Measuring Web Latency in Cellular Networks

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Motivation

- ✓ Increasing adoption of mobile devices changed the way how people interact and access web apps like social media and e-commerce.
- ✓ Web browsing is one of the dominant application in the cellular network.
- ✓ QoE is a key requirement for ISP to retain their customers.
- ✓ Need for an automated tool to measure the web latency in a large scale deployment over cellular networks.

Methodology

+ Use MONROE platform.
+ Measure QoS metrics (e.g., DNS lookup time, TTFB, PLT)
+ Measure webpage complexity metrics (e.g., number of objects).
+ Download all the website contents.
+ Record network related metadata (e.g., Signal strength) .

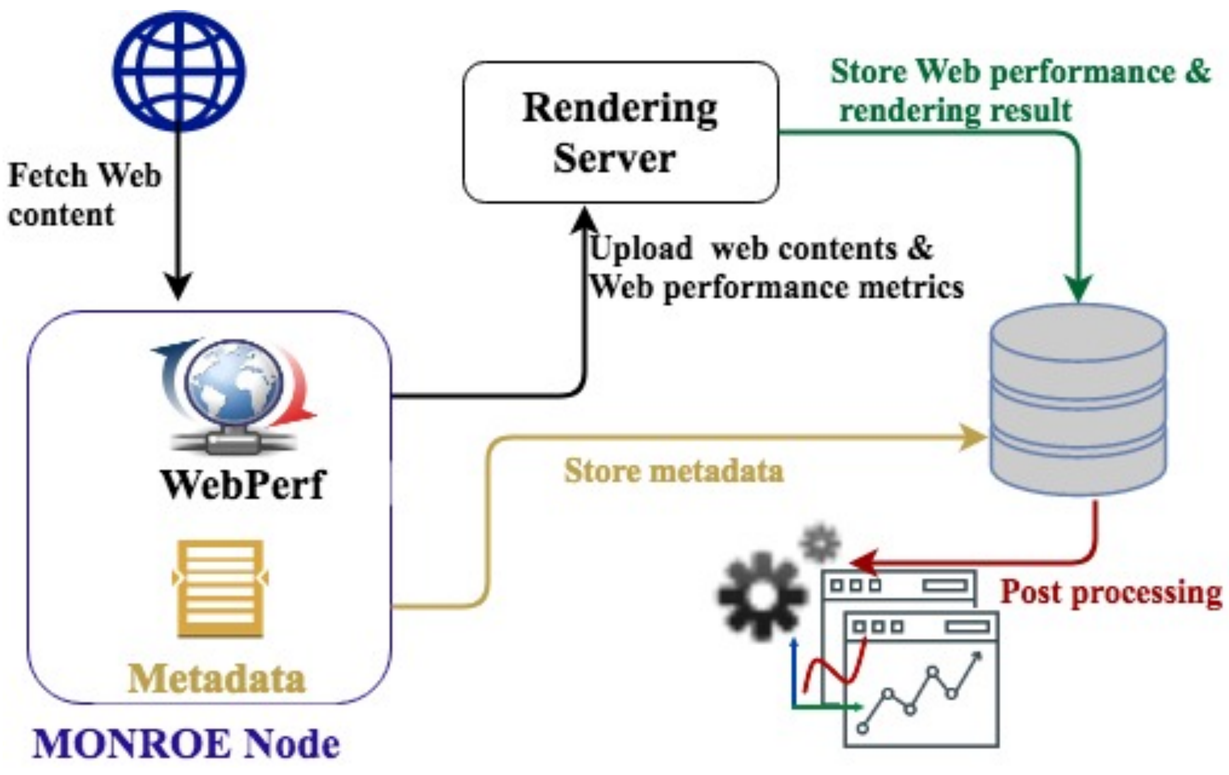
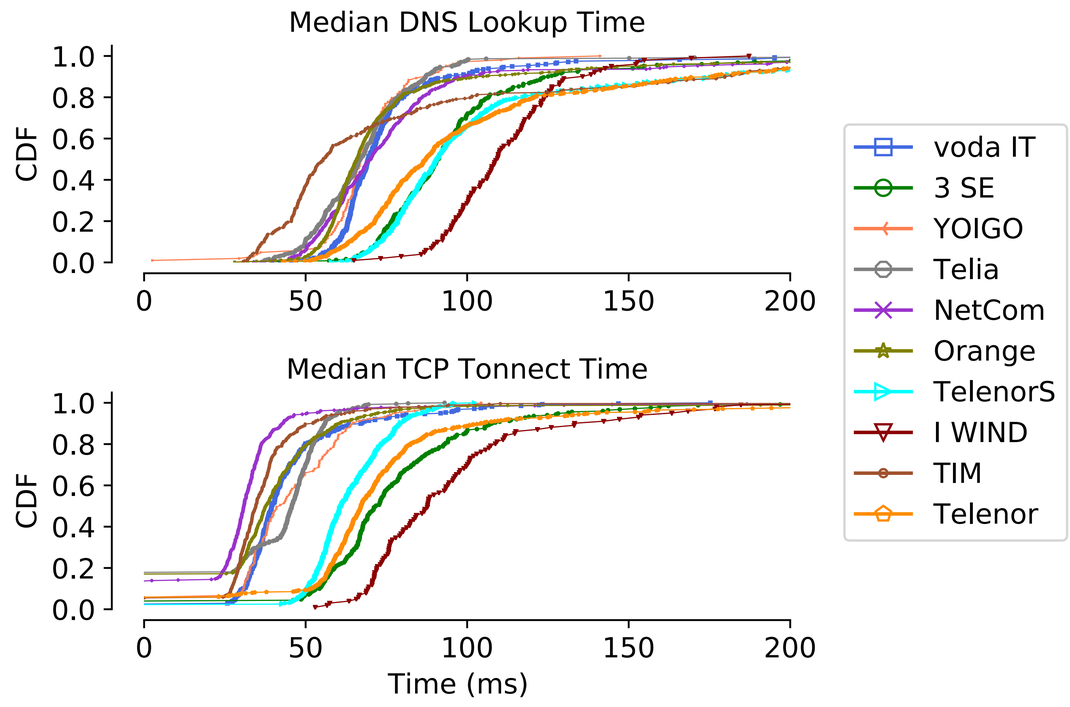


Fig 1: Measurement setup

Dataset

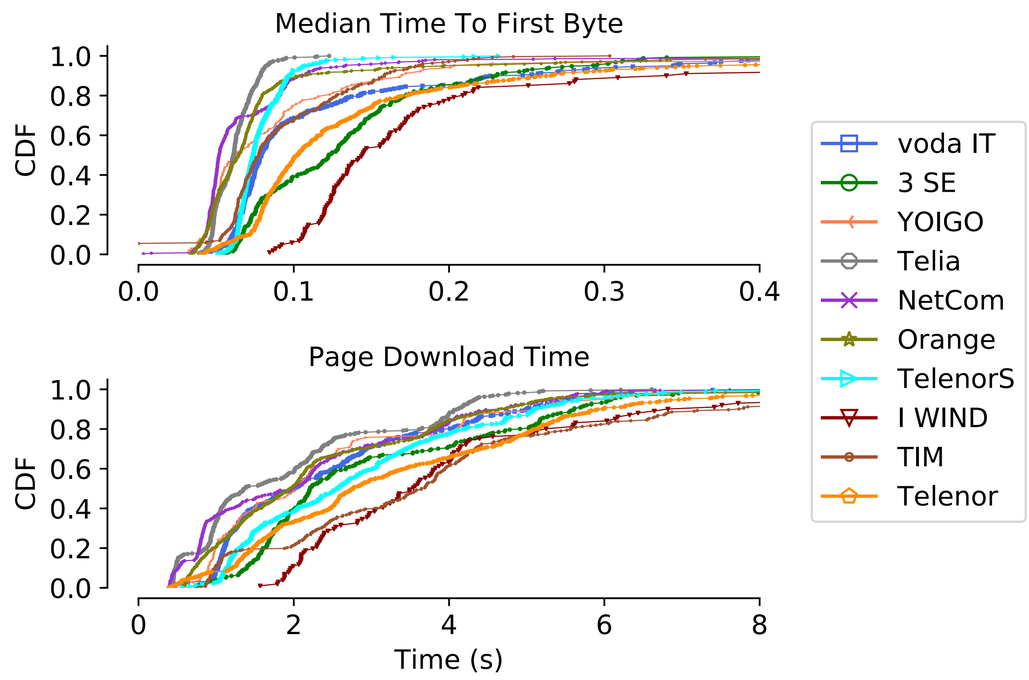
- 3 websites (`www.bbc.com`, `www.ebay.com`, `www.go.com`).
- 19 vantage points in ES, IT, NO & SE.
- 3K data points collected in Aug 2016.

Results



Take away # 1.

The DNS lookup time and the TCP connect time vary among operators even with the same country. e.g. I WIND vs. TIM and 3 SE vs. Telia



2. The TTFB an the page load time vary among operators even with the same country.

3. Good performance in DNS lookup time, TCP connect time, and TTFB do not always yield better performance in terms of PLT. E.g.TIM vs. IWIND

Future work

- ➢ Measuring the rendering time (ATF) to better approximate the user QoE.
- ➢ Collect more data from many nodes and larger set of websites under different mobility scenario.

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