

**Telecom Notice of Consultation CRTC 2019-406**

**Call for comments regarding potential barriers to the deployment of  
broadband-capable networks in underserved areas in Canada**

*Submission of the Canadian Internet Registration Authority (CIRA)*

**May 7, 2020**  
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## BACKGROUND

1. The Canadian Internet Registration Authority (CIRA) welcomes the opportunity to comment on barriers to the deployment of broadband-capable networks in underserved areas of Canada. CIRA is a member-based, not-for-profit organization best known for managing the .CA top-level internet domain name on behalf of all Canadians. While CIRA's core mandate is the safe, stable, and secure operation of the .CA domain and its underlying technologies, the organization also connects, protects, and engages the internet community in Canada and beyond by providing high quality registry, DNS, and cybersecurity services.
2. Among its service offerings, CIRA operates an Internet Performance Test platform.<sup>1</sup> The platform allows Canadians to test the quality of their internet connections – including metrics for speed, latency, jitter, and packet loss. Canadians have performed over 640,000 tests on the platform since May of 2015. Communities around the country, including the cities of Ottawa, Winnipeg, Burlington, Caledon, Kingston, and Kitchener;; all of PEI; and Annapolis Valley, South Shore Nova Scotia, Pictou County and Lanark County have also used the CIRA IPT to assess the quality of broadband connectivity in their regions.<sup>2</sup>
3. In 2019, CIRA partnered with the Ministry of Innovation, Science and Economic Development (ISED) to link to the platform on ISED's website. ISED then asked Canadians to use CIRA's IPT to test their home internet connections. In an August, 2019 press release, the Ministry stated: "We are working to expand high-speed networks to rural, remote, northern and underserved communities across Canada, and we need your help! Take two minutes to complete an Internet speed test. You will be helping us gather important data on Internet speeds in all regions of Canada."<sup>3</sup>
4. In a September, 2019 announcement, ISED further acknowledged the value of performance testing using CIRA's IPT:
 

*"In partnership with the Canadian Internet Registration Authority (CIRA), the Government of Canada has launched a quick and easy Internet speed test. This test will provide CIRA and the Government with the data needed to expand high-speed networks to rural, remote, northern and underserved communities across Canada."<sup>4</sup>*
5. CIRA's Internet Performance Test is one of the most advanced tests of internet speed and quality available and has the public interest at its core. The test nodes are located in internet

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<sup>1</sup> CIRA. Internet Performance Test. <https://performance.cira.ca/>

<sup>2</sup> CIRA. "Smart Community Performance Testing." <https://www.cira.ca/improving-canadas-internet/initiatives/internet-performance-test/smart-community-performance>

<sup>3</sup> ISED. "High Speed Internet for all of Canada" August, 2019. <https://www.ic.gc.ca/eic/site/139.nsf/eng/home>

<sup>4</sup> Government of Canada News Release. "Canadians in Eastern Ontario to benefit from faster Internet." September 6, 2019. <https://www.canada.ca/en/innovation-science-economic-development/news/2019/09/canadians-in-eastern-ontario-to-benefit-from-faster-internet.html>

exchange points located in Tier 1 Canadian cities, rather than within an ISP's own network architecture. This allows CIRA to measure the actual performance of an internet connection to an "off-net" server in real network conditions, closely representing the true internet experience of Canadian users. To assess internet performance, CIRA uses the Network Diagnostic Test (NDT) managed by M-Lab.<sup>5</sup>

6. CIRA is one of the many organizations that help the Canadian and global internet function on a daily basis. It is with this technical understanding of internet architecture, as well as years of experience in global and domestic internet policy debates that CIRA offers the following comments and data to assist the Commission's understanding of the matters under discussion.

### **LACK OF INTERNET PERFORMANCE MEASUREMENT DATA AS A BARRIER**

7. The absence of real-world performance data acts as a barrier to extending services that meet the universal service objective into underserved areas in at least two ways: first, it makes it difficult to assess which communities would benefit from new investments in connectivity; second, it makes it difficult to determine whether new projects are providing the promised service levels.
8. Rural Canadians commonly report they do not receive the quality of service advertised by ISPs. Service providers of all sizes resist using off-net testing because it often shows poorer internet performance metrics than the providers' own service level claims. CIRA's position on this, and the positions of several ISPs are detailed in a 2017 Non Consensus Report of the CRTC Interconnection Steering Committee Network Working Group.<sup>6</sup> Without systematic off-net testing, outside observers are left with only the ISPs' self-reported data, which is helpful in understanding connectivity gaps across Canada, but does not offer a comprehensive picture on its own. CIRA's IPT compensates for a lot of this missing data and can demonstrate existing gaps, weaknesses, or strengths in regional connectivity.
9. In Telecom Decisions CRTC 2016-496<sup>7</sup>, CRTC 2018-241<sup>8</sup>, and CRTC 2019-42<sup>9</sup>, the Commission defined Quality of Service (QoS) metrics for the Universal Service Objective. These identify, among other things, the following as minimum service levels for high-quality fixed broadband Internet access service requirements for every Canadian household and business whether in urban, rural or remote areas:
  - Download Speeds- at least 50 Megabits per second (Mbps)
  - Upload Speeds - at least 10 Mbps
  - Latency/Ping - a round-trip latency threshold of not more than 50 milliseconds (ms)

<sup>5</sup> M-Lab. NDT "(Network Diagnostic Tool)." <https://www.measurementlab.net/tests/ndt/>

<sup>6</sup> CRTC Interconnection Steering Committee Network Working Group. "Develop recommendations as to the appropriate metrics and reporting to define high-quality fixed broadband Internet access service Non-Consensus Report." Nov 29, 2017. <https://crtc.gc.ca/public/cisc/nt/ntr061.pdf>

<sup>7</sup> Telecom Decision, CRTC 2016-496. <https://crtc.gc.ca/eng/archive/2016/2016-496.htm>

<sup>8</sup> Telecom Decision, CRTC-2018-241. <https://crtc.gc.ca/eng/archive/2018/2018-241.htm>

<sup>9</sup> Telecom Decision, CRTC 2019-42. <https://crtc.gc.ca/eng/archive/2019/2019-42.htm>

- Jitter - a threshold of not more than 5 ms or less
  - Packet Loss – a threshold of not more than 0.25% or less
  - Unlimited Data – option is available in a funded project from a service provider
10. In Telecom Decision 2018-241, the Commission determined a measurement methodology to be used in the CRTC’s Broadband Measurement Project.<sup>10</sup> Specifically, the Commission determined, “...broadband QoS is to be measured using a sample-based approach, during peak times (i.e. from 7 p.m. to 11 p.m. local time on weekdays), and using a measurement probe at the modem in the customer premises to an off-net measurement server connected to an IXP in a Canadian Tier 1 city.”<sup>11</sup> The Commission also determined that “QoS measurement should accurately capture ISPs’ actual broadband network access QoS performance, as well as subscribers’ actual real-world experience.”<sup>12</sup>
11. Furthermore, in its preliminary views on the project management of the Broadband Fund, the Commission identifies a need to develop a performance measurement strategy, “including developing performance measures and indicators, the supporting data requirements, and a data collection strategy.”<sup>13</sup> It also emphasized that, “These speeds are to be the actual speeds delivered, not merely those advertised.”
12. To ensure accurate, objective, and reliable measurements, we recommend the use of CIRA’s IPT to measure and validate internet performance.

## MEASURING RURAL INTERNET PERFORMANCE IN CANADA

13. To assist the Commission and other interveners in their understanding of the barriers facing underserved communities in the deployment of high-capacity transport services and last mile access networks, CIRA has submitted twelve months of recent IPT performance data to the record of this proceeding below.
14. As outlined above, we believe it is essential that policy-makers, ISPs, regulators, and other interested stakeholders leverage real-world performance data to better understand where regional strengths, weaknesses, and gaps exist in connectivity for underserved regions.
15. The following figures are based on 31,734 tests in rural areas and 86,706 test in urban areas performed between May 2019 and April 2020 using CIRA’s Internet Performance Test platform.
16. For the purposes of these graphs, postal code data is used to differentiate between rural and urban areas. Postal rural areas are based solely on their being serviced by a rural delivery method. Thus some towns are captured, causing inflation of rural performance figures. Statistics Canada defines rural as, “the population outside settlements with 1,000 or more population

<sup>10</sup> CRTC. “Broadband Measurement Project.” May 9, 2019. <https://crtc.gc.ca/eng/internet/service.htm>

<sup>11</sup> Telecom Decision CRTC 2018-241, para. 44. <https://crtc.gc.ca/eng/archive/2018/2018-241.htm>

<sup>12</sup> Telecom Decision 2018-241, para. 36. <https://crtc.gc.ca/eng/archive/2018/2018-241.htm>

<sup>13</sup> Telecom Regulatory Policy CRTC 2016-496. <https://crtc.gc.ca/eng/archive/2016/2016-496.htm>

with a population density of 400 or more inhabitants per square kilometer.”<sup>14</sup> CIRA is currently working on separating all reporting using the more granular Statistics Canada definition rather than postal codes.

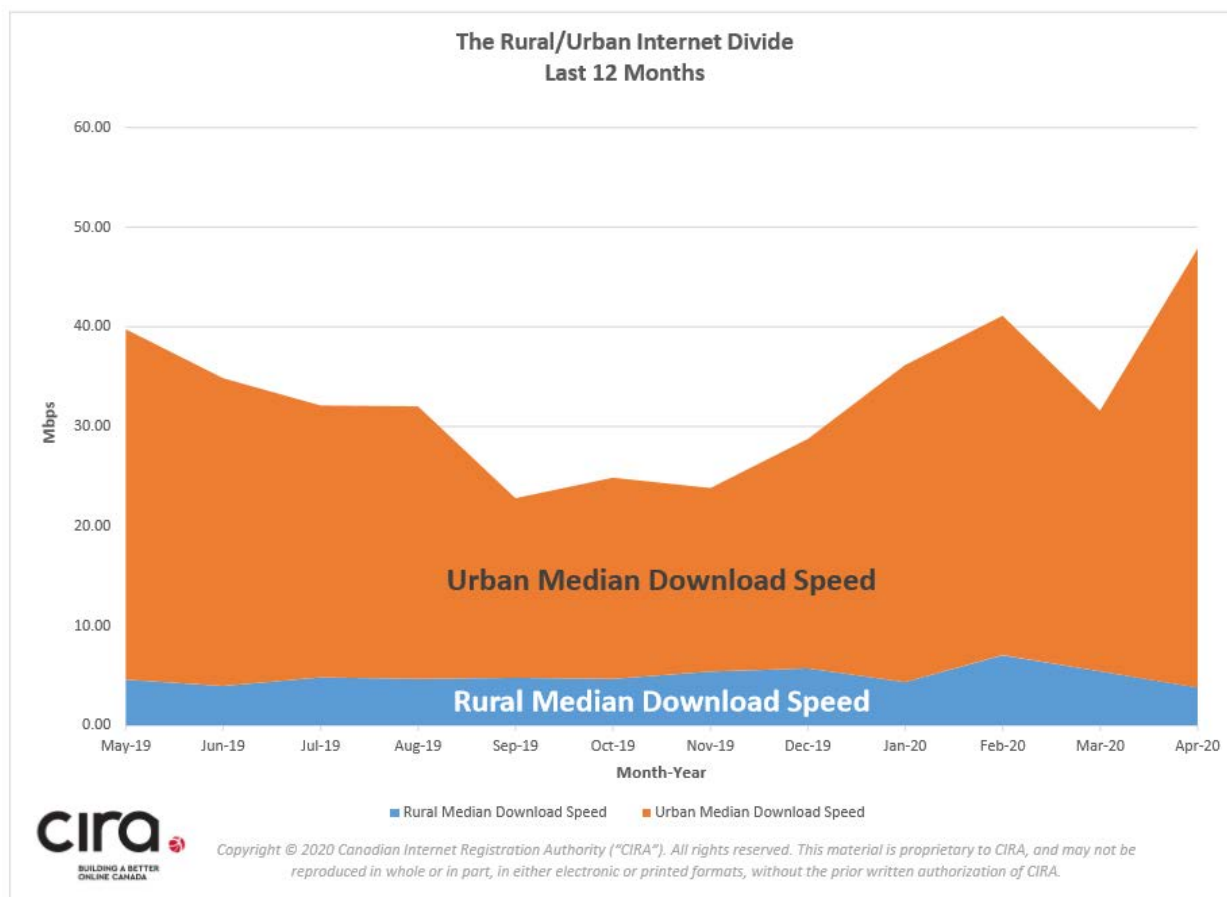


Figure 1: The Rural-Urban Internet Divide

17. Figure 1 demonstrates the disparity in measured service speeds between urban and rural Canada. At its peak in the last 12 months (February), median rural download speeds were 7.03 Mbps while urban access measured 34.06 Mbps - just shy of 5 times the test results generated by rural Canadians. In the most recent month (April 2020), the median rural speed measured by the IPT was 3.78 Mbps versus 44.09 Mbps in urban Canada, or 11.7 times faster in urban Canada.

<sup>14</sup> Statistics Canada. "Rural and Small Town Canada Analysis Bulletin." <https://www150.statcan.gc.ca/n1/pub/21-006-x/2008008/section/s2-eng.htm>

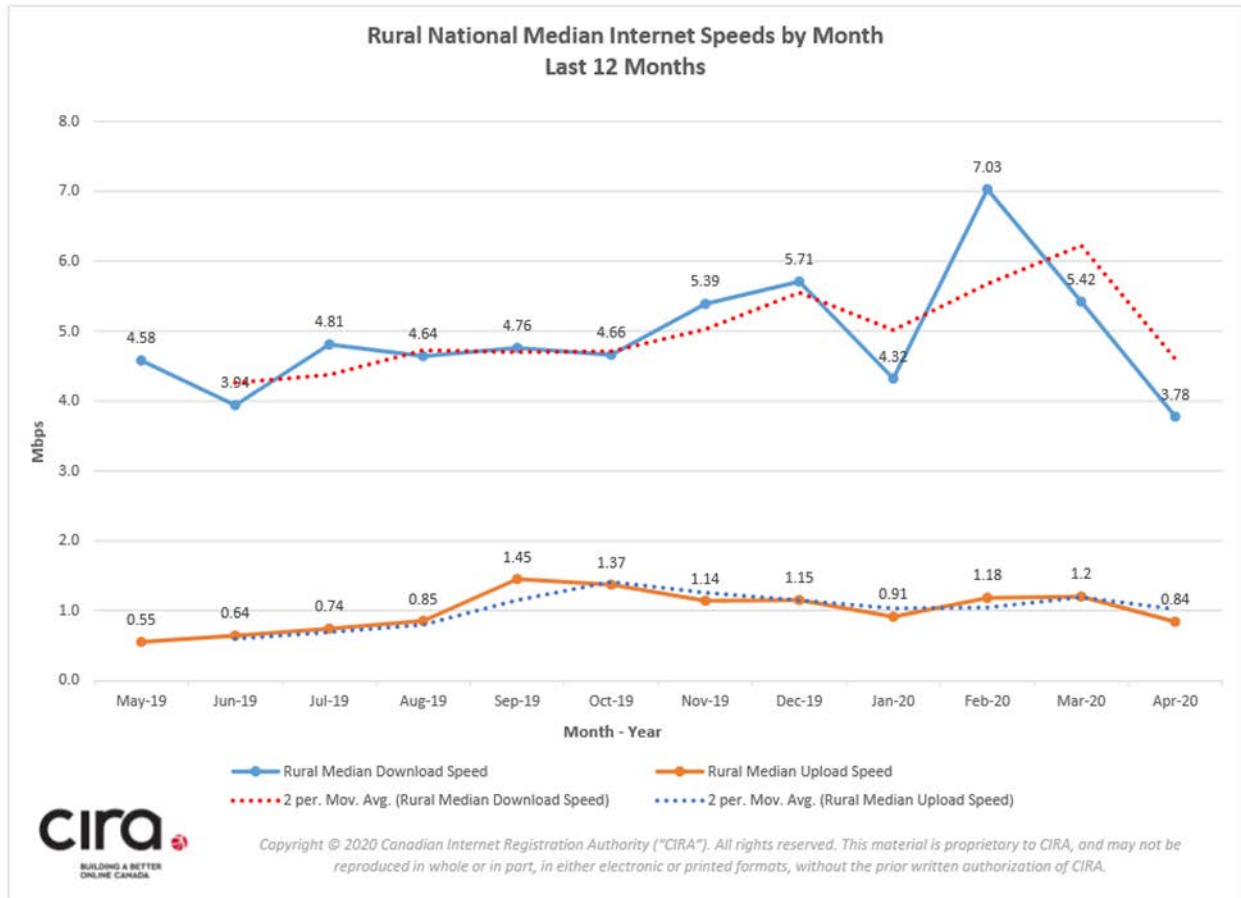


Figure 2: Rural National Median Upload and Download Speeds by Month

18. Figure 2 indicates that typical rural median download speeds vary between 4 Mbps and 7 Mbps. Download speeds have fallen over the past 2 months. Upload speeds in rural Canada hover around 1 Mbps.

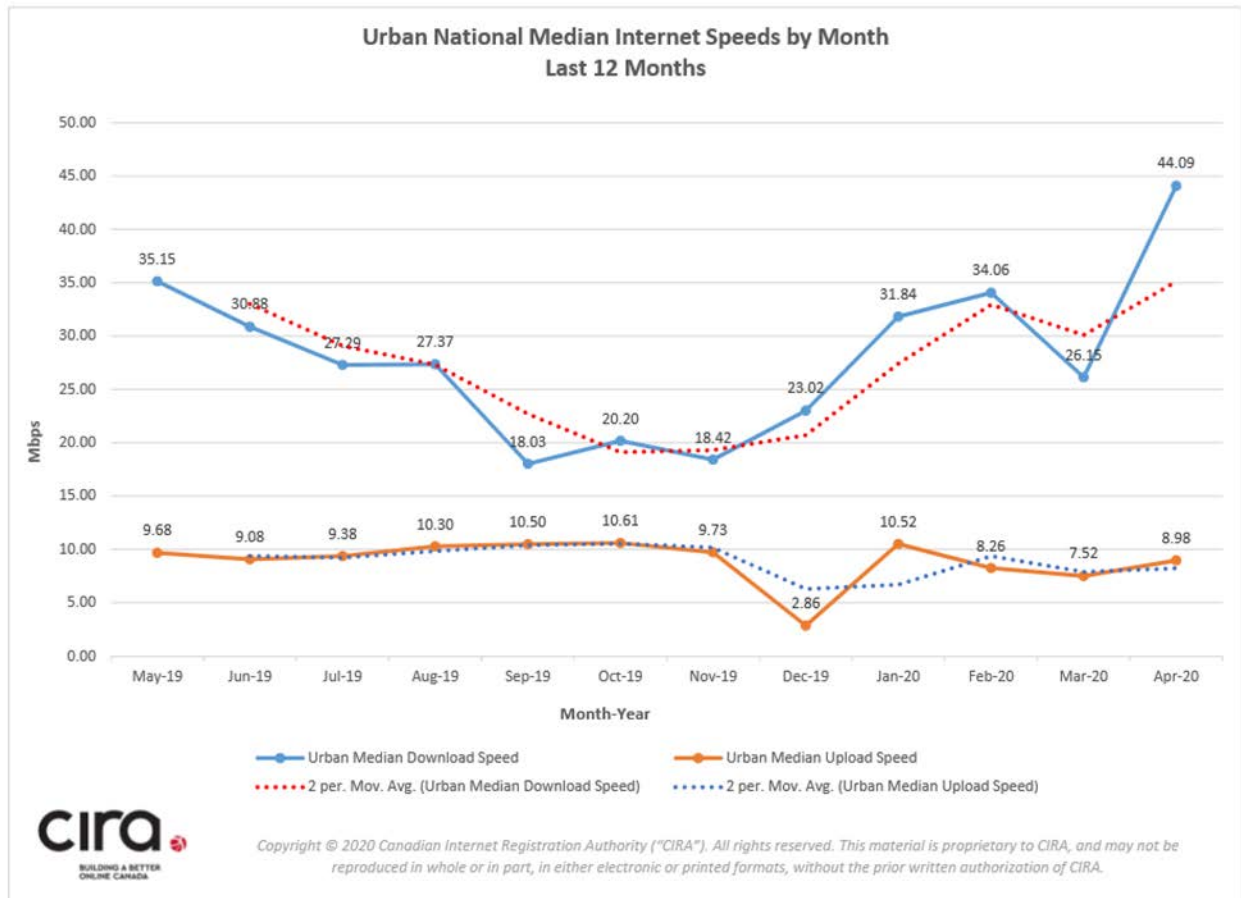


Figure 3: Urban National Median Internet Speeds by Month

19. Figure 3 documents trends in urban upload and download speeds. As you can see, urban upload speeds sit around 10 Mbps and downloads vary between 18 Mbps and 44 Mbps.

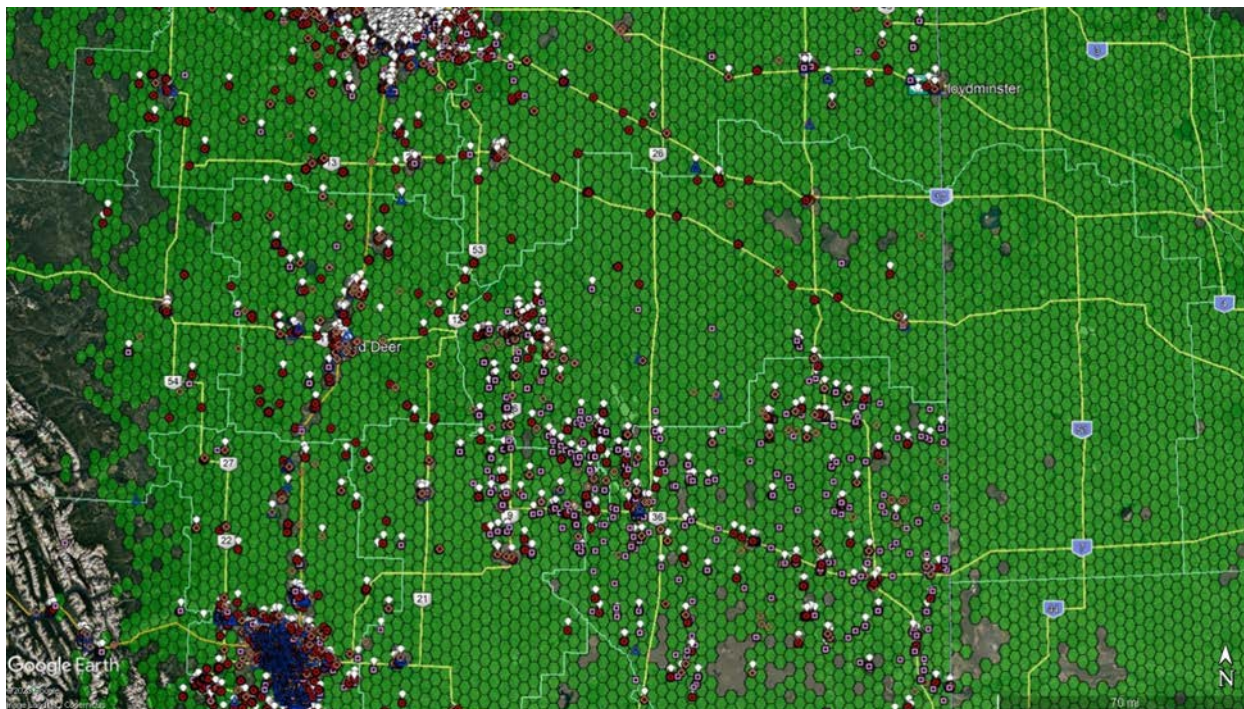


Figure 4: Central Alberta CIRA IPT Test Data Overlaid on CRTC Funding Eligibility Map

20. Figure 4 displays green hexes where CRTC funding is available overlaid with user-generated CIRA IPT test results. The different layers can be activated for interpretation of the data. For example, in the context of this proceeding, our IPT data can be used to help the Commission and other interveners better understand barriers to high capacity transport and last mile access in rural areas.
21. Researchers with the Regional & Rural Broadband project used IPT performance data to benchmark regional broadband performance relative to the CRTC's aspirational speed targets and identified potential barriers to fibre transport/middle mile facilities in a July 2018 policy brief.<sup>15</sup>

## CONCLUSION

22. CIRA's view is that a measurement methodology that reflects rural subscribers' real-world experiences is necessary to identify and prioritize rural broadband projects. The only meaningful way to assess whether Canada is making progress towards our Universal Service speed targets is

<sup>15</sup> Reza Rajabiun & Helen Hambly. "Benchmarking Internet Access Infrastructure Quality Gaps in Southwestern Ontario." July 2018. <http://www.r2b2project.ca/wp-content/uploads/2019/02/Policy-Brief-July-2018-Vol.1-Issue-1-1.pdf>



through regular measurements of network performance to ensure end users are receiving a service that meets the performance targets set by the CRTC.

23. To review, the absence of real world, neutral data on internet performance creates several barriers to the deployment of broadband networks in underserved areas:
24. First, reliance on self-reported data from service providers makes it difficult to determine where improved internet is and is not needed.
25. Second, rural internet users will be unable to assess if their service providers are meeting the Commission's basic service objective quality of service targets with the same level of objectivity, accuracy, or reliability as they would when reviewing third-party performance audits like those enabled through CIRA's IPT.
26. Third, it is difficult to track progress towards the Commission's basic service objective targets, particularly for rural and remote communities who, as our data demonstrates, are receiving much slower speeds than those in urban communities.
27. We hope that our submission of real-world internet performance data on the record of this proceeding will assist the Commission and other parties in their understanding of the connectivity challenges facing underserved communities, and the importance of open-source measurement in ensuring the long-term success of our Basic Service Objectives
28. At CIRA, our vision is of a connected future where the internet empowers individuals and organizations to achieve their economic, social and cultural potential. Our hope is that that our IPT can help ensure that one day soon rural Canadians enjoy the same quality of connectivity and speeds as their urban counterparts.
29. CIRA's web based Internet Performance Test meets, and in fact exceeds all the performance testing requirements defined thus far by the CRTC, and does so without the need for deploying new hardware at each test location. Furthermore, the platform can help prove conclusively a) whether a geographic area has access to the service levels defined in the Universal Service Objective and b) whether projects are meeting quality of service targets – acting as an ongoing test bed.
30. We thank you for the opportunity to provide comments on the barriers to broadband deployment for communities in underserved regions of Canada.

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