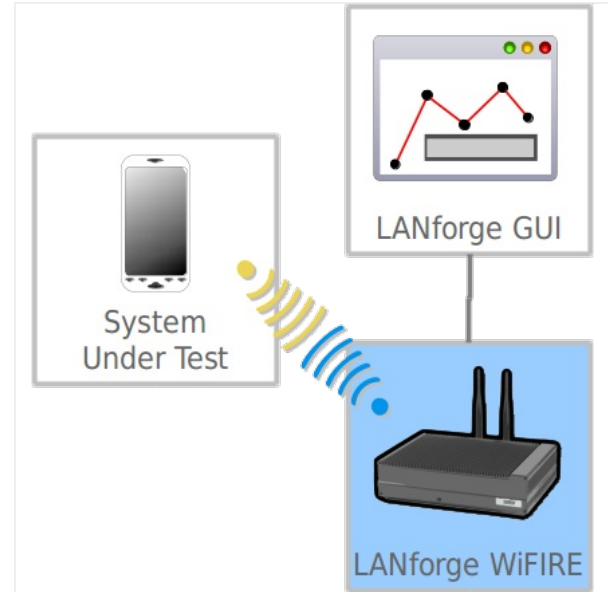
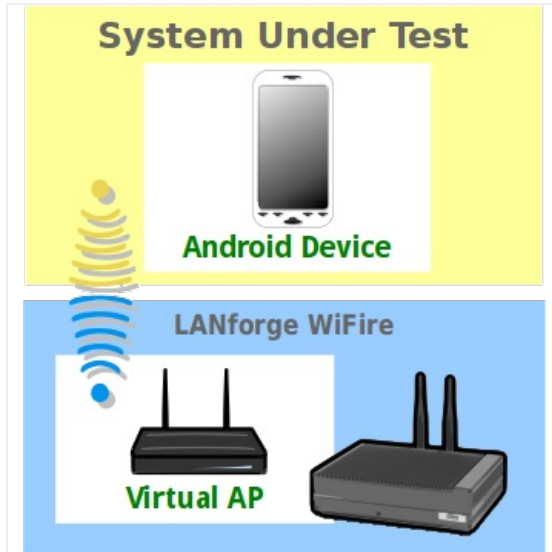


Verifying Android QoS

Goal: Set up Video and Best Effort QoS connections and verify results.

In this example, LANforge-FIRE is used to set up two connections, one running video QoS traffic, the other with Best Effort QoS traffic. The latency and drops will be compared and Wireshark will be used to verify QoS information.



1. Connect the Android device to a LANforge system. You can use the cookbook here for tips: [Running UDP Traffic with Android](#)
2. Create two connections between the Android device and a LANforge port. One for **Best Effort** QoS traffic, one for **Video** QoS traffic.

A. Creating a Best Effort UDP connection.

- Set a **name** for the connection (android-udp-ul-be-100k) in this case.
- Select your **ports**. In this case the connection is between the Android (wlan0) and a bridge (br0).
- Set **Min Tx Rate** on **Endpoint A** to **DOCSIS 1 (30 Mbps)**.
- Set **Min Tx Rate** on **Endpoint B** to **New Modem (56 Kbps)**.
- Make sure **IP ToS** on **both endpoints** is set to **Best Effort**.
- Set **Pkts to Send** to **100000** on **Endpoint A**. **Note:** Because Android is being managed in-band, this limit should prevent losing management frames that could contain reporting data.
- Set **Min IP Port** to **7777** on **Endpoint A**. A custom port is used to help identify the connection type in wireshark.
- Set **Multi-Conn** to 1 for **both endpoints**. This is so each endpoint is running on its own process.

B. Creating a UDP connection with video QoS traffic.

- Set a **name** for the connection (android-udp-ul-vi-100k) in this case.
- Select your **ports**. In this case the connection is between the Android (wlan0) and a bridge (br0).
- Set **Min Tx Rate** on **Endpoint A** to **DOCSIS 1 (30 Mbps)**.
- Set **Min Tx Rate** on **Endpoint B** to **New Modem (56 Kbps)**.
- Set **IP ToS** on **Endpoint A** to **VI (WiFi)**.
- Set **Pkts to Send** to **100000** on **Endpoint A**. **Note:** Because Android is being managed in-band, this limit should prevent losing management frames that could contain reporting data.
- Set **Min IP Port** to **7778** on **Endpoint A**. A custom port is used to help identify the connection type in wireshark.
- Set **Multi-Conn** to 1 for **both endpoints**. This is so each endpoint is running on its own process.

3. Compare latency and drops.

LANforge Manager Version(5.3.3)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr vAP Stations Messages
Status Layer-3 L3 Endps VolP/RTP VolP/RTP Endps Armageddon WanLinks Attenuators File-IO Layer-4

Min PDU Size AUTO Go Max PDU Size Same Go
MIN Tx Rate New Modem (56 Kbps) Go MAX Tx Rate Same Go
View 0 - 400 Go

Start Stop Quiesce Clear

Display Create Modify Batch Modify Delete

All Endpoints

Name	Run	Tx Rate	Rx Rate	Delay	Dropped	Elapsed
android-udp-ul-be-100k-A	☐	25,026,033	47,549	-40,199	14	47
android-udp-ul-be-100k-B	☐	51,053	17,339,287	40,315	30,715	47
android-udp-ul-vi-100k-A	☐	25,026,565	48,051	-40,185	12	47
android-udp-ul-vi-100k-B	☐	51,054	24,982,268	40,233	177	47

Logged in to: brent-523:4002 as: Admin

- The latency can be found under the **Delay** column.
- The drops can be found under **Dropped** column.
- If QoS is working properly, you should see **less delay (latency)** and **less drops** for connections using **VI (WiFi) IP ToS**. The delay can be more easily compared if you add endpoint A and B of each connection. As should be expected, the results above show that the particular device is dropping significantly less packets for the connection with video QoS traffic. Because there is a small amount of latency, a major difference isn't shown here.

4. Verify QoS type with wireshark. This is where our custom port setting is helpful.

- The packets on port **7777** should show **Best Effort**.

Wireshark 1.12.4 (Git Rev Unknown from unknown) (on brent-523)

Filter: ip.addr==195.1.2.1 || ip.addr==195.1.2.10

No.	Time	SSID	Channel type	MCS index	Antenna	Data rate (Mb/s)	Source	Destination
2199	11:21:16.597080000		802.11g	7	0	72.2	195.1.2.1	195.1.2.10
2205	11:21:16.603695000		802.11g	7	0	72.2	195.1.2.1	195.1.2.10
2207	11:21:16.604614000		802.11g	7	0	72.2	195.1.2.1	195.1.2.10
2209	11:21:16.605035000		802.11g	7	0	72.2	195.1.2.1	195.1.2.10
2211	11:21:16.610059000		802.11g	7	0	72.2	195.1.2.1	195.1.2.10

Frame 2209: 1563 bytes on wire (12504 bits), 1563 bytes captured (12504 bits) on interface 0

Ethernet II, Src: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f), Dst: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)

IEEE 802.11 QoS Data, Flags:F.

Type/Subtype: QoS Data (0x0028)

Frame Control Field: 0x8802

Duration: 44 microseconds

Receiver address: LgElectr_c3:a6:80 (40:b0:fa:c3:a6:80)

Destination address: LgElectr_c3:a6:80 (40:b0:fa:c3:a6:80)

Transmitter address: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)

BSS Id: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)

Source address: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)

Fragment number: 0

Sequence number: 264

QoS Control: 0x0000

.....0000 = TID: 0

[.....0000 = Priority: Best Effort (Best Effort) (0)]

.....0 = EOSP: Service period

.....00 = Ack Policy: Normal Ack (0x0000)

.....0 = Payload Type: MSDU

0000 0000 = QAP PS Buffer State: 0x0000

Logical-Link Control

Internet Protocol Version 4, Src: 195.1.2.1 (195.1.2.1), Dst: 195.1.2.10 (195.1.2.10)

User Datagram Protocol, Src Port: 7777 (7777), Dst Port: 33001 (33001)

Data (1472 bytes)

0030 7e c4 2f 00 10 00 00 aa aa 03 00 00 00 08 00 45E

0040 00 05 dc f8 e8 40 00 40 11 b2 1a c3 01 02 01 c3@.

0050 01 02 0a 1e 61 80 e9 05 c8 52 2f 00 00 00 0a@.

0060 2b 3c 4d 00 01 00 02 05 9c 00 00 00 02 a2 91 56V

0070 d5 eb ac 23 cf 2c e0 00 01 00 00 00 00 97 de 00#.

0080 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f 10E

802.1D Tag (vlan.qos.priority), 2 bytes... Packets: 2323 - Displayed: 1018 (43.8%) - Dropped: 0 (0.0%)

B. The packets on port **7778** should show **Video**.

The image shows a Wireshark 1.12.4 capture window. The filter bar at the top is set to `ip.addr==195.1.2.1 || ip.addr==195.1.2.10`. The packet list shows several packets, with packet 2211 selected. The packet details pane shows the following structure:

- Frame 2211: 1563 bytes on wire (12504 bits), 1563 bytes captured (12504 bits) on interface 0
- Radiotap Header v0, Length 29
- IEEE 802.11 QoS Data, Flags:F.
 - Type/Subtype: QoS Data (0x0028)
 - Frame Control Field: 0x8802
 - Duration: 44 microseconds
 - Receiver address: LgElectr_c3:a6:80 (40:b0:fa:c3:a6:80)
 - Destination address: LgElectr_c3:a6:80 (40:b0:fa:c3:a6:80)
 - Transmitter address: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)
 - BSS Id: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)
 - Source address: Sparklan_7e:c4:2f (00:0e:8e:7e:c4:2f)
 - Fragment number: 0
 - Sequence number: 3892
 - QoS Control: 0x0004
 -0100 = TID: 4
 - [.....100 = Priority: Controlled Load (Video) (4)]
 -0..... = EOSP: Service period
 -00..... = Ack Policy: Normal Ack (0x0000)
 -0..... = Payload Type: MSDU
 - 0000 0000 = QAP PS Buffer State: 0x0000
 - Logical-Link Control
 - Internet Protocol Version 4, Src: 195.1.2.1 (195.1.2.1), Dst: 195.1.2.10 (195.1.2.10)
 - User Datagram Protocol, Src Port: 7778 (7778), Dst Port: 33002 (33002)
 - Data (1472 bytes)

The packet bytes pane shows the raw data of the selected packet, starting with `0030 7e c4 2f 40 13 04 00 aa aa 03 00 00 00 08 00 45`.

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