



Canadian Radio-television and  
Telecommunications Commission

Conseil de la radiodiffusion et des  
télécommunications canadiennes

Canada

# COMMUNICATIONS MONITORING REPORT 2018

RETAIL FIXED INTERNET SECTOR AND  
BROADBAND AVAILABILITY

CRTC.GC.CA

ISSN: 2290-7866  
Cat. No.: BC9-9E-PDF

Unless otherwise specified, you may not reproduce materials in this publication, in whole or in part, for the purposes of commercial redistribution without prior written permission from the Canadian Radio-television and Telecommunications Commission's (CRTC) copyright administrator. To obtain permission to reproduce Government of Canada materials for commercial purposes, apply for Crown Copyright Clearance by contacting:

The Canadian Radio-television and Telecommunications Commission (CRTC)  
Ottawa, Ontario  
Canada  
K1A 0N2  
Tel: 819-997-0313  
Toll-free: 1-877-249-2782 (in Canada only)  
<https://applications.crtc.gc.ca/contact/eng/library>

© Her Majesty the Queen in Right of Canada, represented by the Canadian Radio-television and Telecommunications Commission, 2018. All rights reserved.

Aussi disponible en français

## Retail Fixed Internet Sector and Broadband Availability

Infographic 5.1

- **2017 revenues totaled \$11 billion**, a 7.7% increase from 2016 (residential revenues were up 8.8%, and business revenues were up 2.8%)
- From 2013 to 2017 **revenues grew** on average by **9.2% per year**
- **86% of households** subscribed to **Internet service**, with subscriptions up 3.9% compared to 2016
- Monthly data usage by **high-speed Internet service subscribers increased by 30%** from 2016 to 2017.
- **Residential average revenue** per subscriber was **up 5.5%** from 2016, to **\$58.49 per month**
- **FTTH Internet service** is now available to **35% of households**, with 11% of households subscribing.
- Revenue composition:
  - **Residential access: \$8.8 billion** (80% of the sector by revenue).
  - **Residential applications, equipment, and other Internet-related services: \$0.3 billion** (3% of the sector).
  - **Business access and transport: \$1.5 billion** (14% of the sector).
  - **Business applications, equipment and other Internet-related services: \$0.3 billion** (3% of the sector).

Source: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

*Internet applications include services such as email, web hosting and data centre services.*

In 2017, the retail fixed Internet sector (hereafter, Internet sector) was the fastest-growing sector of all telecommunications sectors. Revenues grew by 7.7%, while subscriptions grew by 3.9% compared to the previous year. From 2013 to 2017, revenues for this sector grew at an average annual rate of 9.2%. The

vast majority of revenues (80% or \$8.8 billion) were generated by residential access services followed by business access and transport services (14% or \$1.5 billion). Other types of revenues, such as revenues derived from equipment sales and rentals, as well as Internet applications, represented the balance and comprised only a minor part of telecommunications service providers' (TSPs) revenues.

More Canadians are subscribing to Internet services, 86% of households subscribed to these services in 2017. Canadians continued to use more data; subscribe to faster, larger packages; and allocate more money to Internet services.

Business Internet revenues grew at a much slower pace than residential revenues. However, more Canadian businesses subscribed to Internet service packages, with subscriptions increasing by 4.2%.

Fibre deployment continued, improving the availability of fibre-to-the-home (FTTH) Internet services from 29% to 35%. These deployments were mainly in large urban areas.

Internet service providers (ISPs) are categorized in three main groups: incumbent TSPs,<sup>1</sup> cable-based carriers<sup>2</sup> and other service providers.<sup>3</sup>

---

<sup>1</sup> Examples of incumbent TSPs include Bell, SaskTel and TELUS. They also include small incumbent TSPs such as Sogetel and Execulink.

<sup>2</sup> Examples of cable-based carriers include Rogers, Shaw, and Videotron.

<sup>3</sup> The "Other service providers" category maybe be further divided into "other carriers," such as Xplornet and Allstream Business, and "resellers," such as Distributel and TekSavvy.

## i. Residential market

Infographic 5.2

- **86% of households** subscribed to **Internet services** in 2017, up from 84% in 2016.
- The **residential market** represented **83%** of Internet sector **revenues**.
- The **residential market** represented **91%** of Internet sector **subscriptions**.
- **Independent ISPs** had **13% of residential subscriptions** in 2017
- The average **download speed** for services that Canadians subscribe to **continued to rise**, with the weighted average **reaching 68 Mbps** in 2017, far faster than the 15 Mbps average in 2013.
- Percentage of **subscriptions to Internet service packages** with **unlimited monthly data transfer** went from 12% in 2013 to **37% in 2017**.
- Average **monthly data** use by high-speed residential **Internet service subscribers increased by 30%** from 2016, to **166 GB**.
- Average **revenue per subscriber** reached **\$58.49**, a 5.5% increase over 2016.
- **FTTH-based subscriptions** accounted for **12% of residential Internet service** subscriptions.

Source: CRTC data collection

As mentioned above, more Canadians are subscribing to Internet access services. Canadians households continue to use more data, subscribe to faster, larger packages, and allocate more money to Internet services.

## Subscriptions

Infographic 5.3

- **Independent ISPs** accounted for **13% of Internet service subscriptions**, versus 49% for cable-based carriers and 39% for incumbent TSPs.
- Subscriptions to Internet service packages with **speeds of 50 Mbps or higher doubled from 19%** of total subscriptions in 2015 **to 39%** in 2017. The percentage of **households subscribing** to these packages **rose from 16% to 33%** during the same period.
- **12% of residential subscriptions** were for **fibre-based Internet service (FTTH)**, compared to only 3% in 2013.

Source: CRTC data collection

*Independent ISPs are defined as ISPs that are not cable-base-carriers or incumbent TSPs. Subscriber market shares are calculated from exact amounts although the percentages have been rounded and therefore exceed 100%.*

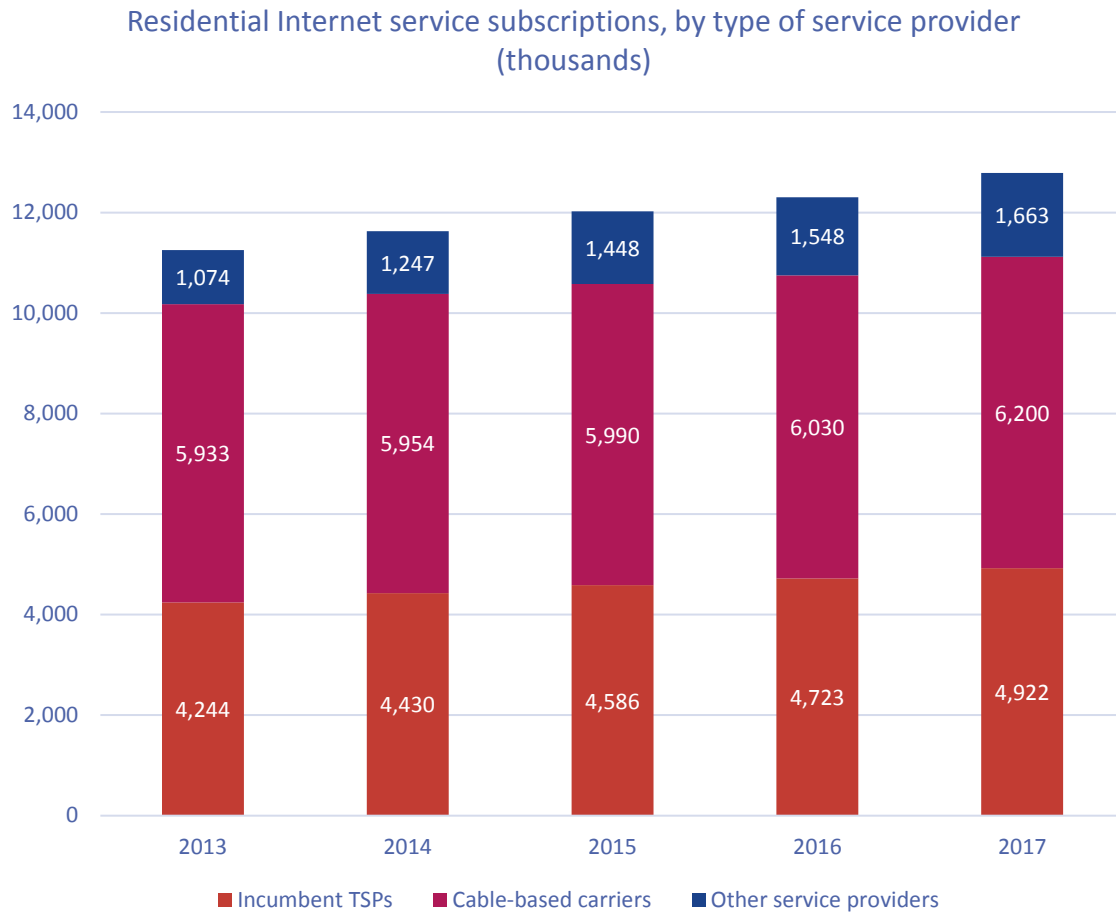
In 2017, a variety of ISPs provided Internet services, including traditional telephone and cable companies, fixed wireless service providers, and resellers. Residential subscriptions reached 12.8 million (86% of the 14.8M households), a 3.9% increase from 2016, which is approximately 3 times higher than the population growth rate<sup>4</sup>. Cable-based carriers and incumbent TSPs had the vast majority of the market by subscriptions (87%). Other entities continued to increase their subscribers, reaching 13%, up from 10% in 2013.

Growth rates in Internet subscriptions were approximately 2 to 4 times higher than population growth rates from 2013 to 2017.

---

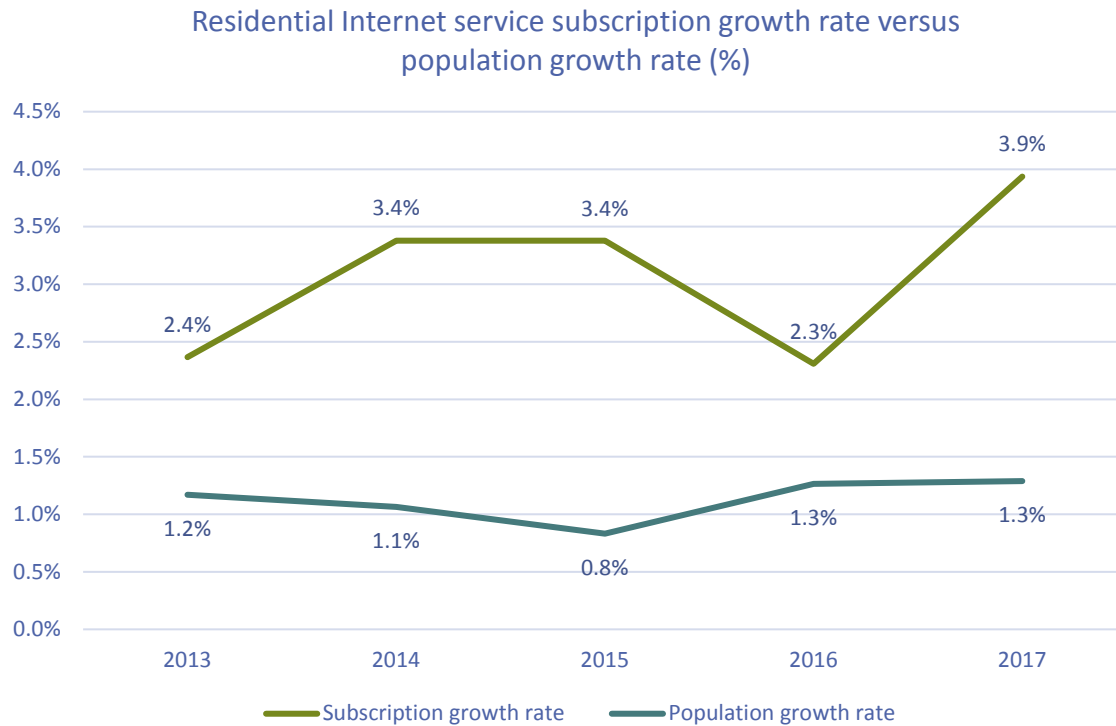
<sup>4</sup> The population growth rate was 1.3% from 2016 to 2017, according to Statistics Canada Table 17-10-0009-01 - Population estimates, quarterly

Figure 5.1 Residential Internet service subscriptions, by type of service provider (thousands)



Source: CRTC data collection

Figure 5.2 Residential Internet service subscription growth rate versus population growth rate



Source: CRTC data collection and Statistics Canada population estimates<sup>5</sup>

Canadians continued to subscribe to Internet services with higher monthly data allowances. In 2017, while most subscriptions (51%) included monthly data transfer limits of 300 gigabytes (GB) or more, approximately 2% of subscribers had transfer limits below 20 GB. Average data use continued to increase concurrently, with a nearly 30% increase in average combined download/upload data usage since 2016, reaching 166.2 GB per month in 2017.

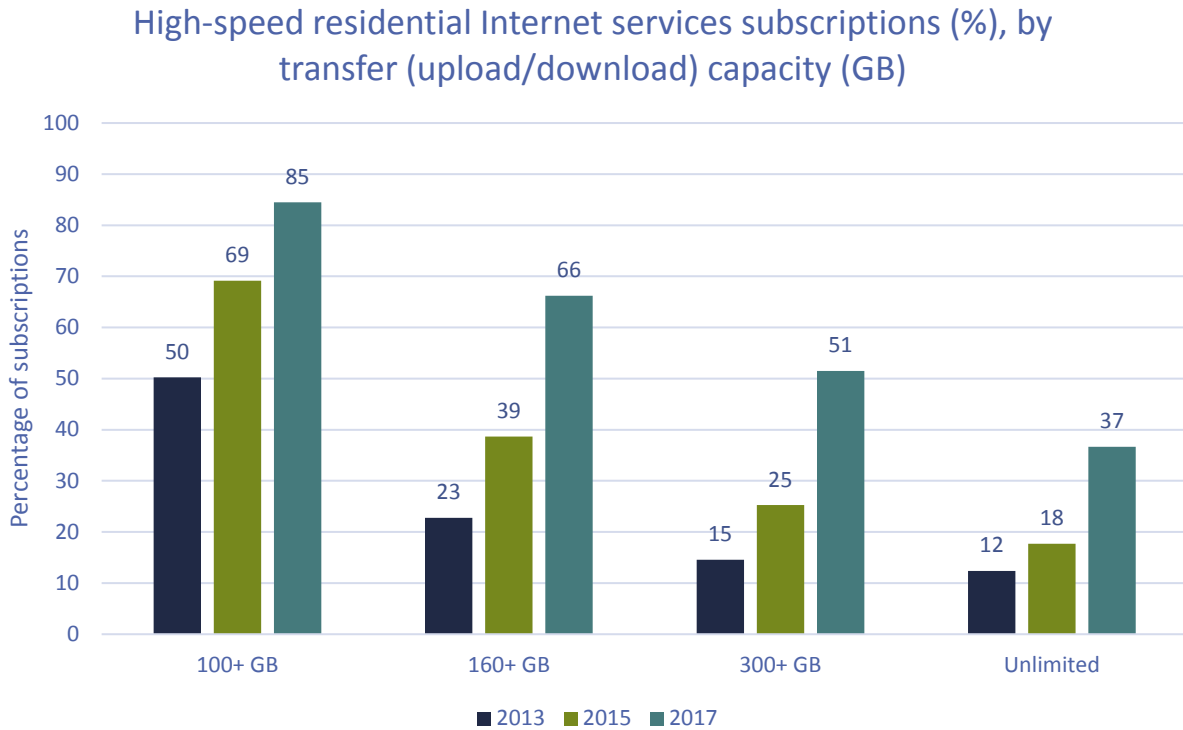
In 2017, Canadian households paid approximately \$94 million in Internet overage charges, which represents roughly 1% of total residential Internet service revenues, and is down from the approximately \$100 million paid in 2016. Less than 5% of subscribers went over their limit in 2017, consistent with 2016 levels.

All information in this section regarding gigabytes per month usage, and subscriptions by advertised speed and advertised download capacity, is from the larger ISPs. They reported approximately 87% of total residential high-speed Internet service subscriptions in 2017.

<sup>5</sup> Statistics Canada. Table 17-10-0009-01 - Population estimates, quarterly



Figure 5.3 High-speed residential Internet service subscriptions, by transfer (upload/download) capacity (GB)



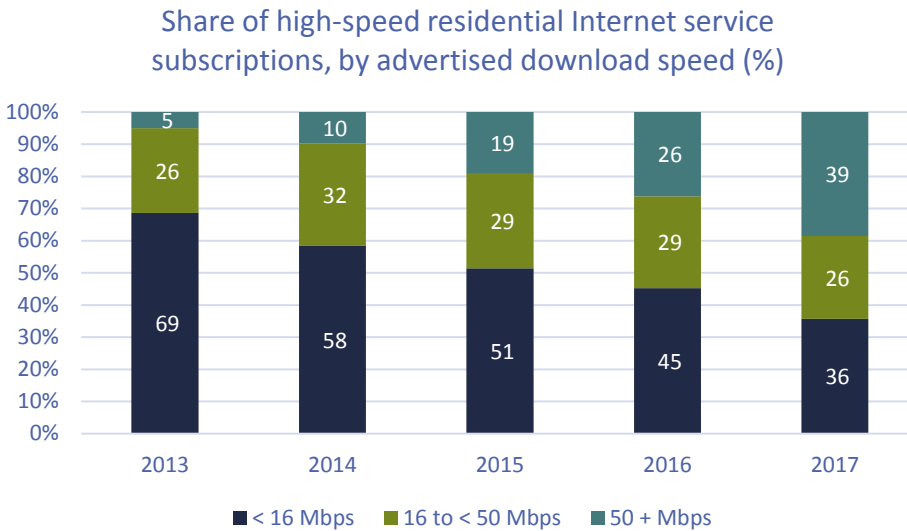
Source: CRTC data collection

*Plans with unlimited data upload were categorized according to their download limit.*

In 2017, 36% of high-speed residential Internet service subscriptions were for a service that met the Commission's target speeds of 50 Mbps download and 10 Mbps upload, compared to 23% in 2016. Subscriptions to services meeting these speeds (50/10 Mbps), and with unlimited monthly data transfer, more than doubled to 28% of total high-speed subscriptions from 14% in 2016.

While the majority of Canadians did not subscribe to an Internet service meeting the Commission's target speeds of 50 Mbps downstream and 10 Mbps upstream (50/10 Mbps service), they were increasingly subscribing to faster Internet services. Services with speeds slower than 16 Mbps went from 69% of high-speed residential Internet service subscriptions in 2013 to 36% in 2017, while subscriptions to services including speeds of 50 Mbps and higher went from just 5% of high-speed residential Internet service subscriptions in 2013 to 39% in 2017.

Figure 5.4 Share of high-speed residential Internet service subscriptions, by advertised download speed (%)



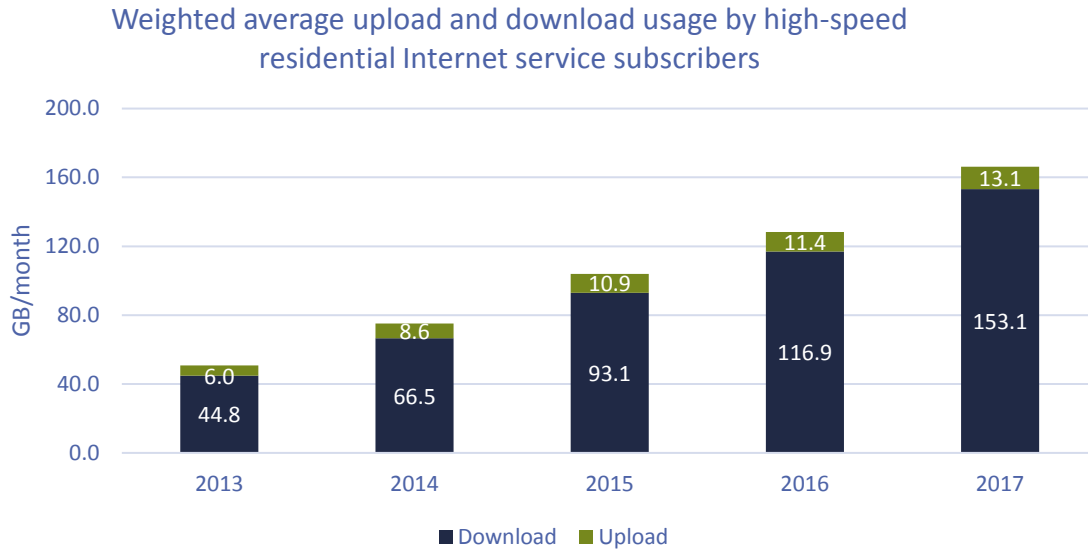
Source: CRTC data collection

*This table indicates that, over time, faster-speed services have accounted for a larger share of subscriptions. 85.9% of Canadian households subscribed to some form of high-speed Internet service in 2017. High speed refers to 256 Kbps or faster.*

In 2017, gigabit services, defined as those with speeds of 940 Mbps and faster, accounted for 1.2% of subscriptions, and generated an average of \$83.65 in one-month revenue, which is far below the reported lowest price for most packages for this type of service. This may be due to promotional activity and bundling. All of the reported gigabit services had unlimited data allowances.

While Canadians subscribed to faster services, they also consumed more data. The average amount of data downloaded by residential Internet service subscribers increased by 31% between 2016 and 2017 to 153GB per month, and by an average of 36% annually from 2013 to 2017. Average upload amounts also increased by 15% in 2017, reaching an average of 13GB per month. These increases from 2013 to 2017, resulted in average uploaded data per subscriber doubling while average downloaded data tripled.

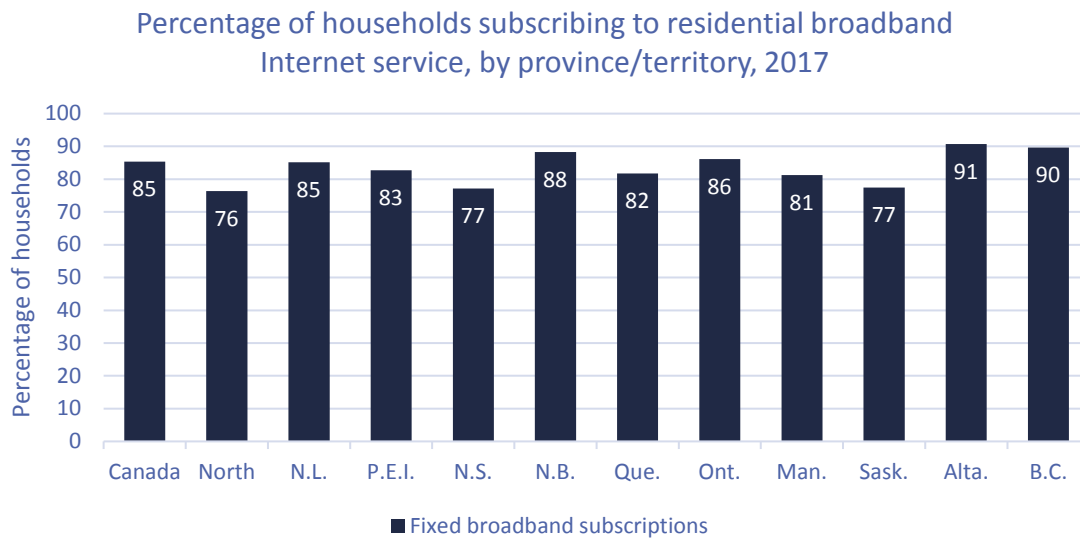
Figure 5.5 Weighted average upload and download usage (GB) by high-speed residential Internet service subscribers



Source: CRTC data collection

While 85% of households subscribed to broadband Internet service,<sup>6</sup> regional differences exist. British Columbia and Alberta led with around 90% of households subscribing to broadband Internet services, while Saskatchewan, Nova Scotia, and the North<sup>7</sup> trailed at around 77%.

Figure 5.6 Percentage of households subscribing to residential broadband Internet service, by province/territory, 2017



Source: CRTC data collection

<sup>6</sup> “Broadband” is defined as any Internet service that features an advertised download speed of at least 1.5 Mbps.

<sup>7</sup> “The North” refers to the Northwest Territories, Nunavut and Yukon.

## Revenues

Infographic 5.4

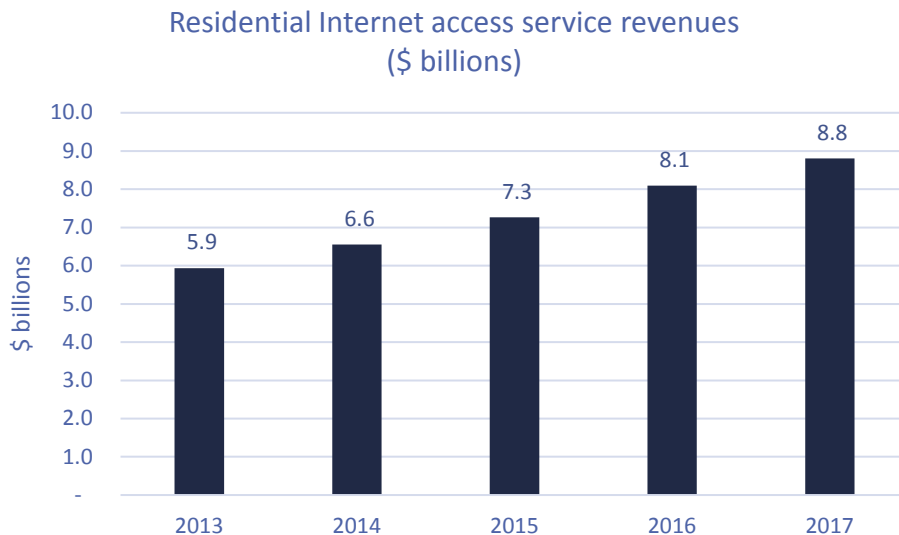
- ⇒ **8.8% revenue growth, 10.3% average per year** since 2013.
- ⇒ The **top 5 companies** generated **74% of revenues** in the residential Internet service market.

Source: CRTC data collection

The Internet service revenue share of the top five companies (Bell, Rogers, Shaw, TELUS and Videotron) declined slightly, from 74.8% in 2016 to 74.3% in 2017.

In the meantime, independent ISPs slowly increased their revenue share, growing from 8% in 2013 to 12% in 2017. This reflects their limited share of the residential Internet service market.

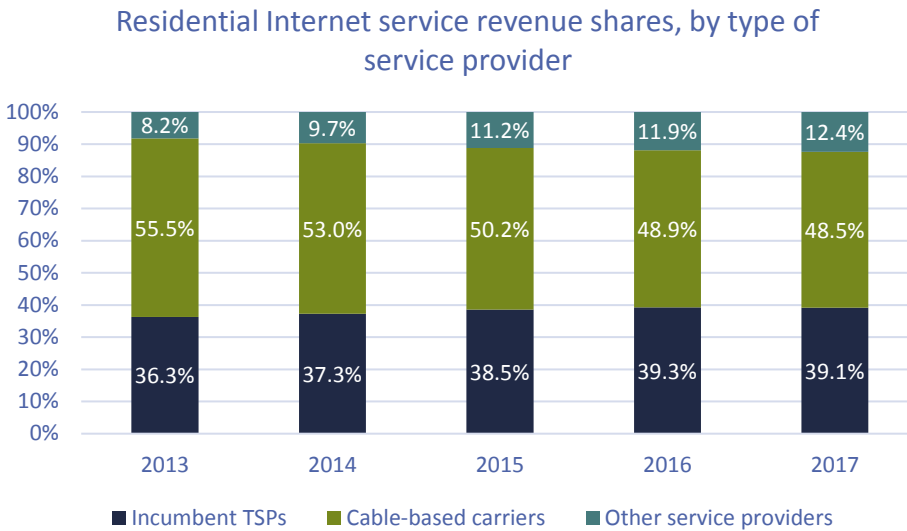
Figure 5.7 Residential Internet service revenues (\$ billions)



Source: CRTC data collection

Independent ISPs and incumbent TSPs increased their share of residential Internet service revenues at the expense of the cable-based carriers' revenues from 2013 to 2017. The independent ISPs were the only type of provider to increase their share of revenues from 2016 to 2017. Cable-based carriers continued to have the highest percentage of residential Internet service revenues.

Figure 5.8 Residential Internet service revenue shares, by type of service provider (%)



Source: CRTC data collection

#### Infographic 5.5

- **Average revenue per user (ARPU)** reached **\$58.49 per month** in 2017, a **5.5% increase** over 2016.
- **Resellers' average revenue per user** was **\$48.62 per month** in 2017, compared to an industry average of \$58.
- **Facilities-based providers** that are not incumbent TSPs or cable-based carriers had an **average revenue per user of \$70.01 per month**.

Source: CRTC data collection

*Facilities-based providers that are not incumbent TSPs or cable-based carriers mainly consist of fixed-wireless and satellite-based service providers.*

Resellers consistently reported the lowest average revenue per user (ARPU), while the highest ARPU was attributed to the other facilities-based TSP category, which consists mainly of fixed wireless and satellite-based service providers.

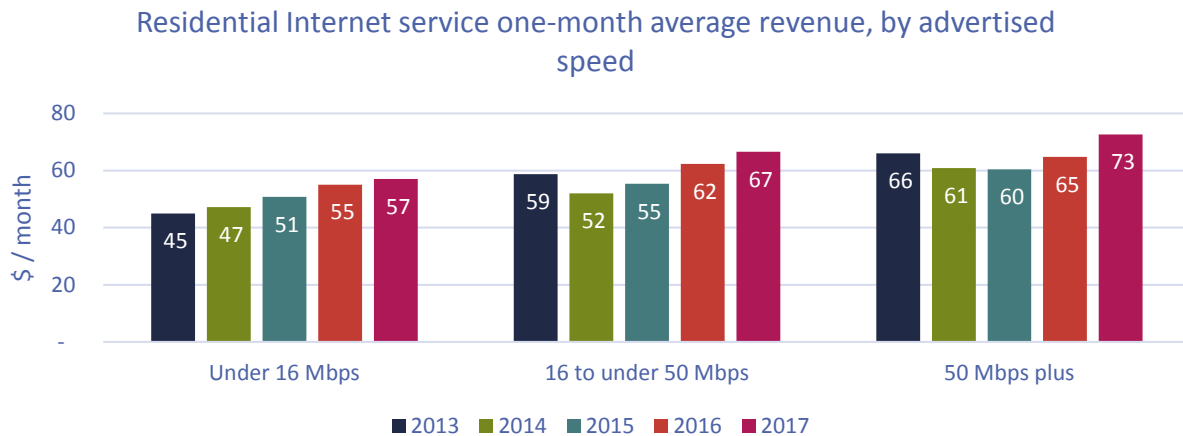
The industry-wide ARPU increased by 5.5% from 2016 to 2017, with an average growth rate of 7.1% from 2013 to 2017.

*ARPU may vary from Figure 5.9 below, which uses data from only the larger providers, who hold 89% of all high-speed residential Internet service subscriptions. ARPU is calculated based whole-year revenues*

and on year-end subscription data, not data from a particular month. This table also contains data from dial-up services.

Per subscriber revenues increased rapidly for the increasingly popular higher-speed Internet service packages. For instance, one-month average reported revenues for Internet service packages with download speeds of 50 Mbps and faster increased by 12% from 2016. This is especially impactful in the marketplace, as these packages represent 39% of the market, as shown in Figure 5.8. Meanwhile, packages with download speeds under 16 Mbps (36% of the market share) have seen one-month average revenues increase by 3.6%. The average revenues generated per subscriber with services offering speeds between 16 and 50 Mbps increased by 6.8% from 2016 to 2017. These services represented 26% of the Internet service market in 2017.

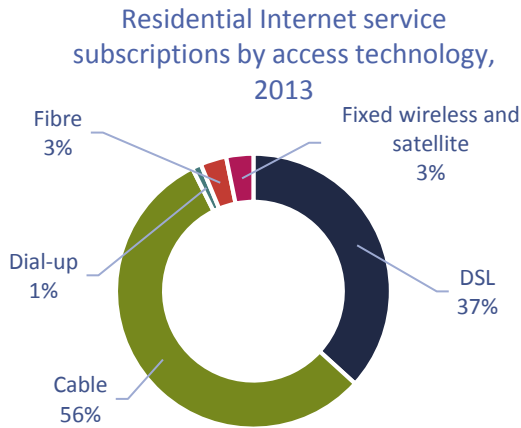
Figure 5.9 Residential Internet service one-month average revenue, by advertised download speed (\$)



Source: CRTC data collection

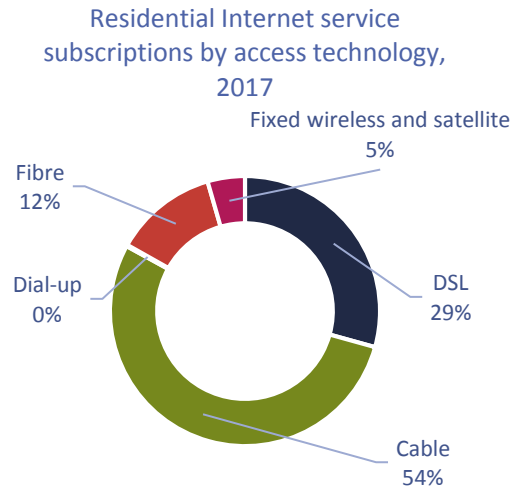
As part of their efforts to compete with cable-based carriers, incumbent TSPs continued to build fibre to the home (FTTH) networks and promote fibre-based Internet services. This resulted in a significant increase in their share of fibre-based Internet service subscriptions, which went from 3% in 2013 to 12% in 2017.

Figure 5.10 Residential Internet access service subscriptions by access technology, 2013 (%)



Source: CRTC data collection

Figure 5.11 Residential Internet access service subscriptions by access technology, 2017 (%)



Source: CRTC data collection

## ii. Business market

Infographic 5.6

- **Access and transport service revenues grew by 4.1% to reach \$1.5 billion** in 2017.
- **Access service subscriptions grew by 4.2% to reach \$1.2 million** in 2017.
- **Incumbent TSPs** had the **largest share** of access service **revenues at 42%**, followed by cable-based carriers at 34%, and other service providers at 24%.
- **Fibre service revenues** made up **27% of access revenues**, with DSL at 37% and cable at 27%.
- **Independent ISPs** had **24% of the access service revenues** in the business market.

Source: CRTC data collection

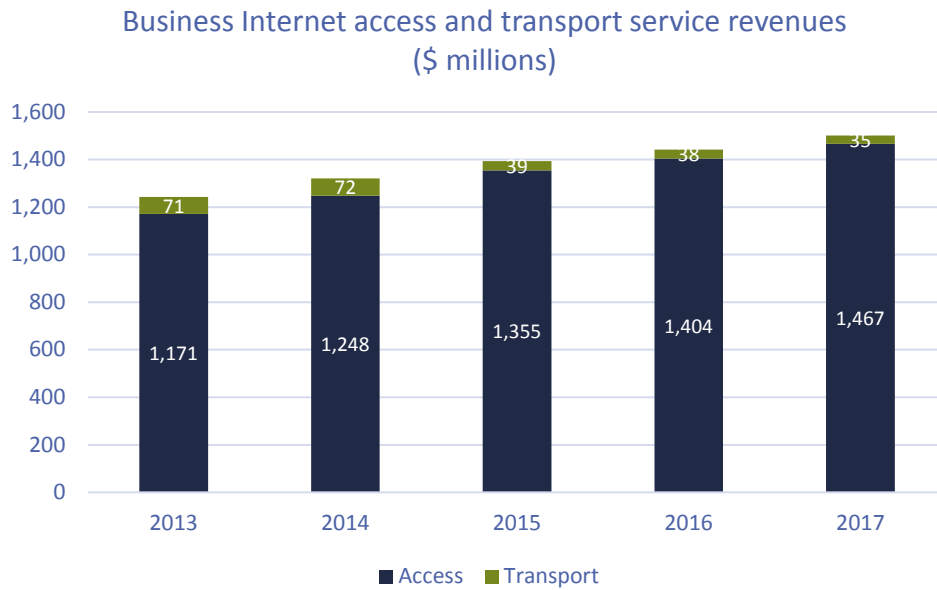
## Revenues

Independent ISPs, which are not affiliated with Canadian incumbent TSPs or cable-based carriers, had 24% of the access service revenues while having 13% of the subscribers in 2017. This may be due to a large proportion of independent ISP revenues coming from business information technology services providers that supply high-capacity connections to large enterprises.

Canadian businesses paid around \$2.3 million in Internet overage charges, with only around 1% of subscriptions going over their monthly limits in an average month.



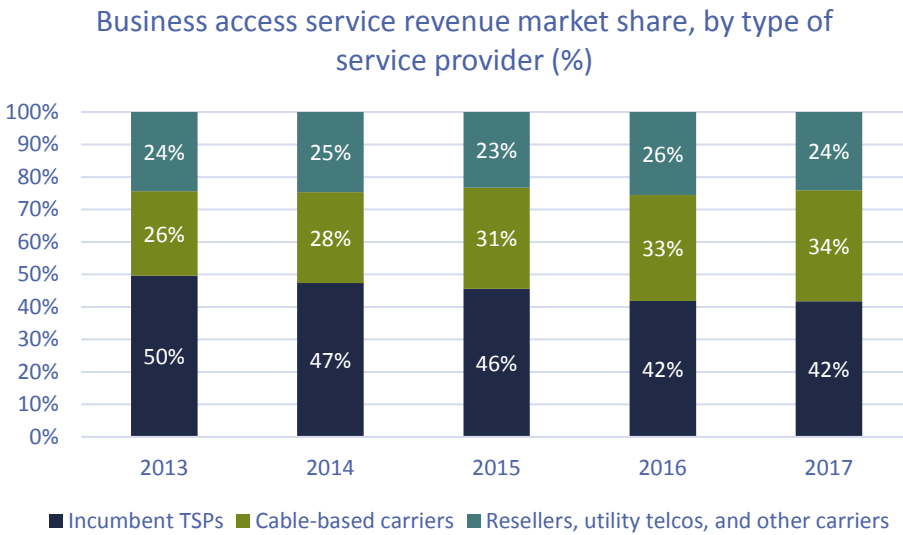
Figure 5.12 Business Internet access and transport service revenues, by type of service (\$ millions)



Source: CRTC data collection

*Due to a change in company reporting, transport service revenues starting in 2015 are not comparable to those from previous years.*

Figure 5.13 Business Internet access service revenue market share, by type of service provider (%)



Source: CRTC data collection

*Part of the increase in cable-based carriers' revenues is due to a reclassification of revenues starting in 2015. Due to a change in company reporting, 2016 figures for resellers, utility telcos<sup>8</sup>, and other carriers, as well as for incumbent TSPs, may not be comparable to those from previous years.*

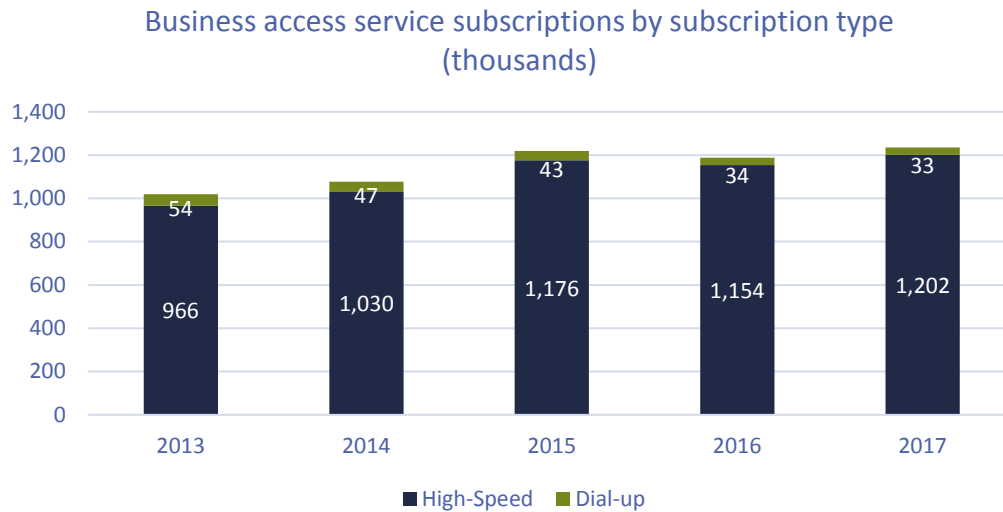
---

<sup>8</sup> Utility telcos are providers of telecommunications services whose market entry, or whose corporate group's market entry, into telecommunications services was preceded by a group-member company's operations in the electricity, gas, or other utility business.

## Subscriptions

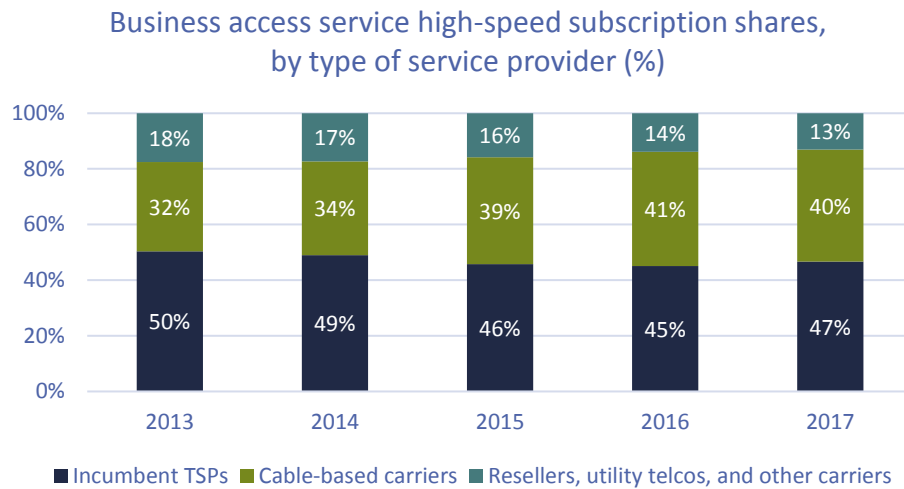
From 2013 to 2017, the growth in the number of subscriptions to business access services was strong, and exceeded residential subscription growth rates (sometimes by a large margin), except for 2016, when changes in company reporting resulted in a change in results.

Figure 5.14 Business Internet access service subscriptions by subscription type (thousands)



Source: CRTC data collection

Figure 5.15 Business Internet access service high-speed subscription shares, by type of service provider (%)



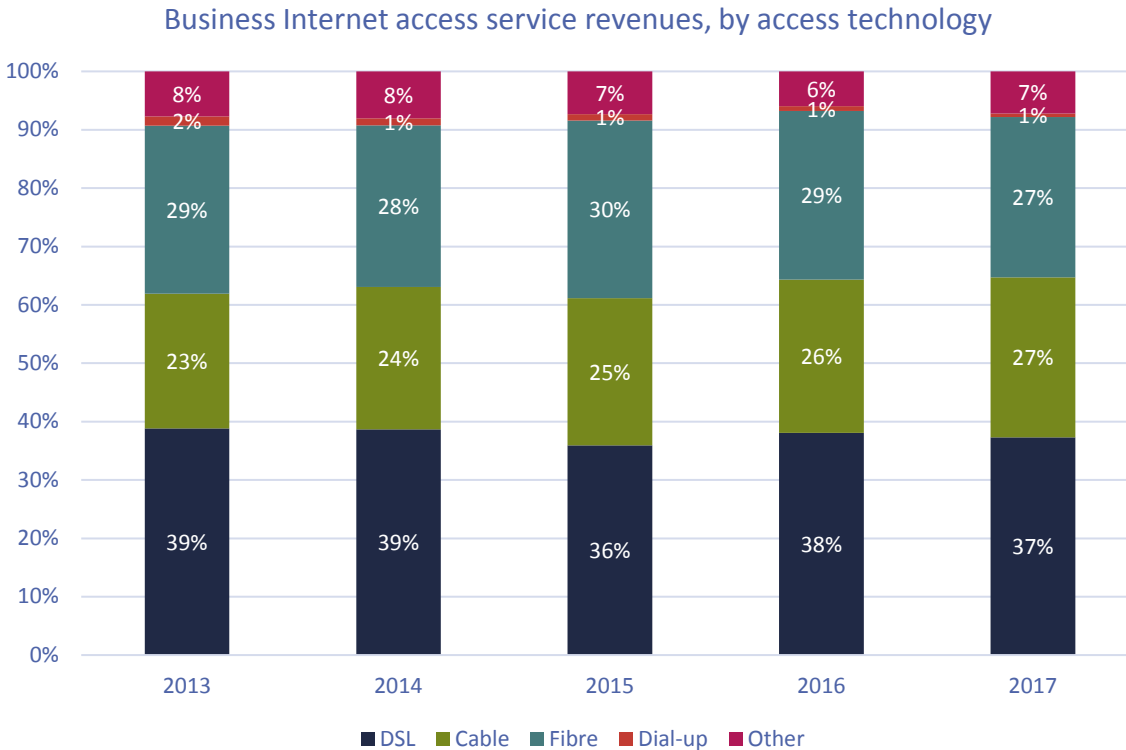
Source: CRTC data collection

*Due to a change in company reporting in 2015 for cable-based carriers and in 2016 for resellers, utility telcos, and other carriers, figures may not be comparable to those from previous years.*

## Technology

Cable-modem-based Internet access service consistently showed increases in market share over the period from 2013 to 2017. These increases made serving businesses over existing DOCSIS [Data Over Cable Service Interface Specification] cable networks an increasingly important part of the business of cable-based carriers. Other technologies, such as fixed wireless and satellite, had only a minimal share of the business market.

Figure 5.16 Shares of business Internet access service revenues, by access technology (%)



Source: CRTC data collection

*Business Internet access service revenue is derived from services provided using a variety of access technologies. The “Other” segment refers to other technologies, such as fixed wireless and satellite technologies. “Fibre” refers to Fiber-to-the-premises (FTTP).*

### iii. Broadband service availability

Infographic 5.7

- ⇒ **50/10 Mbps service** with **unlimited data transfer** was available to **84% of Canadian households** (unchanged from 2016).
- ⇒ **FTTH** was available to **35% of households**, up from 28% in 2016.
- ⇒ **LTE-Advanced** availability **grew from 83%** of population in 2016 to **92%** in 2017.
- ⇒ **26% of rural households** relied solely on **fixed wireless technology for broadband access** and **didn't have access to broadband service via wireline** (cable, DSL, or fibre). This is an **improvement from 31%** in 2016. Satellites have nationwide coverage, but due to capacity limitations, could only serve up to 2% of households.
- ⇒ **66%** of **rural households** could get a service with a **download speed of 25 Mbps or higher, up from 60%** in 2013.

Source: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

Broadband deployment improved since 2016 in some ways, but availability in sparsely populated areas did not improve as much as more dense areas, except for Long-Term Evolution (LTE)-Advanced coverage. Also, among other factors, newer, more accurate information about the extent of deployment reduced coverage in some areas.

Broadband service availability is calculated using information provided by ISPs. For 2013 to 2015, locations were considered to be serviced if their dissemination block representative point fell within an area of broadband service coverage. As of 2016, ISED pseudohouseholds<sup>9</sup> are used, along with 2016 census demography. Broadband service availability data may not take into account capacity issues or issues regarding line of sight.<sup>10</sup>

<sup>9</sup> Pseudohouseholds are points representing the population in an area. These points are placed along roadways within each area, and the population of the area, determined by Statistics Canada, is distributed among these points. Additional data regarding addresses and the position of dwellings is used to guide this distribution. The use of pseudohouseholds aims to improve the accuracy of the availability indicators over the use of the assumption that the population within an area is located at the centre of the area.

<sup>10</sup> The information in this section does not take into account upload speeds unless noted.

Unless otherwise noted, broadband service availability figures exclude wireless mobile technology. “Satellite access services” in this section refer to direct-to-home (DTH) satellite, and not to the technology used to connect communities to the Internet (e.g. satellite link transport).

Table 5.1 Key telecommunications availability indicators (% of households)

Type of service	Subtype	2015	2016	2017
Mobile broadband	3G/3G equivalent	99	99	99
	HSPA+	99	99	99
	LTE	97	98	99
	LTE-Advanced		83	92
Wireline broadband	DSL	82	77	72
	Cable modem	82	84	84
	Fibre to the home (FTTH)	22	28	35
Wireline and fixed wireless	Total	98	98	99
Universal service objective-level	50 Mbps download 10 Mbps upload Unlimited data transfer option	-	84	84
BDU services	IPTV	70	75	77
	Digital satellite	National	National	National

Source: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

Notes: The declines in the availability of DSL [digital subscriber line] in 2016 and 2017 were due to the deployment of fibre technology, with improvements in company reporting also contributing. The increase in cable modem availability in 2016 is attributable mainly to the change to the pseudohousehold methodology. The vast majority of areas that had 50 /10 Mbps service also had unlimited monthly data transfer options.

Mobile availability is depicted as a percentage of population.

Fibre-based Internet service availability continued to increase, going from 28% in 2016 to 35% in 2017. Incumbent TSPs used their fibre infrastructure to make gigabit service available to over 3.9 million households, while cable-based carriers used mainly DOCSIS 3.1 technology to make gigabit service available to over 6.6 million households. However, in general, fibre-based gigabit services have far faster upload speeds than their DOCSIS-based counterparts.

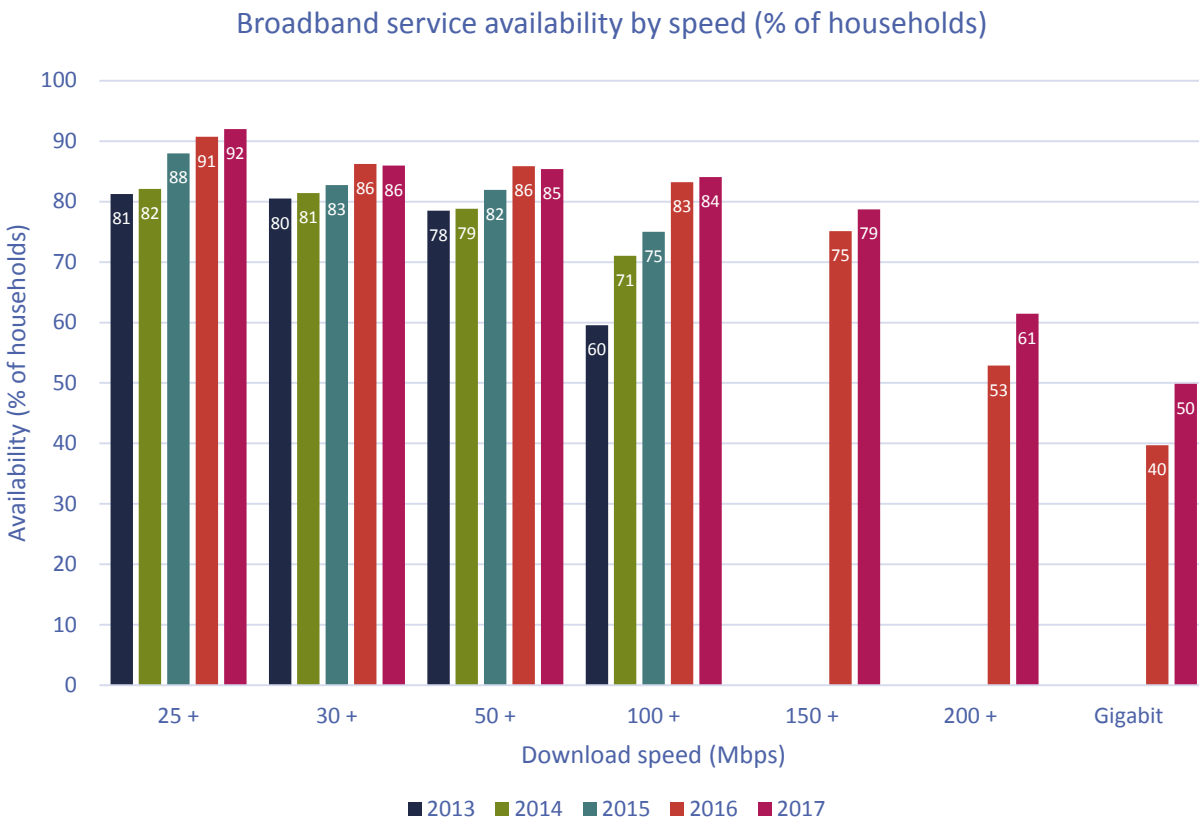
Incumbent TSPs and other non-traditional television providers continued to increase the availability of IP technology-based television service (IPTV), proving a source of competition to traditional cable-based systems, while leveraging their broadband infrastructure to provide services outside of Internet and legacy phone service. These FTTH deployments occurred mainly in large urban areas.

Services at speeds meeting or exceeding the Commission’s target of 50 Mbps download and 10 Mbps upload with an option for unlimited monthly data transfer were available to 84% of Canadian households. However, the availability varied greatly between urban and rural areas, with only 37% of rural households having access to this kind of service, versus 97% in urban areas. Subscriptions to a

50/10 Mbps service with unlimited monthly data transfer more than doubled to 24% of Canadians households, compared to 11% in 2016.

The total footprint for all areas with access to broadband service speeds of 30 Mbps and above and 50 Mbps and above did not increase in 2017, but slightly declined due to more precise information filed with the Commission (e.g. the use of precise coverage instead of modeling).

Figure 5.17 Broadband service availability by speed (% of households)



Source: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

*The availability of broadband services at higher speeds has been expanding in Canada. This graph excludes broadband services provided through satellite and mobile technologies.*

*Increases in speed categories at and above 50 Mbps in 2015 were due in part to the consideration of the effects of line bonding (using more than one line to provide service) on DSL.*

*Increases in broadband service availability by speed categories in 2016 were due partly to the higher accuracy of the pseudohousehold methodology. The increase in availability due to migration to the pseudohousehold methodology is as follows (in percentage points): 0.7 for 1.5 to 4.9 Mbps, 1.0 for 5 to 9.9 Mbps, 1.4 for 10 to 15 Mbps, 1.7 for 16 to 24.9 Mbps, 1.8 for 25 to 29.9 Mbps, 2.7 for 30 to 49.9 Mbps, 2.9 for 50 to 99.9 Mbps and 3.6 for 100+ Mbps.*

*Gigabit service is any service with a downstream data rate at or above 940 Mbps.*

Availability continued to vary by province when it comes to higher-speed broadband services. Saskatchewan and the North had less coverage at the 50 Mbps level. British Columbia, Quebec and Ontario led the way in terms of availability of 50 Mbps service.

The vast majority of areas within the provinces and territories that had broadband service had it at 5 Mbps or faster, with the exception of Nunavut, which had virtually complete coverage at 1.5 Mbps speeds, but far less at 5 Mbps or faster. In fact, only 29.9% of households in Nunavut had access to speeds of at least 5Mbps and none had access to 10Mbps or higher speeds.

Table 5.2 Broadband service availability, by speed and province/territory (% of households), 2017

Province/territory	5 + Mbps	10 + Mbps	16 + Mbps	25 + Mbps	50 + Mbps	50/10 Mbps and unlimited data transfer
<b>British Columbia</b>	97.6	96.7	94.5	94.3	92.8	91.0
<b>Alberta</b>	99.2	98.1	95.9	94.4	82.8	80.3
<b>Saskatchewan</b>	94.6	87.1	77.1	75.3	53.5	45.4
<b>Manitoba</b>	98.0	96.1	94.9	94.6	70.9	69.8
<b>Ontario</b>	98.3	96.4	94.5	93.5	87.4	86.9
<b>Quebec</b>	98.1	96.2	93.3	92.5	88.9	88.5
<b>New Brunswick</b>	94.3	91.9	91.9	91.9	81.2	81.2
<b>Nova Scotia</b>	87.4	83.4	79.1	79.1	78.7	77.8
<b>Prince Edward Island</b>	93.4	87.7	87.7	87.7	59.8	59.8
<b>Newfoundland and Labrador</b>	89.0	80.8	80.7	78.1	70.9	70.9
<b>Yukon</b>	90.5	84.2	60.8	60.8	60.8	0.0
<b>Northwest Territories</b>	97.7	93.6	53.7	53.7	53.7	0.0
<b>Nunavut</b>	29.9	0.0	0.0	0.0	0.0	0.0
<b>Canada</b>	97.5	95.4	92.8	92.0	85.4	84.1

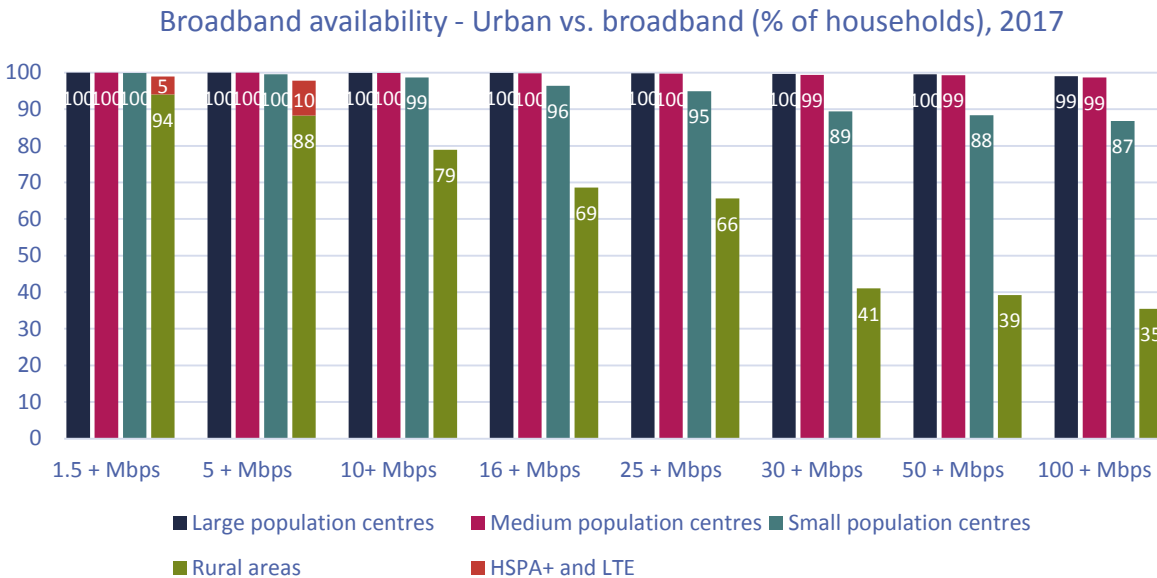
Sources: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

*New Brunswick and Saskatchewan have arrangements to provide broadband services at 1.5 Mbps via satellite under terms and conditions similar to those for wireline services. On Prince Edward Island, HSPA+ [high-speed packet access plus] is available to households without access to other types of broadband services under terms and conditions equivalent to those for wireline services. Since satellite service has a national footprint, it is excluded from this table.*

Rural and small centre populations continued to trail in the availability of advanced broadband services, with only 39% of rural households having access to services with download speeds of 50 Mbps or faster, and small population centres having 88% availability. This is in contrast to near-ubiquitous availability of such services in medium and large centres.



Figure 5.18 Broadband service availability – Urban vs. rural (% of households), 2017



Sources: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

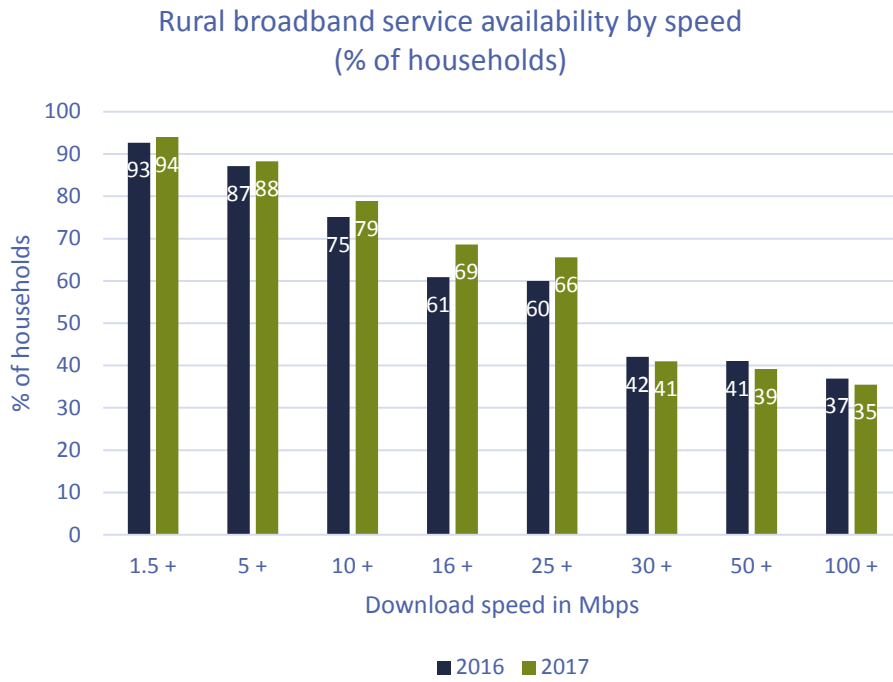
*Small population centres are considered to have populations of between 1,000 and 29,999. Medium population centres are considered to have populations of between 30,000 and 99,999. Large population centres are considered to have populations greater than 100,000. Rural areas have populations of less than 1,000, or fewer than 400 people per square kilometre.*

*The HSPA+ and LTE bars show the additional effect that inclusion of these technologies would have on the following categories: HSPA+ and LTE for 1.5+ Mbps service availability, and LTE for 5+ Mbps service availability.*

*Satellite services are excluded since they have a national footprint.*

Advancements in the deployment of rural broadband were mainly in the 16+ Mbps and 25+ Mbps categories, going from 61% to 69% for 16 Mbps or higher availability, and from 60% to 66% for 25 Mbps or higher. This is due mainly to continued deployments of LTE-based fixed wireless technology. Deployment in lower-speed categories did not increase as appreciably, due to deployment being centred mainly on already built areas with slower service speeds. Due to the filing of more precise data replacing previously used coverage models, the availability of some service speeds decreased slightly in 2017.

Figure 5.19 Rural broadband service availability by speed (% of households)



Sources: Innovation, Science and Economic Development Canada (ISED) and CRTC data collection

## iv. Broadband applications

Infographic 5.8

	Average data usage/overage fees for wireline (per hour)	Average data usage/overage fees for LTE (per hour)	Average wireline overage fees (per hour)	Average LTE overage fees (per hour)
Netflix	2.74 GB	0.33 GB	\$6.50	\$18.05
YouTube	<b>2.95 GB</b>	<b>0.77 GB</b>	<b>\$7.02</b>	<b>\$42.37</b>
CBC Radio 1	0.05 GB	0.04 GB	\$0.12	\$2.30
Spotify	0.19 GB	0.09 GB	\$0.44	\$5.06

Source: CRTC Broadband measurement

Note: Wireline overage fees are calculated based on the average of overage rates published on wireline service providers' websites in June 2018

Wireless overage fees are calculated based on the average of overage rates published on wireless service providers' websites in June 2018

## Data usage

### Streaming services

Streaming services over the Internet consume data at different bitrates. The bitrates are measured in megabits per second (Mbps) or gigabytes per hour (GB/hr). Generally, video streaming services consume data at higher bitrates than audio streaming services because the video stream contains more information.

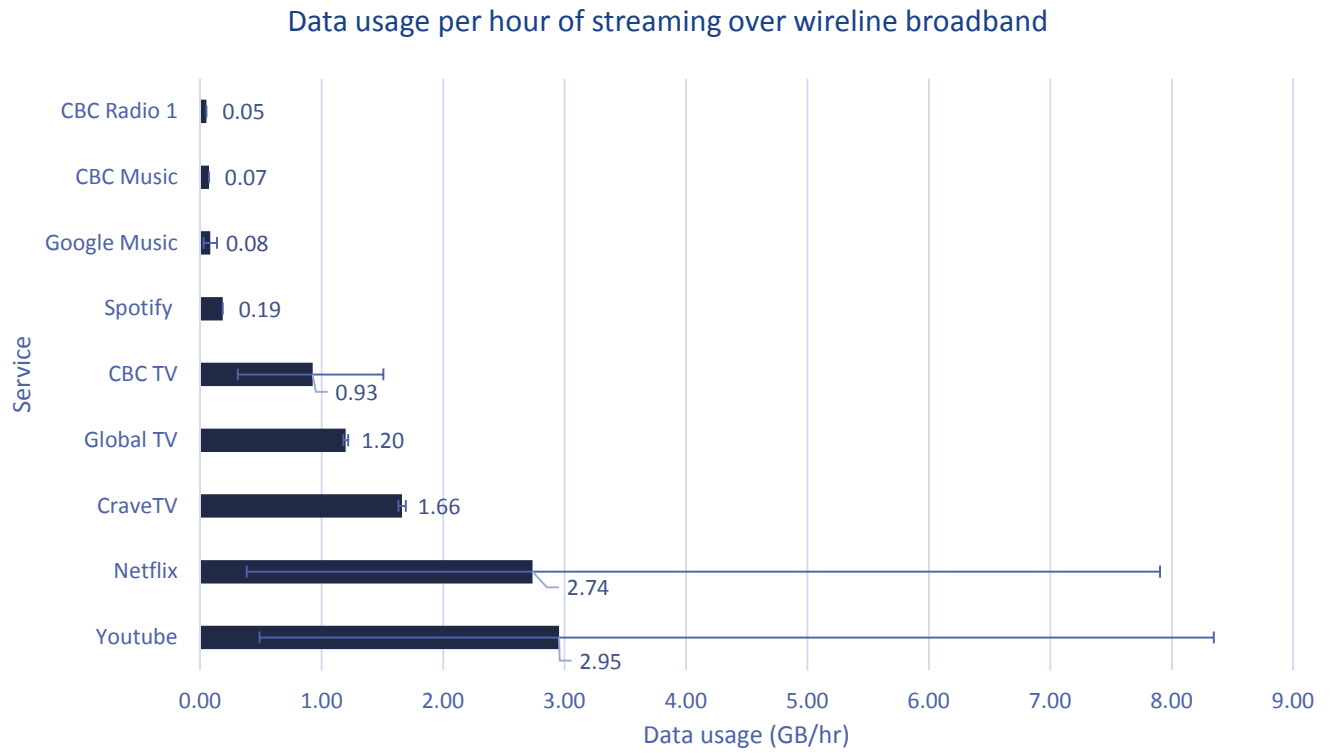
Usually, a higher bitrate can also enable a higher-quality audio or video stream. However, depending on the end-user device, a higher-quality stream may be indistinguishable from a lower-quality stream. For example, on a smartphone, an ultra-high-definition (UHD) video stream may not show a perceivable difference when compared to a lower-resolution video stream due to the relatively small screen size.

Figure 5.20 and Figure 5.21 illustrate the average and the range of the amount of data some streaming services can use on an hourly basis over wireline (broadband) and wireless (LTE) Internet connections, respectively.

The rates at which streaming services consume data can vary significantly.

While some services allow the user to manually control their quality and how much data they use, other services are set automatically. See methodology and observations below for more details.

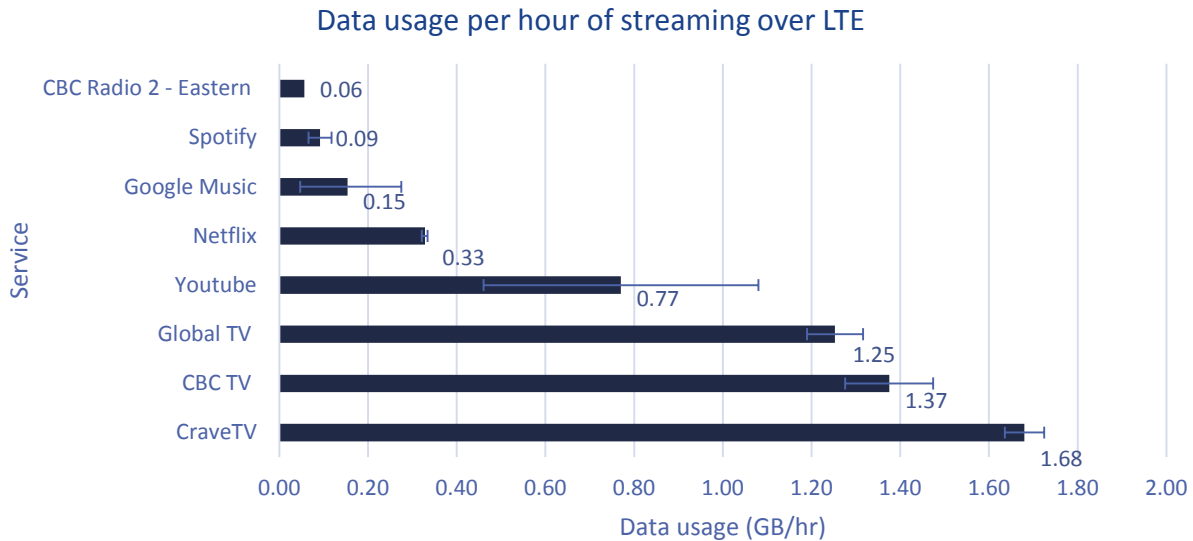
Figure 5.20 Data usage (GB/h) by select services over a wireline broadband Internet connection



Source: CRTC Broadband measurement

Note: Overage fees are calculated based on the average of overage rates published on wireline service providers' websites in June 2018

Figure 5.21 Data usage (GB/h) by select services over a wireless (LTE) Internet connection



Source: CRTC Broadband measurement

Note: Overage fees are calculated based on the average of overage fee rates published on wireless service providers' websites in June 2018

### Limited services and data overage fees

When a customer with an Internet data plan with a data cap exceeds their monthly usage limit, overage fees are applied.

Generally, usage limits are significantly lower and overage fees higher for wireless data plans compared with wireline broadband Internet plans. Currently, the average overage fee per GB is \$2.38 for wireline broadband Internet services and \$55.00 for mobile wireless services.

To address bill shock associated with mobile wireless overage fees, the [Wireless Code](#) requires service providers to suspend data overage fees once they reach \$50 within a single monthly billing cycle, unless the account holder or authorized user expressly consents to pay additional charges.

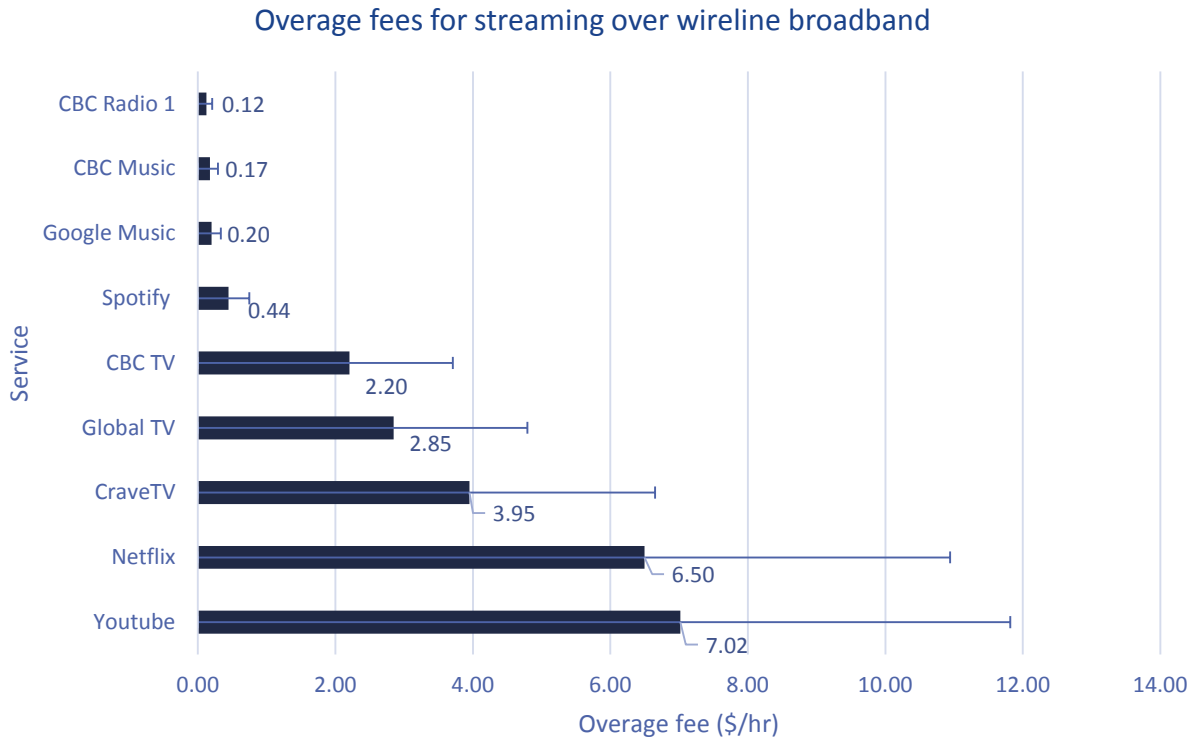
Figure 5.22 and Figure 5.23 below illustrate how overage fees (average and range) can translate to the usage cost of some services (\$/hr) over wireline and wireless Internet plans, respectively.

When reading the charts below, it is important to note that customers incur overage fees only if they exceed their plan limits. Customers can avoid paying any overage fees if they use less than the maximum amount of data included in their plan each month. Service providers offer plans with various limits and, in some cases, it may be in the consumer's best interest to change to a plan with a higher limit if they continue to exceed their usage limit each month.

Since many wireline plans include unlimited data usage, Figure 5.22 shows the lower range as zero.

The "Wireless code data overage cap" line in Figure 5.23 illustrates how much of each service a customer could use, after they hit their plan limit, before hitting the overage cap.

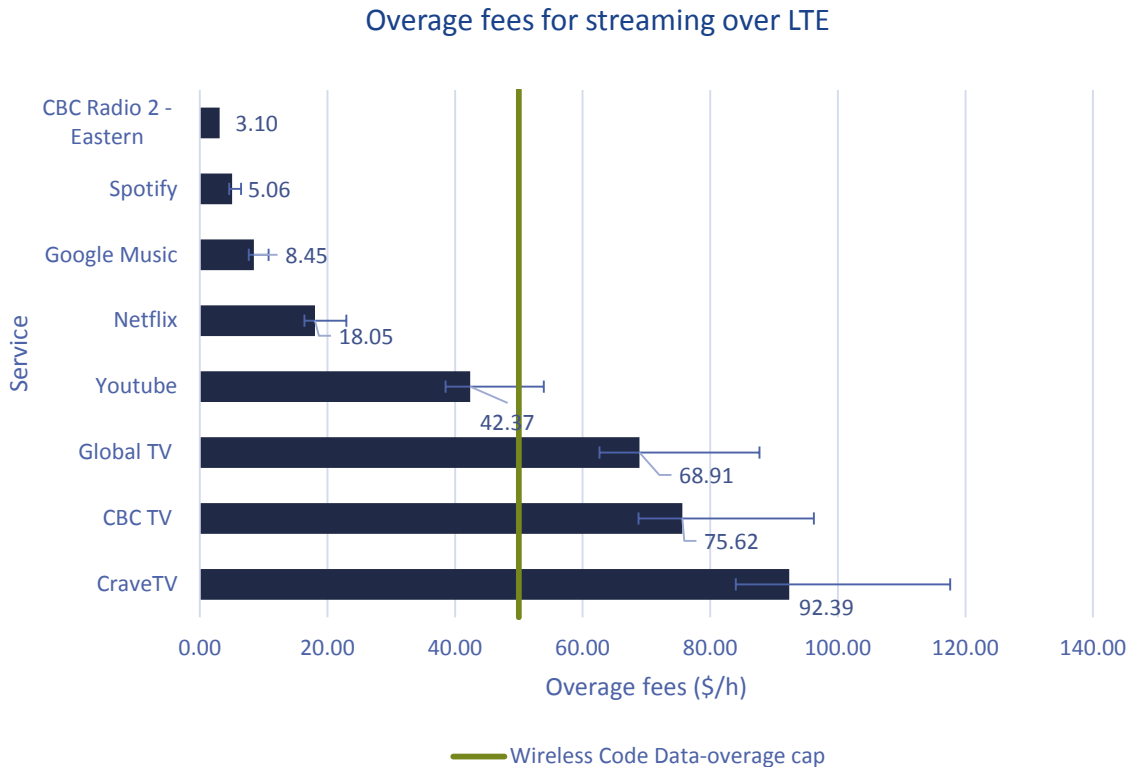
Figure 5.22 Overage fees incurred by select streaming services' data usage over a wireline broadband Internet connection



Source: CRTC Broadband measurement

Note: Overage fees are calculated based on the average of overage fee rates published on wireline service providers' websites in June 2018

Figure 5.23 Overage fees incurred by select streaming services' data usage over a wireless (LTE) Internet connection



Source: CRTC Broadband measurement

Note: Overage fees are calculated based on the average of overage fee rates published on wireless service providers' websites in June 2018

## Unlimited services and fair/acceptable-use policies

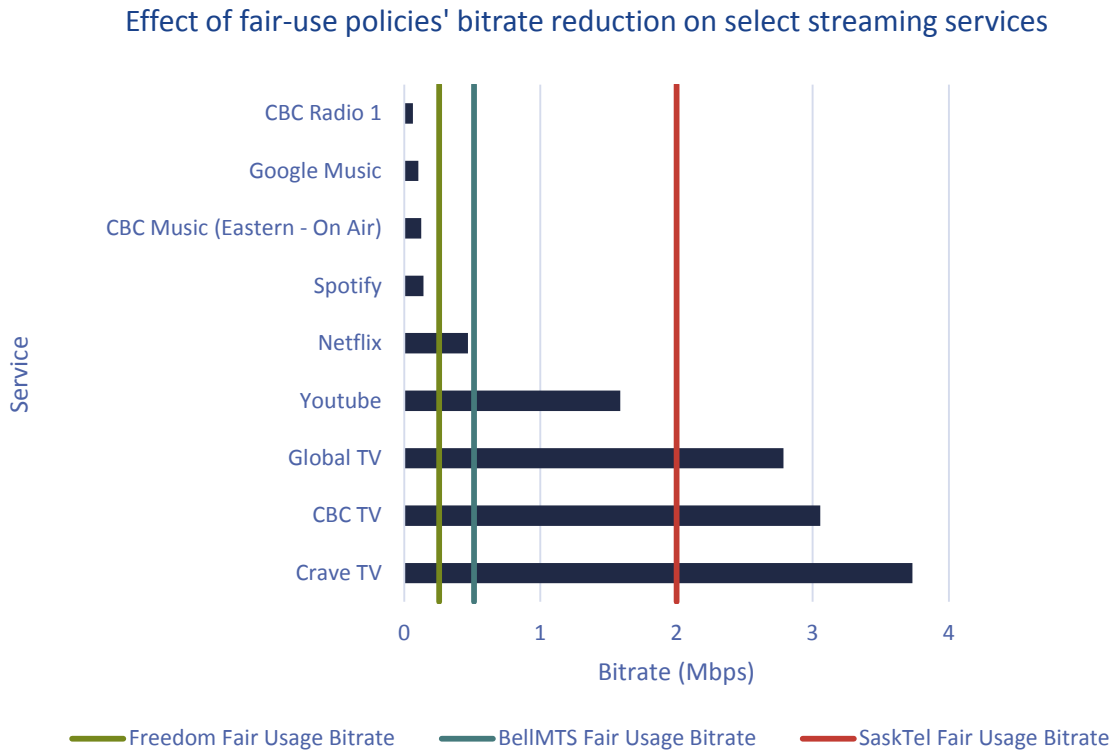
For unlimited wireless plans, the Wireless Code prohibits a service provider from applying overage charges and from putting any limit on the use of such a service purchased on an unlimited basis, unless these limits are clearly explained in the fair-use policy.

For such plans, the fair-use policy may reduce the data connection bitrate once a specified limit has been reached until the monthly billing cycle renews. Bitrate reduction to the end-user usually results in a service degradation so that basic services (e.g. email, web browsing) continue to work, but other services requiring faster connections (e.g. streaming services) are disrupted.

Figure 5.24 compares the average bitrate requirements of some services to some fair-use-policy bitrates for unlimited wireless plans. Generally, if a service's bitrate requirement exceeds the fair-use-policy threshold, the service will be degraded or disrupted, or become unusable.

When reading the chart below, it is important to note that customers can avoid triggering bitrate reductions by not exceeding the usage limits specified in their plans.

Figure 5.24 Effect of fair-use policies' bitrate reduction on select streaming services



Source: CRTC Broadband measurement

## Methodology and Observations of broadband measurement

### Methodology

To collect data for this sub-section, the CRTC used a test environment that aims to replicate how a typical consumer would utilize online streaming and real-time communications services. The services were accessed by a typical wireline residential broadband service, and a national LTE cellular data network, using mainstream off-the-shelf consumer electronics: Android- and iOS-based tablets and phones, smart TVs, Windows-based laptop and desktop computers, and various set-top streaming devices. A web browser was used to access the streaming services on the PCs, and official applications (apps) were used on the other devices.

To measure the data consumed by these services on the wireline connection, a specially-configured Windows-based computer was inserted between the Internet connection and the local network. Using data traffic measurement tools, all data flowing between the test device and the Internet was captured for analysis. For the LTE connection, readily available applications as well as integrated capabilities within the phones operating systems were used to measure the data traffic.

The maximum bitrates of the wireline and LTE Internet connections were tested, and found to be significantly higher than the maximum observed bitrates of the streaming services tested; in other words, the Internet connections did not limit the bitrate of the streams in any way. To ensure accuracy, multiple measurements were taken for each service and quality level (where this setting was available),



and background data usage (i.e. the usage of background apps and services, other than the one being tested) was minimized.

## Observations

The streaming services deliver their data in different patterns, some with single large bursts with gaps in between, and others with more continuous data. The measurements were conducted over sufficient periods of time such that a representative average could be obtained. It should also be noted that most services can modify their burst size dynamically thus making the average rate an important factor in determining the data rate requirement for most services.

In a typical consumer scenario, the available bandwidth at any given moment can vary due to numerous reasons, including resource sharing between multiple devices on a home network or moving around to/from different coverage areas on a mobile network. Although the end-user's internet connection is one factor in determining the quality and stability of a stream, other factors can include network congestion, server load, network/server latency, and end-user device capability. In addition, many services can dynamically and automatically adjust their quality (and therefore the amount of data consumed) based on several factors that contribute to a stable audio and/or video stream to the end-user.

Due to the limited number of samples and the diversity of network configuration and equipment, the reported values in this section should be viewed as average-case estimates, not worst-case limits.