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## How the Washaho Cree Nation at Fort Severn is Using a "First Mile Approach" to Deliver Community Services

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*Abstract: Fort Severn Washaho Cree Nation is a small, remote northern community on the Severn River near Hudson Bay in Ontario. The community services delivered in Fort Severn are managed and controlled by the local leadership, working in collaboration with their regional tribal council Keewaytinook Okimakanak and other strategic partners. The First Mile is both an emerging policy approach and a framework that supports holistic and community-centred broadband development and use by First Nations. First Mile focuses on community management and control of local broadband infrastructure and services. The paper discusses how Fort Severn First Nation is putting First Mile concepts into action.*

### 1 Introduction

Broadband networks are cross-sector enablers - they support the delivery of many different community and social services. Across Canada, remote and rural First Nations are using broadband networks to deliver community services in sectors such as health, training and education, government and administration, languages, lands and resources, justice and policing, and others.

Many First Nations are working to ensure that their broadband-enabled, locally-driven services are sustainable, holistic and supported by policies that recognize their leadership and unique needs. However they face significant challenges in their efforts. Funding constraints hamper their ideas, and fragmented and weak government broadband policies are usually developed in southern urban environments far from their realities.

Fort Severn Washaho Cree Nation is a small, remote northern community on the Severn River near Hudson Bay in Ontario. The community services delivered in Fort Severn are managed and controlled by the local community leadership, working in collaboration with their regional tribal council Keewaytinook Okimakanak and other strategic partners. Services include: health (health administration, telehealth and telemedicine, telemental health, tele-homecare, and DiabeTEXTs); education (Keewaytinook Internet High School, Washaho School, Wahsa, professional development

and training); government and administration; lands and resources (Keewaytinook Mobile, GPS); justice (court) and policing; and others. The community's use of broadband networks is increasing.

At the invitation of the Fort Severn community, researchers visited Fort Severn three times to meet and interview community residents and learn how they are delivering and using broadband-enabled services. This paper includes discussion of the empirical research conducted by researchers from the VideoCom project in partnership with Keewaytinook Okimakanak and in collaboration with Fort Severn First Nation.

Fort Severn's broadband-enabled community service delivery is discussed in the context of the "First Mile" policy approach (<http://firstmile.ca>). As outlined in a recent report: "Putting the 'Last-Mile' First: Reframing Broadband Development in First Nations and Inuit Communities," First Nations such as Fort Severn are employing locally owned or administered digital networks and technologies to support their community and economic development goals (McMahon, O'Donnell, Smith, Woodman Simmonds & Walmark, 2010).

First Mile concepts share synergies with several Canadian and international policies. One is that ownership, control, access and possession - the principles of OCAP (Schnarch, 2004) - of their networks and infrastructure are essential variables to address local needs and priorities in service delivery and community development. Another is that, on an international level, the rights of First Nations to control their local broadband infrastructure and the data that flows through that infrastructure may be supported by the UN Declaration on the Rights of Indigenous Peoples (United Nations, 2007), adopted by Canada in 2010.

In law, First Nations communities are sovereign political entities in treaty relationships with Canada. Since the arrival of the European colonial powers, First Nations have been in an ongoing struggle to maintain control over their lands and resources (Royal Commission on Aboriginal Peoples, 1996). Increasingly, their struggle is to control the essential services that govern their people and that their people need, and the infrastructure and resources to deliver those services in a holistic manner.

## **2 First Mile: Supporting Community-Centred, Broadband-Enabled, Service Delivery**

The "First Mile" approach to broadband-enabled service delivery is community-focused. Anyone living in remote and rural First Nations or working with the community residents knows how important the community is. Without community input, these services would be ineffective and non-sustainable. Many activities within First Nations aim to include, involve and engage as many community members as possible. When designed by communities themselves, the community services aim to be holistic and take into consideration the unique local contexts of First Nations.

Dozens of research publications have found that services made possible by broadband win community support when they are developed under the leadership of First Nations (See, for example Carpenter & Kakepetum-Schultz, 2010; Gideon, Nicholas, Rowlandson & Woolner, 2009; O'Donnell, Molyneaux, Gorman, Milliken, Chong, Gibson, Oakley & Maitland, 2010; Walmark, 2010). Of the many lessons learned from these studies, one of the most important is about control. First Nations must be in control of the service or application to ensure it will remain centred on the needs of the community and be supported by community members. To ensure local control, national and regional plans need to involve First Nations in the program design and implementation, including for broadband development (Ramirez, 2001; 2007).

From a holistic perspective, broadband and technology have little value in a community unless they benefit everyone. This perspective aligns with the theoretical approach of community informatics,

which insists that technology in itself will not support community development if the collective capacity is not available to use the technology effectively. In a community context, Gurstein (2003) defines “effective use” of a technology as the capacity and opportunity to successfully integrate ICT to accomplish collaboratively-identified goals. Among the conditions required to achieve effective use of ICT in communities is “social facilitation.” This refers to the need for local leadership, coordinated planning and design, and training at all levels to make the service usable (Gurstein, 2003).

### **3 How First Mile Concepts are Different from Current Broadband Development Approaches**

The struggle is ongoing for First Nations to control, manage and be responsible for their “First Mile” of broadband infrastructure and the services using that infrastructure (McMahon, O’Donnell, Smith, Woodman Simmonds & Walmark, 2010). Traditionally, the “last mile” refers to the final leg of connectivity from the telecommunications provider to the home. The First Mile concept turns that around. Developed in the late 1990s, First Mile refers to policies and practices to support decisions by remote and rural communities about their broadband connectivity (Paisley & Richardson, 1998). More recently, the “First Mile” has been used to refer specifically to ensuring that First Nations communities are connected to broadband in ways that support sustainable, locally-driven services and activities (McMahon et al.).

The First Mile is both an emerging policy approach and a framework for understanding locally-driven broadband and ICT development. It supports First Nations to use broadband networks and ICT for community-controlled service delivery in a holistic manner. This includes supporting community members to use these technologies effectively. A holistic approach includes the capacity for effective use in the communities to ensure the broadband-enabled services are sustainable. First Mile sensitive policies focus on and invest in local, rural development instead of the traditional corporate or institutional-centered approaches that are most often created by centralized, urban-centric agencies.

Historically, to the extent that they exist in Canada, federal government policies for broadband and ICT development in First Nations communities are not holistic and do not support communities effectively. For example, many of the remote and rural First Nations communities that do have adequate broadband bandwidth have no full-time IT support person – however some First Nations, like Fort Severn, do. In addition, the communities are challenged to find funding to support staff training and the required level of community IT support, and so many schools, health centres and other administrative offices must fend for themselves or rely on costly external IT services for support. Yet despite operating on a shoe-string budget, Fort Severn and many other remote and rural First Nations across the country are developing broadband networks and delivering community services effectively in different sectors.

For the many remote and rural First Nations without adequate broadband, the First Mile approach supports the community leadership to make decisions about the development and deployment of broadband networks in their communities. In contrast, the broadband infrastructure development programs funded by governments require approved Requests for Proposals from corporate and established telecom providers before funding is awarded, leaving most rural and remote communities unable to compete and at the mercy of these corporate entities. The recent Broadband Canada funding insisted that funding contracts had to be directly between the telecom provider and the government program instead of including the First Nations project proponent.

In addition, federal government policies aimed at broadband development in remote and rural communities do not include provision for substantial consultation with First Nations governments, even though First Nations are recognized as sovereign entities in Canadian law and a duty to consult

exists for development projects on First Nations territories. The primary consideration for the federal government seems to be how the infrastructure development can benefit large telecommunications companies and commercial interests in the region rather than the people living there.

Recently, attention has been focused the fact that the federal government has supported large national commercial telecommunications companies that then compete directly with small local rural internet service providers (Marlow, 2010). In one recent case the commercial telecommunications company OmniGlobe Networks - that the federal government highlighted in February 2011 as a commercial success story after subsidizing the company since 2008 - filed for bankruptcy in March 2011, leaving several First Nation communities in the lurch (see for example Erskine, 2011).

In Canada as in many other countries, telecommunications companies are reluctant to develop infrastructure in remote and rural areas. This is due to the low return on investment for commercial development in these areas, which typically have small populations to serve as a customer base and are located in geographically remote, expensive to reach regions. The telecommunications companies demand significant public investment directly into their own companies to do the development work. Consequently, to develop and maintain broadband infrastructure in many remote and rural First Nations, it is necessary to build multi-sector partnerships involving First Nations, federal, provincial or territorial governments, and telecommunication companies. Too often these relationships result in a master - slave "partnership" with the communities forever dependent on the corporate telecom provider and forever paying this external entity for their service. The First Mile approach to these partnerships makes it possible for the community to be in control of their own infrastructure resulting in local development opportunities.

Building these partnerships in an appropriate way would be greatly facilitated by strong federal policy that recognizes and respects the sovereignty and leadership of First Nations and is developed in partnership with their organizations. However federal policy to support broadband in remote and rural First Nations communities is historically fragmented, underdeveloped and uncoordinated among many different departments and program areas. The Canadian government has been promising for years to develop a strategic plan for broadband in First Nations; that plan has yet to appear.

The national organization representing First Nations across Canada, the Assembly of First Nations (AFN), has an active interest in broadband development and an IT working group focused on this issue. By 2009, the AFN had passed five resolutions at their annual general assemblies recognizing the need for First Nations communities to have adequate broadband connectivity and access to ICT. At a major Aboriginal research and policy conference in Ottawa that same year, the AFN outlined a strategy for an equipped First Nations broadband network. They see this broadband network as part of a broader plan for economic, social and cultural change based on knowledge and information. The AFN's "e-Community ICT model" builds upon a common network model employed by Canadian institutions and corporations and has five themes: First Nations capacity development, First Nations connectivity, human resources development, information management, and service delivery and partners (Whiteduck, J., 2010). The AFN is also proposing that First Nation communities and organizations oversee the public funding required to develop and control the broadband infrastructure in their communities.

#### **4 First Mile's Connections with Canadian and International Policies**

First Mile is connected conceptually and has synergies with existing policies in Canada and internationally.

The first policy is OCAP - ownership, control, access and possession. Originally a theory developed by First Nations to apply self-determination to research (Schnarch, 2004), OCAP principles are now applied in several other policy areas. As originally conceived, OCAP is a response to the role of knowledge production in reproducing colonial relations. OCAP principles state that First Nation communities own information collectively, that First Nations have a right to control all aspects of research and information management of a research project from inception to completion, that First Nations must have access to information and data about themselves no matter where it is held, and that First Nations can assert and protect ownership of data (Schnarch). These principles have cross-sector policy applications.

OCAP applied to telecommunications, or self-determination applied to broadband networks, has at least two implications. First, that First Nations must retain access and possession of the capacity and resources to effectively manage the content, traffic and services on their local network. Second, that First Nations have a right to own and control the local broadband network in their communities in order to support the flow of information and services.

Internationally, it is recognized that the right of indigenous peoples to self-determination can be supported by the United Nations Declaration on the Rights of Indigenous Peoples. UNDRIP is currently the only international legal instrument available to indigenous peoples globally to secure recognition of their rights to self-determination (Maguire, 2008). The UNDRIP was accepted by almost all the countries in the UN in 2007 and after a long struggle formally adopted by Canada in November 2010.

Thus on an international level, the First Mile policy approach may be supported by the UN Declaration on the Rights of Indigenous Peoples. UNDRIP recognizes that indigenous peoples continue to suffer injustices as a result of the colonization and dispossession of their lands, territories and resources. These ongoing injustices prevent indigenous peoples from exercising their right to development in accordance with their own unique needs and interests. The UN Declaration supports control by indigenous peoples over developments affecting them and their lands, territories and resources. Indigenous control of development will enable them to maintain and strengthen their communities, institutions, cultures and traditions, and to promote their development in accordance with their aspirations and needs (United Nations, 2007).

The UNDRIP is a tool that First Nations can use to pursue their collective rights and freedoms, and ICT are powerful tools they are using to realize these rights (Fiddler, 2008). Many research articles, papers, reports and presentations have shown how First Nations are using broadband networks and ICT to pursue their self-determination goals. An abundance of evidence exists that remote and rural First Nations are using and shaping broadband networks to meet many of their social, political, cultural and community needs (McMahon, 2011; O'Donnell, Milliken, Chong & Walmark, 2010). Missing in this scenario is government recognition, respect, and support for their innovation and leadership.

We now turn to a case study of Fort Severn First Nation, which is putting First Mile concepts into action.

## 5 Study Methodology

Our Fort Severn study is part of a larger, long-term research project, called VideoCom, conducted in collaboration with three partners: Keewaytinook Okimakanak (KO) in northwestern Ontario, the First Nations Education Council in Quebec, and Atlantic Canada's First Nation Help Desk in the Atlantic region. This paper is written with KO and the support of the Fort Severn leadership.

The current study explores the links between the First Mile concepts and how Fort Severn First Nation is delivering community and social services. We focus on the three core areas that the community identified in 1999 as future priorities for broadband development: local governance/government, education and health.

Researchers and KO liaison staff made three multi-day visits to Fort Severn from March 2010 to March 2011. Researchers conducted a total of 59 interviews with a wide range of Fort Severn residents. Everyone was at least 18 years of age and had a variety of roles within the community, including health workers, band council staff, teachers, caregivers, elders, leaders, and many other roles. For the current study, we are primarily learning from 17 staff members working for community services interviewed during a visit in March 2011 and community services workers interviewed in March 2010. Researchers followed Canadian ethical protocols, the protocols were reviewed by their home institutions, and researchers and partners strived to respect Ownership, Control, Access, and Possession principles (Schnarch, 2004).

In addition to the community-based research, the researchers analyzed past reports and presentations about broadband development and ICT in Fort Severn and the wider region. Finally, the study includes a snapshot log analysis of Fort Severn's network use over a one-year period.

## **6 Fort Severn First Nation and its First Mile Infrastructure Development**

The Washaho Cree Nation at Fort Severn is on the bank of the Severn River near where it flows into Hudson Bay. The community, the most northern Arctic community in Ontario, is home to about 400 people; another 250 community members live elsewhere most of the time. Most community residents speak Cree, and the school-educated people speak English. Every two years, Fort Severn community members elect their local government: a Chief and Band Council. Elders also have a prominent leadership role in the community. Fort Severn is a member of the Keewaytinook Okimakanak (KO) Tribal Council and the Nishnawbe-Aski Nation (Treaty #9 area).

Much of the community life happens outdoors. For many community residents, life is seasonal and grounded in the environment, lands and resources. Many social and community activities, as well as individual and educational activities, involve hunting, trapping, and being on the land, or fishing and being on the water and ice. Almost every household depends on hunting and trapping for food, and the region is rich in wildlife, fish and berries.

For about two months each winter, Fort Severn and other remote communities in the region are connected by winter roads and it is possible to drive to Sioux Lookout, the closest regional centre, in about 24 hours. After the winter roads have melted away, Fort Severn is very isolated and expensive to visit. The flying distance from Toronto to Fort Severn is 1,495 kilometres. A return flight from most Canadian cities to Sioux Lookout costs more than \$1,000. The follow-on return flight from Sioux Lookout to Fort Severn costs about the same, making the total return airfare cost to Fort Severn about \$2,000.

Good communication links and infrastructure are important for all First Nations and particularly so for very isolated communities like Fort Severn. Even before bringing digital infrastructure and communications into their community, Fort Severn as a collective demonstrated its leadership by developing and implementing a community radio station in the 1980s and a community cable TV service in the early 1990s (Fort Severn First Nation, 2011).

The development of digital connectivity in Fort Severn has an interesting history. In 1994, K-Net - the telecommunications division of the KO tribal council - created a bulletin board service (BBS) to

link residents in remote northern communities to students and family members in regional towns and cities. They accessed the BBS via a long distance dial-up connection. In 1999, the community set up a wireless network to service the band office, police station, nursing station and school, and added another MSAT (Mobile Satellite) unit with the support of Industry Canada (FedNor) (Kakekaspan, 2002). In early 1999, Fort Severn's tribal council, Keewaytinook Okimakanak (KO), commissioned a study of the telecommunications needs of the KO communities (Keewaytinook Okimakanak, 1999). The consultants reported that data communications were severely limited in Fort Severn. Like other KO communities, the primary local bottleneck for dial-in internet was the MSAT outbound connection.

In the consultation process, Fort Severn community members identified several key priorities for network services: building a network to connect all of the communities; making internet more accessible; and videoconferencing. Community priorities for health and education were: bringing more education services into the communities; supporting the health service for people who are sick; and mental health and health services. Later that year, Fort Severn hosted a workshop for community members to discuss a planned satellite upgrade and what they would like to do with the increased bandwidth. The community identified governance, education and health as the three main areas for development. K-Net's multimedia staff member Jesse Fiddler created three Flash presentations, still available online, that captured the priorities of community members for broadband and IT development in their community:  
<http://smart.knet.ca/archive/fsworkshop/step4.html> page.

In May 2000, the Kuh-ke-nah SMART First Nations Demonstration project was selected as Industry Canada's Aboriginal SMART demonstration project. As a partner in this project, Fort Severn developed many broadband applications to support the community and its residents. In that year, KO/K-Net, with funding from Industry Canada (FedNor) installed a hub C-Band earth station in Sioux Lookout and in Fort Severn. Fort Severn was part of the community network to share the bandwidth, available for 128kbps Internet and 512kbps on-demand video. In the summer of 2001, the Fort Severn community worked with K-Net to use the existing community TV cable network to add a cable modem service to households. In early 2002, the connectivity was upgraded to support medical quality videoconferencing and X-Ray transfer (Kakekaspan, 2002).

The SMART project and increased bandwidth in the community opened up a plethora of possibilities for Fort Severn residents, who could now access more services and a wider range of information online. Fort Severn set up a community E-Centre for residents without home internet access. They set up a Keewaytinook Internet High School (KiHS) classroom to enable students to study for their high school education in the community (prior to this, young adolescents would be required to leave their community and travel to an urban centre for their high school education). The community worked with KO Telemedicine (KOTM) to increase the range of health services offered via videoconference to residents. Underpinning many of these service areas is their IP videoconferencing services, which continues to play a growing role in several service areas, including health and government.

Soon after, Fort Severn became one of the communities in the Northern Indigenous Community Satellite Network (NICSN- <http://smart.knet.ca/satellite/>). NICSN is a jointly-managed, inter-provincial partnership between First Nations and Inuit communities in northern Quebec, Ontario and Manitoba. NICSN has demonstrated that a satellite network can be locally and regionally owned, managed, operated and maintained. The NICSN group successfully secured bandwidth (one transponder) for 15 years (2005 - 2020), with 100 per cent of costs covered by the federal government (Industry Canada) and Telesat. In 2005, NICSN launched the first inter-provincial community-owned and operated broadband satellite network in Canada. In 2007, under Canada's National Satellite Initiative, the NICSN consortium was able to secure two additional transponders

for eleven years (2008 to 2019) to further improve the bandwidth capabilities of the satellite network service. In 2011, the Quebec partner is adding two more transponders to the network to further improve services in their region for the next five years (2011 to 2016).

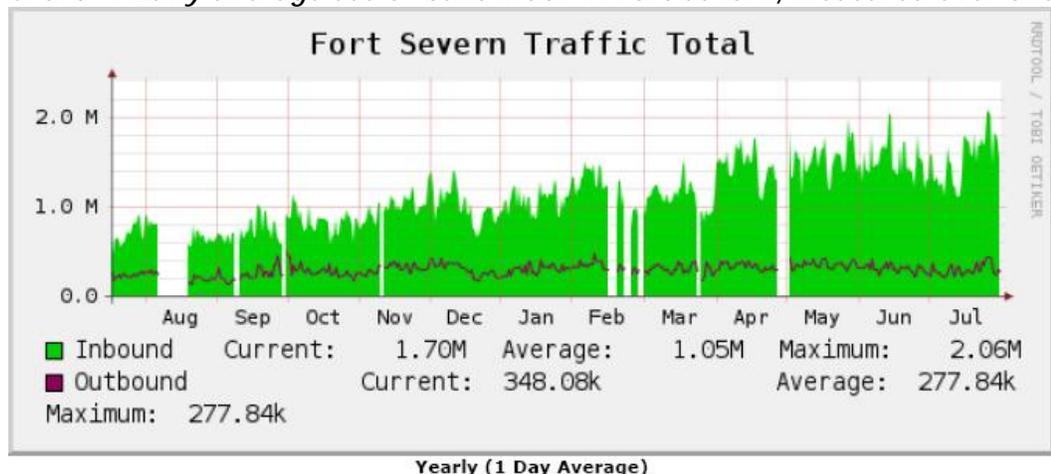
Fort Severn First Nation is clearly an example of the First Mile approach in action. In 2004, this was outlined in a study that examined the best practices and benefits associated with the planning and infrastructure in Fort Severn First Nation and Big Trout Lake First Nation (Jansen & Bentley, 2004). The report found that Fort Severn (and Big Trout Lake) gained experiences in broadband that other communities can benefit from. These included: Fort Severn developed and documented a clear and far-reaching vision; the community applied strategic planning principles; Fort Severn had effective leadership, as evidenced by the success of the implementation of broadband initiatives; the community was fully engaged in the planning and execution of the initiatives; the community had local control of the distribution system; and they chose satellite delivery of broadband as a best practice choice. The report also lists many of the benefits Fort Severn gained from broadband (Jansen & Bentley).

Several years later, Fort Severn leadership worked with their tribal council Keewatinoon Okimakanak (KO) to develop the community-owned and managed cell service, Keewatinoon Mobile (KM). A recent paper on the KM service in Fort Severn discusses how the service has quickly become essential to supporting lands and resources and many other activities in the community (O'Donnell, Kakekaspan, Walmark, Mason & Mak, 2011).

These developments and best practices are possible because the Fort Severn IP network established in partnership with Keewatinoon Okimakanak's Kuhkenah Network (KO/K-Net) is operating on a private managed wide-area network service. Online network management tools such as the coax cable management tool, the videoconferencing bandwidth booking tool and the local bandwidth management tool support the effective use of the Fort Severn IP network. Each of these tools require regular and sustained maintenance of the network by the local Fort Severn ICT technician to ensure proper operation. The equipment (computers, routers, satellite equipment, modems, videoconferencing units, phones, and so on) along with the cabling throughout the community also requires consistent and sustained maintenance and upgrading by the community.

Fort Severn's use of bandwidth is increasing every year. Chart 1 below is a snapshot of the total bandwidth used by the community on an average day, measured over one year. The graph shows that the bandwidth used on an average day in July 2011 is almost double that used on an average day in August 2010.

*Chart 1: Daily average use of bandwidth in Fort Severn, measured over one year*



## 7 Fort Severn's Delivery of Broadband-Enabled Community Services

As previously discussed, the findings from the community research focus on how the community is using the locally owned and operated broadband network in 2010 and 2011 to deliver the three services they identified in 1999 as future priorities for broadband deployment: governance, education and health. We also explore some community perspectives from 2011 on the link between First Mile concepts and service delivery.

### *7.1 Government and Community Administration*

As mentioned, Fort Severn government consists of an elected Chief and band council. A number of staff members carry out band administration. The band office building is in the centre of the community, next to the health centre and across the road from the e-Centre. The government and administrative staff use three primary information communication technologies (ICT) on their IP (internet protocol) network - computers, videoconferencing and cell phones - to conduct their work. They also use the land-based telephones and fax machine daily.

The most common ICT used is the computer and the associated internet-based applications such as email and the Web. Community government members and staff use email regularly to connect internally, with other community members, and with people outside the community. For finance and administrative work involving exchanging documents, email is an essential tool. Web-based services are also used regularly; for example, bank transfers and payments to suppliers are conducted online.

In addition to the traditional means, the band also uses Facebook to schedule meetings and events. Fort Severn community members are very active Facebook users, so this is a convenient way to reach people. Before Facebook was available, a lot of local and external communication took place using personal homepages. So many band office activities use the internet to communicate that when the internet connection is down, band business comes to a virtual halt and there are immediate calls for assistance.

Although Fort Severn has a website (<http://fortsevern.firstnation.ca>), it currently requires more regular maintenance to restore it to its former use of promoting the community and informing the public. The community's web site was used by the band council to post information and community updates in the past when a full-time position was funded by Industry Canada's Smart Communities Demonstration project. The tribal council recently did work with a community member assigned by the chief to complete work on their website. A recent refresh of the site that includes a "Technology Showcase" highlights a lot of the ICT work completed by Fort Severn over the years (Fort Severn First Nation, 2011). The band continues to search for the funds to pay someone to maintain the site, and the volunteer who did that work previously has moved from the community. Several Fort Severn community members interviewed mentioned that the community website was out of date and so they find local news and information updates using other online sources (personal homepages and Facebook). The band council uses the community channel on the local cable TV network to share information with community members.

Another everyday technology used for band administration is cell phones - both voice and text messages. Prior to setting up the IP supported Keewaytinook Mobile service in the community, Fort Severn depended on Bell Aliant / Telesat's satellite system for their local phone service. Now community members can reach their Chief, council members and key band administrative staff by cell phone, wherever they happen to be in the community or if they are travelling outside the community.

The Fort Severn government uses IP videoconferencing over their managed network two or three times per month, primarily to connect the Chief and band councilors or administrative staff to regional meetings. For example, the regional Chief's Forum uses videoconferencing to connect Chiefs of First Nations in Northwestern Ontario to discuss issues of concern. When travelling has been difficult, this forum has served to connect people to discuss pressing issues like addressing the recent H1N1 health pandemic. The band uses the videoconferencing unit in the e-Centre for these meetings. Several years ago, during one winter when more polar bears than usual were moving through the community, Fort Severn used videoconferencing to hold a band council meeting, and residents could participate in the live webstream from their homes.

One impact of the online communication noted by community leadership is that Fort Severn is hosting fewer visits from government officials. *"We're able to share information back and forth. Because way back even before the fax machine we used to see a lot of government people here and that is only because they needed to come and get that information. But now they don't really have to do that much travelling 'cause that information, even financial information, we could download it then email it to them, right to their office."* Some people see this as a challenge because when government officials travelled to the community, they were able to see and learn first hand about the needs and challenges faced by local residents and the leaders.

## *7.2 Education Services*

Staff working in the education sector in Fort Severn use the community's broadband network actively. They deliver education services in the Washaho elementary school and the Keewaytinook Internet High School. In addition to this core service area, staff members and community members use the networks for professional development, training and learning through the Wahsa centre or by group or individual study.

The Washaho Elementary School building constructed in 2008 consists of four double portable classrooms around a central open courtyard and playground. The school is located centrally, a few hundred metres from the band office and health centre. The former school was condemned in 2006 due to mould build-up throughout the building. Many families left the community during this two-to-three year period so their children could attend school in another centre. Families are now starting to return to their community but a more permanent and long term school facility is still required because portable classrooms tend to deteriorate quickly in these harsh environments.

The internet is used extensively for school administration. School administrators use email regularly to connect with the band office and the community education director who is often travelling outside the community. Email is particularly convenient for teachers who only have a few minutes between classes, and time to use the telephone to connect with parents and others outside the school is very difficult to find. Some of the teachers use Facebook to coordinate school events, because most of the pupils are on Facebook.

Washaho School teachers and pupils use the internet for pedagogical reasons. Teachers use the Web to download educational programs and to conduct research for preparing classes. Pupils in the senior classes use the Web for doing research. Pupils use the computer lab when they need to use a computer because computers are still a scarce resource. All the existing computers in the old school had to be destroyed due to the mould contamination. The staff agrees that the school could use more computers. One staff member said: *"Most schools have one or two computers for individual students to work on at the back of the [class] room. We don't have that. That is important, especially in the primary grades because they're getting basic skills from those computers, and they're not getting that daily practice because we don't have enough computers to allow them daily practice."*

At the time of the interviews in March 2011, half of the 12 computers in the Washaho School computer lab had viruses and other problems that prevented them from being used. The school requires a full-time IT technician to complete ongoing maintenance and upgrades. School staff said the school computer situation is getting steadily worse. Teachers would also like to have Smart boards in the classroom but funding for these or other technologies is also a challenge with so many other priorities and needs with a small school population. In December 2010, Edubuntu along with a freeze program was installed on all the school computers and a local teacher was trained to support its use but the staff person left after Christmas leaving the school dependent on the software the staff was already familiar with.

In the interviews, Washaho school staff noted the slow download speeds on the community internet connection and identified several challenges for delivering education services. One teacher said: *"I would go to iTunes and I would pay for a movie to rent for the kids and download it, except the last movie I downloaded took me four days... We've just started to download a whole math program. The books are coming from Sioux, but the teachers' guides are all online. Again, it would really be good to have a little bit more speed, but we are getting them slowly downloaded so we can start teaching that program. And it's a whole lot better program for the kids than what we were using. It all comes down to speed. Just give me some speed."*

As new teachers and staff begin working with the Fort Severn IT technician, many of these challenges can effectively be addressed using some of the bandwidth management tools mentioned previously. Often the challenges faced by Fort Severn school and other local organizations has more to do with being unfamiliar with the local network and how it can be effectively utilized to address their needs.

The Fort Severn Keewaytinook Internet High School (KiHS) is located in one of the portable classrooms in the Washaho School complex. Outside it looks like any other portable classroom but inside it is a high-tech classroom; students and the classroom assistant use many different kinds of ICT for their education and learning. The room is colourful - the walls full of images and other information - and lined neatly with computers, cables and equipment.

KiHS is a provincial high school, the first online high school accredited by the Province of Ontario (Potter, 2010; Walmark, 2010). The KiHS Fort Severn classroom uses ICT more intensively than in other Ontario schools, because it is an online school. The class is coordinated by a classroom assistant who mentors students and keeps everything organized. The teachers are based in KiHS classrooms in other First Nation communities in the region. All communication between students and teachers is online, while the classroom assistant has an important mentoring role.

The main KiHS platform is a Moodle environment modified to meet the needs of First Nation students and educators. All the courses are online and the students, teachers and classroom assistants use the internet extensively - email, the Web and many online tools. Because they use online technology so intensely, KiHS students and the classroom assistant have excellent ICT skills.

The internet connection at the KiHS classroom also requires the same careful management to ensure all these online applications are able to operate effectively. Some of the KiHS teachers in other locations tried to set up the bandwidth-hungry Elluminate service, a web-based multimedia platform, but the internet was too slow to accommodate the video feed and so they stopped using it. Instead, the much more bandwidth-sensitive Adobe Connect software was used to support these interactive sessions.

KiHS in Fort Severn uses videoconferencing to connect with monthly gatherings of all KiHS classrooms, for special educational sessions, for staff training and for school administration. The KiHS students in particular enjoy the videoconferences where they have the opportunity to interact with KiHS students in other First Nations communities.

### *7.3 Health Services*

The health center is a large and busy building next to the band office. It contains offices and clinical health spaces, meeting and activity rooms, and apartments for visiting health workers. Health centre workers use ICT extensively for health administration, clinical health services, professional development, and community wellness activities.

The internet has become an essential tool for the health staff. They use email daily for health administration, especially to schedule appointments with patients, and they use their IP phones. Sometimes they use Facebook because it is quickly becoming the best way to reach some community members. The staff would prefer to use email with Health Canada staff to schedule health-related travel for community members; however Health Canada requires all those exchanges to be done by fax, which is inefficient and time-consuming. The Fort Severn staff use the Web to prepare information sessions for community members on various health topics.

Health staff also use videoconferencing for health administration. Some staff schedule monthly meetings by videoconference with staff in other communities. Videoconferencing is also used extensively for professional development courses and information sessions for health professionals and community members about all aspects of health and wellness.

The health centre staff also use the broadband network for x-rays. They take the x-ray in Fort Severn and transmit the image immediately to doctors in health centres in urban areas. However when researchers visited Fort Severn in 2011, the x-ray application had been down for a month. They were waiting for IT support from Health Canada to come to fix it. Health Canada refuses to pay for the maintenance agreement for the digital x-ray equipment, creating these types of challenges in the remote First Nations.

Health staff use telehealth and telemedicine (primarily videoconferencing) when a patient needs to see a health professional in an urban centre and wants to remain in the community. The telehealth visit typically takes place in the health centre, but staff can also bring a mobile videoconference camera to the patient's home when required. Keewaytinook Okimakanak Telemedicine (KOTM) provides telehealth services to Fort Severn. KOTM has a community-driven and community-led philosophy.

Health is the only service area that has a dedicated staff person specifically to facilitate the effective use of the ICT to deliver services. That position is called the CTC - the Community Telehealth Coordinator. The KOTM CTC in Fort Severn is responsible for supporting all kinds of telehealth visits and activities for community residents. This set-up enables community residents to use telehealth technology (real-time and two-way video and audio) to communicate face-to-face with family members, health professionals, and others.

In 2010, researchers conducted a study of community perspectives on telemental health (using videoconferencing to connect with mental health services). A wide range of opinions were shared: 47% of participants thought that it was a useful and good idea, another 33% had concerns about it and did not think that it was a good idea, and another 20% were neutral. A research paper was written on this topic, fully exploring all of the concerns and advantages identified by community members (Gibson, Coulson, Kakekakekung, Miles, Daniels & O'Donnell, 2011). Many of these new

ways of delivering services require a lot of time and support to ensure they are successfully introduced and maintained. It is still a challenge for First Nations to find the resources needed to create the type of change management required to use ICT tools effectively.

Videoconferencing is also used for community visits for wellness. For several years now Fort Severn has been participating in elder visitations by videoconference, coordinated by KOTM and the CTC in each of the many participating communities. This special time offers elders the opportunity to communicate with each other in their native language, visit with old friends and family, and receive health education and a meal.

When researchers visited the community in 2010, health staff mentioned that they were using videoconferencing to support a lot of family visits. One explained: *" We have two elders staying at long-term health care in Sioux Lookout. And we try and do at least three family visits a month, try and connect with their family here. Or sometimes they would request to see their family. And some people here have their kids in other family living in different reserves, and they request that they would have their own family visit here. And they would see their grandchildren that they haven't seen yet or their daughters or how they're doing, that they would just see and talk to them instead of just over the phone and all that. They really enjoy that because a lot of people have been requesting that."*

Several health centre staff commented that many of the homes where their elderly patients live required their internet connection to be activated. They said if they had more funds they would like to pay for the internet connection so the elderly patients could access health information and resources available online.

## 8 Links between First Mile Concepts and Service Delivery in Fort Severn

More than 10 years ago, Fort Severn community members identified governance, education and health as the service areas they would most like to see developed in future with improved broadband connections. We discussed how the community uses First Mile concepts to develop the local broadband infrastructure and to deliver government, education and health services. In this section we will explore how community services staff perceive the links between First Mile concepts and their delivery of services.

As described earlier, the First Mile refers to ensuring that First Nations communities are connected to broadband in ways that support sustainable, locally-driven services, programs and activities. First Mile concepts applied to service delivery imply that communities: 1) are delivering services that are holistic and community-centred; 2) access and possess the capacity and resources to effectively manage the content, traffic and services on their local network; 3) aim for ownership and control of the local broadband network that supports the flow of information and services in their communities.

Overall, the community leadership and community services staff members interviewed believe that their service delivery enabled by technology is meeting community needs. The youth in elementary school and KiHS are perceived to be major beneficiaries of the technology in the community. One community leader explained: *" The kids in the schools... they're picking it right up. They're picking it up early and they're learning more about it and like they're doing stuff that I don't even know."* On the other hand interview respondents also identified the need to reach out more to community members, especially the youth, to make sure that the content and services developed speak to their needs and that they feel a sense of ownership over them.

Fort Severn leadership is working closely with its tribal council KO and telecommunications division K-Net to effectively manage the content, traffic and services on their local network. Several significant challenges remain to ensure that the Fort Severn community has more local capacity to do this. The first is having more local capacity to manage the traffic on the local network. According to K-Net, there should be enough bandwidth in the community to meet its needs, but many community service staff and community members are complaining that the internet connection is far too slow. This was a particular problem in the Washaho school and KiHS but also mentioned by band office staff and health workers. Having more local capacity to identify the source of the bottlenecks and address them would alleviate some of this problem.

The leadership recognizes the limitations of the satellite-served broadband network in the community and believes they are making the most of it. *“So the internet too, I think it's meeting people's needs although we can't ... like the internet's slow, but it still works for us. I guess we could say we would like it to be better but that's what we have and we'll work with it.”*

The community clearly requires more IT support and development capacity to more effectively deliver education services and community government in particular. The Washaho School needs more IT equipment, resources and support. The band would like to expand its use of ICT for government and community administration - for example, they would like to complete land-use planning and land-use studies using GPS and mapping technology - but will require more staff, technical and related resources to do it.

When the SMART communities project was taking place, Fort Severn was able to create and fill three IT-related positions, including a multi-media person who looked after the website among other duties. Now that SMART is finished, there are just enough funds for one IT position - the e-Centre manager, who also provides IT support to the band and community members who subscribe to the community ICT services, including the community internet, community cable TV, and Keewaytinook Mobile.

Professional development and training of staff working on service delivery is a big challenge for the Fort Severn community. Many of its service areas still require budgets for training new staff. One band staff member explained that many of the people they hire in health and education require both more experience and training to be in the position but they are the best candidates available. The public funds provided for the staff position often do not cover training, so even if distance education is available for that person, they are challenged pay for it.

The health services staff believe that some community members need more support to ensure that they can effectively use the broadband-enabled health services the community is delivering. This includes ensuring that the internet connections in all community homes is hooked up and community members have access to IT support services when they have computer problems, so they can more effectively use their broadband connections.

The study identified opportunities to raise awareness of the services available to community members. A number of suggestions were made to reach out to community members more broadly to make them more aware of broadband-enabled services such as telehealth. Similarly, the interviews highlighted the need for more community awareness of KiHS. Parents need to become fully aware of KiHS and what it can offer their children. One suggestion is an awareness campaign about KO and how KiHS started, to inform community members of the background history.

The Fort Severn leadership clearly recognizes the community's ownership and control of many aspects of the technical infrastructure used to deliver services in the community - such as their C-

band satellite equipment. Those delivering the services using the broadband delivered by the satellite are often generally unaware of who owns and manages the satellite and the broadband.

The community leadership is concerned about the future of the community's satellite connection through the NICSN consortium. Currently, most of the First Nations in Ontario on the NICSN network are included in the new fibre broadband build to First Nations in Northwestern Ontario. As communities receive their fibre connections, they will no longer need their NICSN satellite connection thus freeing up their portion of the satellite bandwidth for the other Ontario NICSN-served communities. Fort Severn, given its very remote location, will not be getting a fibre connection in the foreseeable future, so NICSN and satellite broadband will be very important for the community for many years to come. There are concerns in the community that if only a few Ontario First Nations remain on the NICSN network, it may be difficult to sustain.

The community leadership also recognizes the community's ownership of and control over the services, at least to a point. Staff delivering community services had mixed views about community ownership of the services enabled by broadband. Fort Severn First Nation, like most First Nations across the country, is constantly negotiating with governments for sufficient resources to run the services in a holistic way to meet community needs. Having access to adequate funding is always a challenge and until there is more control over the funding situation, First Nations like Fort Severn will likely not feel fully in control of the services relying on that funding.

## 9 Conclusion

The First Mile is both an emerging policy approach and a framework that supports holistic and community-centred broadband development and use by First Nations. First Mile focuses on community management and control of local broadband infrastructure and services. The First Mile approach sees little value in broadband networks and new technology coming into a community unless they benefit the unique needs of the community as a whole.

This paper presented a case study of Fort Severn First Nation putting First Mile concepts into action. Working with their tribal council, Keewaytinook Okimakanak, and other strategic partners to develop the broadband networks in the community, Fort Severn has shaped these technologies to meet the community's needs. Community priorities for broadband-enabled services identified more than 10 years ago included governance, education and health. This study demonstrates how today the broadband networks in Fort Severn are cross-sector enablers that support the community's delivery of these core community services and activities.

Using a First Mile framework to understand Fort Severn's delivery of community services has several implications. First, it shows how the community requires more local capacity to support the management and control of the information and services flowing through its local network. Related to this is the community's need for ongoing funding for professional development and training for the staff delivering the community services. This means having more than one IT support position in the community and having training dollars available to ensure continuous professional development for these positions. Second, the community needs support for long-term planning, supported by its strategic partners, for the sustainable satellite connectivity to broadband networks required to deliver these services. Finally, community members themselves need support to ensure they can effectively use the broadband-enabled services available to them.

The First Mile approach also recognizes that First Nations like Fort Severn work closely with their tribal councils and other regional First Nations organizations and strategic partners to do this work. For example, the "slow" internet in Fort Severn is a function of some major challenges and issues that remain outstanding in most remote and rural First Nations communities. The reporting and

direct supervision required to make all the broadband-enabled services successfully work in each First Nation is always going to be a challenge as management and personnel continue to change. All this work will require support from dedicated regional support organizations that work closely with First Nations, such as KO/K-Net in Fort Severn's case (see O'Donnell et al, 2009 and 2010, Whiteduck, T., 2010). The support role played by these regional organizations must be understood by funding programs. Funding models must evolve beyond the current practice of paying only for one-time capital without supporting the sustained training and capacity building required in communities.

The First Mile as a policy approach and framework is conceptually linked to OCAP (ownership, control, access and possession) principles and the United Nations Declaration on the Rights of Indigenous Peoples. The UN Declaration is an international legal instrument that could support control by indigenous peoples over developments affecting them related to broadband infrastructure. In Fort Severn's case, control of local broadband and the community services using the network means that they can support community development in a way that meets their unique needs.

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