Wi-Fi Performance

Robert McMahon

Characteristics of Wi-Fi

- Listen before talk (collision avoidance) costly (100 usecs)
- Transmit & receive unit not a 802.3 packet but an 802.11 aggregate
- High variability in PHY rates
- High variability in media access
- Power imbalance (AP/STA)

Wi-Fi Throughput Vectors

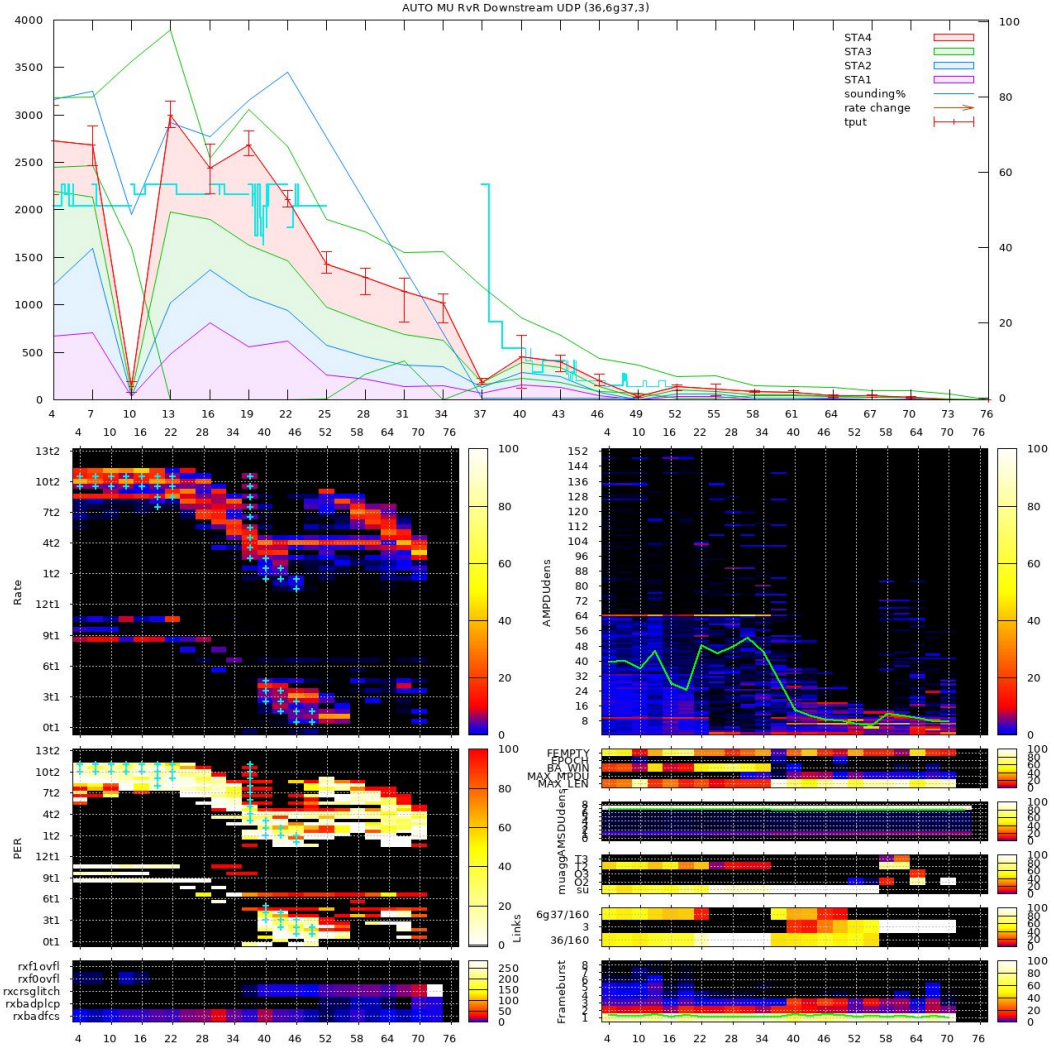
- MCS (QAMs & Spatial Streams)
- Chanspec (bandwidth)
- AMPDU Aggregation
- Packet Error Rate (PER)
- SW FIFO empty (Transport’s not filling host driver)
- Frame bursting

Wi-Fi Latency Vectors

- MCS (QAMs & Spatial Streams)
- EDCAs (AIFS, CWmin, CWMax, TXOP)
- Competition for the receiver
- Chanspec (bandwidth)
- AMPDU Aggregation
- Packet Error Rate (PER)
- SW FIFO empty (Transport’s not filling host driver)
- Frame bursting

Direction matters

- Wi-Fi ink has src (flow control at driver level)
- Wi-Fi link downstream from src (CCA/pacing)


AUTO MU RvR Downstream UDP (36,6g37,3)
STA4
STA3
STA2
STA1
sounding%
rate change
tput
Rate
PER
AMPDUdens
Links
Frameburst
FEMPTY
EPOCH
BA_WIN
MAX_MPDU
MAX_LEN
6g37/160
3
36/160
rxf1ovfl
rxf0ovfl
rxcrsglitch
rxbadplcp
rxbadfcs