Collaborative Measurement of Internet Quality in Lebanon

http://comiqual.usj.edu.lb

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Lebanon Case

- Small country: 10k sqkm, 4M+ inhabitants
  - Internet users : around 70%
  - NRI (2012 rank 95, 2014 rank 97)
- Average throughput (Mar. 2015): 3.2 Mbps
- 1 incumbent public operator (monopoly MoT)
- Enough International capacity but obstacles …
  - Technical : last mile and backbone
  - "Non technical": spare capacity allocation to ISPs
- Mobile : Late 2G/3G deployments, Recent 4G deployments

COMIQUAL

- Large scale measurement platform
- Independent and transparent Internet observatory
  - Mobile and fixed access
- Collaborative : crowd-sourcing
- Generic platform
- Supported by :
  - Saint-Joseph University of Beirut
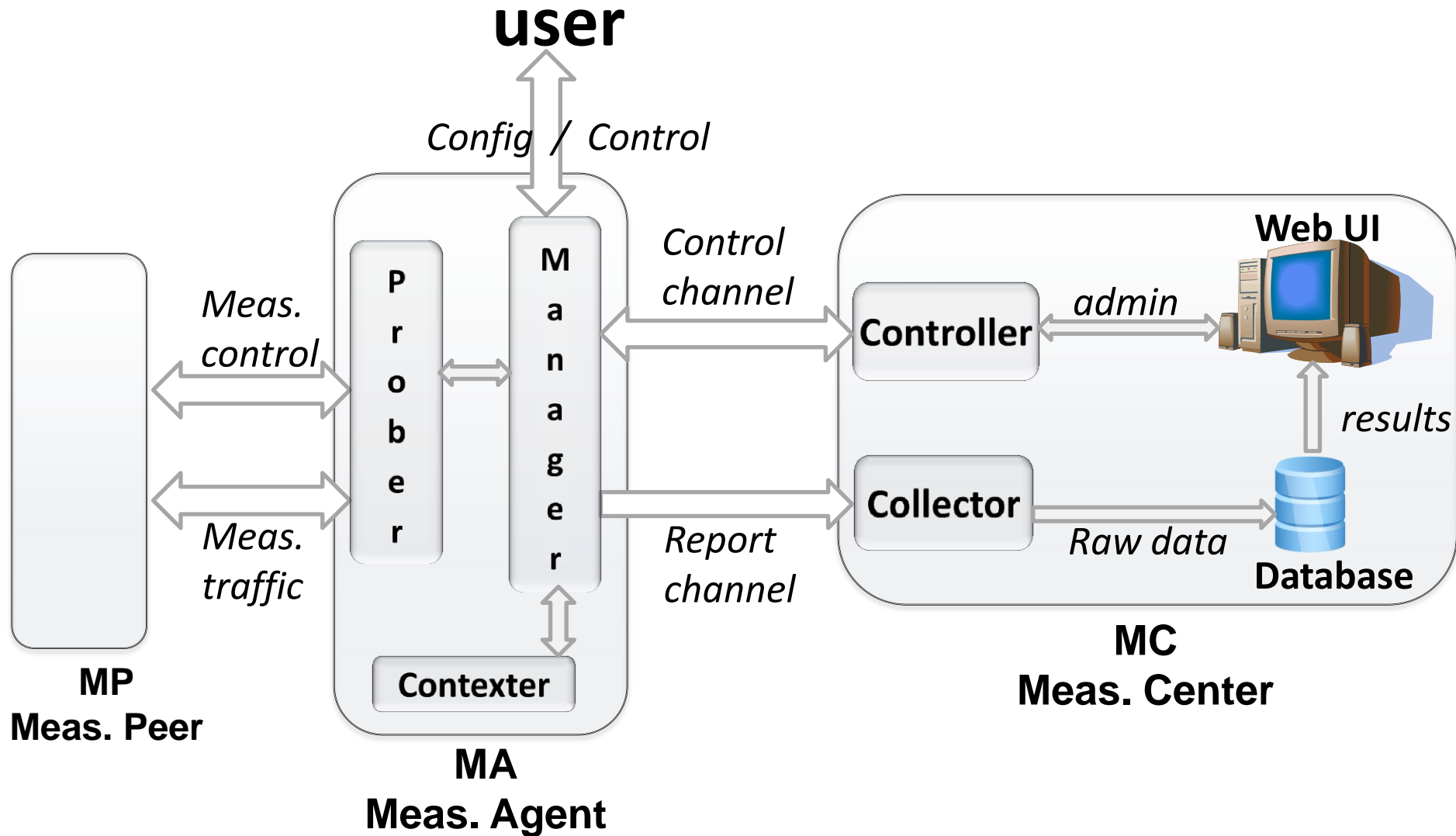 - Internet Society community grants programme
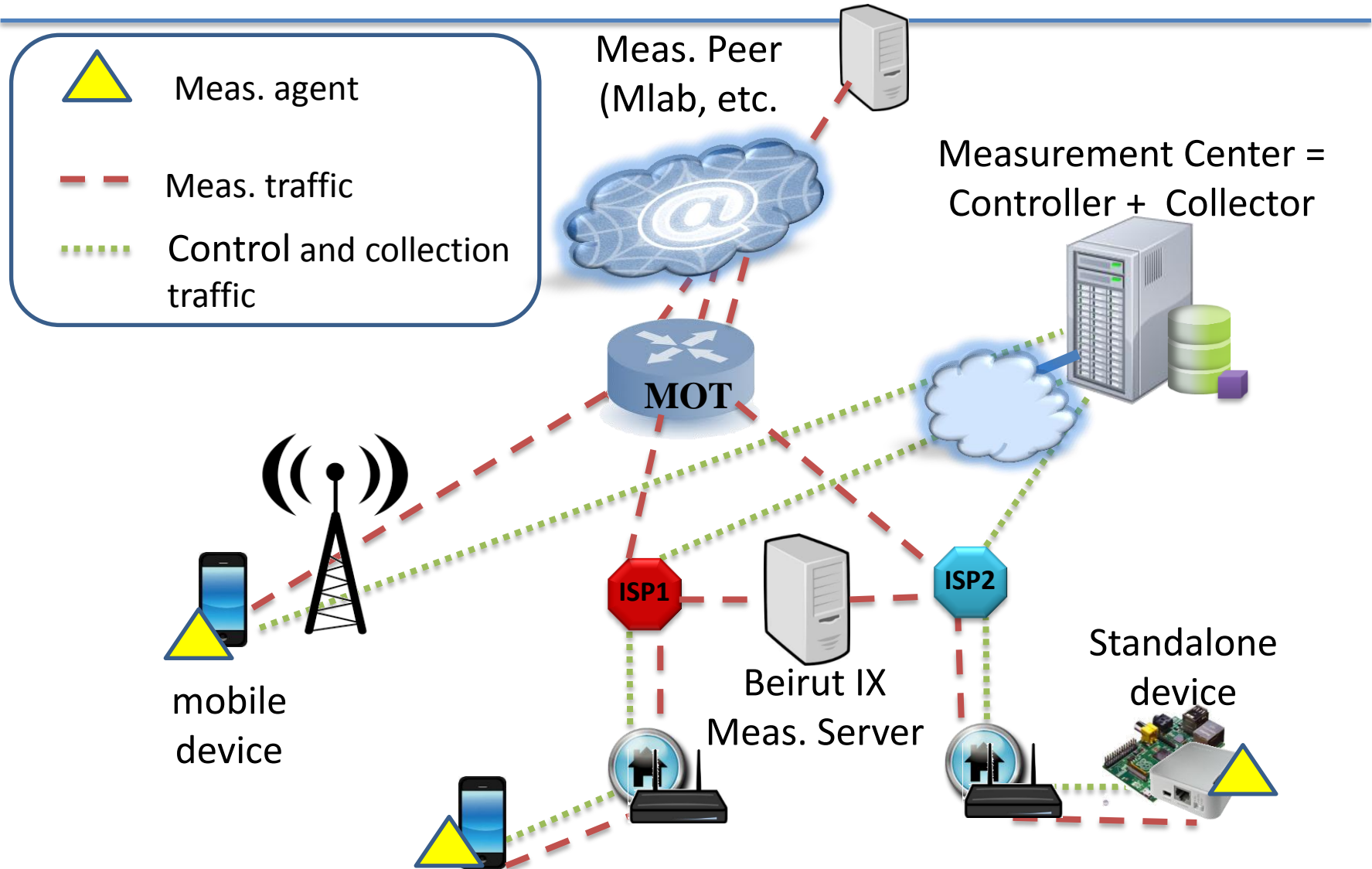
COMIQUAL : a tool for …

- End user :
  - Assess, diagnose, compare
- Provider/Operator
  - Get user perspective, compare to others
- Regulator
  - Quantitative control, transparent information to users, competitive market.

COMIQUAL Architecture

user

Config / Control

P r o b e r

M a n a g e r

Contexter

Meas. control

Meas. traffic

Control channel

Report channel

MP
Meas. Peer

MA
Meas. Agent

Controller

Collector

Web UI

admin

results

Raw data

Database

MC
Meas. Center

Deployment

Legend:
- Meas. agent
- Meas. traffic
- Control and collection traffic

Meas. Peer (Mlab, etc.

Measurement Center = Controller + Collector

MOT

mobile device

ISP1

Beirut IX Meas. Server

ISP2

Standalone device

Control protocol

- JSON messages
- via HTTP through REST calls.
- HTTPS secured
- Communication initiated by MAs (behind NAT)
- Two modes
  - Authenticated mode: the MA is identified prior to communication and all subsequent measurements will be related to that MA
  - Anonymous mode

How to use the platform?

Public portal
- View quality results on map
- Access raw data

Contribute to measurements
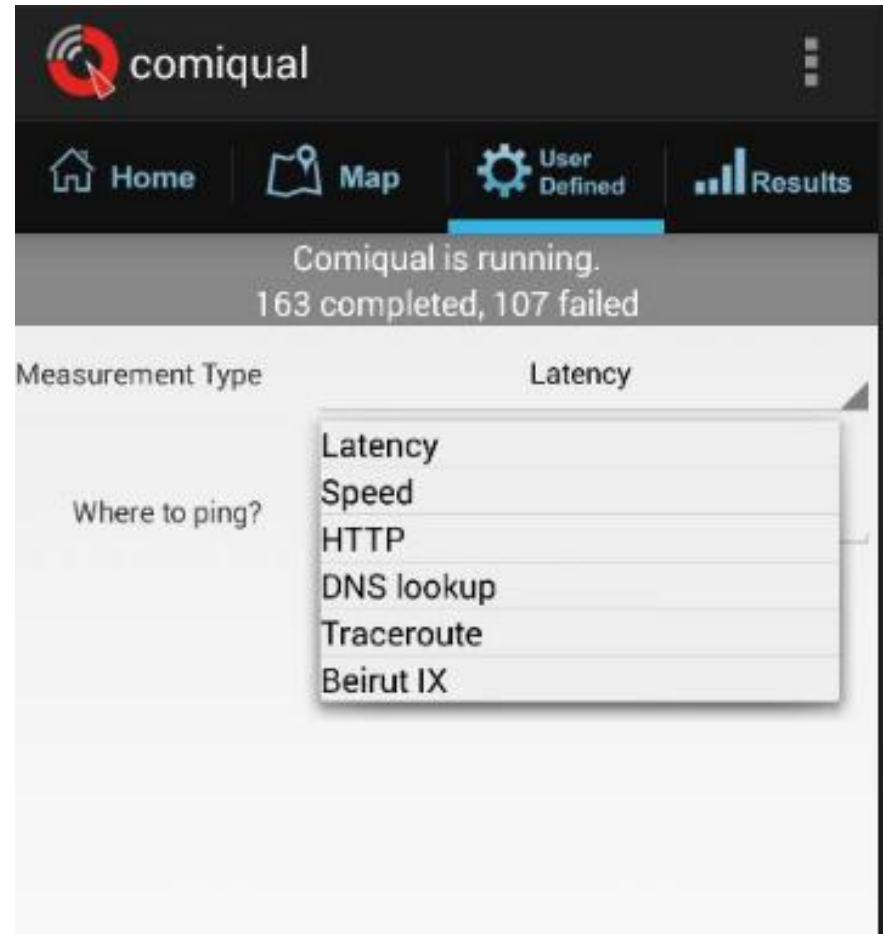- Install the **comiqual** APP
- Use it as a speed test APP
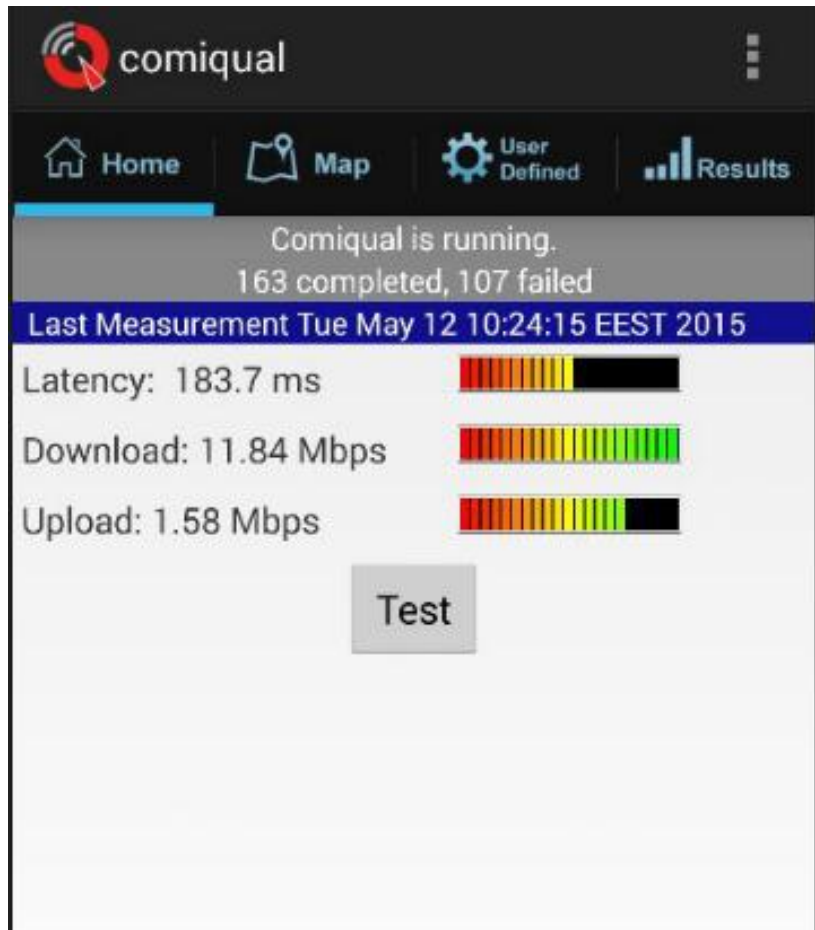- Let it run alone

Do measurements
- Anonymously
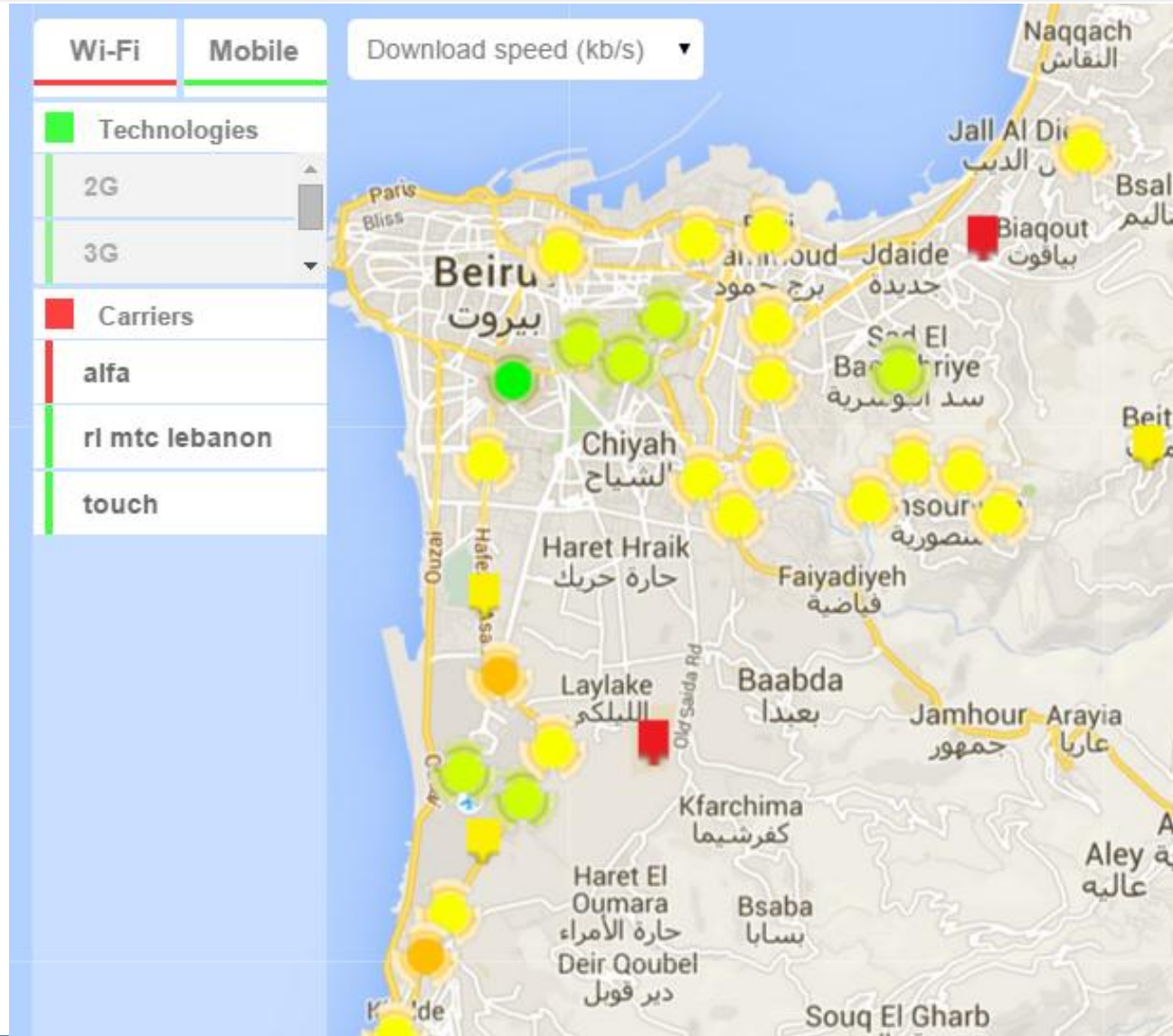- Using a google/facebook/comiqual account
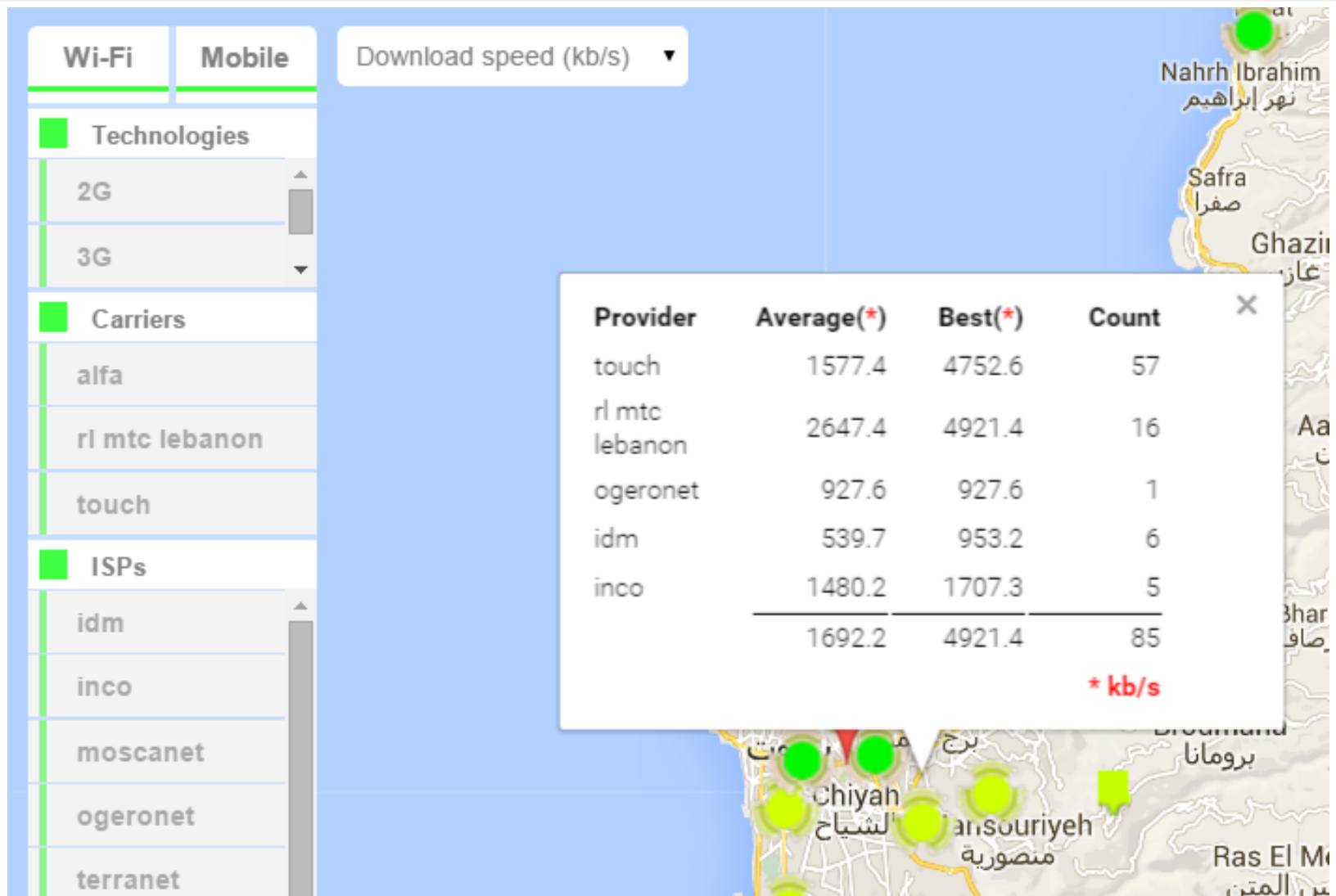
Personal page
- View your own measurements

Mobile App

Measurements on map (1)

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Measurements on map (2)

http://comiqual.usj.edu.lb

User measurements interface (1)

Results for Measurement Agent 417

Show 10 ▼ entries   Search: [   ]

Date ▲	Task ID	Type	Status	Arguments	Metrics	Provider
2/26/2015 2:38:24 PM	91	TCP Down (Mlab)	OK	Target=1.michigan.mlab1.ath01.measurement-lab.org	throughput=1,412.19 kbps	touch
2/26/2015 2:38:32 PM	92	TCP UP (Mlab)	OK	Target=1.michigan.mlab3.ath02.measurement-lab.org	throughput=218.19 kbps	touch

User measurements interface (2)

Measurement Details

Measurement Information

Measurement Key	17852
Measurement Name	RTT
Measurement Descri...	ICMP
task ID	97
MA ID	417
Status	OK

Arguments

target	1.michigan.mlab1.ath02.measurement-lab.org
timeout	10 sec
packet size	56 byte
number of sent packets	10
measurement tool	/system/bin/ping

Metrics

target IP	"83.212.5.142"
max RTT	153.0 ms
min RTT	128.0 ms
stddev RTT	9.221713506718803 ms
mean RTT	139.4 ms
loss ratio	0.0 %

Context

app version	2.0
battery level	80 %
is battery charging	false
carrier	touch
network type	3G
mobile country code	415
mobile network code	03
location area code	932
cell id	19855123
RSSI	1 dB
network technology	HSPA+
DNS resolvability	IPv4 only
IP connectivity	IPv4 only
ISP	TERRANET
initial longitue	35.56373221 deg
initial latitue	33.86568644 deg
final longitue	35.56373221 deg
final latitude	33.86568644 deg
initial location type	gps
final location type	gps
start date	02-26-2015 02:38:48 PM
end date	02-26-2015 02:38:48 PM

Platform management interface

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Online Statistics tool

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Conclusion

- Working on
  - Performing throughput measurement with minimum TCP traffic
    - combining active measurements with passive byte count)
  - Finding incentives to make people contribute
  - Anonymization of the data on the server.
  - Mobile App for iPhone.

THANK YOU