

# Gwaii Tel Society

The logo for Gwaii Tel Society features the word "Gwaii" in red, "Tel" in black, and "Society" in black. To the right is a red stylized symbol consisting of three curved, overlapping lines that resemble a traditional Indigenous design.

Annual Report 2019-2020

# **GwaiiTel Annual Report 2019-2020**

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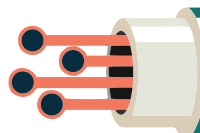
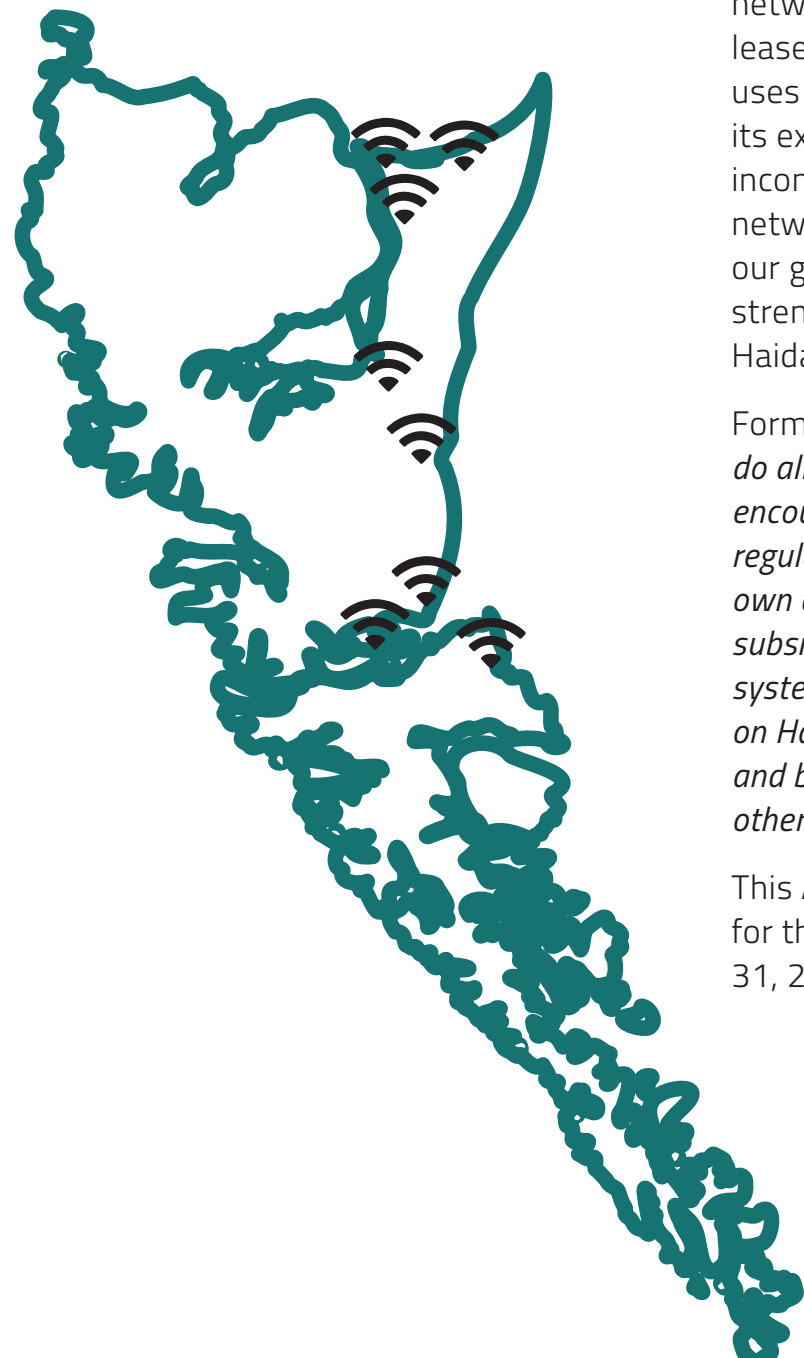
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# What does GwaiiTel do?

The GwaiiTel Society (GwaiiTel) is a Haida Gwaii-based not-for-profit organization whose goal is to facilitate the availability and delivery of affordable broadband Internet services for the people of Haida Gwaii. As a middle-mile provider, GwaiiTel owns a network of on-island physical infrastructure which is leased to Internet Service Providers (ISPs). GwaiiTel uses the resulting revenue to operate and maintain its existing network, and relies on a variety of grant income sources to further expand and upgrade its network. Together, this allows us to work toward our goals of lowering costs, improving reliability, and strengthening the performance of Internet service on Haida Gwaii.

Formally stated, the mandate of GwaiiTel is *“To do all things necessary or desirable in order to encourage, improve, plan, obtain financing for, obtain regulatory consents, permits and licences for, build, own and operate (either directly or through one or more subsidiaries, contractors or agents) communications systems of any sort for use between persons resident on Haida Gwaii between the communities of the Islands and between such persons and communities and any other places in the world.”*

This Annual Report covers the activities of GwaiiTel for the period between September 1, 2019 – August 31, 2020.

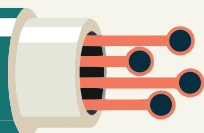


# A Brief History of GwaiiTel

Through many twists and turns, the origins of the GwaiiTel Society can be traced back to the 1993 passage of *The Gwaii Haanas Agreement*. Following decades of political organizing, *The Gwaii Haanas Agreement* laid the foundations for what would become The Gwaii Trust Society, whose mandate included a commitment to investing in a broad range of environmentally sustainable social and economic initiatives across Haida Gwaii. By the mid 1990s, the increasing importance of Internet connectivity led The Gwaii Trust to establish a separate working group in order to explore ways of improving access and lowering the costs of Internet connectivity on Haida Gwaii. As demand grew, this working group split off from The Gwaii Trust Society to become a separate non-profit entity, incorporating as The GwaiiTel Society in 2006.

From its inception, GwaiiTel has used revenue gained from lease agreements and grants from a variety of sources (e.g. Gwaii Trust, federal, provincial) to expand and upgrade the network architecture of Haida Gwaii, an area whose challenging geography and small population provide little financial incentive for traditional ISPs to provide affordable, quality service. These improvements to the network architecture include:

- **2006-2010:** Construction of community Points of Presence (POPs) in the Villages and Municipalities of Sandspit, Queen Charlotte, Skidegate, Tlell, Port Clements, and Massett; Connection via TELUS VPN among communities and across to the mainland via TELUS microwave IP Transit.
- **2011-2015:** Construction of a microwave radio link between the mainland and Old Massett, increasing capacity from 70 to 360 Mbps; Further upgrades to the microwave radio link between Skidegate and Sandspit, increasing capacity from 10 to 70 Mbps.
- **2016-present:** Upgrades to microwave radio link between the mainland and Old Massett increase capacity to 800 Mbps; Upgrades to community POPs, including back-up power facilities; Construction of 1 Gbps fiber backbone from Skidegate to Old Massett; Further upgrades to microwave radio link between the mainland and Old Massett increase capacity to 1.3 Gbps.



# The GwaiiTel Network

GwaiiTel provides middle-mile broadband network services through a mix of wireless and fixed technologies. The GwaiiTel network starts on the mainland, where GwaiiTel acquires IP-Transit services (that is, connects to the public Internet) from CityWest (a municipally-owned telecommunications company wholly-owned by the City of Prince Rupert) through a connection on Mt Hays. From here, GwaiiTel uses an 8 Ghz digital microwave radio link to connect to a site in Old Massett at a maximum capacity of 1.3 Gbps (subject to atmospheric conditions). While available spectrum is limited at Mt Hays, GwaiiTel is also currently exploring the potential of acquiring spectrum in adjacent frequency bands to facilitate further capacity additions to our existing microwave link.

Once IP-Transit has reached Haida Gwaii, GwaiiTel distributes IP-Transit across island through its 'middle-mile' backbone, which utilizes GwaiiTel's fibre-optic network. This backbone includes seven community-facing Points-of-Presence (POPs) which serve as distribution branches off of the main backbone for the communities of Old Massett, Masset, Port Clements, Tlell, Skidegate, Queen Charlotte, and Sandspit. Each POP provides a 1 Gbps service interface (with room for expansion up to 10 Gbps) feeding into GwaiiTel's 1 Gbps DWDM fibre backbone. From here, the Internet travels to households via Internet Service Providers (ISPs) (e.g. Mascon).

At present, GwaiiTel's fibre assets consist of a 96-strand fibre cable (adjacent to Highway 16 between GwaiiTel's Old Massett and Skidegate POPs), and a 24-strand aerial fibre cable connecting GwaiiTel's Skidegate and Queen Charlotte POPs. Together, these provide the GwaiiTel backbone with a total capacity of 8 Gbps. However, as 72 of the 96 strands between Old Massett and Skidegate and 12 of the 24 strands between Skidegate and Queen Charlotte are currently 'unlit', the network has considerable room for further capacity expansion.

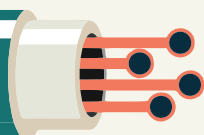
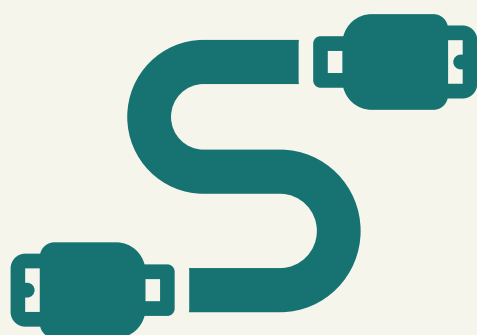
In summary, GwaiiTel owns and operates middle-mile broadband network which with capability of delivering traffic between the Internet and local ISPs, enabling ISPs to deliver broadband Internet services to commercial and residential end-users across Haida Gwaii.



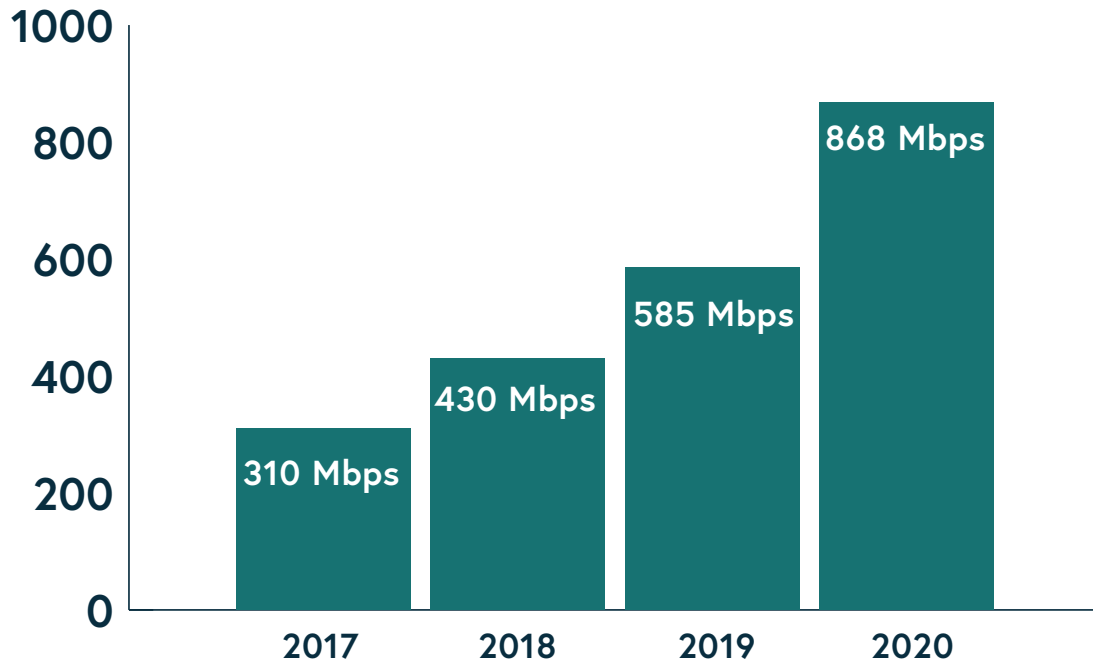
# Summary of activities for fiscal 2020

The past year has seen a number of noteworthy headlines, from upgrades to network outages. In addition, while both average and peak bandwidth usage across the GwaiiTel network have grown consistently over the past decade, the past year has seen a particularly dramatic rise. Below are a few highlights:

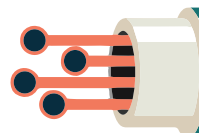
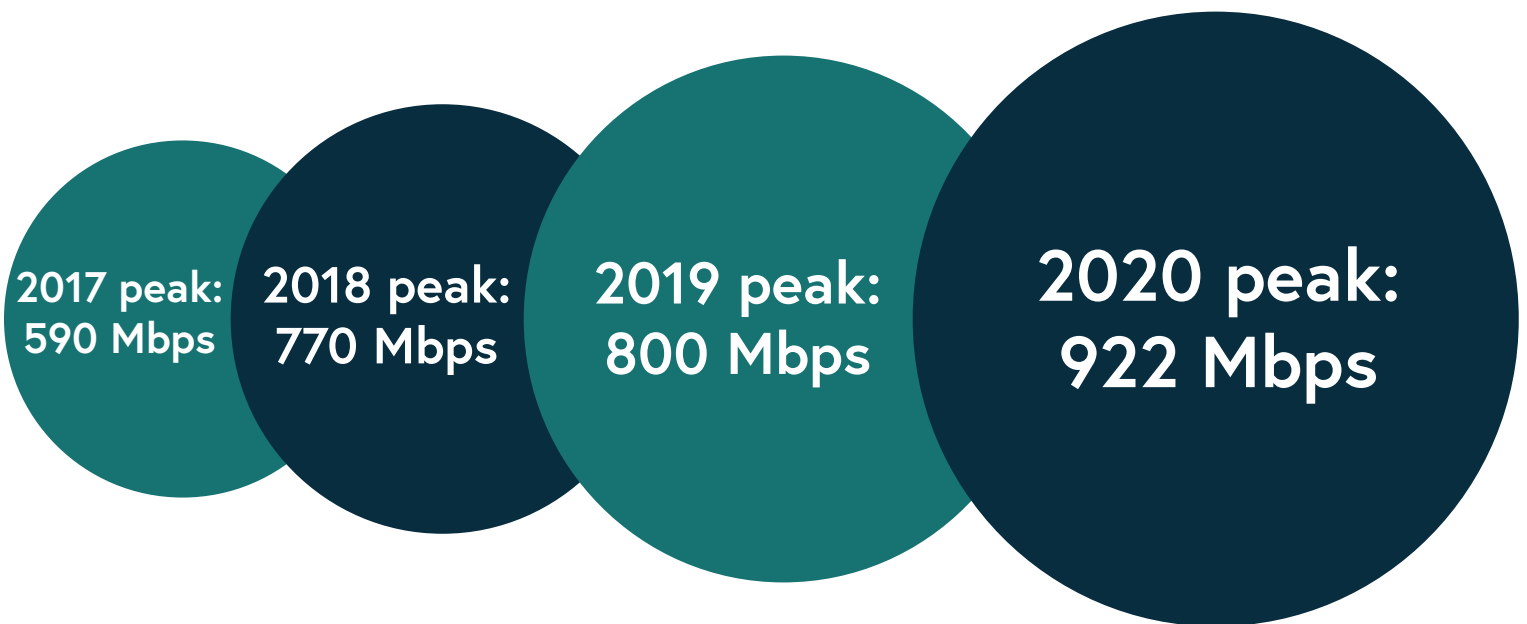
- **January 2020:** Severe weather damage to the antenna, feed horn, and shroud at Mt Hays cause a week-long outage across the GwaiiTel network. Our technicians were able to restore 50% capacity using a redundant feed horn from Old Massett until a permanent fix was installed mid-March.
- **March 2020:** The Skidegate to Sandspit microwave radio link is decommissioned following the successful construction of a subsea cable by Gwaii Communications linking the two communities. GwaiiTel no longer has an operational link to Moresby Island. Following the introduction of social distancing and stay-at-home orders, average bandwidth use across the GwaiiTel network grows by approximately 25% in one month.
- **May 2020:** Contractors on the Gold Creek Bridge relocation cause a network outage after digging up a portion of GwaiiTel fibre; BC One was not called prior to digging.
- **July 2020:** Radio upgrade completed giving the Old Massett to Mt Hays radio link 1.3 Gbps in optimal conditions. Funding for this upgrade was provided by All Nations Trust's Pathways to Technology program.



## Average Bandwidth Use



## Peak Bandwidth Use



# How is GwaiiTel run?

The GwaiiTel Society (GwaiiTel) is a British Columbia incorporated not-for-profit owned by the Haida and civic communities of Haida Gwaii and by North Coast Regional District – Areas D and E. GwaiiTel is subject to the *Societies Act of British Columbia* (BSC 2015, c18).

GwaiiTel's membership is by parity, with 50% Haida community representation and 50% civic communities, as represented by Skidegate Band Council, Old Massett Village Council, the Council of the Haida Nation, the Village of Masset, Village of Port Clements, Village of Queen Charlotte and the North Coast Regional District – Areas D and E.

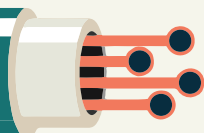
Members are responsible for the following activities: Upholding the constitution and complying with the Bylaws; Appointing the Board of Directors; Setting the goals of GwaiiTel for the Board of Directors; Approving the audit at the Annual General Meeting; Approving new applicants for use of the system; and supporting and furthering the purposes, aims and objectives of the society.

Brian Lund serves as Industry Advisor, and Terri Walker serves as General Manager. The Board of Directors provide oversight and direction to the Industry Advisor and General Manager for the day to day operations of the Society.

The Board of Directors for GwaiiTel's fiscal year September 1, 2019 – August 31, 2020 were:



- Evan Putterill (Chair)
- Sam Hall (Secretary Treasurer)
- Tomas Borsa
- Evan MacLean
- Devin Rawlek





# Frequently Asked Questions

## What is the difference between GwaiiTel and Mascon (formerly GwaiiComm)?

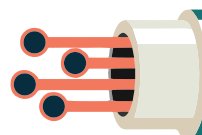
GwaiiTel is a Haida Gwaii-based not-for-profit organization which owns and operates a middle mile network of physical infrastructure leased to Internet Service Providers (ISPs); in this way, GwaiiTel can be thought of as a 'wholesale' provider. By contrast, Mascon is an ISP and wholly-owned subsidiary of TELUS which began offering Internet services on Haida Gwaii after acquiring GwaiiComm in December 2019; in this way, Mascon can be thought of as a 'retail' provider.

## Does GwaiiTel provide any sort of mobile/cellular service?

GwaiiTel provides middle mile connectivity through its microwave radio link between the mainland and Haida Gwaii and among the communities of Haida Gwaii via its fiber backbone, enabling ISPs to deliver broadband Internet services to homes and businesses. This is distinct from the form of Internet access one gets through smartphones and other handheld devices, which use private cellular networks to provide mobile data within a given region. GwaiiTel does not have any plans to enter into the mobile/cellular service market.

## Why do we need to keep investing in middle mile infrastructure?

Due to a combination of factors – the islands' small and spread-out population, variable and heavily-forested terrain, and severe weather systems, to name a few – Haida Gwaii provides little investment incentive for major telecommunications companies to build and maintain the infrastructure necessary for reliable, reasonably-priced broadband Internet. There are simply too many engineering challenges standing in the way and too few people for a profit-driven company to recoup costs from. Despite this, network traffic on Haida Gwaii has grown at a rate of roughly 40% year-on-year for the past decade, and current forecasts show that this rate will only increase in the coming years. In other words, people on Haida Gwaii want and need the Internet, and keeping up with demand requires careful planning and continual investment. Through access to major capital funding programs and the expertise of experienced industry advisors, GwaiiTel is uniquely positioned to ensure that investments to the critical middle mile network keep pace with local needs.



# Frequently Asked Questions

## What about Starlink? Why do I have to wait for fibre?

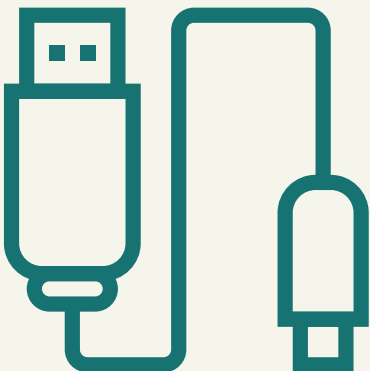
As noted in the 'Definitions' section, Starlink is a Low Earth Orbit (LEO) satellite Internet constellation that aims to provide high bandwidth, low latency Internet to rural and isolated communities across the world. At present, Starlink has made public a planned launch of 'mid-to-late 2021' on Haida Gwaii, and units are available for pre-order on a first come, first serve basis on [their website](#). Testing over the past year suggests that Starlink will be able to offer speeds in the region of 80 Mbps download/40 Mbps upload, with latency times of around 40ms.

## Why is my Internet slower at some times than others?

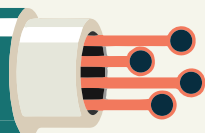
There are many reasons why your Internet may be slow or unreliable. Sometimes, the issue may be related to the incoming signal from the mainland. Because the GwaiiTel network relies on a microwave radio link to Mt Hays, and because the strength of a microwave radio link is weakened by certain atmospheric conditions, you may find that service quality dips during periods of heavy rain, snow, fog, wind, or when weather and water conditions in the Hecate Strait are extremely calm. In other cases, the issue may be closer to, or even in, your home, as obstructions to line-of-sight from large trees or buildings can interfere with the signal, as can outdated routers and other hardware. Homes located in densely-forested areas or enclosed by cliff-faces are likely to have the most variability in signal quality. Network-wide slowdowns are generally due to congestion. The period between 6pm and 2am, particularly on weekends, is when the network sees the largest number of users.

## How do I get my internet hooked up and how much will it cost?

Prices can vary widely based on your individual needs. Today, some options for broadband Internet services on Haida Gwaii include:



- **Xplornet** (<https://www.xplornet.com>)
- **TELUS Mobility** (<https://www.telus.com/en/mobility/>)
- **Mascon** (<https://mascon.ca/haida-gwaii-internet/>)



# Key Terms and Definitions

***Below is a summary of some important and commonly-used terms relevant to the work that GwaiiTel undertakes:***

**Aaxad Tllgaay:** The Xaayda Kil word for the Internet. Roughly translated to English, Aaxad Tllgaay means 'net around globe'; Used in a sentence, one might say 'Aaxad tllgaay k'aaysguuxan gii daanxan dii k'aayxa' *I am really hooked on the Internet.*



**Bandwidth:** The rate at which a network can transmit information. Bandwidth is synonymous with a network's 'speed' and is expressed in bits per second (bps). Generally speaking, higher bandwidth is desirable, as it can mean the difference between downloading an image in 2 seconds or 2 minutes.

**Broadband:** Broadband refers to any permanent, high-speed Internet connection. 'More formally, broadband is a data transmission with a wide bandwidth (as opposed to older dial-up connections known as 'narrow-band'), and can be provided through many different technologies, including fibre, microwave radio link, satellite, and many others. Broadband is the form of connection that most Internet consumers now use (and expect).

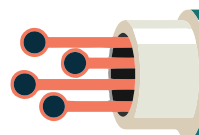
**Coaxial cable:** Easy to install and durable, coaxial cable is a commonly used and relatively inexpensive form of Internet connection. Although often adequate for small to medium networks, it is increasingly combined with fibre-optic elements to create a Hybrid Fibre-Coax (HFC) network, which carry the advantage of being able to provide a variety of services, including television, telephone, and Internet.

**Congestion:** Just as a traffic jam occurs when too many vehicles attempt to get to the same destination all at once, congestion refers to the reduction in quality of service on an overloaded network – that is, when traffic exceeds capacity. Congestion is sometimes also referred to as a 'bottleneck'.

**End-user:** Any person who connects to the Internet for personal or business use. End-users stand in contrast to other 'types' of Internet users, such as those who support or maintain the network (e.g. system administrators or computer technicians).

**Fibre:** Widely seen as the gold standard in Internet connectivity, 'fibre' transmits information by sending pulses of infrared light through a glass (or plastic) fibre-optic strand. Although expensive to install, it is also highly durable, reliable, and offers virtually unlimited expansion capacity. Note: Fibre is further divided into 'lit fibre' and 'dark fibre'. Lit fibre refers to an active strand that is being used to transmit data, while dark fibre refers to a strand which has been laid in place but is not yet in use. Dark fibre is commonly included in new fibre builds as a means of 'future-proofing' it, and can be leased to other businesses as needed.

**Fibre-to-the-Home (FTTH):** A form of fibre connection in which every part of the network is made up of fibre, all the way from the ISP's core network to the end-user. As a 'pure' fibre connection, FTTH is the fastest type of connection available, and is beneficial for businesses and end-users with high bandwidth demands.



# Key Terms and Definitions

**Internet of things/IoT:** A term which references the recent proliferation of Internet-connected devices and spaces, from hairbrushes to thermostats. An aspect of the 'Internet 3.0', IoT pushes the boundaries of the Internet far beyond laptop screens and smartphones.

**Internet Service Provider (ISP):** The retail arm of the Internet, an ISP is a company to whom an end-user pays a monthly fee for Internet access. The largest ISPs in Canada by market share are Rogers, TELUS, Bell, and Shaw. Mascon is an example of an ISP.



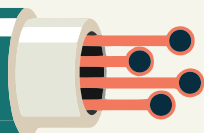
**IP Transit:** IP Transit refers to the service whereby an ISP allows Internet traffic to travel through its network to its final destination.

**Last Mile:** Last mile refers to the final leg of a connection between a provider's network and end-user's premises (e.g. a house or a business). The last mile is often the most expensive part of a network to build or upgrade because of the number of units involved: While only one fibre cable might need to be trenched down a street, there might be dozens of houses on the street which need to be connected to it. Upgrading the cable connection between each house and the fibre in the street is the 'last mile'; without an upgrade to this link, an end-user likely won't receive the maximum level of Internet speed advertised by their ISP.

**Low Earth Orbit (LEO) satellite Internet:** LEO is an emerging technology led by the likes of Starlink and Amazon's Project Kuiper which aims to dramatically increase connectivity across the globe – particularly in rural and isolated regions – by creating roving 'satellite constellations' to beam low-latency, high-throughput Internet back down to earth. Although not yet widely available, LEO satellite Internet should become increasingly available by the end of 2021. Although fibre will always provide the fastest and most secure form of connection, LEO Internet is likely to be dramatically faster than current satellite offerings.

**Line-of-Sight:** As wireless Internet connections (e.g. microwave radio links) are transmitted in straight lines from one point to the next, they need to have a relatively clear path of travel in order to function properly. Anything that stands in the way of that path of travel – trees, hills, buildings, and so on – can be said to 'obstruct it's line-of-sight', and will result in a weaker signal and thus, a slower and less stable Internet connection.

**Microwave radio link:** A microwave radio link is a type of wireless system which uses two nodes, or radio units, to establish an Internet connection through high frequency radio waves. Each radio unit consists of a transceiver (a device that can both send and receive communication) and a highly directional antenna. Once the units are aligned with one another, microwave radio links can provide high bandwidth connections. While microwave radio links carry the advantage of requiring little infrastructure (other than power), they also require direct line-of-sight for optimal performance, and can at times be adversely affected by weather conditions.



# Key Terms and Definitions

**Middle Mile:** A general term for the segment of a network between the 'core' and the 'edge' of a network, the middle mile is the intermediate portion of a network between the local 'last mile' and the broader public Internet. One way of conceptualizing the 'middle mile' is to think of the Internet as a sort of airport, where the IP Traffic provided by ISPs are the airplanes, and the middle mile is the runway. Without the middle mile, IP Traffic would simply have nowhere to land. GwaiiTel is an example of a middle mile provider.

**Ping/Latency:** Although separate concepts, ping and latency (also known as 'lag') work together and can impact Internet performance. In the simplest terms, ping is the signal your computer sends out to a computer or website, while latency describes the time it takes for the other end to respond. The lower, the better. Along with download and upload speeds, ping/latency can be measured through websites such as [Ookla Speedtest](#).

**Point of Presence (POP):** A Point of Presence (POP) is a location or facility at which two or more different networks or communication devices build a connection with each other. A POP is often a small building that stores critical network infrastructure like routers, switches, and servers. The GwaiiTel network includes seven POPs located across Haida Gwaii.

**Satellite internet:** Typically, 'satellite internet' refers to a type of connection provided by a geostationary satellites (that is, a satellite which stays in a fixed position in the sky). While satellite Internet can be a suitable option when no other alternatives exist, it is widely considered a 'port of last call', as it comes with significant downsides including high latency, high cost, and sensitivity to weather conditions.

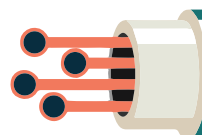


**Subsea cable:** Subsea cable is a section of fibre laid on the seabed in order to connect islands to the mainland and/or continents to one another. Because installation is slow and tedious work, subsea cable installation is often extremely expensive, but once established, the fibre provides unparalleled speed. Through the planned [Connected Coast project](#), Haida Gwaii will be provided with a subsea cable link to the mainland.

**Upload/download:** These two terms refer to the direction that data is moving between an end-user and a service provider: when something is uploading, it is moving 'away' from the end user's computer or device, whereas when something is downloading it is moving 'toward' the end user's computer or device. Like ping/latency, upload and download speeds provide a basic measure of the overall performance of an Internet connection. Generally speaking, the higher these numbers, the better.



**Wireless Internet:** A broad term for any form of Internet connection which uses radio waves (e.g. microwave radio link, White Space Internet, and so on), wireless Internet is a smart option where 'fixed' options like fibre or cable modem are too expensive or impractical. To receive a wireless connection usually requires some form of antenna.



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