



Collaborative Measurement of Internet Quality in Lebanon

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<http://comiqua1.usj.edu.lb>

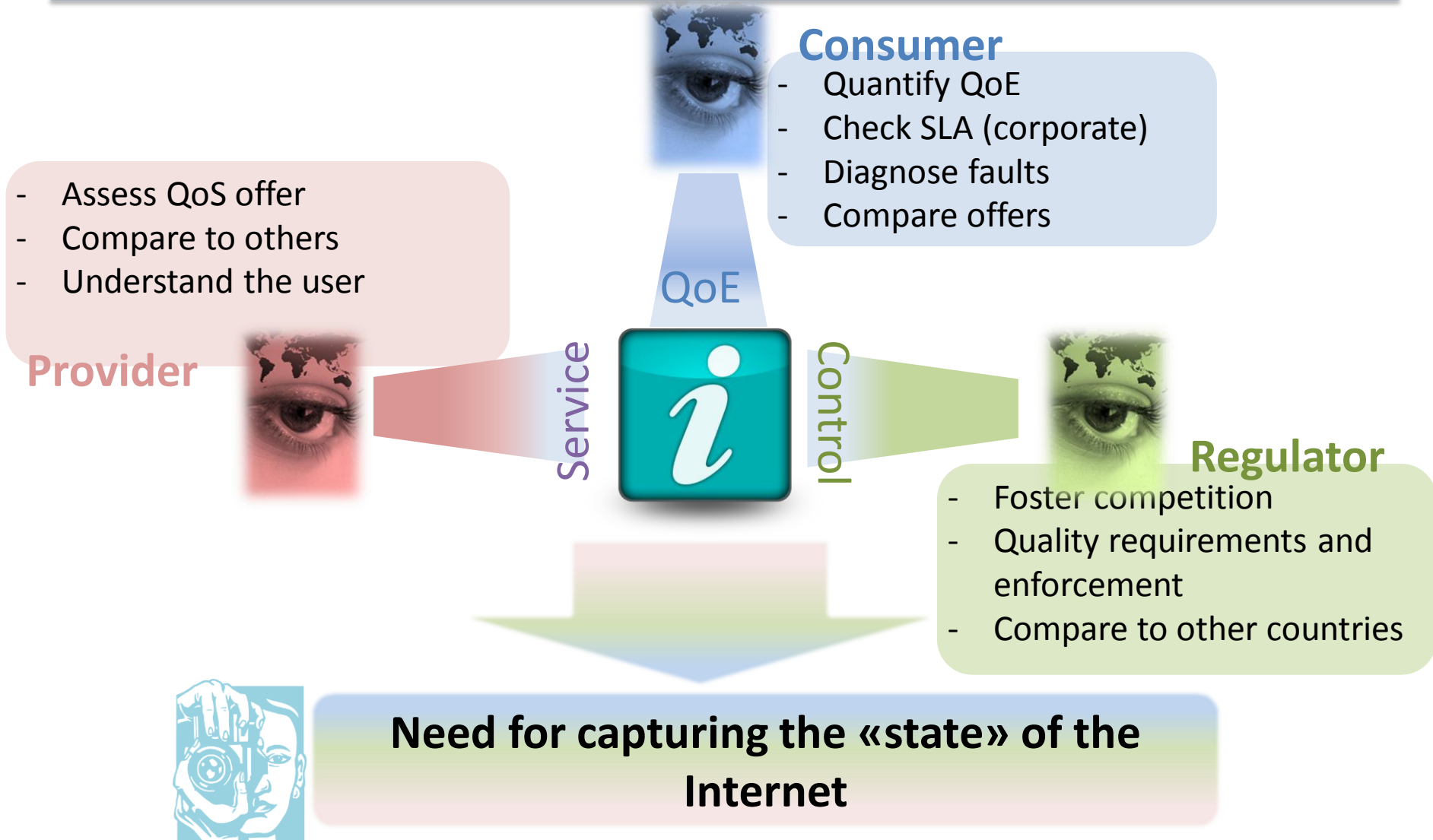
Overview on
large-scale
measurement
Platform

Comiqua
Platform
description

Demo

Item	U.S. Adults (%)
Food	11
Spouse/significant other	29
Car	30
Internet access	44
Computer/Laptop	49
Mobile phone	51
Television	55
Sex	58
Tablet computer	59
eReader	63
Navigation system	69
Social networking sites	78

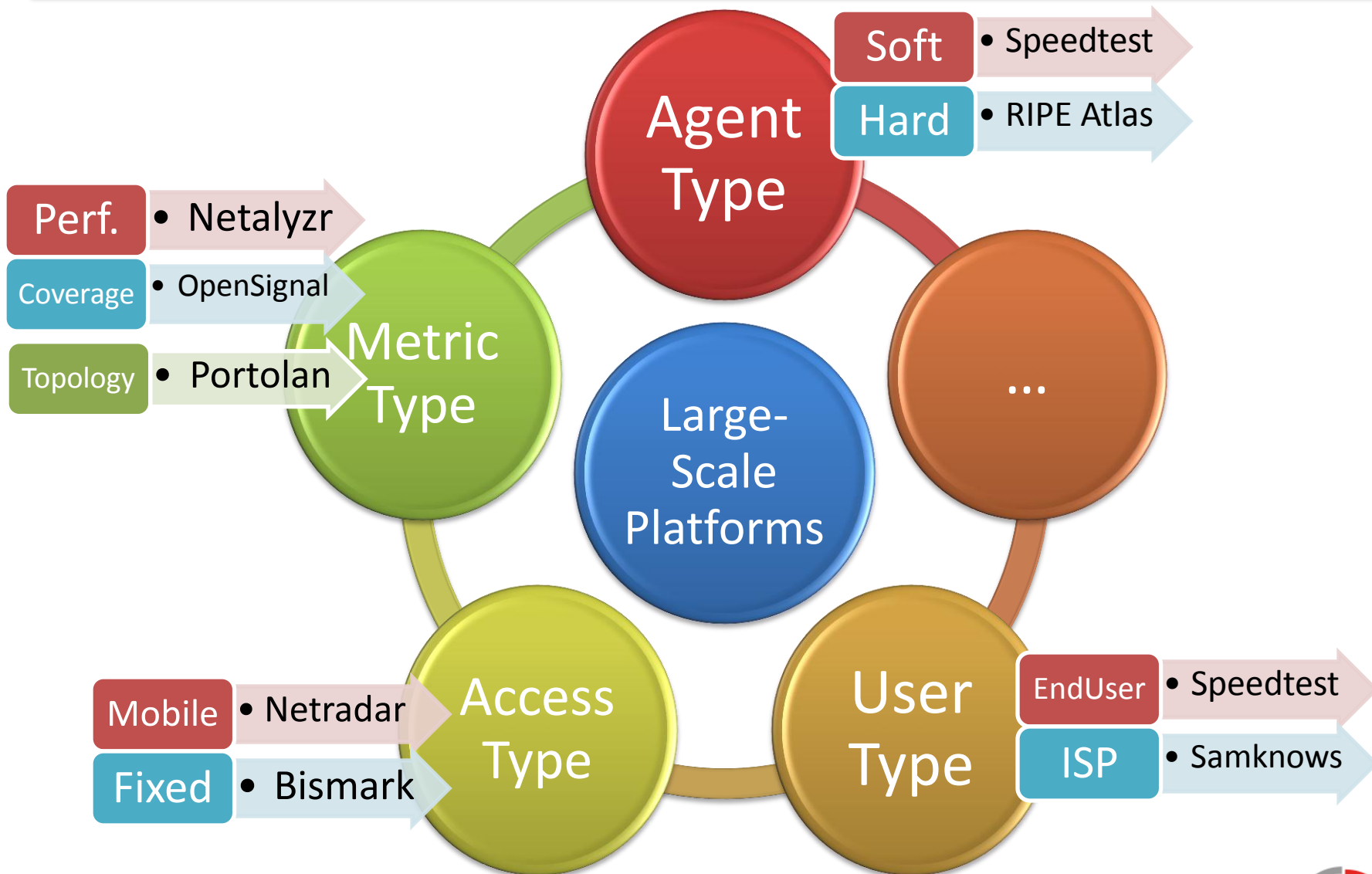
Source : Harris Interactive. The Harris Poll® #13, January 30, 2014



Large-scale measurement (LSM) platforms :

- Large number of measurement points
- Measurement collection
- Analysis and visualization
- Get a deep insight about Internet performance





LMAP IETF working group

- Large-Scale Measurement of Broadband Performance
- Leave metrics definition and measurement methodologies for IPPM WG.
- Focusing on control and report protocols

IEEE 802.16.3 project

- Mobile Broadband Network Performance Measurements
- Metrics specifications and test procedures
- Communication protocols for managing operations and data collection

ID

- Platform for measuring the Internet

Target

- Lebanon
- But can be used anywhere

Attributes

- Independent, neutral
- Collaborative: crowd-sourcing

Objectives

- A tool for users to assess and compare
- User feedback to operators/ISPs

Support

- USJ: Saint-Joseph University of Beirut
- ISOC: Internet Society

Measurement agents types

- Software: smartphone app.
- Hardware: small wireless router with openWrt

Active measurements

- Latency (ICMP, DNS, HTTP), TCP throughput, Signal strength

Measuring Internet and national IXP performance

- Measurement server installed at Beirut IXP

Open data access

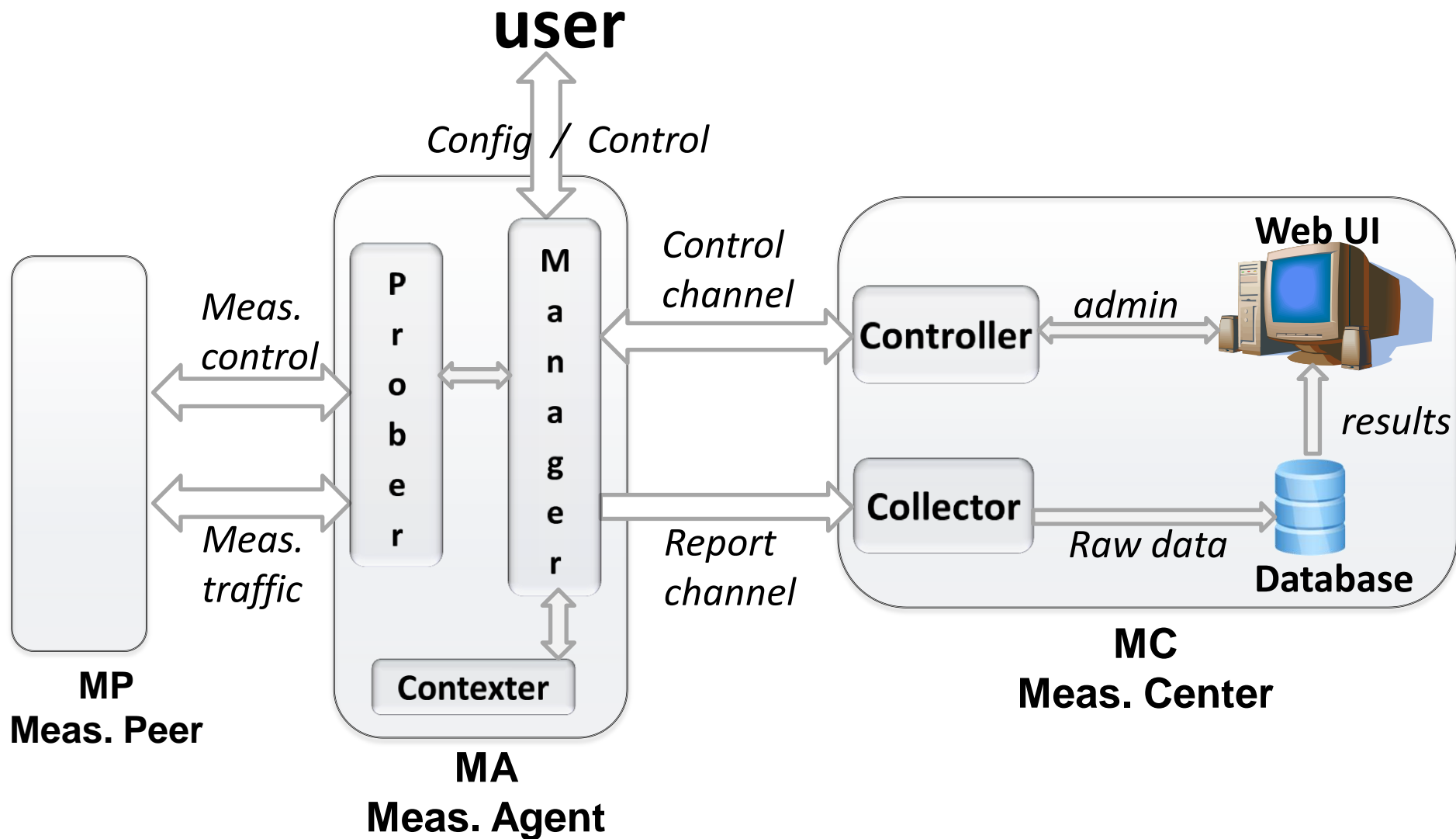
- Aggregated data via map and online statistics tool
- Raw data access.

Flexible management interface

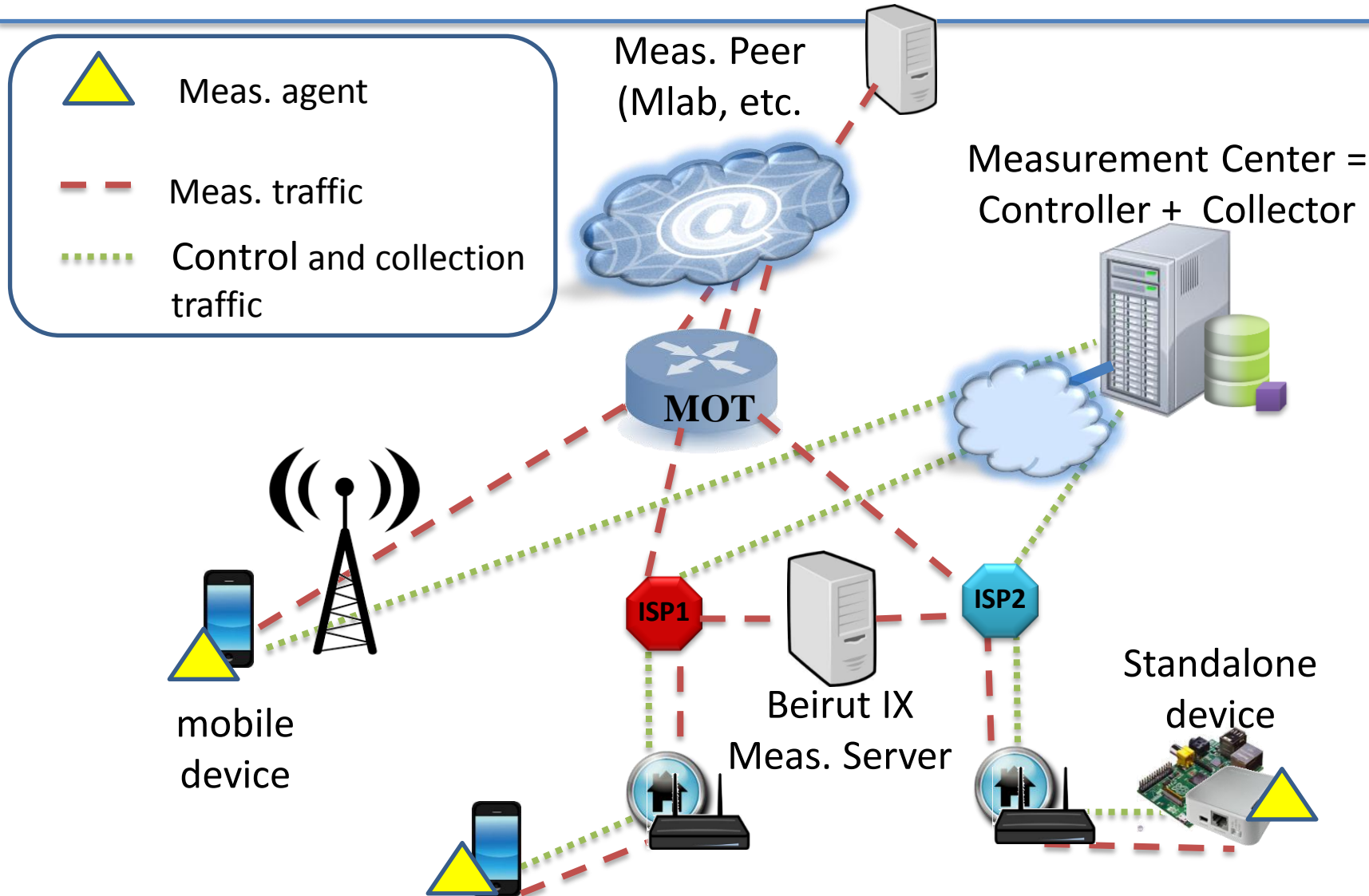
- Control existing MAs
- Activate/deactivate measurements
- Create new measurements and parameters

Constrained measurements

- To be executed in a specific context (location, time, operator, etc...)

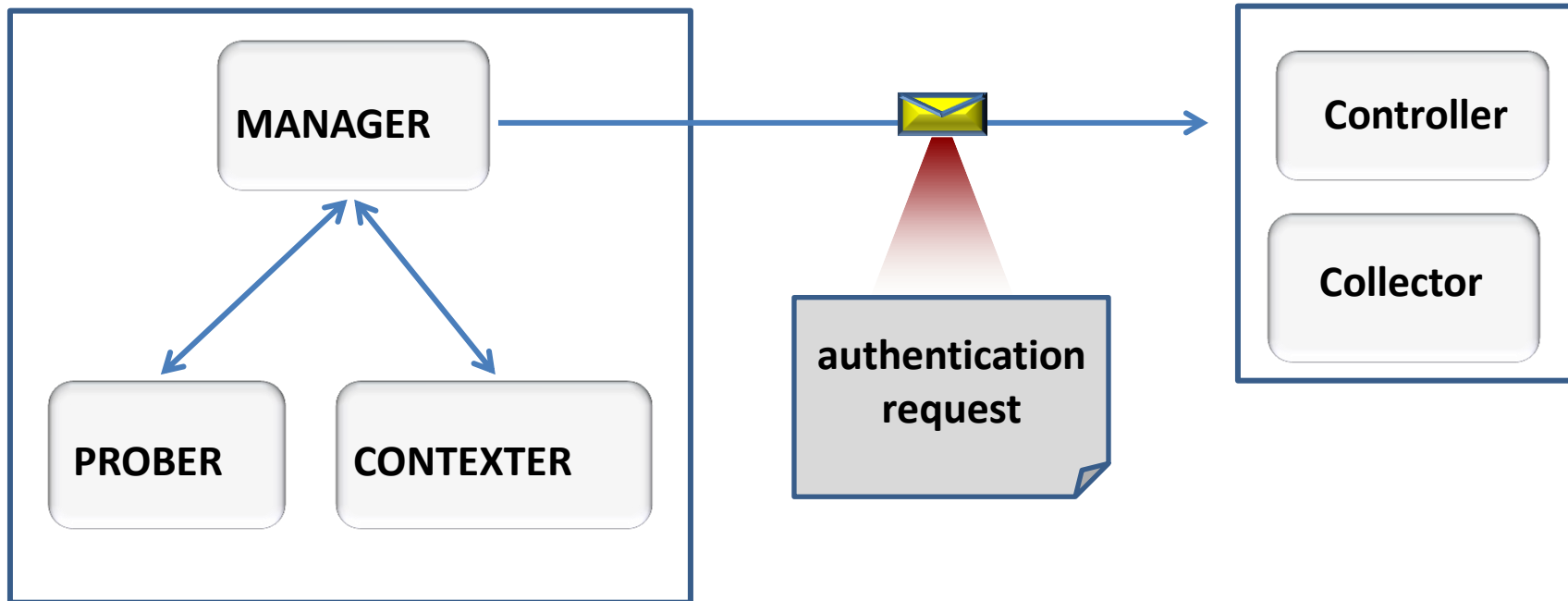


- JSON messages
- via HTTP through REST calls.
- HTTPS secured
- Communication initiated by MAs (behind NAT)
- Two modes
 - Authenticated mode: the MA is identified prior to communication and all subsequent measurements will be related to that MA
 - Anonymous mode



MA

MC

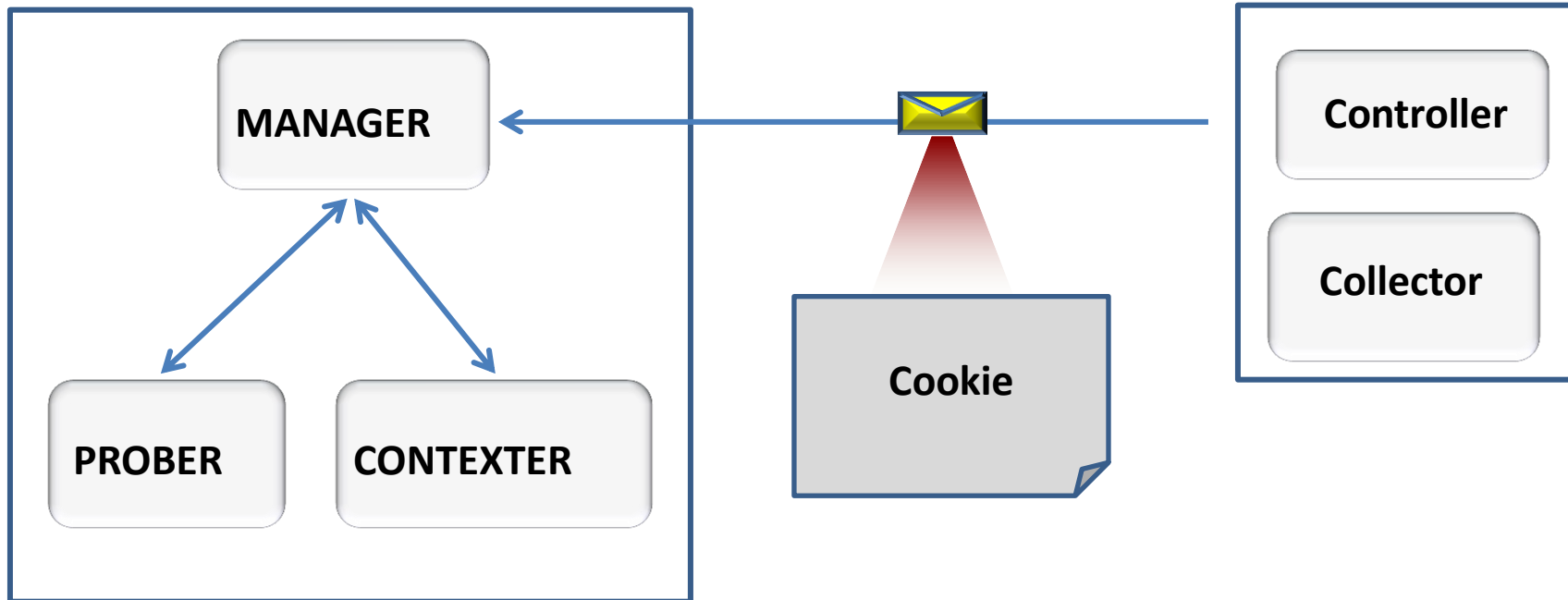


Optional step:
not requested in
anonymous mode



MA

MC

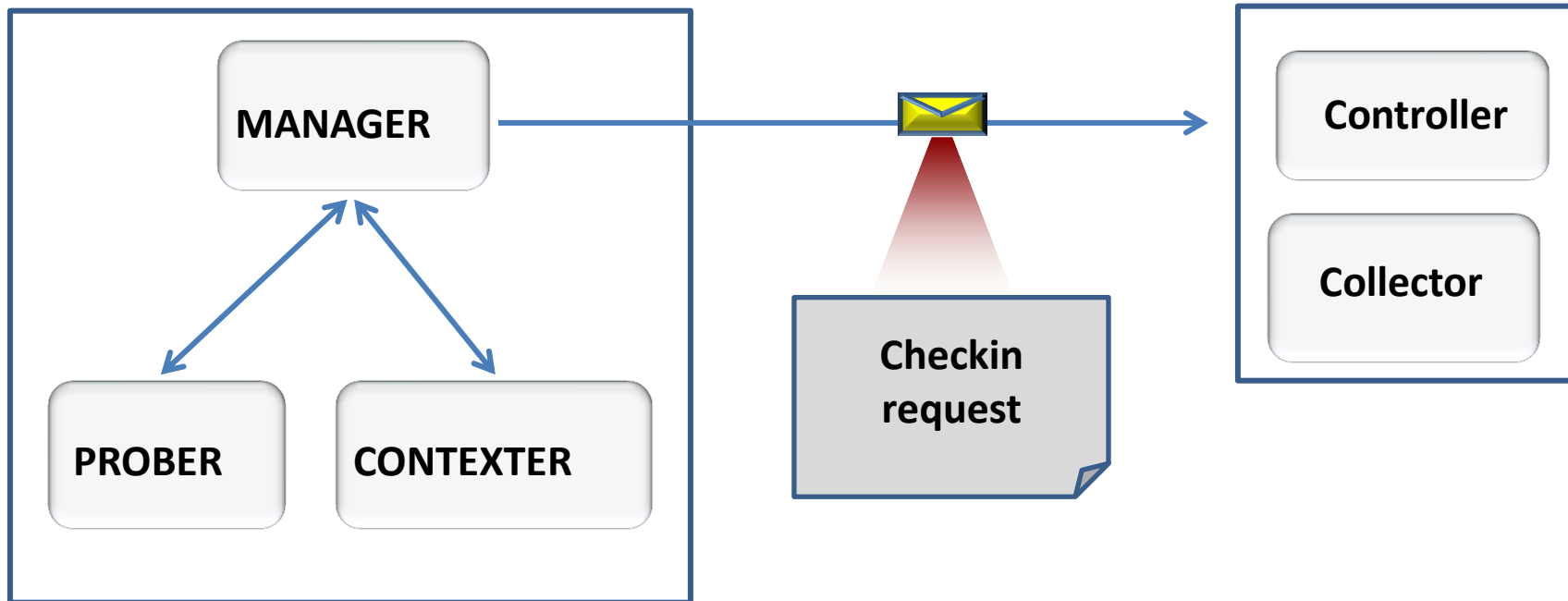


Optional step:
not requested in
anonymous mode



MA

MC



MA

MC

checkin

```
{
  "ma_id": "418",
  "app_version": "2.0",
  "probeness": 1,
  "device": {
    "manufacturer": "Sony",
    "model": "C5303",
    "device_os": "NAME:Android, RELEASE:...",
    "interfaces": ["3G", "WIFI"],
    "device_id": "XXXXXX70595XXXXX"
  },
  "current_tasks": []
}
```

//+ cookie in the HTTP header

MANAGER

Controller

Collector

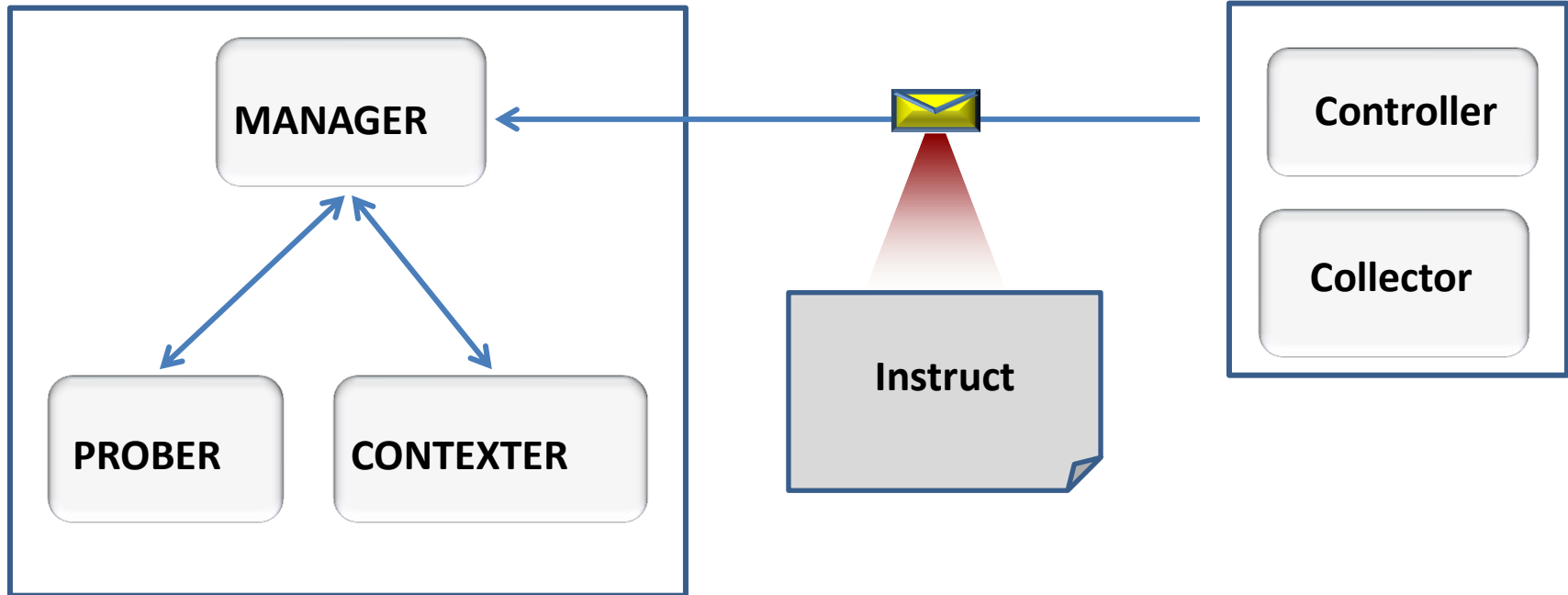
PROBER

CHECKIN message



MA

MC



MA

MC

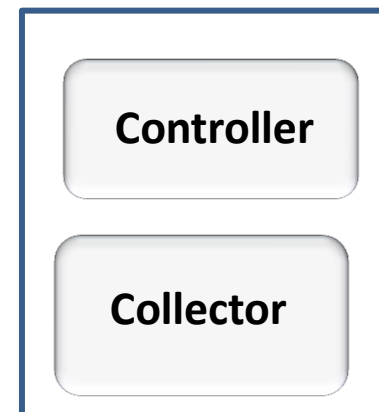
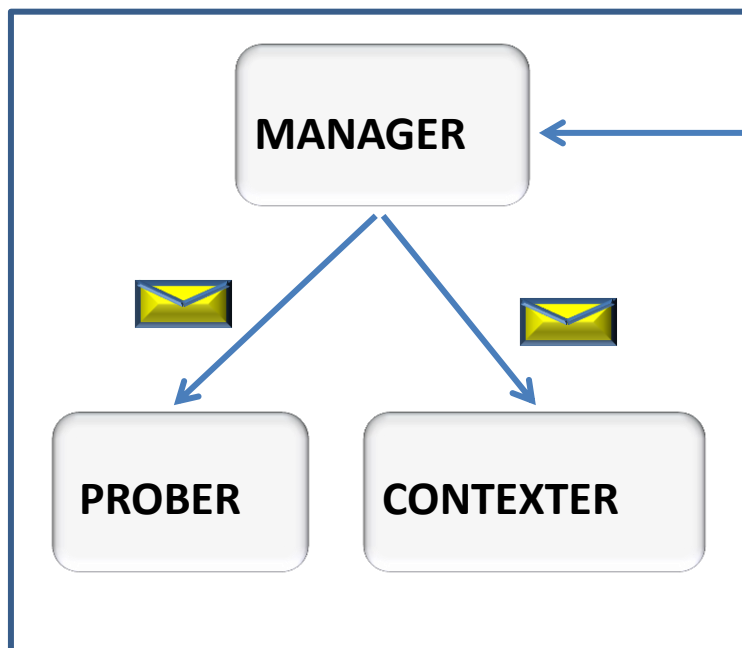
instruct message

```
{
  "ma_id":418,
  "controller_url":"http://comiqua1.usj.edu.lb",
  "collector_url":"http://comiqua1.usj.edu.lb",
  "current_app_version":"2.0",
  "keep_tasks_id":[],
  "new_tasks":[{
    "task_id":97, "end_date":"2024-12-11",
    "description":"ICMP",
    "repeat_interval":"none",
    "arguments":[
      {"target":"ath02.mlab.org"}, {"packets_sent":"5"}],
    "metrics":["target_ip", "loss_ratio",
      "max_rtt", "min_rtt", "stddev_rtt", "mean_rtt"],
    "constraints":[]}]
}
```

//+ cookie in the HTTP header

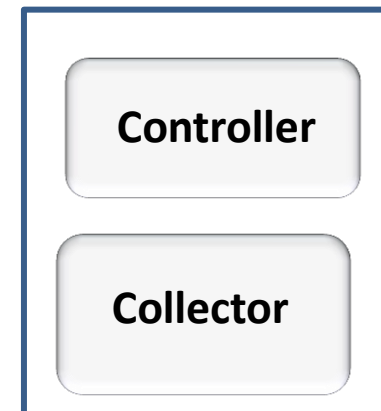
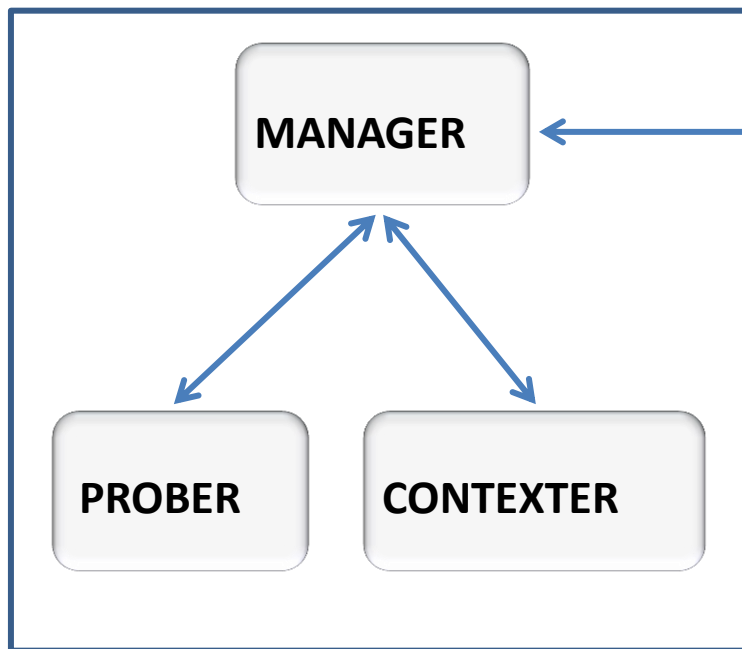
MA

MC



MA

MC

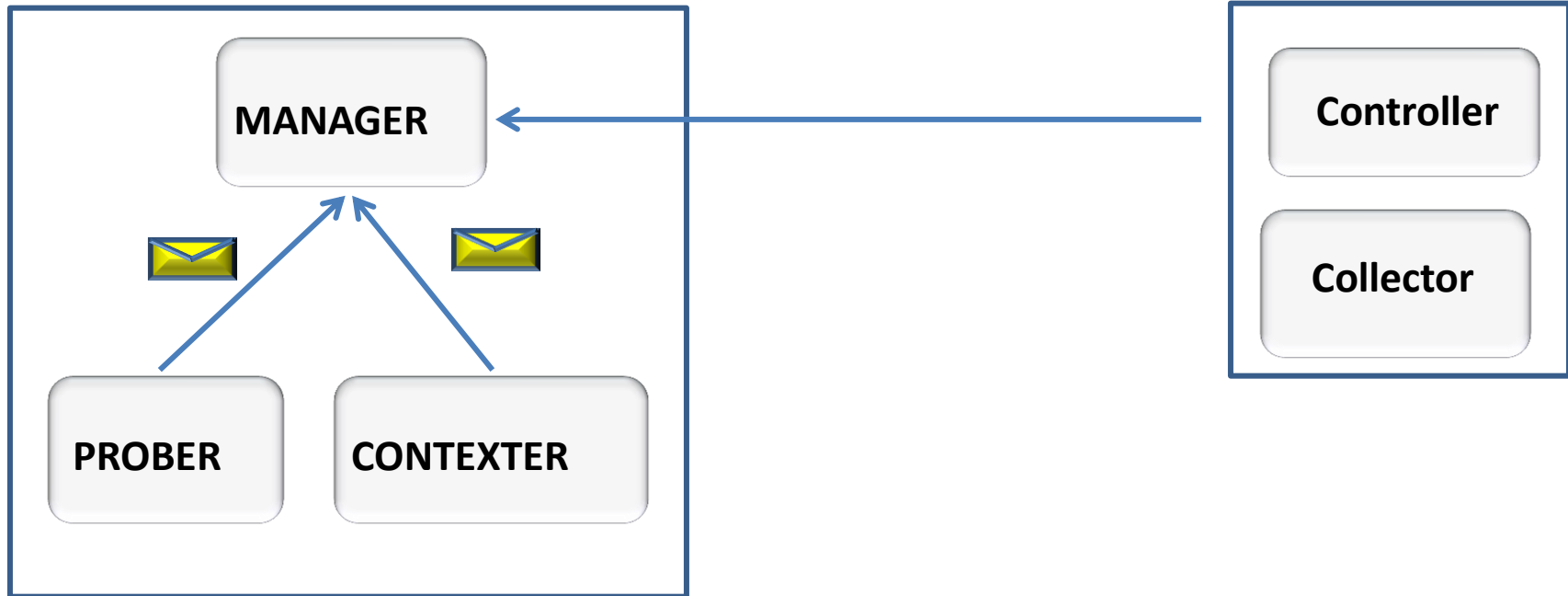


```
ping -i 0.5 -s 56 -w 10 -c 5 83.212.5.142
```



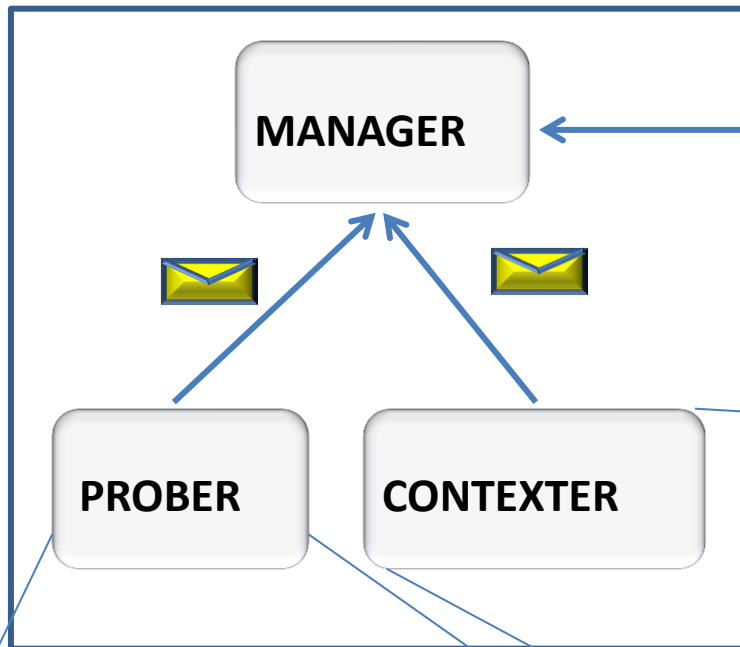
MA

MC



MA

MC

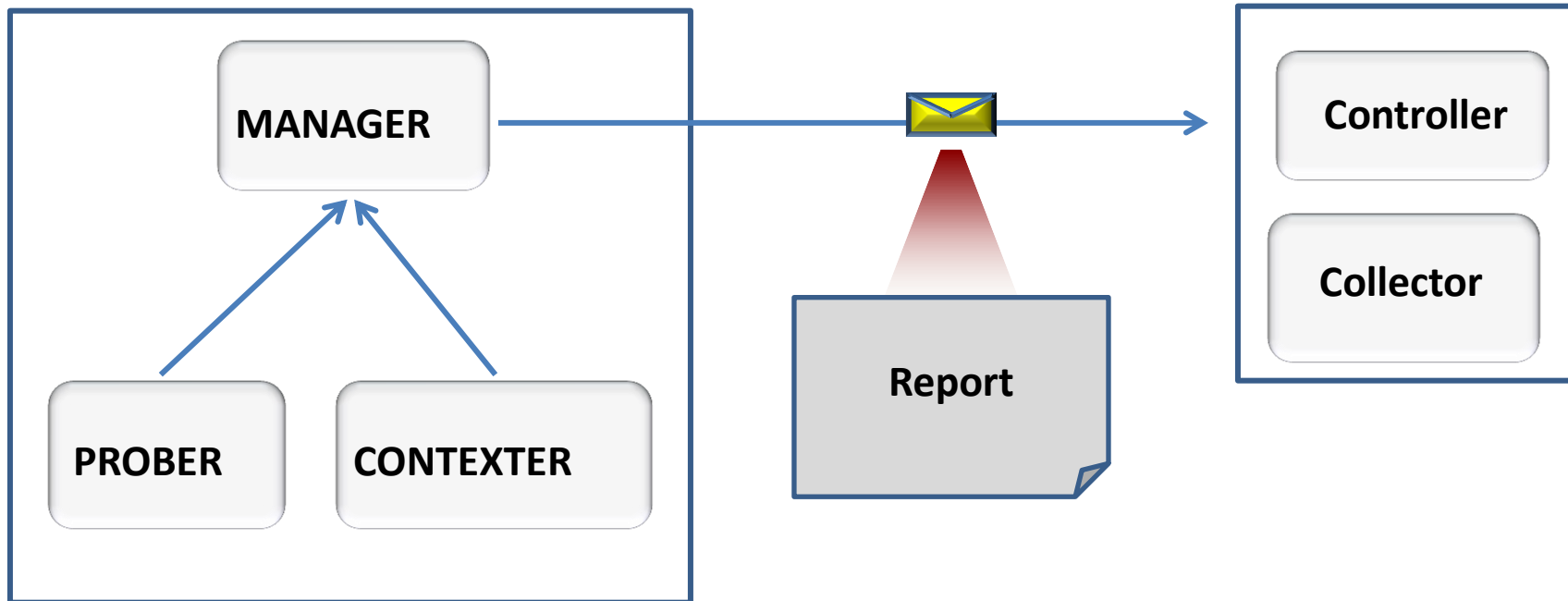


```
Packet Loss:0.0%
Min    RTT: 125.0 ms
Mean  RTT: 134.4 ms
Max    RTT: 148.0 ms
Std   dev: 11.1 ms
```

```
Carrier: TOUCH
Network Type: 3G
Cell: [415;03;932;19824013]
rssi: 98
ISP: TERRANET
Long: 35.56373315
Lat: 33.86592182
...
```

MA

MC




```
ma_report
{
  "context": {"start_date": "02-27-2015 09:04:30 AM",
    "end_date": "02-27-2015 09:04:30 AM",
    "carrier": "TOUCH", "network_type": "3G",
    "cell_info": "[415;03;932;19824013]",
    "rssi": "98", "isp": "TERRANET",
    "location_type": "gps",
    "location_long": "35.56373315",
    "location_lat": "33.86592182",
  },
  "meas_result": {"task_id": "97", "success": "OK",
    "metrics": [{"target_ip": "83.212.5.142"},
      {"loss_ratio": "0.0"} {"mean_rtt": "134.4"},
      {"min_rtt": "125.0"}, {"max_rtt": "148.0"},
      {"stddev_rtt": "11.11"}],
    "arguments": [{"target": "ath02.mlab.org"},
      {"packet_size": "56"}, {"packets_sent": "10"}]}
}
//+cookie in the HTTP header
```

Public portal

- View quality results on map
- Analyze available raw data

Contribute to measurements

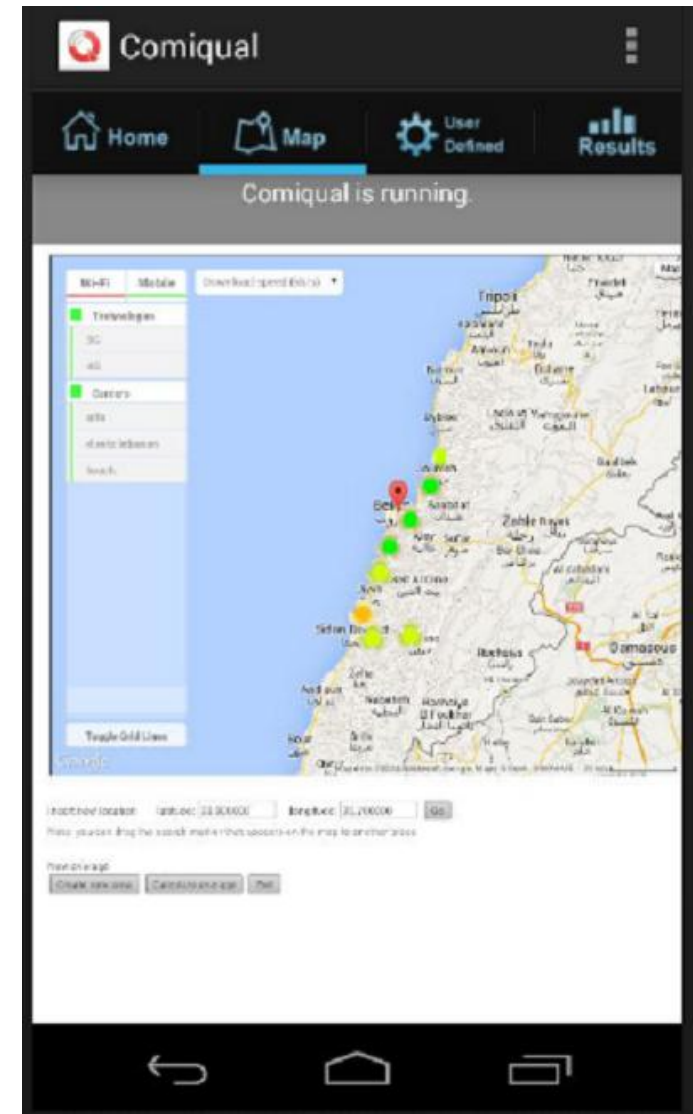
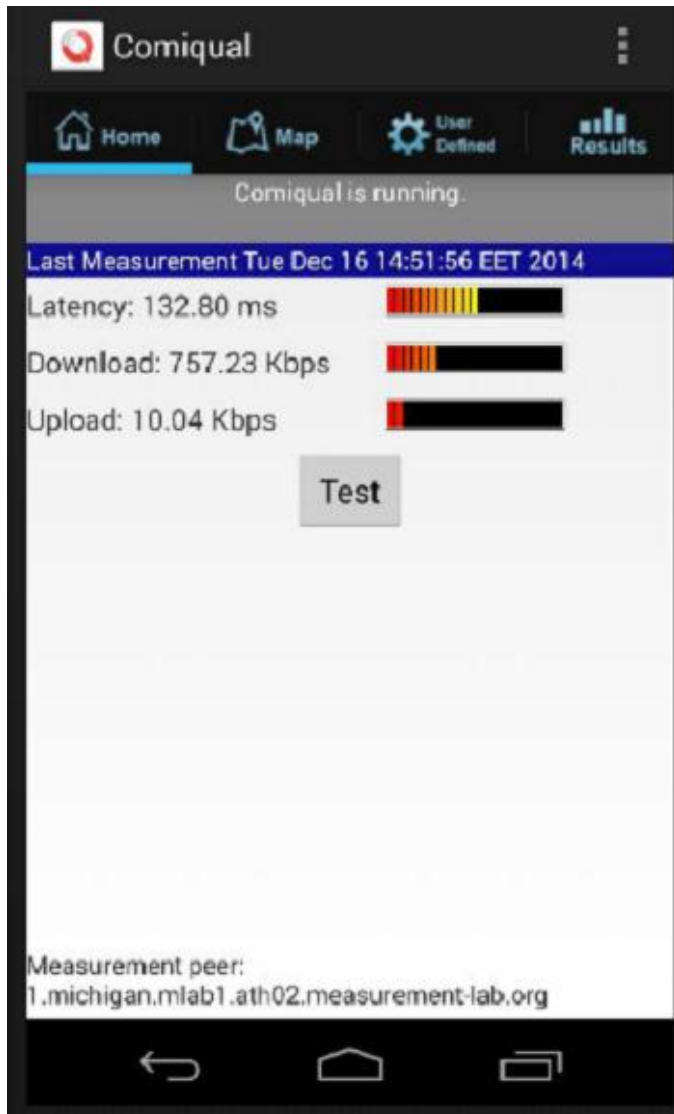
- Install the **comiqua** APP
- Use it as a speed test APP
- Let it run alone

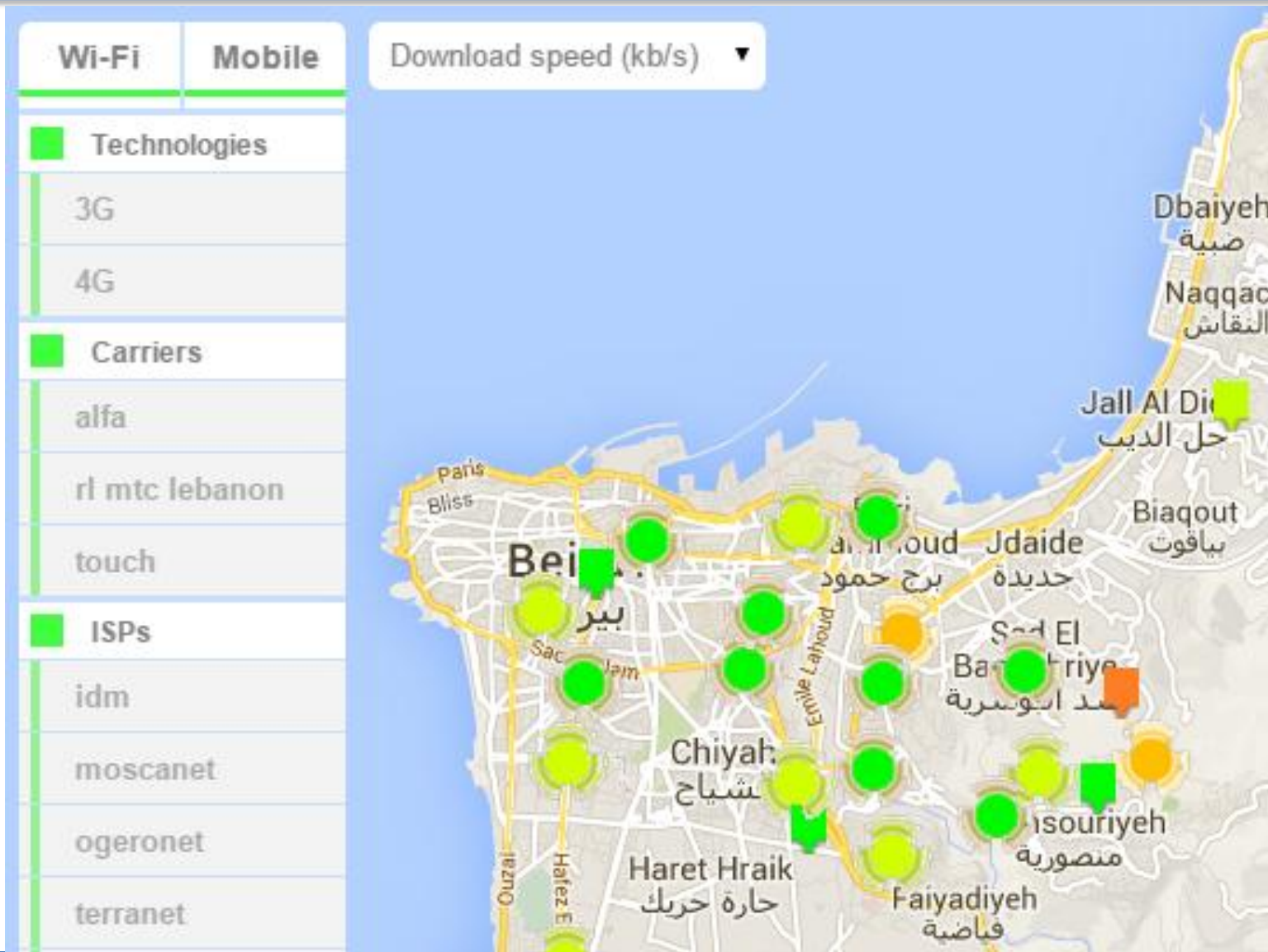
Do measurements

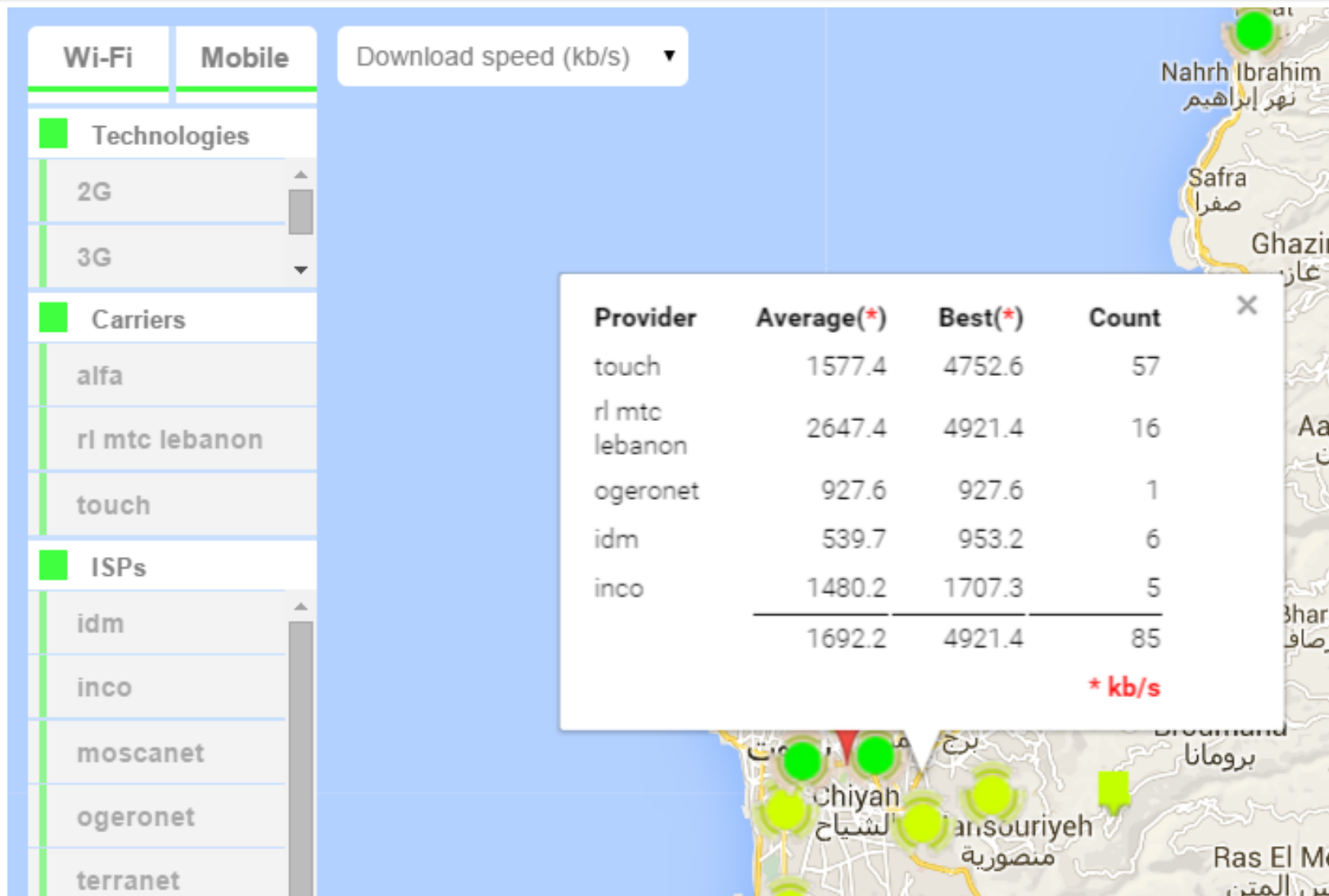
- Anonymously
- Using a google/facebook/comiqua account

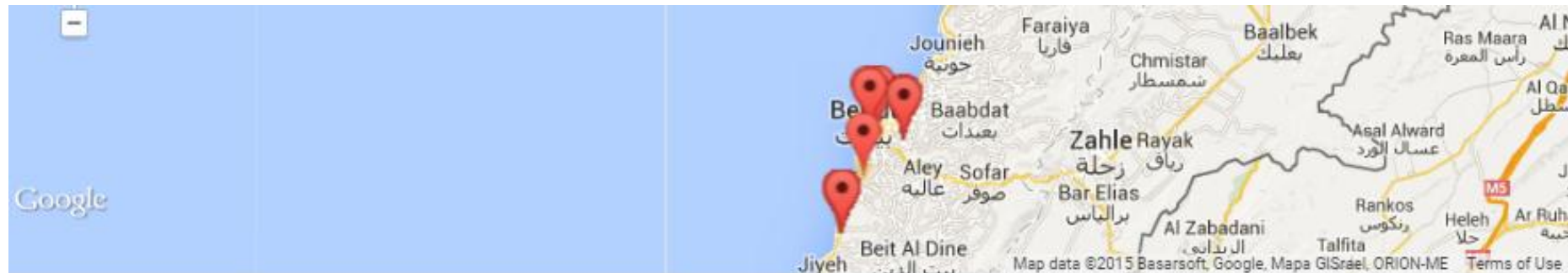
Personal page

- View your own measurements









Results for Measurement Agent 417

Show 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

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 longtue	35.56373221 deg
initial latitue	33.86568644 deg
final longtue	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

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Hi, Marc Ibrahim (marc.ibrahim@gmail.com - google account)

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[Create Task](#)
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Manage Tasks

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[Show Valid Tasks Only](#)

TCP Down (Mlab) [\[Delete\]](#)

Version	Date of Creation	End Date	Is Valid?	Repeat Interval	Scenario Name	
1	7/31/2014 5:17:43 PM	7/31/2024 12:00:00 AM	<input checked="" type="checkbox"/>	none	default	Details Unvalidate

DNS lookup [\[Delete\]](#)

Version	Date of Creation	End Date	Is Valid?	Repeat Interval	Scenario Name	
1	7/31/2014 4:16:04 PM	7/30/2024 12:00:00 AM	<input type="checkbox"/>	none	default	Details Validate

RTT [\[Delete\]](#)

Version	Date of Creation	End Date	Is Valid?	Repeat Interval	Scenario Name	
1	7/31/2014 4:15:16 PM	7/31/2024 12:00:00 AM	<input type="checkbox"/>	none	default	Details Validate

Issues

- Perform throughput measurement with minimum TCP traffic
- Find incentives to make people contribute

Perspectives

- Converge towards LMAP standard
- Anonymization of the data
- Under development:
 - An API and a client for iPhone.
 - Online statistical tool.

THANK YOU