



MobiPerf

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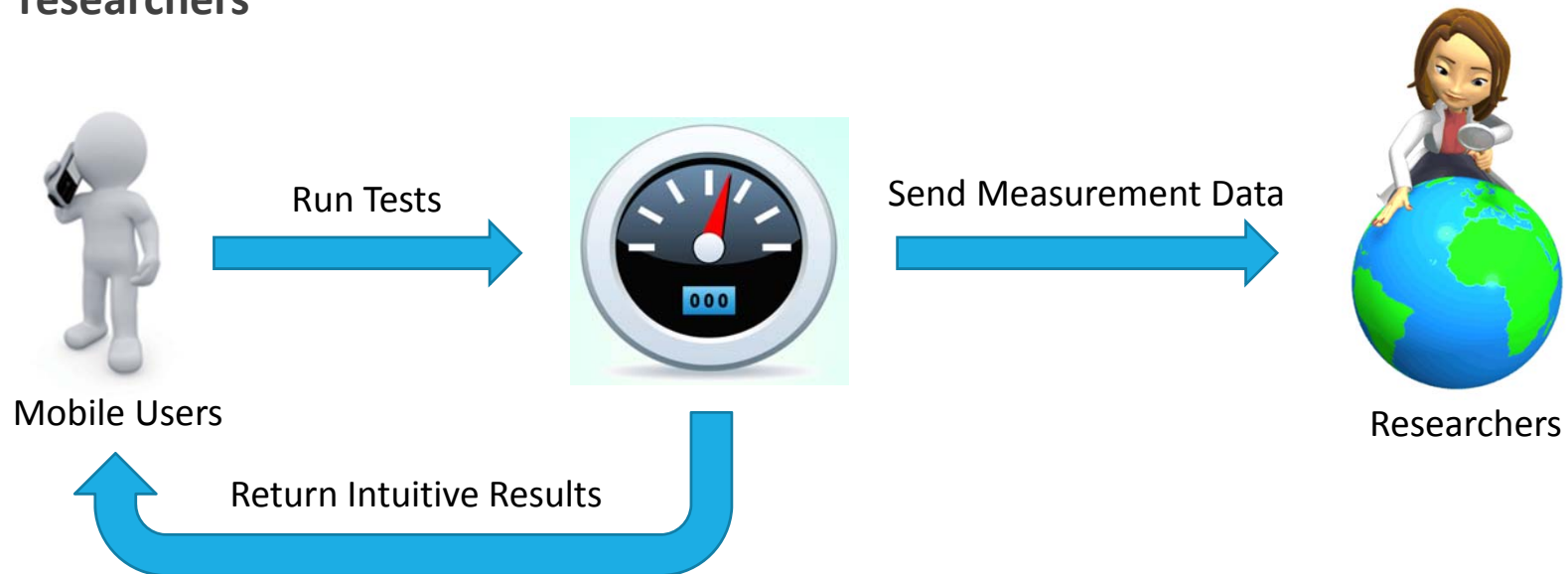
UNIVERSITY OF MICHIGAN



MobiPerf Overview


Joint work by Google/M-Labs, Dave Choffnes (UW), and Michigan.

MobiPerf is a *measurement* platform for **mobile networks**, useful to **mobile users** and **researchers**



Motivation

For mobile users:

- Have senses of real-time network conditions of the cellular networks
 - Compare with previous measurement results
 - Compare measurement results between different carriers/regions
 - Diagnose network applications
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Motivation (Cont.)

For researchers:

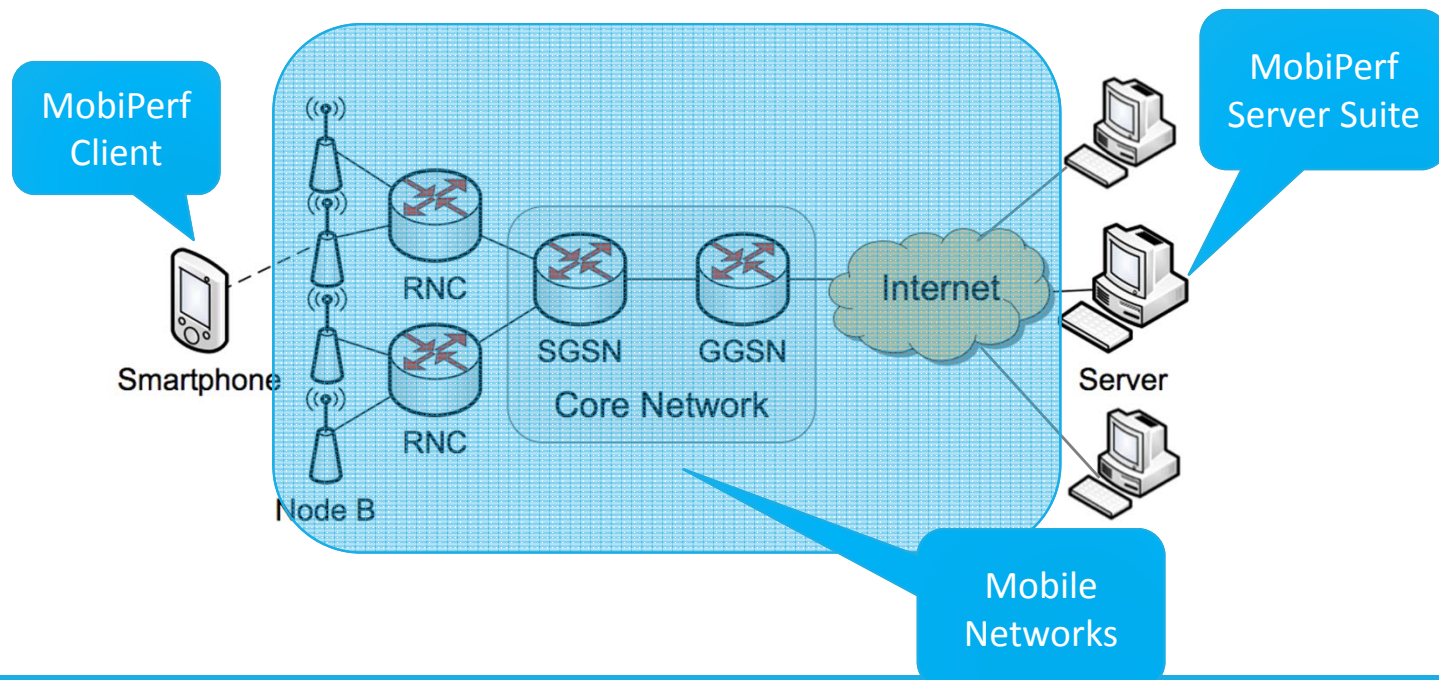
- Measurement results dataset is valuable for researchers working on mobile networks
- Open source software (<https://github.com/Mobiperf/MobiPerf>)
 - Easily plug-in your customized measurement task
- Allow periodic scheduling measurement tasks

Related Work

- **My Speed Test** by Network Operations and Internet Security Lab at Georgia Institute of Technology
 - Downlink/Uplink throughput test
 - Latency test
 - Application bandwidth usage (removed recently)
- **Tempo** by Rice Efficient Computing Group at Rice University
 - Focus on performance characterization and optimization of browsers on smartphones

MobiPerf System Design

End-to-end measurements between end device and central server, mobile networks treated as black boxes

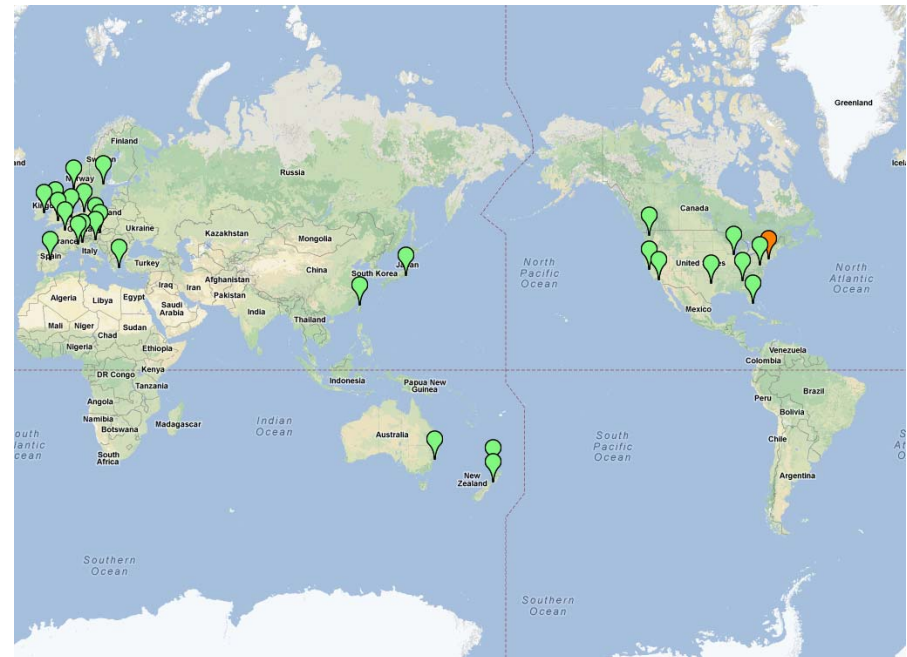


MobiPerf System Design (Cont.)


☐ Measurements

- Traceroute
- HTTP
- TCP Throughput (Downlink/Uplink)
- Ping
- DNS lookup

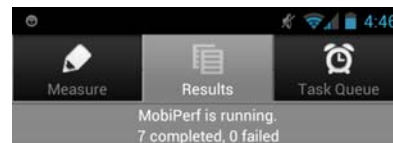
☐ Server Deployment: MLab



General Challenges about Measurement for Mobile Platforms

- User privacy
 - Accuracy (cellular networks architecture is complicated)
 - Efficiency (running time, energy consumption, CPU utilization)
 - Active measurement versus passive measurement
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MobiPerf on Android



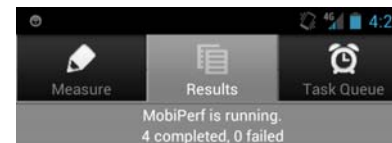
Manual Scheduled

[TCP Uplink]
 Target: 1.michigan.
 mlab3.ord01.measurement-lab.org
 Timestamp: Sun Feb 03 16:45:15 EST
 2013
 IPv4/IPv6 Connectivity: IPv4 only
 IPv4/IPv6 Domain Name Resolvability:
 IPv4 only

Speed: 4.03 Mbps

[TCP Downlink]
 Target: 1.michigan.
 mlab1.ord01.measurement-lab.org
 Timestamp: Sun Feb 03 16:44:55 EST
 2013
 IPv4/IPv6 Connectivity: IPv4 only
 IPv4/IPv6 Domain Name Resolvability:
 IPv4 only

Speed: 10.44 Mbps

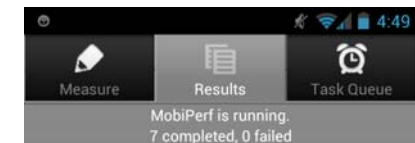


Manual Scheduled

IPv4/IPv6 Domain Name Resolvability:
 IPv4 only
 10 packets transmitted, 10 received,
 0.0% packet loss
 Mean RTT: 100.9 ms
 Min RTT: 62.3 ms
 Max RTT: 273.0 ms
 Std dev: 58.1 ms

[Traceroute]
 Target: www.google.com
 Timestamp: Mon Feb 04 04:29:03 EST
 2013
 IPv4/IPv6 Connectivity: IPv4 only
 IPv4/IPv6 Domain Name Resolvability:
 IPv4 only

1	172.26.242.113	38.00 ms
2	172.26.236.2	46.33 ms
3	172.26.96.3	36.00 ms
4	172.26.96.193	35.00 ms
5	172.16.241.241	42.67 ms
6	12.249.2.9	38.00 ms
7	12.83.171.162	38.67 ms



Manual Scheduled

[HTTP]
 URL: http://www.google.com
 Timestamp: Sun Feb 03 16:44:05 EST
 2013
 IPv4/IPv6 Connectivity: IPv4 only
 IPv4/IPv6 Domain Name Resolvability:
 IPv4 only

Downloaded 10912 bytes in 178 ms
 Bandwidth: 490 Kbps


[DNS Lookup]
 Target: www.google.com
 Timestamp: Sun Feb 03 16:43:51 EST
 2013
 IPv4/IPv6 Connectivity: IPv4 only
 IPv4/IPv6 Domain Name Resolvability:
 IPv4 only

Address: 74.125.225.211
 Lookup time: 204 ms

User Statistics


- 612 active users
- 6GB transmitted measurement data per day
- 800 requests per day (maximum 3000)

Future Work

- Measurement related to IPv6
 - Compare IPv4 and IPv6 performance
 - RRC state inference test
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Discussions

How to further improve MobiPerf with the previously mentioned challenges?

- Resource constraints (CPU, energy)
 - Measurement accuracy
 - Data analysis support (data uploading, data analyzing)
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Thank You!

- MobiPerf Website: <http://www.mobiperf.com/>
- To get collected data, you can go to https://storage.cloud.google.com/?arg=openmobiledata_public#openmobiledata_public (all the data); <http://openmobiledata.appspot.com/> (your data associated with google id, need to login)

