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One-Way Delay Measurement: Wired vs Wireless Interfaces

Methodology

Step 1

Initialize client–server system (TCP + TCP_NODELAY)

Step 2

Sync Phase: estimate the offset between device clocks

Step 3

Client sends a “BOOP” message along with the timestamp of time_sent

Step 4

Server sends back an “ACK” with the timestamp of time_recieved

Step 5

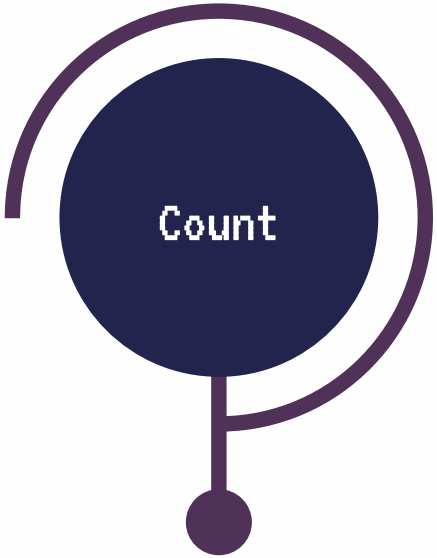
Client computes delay using offset, then adds to log

Topology

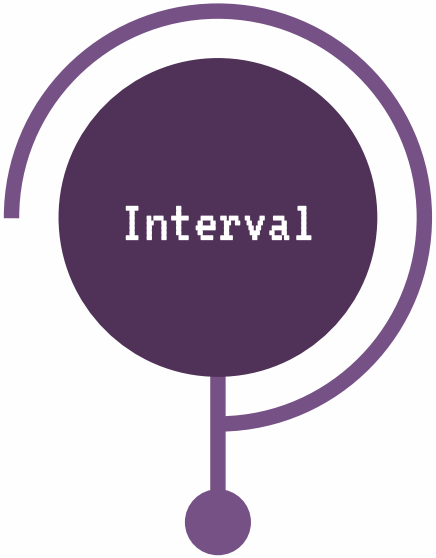
MacBook Issues

Macbook never worked as client.

Different Parameters

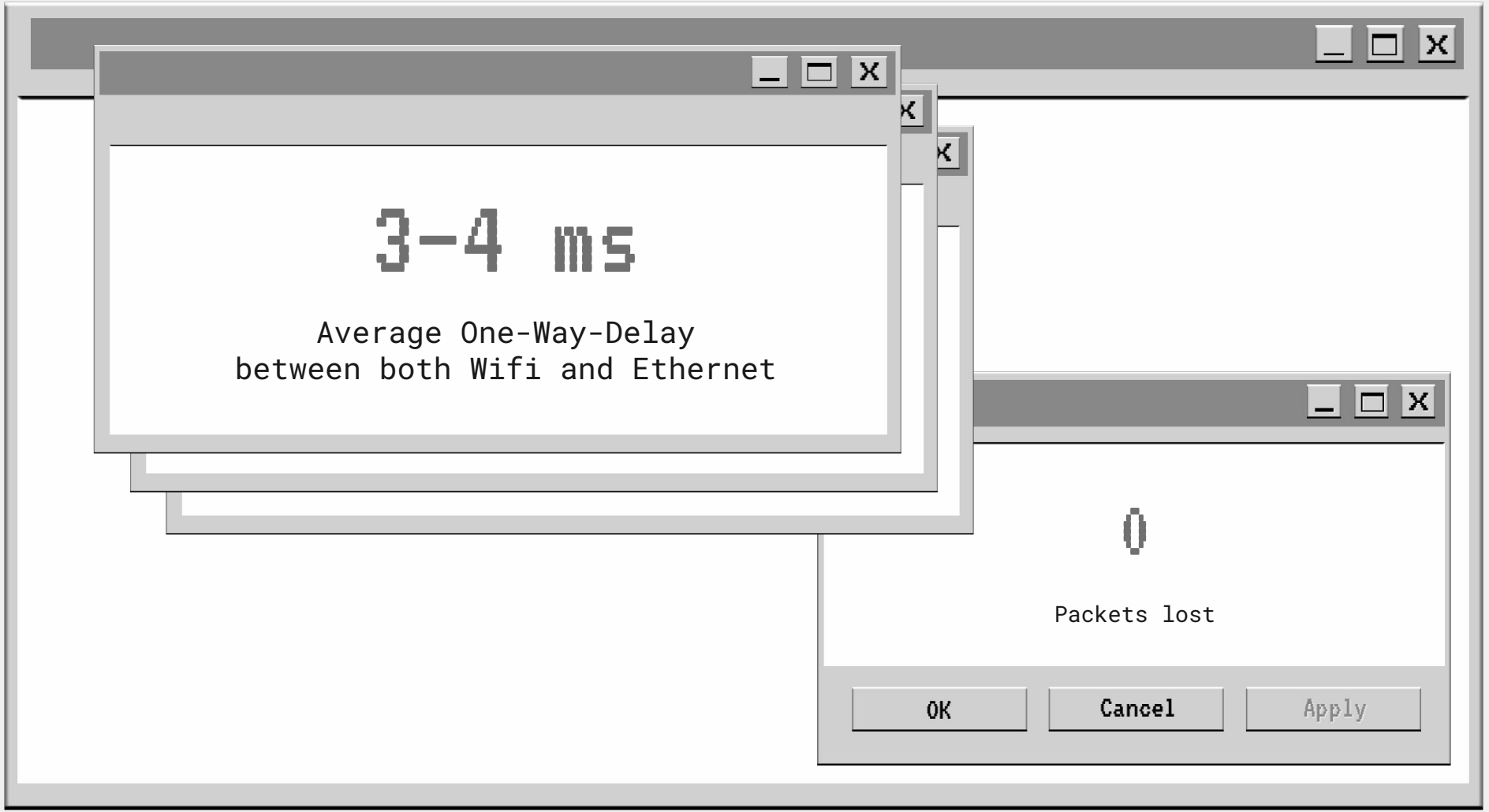


50, 100, 200
messages total

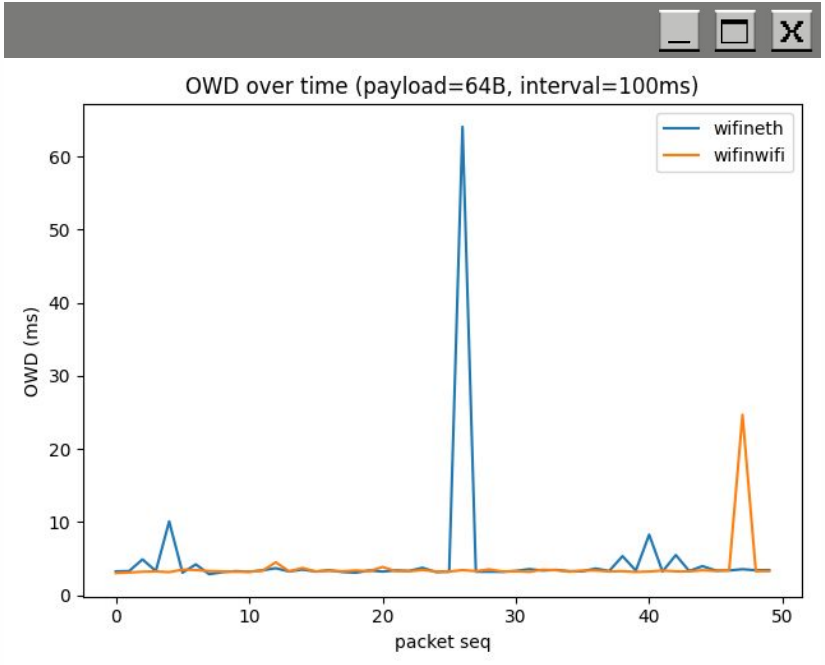


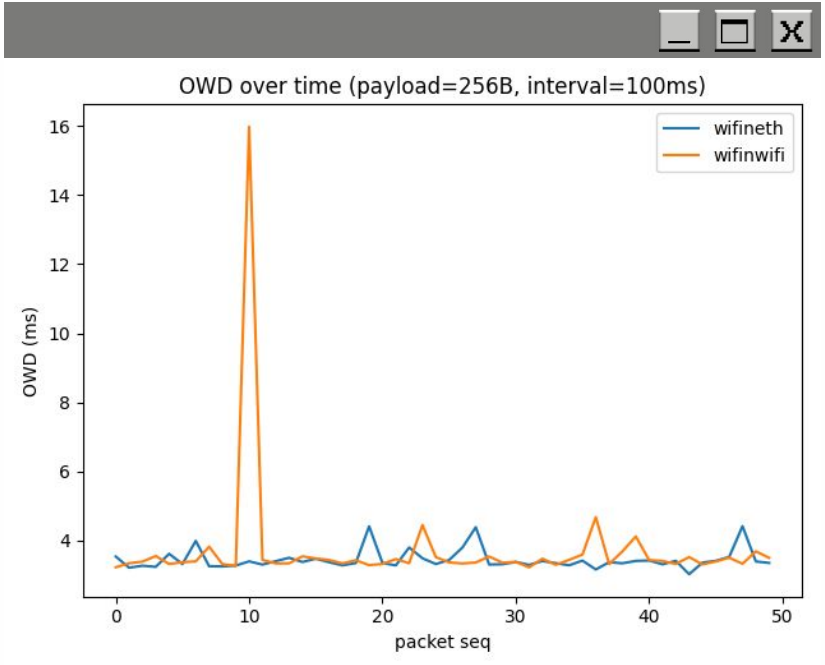
every 100, 50, 10, 1
millisecond

64, 256, 1000
bytes padded

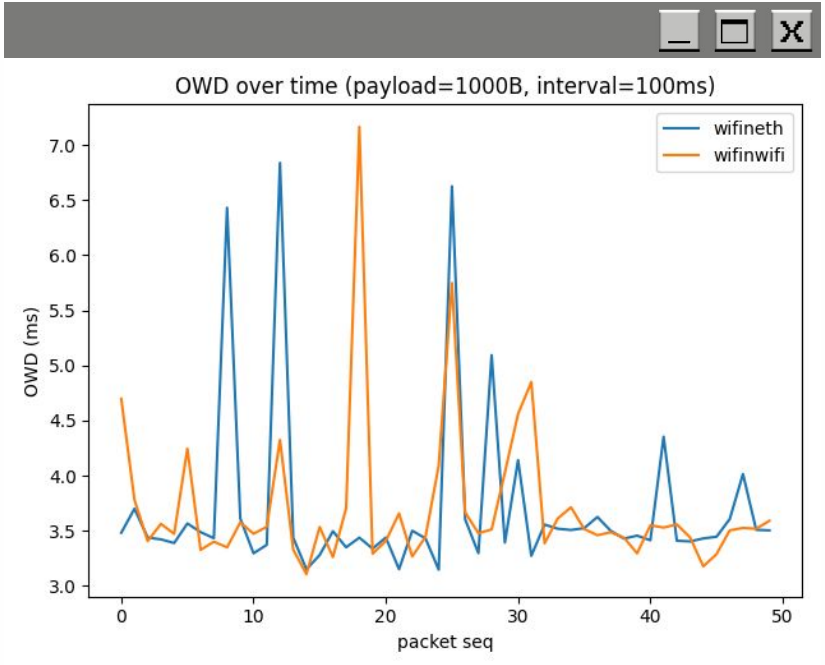

3-4 ms
Average One-Way-Delay
between both Wifi and Ethernet
0
Packets lost
OK
Cancel
Apply

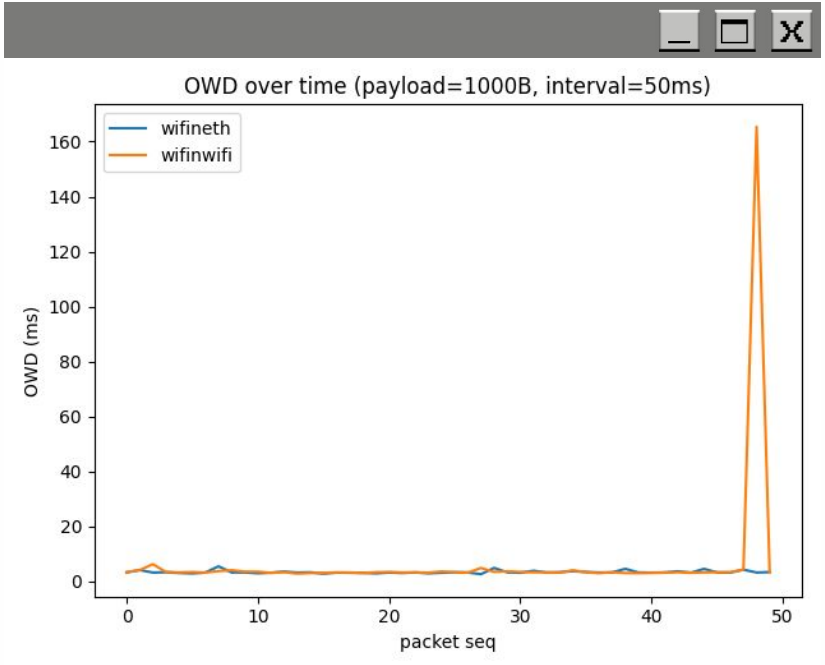
Payload !


OWD over time (payload=64B, interval=100ms)
wifineth
wifinwifi
OWD (ms)
packet seq
0
10
20
30
40
50
60

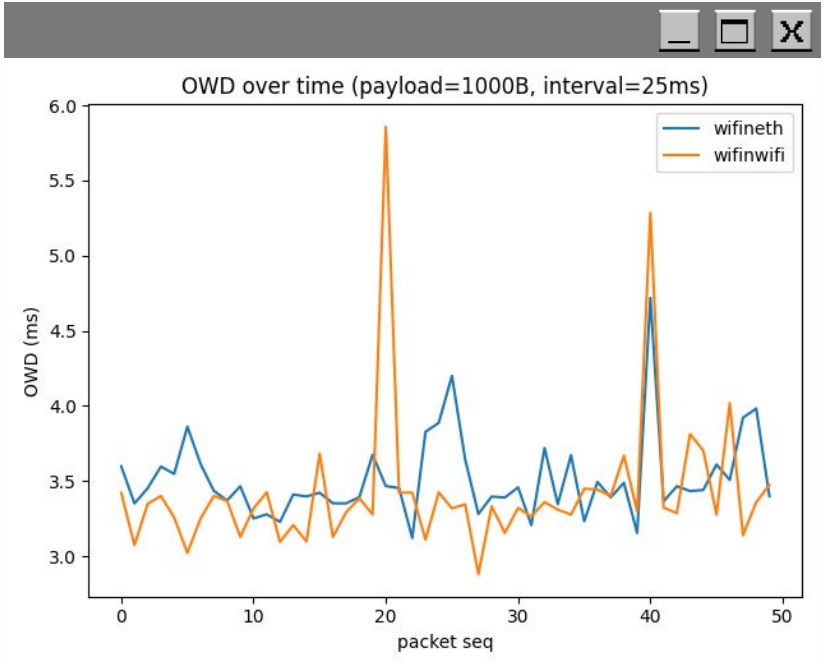

OWD over time (payload=256B, interval=100ms)
wifineth
wifinwifi
OWD (ms)
packet seq
4
6
8
10
12
14
16
0
10
20
30
40
50

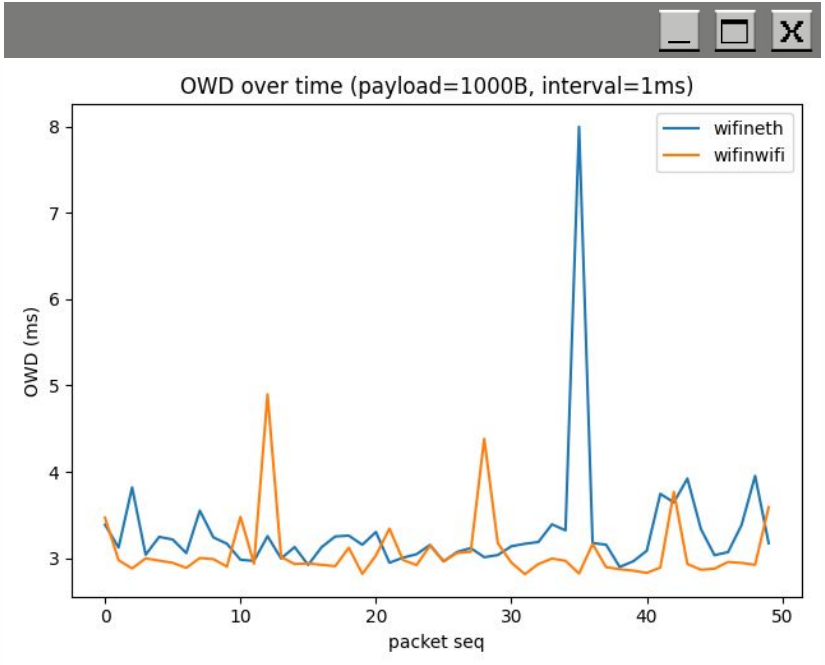
Intervals !

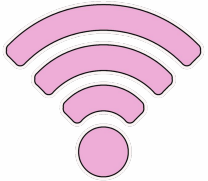

OWD over time (payload=1000B, interval=100ms)
wifineth
wifinwifi
OWD (ms)
packet seq
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
0
10
20
30
40
50

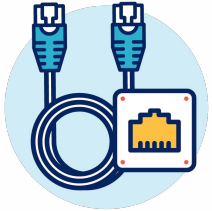

OWD over time (payload=1000B, interval=50ms)
wifineth
wifinwifi
OWD (ms)
packet seq
0
20
40
60
80
100
120
140
160
0
10
20
30
40
50

Intervals Again !









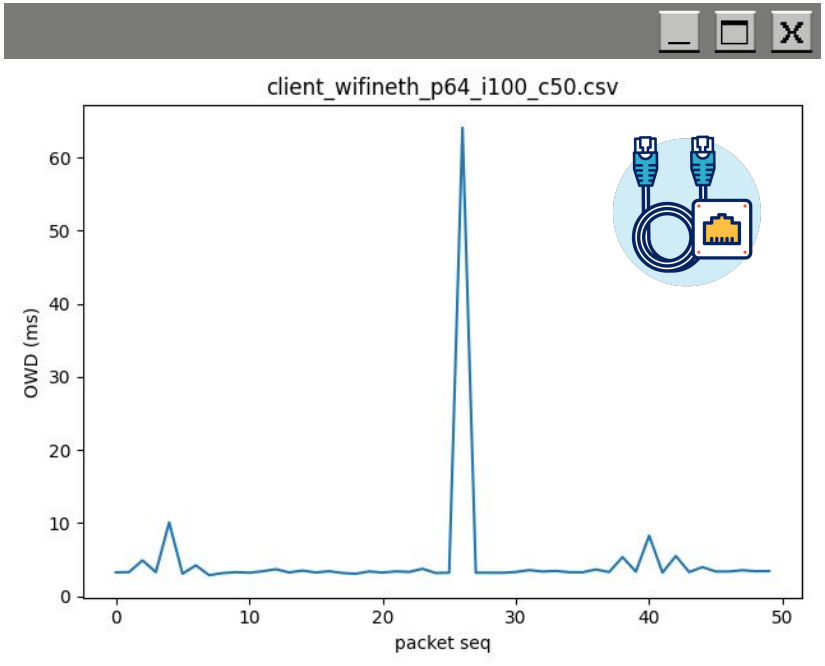
Prone to jitter, especially at mid-range intervals

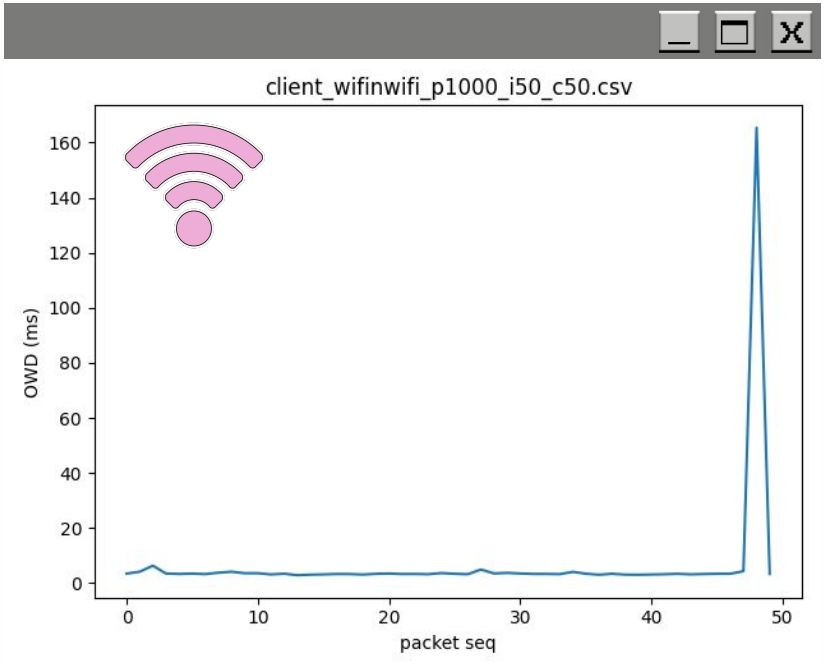
High variation → unpredictable

More stable, but with occasional spikes

Low variation → predictable

Worst Spikes





Thank you

any questions?

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