WiFiMon – new service in the GÉANT service portfolio

Pavle Vuletić, UoB/AMRES
WP6T3 Task Leader

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Why a system for WiFi monitoring?

WiFiMon

- WiFi is among the most popular network access methods
- Measuring the performance of the WiFi networks is challenging:
  - Air is a shared medium – other users and their usage patterns
  - Physical obstacles
  - Other networks
  - type of antenna, positioning, signal reflection, diffraction, refraction…
- Measuring only signal strength or link quality from fixed points is not sufficient to get the impression about the Quality of user's Experience (QoE)
- Vendor solutions – closed and focused on the network equipment (APs)

What WiFiMon offers?

WiFiMon

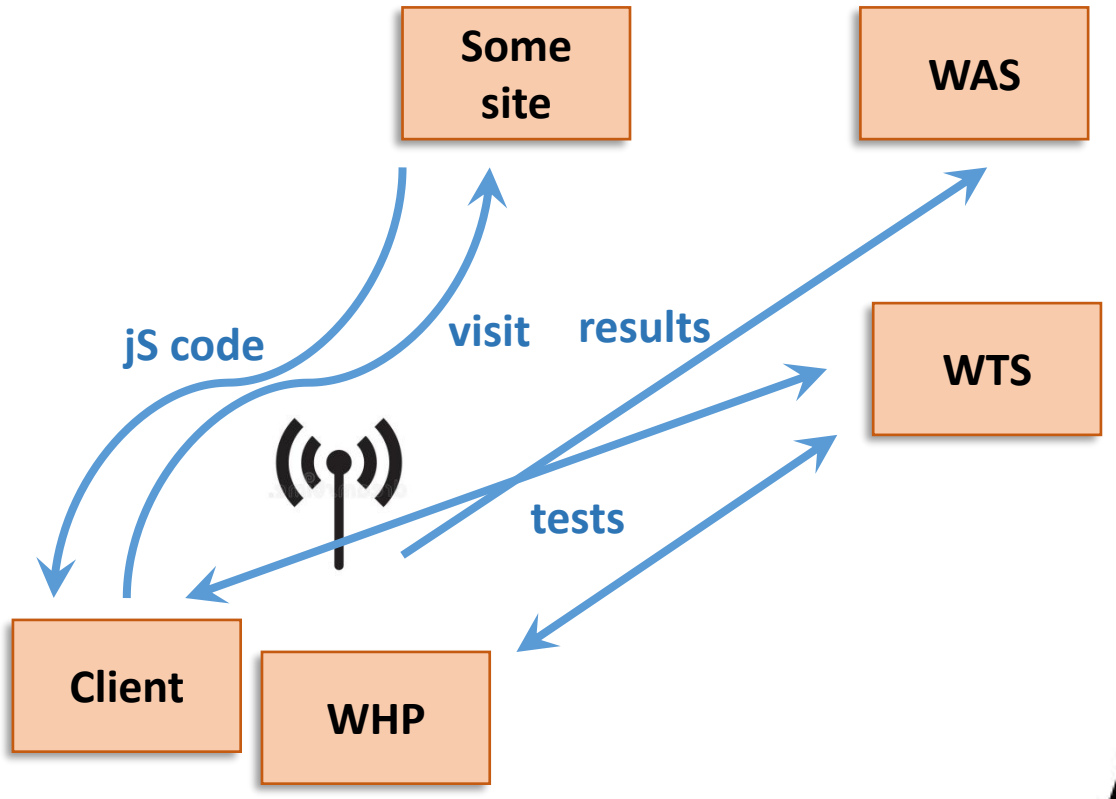
- Vendor independent, open-source monitoring tool
- Transparent to the users
- Low network overhead (active monitoring tool)
- Captures user's perception of the network quality
- Provides metrics like: throughput, latency, signal strength, link quality,…
- The use of well-known open-source tools like: ELK, Akamai Boomerang, SpeedTest

WiFiMon – brief history

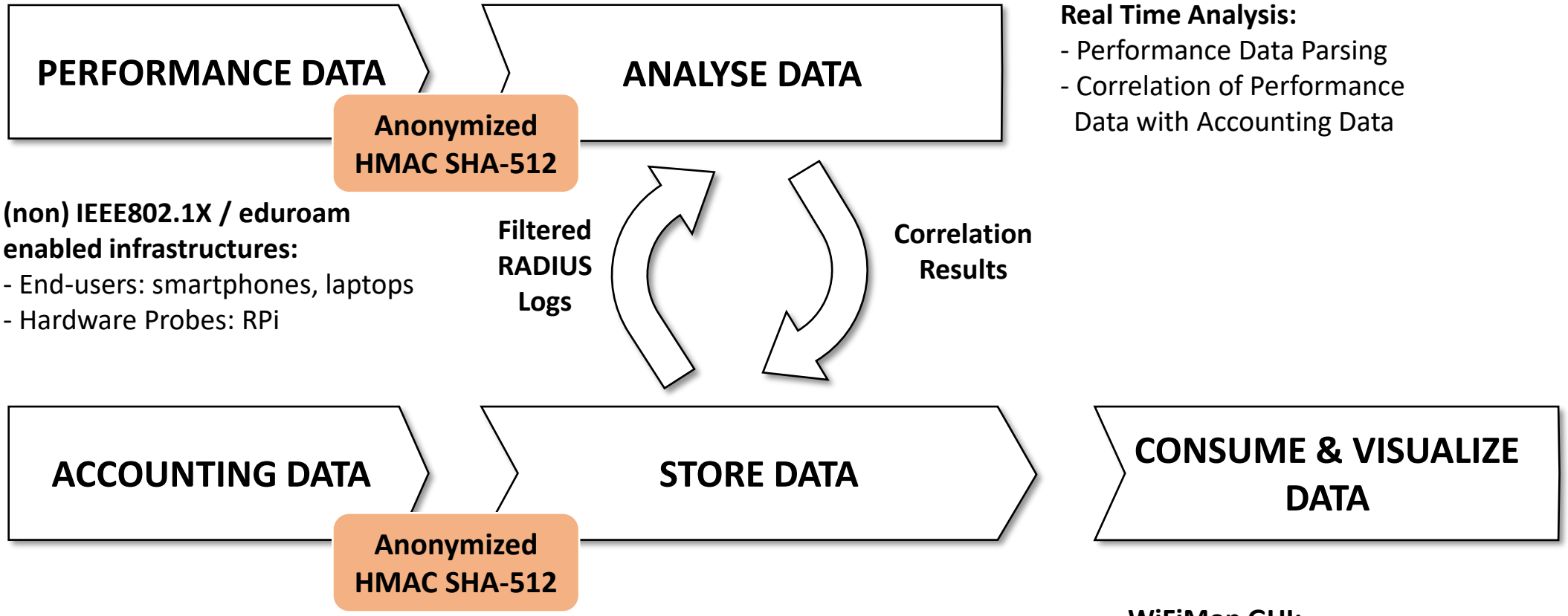
- Idea from GN4-1 – how to capture the user's perception of the WiFi network performance
- Development in GN4-2 – crowdsourced WiFi monitoring
  - Uses well known tools:
    - Akamai Boomerang
    - Speedtest/libretest
    - Nettest
    - ELK stack
- New features in GN4-3 – fixed hardware probes
  - The same tools as for the crowdsourced monitoring
  - Information about the signal strength and quality
  - Correlation with RADIUS logs
- GEANT service since July 2020

WiFiMon building blocks and operation

- Client – any user's device
- WHP – WiFiMon hardware probe (rPi)
- WTS – WiFiMon Test Server - measurements
- WAS – WiFiMon Analysis Server (ELK)
- Site – popular web site (University, captive portal,…)



WiFiMon - Data Flow



(non) IEEE802.1X / eduroam enabled infrastructures:
- End-users: smartphones, laptops
- Hardware Probes: RPi

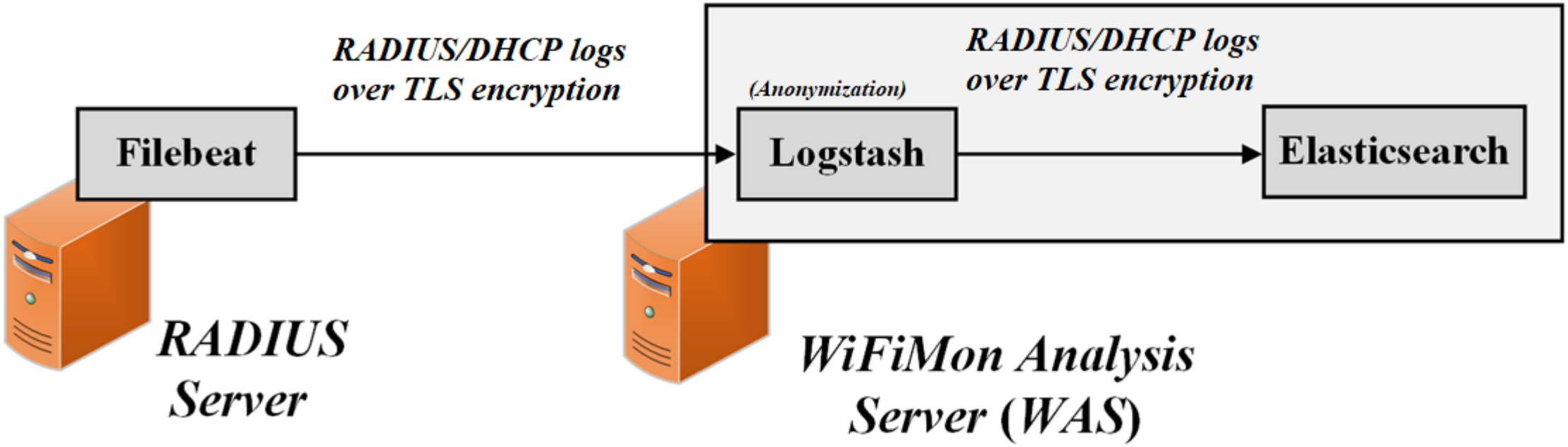
Real Time Analysis:
- Performance Data Parsing
- Correlation of Performance Data with Accounting Data

DHCP and RADIUS Logs:
- Data Filtering (**Logstash**)

Data Storage (Elasticsearch)
- Filtered RADIUS Logs
- Correlated Results (persistent data): Performance Data correlated with RADIUS logs

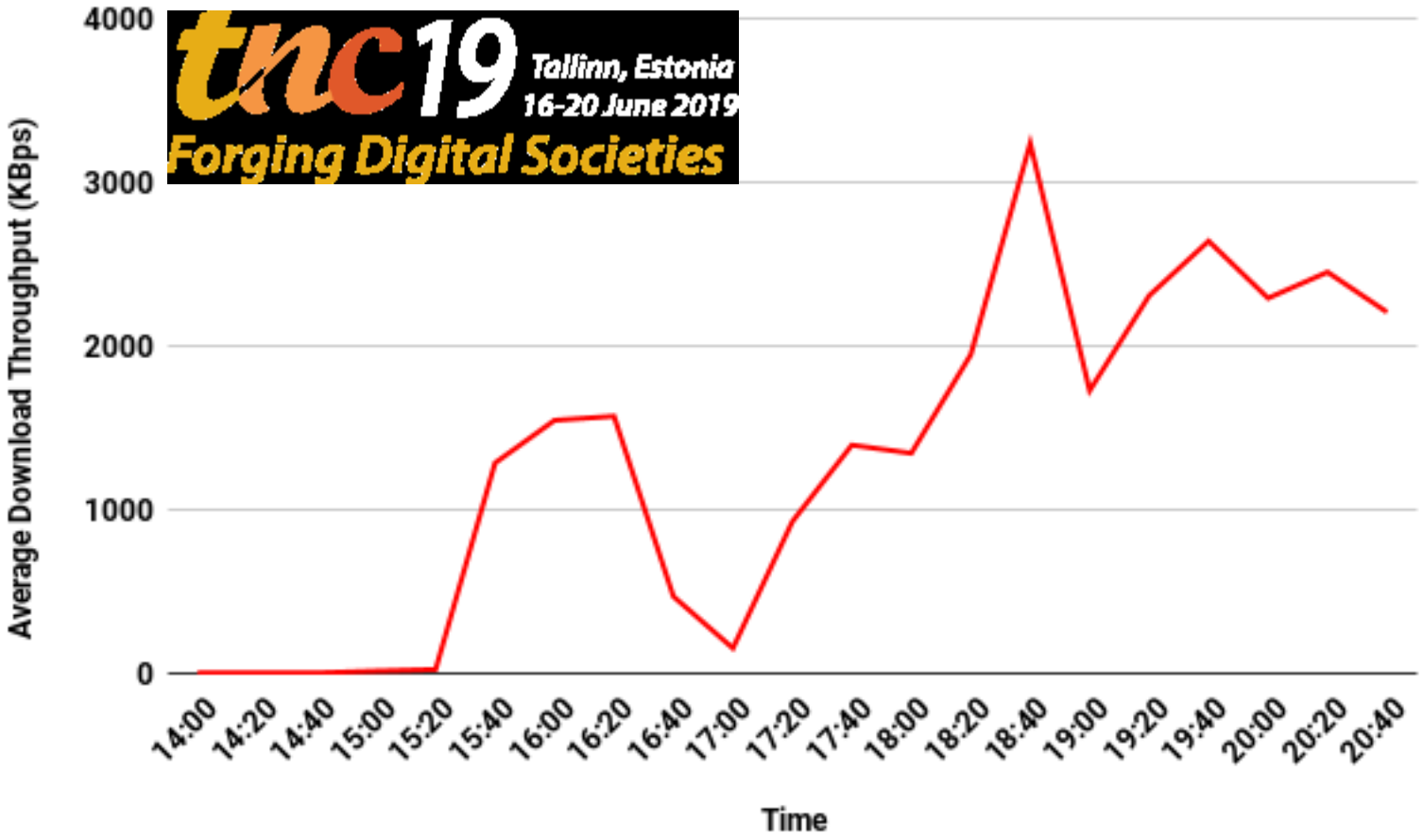
WiFiMon GUI:
- Visualisation (**Kibana**) for network administrator
- User Options

Feedback Integration – RADIUS Logs Privacy



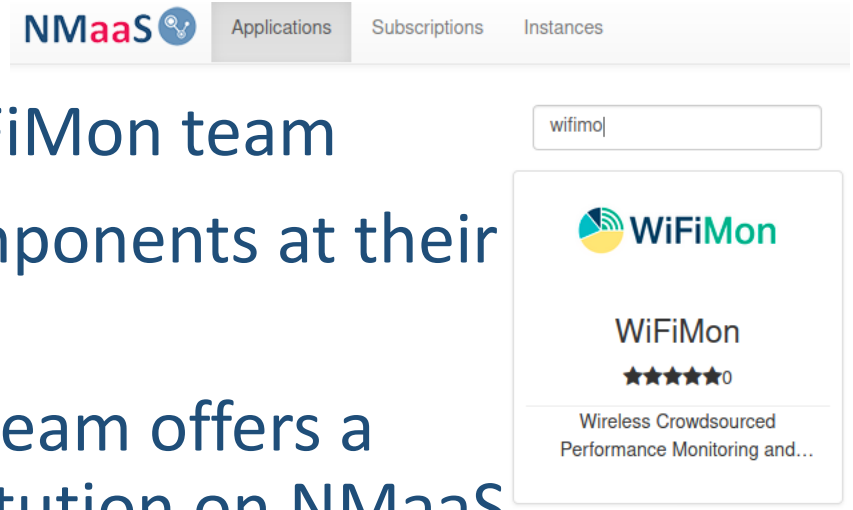
- **Filebeat:** RADIUS logs are streamed encrypted (TLS) to the WiFiMon Agent. Only fields of interest are streamed to reduce total size.
- **Logstash:** RADIUS logs information is obfuscated by Logstash using the HMAC algorithm. Thus the data is directly compared and stored anonymized in Elasticsearch.

How to read the results?



- TCP throughput is not a real achievable throughput
- Look at the relative changes
- Baseline – when the network is quiet
- WHP – changes of the WiFi network parameters
- Crowdsourced – changes of the perceived quality metrics

WiFiMon service model



- Download and install, support from WiFiMon team
- Interested institutions install all the components at their premises (no GDPR issues)
- If needed (for testing/trying) WiFiMon team offers a central WiFiMon WAS instance per institution on NMaaS (operated by WP6T3)
- If you are interested, register at (our mailing lists): https://www.geant.org/wifimon/Pages/Register.aspx

Come to our Infoshare!

WiFiMon

- Infoshare on November 5th. Much more technical details, installation guides, results...
- Register at: https://events.geant.org/event/221/
- Other resources:
  - **GEANT WiFiMon page:** https://www.geant.org/wifimon/Pages/default.aspx
  - **WiFiMon wiki page:** https://wiki.geant.org/display/WIF
  - **WiFiMon code:** https://bitbucket.software.geant.org/projects/WFMON/repos/agent/browse
  - **Publications and Presentations:** https://wiki.geant.org/display/WIF/WiFiMon+Publications

Thank you

Any questions?

Email: wifimon-ops@lists.geant.org

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