



MLAB



open platform, *open* tools and *open* data
for an *open* Internet

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What & who is M-Lab?

Measurement Lab (M-Lab) is a collaborative, researcher-driven effort to empower **Internet users**, **researchers**, and **regulators** with open and scientifically-sound data about broadband performance.



M-Lab's commitment: Openness

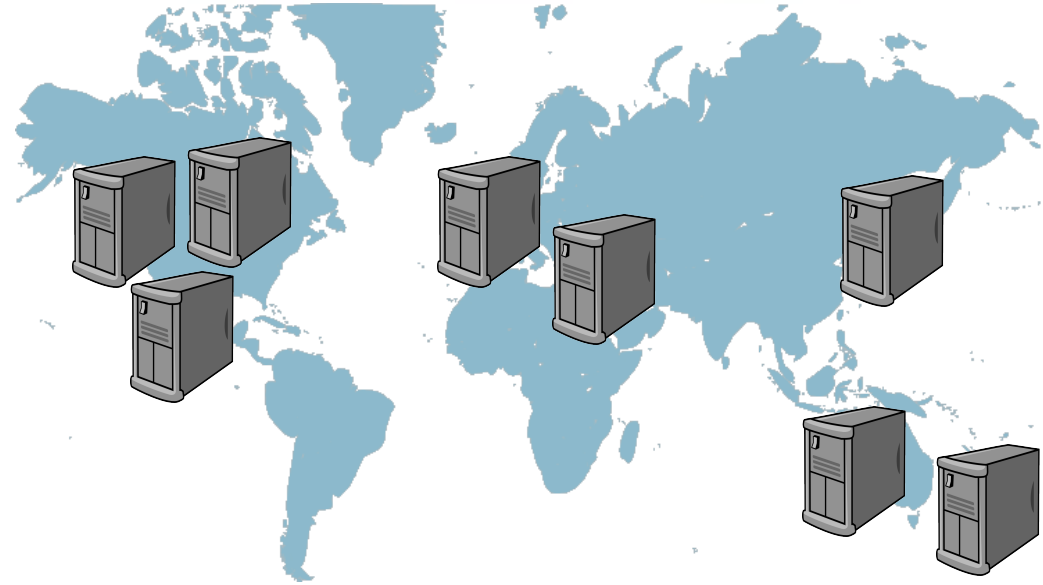
The key to good science, the key to good data

- Open, globally-distributed **server platform** for **researchers**, to deploy broadband measurements tools.
- Open-source **tools** for **Internet users**, to test their broadband connections.
- Open **data** for **everyone**, to build a common pool of network measurement data.
 - Open, openly collected, free.
 - Collected in a consistent way, over time and across geographies.
 - Raw, machine-readable data (non-aggregated).

This model is meant to support collaborations among researchers from different groups and to avoid "silos" research projects.



Open, globally-distributed platform



PlanetLab-like platform specialized for ***accurate* broadband measurements.**

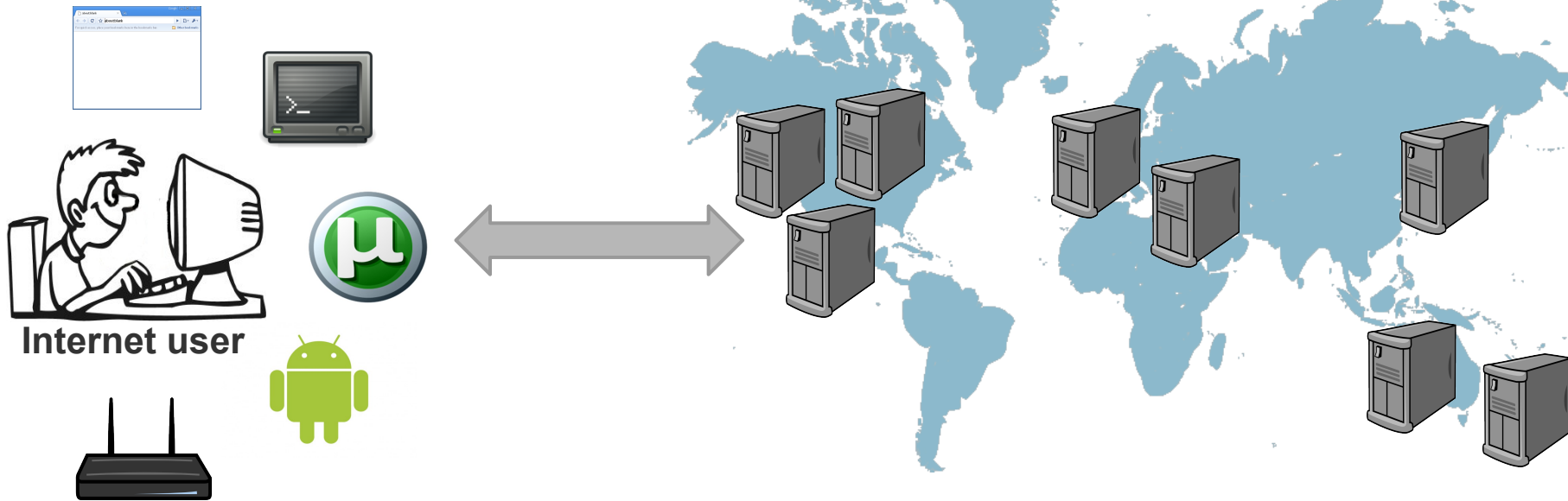
- 1Gb upstream, reserved resources & public IP addresses.
- Web100 instrumentation.

Open, globally-distributed platform



76 servers in
22 locations

Open-source measurement tools



- **Software-based tools**

- NDT, Glasnost, NPAD, Pathload2, ShaperProbe, Neubot.
- **Mobile apps**: MobiPerf, 4G Test, NDT.

- **Router-based tools**

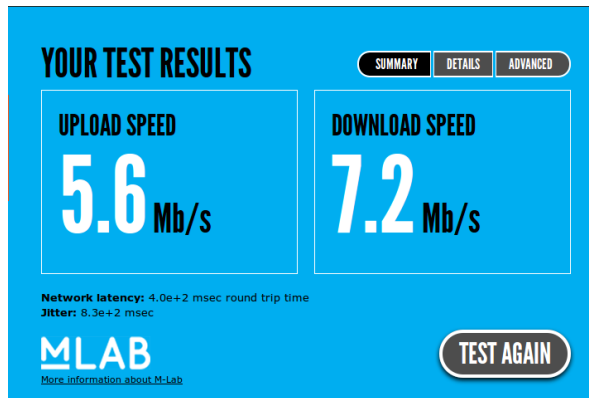
- SamKnows, BISmark.

- **Client-server** applications.
- **Active** measurement only.
- Country-customized clients (FCC, EETT).

Web-based tools

NDT from Internet2

- Tests connection speed and provides sophisticated diagnosis of problems limiting speed.
- Collects full TCP dumps and web100 logs (150+ variables describing TCP states).



Glasnost from Max Planck Institute

- Detects application-specific traffic differentiation.

Select a Glasnost test to run

P2P apps

- BitTorrent
- eMule
- Gnutella

Standard apps

- Email (POP)
- Email (IMAP4)
- HTTP transfer
- SSH transfer
- Usenet (NNTP) **NEW!**

Video-on-Demand

- Flash video (e.g., YouTube)

- Each Glasnost test takes approximately 8 minutes
- **Note to all users:** To allow accurate measurements you should stop any large download
- **Note to MacOS X users:** To work around a unique policy setting in Apple's Java VM, you may need to disable the popup window that will appear once you start the test.

» Start testing «



Glasnost makes use of the [Measurement Lab \(M-Lab\)](#) research platform. To learn what information our tool collects, please go [here](#).

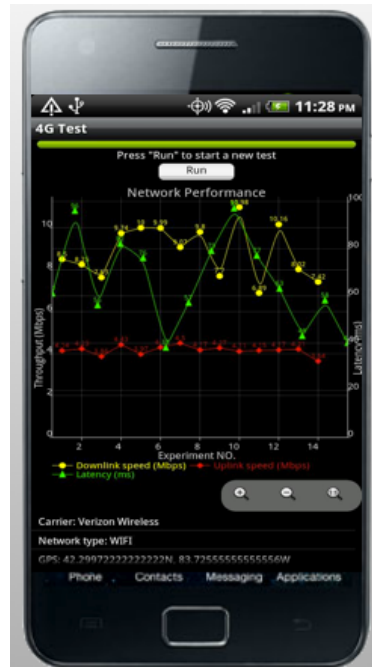


Mobile apps

from University of Michigan

4G Test

- Measurement and diagnostic tool for 4G networks.
- Android app.



MobiPerf

- Measurement and diagnostic tool for 3G networks.
- Android and iPhone apps.



Router-based tools

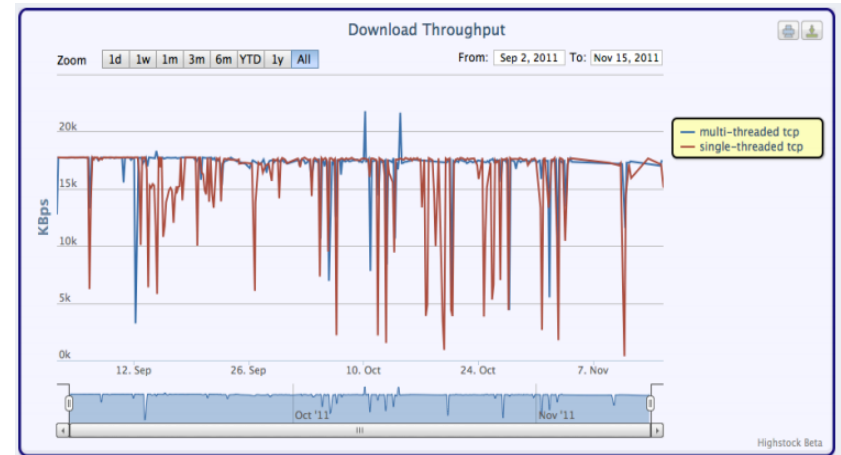


SamKnows

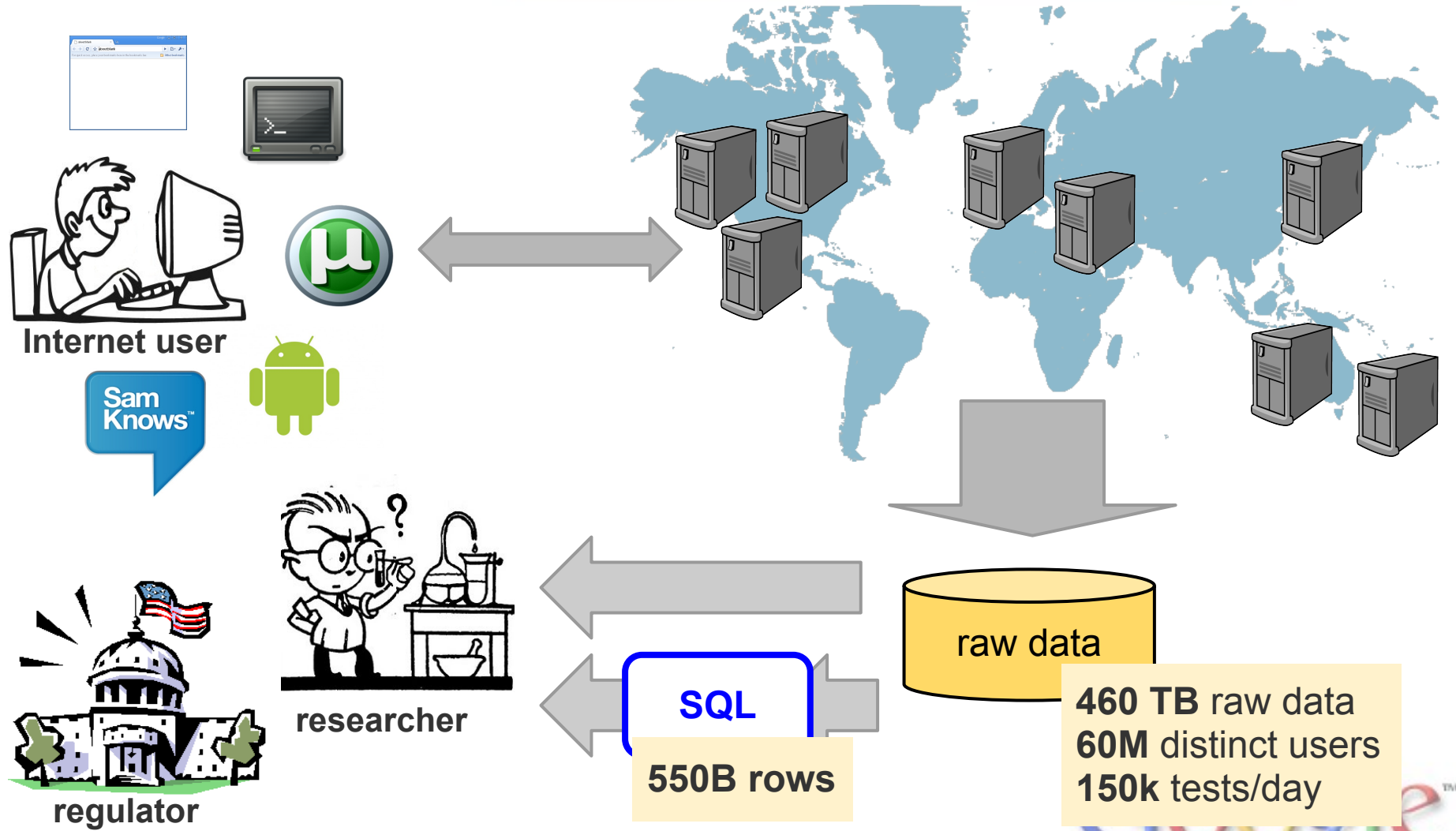
- Working with FCC for 2011 and 2012 broadband performance study in US.
- Working with European Commission for a 3-year broadband performance study in EU.

BISmark from Georgia Tech

- OpenWRT-based platform.
- Last mile and end-to-end periodic measurements.

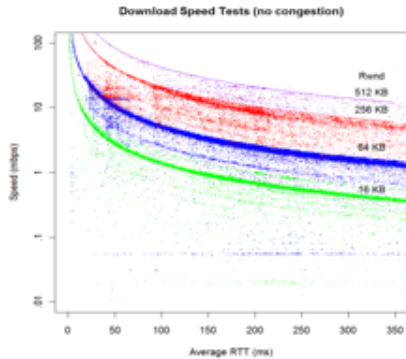


Open data



Open data promotes good research

D.Clark, S.Bauer et al. - MIT
Effects of receiver window on speed



Based on NDT data, determined that in many cases the TCP receiver window was the limiting factor on performance.

*All papers linked from the [M-Lab site](#)

Team from Syracuse University and Delf University analyzed Glasnost data and found evidence of DPI being used to facilitate BitTorrent throttling.

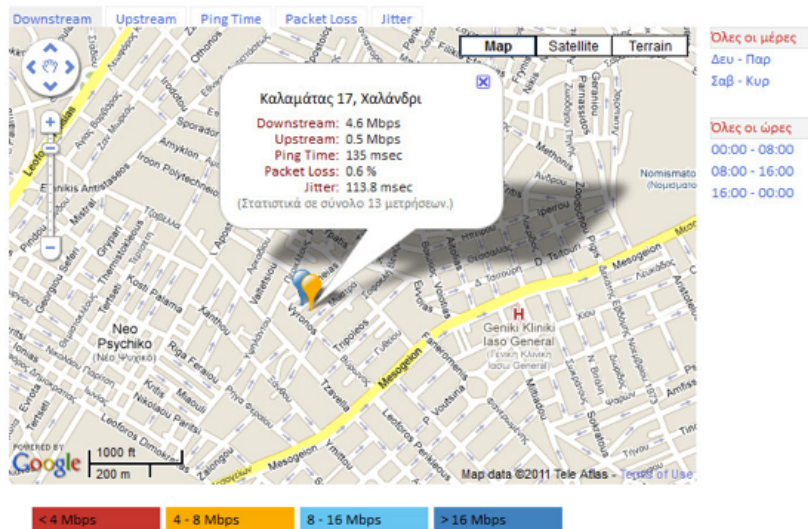
BitTorrent Throttling by ISPs, Worldwide
 Glasnost data, Q2 2008 - Q2 2010

Country	Operator Name	Quarter	Number Of Valid Tests	Range: # of Valid Tests	Pct of Tests Showing DPI
(All)	(All)	2010Q1	(All)	(All)	(All)
US	Comcast	2010Q1	3147	>450	3%
US	Time Warner Cable	2010Q1	2079	>450	4%
US	AT&T Inc.	2010Q1	2006	>450	4%
IL	Bezeq	2010Q1	1916	>450	30%
IL	NefVision	2010Q1	1374	>450	42%
IT	Telecom Italia	2010Q1	1122	>450	5%
US	Verizon Communications	2010Q1	980	>450	3%
BR	Oi	2010Q1	905	>450	23%
GB	Virgin Media	2010Q1	846	>450	6%
US	Cox Communications	2010Q1	751	>450	3%
GB	BT Group	2010Q1	677	>450	27%
CA	Shaw Communications	2010Q1	618	>450	14%
US	Charter Communications	2010Q1	605	>450	5%
BR	Net Servicos	2010Q1	599	>450	34%
PT	Zon Multimedia	2010Q1	556	>450	61%
IT	Wind	2010Q1	543	>450	10%

Regulators making use of M-Lab tools and data



EETT's [SPEBS](#) uses NDT and Glasnost to provide interactive broadband maps of Greece.



FCC's [Consumer Broadband Test](#) used NDT to collect data for the [National Broadband Map](#).

Regulators making use of M-Lab tools and data



FCC's [Measuring Broadband America 2011 report](#)

based on SamKnows data.

[New study](#) in 2012.

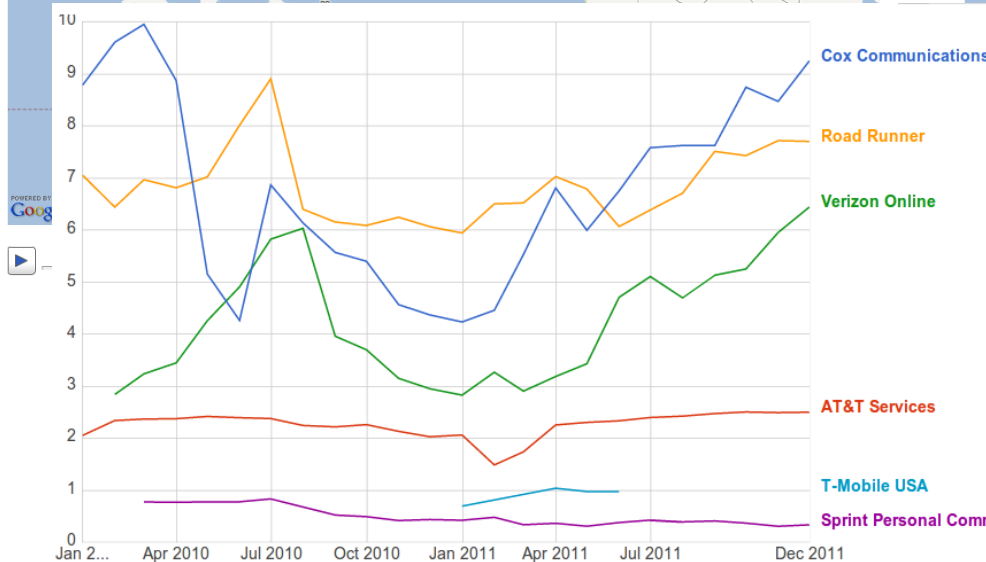
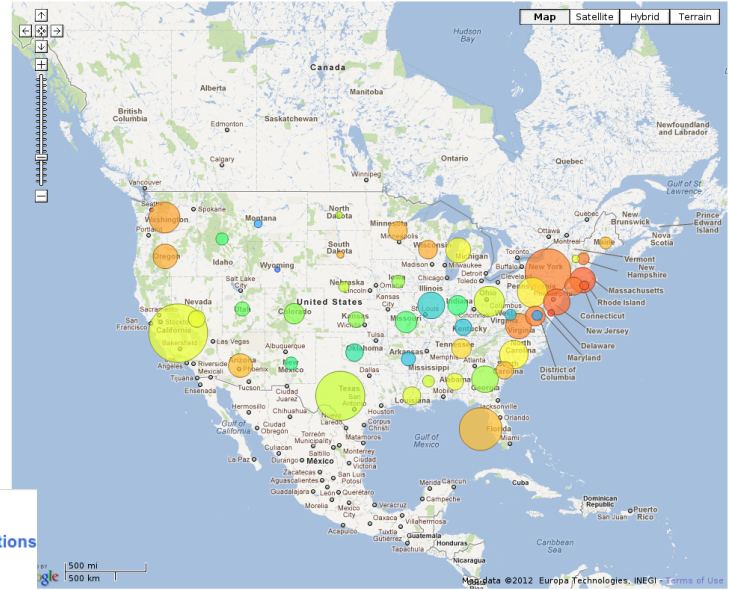
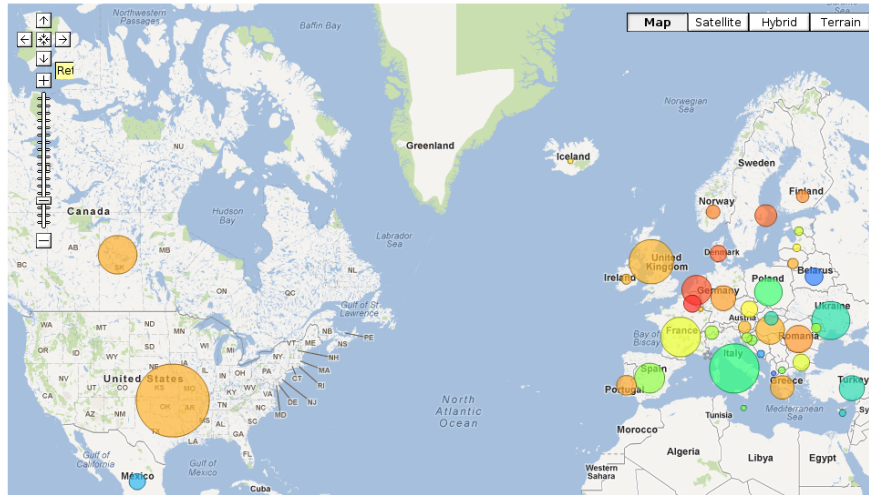


[European Commission study](#) using SamKnows

- 30 countries
- 10,000 users
- 3 years, starting in 2012



Visualizing the power of consistent, globally collected data



Interactive visualizations across a number of metrics [live here](#)

M-Lab: the recap

- **Broadly-deployed, standardized server platform** ensures consistent results across time and geographies.
- **Open source tools** ensure robust methodologies that can be improved and vetted by peer review.
- **Publicly available raw, real-world data** allows creative analysis, collaborative research, and an ecosystem of meaning built on scientific results.

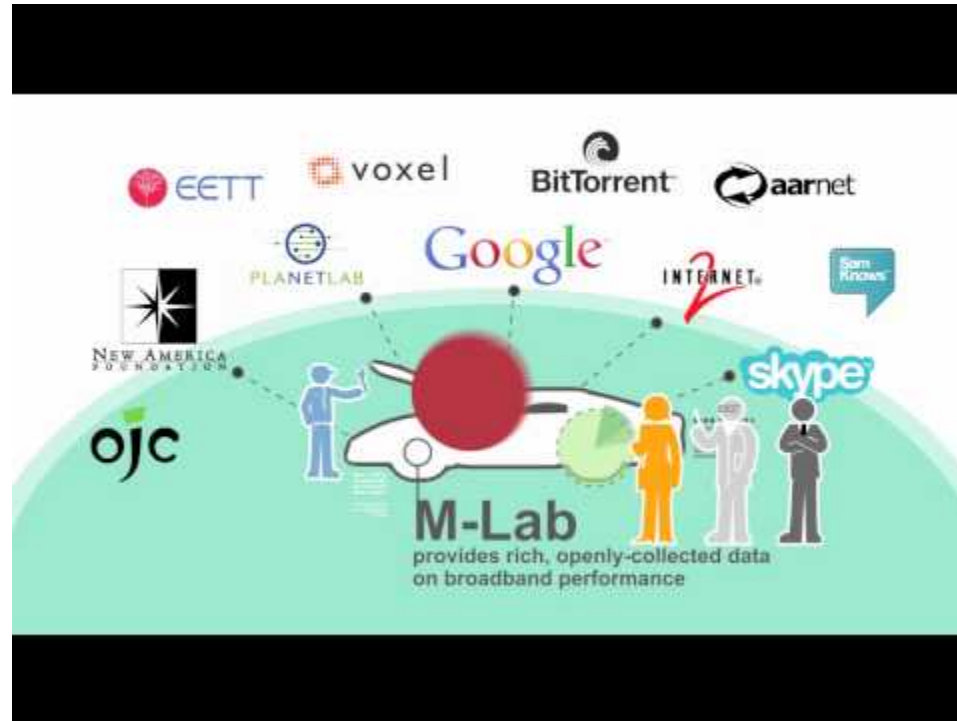
What's next for M-Lab?

- **Extend server platform.**
 - More servers (in particular in Asia, South America and Africa).
 - Full IPv6 support.
 - Testing on 10G networks.
- **Deploy new measurement tools.**
 - New measurement tools.
 - JavaScript-based clients and portable libraries, for easier integration.
- **Provide easier access to data.**
 - Via cloud-based tools.
- **Make M-Lab the go-to platform of good broadband data for researchers and regulators.**
 - More partnerships with researchers to analyze the data and to create visualizations that make the data intelligible to Internet users and regulators. (Google-sponsored research awards)
 - More partnerships with regulators to promote data-based policy making.



More info

<http://measurementlab.net/>



Google™