

WiFiMon Evaluation: Results from Pilots

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EaP Workshop:

Introduction to WiFiMon for EaP NRENs

November 2021, Virtual Event

Evaluation

Based on pilots in 2 recent conference venues:

- TNC19 Conference (Tallinn, 2019)
- GÉANT Symposium 2020 (Ljubljana, 2020)

TNC19:

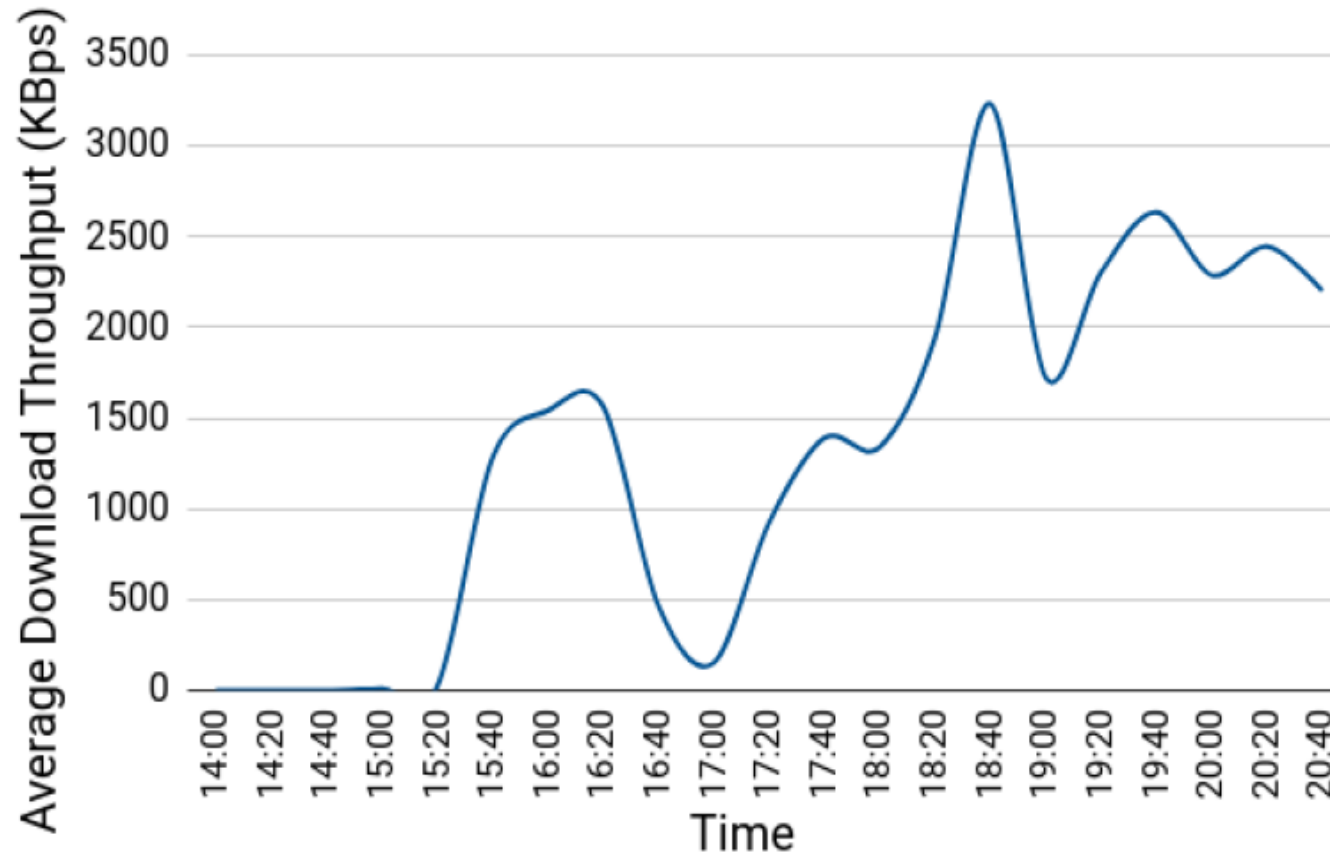
- More than 800 participants
- Monitored Wi-Fi network setup for the conference days
- Monitoring using only *WHPs* (Five Raspberry Pi 3 model B devices)
- *WHP* monitoring interval: 20 minutes
- *WTS* in TalTech: RTT between *WTS* and venue less than 4 msec

GÉANT Symposium 2020 :

- Around 250 participants
- Monitored *eduroam* ESSID
- *WHPs*: Seven Raspberry Pi 3 model B devices (Interval: 5 minutes)
- Also including *WSPs*: HTML lines in the conference agenda after receiving consent during the online registration process
- *WTS* in *ARNES*, the Slovenian *NREN*

TNC19 Pilot (1)

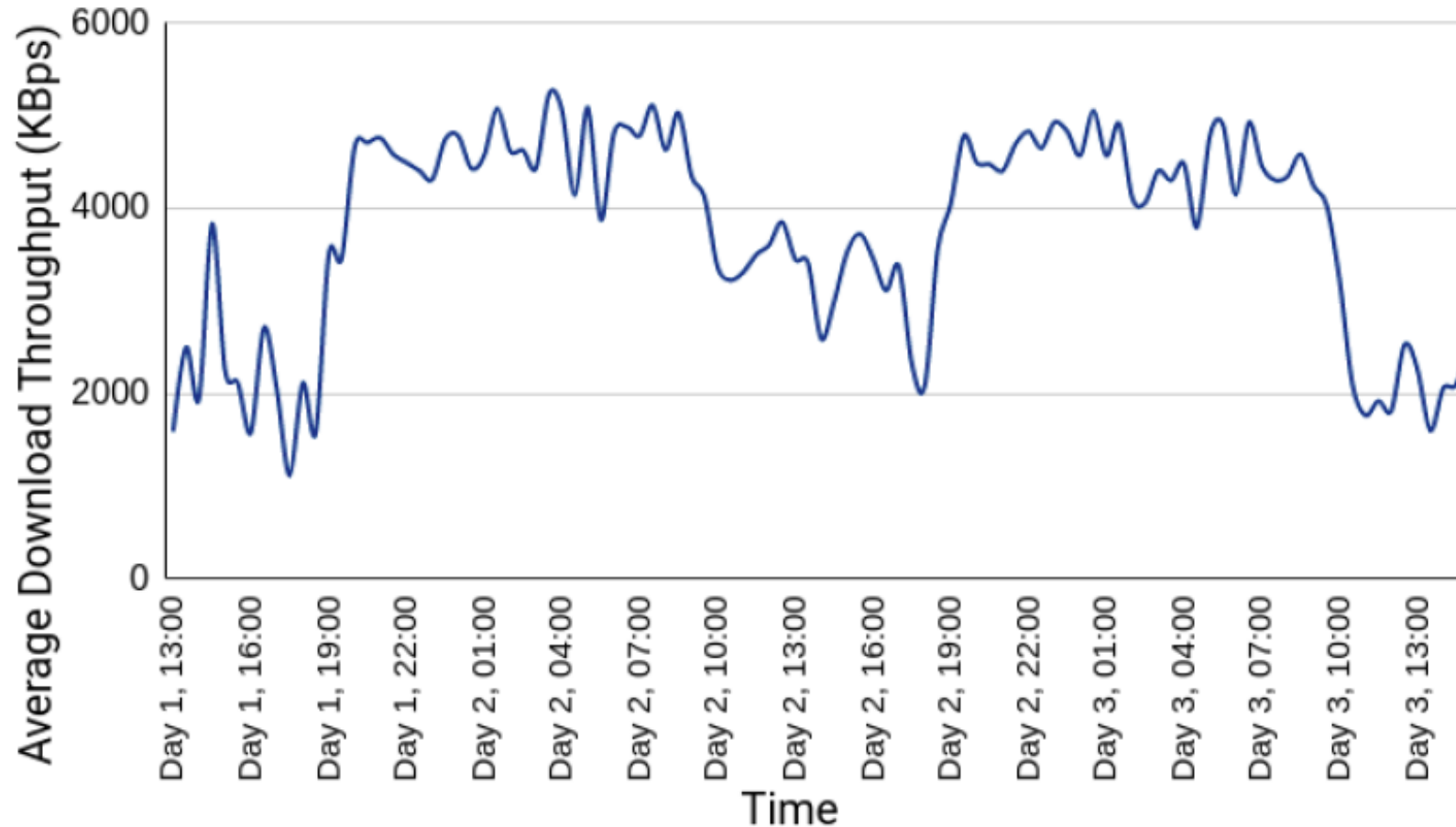
Average download throughput reported by a *WHP* placed in the main hall during the 1st conference day:



- **14:00 – 15:20:** Low throughput and connectivity issues during lightning talks
- **15:20 – 16:30:** Less people in the venue → Higher throughput
- **Around 17:00:** Significant drop because of opening ceremony
- **After 18:00:** Wi-Fi performance restored after people had left the venue

TNC19 Pilot (2)

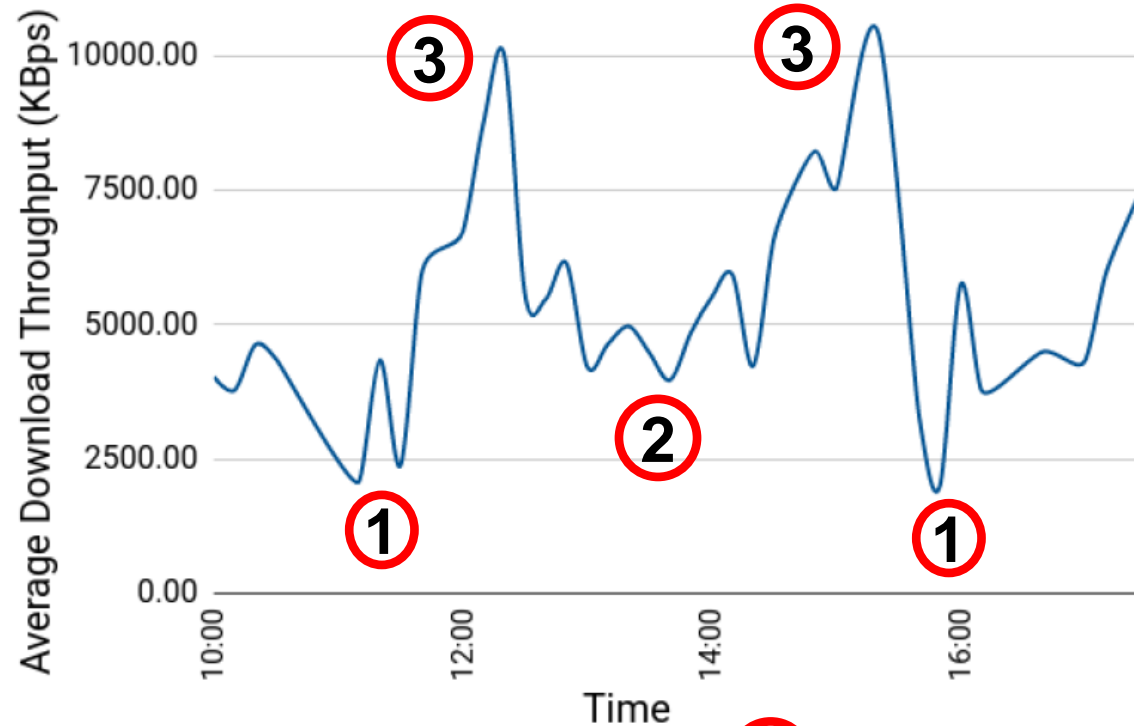
Average download throughput reported by a *WHP* placed in the room where coffee/lunch breaks and the opening ceremony occurred:



Wi-Fi performance degraded when people were at the venue, while the throughput was higher and more stable when participants were absent.

GÉANT Symposium 2020 Pilot (1)

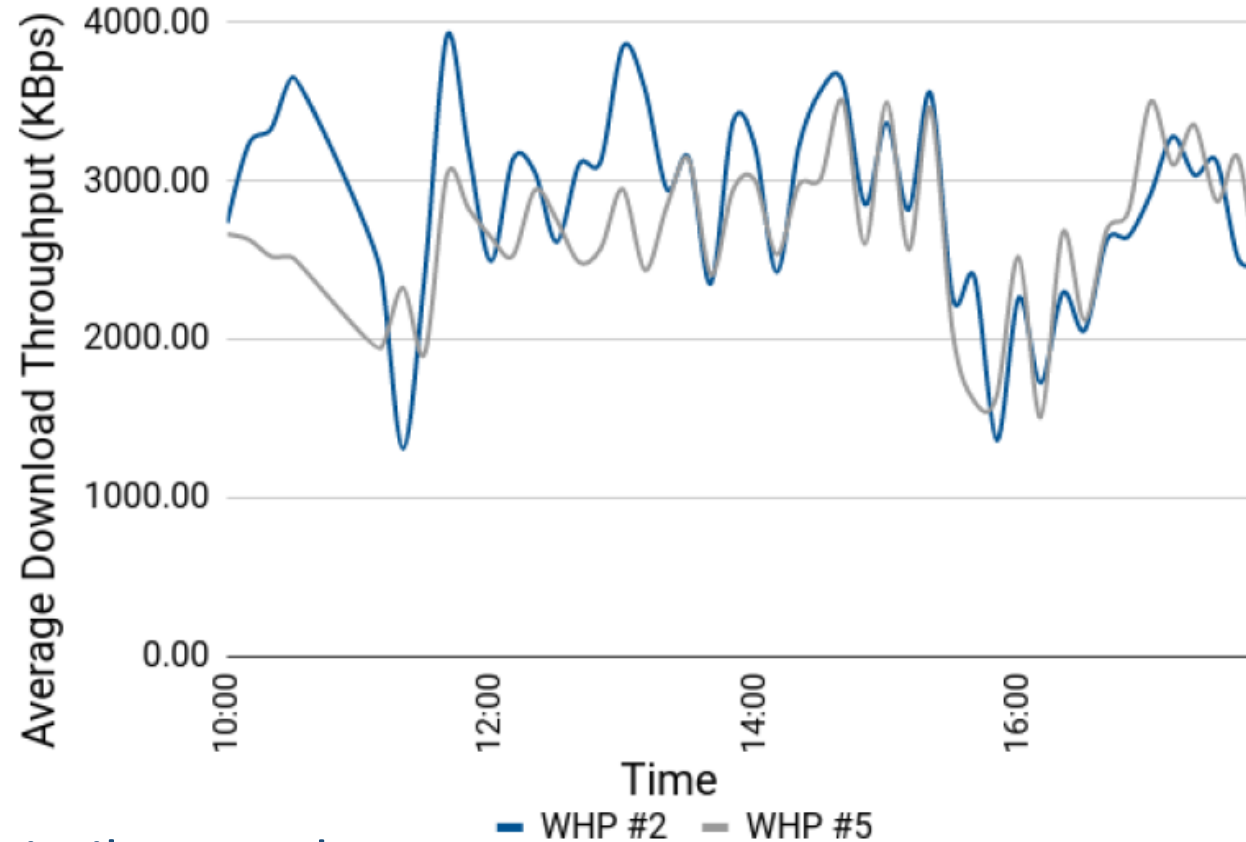
Average download throughput reported by crowdsourced measurements (1st Symposium Day between 10:00 and 17:00):



- **Major drops:** 11:00 – 11:40 and 15:30 – 16:00 **1**
→ Periods after coffee break (more people visiting symposium agenda)
- **Notable drop:** 12:30 – 14:00 **2**
→ During and after lunch time when most participants gathered in less space
- **Higher levels:** Around 12:20 and 15:20 **3**
→ Participants distributed across many different sessions

GÉANT Symposium 2020 Pilot (2)

Average download throughput reported by *WHPs* #2 and #5 (1st Symposium day):



- Both *WHPs* follow similar trends
- Both *WHPs* conceive the throughput drops reported by *WSP* measurements
- *WHPs* reported less throughput as they were placed near the available power plugs, typically farther from *Access Points* than the audience (e.g. on the floor)

GÉANT Symposium 2020 Pilot (3)

WLAN metrics and performance measurements from the 1st Symposium day:

WHP No	Average Signal Level (dBm)	Average Bit Rate (Mbps)	Average Link Quality	Average TX Power (dBm)	Average Download Throughput (KBps)	Average Upload Throughput (KBps)	Average Ping Latency (msec)
1	-43	71	67/70	31	1588	763	48
2	-52	49	58/70	31	2883	1500	30
3	-59	78	51/70	31	2644	1429	44
4	-59	59	51/70	31	1431	650	41
5	-66	75	44/70	31	2678	1514	23
6	-62	65	48/70	31	1758	890	41
7	-55	66	55/70	31	2730	1562	32

Observation: WLAN metric trends may not follow those of performance measurements

- **WHP #1:** *best* average link quality, but among the *worst* throughput results
- **WHP #5:** *worst* average link quality, but among the *best* throughput results

Conclusion: Multiple sources of information, i.e. crowdsourced and probe measurements, are vital for proper Wi-Fi performance evaluation

→ High values of signal strength/link quality do not necessarily guarantee high Wi-Fi throughputs

Thank you

Homepage:

<https://wiki.geant.org/display/WIF>

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