

Telecom Notice of Consultation CRTC 2020-367

“Call for comments - Review of the Commission’s regulatory framework for Northwestel Inc. and the state of telecommunications services in Canada’s North”

Submission from the DigitalNWT Team:

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Executive Summary

- E1. These comments are submitted by the DigitalNWT project, which is a partnership between Northern Indigenous groups, non-profit organizations, and university-based researchers that aims to strengthen digital literacy in the Northwest Territories (NWT). To inform course development and delivery, particularly during COVID-19, the project’s work involves conducting research activities regarding Internet access, affordability, and reliability.¹
- E2. In the course of these activities (2019-2021), we have collected information that is relevant to issues being considered in these consultations, and so present highlights from our findings here. We note that many Internet users in the NWT – particularly in smaller rural communities – face challenges and frustrations in contributing information to these proceedings.
- E3. We note the limitations of our data, including relatively small sample sizes. However, given the limited data available from many of the smaller NWT communities, we believe this information will be of use to the Commission. We also note the benefits of conducting participatory research with communities and local researchers, which can produce detailed data. Finally, we note that our findings complement and in many cases support those expressed in the Environics Research report (*“Research on Telecommunications Services in Northern Canada”*). We present our information with reference to relevant themes and in response to several questions raised by the Commission in the Notice of Consultation (CRTC 2020-367).
- E4. While much of this submission focuses on the limitations faced by residents of the NWT, we also highlight NWT-based digital innovators to point out the ways that Northerners are engaging with digital connectivity when it is available, accessible, affordable, and reliable.

Methodology – Overview of Research Activities

- E5. We give a brief description of our main data collection activities, which consist of: CIRA Internet Performance Test results (2019-2021); two rounds of community surveys (2019 and 2020/1); interviews with digital innovators based in the NWT (2020); and an online survey with Community Adult Educators (2020/1). Further details about these activities are available in Appendix 1.

Research Findings

1. Access / Availability

- E6. Our research confirmed ongoing challenges regarding the availability of home Internet. Many participants stated they do not pay for home Internet or do not have Internet in their homes. Access / availability appear to reflect the locations of individuals and households, indicating the presence of local-level access divides.
- E7. Many community members access the Internet via mobile phones – by mobile devices or by “tethering” them to a laptop/desktop computer. This is explained as a solution to slow/unreliable household Internet or to counter high household Internet costs. This solution negatively impacts the ability of NWT residents to access public services such as education, and can result in high mobile data fees.

2. Affordability

¹ The DigitalNWT research team that produced these comments is: Dr. Rob McMahon, Dr. Murat Akcayir, Kyle Napier, and Brooke Hehr. To prepare this material this team worked with Indigenous organizations, local researchers and digital innovators in communities across the NWT, whose contributions are essential to this work. Everyone involved who wishes to will be thanked and acknowledged by name in future work and any publications associated with this data. We also thank the many NWT residents who contributed information to this research.

- E8. Affordability of Internet and data services (data caps) is a major challenge raised by NWT residents. It is important to note the low incomes and high cost of living in the NWT, particularly in smaller, more rural communities.
- E9. Most research participants experienced challenges related to affordability and data caps. When asked to estimate monthly costs and data overage fees, it is not uncommon to hear stories of bills reaching into the hundreds of dollars – with some people paying more than \$500 for data overage fees. This situation is more pronounced in satellite-served communities that tend to have the slowest services and lowest data caps.
- E10. Participants reported experiencing bill shock, and some people do not appear to understand how data caps and overage fees work. People who are aware of data caps are adjusting their behaviour to avoid overage fees, such as by monitoring their usage, avoiding certain applications (e.g. cloud services or streaming video), subscribing to more than one household Internet account, or tethering to a mobile device.

3. Competition

- E11. Participants indicated that they recognize the limited competition for telecommunications services in NWT communities, and several directly stated their desire for more competition.

4. Reliability

- E12. Our research illustrates widespread concerns related to the reliability of Internet services, including participant experiences of network outages and impacts on economic and safety activities. This includes statements about how service reliability impacts the ability of NWT residents to adopt and utilize contemporary cloud-based software and applications.
- E13. Participants indicated that Internet services are inconsistent, with signal drops taking place often. Of the self-reported data regarding availability collected through the CIRA surveys, only 9 of 291 respondents stated their satisfaction with services as “high”. More than half of respondents (186 of 291) stated their satisfaction was either “low” or “medium-low”. Comments from CIRA surveys reflect these concerns, as do our community surveys and interviews.
- E14. Quality of Service issues seem to be more present in smaller rural communities, including satellite-served communities such as Paulatuk. Many households and individuals also reported challenges with the reliability of online applications, such as videoconferencing (Zoom/Skype). Participants noted constant short outages, dropped connections, and long waits for technical repairs.
- E15. Participants also noted service interruptions due to cuts in infrastructure, which shuts down everything and negatively impacts daily life in the communities.

5. Unique Circumstances in the North

- E16. We stress the unique circumstances of Northern households and businesses – and how these contexts must be considered in the development and provision of telecommunications services. These include the high rate of population growth in the North and the high number of people living in households (and therefore sharing a household Internet connection).

- E17. An Internet connection is viewed as important given the geographic remoteness of communities. NWT residents are increasingly interested in connecting to online public services, economic development opportunities, and social, cultural and language resources. This is encouraged by the Government of the NWT, which recently presented plans to provide online access to various government programs and services.
- E18. The limitations and costs of connectivity services affects the ability of Northerners to access essential services in areas including education, health care, business activities, and personal and household activities.
- E19. COVID-19 has both accelerated the adoption of online applications and Internet services, and reflects differential impacts on individuals, populations, regions, and communities. In the North, limited, expensive, unreliable telecommunications services are affecting the ability of citizens to access essential services during this challenging time.
- E20. Our research indicates that access to telecommunications services has become more important to the majority of participants since the start of COVID-19. At the same time, participants report that the challenges they experience (access, affordability, reliability, etc) have become worse. As a result they are modifying their online behaviours in an attempt to save money and conserve bandwidth – limiting their access to online applications.

6. Speed

- E21. We include discussions of Speed in this submission because it has an impact on Internet use, particularly for online applications. It is also a metric to compare the services that NWT users are receiving with the Commission's 2016 Basic Service Objective of 50 Mbps download / 10 Mbps upload.
- E22. CIRA's Internet Performance Test (IPT) provides an indication of how users experience home Internet speeds. We note that when encouraging NWT residents to run the IPT, we heard that many people have such slow Internet that they are unable to do so. This may explain the low number of tests in some of the smaller rural communities (including satellite-served communities). We stress this point to highlight the challenges in even collecting IPT test data from users in some rural NWT communities.
- E23. We present IPT test data from Jan 1, 2019 to Jan. 13, 2021 (total of 1,438 tests).
- E24. Aggregate data comparing urban vs rural communities illustrates clear divides with respect to Median, Average, Maximum, and Minimum Speeds. Distinctions among median speeds are more evident when we examine average speeds. Faster maximum speeds are available in urban communities – though differences are less prominent when minimum speeds are considered.
- E25. Aggregate data comparing connection type (satellite, DSL, and fiber/coax) also reflects speed divides. Satellite connections reflect the slowest median and average speeds, though we noticed interesting variations with respect to maximum speeds (which are fast for all connection types).
- E26. When we examine IPT speeds experienced by consumers in specific NWT communities, we found that in most rural communities, broadband speeds of 5 Mbps down / 1 Mbps up are still not available. This is particularly apparent in satellite served communities. However, we also note that DSL communities are experience slow median speeds. Interestingly, challenges of low median speeds extend to urban centres in the NWT (particularly Yellowknife).

E27. When we compare median to average speeds, available data seem to indicate the presence of speed divides inside communities, which validates information provided through community survey comments and interviews. This distinction is most pronounced in Inuvik, but is also reflected in rural communities.

E28. Differences between maximum and minimum speeds are also observable among communities. Outside the two regional hubs of Yellowknife and Inuvik, maximum speeds decline significantly – in some cases reaching only 1.1 Mbps down / 0.4 Mbps up or 2.4 Mbps down / 0.9 Mbps up.

E29. All but three of the communities we examined experienced minimum download speeds of less than 1 Mbps. For 21 of 24 communities, minimum download speeds ranged from a high of 0.9 Mbps in Aklavik to 0.02 Mbps in Yellowknife. Five of the communities included in our dataset experienced minimum upload speeds of 0 Mbps; four more communities experienced minimum upload speeds of 0.03 Mbps or less. As noted earlier, given that we heard reports that many people could not even run the IPT because of slow Internet, we stress these findings to note the challenges in even collecting this test data from users in some rural NWT communities.

E30. Many participants in the CIRA surveys and in community surveys and interviews commented about slow speeds, which impact activities such as streaming video.

Overview of NWT Digital Innovator Videos

E31. We end by highlighting the work of NWT-based digital innovators, to illustrate how many NWT residents see connectivity as a means to support their desires, interests, and as conduits to their enthusiastic participation in the digital world. The intent is to illustrate the potential that comes with equitable access to Internet infrastructure and digital literacy.

E32. Currently, we have produced 14 videos of digital innovators from across the Northwest Territories that are available for viewing on YouTube:

https://www.youtube.com/playlist?list=PLNRIOr0W-ghzzf6OLabU1t5MH_IWPM-xB

E33. We refrain from providing specific recommendations at this time, but intend to do so in the course of these proceedings.

E34. We include two Appendices in this submission: 1) Methodology – Details of Research Activities; and 2) 2019-2021 CIRA Data Sets (Speeds by Community for 1,438 tests).

General Comments

1. The DigitalNWT project (www.DigitalNWT.ca) aims to strengthen the foundation of community-based digital literacy in the Northwest Territories (NWT). It is led by a Steering Committee composed of the Gwich'in Tribal Council (GTC), the Inuvialuit Regional Corporation (IRC), the Sahtú Renewable Resources Board (SRRB), and the Tłı̨chǫ Government. These organizations are partnering with the University of Alberta, the Smart Communities Society (NWT), Hands On Media Education, and Aurora College to ensure the successful delivery of the program. DigitalNWT is supported by funding from Innovation, Science and Economic Development Canada's Digital Literacy Exchange Program, and is hosted on MakeWay's Shared Platform.
2. As a partnership dedicated to digital literacy teaching and learning in NWT communities, DigitalNWT requires access for learners to adequate, affordable, reliable Internet services. The lack of adequate, affordable home Internet services in most rural NWT communities became particularly apparent during COVID-19, when our team had to shift from in-person workshop and course delivery to distance/online education. We quickly learned that many NWT community members face access, affordability, and reliability barriers -- a problem compounded when public access sites (learning centres, etc) closed due to social distancing.
3. For these reasons, and to support the preparation and delivery of digital literacy curriculum, the DigitalNWT project team is engaged in several research activities regarding Internet services in the NWT. These activities are supervised by researchers at the University of Alberta, and include collecting information that is relevant to the issues being considered in these consultations.
4. Below we present highlights from these findings that are relevant to the questions asked by the Commission in *Telecom Notice of Consultation CRTC 2020-367*. We do this to support the Commission's efforts to collect information to learn more about the telecommunications services available in NWT communities.
5. We note that Internet users in the NWT -- particularly in smaller rural communities -- face many challenges and frustrations in contributing information to these proceedings. When we held two online/phone-in workshops to introduce the proceedings, demonstrate to consumers how to collect data about their Internet services, and submit a summary form to the Commission, we heard about some of these difficulties. One participant from Łutsel K'e wrote the following in an email to us following the workshop (which we present here with their permission):

"Reporting from Łutsel K'e, NT. The other form about the download n upload speed is frustrating because it's so slow. Upload speed was 0.9 mbps. I waited 2 days to get a download speed but no result! In Dec I paid 569.03 for internet and in Jan, I will pay 499.07. The usage fees in small isolated communities is how Northwestel make their money. It's not fair as we have to subsidize the bigger communities. They get optic fibre and way better service. Small isolated communities should have the option to work with other service providers. I'm looking at star link communications for remote internet service. Shaw would be a nice option too. Thanks for the workshop and hopefully you will give CRTC an earful for small isolated communities which rely on reliable internet

service for business, education, health, entertainment and communication needs. Once again mahsi-cho for your presentation.”

6. In this submission we contribute information from research activities about Internet services in the NWT that we have conducted over the last two years (2019-2021). We recognize the small data sets we are working with -- this is partly due to the challenges in collecting data from rural Northern communities, particularly given the context of COVID-19, which prevented in-person research and necessitated additional public health and safety protocols. We recognize the methodological challenges this raises, and so present our data and analysis as preliminary findings that should be validated by future research.
7. Despite our small sample sizes and tentative conclusions, we believe our material may be helpful in these proceedings. We note the benefits of conducting participatory research with communities and local researchers, which can result in illustrative and detailed data. We also note the relatively small population of rural NWT communities (particularly outside of centres like Yellowknife and Inuvik).
8. We present information collected in relation to six thematic areas: Access / Availability; Affordability; Competition; Reliability; Unique Circumstances in the North; and Speed. This information responds to several questions raised by the Commission in the Notice of Consultation: Q2 and Q14 (Affordability); Q9 (Competition); Q7 (Reliability); and Q15 (Unique Circumstances in the North).
9. Finally, we note that our findings complement and in many cases support those expressed in the Environics Research report (“Research on Telecommunications Services in Northern Canada”).
10. While much of this submission focuses on information regarding limitations faced by residents of the NWT, we also highlight NWT-based digital innovators, to point out that many Northern residents see digital connectivity as a means to support their desires and interests in areas such as culture, language revitalization, and participation in the digital economy. We present these stories to demonstrate some of the ways that Northerners are engaging with digital connectivity -- when it is available, accessible, affordable, and reliable.

Methodology: Overview of Research Activities

11. Starting in 2019, the DigitalNWT project team began research activities to better understand the adoption and use of digital technologies, as well as what digital literacy topics community members want to learn about. Recognising the limited data currently available regarding the adoption and use of telecommunications services and digital technologies, we focused our data collection on small-population rural communities in the NWT -- some of which are fly-in communities. We hope this information will be of use in these proceedings.

12. Our submission reflects data collected through the following methods:

- **CIRA Internet Performance Test Results (2019-2020)** -- These represent **1,438 tests** from **212 unique test locations**, and **38 survey responses** from people living in communities across the NWT.²
- **Community surveys -- Individuals (2019/20)** -- These represent a total of **260 individuals** living in four NWT communities, three of which are rural, satellite-served communities.
- **Community surveys -- Households (2020/21)** -- These represent a total of **192 households** representing **612 individuals** living in nine rural communities across the NWT.
- **Interviews with digital innovators (2020)** -- These represent **24 individuals** living and working in communities across the NWT.
- **Online Surveys with Community Adult Educators (2020/21)** -- These represent **9 individuals** living and working in communities across the NWT.

Altogether, these research activities represent data from an estimated total of **905 individuals** and **192 households** from communities across the NWT.

13. More details about these data collection activities are available in the attached Appendix.

Research Findings

14. In the sections below we organize information drawn from our research activities in relation to six thematic areas:

1. Access / Availability
2. Affordability
3. Competition
4. Reliability
5. Unique Circumstances in the North
6. Speed

1. Access / Availability

15. Our research confirmed that for many NWT residents, the availability of home Internet remains a challenge.³ For example, in the Phase 2 household surveys held in 2020/21, one-third or more of respondents in most communities reported that “Availability of Internet” is a barrier (35% or 61 of 175 households surveyed). Community Adult Educators also stated they faced challenges related to Internet services -- a sentiment reflected in a written comment: “*The digital divide is like the grand canyon here.*” When asked to describe their

² Data collected and analyzed from: Jan. 1, 2019 - Jan. 13, 2021.

³ We note that our research also found challenges of access to digital devices such as computers and mobile phones. However, here we focus specifically on Internet services (household and mobile).

students' home Internet access, most educators stated it is "very low" or "limited". One person wrote: *"Unless someone else is paying for it, it's unlikely students will have access to the internet from home."*

16. Many participants also stated they do not pay for home Internet or do not have Internet in their homes. For example, the 2019 surveys indicate that 60% of survey respondents in Ulukhaktok (55 of 92) and 40% of respondents in Tuktoyaktuk (28 of 65) do not have a home Internet connection. In our 2020/2021 household surveys, 50% (9 of 18) respondents in Fort Good Hope indicated they do not have home Internet; in Tulita, this was the case among 40% (17 of 42) of household respondents.
17. Access and availability barriers reflect the locations of individuals or households. For example, interview participants from Inuvik and Yellowknife found the Internet to be mostly available, while other participants from remote and smaller communities found it limited. However, in larger communities like Inuvik and Yellowknife, availability might vary depending on where someone's home is located. One interviewee from Inuvik commented, *"I seem to have a better connection than my sister, who owns a house on the other side of Inuvik."* These observations may indicate the presence of community-level (local) access divides.
18. When asked why they do not have home Internet, 2020/21 survey respondents, "Affordability" was the primary reason. This point is discussed in detail in section 2.
19. Research participants also reported that many community members access the Internet via mobile phones -- either via mobile devices or by "tethering" them to a laptop/desktop computer. This was explained as a solution to slow/unreliable residential Internet, or to counter high household Internet costs (for both monthly fees and data caps).
20. Several Community Adult Educators illustrated their students' reliance on mobile phones to access education services:

"Few students have home Internet and those that do share the connection with several people and are hesitant to use it for school. Students will often tell you they have home Internet, but mean their cellphone data and may not draw a distinction between the two."

"Students generally use cellphone data instead of home Internet as it is generally cheaper and easier to add extra data when going over. Several have previously had home Internet but have cancelled due to high data cap coverage or belief that their bills were going over because unauthorized people were using it."
21. We note that mobile phones are not an effective solution for everyone; one person in Sachs Harbour reported a December 2020 cell phone bill that was over \$800 (and stated they did not know why it cost that much). For these reasons, more research is required to clarify the extent of household vs mobile phone Internet usage (and associated impacts, challenges, and costs for consumers).

2. Affordability

22. This section contributes information to help answer two questions from the Commission:

Q2: “Provide your views on the current rates for residential and business local voice services, as well as for the rates for residential and business terrestrial retail Internet access services. Are the current rates appropriate, or should they be adjusted?”

Q14: “Provide your views on the affordability of telecommunications services for residents and businesses in Canada’s North.”

23. The information we present here focuses on the affordability of Internet and data caps, not voice services.

24. Affordability of Internet and data services is clearly a major challenge for many residents and businesses in Canada’s North, in both terrestrial and (particularly) satellite-served communities. When considering this issue, we note the generally low incomes and high cost of living in the NWT, particularly in smaller, more rural communities. As one participant from Yellowknife stated, “[Internet is] more expensive than any of our household bills; the highest expense for our family.” As demonstrated in Table 1, these sentiments are clearly reflected in open comments submitted to the CIRA Internet Performance Test surveys (2019-2021).

Table 1: 2019-2021: CIRA Surveys -- Open Comments

Community	Date	Comment
Fort Smith	June, 2019	“Northwestel is literally scamming the entire northwest territories with the ridiculous price quality of the service that they provide.”
Inuvik	Sept., 2019	“We pay more than \$3000 a month for this connection”
Fort Simpson	July, 2019	“Does not get advertised speed and no unlimited data package available to buy from Northwestel !!!”
Fort Simpson	Sept., 2019	“Unlimited data package not sold here. Overage rates are punitive!!!!”
Behchokq	March, 2020	“Internet costs way too much up north. It is capped at 150gigs and is slower than south!”
Yellowknife	July, 2020	“too expensive, not enough bandwidth”
Hay River	August, 2020	“It is very expensive!”
Fort Resolution	August, 2020	“Because I don't have a home phone line, I am charged an additional \$”
Yellowknife	Sept., 2020	“I increased the data on my cellphone plan to ensure I always have internet. I would like to lower costs but don t want to lower speed”
Inuvik	Sept., 2020	“It's \$2300 a month”
Yellowknife	Sept., 2020	“I pay \$250.00 per month for 750Gb. It's the highest tier Nwtel has and just to get a decent monthly bandwidth cap I have to pay crazy \$\$\$”
Gamèti	Sept., 2020	“Constantly going over 300Gb per month. The internet is constantly slow, so I end up using my phone data.”
Yellowknife	Oct., 2020	“I wouldn't mind the cost so much if I was getting the download speeds I am supposed to be paying for.”
Fort Simpson	Oct., 2020	“Speeds fluctuate and rate for exceeding cap is very costly . Upgrading Cap to 300GB monthly helped but upload speed limits usefulness for”

25. In 2019, most of our individual survey respondents pointed to affordability and data caps as key challenges. In all three rural communities surveyed, 60% of respondents (155 of 205) indicated that “Cost of Internet” is a challenge, while more than one-quarter (27% or 56 of 205) indicated that “Data Caps” are a barrier. More than one-third of respondents (38% or 51 of 133) in the three small, satellite-served communities estimated that in 2019 they paid \$161/month or more for their Internet services.
26. In 2020/2021, our household surveys took a more nuanced view of Internet affordability. For the majority of households surveyed -- over 75% in some communities -- “Cost of Internet” is a key challenge (68% or 119 of 175 respondents across all communities). In Tulita, several people stated that “costs are too high” when asked to provide details if they have anything to add about their Internet services. One person responded to an open comment, “*Wish [we] could afford internet at home [but it is] too expensive*”.
27. Many people -- and particularly those living in satellite-served communities -- also noted that they face challenges regarding “Data Caps”. For example, in the satellite-served community of Paulatuk, over half of household respondents (55% or 12 of 22) stated that Data Caps are a key challenge. In Fort Good Hope, where 65% of household respondents (11 of 17) felt that Data Caps are a challenge, one person stated: “*I run my data overage every month*”.
28. Many people reported paying exceedingly high data overage fees. In our 2020/2021 surveys, 11 of 87 households who responded to this question (13%) stated that they pay \$501 or more in data overage fees. In Fort Good Hope, 2 of 9 household respondents pay \$300 for exceeding data caps, while in Paulatuk, several pay \$500 or more. In Wekweètì, two household respondents stated that they pay \$1,000 or more in data overage fees; and 2 of 38 households surveyed in Tulita paid \$1,000 or more. One in three households that responded to this question (31% or 27 of 87) estimated they pay \$101-\$500/month in data overage fees.
29. Five of the Community Adult Educators pay \$100 - \$250 extra for exceeding their data caps – and several stated that they thought their students paid between \$75 to many hundreds of dollars. One noted that over the years, their students made many reports of bills in the hundreds of dollars. Another stated that: “*I heard as much as \$2,000 dollars over, because their young children were gaming and they did not understand how the internet and GB work*”. One respondent summed up affordability challenges faced by their students:
- “It is a shame that some of the most vulnerable people in society have to pay the highest prices in Canada for the lowest quality internet. This is what creates the digital divide and it will only become more difficult for the people in my communities to keep up with the rest of society as our world continues to become more technologically advanced.”
30. Quite a few people appear to not be aware of data overage fees. Six of our interview participants have experienced bill shock at least once. In Sachs Harbour, one person stated they had to pay \$1,200 for their first month of Internet because they did not know about data caps.
31. Expensive data caps have led people to think twice about how they use the Internet. Several people told us they keep an eye on their data usage constantly. A participant from

Yellowknife said, “I start to get very anxious when we're getting towards 85% [of our monthly data cap]”.

32. Two people interviewed had signed up for a second household Internet account to manage overage charges. They stated that it is cheaper to subscribe with another ISP rather than pay overage fees. A participant from Inuvik said, “I had to have multiple [Internet] connections because we've got data caps.”
33. As discussed above, we heard from many participants that people often rely on mobile phones for their Internet access, sometimes tethering mobile devices to provide hotspots for laptop/desktop computers. According to the surveys, levels of mobile phone ownership are higher than computer ownership. However, here we focused on household Internet services.

3. Competition

34. This section contributes to answering the following question from the Commission:

Q9: “Provide your views on the overall level of competition in the North. How might the Commission foster competition in the North?”

35. Research participants recognized the limited competition for telecommunications services in NWT communities. Several participants directly stated their desire for more competition in the NWT in their survey comments. Interview participants also pointed to the fact that there is no real alternative choice in Internet service providers. A participant from Yellowknife expressed the situation as follows, “I just don't have a choice... There is no other real or potential service provider.” Another participant said, “Certainly, in the smaller communities, they're often only serviced by one [provider]. So, there are monopolies around.” One person referred to the existing situation as reflective of an unaffordable and unsustainable business model. These sentiments are reflected in comments from CIRA surveys (2019-2021) and our 2019 community surveys, as demonstrated in Table 2.

Table 2: Combined Data from CIRA Surveys (2019-2021) and 2019 Community Surveys -- Open Comments

Community	Date	Comment
Paulatuk	Fall/Winter 2019	“We need more competition of services”
Paulatuk	Fall/Winter 2019	“Hoping too get other services besides northwestel.”
Tuktoyaktuk	Fall/Winter 2019	“Would be nice to have another provider instead of just Northwestel”
Yellowknife	August 2019 (CIRA)	“I'd prefer a bigger faster package, of course, but the lone option for that is the local 800lb gorilla. I avoid doing business with them.” (SSi Micro is indicated in the CIRA test data as their service provider)
Norman Wells	March 2020 (CIRA)	“Northwestel has monopoly, bends users of the Sahtú region over a barrel.”
Ingraham Trail	Jan 2021 (CIRA)	“The Ingraham Trail is home to over 130 families with poor expensive internet from bell, we need help to get another source.”

4. Reliability

37. This section contributes to answering one question from the Commission:

Q7: “Provide your views on the frequency and duration of network outages in the North, and discuss any economic or safety concerns.”

36. Our research illustrates widespread concerns related to the reliability of Internet services, including participant experiences of network outages and impacts on economic and safety activities. As one interview participant stated: *“In the case of an emergency, that technology could help save a life out here because we have no services out here at all. We have no fire [service], we have no ambulance, nothing.”* Respondents also pointed out that service reliability impacts their ability to adopt and utilize contemporary cloud-based software and applications, which assume users have fast, reliable broadband and limited/no data caps. In NWT contexts, online applications required for economic activities are less reliable.

37. Participants also indicated that Internet services are inconsistent, with signal drops taking place often. For example, self-reported data regarding reliability was collected from the CIRA Internet Performance Tests in the form of a user satisfaction rating assigned on a numerical scale from 1-5 (with 5 as most satisfied and 1 as least satisfied).⁴ We note that more than half of respondents (186 of 291; 64%) rated their satisfaction as “1” or “2” out of 5. Only nine (9) people -- 3% of the total number of respondents -- rated their service as a “5” out of 5. Of these nine people, six are located in the regional hub (urban) community of Inuvik. A summary of this data is presented in Table 3 below; more detailed information sorted by community is available upon request.

Table 3: 2019-2021 -- Data from CIRA Internet Performance Test surveys

	User Satisfaction (Rating of 1-5)				
	1	2	3	4	5
TOTAL (N=291)	96 (33%)	90 (31%)	69 (24%)	27 (9%)	9 (3%)

38. Written comments from the CIRA surveys also reflect reliability concerns. Table 4 presents these comments.

Table 4: 2019-2021: CIRA Surveys -- Open Comments

Community	Date	Comment
Lutsel K'e	May, 2020	“The service has degraded since last year when they installed two new towers in our area from 5 mbps to 2-3 mbps.”
Inuvik	Sept., 2020	“Constant outages, 2-3 x more expensive than similar packages down south.”
Yellowknife	Sept., 2020	“Overpriced and poor connectivity.”
Yellowknife	Sept., 2020	“Speed reduction at peak hours. Lately get service failure 2 3 times a day for 3-6 minutes each time”

⁴ CIRA’s survey question asks respondents to indicate their satisfaction as: high; medium-high; medium; medium-low; low. These indicators are then assigned a number from 1-5, with 1 corresponding to ‘low’ and 5 corresponding to ‘high’.

39. Responses to our first phase of community surveys in 2019 similarly indicated that many individual respondents -- and particularly those living in smaller, satellite-served fly-in communities -- experienced challenges related to the “Quality of Internet” services. In Paulatuk and Ulukhaktok, more than half of respondents (58% or 28 of 48 and 56% or 43 of 77, respectively) indicated this was a key challenge. One respondent in Paulatuk noted that: *“For the prices we pay for our internet and cellular services, it should be a lot more reliable than what it is now.”*
40. Our second phase of surveys in 2020/21 -- those focused on households -- also resulted in a high number of respondents reporting they experience “Quality of Internet” challenges (56% or 98 of 175). These issues are more apparent in smaller rural communities. For example, in the satellite-served community of Paulatuk, 18 of 22 households (82%) stated that this was a key challenge. Similarly high reports were made by households in Sachs Harbour (73% or 16 of 22) and Tulita (63% or 26 of 42).
41. The reliability of online applications (e.g. Skye and Zoom) was an issue for more than half of the households that responded to this question in Wekweètì (63% or 5 of 8), and over one-third of respondents in Paulatuk (32% or 7 of 22) and Tulita (38% or 16 of 42). Six participants in Tulita drew specific attention to service reliability issues in their comments, with five households noting they are waiting for technical support (with one stating they had been waiting for two months). In a survey comment, one household in Fort Good Hope described in detail some of the reliability challenges they face:
- “The household internet does not work good sometimes, with the signal to the modem being dropped. This happens at peak internet use in town, rendering our service barely useable. Northwestel blames the phone lines for signal noise, but do nothing to fix the problem. Terrible company to deal with, yet there is no other option in town. This is the biggest challenge, especially when trying to work from home at the beginning of the pandemic.”*
42. Interview participants also describe inconsistent service, with signal drops happening “often”. They told us it is nearly impossible to conduct video Zoom calls, and people simply cannot do the same things online as users located elsewhere in Canada. One participant from Norman Wells said, *“even if we started with video, we usually just ended up moving to chat.”* Students cannot study and participate in online course meetings the same way children living in southern communities can.
43. Many interview participants also noted service interruptions due to cuts in infrastructure, which is widely reported in media. As was stated by one participant in Inuvik who had experienced Internet cuts of 6 to 36 hours, *“everything shuts down – banking systems, machines, everything. And it's a very stressful time in the community.”* According to the interview results, in the North, service cuts affect daily life in the communities.
44. Among Community Adult Educators, reliability of online applications was an issue for just under half (4 of 9) respondents. One person stated that: *“There are constant short outages which often prevent using certain applications because they require constant connection.”* Another wrote that: *“I am extremely disappointed in the quality of the internet I receive, data caps, punitive overage charges, constant dropped signals which trigger rebooting*

applications.” In their written comments, two Community Adult Educators pointed to reliability challenges that they have experienced:

“Sometimes the signal drops down to zero. For a 9 day period this fall [2020], there was no internet at all in my home”.

“The Internet can vary (particularly during bad weather) and make it difficult to access applications like Zoom or DropBox. It is difficult to acquire new devices and internet set up is expensive and can require a long wait when requested. Internet costs are higher in this community for less internet data and it can be unreliable. Software requires an internet connection to download and even when downloaded and usually working well offline, has periods when functions will not work on slow internet (templates, updates, etc.)”.

45. When asked about their students, Community Adult Educators perceived that they also face reliability challenges -- a very high number of respondents indicated “Quality of Internet” is a challenge for students (8 of 9 responses), while more than half (5 of 9) pointed to challenges to the “Reliability of Online Applications” for students.

5. Unique Circumstances in the North

46. This section addresses the Commission’s question:

Q15: “Are there unique circumstances or characteristics with respect to living or operating a business in the North that the Commission should take into consideration in its assessment of affordability?”

47. We stress the unique circumstances of Northern households and businesses -- and how these contexts must be considered in the development and provision of telecommunications services. In this section we present highlights from our research regarding these issues.
48. We begin by noting the rate of population growth in the North. The Indigenous population is the fastest growing in Canada, with the percentage of population growth more than four times that of the total Canadian population. One point often made about Northern contexts is the high number of people living in households. In part this is due to inadequate housing: many homes are crowded, with multiple generations sharing single dwelling. We asked about this in our research, with the goal of determining not only how many people living together, but also how many people share a household Internet connection. This has bearing on usage costs and speeds, including in the context of usage-based billing (data caps).
49. Our household surveys from 2020/21 indicate that household composition varies, but we note that it is not uncommon for 6, 7, 8 or even 9 people to live in a household -- and share a home Internet connection between them. For example, in Whatì, more than 20% (8 of 37 respondents) stated they live in a household with 6 or more people. As one survey respondent stated in Tulita: “*The packages offered are not big enough for the whole family to use*”. Households often have multiple family members competing for Internet or Internet-enabled

devices -- including routers -- which are difficult to purchase in most communities without flying to a major city or paying expensive mailing costs.

50. As well, many survey respondents pointed out the importance of an Internet connection given the geographic remoteness of their communities. For example, three people in Fort Good Hope, when asked why the Internet is important to their community, stated:

- “It’s very important to have access because we are in such a remote community.”
- “It good for keeping our community informed.”
- “It keeps us connected to everyone outside the community.”

51. We note that NWT residents are increasingly interested in connecting to online public services, economic development opportunities, and social, cultural, and language resources. This is also encouraged by the Government of the NWT, which recently discussed plans to provide online access to various programs and services -- including applications for health-card cards, birth, death and marriage certificates, and driver and motor vehicle services -- through the NWT eServices Portal.⁵ As one Community Adult Educator stated:

“We are a very isolated community and more and more services and education opportunities are moving online. When new opportunities are introduced, they are often planned by people in larger communities where the internet is much better, with the assumption that they will work everywhere. During the pandemic, this is especially clear.”

52. Our household surveys from 2020/21 indicate that in smaller, rural and fly-in communities -- Internet services provide connection to essential services, including economic activity, government services, health care and education. As well, people use Internet connections for social and cultural reasons, and to engage in political activities. A number of people in Tulita specifically brought up that they require the Internet to work from home and access education.

53. Our research suggests that the limitations and cost of connectivity services available to Northerners affects their ability to access these essential services. Interview participants illustrate this finding most clearly, noting that:

- Many avoid video calls due to limited and expensive bandwidth;
- Many adjust their online behaviour in order to try and manage for limitations in their Internet services;
- Several stated that they constantly keep an eye on their data usage to avoid high bills when engaging in online work activities or accessing online public services; and
- Some cannot use cloud services due to slow upload speeds and data caps.

54. Nearly half of our interview participants told us they use video conferencing tools (Zoom, Skype, etc.) only for chatting – but not for video conferencing – as a result of slow and unreliable Internet. A participant from Norman Wells explained, “*with Skype, I have just*

⁵ See: <https://nns1.com/yellowknifer/government-services-to-be-accessible-through-central-website-by-end-of-2020-gnwt/>

given up all hope because every single time I log on, I have pixelated images or the images freeze.”

55. The second-most common unique circumstance is changing online behaviors due to data caps or slow/unreliable service. Examples include pausing uploads before online meetings, waiting for the end of the month for downloads and updates, and leaving the computer open overnight to upload files.

COVID-19 Contexts

56. Across Canada, the COVID-19 pandemic has accelerated the adoption of online applications and Internet services, since face-to-face services are limited due to public health requirements. This situation has resulted in differentiated impacts on different individuals, populations, regions and communities, including in the North, where limited, expensive, unreliable telecommunications services are affecting the ability of NWT citizens to access essential services during this challenging time. This digital divide is particularly amplified in communities with increased risk factors associated with COVID-19, at which point there is an increased call for community members to stay at home. As Whiteduck et al (2020) write:

“COVID-19 highlights the true breadth and depth of Canada’s digital divide. Longstanding digital inequities are widening as data traffic puts increased strain on already burdened networks. High rates charged by commercial providers further exacerbate the burden on economically marginalized individuals and communities. Vulnerable groups are increasingly targeted by online scams and misinformation, highlighting the importance of culturally appropriate digital literacy”.⁶

57. In the surveys we conducted in 2020/21, most respondents reported that during the pandemic they used the Internet to connect with friends/family for social support, engage in economic activities, work remotely, and participate in politics. Many also accessed online education and health services.
58. The following section lists some of the ways in which inadequate telecommunications services are affecting Northerners. We note that many of these challenges preceded COVID-19, given recent shifts to online applications. Below, we present some of the challenges that people working in remote First Nations in northern regions of provinces reported that they are experiencing in their attempts to use digital connectivity:

Education

- It has been difficult for students to have lessons online at home during COVID.
- Providers can’t support teachers who are required to take online professional development courses.
- Teachers in some communities do not have access to enough bandwidth for them to participate remotely in meetings, etc.

⁶ See: <https://ottawacitizen.com/opinion/whiteduck-and-co-covid-19-shows-need-to-support-indigenous-and-non-profit-telcos-connecting-remote-communities>

- “Turbo sticks” used to share bandwidth over mobile networks for educational purposes are at best a temporary solution.

Health care

- Providers are experiencing demand for more bandwidth for telemedicine, especially during COVID when travel has been difficult or impossible.
- There is increased demand for high reliability for emergency communications and first responders.

Business activities

- Accounting is now often done online. Local governments without sufficient bandwidth must scan documents to send to offices in the south. Filings may be late; funding may be delayed.
- Required software may only be accessible in the cloud.
- Software downloads and upgrades for commonly-used software (e.g. Office 365) take hours or days.
- Forms to apply for grants, and make progress reports, etc. can only be filed online. Some must be completed online.
- Non-profits and northern small businesses (crafts, ecotourism, Indigenous tourism, etc.) rely on websites and online booking capabilities.
- Most communities have no banks. Payments and funds transfers are done online.

Personal and household

- People use smartphones to stay in touch with family and friends in other communities and family members studying or working in the South.
- Facebook is often the most popular application for sharing information. Other social media are also popular, especially with young people
- People order goods online that are not available in their community
- Some people have started online businesses.
- People must access government services online: permits and licenses; ID, taxes, etc.

59. In our 2020/21 household surveys, we asked participants if and how the pandemic has changed their life, and whether it has affected their use of the Internet (and if so, how). We learned that similar to elsewhere in Canada, since the start of the pandemic, NWT residents have lost their jobs, shifted to remote work arrangements, unable to attend school in person (and/or have to attend online), face difficulties in accessing health care, and are unable to travel outside of their home communities. In the satellite-served community of Paulatuk, almost half (45%; 9 of 20) of respondents indicated since the pandemic began, they have household members who are unable to attend school or who attend school online.

60. We also learned that access to telecommunications services has become more important to the majority of survey respondents since the start of COVID-19. Almost 60% of the households we surveyed in 2020/21 are using the Internet more now (57% or 96 of 168), while only six percent (6% or 10 of 168) are using it less. As someone in Tulita stated: *“During covid times we need the internet to connect with family, friends, professionals, work school etc.”* Another person from Tulita told us: *“It’s important because our day and age rely on it most for daily lives, such as work, homework, etc”*. The majority of respondents in every

community we surveyed aside from Whatì stated are using the Internet more often now than they did prior to the pandemic.

61. Results from our surveys with Community Adult Educators illustrate that the COVID-19 situation for them was similar to the household survey findings -- with the majority (8 of 9) of participants using the Internet more during the pandemic, and many people using it for online education, social support, work and economic activities. One person noticed that increased use of the Internet at this time may have put a strain on existing services:

“I am using the internet more. I have noticed in certain areas of the community that internet speed and reliability has greatly decreased since the pandemic. I am unsure if this is due to higher use in the community.”

62. Interview participants reported that many challenges they experience have multiplied during the pandemic. Several noted that they used up their data earlier in the month, which increased their bills. After the pandemic, one participant said, “*it becomes an affordability issue at that point.*” Some people responded to these limitations by tracking their daily Internet usage more frequently or changed their priorities. One respondent from Inuvik described how they try to manage household Internet activities due to data caps and bandwidth challenges: “*We should be able to administer how much we can give to each person in the house and say this is your usage for the month. Try to be responsible.*” We note that it is unlikely that similar behavioural changes are present among Internet users in southern or urban communities.

6. Speed

63. Although this final section does not address specific questions from the Commission, it is an important component of these proceedings. We include it here since speed has an impact on Internet use, particularly for online applications that are widely adopted, such as videoconferencing and cloud applications. We also present information about speed as a metric to compare the services that users are receiving with the Commission’s 2016 Basic Service Objective of 50 Mbps download; 10 Mbps upload.
64. CIRA’s Internet Performance Test (IPT) provides some indication of how users experience home Internet speeds. As test results vary across households within communities, some households have indicated through the #NWTDigitalDivide campaign that their quality of Internet is so low that they are unable to take the low-broadband version of the CIRA IPT to report their upload/download speeds. We also note the limited number of tests conducted in these communities - some of the smaller communities only have a handful of tests available.⁷ Given that we heard reports that many people could not even run the IPT because of slow Internet, we stress these findings to note the challenges in even collecting this test data from users in some rural NWT communities.

⁷ We note that we removed two outlier tests for the purposes of this analysis (1 from Fort Good Hope and 1 from Inuvik). We did this because these two tests are much faster than all others. In the interest of transparency, we provide individual Test IDs for these two tests.

65. Despite our small data sets, we think that this information is a useful indicator of existing speeds and services experienced by consumers located in NWT communities. We plan to build on these results in the months ahead as we continue to encourage Northern consumers to run the CIRA IPT. Finally, we note that we have restricted our data set to 1,438 CIRA tests run from Jan. 1, 2019 to Jan. 13, 2021. Although CIRA’s test has been available since 2018, we wanted to restrict our tests to a more recent time period, recognising that network deployment and improvement projects are ongoing in the NWT. It is possible to analyze these data according to alternate timelines.
66. We start with an overview of available speeds aggregated into rural vs urban communities, and by connection type (DSL / Fibre/Coax / Satellite). We have organized connection type according to the packages available through Northwestel; however, we note that Inuvik has a competitive provider (New North Networks) that offers services over coax/fibre connection. Below, we discuss highlights from the IPT data about aggregated connectivity speeds presented in Table 5. In our narrative analysis, numbers refer to Mbps and download / upload speeds.

Table 5: 2019-2021 -- Data from CIRA Internet Performance Test (Aggregated Speeds for 1,438 tests)

	Speed (Mbps)	Community Type		Connection Type		
		Rural	Urban	DSL	Fibre/Coax	Satellite
Download	Median	2.0	4.5	8.0	3.6	0.7
	Average	5.1	23.5	35.8	15.3	3.0
	Fastest (Max)	115.7	247.1	247.1	241.1	84.6
	Slowest (Min)	0.04	0.02	0.06	0.02	0.04
Upload	Median	0.6	3.7	1.0	3.3	0.4
	Average	1.0	5.5	5.5	4.7	0.7
	Fastest (Max)	27.7	89.2	89.2	30.6	9.9
	Slowest (Min)	0.0	0.03	0.0	0.03	0.01

Note: Urban communities include Fort Smith, Hay River, Inuvik, Norman Wells, Yellowknife. Outliers removed include tests #845974 (Fort Good Hope) and #996076 (Inuvik).

Community Type (Rural / Urban)

67. We divided communities into two main categories, urban and rural. For the purposes of our analysis, Urban communities are: Yellowknife, Inuvik, Fort Smith, Hay River, and Norman Wells. We organize our analysis with reference to four key metrics: Median Speeds; Average Speeds; Maximum Speeds; and Minimum Speeds.

68. The aggregate data suggest that Median Speeds vary by community type; as expected rural communities have slower median download (2 Mbps) and upload (0.6 Mbps) speeds when compared to urban communities, which are respectively 4.5 / 3.7.
69. We note that these distinctions are more evident when we examine Average Speeds, which reflect a gap of 5.1 / 1.0 in rural communities versus 23.5 / 5.5 in urban communities.
70. Finally, we point out that much faster Maximum speeds are available in urban communities compared to rural communities (Maximum download speeds of 247.1 in urban vs. 115.7 in rural; Maximum upload speeds of 89.2 in urban vs 27.7 in rural). The differences are less prominent when Minimum speeds are considered -- in both categories, extremely slow minimum speeds are evident.

Connection Type

71. When we examine aggregate data according to connection type, we can see that this affects speeds. Satellite connections clearly reflect the slowest Median speeds. Median download speeds are 0.7 for satellite, compared to 3.6 for fibre/coax and 8.0 for DSL. This is also reflected in upload speeds -- although while satellite remains the slowest connection type (0.4), median upload speeds are slower for DSL (1.0) than fibre/coax (3.3).
72. Average speeds further demonstrate slower speeds for satellite communities, which still do not receive the pre-2016 definition of broadband speeds of 5 / 1 (tests indicate average satellite speeds of 3.0 / 0.7, respectively). We further note that in all cases, average speeds are faster than median speeds, which is why we present both.
73. Finally, when we examine Maximum speeds, we can see some interesting variations among connection types. At times, maximum speeds are extremely fast for all connection types, and particularly for DSL and fibre/coax connections, both of which reached more than 240 Mbps maximum download speeds. For upload speeds, DSL connections achieved 89.2 Mbps, while fastest fibre/coax achieved 30.6 Mbps. All three connection types indicated very poor speeds when we examine the Minimum speeds.

Community Speeds

74. Next, we summarize speeds experienced by consumers located in specific NWT communities. We discuss highlights from IPT speeds by community below – to view a table illustrating this data, please see Appendix 2.
75. While Median Speeds vary by community, available test data illustrate that in most rural communities, broadband speeds of 5 / 1 are still not available. This is particularly apparent in satellite communities, which tend to reflect the slowest median speeds. However, we also note that DSL communities also experience extremely slow median speeds. For example, consider Fort Good Hope (1.7 / 0.7); Tsiigehtchic (1.0 / 0.1); and Fort McPherson (1.4 / 0.6).
76. We note that these challenges of low median speeds extend to urban centres in the NWT. We were quite surprised to notice the slow median speeds in Yellowknife. Despite the large size of Yellowknife, its role as the administrative and commercial centre of the NWT, and the

relatively large number of IPT tests run there (876 in our data set), the median test speed was: 3.3 / 3.0.

77. When we compare Median Speeds to Average Speeds, available data seem to indicate the presence of speed divides inside communities. This validates information provided to us through our community survey comments and interviews. For example, in Yellowknife, Average Speeds (13.2 / 4.5) are notably faster than Median Speeds (3.3 / 3.0). This distinction is even more pronounced in Inuvik (Average Speeds of 62.4 / 9.3; Median Speeds of 31.2 / 7.9).
78. These distinctions between Median and Average Speeds are also present in rural communities. For example, Behchokq ranges from Average Speeds of 14.6 / 1.4 to Median Speeds of 2.9 / 0.8. Another example is Łutsel K'e, which ranges from Average Speeds of 12.7 / 1.8 to Median Speeds of 1.1 / 0.9. These findings suggest the need to consider both Average and Median speeds when measuring Internet performance.
79. Finally, when considering Maximum vs Minimum speeds, we can see quite wide differences among communities. Inuvik, which appears to have the fastest download and upload speeds available in the NWT, reaches up to 247.1 Mbps download -- exceeding Yellowknife's maximum speeds by a few Mbps (241.1). Inuvik also has the fastest upload speeds: 89.2 Mbps compared to 30.6 Mbps in its closest comparator, Yellowknife. We note that outside of these two regional hubs, maximum speeds declined significantly. For example, consider maximum speeds in Paulatuk (1.1 / 0.4) and Coville Lake (2.4 / 0.9).
80. We note that when examined according to connection type, outside of Inuvik, the fastest maximum download speeds are available in the four fibre/coax communities (Fort Smith, Norman Wells, Hay River, and Yellowknife). (As noted above, Inuvik has a competitive provider, New North Networks, that offers services over coax/fibre connection). Interestingly, satellite and DSL communities reflect differences between Maximum download and Maximum upload speeds. For example, Sachs Harbour and Łutsel K'e both experienced faster Maximum download and upload speeds than several DSL communities. The maximum download speeds available in the DSL communities of Fort McPherson and Fort Liard are slower than those in several satellite-served communities. With regards to upload speeds, we note that the maximum upload speeds in three of the DSL communities (Aklavik, Fort Liard, and Fort Simpson) also out-perform some fibre/coax communities.
81. All but three of the communities we examined experienced minimum download speeds of less than 1 Mbps. Interestingly, the slowest speed in Fort Providence was 14.3 Mbps. For the majority of communities considered (21 of 24), minimum download speeds ranged from a high of 0.9 Mbps in Aklavik to 0.02 Mbps in Yellowknife. With respect to upload speeds, the fastest minimum speeds are available in Norman Wells (2.1 Mbps).
82. Finally, we note that five of the communities included in our data set (Tsiigehtchic, Fort McPherson, Tuktoyaktuk, Fort Simpson, and Behchokq) experienced minimum upload speeds of 0 Mbps. Four more communities (Paulatuk, Łutsel K'e, Yellowknife, and Fort Smith) experienced minimum upload speeds of 0.03 Mbps or less. As noted earlier, given that we heard reports that many people could not even run the IPT because of slow Internet,

we stress these findings to note the challenges in even collecting this test data from users in some rural NWT communities.

83. Turning to survey data, we note that many participants in the CIRA surveys made comments about speed. We present this information in Table 6.

Table 6: 2019-2021: CIRA Surveys -- Open Comments

Community	Date	Comment
Whatì	March, 2020	“What I have is adequate for my use. I can stream netflix and conduct video conferences with family members.”
Paulatuk	Sept., 2020	“Our data here is on 3G and is very slow.”
Behchokò	Sept., 2020	“Nwtel internet very slow service due Netflix and gaming issue around town of behchoko and whole nwt of the north.”
Behchokò	Oct., 2020	“nwtel internet painfully slow the internet speed reduced to dial up mode.”
Yellowknife	Oct., 2020	“My package is supposed to give me 50MBPS dnload speed. Test midday today.... 17.7. Lets see how the next 28 days go.”
Colville Lake	Jan., 2021	“it is never fast internet is always slow best that it gets is 2-300 kbs on download.”
Inuvik	Jan., 2021	“Needs to be faster and cuts in and out”
Inuvik	Jan., 2021	“the internet could be faster and cheaper for the amount we pay.”

84. In the community surveys we held in 2019, high numbers of individual respondents stated that the “Speed of Internet” is a key challenge they face (72% or 133 of 184 respondents in rural communities). In response to an open question in the 2019 surveys, two people from Paulatuk commented on their slow Internet, stating: “*Would be nice to have better (faster) internet/cell services*” and “*It would be nice if our community had better access too internet services (faster, more reliable, cheaper)*”.

85. Concerns about slow Internet speeds were also raised by many households surveyed in 2020/21 (68% or 119 of 175). In Paulatuk, every household that answered this question (100% or 22 of 22) stated that “Speed of Internet” is a technical challenge they face. Household respondents from other communities reported similarly high concerns over the speed of Internet. In Tulita, many pointed out slow speeds with statements like: “*The internet around here is pretty slow and I have to reset it...cause it [is] slow*” and “*Need faster internet in the Sahtù*”.

86. Interview data further confirmed that many people suffer from “very slow” speeds. Slow connections are one of the main problems they noted in the NWT. People are not able to use/stream Netflix or even YouTube videos. Therefore, several respondents from Sachs Harbour, Paulatuk and Inuvik said they do not watch videos on the Internet.

87. While the CRTC considers basic Internet access to mean speeds of 50 Mbps download, and 10 megabytes per second upload, Northerners’ speeds are far lower. For instance, one

participant from Inuvik stated that their average download speed is around 11 Mbps, even if it is supposed to be 50 Mbps. As the same participant stated, lower speed means lower access and lower opportunity -- an issue noted by another interview participant living in a satellite-served community: “*it can take someone in Paulatuk three hours to upload a 20 Mb file sometimes.*” We note that most of the available Internet plans offered by ISPs are under 50 Mbps. More expensive plans mostly offer more data, but not faster speeds.

Overview of NWT Digital Innovator Videos

88. While much of this submission focuses on limitations and challenges faced by residents of the NWT, we end by highlighting the work of some of the many digital innovators living in the North. We do this to point out that many NWT residents see connectivity as a means to support their desires, interests, and as conduits to their enthusiastic participation in the digital world. This section presents a summary of some of the many ways that residents of the NWT are utilizing digital technologies -- the intent is to illustrate the potential that comes with equitable access to Internet infrastructure and digital literacy.

89. Currently, we have produced 14 videos of digital innovators from across the Northwest Territories. These videos have been created with, by and for people who share their distinct and varying experiences with the Internet, digital divides, and digital literacy. These stories have been created and subsequently approved by each featured digital innovator for public release. Visit the link below to view these videos:

https://www.youtube.com/playlist?list=PLNRIOr0W-ghzzf6OLabU1t5MH_IWPM-xB

90. The videos referenced in this submission demonstrate how Northerners, who predominantly come from Dene or Inuk backgrounds, have used the Internet and digital technologies to share stories of their work, frustrations, and passions. These stories are presented here to highlight the themes related to digital divides and digital literacy that are presented by these innovators, which include but are not limited to:

- The lack of reasonable and equitable access to the Internet;
- The lack of reasonable and equitable access to digital literacy within communities;
- The benefits of local, Indigenous-owned Internet infrastructure and community networks;
- The potential to share, market or produce creative works, such as podcasts, movies, art, videos, and live performances;
- The ability to record, document, archive, store, preserve, share, and revitalize elements of culture, heritage and language through digital tools and technologies;
- The ability to connect with one’s culture when one is either isolated within community or wanting to stay connected to their relatives and relations from a distance;
- The ability to participate in developing or sharing Indigenous language learning resources, through which in-person immersion programs with a variety of speakers is inaccessible;
- The ability to share or participate in global conversations, policy decision-making, or community engagement through social media, email or other digital communications;
- The ability for one’s government, whether municipal or Indigenous, to share resources through affordable and open digital spaces — including, but not limited to, social media, websites, digital storage spaces, and communications requiring file transfers of any size;

- Access to tele-education, previous to and concurrent to COVID-19 travel restrictions, in which education opportunities are inaccessible to a majority of communities in the Northwest Territories; and
- The ability to network, participate, or contribute to discussions, conferences, talks, workshops, or other digital spaces and fora.

91. Digital innovators featured in the videos include Juno-award winning musicians who have had to adapt to performing live concerts from home; award-winning movie-makers, videographers and content creators; award-winning graduate students specializing in fields ranging between community engagement and digital world creation through virtual and augmented reality; independent digital infrastructure developers; and those who have otherwise had to adapt into an increasingly digitally-connected world despite the imbalanced odds which are increasingly apparent with consideration to limited access, affordability, reliability, with increased costs and frequency with surprise bills.



Recommendations

92. We will refrain from providing specific recommendations at this time, but intend to do so in the course of these hearings after we have had the opportunity to review submissions filed by other parties.
93. We thank the Commission for the opportunity to contribute to these proceedings.

Appendix 1: Methodology – Details of Research Activities

Starting in 2019, the DigitalNWT project team began research activities in communities across the territories to better understand the adoption and use of digital technologies, as well as what digital literacy topics community members want to learn about. This research has involved collecting information pertinent to these proceedings. Specifically, we discuss issues of Internet access, affordability, reliability, and user experiences of Internet speeds, as well as the unique circumstances in the North.

We focused our data collection on small-population rural communities in the NWT -- some of which are fly-in communities. Recognising the limited data currently available regarding the adoption and use of telecommunications services and digital technologies in many of these communities, we hope this information will be of use to the Commission in these proceedings.

Starting in 2019, the DigitalNWT project team collected data through the following methods:

- **CIRA Internet Performance Test Results (2019-2020)** -- These represent **1,438 tests** from **212 unique test locations**, and **38 survey responses** from people living in communities across the NWT.⁸
- **Community surveys -- Individuals (2019/20)** -- These represent a total of **260 individuals** living in four NWT communities, three of which are rural, satellite-served communities.
- **Community surveys -- Households (2020/21)** -- These represent a total of **192 households** representing **612 individuals** living in nine rural communities across the NWT.
- **Interviews with digital innovators (2020)** -- These represent **24 individuals** living and working in communities across the NWT.
- **Online Surveys with Community Adult Educators (2020/21)** -- These represent **9 individuals** living and working in communities across the NWT.

These research activities represent data from an estimated total of **905 individuals** and **192 households** from communities across the NWT.

These data collection activities are described below, and results of these activities are presented in the section titled “Research Findings”.

1. #NWTDigitalDivide campaign and data from CIRA Speed Test

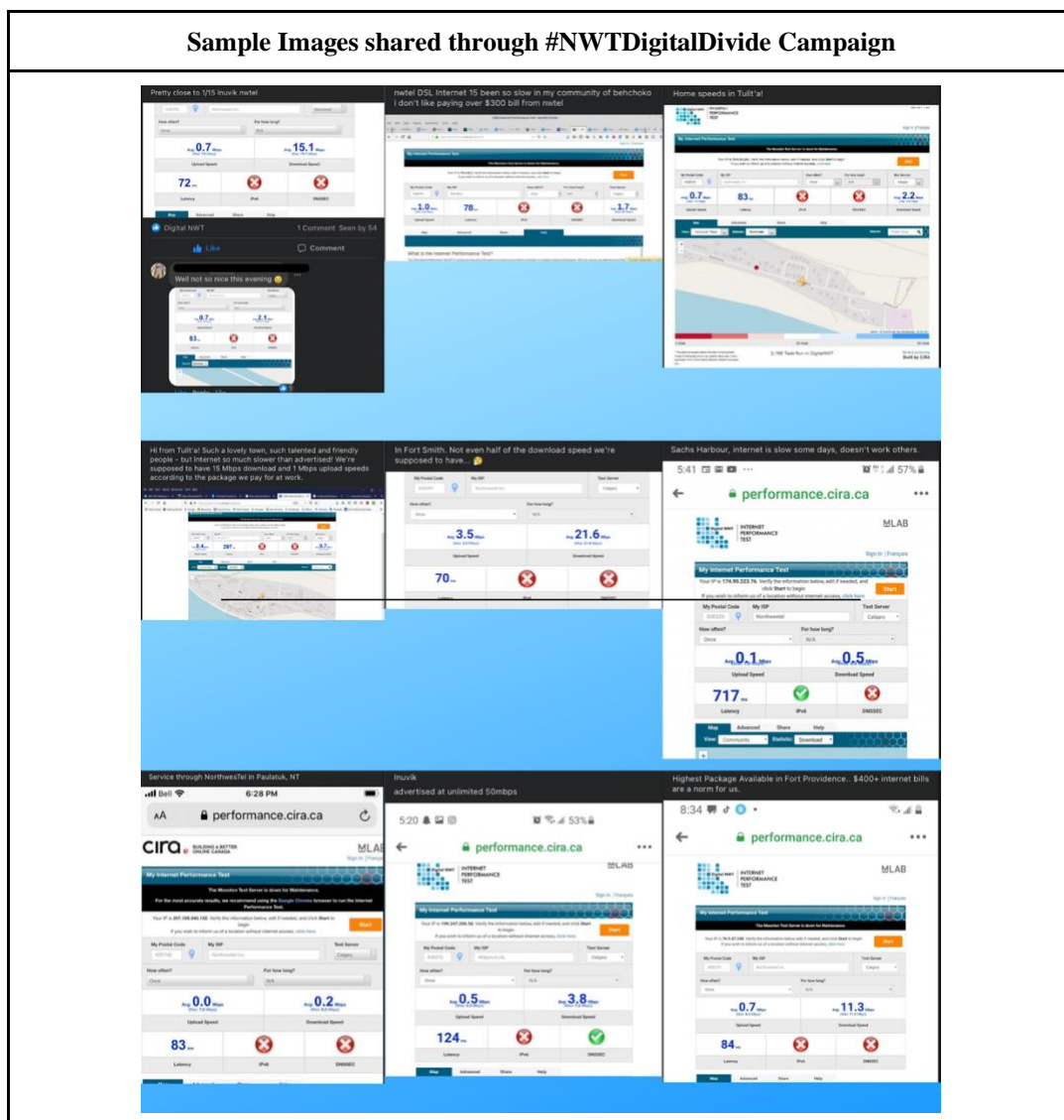
In Fall 2020, DigitalNWT partnered with the Canadian Internet Registration Authority (CIRA) to develop a custom lander page for the CIRA Internet Performance Test (<https://performance.cira.ca/DigitalNWT/>). This lander page allows us to view results through customized maps. At present, results from this test are publicly viewable by community and by settlement area using GIS shapefiles, as well as through data provided through individual tests. The test also asks users to provide details about their postal code, Internet Service Provider (ISP), and monthly plan (e.g. cost & data caps).

⁸ Data collected and analyzed from: Jan. 1, 2019 - Jan. 13, 2021.

To encourage Northern residents to conduct Internet Performance Tests, DigitalNWT launched a public awareness campaign on September 10, 2020 (#NWTDigitalDivide). This campaign encouraged users to take the CIRA Test and share their results over social media, and had the opportunity to participate in a series of prize draws for doing so (iPad and gift cards). We noted that the information collected through this campaign and the CIRA Test will help researchers and policy makers understand the speed and cost of Internet services in the NWT. Users are informed that information collected through the campaign is used for the following objectives:

- Raise public awareness of limited northern Internet speeds and urban/rural digital divides.
- Add data to CIRA's map, which currently has little data about northern speeds.
- Contribute to publicly accessible information highlighting the availability and cost of Internet access in the NWT communities to policymakers and researchers who are studying and working to address digital divides.

The image below illustrates some of these test results shared on social media through the #NWTDigitalDivide campaign.



After hearing numerous reports from participants that their Internet services are too slow to even conduct the regular CIRA Test, we also began sharing the link for the ‘low bandwidth’ version of the Test, which is available here: <https://performance.cira.ca/mini>.

Internet performance monitoring, understanding issues such as monthly costs and data caps, and learning how to report issues to the Commission are all important components of digital literacy. DigitalNWT also provided two online workshops (and associated resources) to support NWT residents in preparing and providing information directly to the Commission through these consultations (CRTC 2020-367). These workshops provided an introduction to these proceedings, showed participants how to collect information about their home Internet services, and demonstrated how they can submit their information directly to the CRTC by email, fax and mail.

In this report we present data collected through the CIRA tests and associated surveys. We present findings from test data analyzed from **Jan. 1, 2019 - Jan. 13, 2021**. This consists of a total of **1,438 tests** conducted by users in **212 unique test locations**. We also present data from the surveys available to users when they take the test.

2. Community Surveys

DigitalNWT has been involved in conducting community-level surveys since Winter 2019. In order to enable the most inclusive participation of Northern community members -- some of whom may lack access to computers, Internet, or telephone services, we decided to work with local researchers to conduct in-person surveys where possible. Due to travel restrictions due to COVID-19, the team worked remotely with local researchers and Indigenous organizations to collect community data to the best of our ability, using communication tools (phone, email and survey collection apps) to guide the process.⁹ We recognise the limitations of these data given the small sample sizes and remote data collection methodology. However, we present it here as it provides information otherwise unavailable to the Commission, particularly from smaller, more remote communities.

COVID-19 presented challenges in recruiting local surveyors and conducting surveys; however, we secured approvals for these surveys from NWT public health. To protect the privacy of survey respondents, local researchers signed confidentiality forms. The data presented are self-reported and voluntary, and following the standards of ethical research, respondents were not required to answer every question. We only present data from participants who provided consent and are over 18 years of age.

Surveys were conducted by local researchers from the involved communities who have been trained to conduct short questionnaires with community residents. Survey procedures have been developed in consultation with Indigenous governments and partner organizations (e.g. Smart Communities Society NWT). We intend to continue refining our process and training local researchers to build local capacity conduct community surveys on an ongoing basis.

⁹ We note the challenges with conducting surveys remotely. For example, we tried an online survey in one community and received 0 responses. We also tried distributing a survey by mail in another community, and similarly received 0 responses. These experiences indicated to us the importance of working with local researchers conducting in-person surveys.

So far, data collection via community surveys has consisted of two phases of research:

Phase 1 (Winter 2019/2020) -- Individual Surveys

During phase one, surveys involved local researchers visiting either households or large public gatherings (like jamborees) to solicit individual survey participants. Data was collected from participants either through pen/paper surveys or by tablets. In both cases, data was entered into the Survey Monkey application and analyzed by researchers based at the University of Alberta. Survey participants had the option to participate in a prize draw for an iPad.

Phase one surveys were conducted in the following communities:

- Tuktoyaktuk (65 respondents)
- Inuvik (54 respondents)
- Paulatuk (48 respondents)
- Ulukhaktok (93 respondents)

This represents a total of **260 individuals** from these four communities, three of which are rural, satellite-served communities.

Phase 2 (Fall/Winter 2020/2021) -- Household Surveys

During phase two, the team adapted this process to respond to COVID-19 public health requirements, including physical distancing and health advisories, as well as to refine the surveys to focus on household-level data and adjust questions. Local researchers visited households to conduct surveys using tablets or pen/paper surveys. Following the procedures described above, survey data was entered into Survey Monkey or Open Data Kit, and analyzed by researchers at the University of Alberta. Survey participants had the option to participate in a prize draw for an iPad.

Phase two surveys were conducted in the following communities:

- Paulatuk (23 households representing 84 individuals)
- Fort Good Hope (18 households representing 49 individuals)
- Aklavik (7 households representing 18 individuals)
- Tsiigehtchic (27 households representing 69 individuals)
- Tulita (42 households representing 152 individuals)
- Sachs Harbour (22 households representing 53 individuals)
- Wekweètì (9 households representing 32 individuals)
- Norman Wells (6 households representing 11 people)
- Whatì (38 households representing 144 individuals)

This represents a total of **192 households** representing **612 individuals** living in nine (9) rural/remote communities across the NWT.

3. Interviews

In Summer/Fall 2020, DigitalNWT also conducted interviews with **24 individuals** who are either based in the NWT, or who work closely with NWT organisations and/or communities to support IT services, including Internet services. These semi-structured interviews focused on issues

related to the development, adoption and use of digital technologies in the NWT. Participants were identified through targeted and snowball sampling, by DigitalNWT partner organizations, and/or by contact information they provided to researchers in surveys. Data collected through audio recordings of interviews will be used to inform curriculum development and delivery, as well as research outputs, including this report. Interviews were conducted by Zoom or telephone, and lasted for approximately 60-90 minutes. Interview participants received honoraria for their time. Participants provided informed consent to allow the use of data collected through these procedures to inform research outcomes such as presentations and papers.

Data collected from interviews were analyzed using an inductive content analysis method, which has been defined as a systematic and objective categorization of the qualitative data. A three-stage process was employed. First, all the interview data transcripts were coded; then, themes were identified; finally, coded responses were arranged according to the themes.

4. Online surveys from Community Adult Educators

Finally, we present data collected from Dec. 2020 - Jan. 2021 through an online survey conducted with **nine (9) Community Adult Educators** from Aurora College. Community Adult Educators staff Community Learning Centres (CLCs) in many NWT communities. As noted on the Aurora College website: “The Community Learning Centres are an integral part of Aurora College as they are often the first contact that many students have with the College. Students may complete their high school upgrading at a learning centre in preparation for enrolling in a full-time program at one of the campuses. Also, the learning centres deliver many general interest and employment-related programs and courses.”¹⁰ Community Adult Educators deliver DigitalNWT courses, and so have experience teaching digital literacy and are in regular contact with local students. These surveys ask questions about both their own experience with Internet services, and their opinions about the experiences of their students.

There was a small incentive (gift card prize draw) for completing the survey. Respondents gave consent to present the (anonymized) survey data in this report. This resulted in 9 responses from Community Adult Educators working in small, rural communities across the NWT.

¹⁰ See: <http://www.auroracollege.nt.ca/live/pages/wpPages/CampusCLC.aspx>

Appendix 1: 2019-2021 CIRA Data (Speeds by Community for 1,438 tests)¹¹

Community	Download Speed (Mbps)				Upload Speed (Mbps)				Test Count	Unique Locations	Connection Type
	Median	Average	Fastest (Max)	Slowest (Min)	Median	Average	Fastest (Max)	Slowest (Min)			
Tsiigehtchic	1.0	2.4	13.8	0.1	0.1	0.3	0.7	0.0	13	3	DSL
Fort McPherson	1.4	1.4	2.7	0.3	0.6	0.5	0.8	0.0	4	2	DSL
Tuktoyaktuk	3.6	4.2	12.3	0.6	0.7	1.1	9.0	0.0	17	7	DSL
Fort Simpson	9.0	11.6	52.4	2.3	0.9	1.8	12.9	0.0	12	4	DSL
Paulatuk	0.2	0.3	1.1	0.04	0.04	0.2	0.4	0.01	13	5	Satellite
Behchokq	2.9	14.6	115.7	0.1	0.8	1.4	8.4	0.0	21	8	DSL
Lutsel K'e	1.1	12.7	84.6	0.2	0.9	1.8	8.3	0.02	8	6	Satellite
Yellowknife	3.3	13.2	241.1	0.02	3.0	4.5	30.6	0.03	876	83	Fibre/Coax
Fort Smith	21.7	36.9	118.4	0.1	5.0	5.1	12.3	0.03	40	10	Fibre/Coax
Ulukhaktok	0.5	0.8	2.2	0.2	0.3	0.3	0.9	0.1	29	5	Satellite
Fort Good Hope	1.7	3.2	14.7	0.3	0.7	0.8	3.6	0.1	21	2	DSL
Sachs Harbour	1.1	4.1	42.6	0.5	0.6	1.1	9.9	0.1	17	6	Satellite
Inuvik	31.2	62.4	247.1	0.1	7.9	9.3	89.2	0.1	205	23	DSL
Aklavik	4.0	5.8	13.3	0.9	0.5	1.6	27.7	0.2	24	3	DSL
Whati	3.6	3.6	12.0	0.3	0.7	1.2	7.7	0.2	26	3	DSL
Déline	9.3	8.3	14.8	0.2	0.9	0.8	1.0	0.2	10	2	DSL
Hay River	5.8	30.9	202.6	0.1	4.9	6.0	15.7	0.2	50	16	Fibre/Coax
Tulita	1.6	2.3	11.5	0.4	0.6	0.6	1.0	0.2	17	10	DSL
Colville Lake	1.0	1.3	2.4	0.5	0.4	0.5	0.9	0.3	3	2	Satellite
Fort Liard	1.4	1.7	4.9	0.2	0.5	3.8	16.9	0.4	5	3	DSL
Fort Resolution	6.1	6.2	12.8	0.6	0.7	0.7	1.0	0.5	12	3	DSL
Gameti	6.0	6.0	9.6	2.4	0.9	0.9	1.0	0.9	2	2	Satellite
Fort Providence	15.3	15.3	16.2	14.3	2.3	2.3	3.5	1.1	2	2	DSL
Norman Wells	22.2	35.5	159.7	0.2	14.1	11.1	17.1	2.1	11	2	Fibre/Coax

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¹¹ *Note:* Outliers removed include tests #845974 (Fort Good Hope) and #996076 (Inuvik).