

Broadband Overview



Agenda

- Broadband 101
 - Components of a broadband network
 - Current and future technologies
 - What affects my internet?
- Barriers to Broadband
 - The Saskatchewan Reality and Result
 - Infrastructure costs
- Bridging the Digital Divide
 - What is SaskTel doing?



Components of a Broadband Network

- **Transport**
 - Connects communities and regions
 - Massive capacity
 - Fibre, Satellite, Microwave Radio
- **Last Mile**
 - Connects homes and businesses
 - Speeds dependent on technology
 - Fibre, DSL, Cable Modem, Fixed Wireless, Satellite
- **In-home equipment**
 - Modem, Router, Gateway
 - Wi-Fi Enhancers



Transport - Wholesale

- SaskTel's transport network is the largest in Saskatchewan, delivering backhaul capacity throughout the province.
- All broadband providers in Saskatchewan have the option to connect to SaskTel's transport network at (CRTC approved) wholesale rates to serve rural and urban customers alike.
- Although many broadband providers do utilize SaskTel for wholesale network capacity, it still is not economically feasible for these other broadband providers to construct 'last mile networks' needed to serve some rural and remote residents.



Last Mile Technologies

- Fibre
 - Fast download and upload speeds
 - Future proof
 - Cost prohibitive
 - Best suited for large, medium, and small urban
- DSL
 - Widely available
 - Loop length limitations
 - Currently incapable of speeds much beyond 50/10



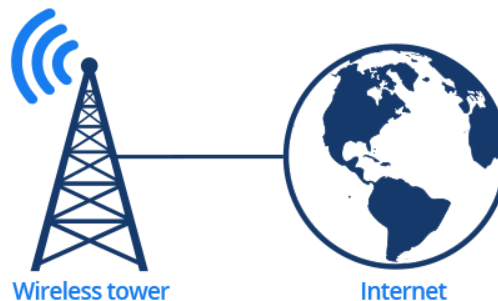
Last Mile Technologies - Cont.

- Cable Modem

- Fast download and moderate upload
- Easier to upgrade
- Shared service
- Best suited for large, medium, and small urban

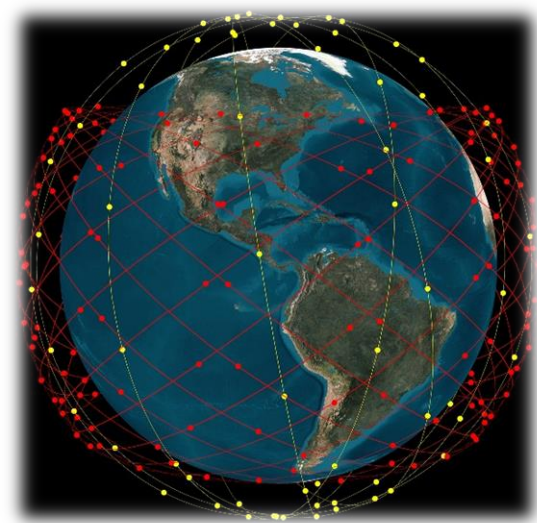
- Fixed Wireless

- Capable of 50/10 and beyond
- High number of Fixed Wireless providers in SK
- Shared service, limited range, limited capacity
- Best suited for very small communities, farms, acreages, and first nations



Last Mile Technologies - Cont.

- LEO Satellite
 - Capable of 50/10 and beyond
 - Greater range than fixed wireless
 - Technologically and cost prohibitive
 - Shared service with limited capacity
 - Best suited for very small communities, farms, acreages, and first nations



What Affects Internet Speeds?

Factors inside the home

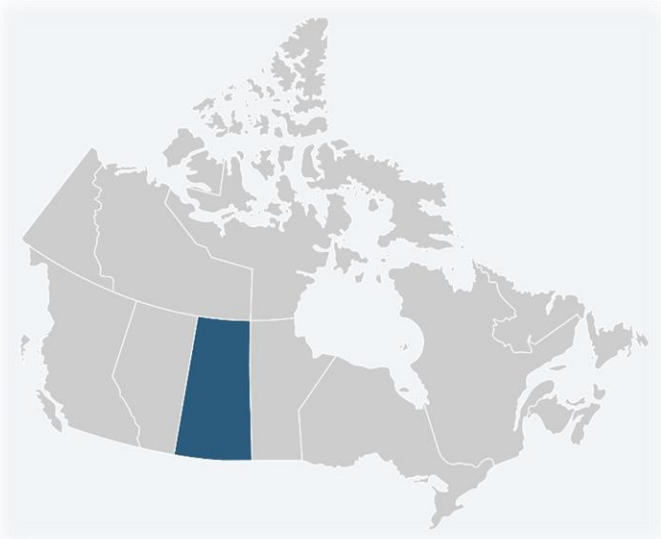
- **Subscribers Device (Computer):** Older hardware can struggle to keep up with the demands of new applications
- **Wi-Fi:** The distance as well as the materials (walls, appliances, etc.) between a connected device and the gateway will affect Internet speeds.
- **Number of devices connected:** Many devices using the Internet at the same time compete for the same speeds and can slow things down.

Factors outside the home

- **Heavy traffic on a site.** If thousands of other people are trying to access the same website, it may affect how quickly you can access that site.
- **Technical factors.** Latency (the time it takes for data to travel from a source to a destination) and packet loss (the number of data packets sent to or from your home that don't get to their destination) can slow Internet speeds.

Saskatchewan Challenge

- Reality: Saskatchewan is the second least densely populated province nationally and has the fewest people per community in Western Canada.
- Result: Extremely difficult for any ISP to build positive business cases required to deploy advanced broadband technologies to some areas.



Average Infrastructure Costs

The costs to expand services to rural areas/communities are extraordinarily high and a major challenge for any communications provider.

Average Infrastructure Costs:

- Wired Broadband
 - \$450,000 - \$2,600,000
- Wireless Services
 - Small cell tower: \$150,000 - \$385,000
 - Large cell Tower: \$700,000 - \$1,000,000
 - Fixed Wireless: add \$330,000



Fibre-to-the-Farm

Bringing fibre-optic internet to every household and business in the southern half of the province is estimated to cost over **\$7 Billion**.



Bridging the Digital Divide

- Fibre Expansion
 - Rural Fibre Initiative
- Partnerships
 - Fixed Wireless
- LEO Satellite
 - Pursuing Telesat and Starlink on partnership opportunities
- Federal Funding
 - Est. \$75 million coming to SK
 - Need a program to cover ongoing costs
- Stakeholder Investments
 - Community Participation Program



Thank you!