MLAB

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<u>Via Electronic Submission</u>

National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue NW., Room 4887
Attn: National Broadband Research Agenda
Washington DC 20230

Re: Request for Comments National Broadband Research Agenda, Docket Number: 160831803-6803-01

Dear Madam or Sir,

Measurement Lab (M-Lab) submits this letter in order to affirm its support for the National Telecommunications and Information Administration (NTIA) and the National Science Foundation (NSF)'s efforts to develop a National Broadband Research Agenda. M-Lab writes to offer further recommendations on supporting research on broadband, specifically, Federal Leadership in Data Collection and Research, D.15, D.16 and D.17.

M-Lab is an international consortium of academic, industry, and public interest partners dedicated to providing an ecosystem for open and verifiable measurement of global Internet performance. The platform began as a pilot project to improve data collection, analysis, and research on broadband in response to early debates over content blocking in the United States. M-Lab was founded on the principle that open measurement enables public learning on how factors of demographics, geography, and socioeconomic status influence the digital divide. M-Lab has never taken a position on regulation; we only seek to provide a common set of facts to inform research and public dialog on broadband deployment and its impact on society through our open and trusted dataset. Our experience as a partner to national regulatory agencies around the world has demonstrated that rigorous measurement of broadband access is critical to ensuring a healthy Internet that serves as an engine of innovation and development.

Foremost, we believe that open data is a critical complement to qualitative efforts in informing any debate around broadband development. Historically, there have been limited metrics available to the public on

broadband health and deployment, as most important information is held as a commercial secret by network providers. This secrecy limits the ability of leaders to understand the status of broadband deployment in their communities and identify where gaps persist. In order to foster an educated conversation around broadband access and empower communities to pursue innovative policies, the public needs access to trustworthy and independent metrics on digital inclusion and growth. M-Lab is already equipped to provide the necessary data on trends in broadband health and expansion to inform a National Broadband Research Agenda.

M-Lab provides regulators, researchers and consumers with a rich set of free and open tools to conduct independent assessments of broadband access using transparent and objective methodologies hosted on tested platforms. After eight years of growth and development, M-Lab has reached maturity and scale. As a result of its unique, collaborative data-collection model, M-Lab receives a quarter million daily measurements from Internet users in the United States. Data analysis at this scale empowers issue identification and informs policy-making. An example of this is found in the M-Lab report entitled "ISP Interconnection and its Impact on Consumer Internet Performance," a two-year collaborative effort to understand how interconnection arrangements impact end-user access in the United States.[1] Through comparative analysis across the country and across network providers, M-Lab was able to demonstrate significant degradation of consumer broadband performance associated with business disputes between network providers. This report, reinforced by subsequent M-Lab research and additional analysis from the Open Technology Institute, was cited in regulatory filings by a breadth of parties and has contributed to a stronger public discourse on the role of the business relationships at the core of the Internet.[2]

M-Lab exemplifies the value of collaborative relationships between the public and private sector, which has been a strength at a time where budgets everywhere are limited. M-Lab has supported the FCC's Measuring Broadband America program by providing much of the server infrastructure against which its partner, SamKnows, conducts tests. M-Lab continues to expand and diversify its partnerships and collaborations. In order to make M-Lab's extensive dataset more accessible and informative to the public, M-Lab is in the process of launching new data visualizations. It is our hope that these visualization tools will empower any interested party to conduct research on the performance and health of Internet infrastructure. These developments accompany more options and tools to collect performance metrics from broadband users, in turn strengthening the core datasets that we provide to inform broadband policy development.

M-Lab looks forward to continuing to enable analysis and research on broadband access, including its impacts on economy and society, and offers three recommendations for the Agenda to foster further opportunities.

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[1] "ISP Interconnection and its Impact on Consumer Internet Performance," Measurement Lab, http://www.measurementlab.net/static/observatory/M-Lab_Interconnection_Study_US.pdf

[2] "Beyond Frustrated: The Sweeping Consumer Harms as a Result of ISP Disputes" http://www.newamerica.org/oti/policy-papers/beyond-frustrated-the-sweeping-consumer-harms-as-a-result-of-isp-disputes/ Also see: Letter of National Cable & Telecommunications Association in GN Docket No. 14-28. Page 3, January 21, 2015, http://apps.fcc.gov/ecfs/document/view?id=60001014982; Letter of COMPTEL, Level 3, Cogent and Netflix in GN Docket No. 14-28. Page 3, January 13, 2015, http://apps.fcc.gov/ecfs/comment/view?id=60001008405

Community Connectivity Initiative Should Include M-Lab Performance Indicators (D.15)

Among the most innovative plans outlined by the Council is the creation of a Community Connectivity Initiative, which will harness community-level input on local broadband adoption programs, and connect communities to granular data about local broadband connectivity from mixed sources. The Council notes that this could include data on broadband speeds and other quality points, and leverage interagency and cross-sector collaboration. The inclusion of consistent and measured indicators of deployment and performance is critical to ensuring the integrity and relevance of the initiative.

Connectivity holds the potential to catalyze economic mobility and reduce inequality. Broadband infrastructure is the foundation of economic growth and social participation in a digital economy. For everyone from small business owners to hospital administrators to telecommuting workers, Internet performance matters and M-Lab's research demonstrates that claimed speed can often differ substantially from the network performance that consumers experience. Deployment often starts with the most-profitable neighborhoods and neglects communities deemed less profitable. By adopting an approach that incorporates internet measurements, the Community Connectivity Initiative has the potential to provide a map that shows community leaders and the public when and where new services are being rolled out, as well as identify gaps. Without tools to measure actual speeds on the network, users and regulators will be powerless to identify when and how to enforce these important rules. M-Lab's open data offers a transparent method for communities to track broadband deployment and quality, and find incongruities in the market, that is comparable across geography and technology.

The Agenda should include measured indicators of performance, such as speed and reliability, in the Community Connectivity Initiative, and M-Lab is prepared to make its metrics freely-available for inclusion into the platform.

The Agenda Should Support Communities in Collecting Further Measurements (D.16)

In order to provide more granular accounting of the factors that influence a community's connectivity, the Agenda should support initiatives that enable communities to monitor their own access. Displaying measurement data in the Self Assessment Tool will encourage more communities to actively monitor the connectivity impact of broadband programs themselves, to better direct investments and improve development outcomes. By promoting M-Lab's measurement platform, the Agenda would also provide geographic comparability and avoid the potential use of disparate and incomparable metrics across communities.

Since 2011, the FCC has conducted the MBA program under the National Broadband Plan, releasing annual reports on broadband performance. While this dataset is important, the MBA program is primarily focused on national or regional trends, and it does not collect enough samples to identify potential issues and inform policy-making at the local level. However, regulatory decisions about planning and support for broadband services are made at both the federal and local levels. This discrepancy leaves policy-makers and communities without credible data to speak to issues such as rural and tribal

connectivity. Unfulfilled opportunities remain to support credible research to bolster the availability of data on Internet penetration and performance at the local level.

M-Lab recently partnered with the city of Seattle in order to develop and deploy the Seattle Broadband Speed Test.[3] The Seattle Broadband Speed Test provides the public the ability to conduct speed measurements against local servers in order to determine how fast their connection is. This information, alongside additional facts, such as cost of service and advertised speed, are plotted on a map in order to depict general trends in performance across the city. One of the strengths of the Seattle Broadband Speed Test is that it is built on open source software and, as a result, provides a framework that can be easily deployed elsewhere at minimal cost. As a result of the success of the Seattle Broadband Speed Test, M-Lab is in contact with other municipalities about deploying speed tests and partnerships to deepen the data available for communities.

Moreover, policy-makers have set national goals to bring fiber-optic networks to schools and libraries in order to enhance essential connectivity to our educational institutions. The FCC has previously reported that two-thirds of America's school districts have an inadequate foundation for digital learning, with many reporting that not a single school in the district will be able to meet national high-speed broadband targets, set at 1 Gbps allocated for every 1,000 students.[4] Programs to achieve these goals, including those arising out of Broadband Technology Opportunities Program investments, should actively measure whether and when publicly-supported services are delivered at the level the public wants and expects – rather than relying on trust in advertised speeds.

In its Measuring Broadband in Schools project, New America's Education Policy Program and Open Technology Institute developed customized measurement tools for schools and libraries to offer performance assessment for their highly-used Internet connections. In the project's pilot, hardware probes were deployed to several schools within the Alexandria County Public Schools (ACPS) system in order to determine whether they actually received the Internet speed they need to support digital learning.[5] For this pilot study with ACPS, M-Lab tested a device prototype that can automatically run Internet measurement tests from within a school's network. The Measuring Broadband in Schools project and Institute of Museum and Library Services toolkits are examples of measurement programs serving a strong public interest, which align with the Agenda and can be supported through research initiatives.[6]

The Council should leverage the tools made available through M-Lab to enable communities to conduct continuous, independent assessment of broadband health. M-Lab has developed consumer-facing software, such as browser extensions and web portals that provide easy performance measurements in the browser and on mobile devices. These tools all build toward a common dataset on actual quality of service for Internet users, providing visibility into consumer connectivity that is directly comparable across communities. These programs complement the work of the MBA, lending to the sustainability of measurement efforts.

[3] http://www.seattle.gov/broadband/broadband-map-faq
[4] https://www.fcc.gov/document/fcc-continues-e-rate-reboot-meet-nations-digital-learning-needs
[5] https://context.newamerica.org/measuring-broadband-in-schools-7d1a6d22366d#.refwf96pe
[6] https://www.imls.gov/news-events/upnext-blog/2015/09/expanding-broadband-access-work-continues

NSF Should Convene Discussions on Performance Data Collection (D.17)

While the NSF has fostered the academic development of broadband performance measurements over the past decade, there remain ample opportunities for further studies that extend research into deployed systems for the benefit of communities.[7] The NSF should convene discussions or workshops that would inform an overall strategic plan for inclusive broadband measurements. These sessions could include regulators, community leaders, academic researchers, and the private sector, in order to identify information gaps and opportunities for cross-sector collaboration.[8] .

Workshops could include topics and outputs such as:

- Outlining research that would support the broadband assessment toolkit planned by the Council for conducting measurements within libraries and schools;
- Exploring strategies to overcome the challenges of scaling measurement systems to cover the digital divide; and,
- Identifying what indicators are important to policy-makers and any associated metrics that are not currently collected.

This conversation would also enable the research community to promote best practices on the measurement of infrastructure and inform the development of assessment toolkits.

Conclusion

The National Broadband Research Agenda can complement existing initiatives through providing quality of experience data on federal broadband deployment and adoption programs, facilitated by the academic community and non-governmental entities. The broadband programs laid out by the Council align with a multi-year history of research and data collection from Measurement Lab. As the Council moves forward, M-Lab is committed to being a strong partner in these monitoring efforts through its open measurement platform and dataset in order to serve the public interest.

Respectfully submitted,

Collin Anderson
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Measurement Lab

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[7] For example, M-Lab's partner Project BISmark has benefited from support from the NSF.
[8] For example, measurement initiatives have not traditionally covered rural populations due to the difficulties of collecting a sufficient sample size