



REGIONAL DISTRICT OF BULKLEY-NECHAKO

Supplementary AGENDA Thursday, November 21, 2024

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ADJOURNMENT

MEMORANDUM

TO: Board of Directors
Regional District of Bulkley-Nechako

FROM: Michael Riis-Christianson
Director (Electoral Area B)

DATE: November 16, 2024

SUBJECT: Canada's Rural and Remote Broadband Conference (West)

RECOMMENDATION

(all/directors/majority)

Receive

EXECUTIVE SUMMARY:

- Improved connectivity is an essential component of community sustainability and growth, and administrations that have elected to develop community-owned infrastructure are already reaping the benefits.
- Indigenous-owned and operated connectivity networks are powerful economic tools that create new opportunities, improve living conditions, and promote self-government.
- There is no guarantee the federal government's Universal Broadband Fund will continue beyond the next federal election.
- In Saskatchewan, the Crown corporation that was once a connectivity champion has become an impediment to change. Saskatchewan is another example of why competition in the marketplace is essential for growth.
- If knowledge is power, data is the new currency. Collecting, storing, and utilizing it at the heart of what is now being called the fourth industrial revolution.
- Population density helps build a business case for better connectivity, but it doesn't guarantee good connectivity for everyone. One of Europe's most populous countries is struggling to bridge the digital divide.
- Space really is the final frontier. Satellite-based connectivity solutions shouldn't be discounted. In fact, they may represent the future of internet connectivity. But beware the Kessler Syndrome.
- Relationships are important to improving connectivity. We need to follow up with firms that asked us for a date at this year's conference!

BACKGROUND

Canada's Rural and Remote Broadband Conference was held November 3-5, 2024, in Kelowna. Attended by industry representatives, members of the scientific community, and leaders from all levels of government, it provided a snapshot of the connectivity problems facing rural and remote communities, as well as possible solutions to them.

What follows are the conference's highlights.

Monday, November 4

Session #1

Indigenous Owned Broadband Networks

Moderator: Claudia Tarbell, Sr. Engagement Manager for Indigenous Communities Calix

Panelists: Jonathon Fleury, IT, Broadband and eHealth Specialist
Norway House Cree Nation
Lyle Fabian, President (KatloTech Communications Ltd.)
Gerald Thunderbird-Sky, Director (Sioux Valley Dakota Nation)

This session explored the transformative opportunities that Indigenous ownership of community broadband networks brings to Indigenous communities. Several Indigenous communities in Canada, tired of waiting for major companies or senior governments to connect their, have built networks that are transforming their communities. Fleury said having access to good connectivity has improved his community's access to virtual health care and online education. Many of the barriers the Norway House Cree Nation faced, e.g., access to health care and education, have largely disappeared.

One of the panelists noted that Indigenous communities are not looking for saviours. "We will save ourselves," he said, "if you enable us." Good connectivity is a requisite tool in this respect. The fact, he said, is that the laying of a ¾ inch fiber optic cable has helped the community generate millions of dollars in revenue and opportunities. The community in question is now looking at creating a data centre for its use. This will repatriate data on the community and its members that is currently stored in various data centres across Canada – thus promoting the nation's data sovereignty and providing local jobs.

Fleury noted that many Canadian businesses face human resources challenges. He noted that Indigenous communities, particularly those with good connectivity, should be viewed as a pool of potential employees.

Session #3

Maximizing Community Potential

Moderator: Keith Ponton, Telecoms & Media Cabinet Leader (Woven Arcadis)

Panelists: Gord Reynolds, Executive Director (Digital Twin Ontario)
Cam McDonald, Manager – Info Technology (Clearwater County)

Robert Whitney, CEO (OKIB Management Services LLP)
Alfred Loon, President (Eeyou Communications Network)
Rick Denis, Director – Network Services (Rohl Global Networks)

Ponton asked panel members to “look over the horizon” at new technologies and opportunities. One of the panel members noted that “following the money,” i.e., seeing where companies and individuals are investing, can help identify new opportunities for communities.

Society’s increasing reliance on data and the growing use of Artificial Intelligence necessitate the development of new data centres – operations that host large amounts of data for governments, individuals, businesses, and organizations. These data centres require excellent connectivity and large amounts of sustainable power. Communities with both have an opportunity to develop new tech-based industries.

Loon discussed the benefits the Cree Regional Authority in Ontario has enjoyed since establishing the non-profit Eeyou Communications Network. He noted that in addition to creating new jobs, improved connectivity has allowed Indigenous communities served by Eeyou to grow their tourism and arts/craft industries. Good connectivity has also helped the Cree preserve their language by allowing Cree speakers to easily share their knowledge and literacy skills with others in neighbouring communities. Adjacent non-Indigenous communities have also benefited.

Reynolds noted that the Province of Ontario has invested \$4.2 billion on connectivity projects. Workers who helped construct Ontario’s new connectivity infrastructure are using their skills in other projects across the country. He noted that by improving connectivity in rural and remote areas of Ontario, the government hopes to encourage development outside the greater Toronto area. Southern Ontario’s population is growing at a rapid rate, creating an unsustainable demand for housing and services. Improving connectivity in smaller outlying communities will take the pressure off Ontario’s large urban centres.

Improving connectivity in rural communities can also help address their shortage of skilled labour. Reynolds noted that even medium sized communities like Sault St. Marie are finding it difficult to attract planners. Small communities with world-class connectivity are more likely to attract and retain professionals. Good connectivity also allows professionals living elsewhere to serve rural communities remotely.

Clearwater County in Alberta is a local government that has chosen to build an open-access broadband network and invite ISPs to offer services to households. The Clearwater County fibre network already connects Rocky Mountain House with outlying communities like Nordegg (70 km away). Laying this fibre line has also enabled several Indigenous nations to connect. Clearwater County believes that by improving connectivity in the region, it will facilitate new industries, allow tourism operators to better promote their businesses, and ensure that residents have improved access to health care and education.

Maintaining a community-owned network isn't easy, though. Clearwater County plans to automate its network operations as much as possible to reduce costs and improve efficiency.

Session #4

Amplifying Connectivity Through Relationships, Creativity, and Growth

Moderator: Rachel Greenspan, Ex. Director (Network BC)

Panelists: Johann Reimer, Director – Bus. Dev. (Canadian Fiber Optics)
Mathieu Bourbonnais, Professor (UBC Okanagan)
Sam Hall, Chair (GwaiiTel)
Michael Riis-Christianson, Director (RDBN)

I was a last minute (Nov. 1) addition to this panel.

Panelists agreed that relationships and creativity are the keys to amplifying connectivity. It was exciting to hear how UBC Okanagan is using connectivity to enhance wildfire monitoring and actioning. Canadian Fiber Optics has built fiber optic networks in several small and medium sized communities in Canada, and the GwaiiTel Society is working to connect all communities on Haida Gwaii.

The panel was asked to answer four questions:

1. How have relationships helped maximize connectivity benefits in your area/company?
2. Emerging technologies – How are you using them? What are the most exciting technologies you see on the horizon?
3. What lessons have you learned on your connectivity journey? What was a challenge you didn't expect? What advice would you have for communities where connectivity is expanding?
4. What are your biggest priorities moving forward?

Everyone agreed that relationships are key to advancing connectivity in rural and remote communities, and each of us had our own success stories. We all stated that emerging technologies offer hope that all communities, regardless of their size and geographic location, will eventually be connected. I expressed hope that the new satellite-to-mobile technology would ensure that all regional district residents have good connectivity – particularly in emergency situations.

Our biggest priority moving forward, I said, is ensuring that everyone in the regional district has access to fast, reliable, Internet services that meet or exceeded Canada's national standard. I noted that despite the fact we have been working on connectivity since 2019, many areas in the RDBN remain unserved.

Lessons learned? The biggest lesson we have learned, I said, was this: Even if you want to improve connectivity in your area and are willing to contribute financially to network construction, don't assume that Canada's largest telecommunications companies and ISPs want to have a relationship with you. They have other priorities, and the business case for serving remote communities – even with financial help – is often weak at best. But don't give up. Even if your overtures are initially ignored, keep trying. Eventually, you'll find a partner like CityWest that shares your vision. I also said that BC communities shouldn't discount the benefits of forging a relationship with Citizen Services' Connectivity Division, which is great source of information and advice.

My "Lessons Learned" comment sparked an immediate response. Reimer went on record as saying that Canadian Fibre Optics wants to have a relationship with us. Three other ISPs also approached me after the panel discussion ended and expressed a willingness to work with us.

One of the panel members later compared the RDBN's experiences with Canada's largest service providers to dining at a fastfood restaurant. "If you get bad service from McDonald's, you don't complain," he said. "You know they don't care, so you just eat somewhere else."

"That's true," I said. "But if you don't like what they're serving at McDonald's, you generally have other dining options. You can go to another restaurant or cook at home. But when it comes to telecommunications services in Canada's most rural and remote communities, your dining options are often limited. In some places, like the Regional District of Bulkley-Nechako, you only have one or two choices, and you don't even have the option of cooking from home. You must to take what is offered, no matter how expensive, substandard, or unpalatable, or not eat. And that breeds resentment."

Tuesday, November 5

Session #1

ISED Keynote + Q&A

Josie Brocca

Director General, Connected Canada Branch

Innovation, Science and Economic Development Canada

The federal government is committed to connecting all Canadian communities by 2030. Brocca said she is confident ISED's Connected Canada branch will exceed its 2026 target. The agency will likely use satellite technology to connect the most rural and remote communities. There are still vast areas in Canada that have little or no mobile coverage.

While the federal government's target date is 2030, there is no guarantee funding will continue past 2025 or 2026. The federal Universal Broadband Fund had \$3.225 billion. A decision to further fund the program will be made by the next government.

Session #2**Saskatchewan Broadband Action Committee (SBAC)****Moderator:** Neil McLughan, Executive Advisor (Junction Consulting)**Panelists:** Jean-Marc Nadeau, CEO (SUMA)

Darren McKee, (Executive Director – Sask. School Boards Assoc.)

Verona Thibault

This session explored the distinct challenges and opportunities surrounding broadband connectivity in Saskatchewan. Panelists provided an in-depth understanding of the "broadband problem" specific to the province, highlighting the geographical, economic, and technological factors that make Saskatchewan's connectivity needs unique. From vast rural areas to underserved remote communities, the panel addressed why traditional solutions may not be sufficient and what approaches are required to close the broadband gap. It also delved into the long-term economic, educational, and social implications for Saskatchewan if this gap is not addressed.

Like BC, Saskatchewan has many small rural and remote communities, many of which have poor connectivity or no connectivity. However, Saskatchewan has basically one provider: SaskTel, the provincially owned telecommunications corporation. This lack of competition in the marketplace has impeded Saskatchewan's ability to connect its citizens. Ironically, the Crown corporation that connected rural Saskatchewan residents by telephone has (at least in the opinion of panel members) become a major impediment to internet connectivity. Today, about 55 percent of Saskatchewan residents do not have access to internet that meets the national standard of 50/10 mb/s.

The Saskatchewan Broadband Action Committee, a cross-sector and community-based group of provincial, local, and Indigenous organizations, is trying to bridge the digital divide. Yet the group faces an uphill battle. The lack of competition in the Saskatchewan telecommunications marketplace is stifling growth. Despite being a Crown corporation, SaskTel is sometimes guilty of bad behaviour. One panel member noted that SaskTel often makes no effort to connect small communities until independent, privately-owned ISPs try to do so. Then the communications giant builds over the existing privately-owned infrastructure and out-competes the upstarts.

This type of behaviour makes it difficult for small ISPs to serve Saskatchewan communities. Many ISPs that try to develop projects in Saskatchewan have difficulty raising the requisite capital. "Bankers know that Saskatchewan is not an investible market," stated one ISP representative.

Saskatchewan, according to panel members, also lacks a coherent connectivity strategy. Access to good connectivity is essential for Saskatchewan's sustainability. What the province needs most is competition and a plan.

Session #3

Connectivity Journey

Moderator: Shawn Smith, Publisher (CARTT.ca)

Panelists: Justin Cameron, National Director – Broadband (Rexel)
 Bud Keys, President & CEO (Westman Communications Group)
 Dan McCarthy, President (Eagle Engineering & Consulting)

Rural broadband deployment is often perceived by the public as a slow and frustrating process, marked by a cycle of project announcements, long periods of silence, and delayed connectivity. Constituents see little happening between the initial funding announcement and the final ribbon-cutting ceremony. However, for those working within the industry—vendors, manufacturers, contractors, and operators—the reality is quite different. Behind the scenes, there is an extraordinary level of innovation, collaboration, and technological advancement driving each project forward.

This session delved into the exciting technologies and methodologies that are reshaping rural broadband deployment, including the use of LiDAR, automation, and AI.

Digital connectivity can transform communities and neighbourhoods. One of the presenters owns property in an isolated community. About 70 percent of the 300 homes there were only occupied seasonally, and 20 percent were board up.

That all changed when fiber optic internet was extended to the community. It fueled a real estate boom. Now, most of the homes are occupied by people who live there year-round and work remotely.

The role of ISPs is also changing. For a long time, telecommunications companies competed to provide the fastest service as the lowest price. Now, as more communities are getting connected, the same companies are focusing on selling products and services that require fast, reliable internet.

McCarthy's firm recently used vehicles equipped with LiDAR to map 7,900 km of roadside infrastructure in just six weeks, collecting 1.7 trillion data points that can be used to create incredibly detailed 3D infrastructure maps. Some of the maps are so detailed that they show exact rivet locations on towers.

The use of Artificial Intelligence (AI) is revolutionizing the industry, automating inspection and maintenance processes. All three panelists admitted their firms were using the new technology to some degree, though one said he was a bit afraid of it. Companies are now using AI to predict network problems and fix them *before they happen*. Others are using it to monitor world events and predict shortages of key materials like fiber optic cable – leading to more informed purchase choices.

One panelist said he was regularly used AI to write reports. “You have to have to edit the stuff because AI does make errors,” he said. “But something that would have taken a day or more can now be done in a few hours.”

Session #4

Fireside Chat: South London (UK) Partnership

Moderator: David Pickett, Principal (Pardal Ventures Inc.)

Speaker: Stacey McAdie, Digital Connectivity Lead (South London Partnership)

You’d think that an urban centre the size of Greater London would have great connectivity. After all, there’s about 9.7 million people living in an area two one-hundredths the size of the Regional District of Bulkley-Nechako.

According to McAdie, thinking that Londoners enjoy a connectivity advantage over Canadians would be a mistake. Many places in Greater London have poor connectivity. At last count, more than 150,000 premises in the UK’s largest metropolis did not have access to broadband internet service, and many of them reported download speeds of under 30 mb/s. Connectivity is so bad in some high-profile commercial “not spots” that retailers are moving out because they can’t process digital credit card payments.

Cellular coverage isn’t great, either. Forty-two percent of Londoners have poor cell service, perhaps in part due to the technology lag there. While most European and North American telecommunications companies switched to Fifth Generation (5G) network technology years ago, several of the UK’s largest telcos are just starting the transition.

The UK ranks 35th in the world in terms of mean download speeds, well behind Canada and most European countries. So how did connectivity in the UK get so bad?

“What we have is a market failure,” McAdie explained.

McAdie said governments are trying to address the situation by providing financial incentives and low-interest loans to ISPs. Some experts, though, feel this strategy is akin to “rewarding bad behaviour.”

Municipalities in the UK haven’t expressed much interest in building or operating broadband networks, she said. Small, independent ISPs known as alternate network providers (“alt nets”) have laid some fiber optic cable and offered broadband service only to discover they couldn’t secure enough market share to make their operations sustainable. Even financial “carrots”, i.e., discounted rates on long-term service contracts, have failed to woo customers.

“We have a massive housing crisis,” McAdie explained. “Incumbent ISPs have offered great deals to customers who sign up for two years, but the uptake hasn’t been there because

many people don't know where they'll be living in two years. As a result, some suggest there's no point in putting in a solution that no one will use."

The result is more consolidation in an industry already dominated by a few large firms.

McAdie said improving internet and cellular service in Greater London is imperative. She said poor connectivity is affecting almost every aspect of life in the UK's largest city. "We have to get the infrastructure in place to improve quality of life," she said.

Sessions #5 & 6

Space: It Shouldn't Be Your Last Resort (and Space: A Deeper Dive)

Moderator: Jason Presement, Business Advisory (Canadian Fiber Optics Corp.)

Panelists: Michele Beck, Sr. Vice President, Canadian Sales (Telesat)
Rick Hodgkinson, CEO (Galaxy Broadband)
Lynne Genik, Dir. – HTSN Chall. Prog. (Nat. Research Council Canada)

Satellite-based telecommunication systems have traditionally been considered the connectivity solution of last resort for organizations and businesses trying to bridge the digital divide in Canada, and for good reason. Space-based connectivity solutions that relied on Geosynchronous Equatorial Orbit (GEO) satellites have been plagued by low upload/download speeds, high latency, and unreliability. They were also costly.

All that is changing. As the members of this panel noted, technological advancements may soon make space-based connectivity solutions the gold standard.

Beck noted that technological advancements and competition in the marketplace are driving down the cost of satellite-based connectivity. When the first satellite-based internet systems were launched more than a decade ago, the cost of transporting a megabit of data was \$4,000 to \$5,000. Now, thanks to better technology and the launch of a new generation of Low Earth Orbit satellites, that cost has dropped to about \$35/mb, and will likely get even cheaper when companies like Elon Musk's Starlink have fully deployed their LEO constellations. (Starlink currently has about 6,000 LEO satellites in operation and plans to launch 34,000 more.)

Starlink provides satellite internet service direct to the home. Other companies, including Telesat (a Canadian company), plan to provide LEO satellite connectivity to ISPs that will be responsible for delivering individuals homes.

All of today's LEO satellite constellations (e.g., Starlink's) offer high-speed and low latency internet service. Upload and download speeds are already on a par with (or superior to) all earth-based connectivity solutions except fibre – and that may soon change.

LEO satellites, many of which are the size of household washing machines, are now using optical systems (i.e., lasers) to transmit data between each other at the speed of light. Optical transmission systems of this type currently require a clear line of sight, though, and Canada has notoriously bad weather. As a result, space-based connectivity providers like Starlink still rely heavily on Radio Frequency (RF) technology to transmit data to and from Earth. (RF doesn't require a clear line of sight.)

One way to get around the bad-weather issue is by routing data via fiber optic cable to terrestrial transmitters in areas with clear skies. Canada has notoriously bad weather, but it's seldom completely blanketed by cloud. By continuously monitoring weather patterns across the country with AI, it may be possible to route signals to transmitters with clear lines of sight to orbiting GEO satellites.

Of course, getting the data to a satellite is only half the problem. You still need to get data back to customers regardless of the weather. One possible solution involves the use High Altitude Platform (HAP) stations operating in the high atmosphere (i.e., 20 km above Earth). HAP stations could in theory receive data from satellites via an optical link and then transmit to customers on Earth via RF.

Sound complicated? It is – and that's why the National Research Council Canada is partnering with other organizations to overcome the line-of-sight issue. When they solve the inherent challenges – and members of the panel feel they will – rural Canadians can expect access to space-based internet service on a par with fiber optic systems. It will, they said, but “fibre in the sky.”

The European Space Agency's HydRON network is an example of this new technology. You can check it out here:

https://www.esa.int/ESA_Multimedia/Videos/2021/04/HydRON_Fibre_in_the_sky

Plans to link the world via a multitude of satellites will have financial, social, and environmental implications. The stuff that's being launched – particularly the LEO satellites – won't stay up there indefinitely. While GEO satellites are large and have a long lifespan (decades), LEO satellites have a lifespan of about five years. Companies will have to continually launch new satellites to replace the ones that fail.

Given the number of satellites needed to make the next generation of space-based connectivity work, it's not surprising that people are starting to express concern about the amount of stuff floating around up there. Concern over space debris is growing. It's already crowded up there. According to latest estimates, there are more than a million pieces of space junk larger than 1 cm in size orbiting the planet at speeds of up to 27,500 kph. Some of those pieces are small, but others (like spent upper-stage rocket bodies and old satellites) are large.

Earth's orbit is a finite resource. As far back as 1978, NASA scientist Donald Kessler suggested that the likelihood of space collisions would increase as mankind lofted more and more things into orbit. These collisions, Kessler and co-author Buton Cour-Palais said, could ultimately lead to an exponential increase in space junk that would render spaceflight impossible.



Map of space debris courtesy of European Space Agency.

Sound implausible? It's not. According to the European Space Agency, the "Kessler Syndrome" presents a significant threat to the future of space travel, if not mankind. That's why ESA is one of several agencies testing the feasibility of cleaning up space. ClearSpace-1 will be ESA's first attempt to recover the 95-kg PROBA-1 satellite launched in 2001.

Wouldn't it be ironic if mankind solved the riddle of space travel only to discover that Earth's orbit is so congested that the technology couldn't be deployed?