Test sketch: U\_Time of Flight

Initial conditions:

Wemos D1 Mini, LwIP Lower Memory

|  |  |
| --- | --- |
| QoS | 0 |
| Burst Size | 4 |
| Payload Size | 100 |
| TX Rate | 5000 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Test condition | TOF P | TOF A | Result | Severity | | |
| L | M | H |
| 1 Initial Conditions | 6 | 35 | A very erratic – see graph 1 |  |  |  |
| 2 Burst Size => 6 | 6 | 45 | A erratic again - very suspicious lows of e.g. 3 mS |  |  |  |
| 3 Burst Size => 8 | 6 | 45 | A seems “steadier” but peaks up to 95mS! |  |  |  |
| 4 Burst Size => 10 | 6 | X | Test suspended: A is discarding messages – see evidence bundle 1 |  |  | A  FAIL |
| Testing restarted from initial conditions after failure | | | | | | |
| 5 Payload size set to 250bytes | 6 | 66 | A erratic: high peak of 159mS! |  |  |  |
| 6 Payload set to 500 | 6 | X | Test suspeded: A now dropping 2x messages per burst – see bundle 2 |  |  | A  FAIL |
| Testing restarted from initial conditions after failure | | | | | | |
| 7 Burst rate lowered to 2  Payload set to 1500 | 16 | X | Test suspended: A now failing to send any messages at all |  |  | A  FAIL |
| Testing restarted from initial conditions after failure | | | | | | |
| Various inconclusive tests with “killer packets” over 10kb | X | X | P simply ignored the killer packets. A spontaneously went into a loop of false input messages |  |  | A  FAIL |
| Testing restarted from initial conditions after failure | | | | | | |
| QoS set to 1 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

<Graph 1>

**Failure mode 1 – “high burst/small size” discarded messages**

Evidence bundle 1

< Shark log >

Wireshark log clearly shows only 9 outbound messages, with 9 correct replies from server – it is simply arbitrarily discarding messages. This is ***NOT*** an “acceptable” QoS0 “fire and forget” failure: that is related to the *transport* layer not the *application* layer: QoS0 says “once you send a message, there is no guarantee it will be delivered”

In the current case, AsyncMqttClient ***is not sending the message in the first place***

Conclusion: *High-severity bug. A cannot send more than 8-9 messages in rapid succession. Below that figure it is 9x slower than P*

Graph 2

P steady between 5mS and 7mS – A erratic and average 11x slower than P, peaking at 27x slower than P

**Failure mode 2 – “low burst/medium size” discarded messages**

Evidence bundle 2

< Shark log >

Wireshark log clearly shows only 2 outbound messages, with 2 correct replies from server out of the “burst” of 4 messages. A is now discarding 2x messages per burst.

Conclusion: *High-severity bug. A cannot send more than 1 or 2 medium-szied messages in rapid succession. Total failure prohibits any tim-of-ligt comparison*

**Failure mode 3 – “low burst/medium size” Total message loss**

Evidence bundle 3

< Shark log >

Wireshark log shows no outbound messages sent at all, while the Serial omitor shows A still claiming to have sent them.

Conclusion: *High-severity bug. A simply refuse to send messages > 2x TCP MSS yet gives no warning or error.*

**Failure mode 4 – “killer packet reaction” Spontaneous “handling” of non-existent messages**

**Random1 and 2**