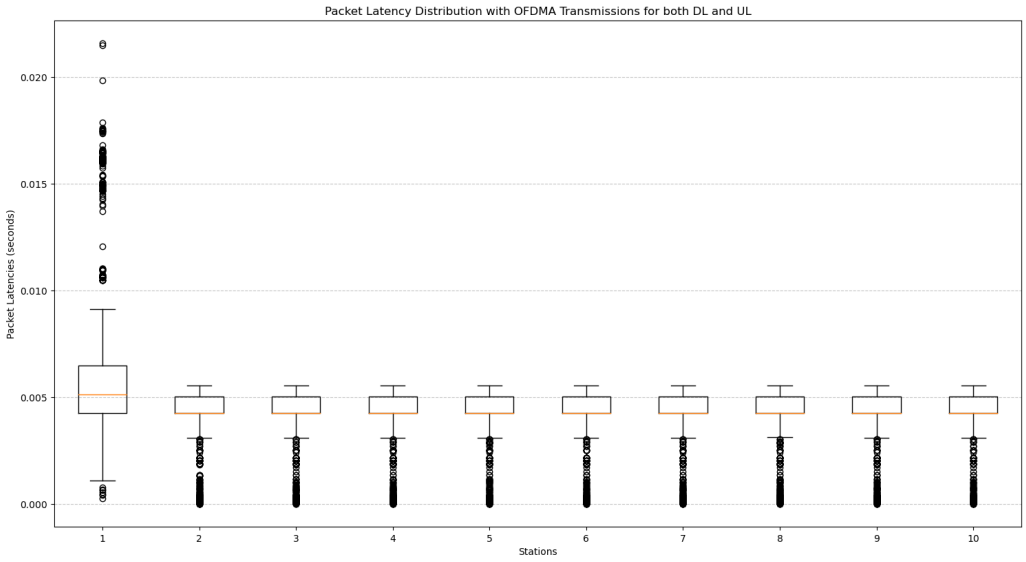
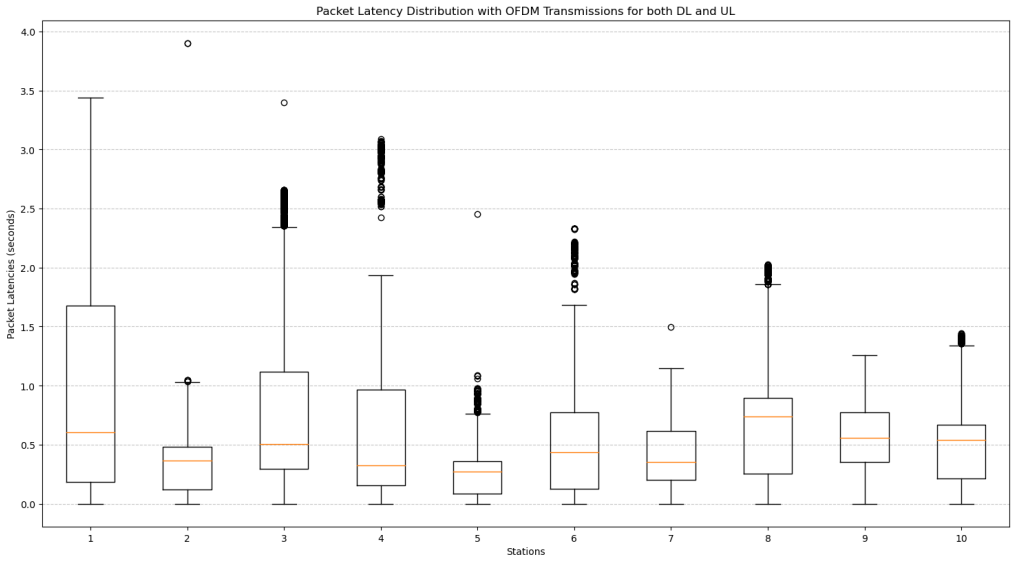
1) In the both the metrics OFDMA will performs **better** than OFDM.

In term of Packet Latency Distribution: OFDMA performs better because it allows multiple STAs to communicate with AP simultaneously by dividing channel into multiple RUs and allocate sub-carriers to each STA. This parallel communication reduces contention and, consequently, reduces packet latency distribution.

Box Plot of Packet Latency Distribution for OFDMA



Box Plot of Packet Latency Distribution for OFDM



In term of TCP RTT: For Video Streaming the median TCP RTT for OFDMA is better because of the low latency of OFDMA and that is because it divides channel into multiple sub-carriers and allocate them to different STAs.

Experiment Results for Median TCP RTT for OFDMA & OFDM

- OFDM Median TCP RTT : **0.03078 second**
- OFDMA Median TCP RTT : **0.027087 second**

2) In average page load time OFDMA performs better than OFDM because in OFDMA transmission happens through Multiple RUs and reduces overall page load time. Also, The variability in embedded object sizes can be managed better in OFDMA. Specific RUs can be allocated for larger or smaller embedded objects, optimizing the transmission process.

But the Average Main Object Latency is less in OFDM as compared to OFDMA because Main object is the one large object that contains whole information about page. So it's latency is less in OFDM because the whole carrier is allocated to only task.

For OFDMA

```
[  0%] Linking CXX executable ../../build/scratch/ns3.40-Part-B-default
Channel bw = 40 MHz
HE MCS = 11
Number of stations = 10
EDCA queue max size = 6000 MSDUs
MSDU lifetime = 500 ms [BE]  500 ms [BK]  500 ms [VI]  500 ms [VO]
BA buffer size = 64
Ack sequence = ACK-SU-FORMAT


Average Page load time: 142.702 ms

Average Main Object Latency: +3.77342e+06ns
```

For OFDM

```
[  0%] Linking CXX executable ../../build/scratch/ns3.40-Part-B-default
Channel bw = 40 MHz
HE MCS = 11
Number of stations = 10
EDCA queue max size = 6000 MSDUs
MSDU lifetime = 500 ms [BE]  500 ms [BK]  500 ms [VI]  500 ms [VO]
BA buffer size = 64
No OFDMA


Average Page load time: 143.178 ms

Average Main Object Latency: +2.85267e+06ns
```