

Operational Monitoring and Measurement Challenges in Large Scale WiFi Networks

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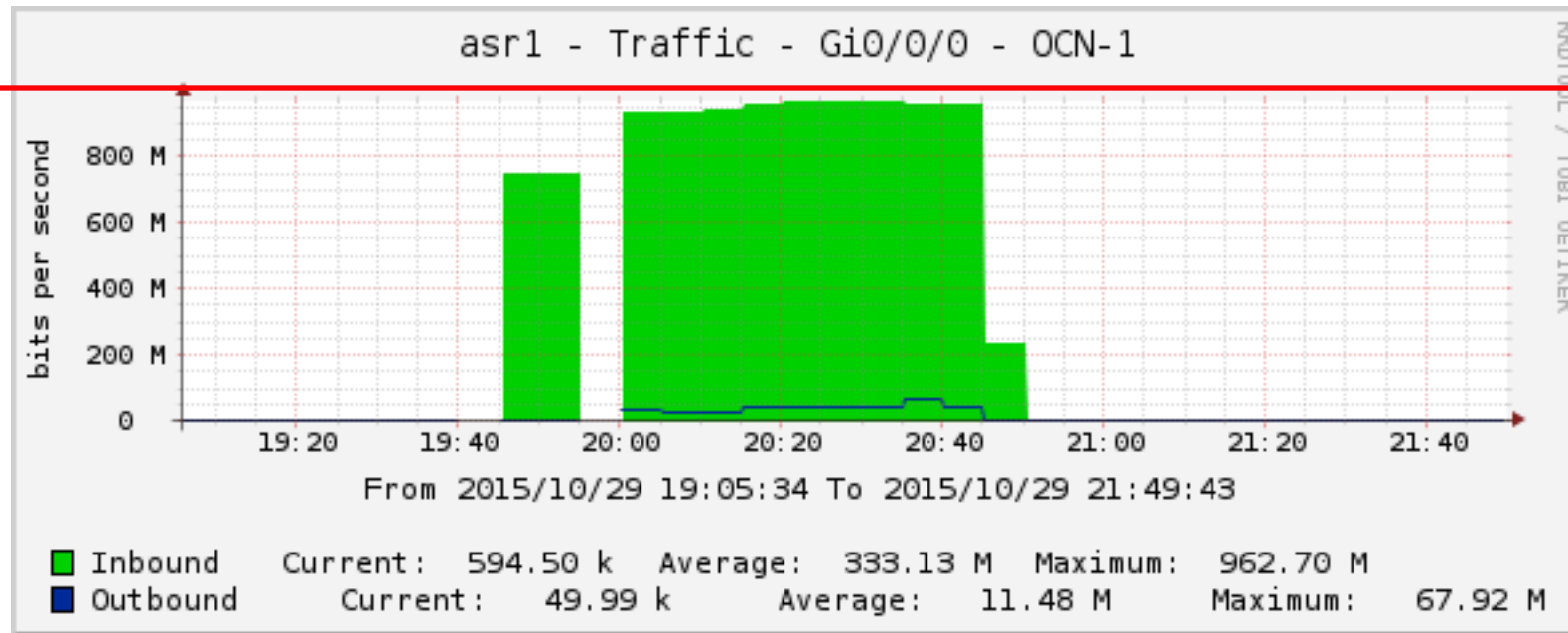
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Keiichi Shima

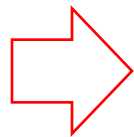
IIJ Innovation Institute

Monitoring at IETF 94 (Wired link)



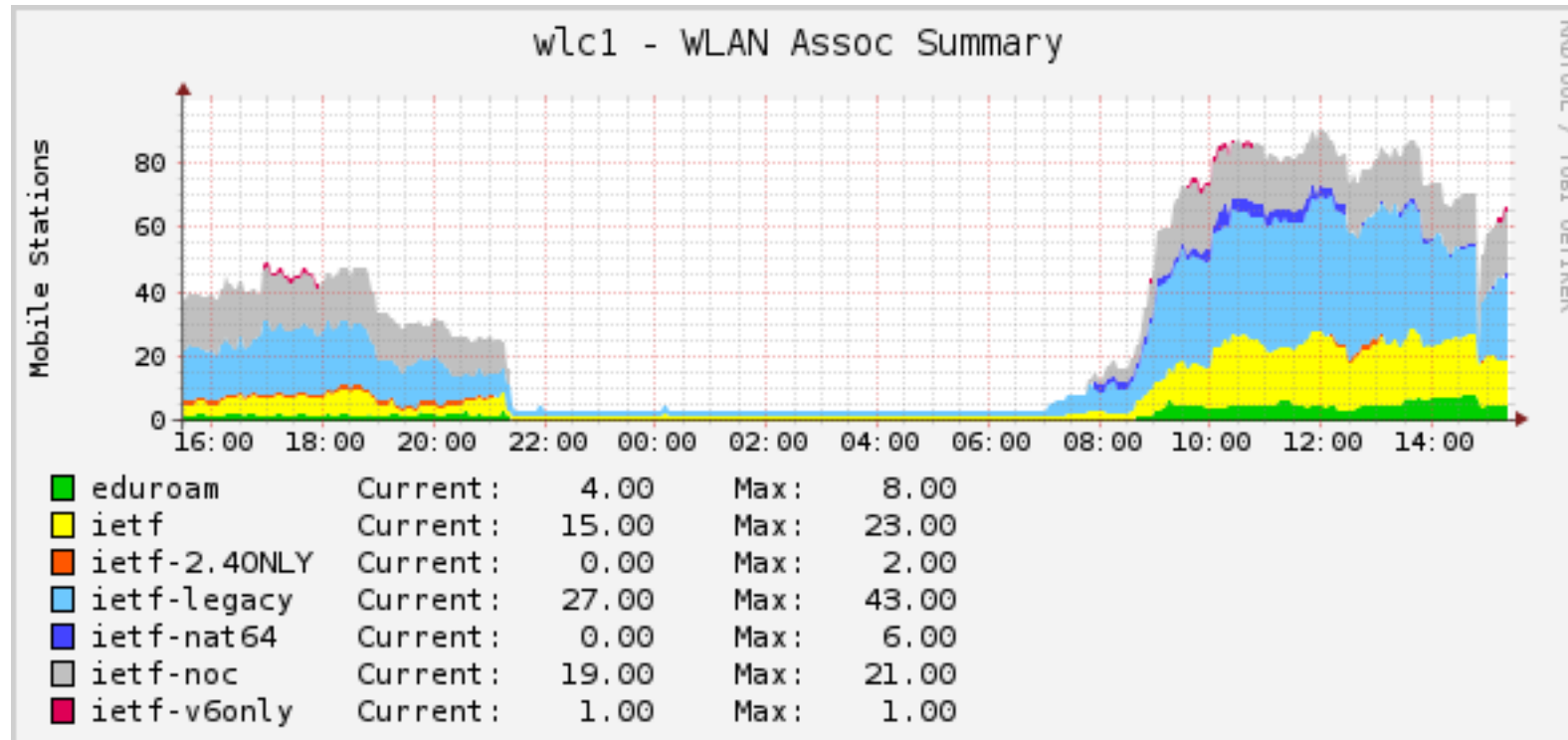
1000 Mbps = Capacity

Does this help us?

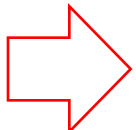


Yes 😊

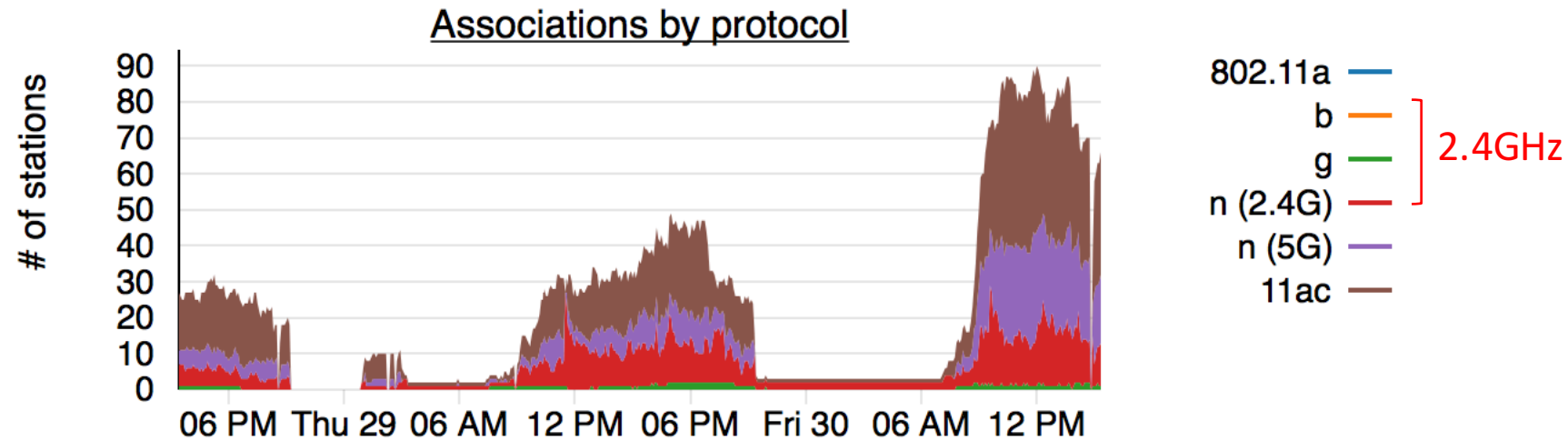
Monitoring at IETF 94



Does the number of associations per SSID help us?

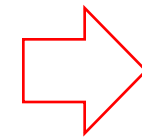
- Good to visualize (eye-catching)
- But, how about for operations...?  No “capacity” info. Umm ☹️

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Does the number of associations per protocol help us?

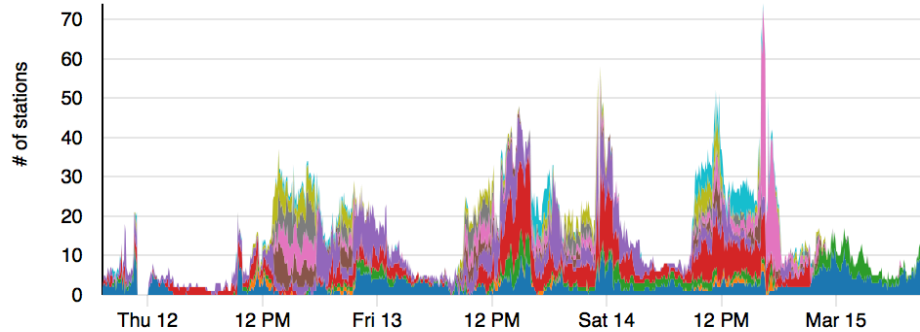
- More meaningful than # of associations per SSID
- But, still missing capacity info...



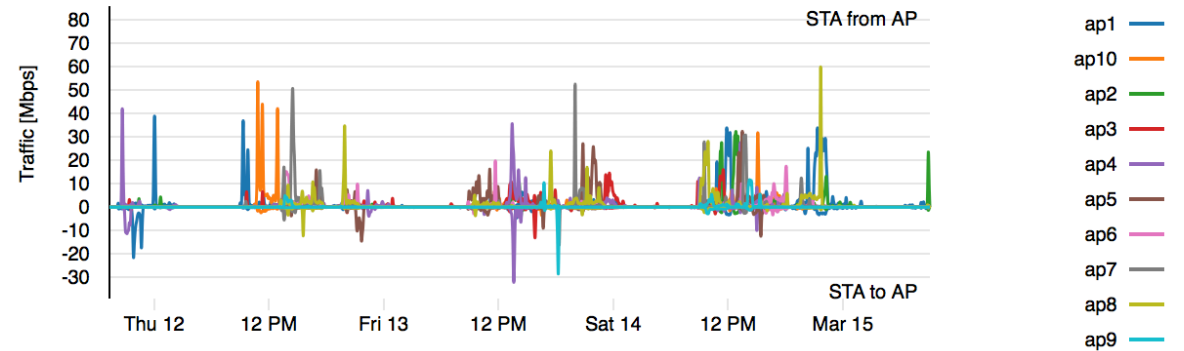
Umm ☹️

Any other monitoring?

of associations per AP (2.4G)



Traffic chart per AP



of associations per AP

- Meaningful for “processor” capacity
- But, not for “radio” capacity

of associations per AP

- Meaningful for “forwarding engine” capacity
- But, not for “radio” capacity
 - 1 KB / 1 Mbps rate → **8000 us**
 - 1 KB / 54 Mbps rate → **148 us**

Gap between Research and Operations on Measurement (or Monitoring)

- Research
 - **Develop** measurement metrics what researches need
- Operations
 - **Use** standardized metrics (e.g., values defined in MIBs) what vendors implement

What we need to monitor (in operations)

- **Utilization against capacity**

- Example in WiFi
 - Direct metric
 - Radio time utilization (available for transmission and received packets; no dropped packets)
 - Indirect metric
 - Retransmission counter = Drop (need transmit packets)
 - Backoff time = Contention (need transmit packets)
- Other possibilities than metrics (may be research)
 - Duration in RTS in CAPWAP packets
 - Estimation from Tx rate and packet/byte counters