

# Measuring Library Broadband Networks

Colin Rhinesmith, [crhinesmith@simmons.edu](mailto:crhinesmith@simmons.edu)

Georgia Bullen, [georgia@measurementlab.net](mailto:georgia@measurementlab.net)



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# Measuring Library Broadband Networks



Institute of Museum and Library Services (IMLS)  
National Leadership Grant for Libraries program

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Award #[LG-71-18-0110-18](#)

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Website: <http://slis.simmons.edu/blogs/mlbn/about/>

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# MLBN Overview



**Overview:** 2-year research project (2018-2020)

**Goal:** To develop an open-source broadband measurement system for public libraries

- Year 1: 10-15 public libraries
- Year 2: 50-60 public libraries

**Website:** <http://slis.simmons.edu/blogs/mlbn/about/>

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# MLBN: Research Question



## Research Question:\*

*How can public libraries utilize broadband measurement tools to develop a better understanding of the relationship between library network infrastructure and digital services?*

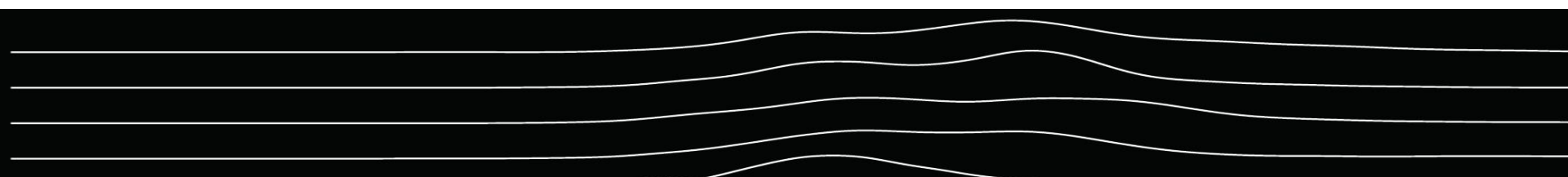
\*Builds on findings from University of Maryland's Digital Inclusion Survey:  
<https://digitalinclusion.umd.edu>

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# MLBN: Methodology

- Qualitative data
  - participatory design workshop (fall 2018)
  - interviews with library services and IT professionals
  - focus groups with library patrons
  - user feedback via Discourse forums
- Quantitative data
  - surveys with public library participants
  - broadband measurement data



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# MLBN: Year 1 Participating Public Libraries:

- Bennington Free Library (VT)
- Hollis Public Library (AK)
- Multnomah County Library (OR)
- Pasco County Public Library (FL)
- Saint Paul Public Library (MN)
- Twin Falls Public Library (ID)
- Truro Public Library (MA)
- Thomas J. Harrison Pryor Public Library (OK)
- Ventura County Library (CA)
- Westchester County Library (NY)



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# MLBN Final Deliverables (May 2020)

1. Open-source broadband measurement system
2. Training manual
3. Final report on the research project



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# Background

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- Goal: Open source, Lightweight, automated testing devices
- [Alexandria, Virginia Pilot](#)
  - ODroids running NDT tests on a randomized schedule
  - Devices in classrooms (on wired & wireless)
- [IMLS Measuring Library Broadband Networks](#)
  - Partners: Internet2, Simmons University
  - More measurement tests
  - Year 1: 10-15 Libraries
  - Year 2: 50-60 Libraries



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# MLBN System

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The current measurement system consists of three main components:



1

One or more small computers, connected to an institution's network, configured to run M-Lab's Network Diagnostic Tool (NDT).



2

*Resin.io* cloud service used to manage, provision, administer, and update all of the measurement computers in the field.



3

*Prometheus.io* cloud service receives test data from small computers, and is visualized by *Grafana* service, where project and library staff can access.



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# MLBN System

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## Additional General Features Envisioned by the Project Team:



- \* Add support for additional M-Lab network measurement tests and potentially other tests not provided by M-Lab.
- \* Support multiple types of measurement computers.



- \* Support self-managed option for managing, provisioning, and administering measurement computers.



- \* Add a robust user portal, to provide a user login service, multiple roles for users configuration of measurement devices, configuration of measurement tests to run, and visualization of test data from *Prometheus* and *Grafana*.
- \* Add a plugin architecture to support connections to other network systems.
- \* Provide a function to upload local data to compare with measurement data.

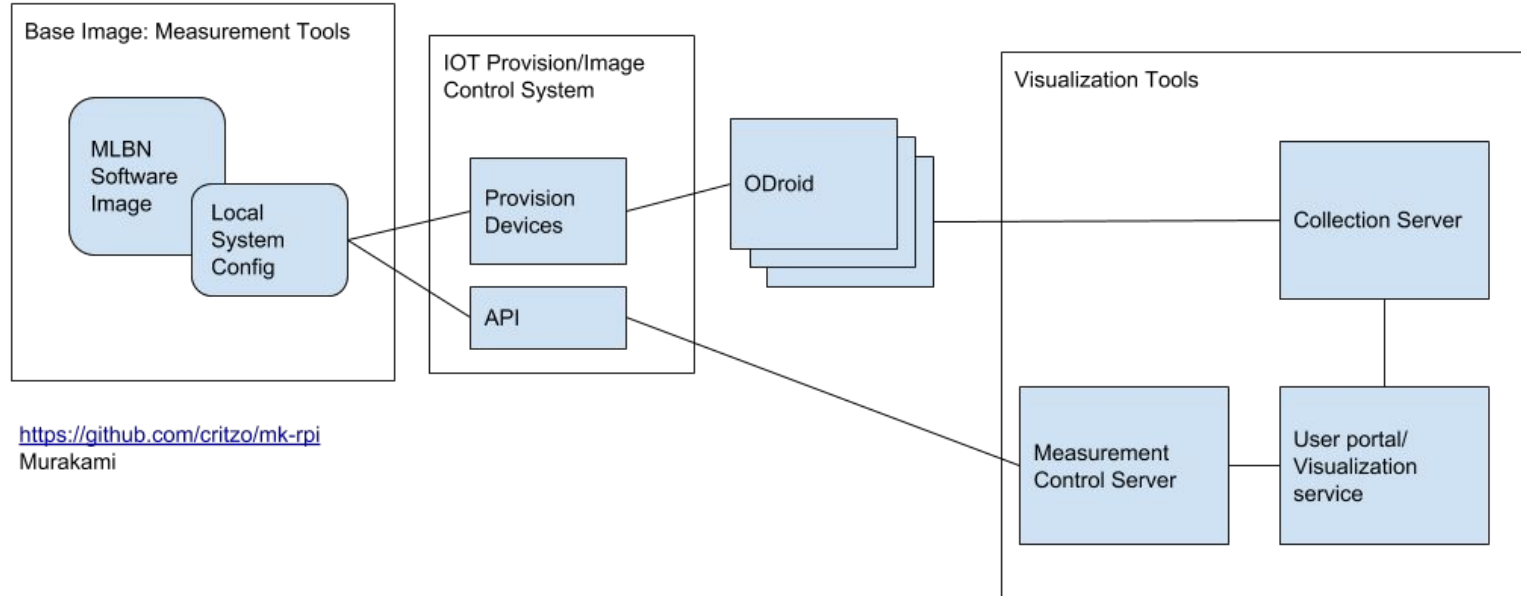


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# MLBN System



<https://github.com/critzo/mk-rpi>

Murakami

# MLBN System

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- Tests that running
  - M-Lab NDT
  - M-Lab DASH
  - Speedtest CLI
- Devices
  - Year 1: 2 Wired connections, 1 wireless connection
  - Year 2: 1 wired, 1 wireless connected devices

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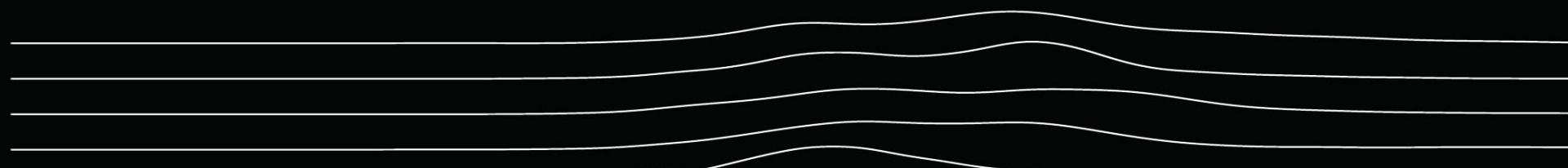
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Why M-Lab?

What is M-Lab?



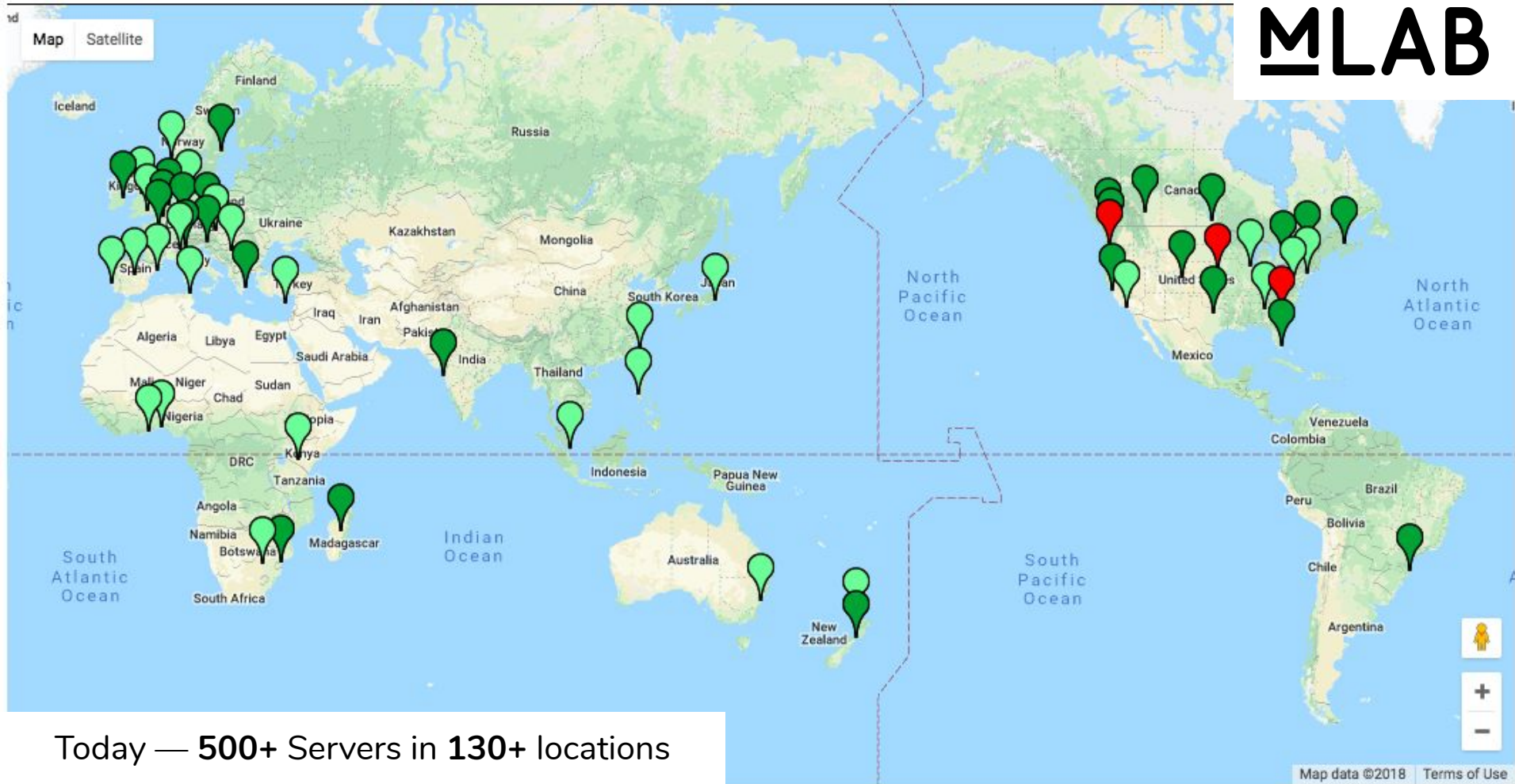
# M-Lab's Mission

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Measure the internet.

Save the data.

Make it universally accessible and useful.

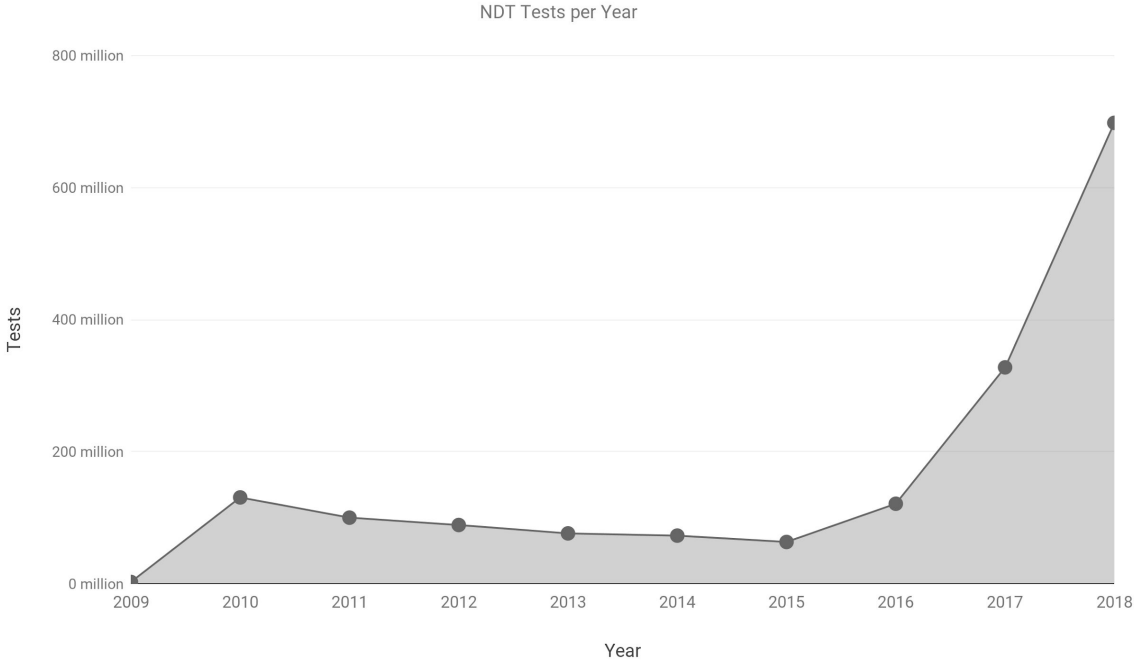


Today — **500+** Servers in **130+** locations

# The Data

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- Current Daily volume  
~2,000,000 new NDT measurements per day
- Not counting sidestream, paris-traceroute, diffdetect, etc.





# Where do tests come from?

how fast is my internet

All News Videos Shopping Books More Settings Tools

About 1,070,000,000 results (0.36 seconds)

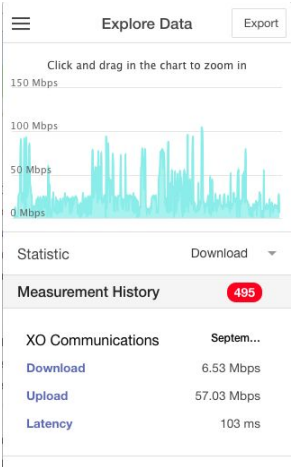
### Internet speed test

Check your internet speed in under 30 seconds. The speed test usually transfers less than **40 MB of data**, but may transfer more data on fast connections.

To run the test, you'll be connected to **Measurement Lab (M-Lab)** and your IP address will be shared with them and processed by them in accordance with their **privacy policy**. M-Lab conducts the test and publicly publishes all test results to promote internet research. Published information includes your IP address and test results, but doesn't include any other information about you as an internet user.

[About](#) [RUN SPEED TEST](#)

[Feedback](#)



### uTorrent Setup Guide

uTorrent will test your network and configure itself for b

**Bandwidth** Greece, Athens

Results: Upload: 209.71 kbit/s (25.5 kB/s) Dow  
(Alternate speed test at [dslreports](#))

Your Upload Speed:

uTorrent Bandwidth Configuration

Upload Limit:	17.0 kB/s
Connections (per-torrent):	55
Max active torrents:	1

**Network**

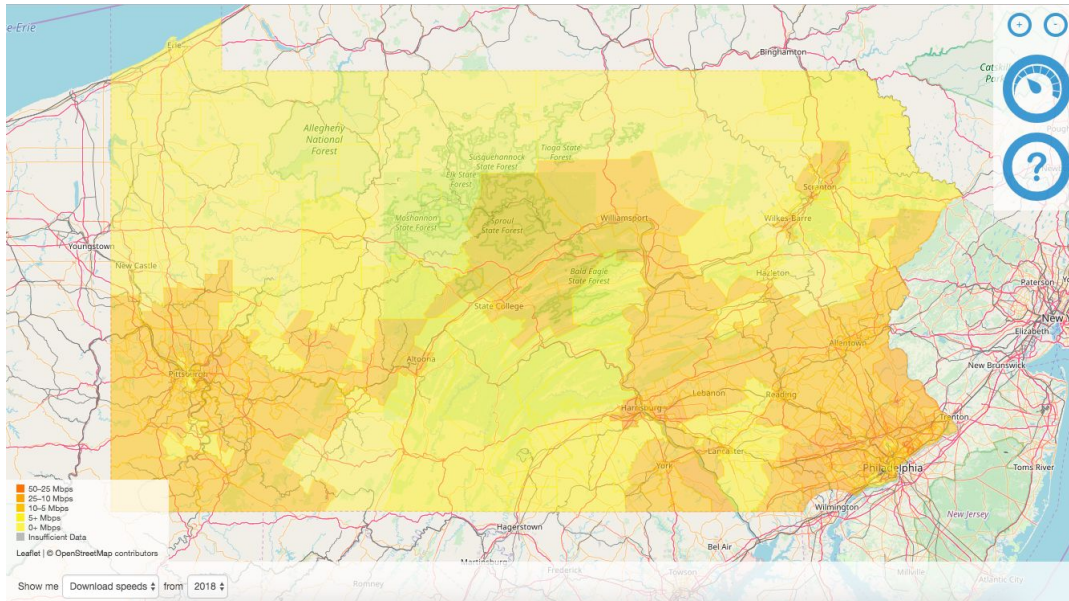
Results: Port is open. Your network is properly con

Current Port: (0:random)   Au

[Cancel](#) [Run Tests](#)

Google Search, Software Integrations (uTorrent), Router Integrations, [Fingbox](#), [Chrome Extension](#), the M-Lab Website

# Where do tests come from?



**Taking part in the Pennsylvania Broadband Mapping Initiative? Check your Internet speed in roughly 30 seconds!**  
The Measurement Lab (M-Lab) platform is run by the scientific community. We make all test results publicly available via the MeasurementLab.net website to help promote Internet research. M-Lab's Network Diagnostic Tool collects a number of measures of different facets of your Internet connection. The information published includes each device's IP address, but does not include personal identifying information about you as an Internet user.

Are you testing from your home, a business, or a community institution like a school or library?

I agree to the [M-Lab privacy policy](#), which includes retention and publication of IP addresses, in addition to speed test results.

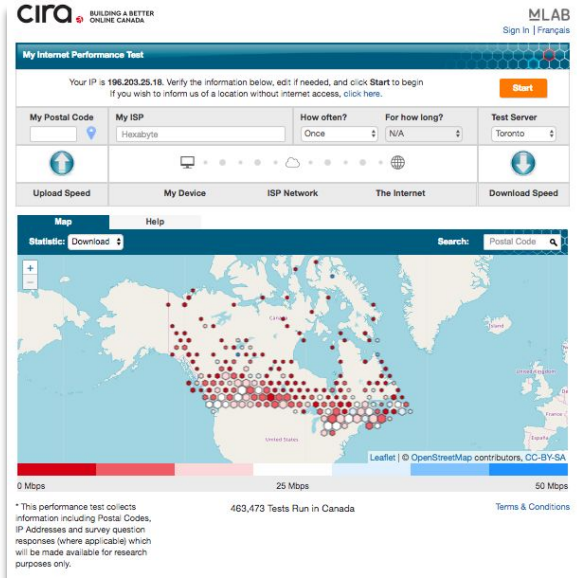
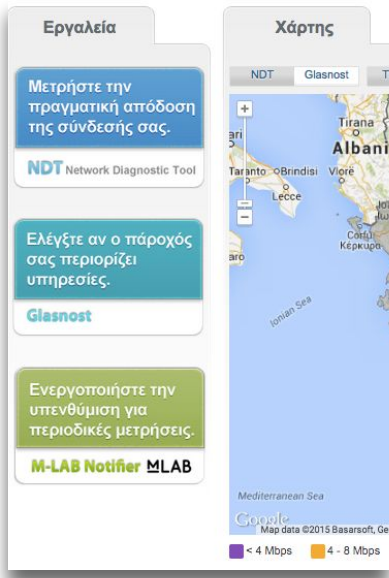
**Browse the Broadband Map**

**Learn More**

- Partnered with Center for Rural PA & Penn State, ILSR, <https://pa.broadbandtest.us>  
**\*\* Adding comparisons to Form 477 Data \*\***
- Stevens County & State CIO  
<https://stevenscountybroadband.net>
- City of Seattle  
<https://broadbandmap.seattle.gov/>
- And many more!

# Where do tests come from?

- Partnerships with Regulatory Agencies: Monitoring the progress of broadband deployment for policy-making.
- Examples: United States (FCC & SamKnows), EC (Alladin.IT), Canada/CIRA, Greece, Cyprus, Thailand, Austria, Netherlands.



# Notes

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BigQuery & DataStudio:

- <https://datastudio.google.com/s/mhfKLWtgb1q>
- <https://www.google.com/search?q=internet+speed+test>

Preview: United States of Broadband mapping project:

- <https://opentechinstitute.github.io/USBB/SOTI.html>

Useful Tools:

- Chrome Extension:  
<https://chrome.google.com/webstore/detail/m-lab-measure/leijmacehibmiomcnpaolboihcdepokh/related?hl=en-US>
- M-Lab Speed Test Site: <https://speed.measurementlab.net/#/>
- Google Search: <https://www.google.com/search?q=internet+speed+test>
- NaCO — TestIT: <https://www.naco.org/testit>

# Data Access

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- Sign up for the M-Lab Discuss List to get open & free access to the data:  
<https://www.measurementlab.net/quickstart/>

# MLBN: How you can help!

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- Looking for Year 2 partners
- If libraries that you work with would be interested, or if you want to reach out to other libraries, that'd be great!
- Website: <http://slis.simmons.edu/blogs/mlbn/about/>
- Email: [mlbn@measurementlab.net](mailto:mlbn@measurementlab.net)

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Thank you!

