CANADA PROFILE

**TeleGeography
GlobalComms Database**

TeleGeography

GlobalComms Database

Canada

Summary Data

Total wireless subscribers (Mar 2015):	28,724,509
Population penetration:	80.7%
Average penetration in region:	99.1%
Average penetration in GDP per cap decile:	107.2%
Total broadband subscribers (Mar 2015):	12,400,000
Household penetration:	89.4%
Average penetration in region:	90.9%
Average penetration in GDP per cap decile:	88.4%
Total PSTN lines (2014):	12,298,000
Household penetration:	88.9%
Average penetration in region:	65.5%
Average penetration in GDP per cap decile:	63.0%

Country Overview

Key Data

Area (sq km):	9,984,670
Population 2014 (million):	35.5
Households 2014 (million):	13.8
Capital:	Ottawa
Language:	English, French
Exchange rate annual average (2014):	USD 1 = CAD 1.10
GDP 2014 (USD billion):	1,788.7
GDP per capita 2014 (USD thousand):	50.4

Sources: BBC, CIA World Factbook, EIA, IMF, UN, World Bank

Map

Political Profile

Canada, the second largest country in the world in terms of land area after Russia, is a federation of ten provinces and three territories. Its only land border is with the United States, stretching for 9,000km between the Atlantic and Pacific; some 90% of Canadians live within 200km of the border. The majority of the population is concentrated in the provinces of Ontario and Quebec, particularly those areas bordering the Great Lakes. These two provinces account for roughly 62% of both population and GDP. The Prairie provinces — Manitoba,

Saskatchewan and Alberta — together with British Columbia in the far west, account for the bulk of the rest of the population. The Atlantic provinces (Newfoundland & Labrador, Nova Scotia, New Brunswick and Prince Edward Island) are historically the poor relations; GDP per capita there averages just 75% of the national mean. The northern part of Canada is divided between Yukon, the North West Territories and Nunavut, an area governed by indigenous peoples which was officially established in 1999.

Officially Canada is a constitutional monarchy, with the British monarch as head of state, represented by a Governor General, currently David Johnston, who was appointed by the Ottawan government in October 2010. In practice, the bicameral Canadian Parliament holds sovereign authority, consisting of the directly-elected House of Commons (currently numbering 308 seats, but scheduled to increase to 338 for the upcoming October 2015 elections) and the 105-seat Senate appointed on the advice of the Canadian Prime Minister. Twelve years of Liberal government ended when Stephen Harper's Conservatives defeated incumbent premier Paul Martin in the House of Commons election of January 2006. The Liberal administration had come under intense pressure over a scandal surrounding the alleged misappropriation of millions of dollars of public money. Though he was personally exonerated by an inquiry, Mr Martin's government received a vote of no-confidence in November 2005. The Conservatives – steered towards the political centre by Harper – came to power on promises to cut taxes, fight crime, boost military spending and repair relations with the US. The lack of an overall majority drove the administration to call an early election in October 2008, in which the Conservatives improved their position, winning 16 more seats than in the 2006 vote, but remained a minority government. Prime Minster Harper came under strong political attack for his handling of the financial crisis in late 2008, but the following year critics were appeased to some extent by a major economic stimulus package. In the latest federal elections of May 2011 the Conservatives finally secured an overall majority, raising their number of parliamentary seats by 23 to 166 while the Liberals lost 43 seats to take the lowest seat total in their history, 34, and The New Democratic Party gained 67 seats to give it a total of 103, forming the official opposition for the first time ever. As some MPs subsequently assumed 'independent' status while certain seats became vacant, by June 2015 the main parties' seat tallies had altered to: 159 (Conservative); 95 (New Democratic); 36 (Liberal). The next elections are scheduled for October 2015.

One of the perennial issues in domestic politics is the question of independence for predominantly French-speaking Quebec. The latest referendum on the issue in 1995 resulted in a slim majority for the 'no' camp, despite the efforts of the independence movement led by Parti Quebecois (PQ). In a symbolic vote in 2006, the federal parliament agreed that the Quebecois should be considered a 'nation' within Canada. In Quebec's provincial election of September 2012 PQ increased its number of seats in the National Assembly of Quebec by three to 54, to oust the incumbent Quebec Liberal Party (50 seats, down by 16), but in the following election of April 2014 the separatist party could only muster 30 seats, behind the Quebec Liberals' 70. The loss of support was partly blamed on prominent PQ politician Pierre Karl Peladeau, the former head of telecoms/broadcast/media group Quebecor who has since become party leader, as his campaigning appeared to alienate many voters who did not want a new referendum on sovereignty. At federal level, May 2011's general election was disastrous for the Quebec Bloc (Bloc Quebecois, informally tied to PQ); having won 49 parliamentary seats in the 2008 poll, it lost official party status in the latest legislative vote when its number of seats plummeted to just four, while by June 2015 it retained just two seats in the Commons.

Economic Development

Canada is a high-tech industrial nation with abundant natural resources and a highly skilled labour force. Its economy is the eleventh largest in the world (as ranked by 2014 GDP in US dollars), close behind Russia. Economic development is heavily influenced by the

neighbouring US, which accounts for over three-quarters of exports and around 65% of imports. Canada is also the US's largest foreign supplier of energy, including oil, gas, uranium and electric power, while the North American Free Trade Agreement (NAFTA) between Canada, the US and Mexico boosted trade by around 40% since its signing in 1994. Canada is the world's fifth largest oil producer and it aims to continue diversifying its energy sector, including exploitation of oil sand reserves (bitumen deposits) second only in size to Saudi Arabia. Canada's banks, meanwhile, emerged from the financial crisis of 2008/09 among the strongest in the world, due to early intervention by the Bank of Canada alongside conservative lending practices and strong capitalisation.

GDP performance recovered quickly from recession in 2009 – when the economy contracted by 2.6% on the back of the global financial meltdown – as a wide-ranging government-led economic stimulus programme helped the country achieve 3.2% economic growth in 2010. The International Monetary Fund (IMF) reported further steady GDP expansion, averaging 2.3% annually in 2011-2013, and 2014 saw growth accelerate to 2.5% despite falling oil prices, with a preliminary forecast of 2.2% for full-year 2015.

Unemployment reached its lowest rate in more than 30 years at 6% in 2007, but climbed again to 8.3% by end-2009, before improving slightly to just below 8.0% at the end of 2010. The IMF says joblessness has continued to fall steadily, to 7.5% in 2011, 7.3% in 2012, 7.1% in 2013 and 6.9% in 2014 (the 2013-2014 numbers being slightly better than previously forecast), although the level of unemployment is projected to flatten out in 2015-2016 at 6.9%-7.0%. Inflation – having dived from 2.4% to 0.3% in the recession year of 2009 – averaged around 2.1% annually in the period 2010-2012, before fluctuating between 0.95% in 2013 and 1.9% in 2014, with the IMF projecting inflation of around 0.9% for full-year 2015.

Regulations

Regulatory Overview

Industry Canada is the federal government ministry responsible for telecoms policy, spectrum management and licensing. Gaining its mandate from the Department of Industry Act 1995, the ministry defines its role as the government's 'centre of microeconomic policy expertise' for a wide range of sectors. In respect of telecoms, Industry Canada is responsible for the Telecommunications Act 1993 and the Radiocommunication Act 1985 (both most recently amended in December 2014), plus various regulations subordinate to each of these two main acts, e.g. Telecommunications Fees Regulations, Canadian Telecommunications Common Carrier Ownership and Control Regulations, International Submarine Cable Licences Regulations and Canadian Radio-television and Telecommunications Commission Rules of Practice and Procedure.

The Canadian Radio-television and Telecommunications Commission (CRTC) is an independent public authority and administrative tribunal that regulates and supervises telecommunications and broadcasting in the public interest. The CRTC reports to parliament through the Minister of Canadian Heritage, and derives its authority from the Telecommunications Act and the Broadcasting Act 1991 (and amendments). The CRTC's jurisdictions include:

- approving tariffs and certain agreements for the telecoms sector;

- promoting compliance with telecoms regulations;

- encouraging competition in telecoms markets;

- issuing broadcasting licences and international telecoms licences; and

- making decisions on mergers, acquisitions and ownership changes in the broadcasting sector.

Canada's Competition Bureau and the CRTC signed an agreement for closer cooperation in September 2013, as the two agencies exercise complementary roles in reviewing merger transactions in the communication sector (the CRTC under the Telecommunications Act and Broadcasting Act, the Competition Bureau in its role of administering and enforcing the Competition Act).

Infrastructure-based telecoms service providers (fixed or mobile) with more than a 10% share of total Canadian telecoms revenues must adhere to foreign ownership rules requiring them to be 'Canadian-owned and controlled'. This applies to the three largest telecom groups – Bell Canada Enterprises (BCE), Rogers Communications and Telus Corporation (Telus Communications). Under the Telecommunications Act and the Ownership & Control Regulations, foreign investment in large facilities-based telecoms operators (also referred to as telecoms common carriers) is capped at 20.0% direct voting shares; direct voting control – and the members of the board of directors – must be at least 80% Canadian, while indirect voting share must be at least 66.66% Canadian. These limits do not apply to telecoms service resellers, or to operations conducted under an international submarine cable licence, fixed satellite services or mobile satellite services. Up until a government decision in March 2012 (see below), the foreign ownership restrictions under the Telecommunications Act applied to all facilities-based telecoms service providers, large or small.

Foreign ownership rules were tested when in December 2009, Industry Canada issued a decision overruling the CRTC which had declared that a new entrant to the mobile sector, Globalive Wireless (Wind Mobile), contravened the law. Following more legal to-and-fro the Federal Court of Appeal issued the final decision on the matter in June 2011, agreeing with Industry Canada that Wind Mobile met Canadian ownership and control requirements. Meanwhile, in Q2 2010 the CRTC approved the ownerships of two other cellular start-ups, BMV Holdings trading as Public Mobile (which was eventually taken over by Telus in November 2013) and DAVE Wireless (trading as Mobilicity, since acquired by Rogers in June 2015), on the proviso that they adjusted their boards of directors to comply with the restrictions in place at the time.

The debate over foreign ownership polarised the conflicting stances of the independent regulator and the government: the CRTC was determined that foreigners should not be allowed to increase controlling (voting) shares 'beyond 49% in any telecoms network operator', but in May 2010 then-Industry Minister Tony Clement expressed an opposite viewpoint, aiming to loosen foreign ownership restrictions on telecom firms (while excluding the broadcasting sector, including media and broadcasting content divisions attached to telcos). In May 2011 the Conservative government won a parliamentary majority, effectively preventing opposition parties blocking its plans, and the following month the administration presented three potential options: 1.) To increase the limit for direct foreign investment in broadcasting and telecoms common carriers to 49%; 2.) To lift restrictions on telecoms common carriers with a 10% market share or less, by revenue; or 3.) To remove foreign ownership restrictions completely. The government eventually settled on the second option, in a decision announced in March 2012.

Consequently, in June 2012 the Telecommunications Act was amended to remove all foreign investment restrictions from network operators with less than 10% share of total telecoms market revenue, i.e. all companies except the three largest incumbents Bell, Rogers and Telus. To encourage long-term investment, smaller companies that subsequently increase their share to above 10% of total revenues organically – i.e. other than by way of mergers/ acquisitions – will continue to be exempt from the restrictions. According to Industry Canada calculations the combined market share of network operators regarded as new entrants reached only around 4% at the time of the decision. The edict to relax ownership rules for smaller competitors was a pre-requisite for finalising plans for auctioning additional 4G mobile spectrum licences, implemented in Q1 2014 (see Wireless Key Legislation).

Regulation Links

Wireless Key Legislation

Broadband Key Legislation

Wireline Key Legislation

Wireless Regulatory Overview

Regulatory Bodies

Canadian Radio-television and Telecoms Commission (CRTC)

Les Terrasses de la Chaudiere
Central Building

1 Promenade du Portage
Quebec City, Quebec J8X 4BI
Canada
Tel. +1 819 997 0313
Fax +1 819 994 0218
http://www.crtc.gc.ca

Industry Canada

Economic Development Agency
11th Floor, East Tower
C.D. Howe Building
Ottawa, Ontario K1A 0H5
Canada
Tel. +1 613 995 9001
Fax +1 613 992 0302
http://www.ic.gc.ca

Wireless Key Legislation

Under the Radiocommunication Act (last amended in December 2014), licences issued by Industry Canada are required for the use of radio spectrum to provide wireless communications, including analogue cellular, digital Personal Communications Service (PCS) and Enhanced Specialised Mobile Radio (ESMR). The Minister of Industry has ultimate responsibility for managing the use of spectrum in accordance with the provisions of the Radiocommunication Act as set out in the 2007 Spectrum Policy Framework (rules which governed July 2008's AWS-1 3G/4G licence auction, see below). In March 2013 the minister set out the government's five-year Commercial Mobile Spectrum Outlook', aimed at ensuring additional resources are available to meet demand for mobile services over the next five years, which included the auctions of spectrum in the 700MHz (completed in February 2014), AWS-3 (March 2015) and 2500MHz (April 2015) bands (see below).

Rate Setting

In 1996 the Canadian Radio-television and Telecommunications Commission (CRTC) decided to refrain from exercising many of its regulatory powers including rate-setting, with respect to publicly-interconnected mobile wireless voice services provided by carriers other than the incumbent local exchange carriers (ILECs, see Wireline section), and in 1998 the same forbearance was extended to ILECs' mobile operations after the necessary competitive safeguards were implemented. Unlike many countries, wholesale mobile network termination rates (MTRs) are not subject to ex-ante regulation, and as such, no MTR guidelines are issued by the regulator.

Mobile Number Portability (MNP)

MNP was introduced on 14 March 2007. It initially applied only to Bell, Rogers and Telus customers in British Columbia, Alberta, Ontario and Quebec (wherever wireline local number portability [LNP] was in effect), but was extended nationwide to all other locations and wireless carriers, beginning on 12 September 2007. For all locations where LNP does not exist, MNP must be introduced 'within CRTC-approved time periods upon wireless carrier notification to an incumbent'. CRTC Decision 2008-122 (18 December 2008) ruled that the existing MNP framework – including porting numbers between fixed and mobile networks – applicable in the territories of ILECs (see Wireline section), should also be implemented in the territories of the small incumbent local exchange carriers (SILECs); upon request from

a competitor SILECs should file an implementation plan for MNP within 30 days. SILECs must implement porting-out of numbers, but porting-in remains optional. The framework is applicable to 35 SILECs (including at least three majority-owned by larger groups) as of 30 June 2015.

Mobile TV

The CRTC said in April 2006 that mobile TV – defined as television programming broadcasted to cellular phones and other wireless handheld devices – would remain exempt from regulation. It issued a decision in February 2007 formalising this policy.

Digital PCS Licensing (1995)

In December 1995 Industry Canada licensed 14 companies to provide PCS (digital) services. Two national 30MHz licences were awarded to Clearnet PCS (now part of Telus Mobility) and Montreal-based Microcell Telecommunications (also known as Fido, now owned by Rogers Communications). One national 10MHz PCS licence was awarded to Rogers and eleven regional 10MHz concessions were awarded to the members of the Mobility Canada consortium. Mobility Canada dissolved in 1999 with three members, Telus, BCTel Mobility and Quebec Telephone, merging under Telus, and the remaining members forming the Bell Wireless Alliance. As part of the PCS licensing policy established in 1995, an initial limit of 40MHz was put on the amount of mobile spectrum any one licensee and its affiliates were permitted to hold in a specific geographic area, but in 1999 the cap was raised to 55MHz and in August 2004 the limit was revoked altogether. The decision to remove the ceiling was based on the fact that three of the national carriers had reached the limit in several regions.

1900MHz Auction (February 2001)

In January-February 2001 Industry Canada held an auction for additional PCS spectrum in the 1900MHz range, issuing 62 licences to five operators with total winning bids of CAD1.5 billion. Bell Mobility bid CAD720.5 million for 20 licences, including two of the four hotly contested 10MHz blocks of spectrum in southern Ontario; Rogers bid CAD93.5 million for 23 licences, including one of the southern Ontario licences; Telus Mobility spent CAD356 million on five concessions, including the fourth southern Ontario licence; Montreal-based W2N Inc purchased three licences for CAD11.4 million; northern Ontario-based Thunder Bay Telephone (TBayTel) bought one for CAD600,000. In January 2003 Industry Canada issued a 1900MHz PCS licence to MTS in Manitoba.

AWS-1 Auction (July 2008)

The government auctioned a further 105MHz nationwide block of spectrum in the 1700MHz/ 2100MHz 'Advanced Wireless Services' (AWS-1) and 1900MHz PCS frequency ranges in a process that ran from 27 May to 21 July 2008. 40MHz of frequencies on offer were set aside exclusively for new entrants, while the three national incumbents were required to allow start-ups the option of wholesale access to their infrastructure for roaming purposes for a period of ten years. An initial ban on transferring AWS spectrum from a new entrant to a national incumbent was set at five years from the date of individual licensing (although spectrum transfer rules were subsequently tightened further in June 2013, see below). The AWS-1 spectrum has been used by the winners for the rollout of 3G W-CDMA/HSPA and 4G Long Term Evolution (LTE) networks.

On offer for AWS usage were three blocks each of 2×10MHz and 2×5MHz spectrum, in the bands 1710MHz-1755MHz and 2110MHz-2155MHz. Alongside was one new block of PCS spectrum – 2×5MHz in the bands 1910MHz-1915MHz and 1990MHz-1995MHz ('G-band') – and one additional 5MHz block (1670MHz-1675MHz, the 'I-band').

At the conclusion of bidding, the auction had raised CAD4.25 billion in government revenue, with all but ten of the total 292 regional spectrum licences assigned to 15 companies (with one concession later transferred to a 16th firm, in April 2009). The largest winners were as follows:

- Rogers Communications won 59 licences for CAD999.3 million;

- Telus Mobility was awarded 59 licences costing CAD879.8 million;

- Bell Mobility gained 54 licences at a price of CAD740.9 million;

- Videotron bid a total of CAD554.5 million for 17 licences;

- Globalive Wireless (a consortium of Globalive [parent of long-distance reseller Yak], Egyptian-backed Weather Investments and Icelandic firm Novator) won 30 spectrum licences priced at CAD442.1 million (later rebranding itself as Wind Mobile);

- Shaw Communications spent CAD189.5 million on 18 licences mainly in western Canada and the Prairies;

- Data & Audio-Visual Enterprises (DAVE) Wireless won spectrum worth CAD243.2 million in ten urban areas (and later rebranded itself as Mobilicity);

- EastLink (the trading name of Bragg Communications) paid CAD25.6 million for 19 licences in Atlantic Canada, Alberta and Ontario; and

- SaskTel and MTS gained three licences each in Saskatchewan (costing CAD65.7 million) and Manitoba (CAD40.8 million) respectively.

700MHz Auction (February 2014)

A further stage of wireless frequency licensing – to allocate spectrum in the 700MHz 'digital dividend' band (698MHz-756MHz, 'Lower 700MHz band', and 777MHz-787MHz 'Upper 700MHz band') – is considered important for rollout of 4G LTE services over wide areas. The spectrum was relinquished by broadcasting operators on a national basis by a deadline of August 2011 via the switch from analogue to digital broadcasting. However, an auction was delayed as the government was determined to resolve any outstanding issues in the sector before proceeding with a licence auction, chiefly the decision on whether to relax foreign ownership restrictions; this obstacle was cleared in March 2012 when Industry Canada declared all foreign ownership limits would be scrapped for companies with less than 10% share of total domestic telecoms market revenues, i.e. all companies except Bell, Rogers and Telus (enacted in June 2012, see Regulatory Overview). Industry Canada revealed plans in March 2012 to hold the 700MHz digital dividend 4G licence auction 'in H1 2013' (but later delaying proceedings to 1Q14), followed by an auction of 2500MHz spectrum, also earmarked for 4G, within 'a year' of the 700MHz auction. The government resolved to apply spectrum caps in both the 700MHz and 2500MHz auctions to enable four or more service providers in each of Canada's 14 licence regions to obtain spectrum. However, it ruled out setting aside a larger guaranteed amount of bandwidth specifically for new entrants, despite lobbying from smaller cellcos, although in the case of the 700MHz spectrum it decided to impose a cap on large incumbent operators, which effectively reserves a certain amount of 'prime' spectrum bands for new entrants and smaller regional providers.

In March 2013 the conditions for digital dividend licensing were finalised as follows: 700MHz band licences split into 14 geographical areas, with each zone covered by five blocks of paired spectrum and two blocks of unpaired spectrum, making a total of 98 licences nationwide. A spectrum cap of two paired frequency blocks applies to all licensees in each of the 14 zones; the unpaired blocks are not subject to a spectrum cap. Furthermore, a spectrum

cap of one paired spectrum block from within specific blocks – B, C, C1 and C2 – applies to all large (national) wireless service providers.

The government has imposed coverage obligations on 700MHz spectrum licensees 'to support the deployment of next generation services to rural Canadians in a timely fashion', and requires companies with access to two or more blocks of paired 700MHz spectrum (either via newly auctioned licences or through spectrum sharing) to cover 90% of the population in their footprint within five years of licensing and 97% within seven years. Further, general rollout requirements apply to both the 700MHz and the 2500MHz bands, as in previous auctions, requiring between 20% and 50% population coverage depending on the region, within ten years. In June 2013 Industry Canada moved the application deadline for 700MHz licence bids backwards three months to 17 September 2013, in order to allow companies additional time to consider the ramifications of a federal spectrum licence transfer policy, which was finalised and published at the end of June that year (see below).

The 700MHz licence auction (also known as 'Tier 2' Mobile Broadband Services [MBS] auction) started on 14 January 2014 and concluded on 13 February that year. All but one of the 98 regional 20-year licences on offer were awarded to eight companies, meeting the government's aim to license at least four wireless players in every province. Total revenue generated from the 700MHz auction was CAD5.27 billion, the highest return ever for a wireless auction in Canada, eclipsing the AWS 2100MHz auction in 2008 which raised CAD4.3 billion. The relative value of spectrum in Ottawa's 700MHz sale was also higher when compared to the 2008 700MHz licence auction across the border in the US, which generated USD19.1 billion – or quadruple Canada's total – to cover nine-times the population. Canadian 700MHz licence winners were permitted to deploy 700MHz services from mid-April 2014.

The eight 700MHz winners are listed below (number of paired/unpaired spectrum licences; price paid; licence population covered [of a total population of roughly 35 million]):

- Rogers (22 paired; CAD3.292 billion; 33,368,699);

- Telus (16 paired + 14 unpaired; CAD1.143 billion; 33,475,914);

- Bell (17 paired + 14 unpaired; CAD565.7 million; 33,475,914);

- Videotron (7 paired; CAD233.3 million; 28,020,943);

- Bragg (Eastlink) (4 paired; CAD20.3 million; 3,101,204);

- MTS (1 paired; CAD8.8 million; 1,206,968);

- SaskTel (1 paired; CAD7.6 million; 1,039,584);

- Feenix Wireless (100%-owned by Mobilicity founder John Bitove) (1 paired; CAD284,000; 107,215).

By province, 700MHz licences were awarded as follows:

- Newfoundland & Labrador – Bell, Eastlink, Rogers, Telus;

- Nova Scotia – Bell, Eastlink, Rogers, Telus;

- Prince Edward Island – Bell, Eastlink, Rogers, Telus;

- New Brunswick – Bell, Eastlink, Rogers, Telus;

- Quebec – Bell, Rogers, Telus, Videotron;

- Ontario – Videotron [south Ontario only], Eastlink [north Ontario only], Bell, Rogers, Telus;

- Yukon, Northwest Territories and Nunavut – Bell, Feenix, Telus;

- Manitoba – MTS, Bell, Rogers, Telus;

- Saskatchewan – SaskTel, Bell, Rogers, Telus;

- Alberta – Bell, Rogers, Telus, Videotron; and

- British Columbia – Bell, Rogers, Telus, Videotron.

Two of the ten qualified bidders, TBayTel and Novus Wireless, did not win any 700MHz licences, while Wind Mobile withdrew from the 4G auction shortly before it commenced due to lack of funding from its then foreign backer, Vimpelcom.

AWS-3 Auction (March 2015)

In July 2014 Industry Canada announced a plan to auction 2×25MHz of 'AWS-3' spectrum (1755MHz-1780MHz, 2155MHz-2180MHz) adjacent to existing AWS spectrum. A 2×15MHz block of AWS-3 spectrum was set aside for 'operating new entrants' (such as Wind Mobile, Videotron, Mobilicity and Eastlink) with the remaining 2×10MHz in each region open to all, albeit with strict provisions applying to the transfer of AWS-3 spectrum – to protect competition. Following a deadline for applications on 30 January 2015, a list of ten qualified AWS-3 licence applicants was published on 13 February 2015, namely: Rogers Communications, Telus Communications, Bell Mobility, Wind Mobile, Videotron, Data & Audio-Visual Enterprises Wireless (Mobilicity), Bragg Communications (Eastlink), MTS, Saskatchewan Telecommunications (SaskTel) and TBayTel.

Industry Canada concluded the auction of AWS-3 licences on 6 March 2015, with five companies picking up a total of 39 regional licence blocks (out of 42 on offer) for a combined price of over CAD2.1 billion. Winners were as follows:

– Telus bid CAD1.511 billion for spectrum covering a population of 30.077 million in British Columbia, Alberta, Saskatchewan, Manitoba, Southern Ontario, Eastern Ontario, Eastern Quebec and Southern Quebec;

- Bell bid CAD499.9 million for spectrum with a population footprint of 13.490 million in Newfoundland & Labrador, Nova Scotia, Prince Edward Island, New Brunswick, Northern Quebec, Southern Ontario, Northern Ontario, Nunavut, Northwest Territories and Yukon;

- Wind Mobile spent CAD56.4 million on licences covering a population of 18.141 million in Southern Ontario, British Columbia and Alberta;

- Videotron bought spectrum worth CAD31.8 million, representing a 9.890 million population footprint in Eastern Quebec, Northern Quebec, Southern Quebec and Eastern Ontario; and

- Eastlink acquired concessions in Newfoundland & Labrador, Nova Scotia, Prince Edward Island, New Brunswick and Northern Ontario, covering 3.101 million people, for CAD9.96 million.

In three regions – Saskatchewan, Manitoba and the Far North (Northwest Territories / Yukon / Nunavut) – the AWS-3 set-aside blocks (for operating new entrants) went unsold.

2500MHz Auction (April 2015)

Following the AWS-3 auction, Industry Canada opened a contest for Broadband Radio Service (BRS) licences in the 2500MHz-2690MHz (officially '2500MHz') band – on 14 April 2015. The BRS licences are intended for mobile broadband usage on devices such as smartphones and tablets, as well as fixed-wireless broadband internet services in rural areas. The 2500MHz-2690MHz auction framework rules included:

- spectrum caps to ensure that four or more providers have the opportunity to access spectrum (40MHz except in Northwest Territories, Yukon and Nunavut service areas, where there is no limit); the cap applies for five years, after which date any proposed spectrum transfer is subject to federal approval;

- smaller geographic licence areas, with the aim of providing more opportunity for rural internet service providers to participate; and

- strict 'use it or lose it' deployment requirements, with licensees expected to prove minimum population coverage ranging from 15% to 50% depending on the licensing area, after ten years.

The results of the BRS auction were announced on 12 May. 302 of 318 licences on offer in 61 zones were awarded to nine licence winners, who bid the following amounts (for 2500MHz concessions in the named provinces/territories):

Telus – CAD478.82 million (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Yukon, Northwest Territories, Nunavut);

Videotron – CAD186.95 million (Quebec, Ontario, Alberta, British Columbia);

Bell – CAD28.98 million (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Alberta, British Columbia, Yukon, Northwest Territories, Nunavut);

Xplornet – CAD25.43 million (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Alberta, British Columbia);

Rogers – CAD24.09 million (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia);

Eastlink – CAD4.82 million (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Alberta);

Corridor Communications (CCI Wireless) – CAD2.30 million (Ontario, Alberta);

MTS Allstream – CAD2.24 million (Manitoba); and

TBayTel – CAD1.73 million (Ontario).

Two other qualified bidders, Wind Mobile and SSi Micro, did not win any licences.

Note that fixed-wireless licences in the 2500MHz-2690MHz band officially became eligible for transition to mobile Broadband Radio Service (BRS) licences on 31 March 2011 (under a conversion process which Industry Canada approved in July 2009). Bell and Rogers, joint owners of national 2500MHz-2690MHz frequencies via fixed-wireless operating venture Inukshuk (divided between the two in Q4 2012), were among the companies permitted to convert their spectrum to full mobile service usage to assist with LTE deployment across the

country, before adding to their existing 2500MHz resources via the BRS auction (as detailed above).

Residual 700MHz and AWS-3 Licence Auction (August 2015)

Consultation on a 'Licensing Framework for Residual Spectrum Licences in the 700MHz and AWS-3 Bands' ended in May 2015, and Industry Canada set 6 August 2015 as the deadline for receipt of applications for the 'leftover' spectrum auction, with winners scheduled to be announced later that month.

600MHz Band

Industry Canada launched a preliminary consultation on repurposing the 600MHz spectrum band for mobile use in December 2014. This spectrum is currently used primarily by over-the-air (OTA) TV broadcasters for local TV transmissions. There is a possibility of repurposing the 600MHz band jointly with the US, and there may be a further consultation on the policy, technical and licensing framework issues at a later date. Initial responses to the consultation published in April 2015 can be found at https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10974.html.

3500MHz Band

On 18 December 2014 Industry Canada published a decision regarding policy changes for the 3500MHz (3475MHz-3650MHz) band, which is currently used by fixed-wireless broadband services but will be reallocated to allow mobile services after future consultations.

AWS-4 Band

In December 2014 Industry Canada issued a Licensing Framework for Mobile Satellite Service (MSS) and Advanced Wireless Service (AWS-4, terrestrial mobile services) in the bands 2000-2020MHz and 2180MHz-2200MHz ('2GHz'), resolving to harmonise the bands with the US; new spectrum licence terms for incumbent 2GHz licensees took effect on 1 April 2015.

Spectrum Transfer Regulation

In June 2013 Industry Canada published its new wireless spectrum licence transfer framework, aimed at improving competition by promoting at least four mobile network operators in each region. Under the rules, all spectrum transfer requests must be reviewed, and those that would result in 'undue spectrum concentration, and therefore diminish competition' are not permitted. Decisions on transfer requests are made on a case-by-case basis and issued publicly to increase transparency and clarity. The rules apply to all licence transfers, including prospective transfers that could arise from options and other agreements. Under the Spectrum Licence Transfer Framework, a licensee is required to seek a review within 15 days of entering into any agreement that could lead to a prospective transfer. The rules state that reviews will normally be completed within twelve weeks from the time of receipt of all required information. This policy was applied by the ministry in June 2013 to block an attempted takeover of Mobilicity by Telus. Second and third attempts by Telus to buy Mobilicity were subsequently abandoned, in October 2013 and May 2014, due to conflicts with the Spectrum Licence Transfer Framework. Nonetheless, Industry Canada eventually approved the sale of Mobilicity to Rogers in June 2015, due to the deal including a transfer of Mobilicity's spectrum to Wind Mobile and the sharing of cableco Shaw's unused AWS spectrum between Rogers and Wind (as Industry Canada simultaneously approved Shaw's licence transfers, which had been pending since January 2013). Full details of the policy can be found at: www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10653.html.

Wireless Roaming Regulation / Tower Sharing

In order to support competition and access to network roaming/tower sharing for new entrants, Industry Canada announced in March 2012 that it intended to alter roaming/tower sharing policies (introduced in 2008) through the following:

– extending roaming provisions indefinitely and expanding them to all carriers;

– requiring carriers to make available basic information on all towers to improve transparency and expedite the sharing process; and

– shortening the timelines for arbitration between companies negotiating roaming/tower sharing agreements.

In March 2013 Industry Canada finalised the above measures under the 'Revised Frameworks for Mandatory Roaming and Antenna Tower and Site Sharing', including conditions of licensing to prohibit exclusive site arrangements, aimed at accelerating 4G mobile broadband expansion following the digital dividend auction.

The CRTC began to review the competitiveness of the market for wholesale mobile services including wholesale network roaming (voice, data and messaging) and wireless tower sharing, in February 2014. In the meantime, the government drafted amendments to the Telecommunications Act, contained in Bill C-31 of 28 March 2014 – preventing Canadian carriers from charging their peers more for wholesale mobile roaming services than they charge their own customers for mobile voice, data and text services – as an 'interim measure'. Bill C-31 received Royal Assent on 19 June 2014, and these caps formed part of the new section 27.1 of the Act. Furthermore, on 31 July 2014 the CRTC issued Telecom Decision 2014-398 which banned exclusivity clauses in domestic roaming agreements; the decision specifically named Rogers as unfairly discriminating against 'certain new entrants' in its roaming agreement conditions and rates.

Following a public hearing in September-October 2014, in May 2015 the CRTC issued its final decisions on three types of wholesale wireless access: (i) roaming, (ii) mobile virtual network operator (MVNO) access, and (iii) tower/site sharing. Telecom Regulatory Policy CRTC 2015-177 ('Regulatory framework for wholesale mobile wireless services') concluded that, under existing market conditions, competition in the wireless market was 'likely not sustainable'. Therefore the CRTC opted to regulate the wholesale roaming rates charged by the national cellular network operating companies, Rogers, Bell and Telus; the trio were given until 4 June 2015 to submit interim rates and must file their final proposed rates by 4 November 2015. In light of the above measures, the CRTC is recommending that the government repeal the legislated roaming caps that remain in place. The CRTC's Policy statement also included certain determinations regarding measures for developing the MVNO sector (see MVNO Legislation). Lastly, the Policy stated that the CRTC's existing processes are sufficient to address tower/site sharing issues related to the rates, terms, and conditions of wholesale agreements.

On 25 June 2015 a group of operators – Eastlink, Videotron and Wind Mobile – having obtained the interim roaming tariffs filed by Rogers, Telus and Bell, submitted that the tariffs were 'generally inconsistent' with the new Regulatory Framework, and requested that they be amended.

Consumer Protection / New Mobile Contract Rules

On 2 December 2013 the CRTC's new 'Consumer Code' regulations took effect, under which consumers are allowed to cancel wireless contracts after two years without cancellation fees – applicable to all new/renewed contracts signed as of that date, and all wireless contracts from 3 June 2015. The regulations also require carriers to: cap data overages at CAD50 per month and international data roaming at CAD100 per month; allow customers to unlock devices after 90 days of service or immediately if the device has been paid for in full; provide a

15-day return window for customers signing up for a new service; allow customers to accept/decline changes to key terms of a fixed-length contract; and ensure contracts are 'easy to read and understand.' In May 2015 the Federal Court of Appeal rejected a bid by Canada's largest mobile operators to delay the full implementation of the wireless code of conduct.

In another consumer protection measure, Canada's major mobile network operators jointly launched automatic blocking of mobile devices registered as lost/stolen (in Canada or the US) via the International Mobile Equipment Identity (IMEI) database, with effect from 30 September 2013, the deadline set by the CRTC.

AWS (3G/4G) Licensees

Company	Official Date of Licensing
7140282 Canada Inc	Apr-09
Bell Mobility Inc	Dec-08
Blue Canada Wireless Inc*	Mar-10
Bragg Communications Inc (Eastlink)	Dec-08
Celluworld Inc	Dec-08
Data & Audio-Visual Enterprise Wireless Inc (DAVE)	Feb-09
Globalive Wireless Management Corp	Mar-09
MTS Allstream (6934242 Canada Ltd)	Dec-08
Novus Wireless Inc*	Dec-08
Public Mobile Inc. (6934579 Canada Inc)*	Mar-09
Rich Telecom Corp	Dec-08
Rogers Communications Inc	Dec-08
SaskTel	Dec-08
Shaw Communications (1380057 Alberta Ltd)	Sep-09
TELUS Communications Inc	Dec-08
Videotron (9193-2962 Quebec Inc)	Mar-09

Notes: *Public Mobile (since acquired by Telus), Blue Canada and Novus licences are 1900MHz PCS 'G-band' or 1700MHz 'I Band', although auctioned alongside the AWS spectrum.
Sources: Industry Canada

2100MHz AWS (3G/4G) Spectrum Distribution

Province / Territory	Licensee, Bandwidth (Bands)*	KEY (MHz)
Newfoundland		A 1710-1720, 2110-2120
	Rogers 20MHz (A)	B 1720-1730, 2120-2130
	Eastlink 30MHz (B, C)	C 1730-1735, 2130-2135
	Bell Mobility 20MHz (F)	D 1735-1740, 2135-2140
	Telus 10MHz (E)	E 1740-1745, 2140-2145
	Globalive 10MHz (D)	F 1745-1755, 2145-2155
Prince Edward Island		
	Rogers 20MHz (A)	
	Eastlink 30MHz (B, C)	
	Bell Mobility 20MHz (F)	
	Telus 10MHz (E)	
	Globalive 10MHz (D)	
Nova Scotia		
	Rogers 20MHz (A, F)	
	Eastlink 30MHz (B, C)	
	Bell Mobility 20MHz (A, F)	
	Telus 10MHz (E)	
	Globalive 10MHz (D)	
New Brunswick		
	Rogers 20MHz (A)	

Province / Territory	Licensee, Bandwidth (Bands)*	KEY (MHz)
	Eastlink 20MHz / 30MHz (B, D)	
	Bell Mobility 20MHz (F)	
	Telus 10MHz (E)	
	Globalive 10MHz (C)	
Quebec		
	Rogers 20MHz (A)	
	Videotron 30MHz / 20MHz (B, C, D, E)	
	Telus 20MHz (F)	
	Bell Mobility 10MHz (E)	
Ontario		
	Rogers 20MHz (A)	
	Bell Mobility 20MHz (F) / 10MHz (E)	
	Telus 20MHz (F) / 10MHz (E)	
	Globalive 30MHz / 20MHz / 10MHz (B, C, D)	
	DAVE Wireless 10MHz (C, D)	
	Shaw 10MHz (D)	
	Videotron 10MHz (D)	
	Eastlink 10MHz (D)	
	Celluworld 10MHz (D)	
Saskatchewan		
	Rogers 20MHz (A, F)	
	SaskTel 30MHz (B, C)	

Province / Territory	Licensee, Bandwidth (Bands)*	KEY (MHz)
	Telus 20MHz (A, F)	
	Shaw 10MHz (D)	
	Globalive 10MHz (E)	
Manitoba		
	Rogers 20MHz (A)	
	MTS 20MHz (B)	
	Telus 20MHz (F)	
	Shaw 10MHz (C, E)	
	Globalive 10MHz (D)	
Alberta		
	Rogers 20MHz (A)	
	Telus 20MHz (F)	
	Bell Mobility 10MHz (E)	
	Shaw 20MHz (B)	
	Eastlink 20MHz (D, E)	
	Globalive 10MHz (C)	
	DAVE Wireless 10MHz (D)	
British Columbia		
	Rogers 20MHz (A)	
	Telus 20MHz (F)	
	Bell Mobility 10MHz (E)	
	Shaw 20MHz (B)	

Province / Territory	Licensee, Bandwidth (Bands)*	KEY (MHz)
	Globalive 10MHz (C)	
	DAVE Wireless 10MHz (D)	
	Rich Telecom / 7140282 Canada Inc.10MHz (D)	
Yukon, North West & Nunavut		
	Rogers 20MHz (A)	
	Globalive 40MHz (B, C, D)	
	Bell Mobility 20MHz (F)	
	Telus 10MHz (E)	

Notes: *Licences may cover only certain cities/zones; 'G' and 'I' Bands not shown (allocated alongside AWS spectrum); further details from CRTC (www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09001.html).
Sources: Industry Canada

AWS-3 Licence Winners (March 2015)

Province / Territory / Zone	Block(s)*	Licensee
Newfoundland & Labrador	2x15MHz (Set-Aside)	Eastlink
	2x10MHz (J1+J2)	Bell
Nova Scotia & Prince Edward Island	2x15MHz (Set-Aside)	Eastlink
	2x10MHz (J1+J2)	Bell
New Brunswick	2x15MHz (Set-Aside)	Eastlink
	2x10MHz (J1+J2)	Bell
Eastern Quebec	2x15MHz (Set-Aside)	Videotron
	2x10MHz (J1+J2)	Telus
Southern Quebec	2x15MHz (Set-Aside)	Videotron

Province / Territory / Zone	Block(s)*	Licensee
	2x10MHz (J1+J2)	Telus
Northern Quebec	2x15MHz (Set-Aside)	Videotron
	2x10MHz (J1+J2)	Bell
Southern Ontario	2x15MHz (Set-Aside)	Wind Mobile
	2x5MHz (J1)	Bell
	2x5MHz (J2)	Telus
Northern Ontario	2x15MHz (Set-Aside)	Eastlink
	2x10MHz (J1+J2)	Bell
Eastern Ontario & Outaouais	2x15MHz (Set-Aside)	Videotron
	2x10MHz (J1+J2)	Telus
British Columbia	2x15MHz (Set-Aside)	Wind Mobile
	2x10MHz (J1+J2)	Telus
Alberta	2x15MHz (Set-Aside)	Wind Mobile
	2x10MHz (J1+J2)	Telus
Manitoba	2x10MHz (J1+J2)	Telus
Saskatchewan	2x10MHz (J1+J2)	Telus
Yukon, Northwest Territories & Nunavut	2x10MHz (J1+J2)	Bell

Notes: *AWS-3 blocks (MHz): (Set-Aside: 1755-1770, 2155-2170); (J1: 1770-1775, 2170-2175); (J2: 1775-1780, 2175-2180); (J1+J2: 1770-1780, 2170-2180)
Sources: Industry Canada

MVNO Legislation

The Canadian Radio-television and Telecommunications Commission (CRTC) has repeatedly declined requests to mandate network access for mobile virtual network operators (MVNOs), and therefore such access has remained subject solely to commercial negotiations with mobile network operators (MNOs). In 1997's Telecom Order CRTC 97-1797 the independent regulator rejected the idea of mandating reseller/MVNO network access, in favour of a strategy based on encouraging facilities-based investment, and it came to the same conclusion in May 2015's Telecom Regulatory Policy CRTC 2015-177 ('Regulatory framework for wholesale mobile wireless services'), although the latter policy did contain certain determinations aimed at reducing barriers faced by MVNOs.

In assessing the May 2015 Policy, the CRTC took into account public submissions made by prospective MVNO market entrants – including Canadian cableco Cogeco, UK-based Lycamobile, France's Orange Group, would-be Canadian consumer cooperative Raven Wireless and Canadian internet services group Tucows (already an MVNO in the US) – which complained that the large Canadian MNOs Rogers, Telus and Bell have offered unreasonable wholesale rates and terms, or in some cases refused to negotiate MVNO arrangements altogether. Furthermore, parties interested in operating as full MVNOs claimed that the biggest MNOs would only consider offering wholesale access to 'Light MVNOs' or branded resellers. The prospective MVNOs submitted that the Commission should mandate the provision of wholesale MVNO access, while MNO contributors (the national carriers plus regional MNOs Videotron, Wind Mobile and Eastlink) opposed mandating MVNO access and instead supported a facilities-based competition strategy. At the time of the consultation (September-October 2014) Rogers – which has been the most open to signing MVNO agreements among the three national MNOs – disclosed that it had eight active direct relationships with independent MVNOs on its network (in addition to some indirect MVNO arrangements), while Bell and Telus have been relatively reticent in agreeing independent MVNO access deals (i.e. without some level of ownership in each venture).

The CRTC concluded in the May 2015 Policy that Rogers, Telus and Bell collectively possess nationwide 'market power' for wholesale MVNO access, and determined such access is an 'essential' service. The Commission noted that there are relatively few wholesale MVNO access arrangements in Canada, despite significant demand demonstrated in the consultation. Further, the CRTC observed that national MNOs have exhibited limited interest in providing MVNOs with access for retail mobile wireless voice, text and data services on a national or regional basis, resulting in fewer choices for consumers. Despite all this, however, the regulator concluded that it was not appropriate to mandate wholesale MVNO access because it would 'significantly undermine' current network investments by newer MNOs, particularly outside urban core areas, and would 'likely discourage' continued network investment by wireless carriers because they could rely instead on MVNO access.

Instead, the May 2015 Policy set out two measures to reduce certain barriers faced by MVNOs 'to facilitate, and allow more flexibility in, their commercial negotiations with wireless carriers'. Firstly, the CRTC directed the Canadian Steering Committee on Numbering (CSCN) to amend guidelines to allow full MVNOs to acquire Mobile Network Codes (MNCs) so they no longer have to rely on the host wireless carriers' MNCs and SIM cards (with the amended guidelines to be submitted for CRTC approval by 6 July 2015).

Secondly, the CRTC declared that Rogers, Telus and Bell must provide roaming to all subscribers served by their domestic wholesale roaming partners, including the subscribers of any MVNOs operating on the wholesale roaming partners' networks. In reaching this decision, the Commission considered that existing restrictions in wholesale roaming arrangements could impede a wireless carrier from offering wholesale network access to a virtual operator and therefore represented a barrier to entry to MVNOs (Wind Mobile, for

instance, submitted that restrictions in certain wholesale roaming arrangements had impeded its ability to support MVNOs on its network).

Wireless Regulatory Timeline

1901	First wireless (radio-telegraph) transatlantic signals are sent from Cornwall, England to St. John's, Newfoundland
1902	Canada's first wireless station established in Glace Bay, Nova Scotia
1905	The first Canadian legislation on wireless telegraphy, the Radiotelegraph Act, is passed
1913	The Radiotelegraph Act encompasses the radio-telephone sector
1947	Bell Canada reportedly offers the first commercial 'mobile telephone' service
1968	Restrictions on foreign ownership increased; the Canadian Radio-television Commission created as a regulatory agency that becomes the Canadian Radio-television and Telecommunications Commission (CRTC) in 1976
1984	Regional duopolies in mobile cellular market created
1991	New Radiocommunication Act
1993	New Telecommunications Act
1995	Personal Communications Systems (PCS) licensed
1997	CRTC announces regulatory framework for competition in local telephone services; wireless carriers must contribute to high cost support fund
2000	Telus buys 100% of Clearnet
2001	Industry Canada awards 62 PCS licences in the 1900MHz frequency range
2003	MTS awarded PCS concession for 1900MHz operations
2004	Spectrum cap revoked
November 2004	Rogers buys Microcell (Fido)
March 2007	Mobile number portability (MNP) introduced
April 2007	Rogers launches Canada's first 3G video calling
September 2007	MNP implemented nationally by all operators
July 2008	AWS (1700MHz/2100MHz) spectrum auction concludes with 15 winners of 282 regional licences; 105MHz AWS blocks offered in regions nationwide including 40MHz reserved for new entrants
July 2009	Bell completes 100% purchase of MVNO Virgin Mobile Canada
September 2009	Rogers launches HSPA+ in five major cities
November 2009	Bell and Telus launch nationwide HSPA+ mobile network via infrastructure sharing

December 2009	Globalive Wireless (Wind Mobile) launches 3G network after Industry Canada reverses CRTC's decision to disqualify the cellco's ownership structure
May 2010	DAVE Wireless (Mobilicity) and Public Mobile launch networks
September 2010	Videotron launches 3G network in Quebec
February 2011	Federal Court overrules government's approval of Wind's ownership, but Wind and government successfully appeal decision
31 March 2011	Transition of 2500MHz-2690MHz fixed-wireless licences to mobile Broadband Radio Service (BRS) licences permitted
August 2011	Bulk of transition from analogue to digital broadcasting finished, freeing up 'digital dividend' 700MHz spectrum band
July 2011	Rogers launches 4G LTE mobile broadband networks in major cities initially using AWS band
September 2011	Bell launches an LTE network initially using AWS band; Shaw cancels plan to enter mobile market
February 2012	Telus launches LTE services in AWS band
29 June 2012	Foreign investment restrictions removed for telecoms operators that hold less than a 10% share of total Canadian telecom market revenues
January 2013	Rogers agrees an option to acquire cableco Shaw's unused AWS spectrum
February 2013	Cableco Eastlink enters mobile market with 3G/4G network launch
March 2013	Industry Canada releases new five-year spectrum outlook
May 2013	Rogers agrees an option for Videotron's unused AWS spectrum in Greater Toronto, but deal faces blocking under the 'pro competition' federal licence transfer policy
June 2013	New spectrum licence transfer policy officially enforced, requiring individual review of every transfer request with the emphasis on preventing 'undue concentration' of frequency holdings; Telus blocked from acquiring Mobilicity under the policy
November 2013	Telus permitted to acquire Public Mobile
June 2014	Wholesale domestic network roaming caps introduced to ensure competitive fairness
July 2014	CRTC bans exclusivity clauses in domestic network roaming agreements
September 2014	Videotron launches LTE network based on joint building agreement with Rogers
December 2014	Industry Canada issues decision to proceed with 3500MHz mobile licensing; launches consultation on repurposing 600MHz band
February 2014	Eight 700MHz licence winners spend CAD5.3 billion in digital dividend auction which achieves government target of four licensed operators per province
March 2015	Five operators win licences in AWS-3 auction, with Wind Mobile, Videotron and Eastlink buying concessions set aside for newer entrants

April-May 2015	2500MHz licences auctioned to nine cellcos and rural fixed-wireless operators Canada-wide
May 2015	CRTC decides to regulate domestic wholesale roaming rates of Rogers, Telus and Bell, while introducing measures intended to encourage independent MVNOs, but stops short of mandating wholesale MVNO access terms
3 June 2015	Consumer Code regulations, under which wireless contracts may be cancelled at no cost after two years, now apply to all new/existing contracts
June 2015	Rogers permitted to buy Mobilicity and Shaw's unused AWS spectrum; Wind receives all Mobilicity's spectrum plus some of Shaw's frequencies in return for giving Rogers a portion of its own AWS spectrum
August 2015	Auction scheduled for leftover 700MHz and AWS-3 licences.

Broadband Regulatory Overview

Regulatory Bodies

Canadian Radio-television and Telecoms Commission (CRTC)

Les Terrasses de la Chaudiere
Central Building
1 Promenade du Portage
Quebec City, Quebec J8X 4BI
Canada
Tel. +1 819 997 0313
Fax +1 819 994 0218
http://www.crtc.gc.ca

Industry Canada

Economic Development Agency
11th Floor, East Tower
C.D. Howe Building
Ottawa, Ontario K1A 0H5
Canada
Tel. +1 613 995 9001
Fax +1 613 992 0302
http://www.ic.gc.ca

Current Status of Local Loop Unbundling: Commercial
Reference unbundling offer: http://www.bce.ca/aboutbce/regulatory/tariffs/bellcanada/details/tariff/7516
Notes: This link contains RUO information for the largest incumbent operator Bell Canada (Part 2 – CAT – Access Arrangements – 'Item 105 – Local Network Interconnection and Component Unbundling' [pdf])

Broadband Key Legislation

Under the Telecommunications Act, retail internet access is exempted from regulation, and wholesale internet access is regulated by the Canadian Radio-television and Telecoms Commission (CRTC). In the case of the incumbent local exchange carriers (ILECs), the underlying facilities and services required by third-party DSL internet service providers (ISPs) are subject to price capping. In July 2003 the CRTC's Telecom Decision 2003-49 obliged incumbents to provide retail DSL services to competitors' residential unbundled local loop (ULL) customers if requested, preventing ILECs from limiting availability of their consumer DSL services to their own voice line customers. Cable network operators are also required to provide third-party access (known as TPIA) to their infrastructure; in Decision 2004-69 the CRTC approved tariffs and terms for TPIA agreements. There were 175 DSL providers registered with the CRTC as of June 2015 (up from 159 a year earlier and 141 at mid-2013), in addition to 364 high speed service resellers (an increase from 311 a year earlier and 259 at mid-2013).

Wholesale Fibre Broadband Regulation

The CRTC announced in March 2008 that certain wholesale network services – around a third of the existing available range, including fibre-based broadband access – would be removed from the list of 'essential' facilities/services subject to regulation. At the time the regulator decided that 'high speed fibre-based access and transport facilities and related services are to be classified as non-essential' due to the 'high incidence of competitor self-supply or alternative supply of fibre-based access and transport facilities [which] … demonstrates the existence of competition in the upstream market for such facilities.' Wholesale services were assigned to one of six categories: i) Essential, ii) 'Conditional essential', iii) 'Conditional mandated non-essential', iv) 'Public good', v) Interconnection, and vi) 'Non-essential subject to phase-out'. The wholesale regulatory framework and definitions of essential services are set out in Telecom Decision CRTC 2008-17 (www.crtc.gc.ca/eng/archive/2008/ dt2008-17.htm). In December 2009 Industry Canada backed the CRTC's ruling to exclude Ethernet (among the recognised fibre-based access services) from the list of wholesale 'Essential' network services subject to regulation, leaving large players like Bell and Telus free to refuse access to rivals, despite MTS Allstream and smaller ISPs lobbying against the decision. Focus has since switched to the question of whether or not to mandate wholesale access to fibre-to-the-premises (FTTP), as part of a wider review on the possibilities of mandating any additional wholesale services or deregulating any existing ones. In a public hearing in November-December 2014, Bell Canada argued against mandating wholesale access to fibre broadband access networks operated by incumbent large wireline telcos, claiming that investment in nationwide high speed infrastructure development would suffer if the large incumbents were forced to give smaller providers access to their direct fibre access networks, and instead urged the regulator to allow market forces to drive competition. Opposite views were presented by the Canadian Network Operators Consortium, representing independent ISPs, dismissing Bell's arguments at the hearing, countering that large telcos such as Bell and Telus would have to continue investing in last-mile fibre regardless of wholesale access rules in order to compete with cablecos such as Rogers, Shaw, Videotron and Cogeco. Final decisions were pending as of end-June 2015.

Wholesale Charging Models for ISPs

Also in the wholesale market, as at 30 June 2015 the CRTC allows large wireline and cable network operators the option of charging smaller independent ISPs for broadband network access under two models: either the 'flat-rate model' or the 'capacity-based' model, while the operator's chosen model must be used for all its wholesale ISP customers in the residential and business markets. The flat-rate wholesale billing model (historically the most commonly used) allows smaller ISPs to be charged a flat monthly fee per retail customer for access to

the network (which in turn allows the ISP's retail customers to be offered unlimited use of the network with no additional fees/conditions). Alternatively, the capacity-based wholesale billing model (introduced by the CRTC in February 2012, initially for the residential ISP sector only, via Telecom Order CRTC 2012-60 – which scrapped a widely-criticised interim 'usage-based' wholesale model) allows the independent ISPs to 'pre-purchase the amount of network capacity that they expect to need to serve their retail customers'. The capacity-based model adds that 'if demand exceeds the capacity an independent service provider has purchased, the provider must manage its network capacity until it can buy more. Independent service providers must also pay a monthly access fee for each of their retail customers.' In addition to specifying the acceptable wholesale billing models, the CRTC sets the actual rates at which wireline telcos and cablecos may charge their wholesale clients, based on cost of provision plus a 'reasonable mark-up'. The current versions of the two wholesale ISP models, including individual rates for all wireline incumbents/large cablecos, were established under Telecom Regulatory Policy CRTC 2013-70, enforced on 21 February 2013. This decision recognised that 'most incumbents do not distinguish' between residential and business wholesale ISP services, and therefore made the rates equal in each sector from that date. Furthermore, corrections to previous cost estimates were built into the decision, with the effect of raising the wholesale ISP rates chargeable by some cablecos (Rogers, Shaw and Videotron) while reducing the chargeable rate of rival cableco Cogeco, and significantly lowering (by up to around half) the wholesale rates of the Bell group in Ontario and Quebec and of Telus in its incumbent territories in Alberta and British Columbia.

In May 2015 the CRTC issued a consultation paper looking at whether the wholesale 'flat-rate / capacity-based' model (as detailed above) remained applicable or whether it required changing. Comments were sought on whether existing wholesale costing assumptions remained appropriate, as well as considering whether a new streamlined tariff application process should be established to lessen the regulatory burden. Submissions were accepted up until 6 July 2015. Full details are at www.crtc.gc.ca/eng/archive/2015/2015-225.htm.

2300MHz / 2500MHz / 3500MHz Broadband Licensing

The first broadband wireless access (BWA) licences were auctioned in March 2000: Industry Canada awarded twelve regional 2500MHz-2690MHz ('2500MHz') licences to fixed-wireless provider Inukshuk (a 50/50 venture of Bell Canada and Rogers Communications), whilst SaskTel won the 2500MHz permit covering Saskatchewan province. In February 2004 Industry Canada auctioned a total of 392 BWA licences in the 2300MHz (Wireless Communications Service – WCS) and 3500MHz bands to 22 companies, with winning bids totalling CAD11.2 million. A second phase auction in January 2005 yielded a further CAD56.6 million in state revenues, with twelve highest bidders receiving a total of 306 2300MHz/3500MHz concessions. Bell Canada finished the two-stage process having paid CAD36 million for 193 licences, and other licensees included Telus / Tele-Mobile (141 licences costing CAD8.9 million), Rogers (77, CAD10.7 million), VCom (60, CAD1.3 million), Mipps (26, CAD2.4 million) and 4253311 Canada Inc (25, CAD7.6 million). Regional telcos including SaskTel, NorthwestTel and Telecom Ottawa also bought 2300MHz and/or 3500MHz BWA concessions in their respective coverage areas. Having already awarded 842 licences (for a total of CAD69 million) in the 2300MHz and 3500MHz bands, in June 2009 the CRTC auctioned unclaimed 2300MHz/3500MHz licences in ten regions for CAD415,000: six service areas going to BroadPoint International Telecom, and one each to Monophone, 768812 Ontario, I-NetLink and SSI Micro.

In July 2009 the CRTC granted an extension to the rollout obligations of all 2300MHz/ 3500MHz licensees, mandating them to utilise spectrum by the end of the eighth year of their concession's term, up from the previous five-year deadline. Getting tougher on the licensees though, in November 2013 Industry Minister James Moore stated that companies holding under-utilised 2300MHz and 3500MHz frequency licences must return the spectrum and will not be allowed to renew their concessions.

In July 2009 Industry Canada wrapped up a consultation on the transition of 2500MHz-2690MHz ('2500MHz') fixed-wireless/nomadic broadband service licences to Broadband Radio Service (BRS) licences allowing mobile services, and adopted 31 March 2011 as the date from which fixed-wireless licences became eligible for conversion to BRS. Inukshuk partners Rogers and Bell split their remaining 2500MHz spectrum equally in Q4 2012 for their own respective mobile LTE expansions (after returning one-third to the government under spectrum policy for the band). An auction of spare BRS 2500MHz spectrum was completed in April-May 2015, intended both for mobile broadband and rural fixed-wireless broadband (see Wireless Key Legislation for details).

Similarly, on 18 December 2014 Industry Canada published a decision regarding policy changes for the 3500MHz (3475MHz-3650MHz) band, which is being reallocated to allow mobile services. A new 'flexible use' band plan and licensing framework will be developed after future consultations. Until such time, all licences in the 3500MHz band will remain fixed-only. The full decision can be seen at https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10914.html.

Other Broadband Frequencies

The utilisation of licence-exempt 2400MHz wireless frequencies – i.e. for public sector connectivity applications – is supported by Industry Canada policy published in mid-2001. In April 2005 the department opened up new spectrum in the 5GHz band, in response to increasing demand for BWA. The 5470MHz-5725MHz range was released for licence-exempt wireless local area networks (LE-LANs), whilst improvements were implemented for the existing 5250MHz-5350MHz LE-LAN band.

In December 2014 Industry Canada decided on a licensing process to be implemented for all available spectrum in the 24GHz, 28GHz and 38GHz bands, while standardising all existing licences in the 28GHz band.

Rural Broadband Obligations

In September 2010 the CRTC issued a final ruling forcing incumbent fixed line operators Bell Canada, Bell Aliant, Telus and MTS to pay back CAD311 million to residential phone customers in urban areas that were overcharged between 2002 and 2006 (see Wireline Key Legislation). In its decision the regulator also approved a plan for the deployment of fixed broadband internet access to 287 rural and remote communities over the next four years at a cost of CAD422 million, using the remaining funds accumulated from the overcharging. Telus promised to cover 159 communities in British Columbia, Alberta and Quebec, MTS is responsible for connecting 16 communities in Manitoba, whilst Bell Canada and Bell Aliant agreed to jointly connect 112 rural communities in Ontario and Quebec. In November 2010 the CRTC gave Bell Canada and Bell Aliant permission for a plan to use wireless instead of wireline technology for fulfilling their rural broadband rollout obligations, after the sister telcos revised mobile data packages – previously rejected by the watchdog – to offer the same speeds/volumes/features as their DSL-based counterparts.

Universal Internet Services

Concluding a debate on the scope of universal telecoms service obligations, in May 2011 the CRTC released Telecom Regulatory Policy 2011-291 determining not to add high speed internet to the basic service obligation under which ILECs are obliged to provide voice services and dial-up internet (at local rates) in regulated (non-forborne) exchanges). A new review of the scope of basic telecoms service obligations began on 9 April 2015, with a deadline for the first phase of submissions set for 14 July 2015 and a public hearing scheduled for 11 April 2016.

Broadcasting / Convergence Regulation

In October 2009 the federal government reached an out-of-court settlement with TV broadcasters, cablecos and telcos by altering licensing fees and agreeing to return CAD450 million in taxes backdated for three years. In 1997 Ottawa began collecting the annual revenue-based fees ('Part 2 fees') from companies including Global Television, CTV, Rogers Communications and Bell Canada, to offset the cost of managing Canada's airwaves. However, as communications revenues grew, the government's takings rose in turn from CAD10 million to around CAD115 million per year. The companies had originally sued for the return of more than CAD800 million. The formula used to calculate Part 2 fees has now been revised and capped at a combined CAD100 million a year. Cable and telephony companies benefitted more from the changes than those focused solely on broadcasting, having paid around two-thirds of all fees collected.

Further regulatory arguments have concerned the convergence of services such as internet access and broadcasting. On 7 July 2010 the Federal Court of Appeal issued a decision in which it concluded that ISPs were not subject to the Broadcasting Act when providing online access to broadcasting content requested by end-users. On 27 September 2010 a group of 'content creators' comprising the Alliance of Canadian Cinema, Television & Radio Artists, the Canadian Media Production Association, the Directors Guild of Canada and the Writers Guild of Canada filed a motion against this decision in the Supreme Court, which on 24 March 2011 granted leave to consider the appeal. If the Supreme Court were to reverse the Court of Appeal's decision, it would give the CRTC the jurisdiction to impose additional levies on ISP revenues under the Broadcasting Act (with funds raised in whole or part to subsidise the creation and/or distribution of 'Canadian new media broadcasting programming content'). However, the ISPs came out on top when, in a final ruling in February 2012 the Supreme Court decided that ISPs are not bound by domestic broadcast regulations. The judgement said that ISPs 'merely provide the mode of transmission [of content] ... they take no part in the selection, origination, or packaging of content.' CRTC sums up its policy thus: 'In Canada, services that broadcast over the internet don't need a licence from the CRTC. We do not intervene on content on the internet.'

In another decision concerning the convergence of telecoms and broadcasting groups (so-called 'vertical integration'), in June 2013 the CRTC approved Bell Canada Enterprises' (BCE's) CAD3.4 billion takeover of broadcaster Astral Media's pay-TV and radio channels, after the two parties revised the terms of the deal to address anti-monopoly concerns, while the regulator imposed additional conditions to 'uphold the public interest.' The conditions of the approved transaction required BCE to invest in new Canadian programming and sell eleven TV services and ten radio stations while obeying conditions such as a prohibition on imposing restrictive bundling requirements on providers.

Local Loop Unbundling

The Telecommunications Act of 1993 does not specifically provide for local loop unbundling (LLU) but instead gives the CRTC wide-ranging powers that allow it sufficient scope to interpret general clauses as it sees appropriate. In 1997 the CRTC's decision on local competition concluded that essential facilities were those that: i). are under monopoly control, ii). are required as an input to provide services, and iii). cannot be duplicated economically. In the decision, local loops in certain bands, primarily small urban and rural areas, were deemed essential facilities. Nevertheless the CRTC also concluded that local loops in lower cost areas (such as major towns), while not defined as essential, would also be subject to the same unbundling and pricing requirements for a period of five years (from 1 May 1997) in order to give new entrants the ability to build up an initial customer base using local loops while maintaining an incentive for eventual construction of their own facilities. However, following lower than expected use of unbundled local loops (ULLs), reductions in service charges were mandated by the CRTC, and in April 2001 it extended the unbundling requirements of low-cost (urban) local loop areas indefinitely.

In its announcement in March 2008 that a third of 'Essential' wholesale services were being deregulated (for the period 2008-2012), the CRTC affirmed that rules would still require PSTN operators to offer ULLs on their copper access networks. Traditional telcos argued that the continuation of mandatory LLU was unjustified, whilst on the other hand conceding that it would not have a marked effect on them, as most significant competition was now cable-based. The remaining mandated wholesale services remained under review at mid-2015 (see Broadband Key Legislation).

Monthly prices for full ULL access vary widely from location to location. In June 2009 Bell Canada and Bell Aliant filed tariff applications to increase the rates for their unbundled copper loops in Ontario and Quebec, while Rogers Communications, which leases ULLs from both telcos, registered its opposition to the proposals. The CRTC approved the rate changes on an interim basis only on 14 December 2009, and following a review the watchdog set new rates in a decision on 12 January 2011 (Telecom Decision CRTC 2011-24), applicable retroactively to the interim date; the rates begin at CAD6.75 for local loops within the shortest distance-to-exchange category, with higher rates for longer distances, beginning at CAD13.45. The approved new rates were on average 6% higher than the pre-December 2009 rates (e.g. in most cases significantly less of an increase than asked for by the Bell telcos). In March 2011 MTS Allstream led a review and variance application of the latter CRTC decision arguing that ULL rates should be even lower than they were before December 2009. In answer, in April 2011 Bell Canada filed its own review and variance application instead seeking further increases to the rates approved by the CRTC, in total ranging from 25% to 156% of pre-December 2009 rates, citing an increase in its own costs of service provision. Primus Telecommunications Canada weighed in with an application supporting MTS's view that Bell's original rate increases were too high. In November 2012 the CRTC issued Telecom Decision CRTC 2012-628, ruling on the appeals and establishing new rates on average 14% lower than the rates approved in Decision 2011-24 (see above); the new approved rates were backdated to December 2009.

Wireline Regulatory Overview

Regulatory Bodies

Industry Canada

Economic Development Agency
11th Floor, East Tower
C.D. Howe Building
Ottawa, Ontario K1A 0H5
Canada
Tel. +1 613 995 9001
Fax +1 613 992 0302
http://www.ic.gc.ca

Canadian Radio-television and Telecoms Commission (CRTC)

Les Terrasses de la Chaudiere
Central Building
1 Promenade du Portage
Quebec City, Quebec J8X 4BI
Canada
Tel. +1 819 997 0313

Dates of Liberalisation

- Local Telephony: 1997
- Domestic Long-distance Telephony: 1992
- International Telephony: 1998

Wireline Key Legislation

Deregulation of the telecoms markets began in 1979 when the CRTC ruled that telephone companies no longer had a monopoly on private (leased) lines connected to the PSTN. CRTC decisions in 1984 mandated interconnection of cellular and incumbent local exchange carrier (ILEC) networks and allowed basic telephone services to be resold by competitive service providers. The domestic long-distance (DLD) market was opened to facilities-based competition in 1992, and the regulator opened up the facilities-based international long-distance (ILD) market in 1998. It initially excluded former monopoly wholesale international carrier Teleglobe — now Tata Communications (Canada) — from its regulatory forbearance ruling on the market. However, certain services provided by Teleglobe were later excluded from regulation as well. Teleglobe was acquired by Bell Canada Enterprises (BCE) in 2000 only to be sold two years later to American owners based in Bermuda. In February 2006 India's VSNL (now Tata Communications) acquired Teleglobe and renamed it VSNL International Canada, and rebranded it again in February 2008 to Tata Communications (Canada). After a review of the basic international telecommunications services (BITS) licensing regime, CRTC Decision 2008-70 of 11 August 2008 merged the two existing classes of ILD (BITS) licences — Class A covering facilities-based (whether owned or leased) services, and Class B, non-infrastructure based — into one. At the time of the licence merging there were around 125 operators holding Class A BITS concessions. As at June 2015 there were a total of 551 BITS licensees, an increase of 61 in a year (following an increase of 47 the year before).

With the goal of promoting competition, in 1994 the regulator set out rules to eliminate the cross-subsidisation of local telephone services by inflated long-distance rates; the rebalancing led to an increase in local telephony rates and a decrease in long-distance tolls. Another major change that year was allowing cable TV providers to offer telecoms services and ILECs to offer video services. In 1997 the CRTC mandated ILECs to provide 'unbundled' components of the local loop to competitors (competitive local exchange carriers — CLECs*) whenever such facilities cannot be duplicated. The regulator also ruled that all local telephone networks had to interconnect with each other, as well as with all long-distance and wireless carriers.

Revenues from high margin (e.g. urban) markets had historically been used to subsidise services in remote, high cost areas. The CRTC decided in 1997 that no single sector should bear the burden of paying this universal service support and changed the structure to one in which a percentage of total revenues is paid into a fund for carriers operating in high cost areas. All operators with annual revenues in excess of CAD10 million must pay into this fund.

After relaxing regulations in sectors including long-distance and retail internet access, the next market on the CRTC's list was local telephony, in particular the residential and business basic PSTN services provided by ILECs belonging to the former Stentor Alliance, including Bell Canada, Bell Aliant, Telus Communications, Manitoba Telecom Services (MTS) and

Saskatchewan Telecommunications (SaskTel). In April 2006 the CRTC constructed a price deregulation framework in its Telecom Decision 2006-15, based on 86 local regions, which essentially stated that CLECs must win 25% of a local telephony market before ILECs could set their own rates for retail services. However, since virtually no local areas met the criteria, the ILECs appealed on the basis that competition was already sufficient for price deregulation, and demanded the freedom to bundle local telephony with other services at below-cost prices to compete with cablecos and other newcomers. The ILECs were backed by the state-appointed Telecommunications Policy Review Panel which recommended that market forces replace price regulation.

In December 2006 the then-Minister of Industry Maxime Bernier overruled Decision 2006-15 in order to accelerate deregulation of local telephony services. He ruled that incumbents no longer have to seek CRTC approval to change prices in local markets with three competing service providers, whilst the CRTC's local geographic regions were replaced by incumbent local exchange boundaries. All restrictions were lifted on ILEC's activities in pursuit of winning back former customers (which applies to both voice line and DSL broadband services), and guidelines on service promotions – such as price, availability, timing and duration – were removed. Despite going against the guidance of a parliamentary committee, the entire policy became official in April 2007, when Order in Council PC 2007-0532 (Forbearance Order) replaced the CRTC's decision of a year earlier.

Under the Forbearance framework the CRTC is given a maximum 120 days to review a telco's application for deregulation in a given market, and in the case of small new entrants, the government has the right to delay deregulation for 18 months from their launch. Bell Canada, Telus, Bell Aliant, MTS and SaskTel immediately applied to the CRTC for the right to set their own local tariffs in key cities, and the Commission initially received applications in 423 residential and 327 business markets within 430 local exchange areas, representing 69% of residential and 57% of business subscriber lines. The regulator began granting forbearance for ILECs in local residential markets across the country in July 2007, giving them control over tariffs in most major urban markets, before kicking off deregulation in local business user markets the following September. Within five years (by mid-2012) the Commission had deregulated local exchanges representing over 80% of residential lines and over 70% of business lines in Canada (with combined total lines generating at least 75% of all local revenues), whilst regarding the two largest ILECs, the CRTC approved Bell's applications for deregulation of local telephony service tariffs in areas representing over 90% of its residential access lines in Ontario and Quebec (at least 220 areas) and over 80% of its business lines in the two provinces (at least 60 areas), whilst Telus had received approval for deregulation in local markets covering at least 80% of its residential lines in urban areas across British Columbia, Alberta and eastern Quebec, in addition to more than 70% of business lines in the same areas. The CRTC has continued to grant ILECs' applications in a stream of decisions, mainly affecting less-densely populated markets, steadily adding to the list of forborne (deregulated) local exchanges.

By the end of 2014 there were approximately 710 deregulated local exchanges in the residential sector and 465 forborne local exchanges for business telephony services across Canada's ten provinces (up only marginally from 704 [residential] and 465 [business] in a year, but having increased from 557 [residential], 305 [business] in 2012), indicating that the deregulation phase is largely complete. Broken down, the forborne exchanges are situated in: Ontario (230 deregulated residential local exchanges, 66 deregulated business local exchanges [up from 227, 66 year-on-year]); Quebec (185, 65 [unchanged year-on-year]); British Columbia (99, 85 [unchanged]); Alberta (70, 52 [unchanged]); Nova Scotia (53, 61 [up from 51, 61]); New Brunswick (29, 57 [up from 28, 57]); Newfoundland (13, 58 [unchanged]); Prince Edward Island (11, 14 [unchanged]); Saskatchewan (10, 4 [unchanged]); and Manitoba (10, 3 [unchanged]).

In December 2011 the CRTC decided to open Canada's Far North – the Yukon, Northwest Territories and Nunavut regions – to local telephony competition from 1 May 2012, allowing

users to choose an alternative service provider, where available. Previously, Northwestel, part of Bell Canada, was the sole local telephony provider in the Far North. A review of Northwestel's retail and wholesale obligations resulted in a decision from the CRTC in December 2013 which ordered Northwestel to make network modernisations over the next four years, including broadband and wireless expansions plus upgrading fixed network equipment in order to support enhanced calling services, such as call display and call waiting, as well as local number portability and local network interconnection.

Further addressing markets outside main towns and cities, on 1 June 2007 the CRTC allowed the former regional monopolies to increase the price of local telephony services in rural areas by 5% or the inflation rate, whichever is lowest. In May 2011 the CRTC decided to phase out subsidies for large telephone companies providing residential basic local voice services in rural and remote regions over the three-year period 2011-2013, but allowed operators to gradually increase line fees over the same period to a maximum of CAD30 per month. The CRTC reasoned that the new price ceiling will enable 'more consistent and reasonable' rates across Canada, by allowing telcos to rebalance urban/rural tariffs, while reducing the reliance on subsidies. In a simultaneous decision, the CRTC decided that the existing subsidies received by smaller ILECs will remain in place until 75% of the small ILEC's market's population is covered by a competing service.

In September 2010 the CRTC issued a final ruling forcing ILECs Bell Canada, Bell Aliant, Telus and MTS to pay back CAD311 million to residential phone customers in urban areas that were overcharged between 2002 and 2006. The so-called deferral account funds were begun in 2002 when the CRTC allowed telcos to charge above their usual regulated price caps so that new competitors entering the fixed line market — primarily cablecos such as Rogers, Shaw, Videotron and Cogeco — could undercut them. The deferral accounts grew to around CAD1.6 billion before telcos were permitted to withdraw a portion to lower the wholesale rates they charged resellers such as Primus and Yak to access their networks. In 2008 the CRTC ruled that telcos must spend around half the remaining money on expanding rural broadband facilities (see Broadband Key Legislation) and improving services for disabled users (with CAD35 million going to the latter project), with the remainder – CAD300 million at the time – earmarked for rebates to the overcharged urban customers; the total remaining fund subsequently rose to CAD770 million including interest. In 2009 the Supreme Court upheld the CRTC's decision, quashing an appeal from the telcos to spend the entire budget on broadband, whilst also resisting calls from consumer groups to give the full total back to subscribers. The watchdog previously approved SaskTel's proposal to spend the entire funds in its deferral account, around CAD1.5 million, on accessibility initiatives in Saskatchewan.

In the public payphone sector, in June 2007 the CRTC permitted ILECs to raise the price of a payphone call to CAD0.50, from the previous maximum of CAD0.25 (which Bell Canada had been charging since 1981). However, in July 2013 the regulator refused a request from Bell to raise payphone charges again to as much as CAD1, whilst the regulator also imposed a moratorium preventing large telephone companies from removing the last payphone in any given community, and this will be maintained until the regulator has made a final decision on payphone removal. In February Canadians were invited to submit their comments on the payphone issue (comments collected until 30 March 2015). That month the CRTC released its latest findings on the public payphone sector, showing a steady decline in usage: compared to 2004, when 50% of Canadians reported occasionally using payphones, today only 32% of Canadians use a payphone at least once a year, according to the report. The regulator has proposed that all incumbent telephone companies be obligated to notify communities affected, including municipalities and First Nations, before removing the last public telephone in each community; companies would also have to notify communities before removing a public telephone where wireless service is not available.

In November 2013 the CRTC introduced a model municipal access agreement (under Telecom Decision CRTC 2013-618) to streamline negotiations between operators and municipalities on the installation, upgrading and maintenance of telecoms infrastructure

including fibre-optic cables (regarding access to streets and other municipal property). The model agreement can be found at: www.crtc.gc.ca/cisc/eng/ciscmanu.htm.

Notes: *CLEC services include ILECs' out-of-territory operations, e.g. Bell Canada (incumbent in Ontario and Quebec) offering services in western Canada.

VoIP Legislation

Voice-over-internet protocol (VoIP) telephony services fall under the CRTC's jurisdiction when used as a local telephony service; rules do not apply to PC-based peer-to-peer or pure over-the-top (OTT) VoIP services/applications, such as Skype. VoIP providers have unrestricted access to geographic local telephone numbers. The CRTC categorises VoIP services into 'fixed local' (calls made/received at a single location), 'nomadic local' (i.e. calls to/from a PSTN number from any broadband access point) and 'foreign exchange local' (which allow a user in one exchange area to receive calls dialled as local numbers in another exchange).

CRTC Telecom Decisions 2005-28 (May 2005) and 2006-53 (September 2006) determined that VoIP telephony be regulated as a fixed local service, which at those dates obliged incumbent operators (ILECs) to seek the regulator's approval for tariffs, whilst new entrants to a local market remained free of such constraints. ILECs opposed VoIP tariff regulation, arguing that it unbalanced the playing field and kept prices artificially higher than would be created by market forces, but the Canadian Cable Telecommunications Association (CCTA) backed the regulator's stance, claiming that if the ILECs' VoIP tariffs were deregulated, they would use their dominant positions to inhibit emerging competition, limiting consumer choice.

Crucially, however, the government opposed the CRTC's strategy. In November 2006 then Industry Minister Maxime Bernier issued a policy directive altering Decisions 2005-28/ 2006-53 to remove any economic regulation of access-independent VoIP services. This was backed by an order ('Governor in Council Order 59') formally requiring the Commission to refrain from regulating the tariffs of retail local access-independent VoIP services provided by ILECs. The new policy was in line with the wider relaxation of regulations on ILECs' local telephony services (see Wireline Key Legislation). Bernier said that freeing the old monopolies from tariff controls would stimulate competition, leading to lower end-user service costs. John Lange, President of the Canadian Association of VoIP Providers, countered that the state's move would in fact hurt competition.

In Decision 2008-11 (February 2008) the CRTC confirmed that VoIP providers must port out telephone numbers to other VoIP, local fixed telephony and wireless service providers; numbers may be ported in at an operator's discretion.

In January 2012 the CRTC introduced a policy designed to quicken the migration from circuit-switched voice technology to IP amongst large fixed line network operators. The rules dictate that requests for IP interconnection be fulfilled within six months, otherwise the CRTC may intervene. According to the regulator its rules 'establish basic principles to ensure IP technology becomes the industry standard for voice networks as quickly as possible.'

'Fixed local' VoIP providers must offer full emergency (911) services, while 'nomadic' or 'foreign exchange' local operators must provide a 'comparable' solution to access emergency numbers. Most recently, on 25 June 2014 the CRTC introduced measures to ensure Canadian telecoms networks can support next generation emergency services.

Wireline Regulatory Timeline

1852	First Telegraph Act passed
1866	First permanent transatlantic telegraph link launched, via cable between Ireland and Newfoundland
1880	The Bell Telephone Company of Canada is incorporated by a special act of parliament
1916	First connection made between Montreal and Vancouver via Buffalo, Chicago, Omaha, Salt Lake City and Portland
1927	Transatlantic service between Canada and the UK inaugurated
1932	First trans-Canada telephone system is completed (the Copper Highway)
1936	Canadian Broadcasting Corporation (CBC) created
1950	Nationalisation of Cable & Wireless and the Canadian Marconi Company results in the creation of a crown corporation, the Canadian Overseas Telecommunication Corporation (COTC), which becomes Teleglobe in 1975
1958	A new regulatory body, the Board of Broadcast Governors (BBG), replaces the CBC
1962	Canada becomes the third country in the world to have a satellite in orbit; Bell Canada reportedly first in the world to offer commercial fax service
1968	Broadcasting Act adopted, allowing for the creation of the CRTC
1976	CRTC Act (amended 1991, 1993) establishes CRTC as an independent regulator
1979	Telephone companies' monopoly on private (leased) lines connected to PSTN ended
1980	CRTC deregulates telephone set and customer premises equipment markets
1982	End-users allowed to purchase their own terminal equipment for the first time
1983	Bell Canada Enterprises (BCE) created
1987	Telecoms landscape altered by Bell Canada Act and Teleglobe Canada Reorganisation and Divestiture Act
1989	Supreme Court confirms federal jurisdiction over provincial telephone companies
1992	CRTC allows domestic long-distance (DLD) competition; pre-selection for long-distance introduced and framework for subsidy from long-distance to support local residential service rates formalised by CRTC
1993	New Telecommunications Act

1994	CRTC establishes new regulatory framework; replaces ILECs 'rate-of-return' price regulation with price cap regime basing end-user prices on rate of price inflation less a productivity factor
1995	Telecommunications Fees Regulations defined carrier payments to the CRTC
1997	CRTC introduces local competition; MTS becomes a share capital corporation pursuant to The Manitoba Telephone System Reorganisation and Consequential Amendments Act
1998	CRTC opens facilities-based international telecoms market and establishes regulatory framework for international services; also liberalises public payphone market and implements price caps
1999	CRTC rules that resellers must be provided with access to central office switches through competitive co-location facilities
2000	Long-distance competition introduced in areas served by Northwestel; Telesat Canada's monopoly on satellite telecommunication carriage ended
2001	Changes to the Contribution Regime (universal service funding) implemented
2002	MTS becomes a corporation under The Corporations Act.
2005	CRTC rules that VoIP-based local telephony should be regulated under the same framework as circuit-switched services; Bell Canada launches consumer VoIP service, 'Digital Voice'
March 2006	Telecommunications Policy Review Panel publishes report recommending that market forces replace price regulation and a relaxation of foreign ownership rules
April 2006	CRTC Telecom Decision 2006-15 rules that newcomers must gain 25% of local telephony markets before incumbents are permitted to set their own retail tariffs
July 2006	Holding group BCE merges majority-owned subsidiary Aliant's Atlantic Canada customer base into an income trust with Bell Canada's rural operations in Ontario and Quebec under the Bell Aliant banner
September 2006	CRTC issues Telecom Decision 2006-53, reaffirming that VoIP should be subject to the same regulations as other local telephony services
October 2006	Bell Canada and Telus scrap plans to convert their assets into income trusts after the government announces it will begin taxing trust distributions
November 2006	Government issues new policy directive removing any price regulation of access-independent local VoIP telephony services
December 2006	Government issues policy directive to overrule CRTC's Decision 2006-15 and speed up local telephony price deregulation
April 2007	Government's new rules on local telephony deregulation come into force
July 2007	CRTC begins local telephony deregulation in residential sector

September 2007	Regulator extends deregulation to the business local telephony segment
February 2008	Bell Canada ceases actively promoting its Digital Voice consumer VoIP service
March 2008	CRTC publishes plan to deregulate one-third of wholesale services in three to five years
August 2008	Facilities-based (Class A) and infrastructure-independent (Class B) ILD licences merged
December 2008	A buyout deal for BCE collapses
December 2009	Industry Canada upholds CRTC's decision to exclude Ethernet from list of 'Essential' wholesale network access services subject to regulation
May 2010	Industry Canada aims to liberalise foreign ownership rules, contradicting CRTC's stance
August 2010	CRTC reaffirms 2008 decision to require unbundling of ADSL2+, VDSL and other advanced DSL services
December 2010	Telus declares readiness to enter consumer VoIP market, initially with IP-based voice services for fibre-based customers
May 2011	CRTC decides to phase out subsidies for large ILECs' residential basic local voice services in rural/remote regions in 2011-13, but will allow phased increases in line fees to CAD30 per month
November 2011	CRTC decides to impose a new wholesale internet access billing framework, the 'approved capacity model', which allows telcos to impose a form of usage-based wholesale billing on independent ISPs, but is altered from the volume-based model that Bell had pushed for
Q1 2012	Rogers and Bell discontinue 2500MHz WiMAX services of Inukshuk joint venture
January 2012	CRTC introduces rules dictating that requests for VoIP interconnection be fulfilled by ILECs within six months
29 June 2012	Amendment becomes effective removing foreign investment restrictions for telecoms operators that hold less than a 10% share of total telecom market revenues
November 2012	CRTC sets LLU rates 14% lower than the rates it approved in January 2011 (backdated to December 2009)
February 2013	CRTC unites wholesale ISP access rates for business and residential markets; also significantly reduces wholesale rates Bell Canada can charge smaller ISPs
November 2013	CRTC introduces model municipal access agreement for telecoms infrastructure
October 2014	BCE ups stake in Bell Aliant from 44% to 100%
November-December 2014	Hearing on review of wholesale access to fibre-based network services

January 2015	Call for ISP applications closes for 'Connecting Canadians' funding programme to reach underserved areas with broadband speeds of at least 5Mbps/1Mbps (down/upload)
May 2015	Rural broadband operators win 2500MHz licences alongside cellcos
December 2015	CRTC originally targeted near-100% population coverage with broadband speeds of at least 5Mbps (download) and 1Mbps (upload), but target likely to be moved to 2017.

Wireless

Market Commentary

Geographically speaking Canada is a vast country, and although its cellular operators cover 99% of the population with their combined networks as of June 2015 (up from 98% in 2007), the total network footprint reaches only around 20% of the land area, according to data from the Canadian Radio-television and Telecommunications Commission (CRTC), a metric which has not changed for at least three years. Three quarters of the population is located in large urban centres, with the remainder in rural areas, and to serve them the incumbent cellcos have between them deployed 2G GSM/GPRS/EDGE, 3G W-CDMA/HSPA and 4G Long Term Evolution (LTE) networks on a national scale, while the previously ubiquitous 2G/3G CDMA2000/1xEV-DO/Rev A networks are in the process of being decommissioned. Canada's relatively low cellular penetration rate — which has crept slowly past 80% in the last couple of years (see Annual Country Subscriber Growth table) — indicates that is an opportunity and room for growth for a fourth major player to make its mark alongside the three established nationwide operators, Rogers Communications, Telus Mobility (an integrated division of Telus Communications) and Bell Canada's integrated wireless arm Bell Mobility, something that the government has attempted to encourage through its spectrum licensing policies.

The opportunity presented by the government was seized by several start-ups which snapped up next generation licences in 2008's Advanced Wireless Services (AWS-1) auction, with five newcomers going on to launch commercial services. However, two of these, Public Mobile and Mobilicity, have since been acquired by the incumbents after struggling financially – the former by Telus in November 2013 and Mobilicity by Rogers in June 2015. Another new-entrant however, Globalive Wireless (trading as Wind Mobile), has achieved a modicum of success operationally in major urban areas, gaining a distant fourth place in the national cellular market in terms of subscriber numbers by end-March 2015 over its 3G-only platform. Meanwhile, the remaining two new mobile entrants Videotron and Eastlink are both existing cable network operators, and are more financially secure, but as of mid-2015 their 3G/4G cellular networks remained of regional scope within their core cable heartlands: Videotron in Quebec, and Eastlink in Atlantic Canada.

A new nationwide competitor could still emerge though, as a number of players build up national portfolios of multi-band spectrum, via a recent flurry of 4G licence auctions which have fulfilled a federal aim of licensing at least four facilities-based mobile operators in each of Canada's ten administrative provinces. The digital dividend (700MHz, licensed in February 2014), AWS-3 (March 2015) and 2500MHz (April-May 2015) auctions are to be followed by 'leftover' 700MHz and AWS-3 licensing later in 2015, while other bands are under consultation for future distribution (see Wireless Key Legislation for details). Wind, in particular, has positioned itself as a would-be nationwide operator, and now has enough resources to compete effectively with the three established incumbents in the 4G market in at least five provinces, following the AWS-3 licensing and an AWS-1 spectrum swap deal in June 2015 which handed Wind the frequencies relinquished by Mobilicity, while divvying up cableco Shaw's unused AWS concessions between Wind and Rogers. Videotron too has aspirations to expand geographically and become a competitive 'fourth national mobile operator', but for the time being it is sitting on its wider 700MHz licences, as is Eastlink, although these regional cellcos will have been encouraged to some extent by the authorites introducing controls on large incumbents to make domestic roaming deals fairer in 2014/15 – which had been one of the issues the younger cellcos said was inhibiting confidence in network coverage expansion ventures. Consolidation of one or more peers is likely required if they are to mount a serious nationwide challenge, and Wind has repeatedly stated its

desire for a merger – most likely with Videotron – although since new US/Canadian financial backers came on board, Wind in November 2014 it is unclear whether or not a potential tie-up still features in its short-term plans.

The cellular market remains dominated by the three well-established nationwide players, all of which have quadruple-play fixed, broadband, cellular and pay-TV empires — Rogers, Bell (including the former Aliant Mobility) and Telus. The national operators controlled over 90% of customers at the end of March 2015, down marginally by just over half a percentage point from twelve months earlier. Rogers enjoyed its status as the only W-CDMA/HSPA network operator in the country for three years until November 2009 when Bell and Telus abandoned their nationwide CDMA strategies and both launched HSPA services over a jointly funded network. The Bell/Telus network was based wholly on HSPA+ technology and covered 93% of the population at launch, and both Bell and Telus claimed over 98% coverage at mid-2015. Rogers previously capitalised on the perceived benefits of its GSM and 3G platforms with a particular focus on multimedia, youth branding, content, international roaming, high speed data, video calling and value pricing, whilst another facet of its portfolio is the well-established urban mobile sub-brand Fido (see Fido profile). Rogers lost all of its former unique selling points, but it has continued to enjoy pole position in terms of subscriber numbers and revenues. Quebec-based Bell had already been overtaken in wireless sales volume by Telus, and the two were virtually neck-and-neck in terms of customer base for some time, with Telus finally overtaking Bell in 2013 to claim second largest market share, which it narrowly clung on to at the end of March 2015 with a roughly four percentage point advantage.

Canada's first commercial 4G LTE mobile broadband network was launched by Rogers in July 2011 over a 2100MHz network, and Bell introduced its commercial 2100MHz LTE service in September the same year, while Telus switched on LTE 2100MHz services in February 2012. Regional incumbents Manitoba Telecom Services (MTS) and SaskTel also launched LTE networks in their home provinces, in September 2012 and January 2013 respectively, augmenting their own set-ups by forging additional cost-sharing regional LTE infrastructure/national roaming agreements with larger rivals. Eastlink switched on its LTE network in Atlantic Canada in February 2013, and in May that year Videotron signed an agreement with Rogers to build and operate shared 2100MHz LTE infrastructure in Quebec and the Ottawa area, which went live in September 2014; a 700MHz network is also planned – initially in Quebec and the Ottawa area. Both Bell and Telus – helped by extensive infrastructure sharing arrangements between them – claimed 91% LTE population coverage by June 2015, while Rogers reported an 84%-plus LTE footprint at the same date. Meanwhile, Rogers was the first in the country to introduce a commercial LTE-Advanced (LTE-A) upgrade, in October 2014, enabling peak (theoretical) download data speeds of 220Mbps, while Bell did not follow suit until announcing its upcoming LTE-A rollout in June 2015, with commercial services expected to appear in the third quarter. Telus has lagged slightly behind its two main rivals in terms of LTE speed upgrades however, due to possessing less multi-band spectrum than either Rogers or Bell. This situation has been at least partially addressed by Telus' new concession awards in March 2015's AWS-3 auction though, and the 2Q15 2500MHz licence contest. Telus was the largest winner in both auctions – purchasing 2500MHz concession across all 13 provinces and territories, plus 15 AWS-3 licensed blocks covering a population of over 30 million.

Meanwhile, Comprehensive national LTE coverage is being rolled out via 700MHz frequencies after seven major companies – Rogers, Bell, Telus, MTS, SaskTel, Videotron and Eastlink – won spectrum licences in Q1 2014, and the only licensing region which fell short of attracting four licensees was the Far North – Yukon, Northwest Territories and Nunavut. The three national mobile network operators (MNOs) are aiming for 98% LTE population coverage by end-2015 via their 700MHz rollouts.

By end-March 2015 smartphone usage was running at nearly 80% of the main Canadian MNOs' post-paid subscribers, up from around 75% a year earlier, while at that date

TeleGeography estimated that 4G LTE usage had reached roughly one-third (around 9.82 million) of all Canadian mobile customers, with Rogers, Bell and Telus now accounting for three million or more LTE device users each.

The three national MNOs are keen to attract a broader range of subscribers via their own virtual mobile sub-brands, but have been more reticent where it comes to opening their networks to independent mobile virtual network operators (MVNOs). The auxiliary MNO-owned brands (e.g. Roger's Fido brand) give the major players a strategic vehicle to take on new competitors at the budget end of the market or in other niches such as the youth/ young adult segment (see MVNO Market Commentary). Although the CRTC stopped short of mandating MVNO network access in a policy decision in Q2 2015, it introduced certain measures designed to encourage the development of the sector, including tackling barriers to smaller MNOs forming partnerships with independent resellers (see MVNO Legislation). Meanwhile, in response to the new national consumer code for wireless providers (effective from December 2013), which, among other things, effectively limited cellphone contracts to two years, carriers have all revamped their offerings to focus on two-year contracts that provide a discounted device upfront with the remaining balance of the handset amortised over the rest of the period.

Elsewhere, the number of machine-to-machine (M2M) connections in Canada is expected to near-double from an approximate figure of two million connected M2M SIMs/devices at end-2014 to at least 3.6 million in 2016 (figures which the MNOs exclude from their reporting). The most prominent M2M facilitator of the major MNOs, Rogers, has said it expects the annual market revenue for the overall M2M ecosystem in Canada to reach approximately USD1 billion by the end of 2015.

Legacy technologies have been pushed aside in the 4G era, freeing up valuable frequency resources. Bell and Telus both dismantled their AMPS/TDMA networks in 2008, following Rogers' shutdown of its analogue system the previous year, and SaskTel carried out a similar decommissioning in 2011, and subsequently the marketing of CDMA2000-based devices began to be phased out. Canada's first commercial 3G services were launched in Q4 2005 by Bell and Telus using CDMA2000 1xEV-DO technology in eastern and western Canada respectively, which the pair subsequently expanded to over 90% via their own networks and access/roaming deals. SaskTel (in Saskatchewan), Aliant Mobility (covering Atlantic Canada, since amalgamated into Bell Mobility) and MTS (in Manitoba) also deployed EV-DO networks, while 3.5G Rev A standards appeared on the market in 2007, before all operators switched focus to HSPA and LTE. Telus began shutting down sections of its CDMA network in Q1 2014 with a final CDMA switch-off date set for late-2015, while SaskTel switched off its EV-DO network in September 2014, with its 2G CDMA switch-off to follow around the end of 2015; SaskTel also disclosed it was reusing 850MHz spectrum as an additional LTE carrier in certain areas in Q4 2014. MTS set a timeframe of Q4 2016 for closing down CDMA, while the last remaining major CDMA provider looks likely to be Bell, which scheduled turning off EV-DO data services for 1 July 2015 while expecting to keep 2G CDMA services operational until January 2017. Meanwhile, push-to-talk integrated digital enhanced network (iDEN) technology, including Telus' widespread Mike-branded iDEN service, also began to be phased out in 2013, to be replaced by advanced HSPA/LTE-based solutions, such as 3G/4G push-to-talk (PTT) solutions, which Telus launched in October that year.

Networks

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
Bell Canada Enterprises (BCE)	1G	AMPS	None	800	Q4 1985	Shut Down	Decommissioned Dec-08
Bell Canada Enterprises (BCE)	2G	CDMA	IS-95A	800/1900	Q1 1997	Shut Down	Upgraded to CDMA2000 1x
Bell Canada Enterprises (BCE)	2.5G	CDMA2000	1x	800/1900	Feb 2002	Live	Jun-15: expected shutdown date January 2017; began decommissioning in 2014; reached >90%
Bell Canada Enterprises (BCE)	3G	CDMA2000	1xEV-DO	800/1900	Nov 2005	Shut Down	Shutdown date 1 Jul-15; began decommissioning in 2014; reached >90% (including 99% of Ontario + Quebec, 97% of Atlantic Canada)
Bell Canada Enterprises (BCE)	3G	W-CDMA	None	800/1900	Nov 2009	Live	Jun-15: >98% (since ~4Q13); Jun-13: >97%; Jun-12: 97% (May-10: 93%, 20,000 towns); via rollout sharing with Telus
Bell Canada Enterprises (BCE)	3.5G	CDMA2000	1xEV-DO Rev A	800/1900	Apr 2007	Live	Shutdown date 1 Jul-15; began decommissioning in 2014; reached >75%
Bell Canada Enterprises (BCE)	3.5G	W-CDMA	HSDPA	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97%; Jun-12: 97% (May-10: 93%, 20,000 towns); via rollout sharing with Telus
Bell Canada Enterprises (BCE)	3.5G	W-CDMA	HSUPA	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97%; Jun-12: 97% (May-10: 93%, 20,000 towns); via rollout

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
							sharing with Telus
Bell Canada Enterprises (BCE)	3.5G	W-CDMA	HSPA+	800/1900	Nov 2009	Live	Jun-15: >98% (since ~4Q13); Jun-12: 97% (May-10: 93%, 20,000 towns); via rollout sharing with Telus
Bell Canada Enterprises (BCE)	3.5G	W-CDMA	DC-HSPA+	800/1900	Nov 2010	Live	Jun-15: >83%; Dec-12: 83% (Jun-12: >70%)
Bell Canada Enterprises (BCE)	4G	LTE	None	1700/2100	Sep 2011	Live	Jun-15: 91% (multi-band); Feb-15: 86%; Jun-14: 81%; Dec-13: 80%; Jan-13: 67%; Sep-12: 45%; (Jun-12: 16 cities) (Dec-11: 7 areas incl. Toronto)
Bell Canada Enterprises (BCE)	4G	LTE	None	2600	Q4 2012	Live	Jun-15: multi-band AWS/ 2600MHz/ 700MHz 91% (Oct-12: reported live 2600MHz LTE coverage in selected cities)
Bell Canada Enterprises (BCE)	4G	LTE	None	700	Apr 2014	Live	Jun-15: multi-band AWS/ 2600MHz/ 700MHz 91% (700MHz licence footprint ~95.6%)
Bell Canada Enterprises (BCE)	4G	LTE	LTE-Advanced	Multi	Q3 2015	In Deployment	Jun-15: first planned coverage - Greater Toronto Area, Fredericton, Sydney, Charlottetown, Halifax; 220Mbps
Eastlink	3G	W-CDMA	None	1700/2100	Feb 2013	Live	Jun-15: Nova Scotia, Prince Edward Island (other areas served via roaming)

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
Eastlink	3.5G	W-CDMA	HSPA+	1700/2100	Feb 2013	Live	Jun-15: Nova Scotia, Prince Edward Island (other areas served via roaming)
Eastlink	4G	LTE	None	1700/2100	Feb 2013	Live	Jun-15: Nova Scotia, Prince Edward Island (other areas served via roaming)
Eastlink	4G	LTE	None	700	Q3 2015	In Deployment	Won 700MHz licences in Feb-14 covering the four Atlantic Canada provinces, to expand existing LTE (AWS) coverage
Globalive Wireless (Wind Mobile)	3G	W-CDMA	None	1700/2100	Dec 2009	Live	Jun-15: ~45%; Jun-14: 1,412 active BTS; Dec-13: 41%; Mar-12: ~37% (Jun-11: ~30% [Toronto, Ottawa, Calgary, Edmonton, Vancouver, Hamilton])
Globalive Wireless (Wind Mobile)	3.5G	W-CDMA	HSDPA	1700/2100	Dec 2009	Live	Jun-15: ~45%; Jun-14: 1,412 active BTS; Dec-13: 41%; Mar-12: ~37% (Jun-11: ~30% [Toronto, Ottawa, Calgary, Edmonton, Vancouver, Hamilton])
Globalive Wireless (Wind Mobile)	3.5G	W-CDMA	HSPA+	1700/2100	Nov 2011	Live	Jun-15: ~45%; Jun-14: 1,412 active BTS (100% of 3G network) (Jun-13: ~65% of network) (Jul-12: 34% of network)
Globalive Wireless (Wind Mobile)	3.5G	W-CDMA	DC-HSPA+	1700/2100	Q3 2014	Live	Jun-15: >500 sites (est.); Jun-14: confirmed 360

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
							sites equipped with DC-HSPA+
Globalive Wireless (Wind Mobile)	4G	LTE	None	1700/2100	Q4 2015	Planned	Jun-15: obtained additional AWS-1 spectrum via trade with Rogers; Mar-15: bought AWS-3 spectrum for planned LTE launch
Manitoba Telecom Services (MTS Allstream)	2G	CDMA	IS-95A	1900	Q2 1998	Shut Down	(upgraded to 1x)
Manitoba Telecom Services (MTS Allstream)	2.5G	CDMA2000	1x	1900	Nov 2002	Live	Jun-15: 97% of Manitoba's population (rollout complete); earmarked for shutdown by Q4 2016
Manitoba Telecom Services (MTS Allstream)	3G	CDMA2000	1xEV-DO	1900	Mar 2006	Live	Jun-15: 72% of Manitoba's population (rollout complete); earmarked for shutdown by Q4 2016
Manitoba Telecom Services (MTS Allstream)	3G	W-CDMA	None	800/1900	Mar 2011	Live	Jun-15: >97% of Manitoba (national roaming via Rogers' network)
Manitoba Telecom Services (MTS Allstream)	3.5G	W-CDMA	HSPA+	800/1900	Mar 2011	Live	Jun-15: >97% of Manitoba (national roaming via Rogers' network)
Manitoba Telecom Services (MTS Allstream)	4G	LTE	None	1700/2100	Aug 2012	Live	Jun-15: (AWS/ 700 bands) >75% of Manitoba (incl. Winnipeg, Brandon, Victoria Beach, Grand Beach, Portage la Prairie, Selkirk, Steinbach, Ste. Anne)

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
Manitoba Telecom Services (MTS Allstream)	4G	LTE	None	700	Q4 2014	Live	Jun-15: Manitoba province; augments original 2100MHz (AWS) LTE in Manitoba
Mobilicity	3G	W-CDMA	None	1700/2100	May 2010	Live	Jun-15: Toronto, Vancouver, Edmonton, Calgary, Ottawa (takeover by Rogers approved that month)
Mobilicity	3.5G	W-CDMA	HSDPA	1700/2100	May 2010	Live	Jun-15: Toronto, Vancouver, Edmonton, Calgary, Ottawa (takeover by Rogers approved that month)
Mobilicity	3.5G	W-CDMA	HSPA+	1700/2100	Oct 2012	Live	Jun-15: Toronto, Vancouver, Edmonton, Calgary, Ottawa (takeover by Rogers approved that month); Oct-12: 21Mbps across HSPA network
Public Mobile	2.5G	CDMA2000	1x	1900	May 2010	Shut Down	Shut down Jul-14 after migrating users to Telus (Toronto, Montreal, other areas of Ontario, Quebec)
Public Mobile	3.5G	CDMA2000	1xEV-DO Rev A	1900	Nov 2011	Shut Down	Shut down in Jul-14 (Toronto, Montreal and surrounds) after migrating users to Telus network
Rogers Communications	1G	AMPS	None	800	Jul 1985	Shut Down	Closed down: 31 May 2007
Rogers Communications	2G	TDMA	None	850/1900	Q2 1992	Shut Down	Closed down: 31 May 2007
Rogers Communications	2G	GSM	None	850/1900	Q4 2001	Live	Jun-15: 95% (Dec-08: 94%)

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
Rogers Communications	2.5G	GSM	GPRS	850/1900	Q2 2002	Live	Jun-15: 95% (Dec-08: 94%)
Rogers Communications	2.5G	GSM	EDGE	850/1900	Nov 2003	Live	Jun-15: >93%
Rogers Communications	3G	W-CDMA	None	850/1900	Nov 2006	Live	Jun-15: >91% (Dec-10: 88%) (Jun-10: 85%) (Nov-09: >75%) (Dec-07: ~60% [28 cities])
Rogers Communications	3.5G	W-CDMA	HSDPA	850/1900	Nov 2006	Live	Jun-15: >91% (Dec-10: 88%) (Jun-10: 85%) (Nov-09: >75%) (Dec-07: ~60% [28 cities])
Rogers Communications	3.5G	W-CDMA	HSUPA	850/1900	Aug 2009	Live	Jun-15: >91% (Nov-09: at least 21%)
Rogers Communications	3.5G	W-CDMA	HSPA+	850/1900	Sep 2009	Live	Jun-15: >91% (Jun-11: 90%, whole 3G footprint) (Nov-09: ~21%, 5 cities)
Rogers Communications	3.5G	W-CDMA	DC-HSPA+	850/1900	Q4 2011	Live	Jun-15: high-demand urban areas
Rogers Communications	4G	LTE	None	1700/2100	Jul 2011	Live	Jun-15: >84% (multi-band); Dec-13: 73%, ~120 cities; Dec-12: 60%, 25 cities; Jan-12: 32%; Sep-11: 15% (Ottawa, Toronto, Montreal, Vancouver)
Rogers Communications	4G	LTE	None	2600	Nov 2012	Live	Jun-15: LTE >84% (multi-band); Jun-14: 2600MHz >60 markets (augmenting 2100MHz where sufficient spectrum); Dec-12: 2600MHz within 25 markets

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
Rogers Communications	4G	LTE	None	700	Apr 2014	Live	Jun-15: LTE >84% (multi-band); Jun-14: 700MHz in parts of Vancouver, Calgary, Toronto (700MHz licence footprint 99.7%)
Rogers Communications	4G	LTE	LTE-Advanced	Multi	Oct 2014	Live	Jun-15: twelve cities initially; using 700MHz and AWS (1700MHz/ 2100MHz) spectrum
SaskTel Mobility	1G	AMPS	None	800	Q1 1989	Shut Down	Earmarked for shut-down in Q1/ Q2 2011 (Dec-07: ~2.5%)
SaskTel Mobility	2G	CDMA	IS-95A	800	Q1 1998	Shut Down	(upgraded to CDMA2000 1x)
SaskTel Mobility	2.5G	CDMA2000	1x	800	Apr 2003	Live	Jun-15: ~95% of Saskatchewan (earmarked for shutdown end-2015)
SaskTel Mobility	3G	CDMA2000	1xEV-DO	800	Aug 2005	Shut Down	Shut down Sep-14 (Jun-13: ~80 communities in Saskatchewan) (Dec-08: 64 communities in Saskatchewan)
SaskTel Mobility	3G	W-CDMA	None	850/1900	Aug 2010	Live	Jun-15: 98% of Saskatchewan (national roaming via Bell/ Telus)
SaskTel Mobility	3.5G	CDMA2000	1xEV-DO Rev A	800	Feb 2008	Shut Down	Shut down Sep-14 (Jun-13: ~75 communities in Saskatchewan) (Dec-08: 47 communities)
SaskTel Mobility	3.5G	W-CDMA	HSPA+	850/1900	Aug 2010	Live	Jun-15: 98% of Saskatchewan (national roaming via Bell/ Telus)

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
SaskTel Mobility	3.5G	W-CDMA	DC-HSPA+	850/1900	Q4 2011	Live	Jun-15: urban centres in Saskatchewan
SaskTel Mobility	4G	LTE	None	1700/2100	Jan 2013	Live	Jun-15: ~98% in Saskatchewan; Jun-14: 9 main cities/towns (since Dec-13); Jun-13: ~6 cities; Jan-13: Regina and Saskatoon
SaskTel Mobility	4G	LTE	None	700	Q1 2015	Live	Jun-15: Saskatchewan (augmenting existing LTE [AWS-1] coverage). Reportedly also added a 850MHz LTE carrier at end-2014
Telus Communications	1G	AMPS	None	800	Q4 1986	Shut Down	Shutdown Sep-08->2009
Telus Communications	2G	iDEN	None	800	Q3 1996	Live	Jun-15: Being decommisioned; Jun-14: ~50% (Jun-13: ~71%). New 3G/4G push-to-talk services (launched Oct-13) being phased in to replace iDEN.
Telus Communications	2G	CDMA	IS-95A	800/1900	Q4 1997	Shut Down	(upgraded with CDMA2000 1x)
Telus Communications	2.5G	CDMA2000	1x	800	Jun 2002	Live	Jun-15: earmarked for shutdown end-2015; Jun-14: ~60% (est.); Jun-13: ~76%, 99% w/ roaming (Dec-08: ~74%, 96% w/ roaming)
Telus Communications	3G	CDMA2000	1xEV-DO	800/1900	Nov 2005	Shut Down	EV-DO shutdown 4Q14; Jun-14: ~40% (est.) Jun-13: ~75% (est.), ~90% via roaming (Dec-08: >70% [est.], 88% via

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
							roaming) (Feb-08: >60%)
Telus Communications	3G	W-CDMA	None	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97% (Jun-12: 97%) (May-10: 93%, 20,000 towns), via shared rollout with Bell
Telus Communications	3.5G	CDMA2000	1xEV-DO Rev A	800/1900	May 2007	Shut Down	EV-DO shutdown 4Q14; Jun-14: ~35% (est.); Jun-13: ~70% (est.) (Feb-08: ~50%) (May-07: Montreal, Winnipeg, S.Ontario)
Telus Communications	3.5G	W-CDMA	HSDPA	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97% (Jun-12: 97%) (May-10: 93%, 20,000 towns), via shared rollout with Bell
Telus Communications	3.5G	W-CDMA	HSUPA	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97% (Jun-12: 97%) (May-10: 93%, 20,000 towns), via shared rollout with Bell
Telus Communications	3.5G	W-CDMA	HSPA+	800/1900	Nov 2009	Live	Jun-15: >98%; Jun-13: >97% (Jun-12: 97%) (May-10: 93%, 20,000 towns) (includes shared rollout with Bell)
Telus Communications	3.5G	W-CDMA	DC-HSPA+	800/1900	Mar 2011	Live	Jun-15: >80% (est.)
Telus Communications	4G	LTE	None	1700/2100	Feb 2012	Live	Jun-15: (AWS/ 700 bands) ~91%; Mar-15: 89% ; Sep-13: 79% (2100); Jun-13: >70%, 24.7m; Dec-12: '23.9m', ~67% (Jun-12: 14 cities)
Telus Communications	4G	LTE	None	700	Q3 2014	Live	Jun-15: (AWS/ 700) ~91%;

Provider Name	Generation	Platform	Evolution	Frequency	Launch	Status	Network Details
							Mar-15: 89%; Sep-14: Augmenting existing LTE-2100 with LTE-700 (Feb-14: won 700MHz licences covering ~95.7%)
Videotron	3G	W-CDMA	None	1700/2100	Sep 2010	Live	Jun-15: >7m people; Mar-12: nearly 7m people (Jun-11: 90% of cable footprint in Quebec, ~4m people)
Videotron	3.5G	W-CDMA	HSPA+	1700/2100	Sep 2010	Live	Jun-15: >7m people; Mar-12: nearly 7m people (Jun-11: ~4m people [incl. at least 90% of Videotron's cable service footprint in Quebec])
Videotron	3.5G	W-CDMA	DC-HSPA+	1700/2100	Q3 2012	Live	Jun-15: offers maximum 42Mbps speeds, Quebec
Videotron	4G	LTE	None	1700/2100	Sep 2014	Live	Jun-15: 90% of Quebec + Ottawa (same % claimed at launch); via LTE infrastructure building/sharing agreement in Quebec and Ottawa with Rogers
Videotron	4G	LTE	None	700	2015	Planned	To augment 2100MHz (AWS) initially in Quebec, Ottawa [has 700MHz licences in Quebec, south Ontario, Alberta, BC]

3G/4G Licences

Operator	Type	Price Paid (USD million)	Date Issued	Term (Years)	Licence Name	Block (MHz) Paired	Block (MHz) Unpaired	Frequency Range (MHz) Paired	Frequency Range (MHz) Unpaired (within)
Bell Canada Enterprises (BCE)	Open	737	Dec 2008	10	AWS-1: 54 licences in Bands F, E (+A)	2x10 / 2x5		(F: 1745-1755, 2145-2155) (E: 1740-1745, 2140-2145)	
Bell Canada Enterprises (BCE)	Open	510.4	Feb 2014	20	700MHz: 17 paired Tier-2 licences in C2 / C / A+B; 14 unpaired in D+E	2x5 (7 zones) / 2x6 (4 zones) / 2x12 (3 zones)	1x12 (7 zones)	(751-756, 782-787) / (710-716, 740-746) / (698-710, 728-740)	716-728
Bell Canada Enterprises (BCE)	Open	395.9	Mar 2015	20	AWS-3: 13 blocks (J1/J2) in 7 regions	2x10 (6 regions) / 2x5 (1 region)		1770-1780, 2170-2180 (6 regions) / 1770-1775, 2170-2175 (Southern Ontario)	
Bell Canada Enterprises (BCE)	Open	24.03	May 2015	20	BRS 2500MHz (51 licences in 12 provinces/ territories)	2x10 (2x20 incl. existing licences)		2550-2560, 2670-2680 [F: 36 licences]; 2540-2550, 2660-2670 [E: 7]; 2520-2530, 2640-2650 [C: 3]; 2530-2540, 2650-2660 [D: 3]; 2510-2520, 2630-2640 [B: 2]	(existing licences 1x20MHz in 13 cities)
Eastlink	Open	25	Jul 2008	10	19 licences in Atlantic Canada (Bands B, C, D), Alberta and Ontario (D, E)	2x15 / 2x10 / 2x5		(B: 1720-1730, 2120-2130) (C: 1730-1735, 2130-2135)	
Eastlink	Open	18.3	Feb 2014	20	4 Tier-2 licences in Atlantic Canada, Band C1	2x5 (4 zones)		746-751, 777-782	

Operator	Type	Price Paid (USD million)	Date Issued	Term (Years)	Licence Name	Block (MHz) Paired	Block (MHz) Unpaired	Frequency Range (MHz) Paired	Frequency Range (MHz) Unpaired (within)
Eastlink	Open	7.89	Mar 2015	20	AWS-3: Block GHI in Atlantic Canada	2x15 (4 regions)		1755-1770, 2155-2170 (4 regions)	
Globalive Wireless (Wind Mobile)	Open	439.8	Mar 2009	10	30 licences in Bands B, C, D, E	2x5 / 2x10 / 2x15 / 2x20		(within 1720-1745, 2120-2145)	
Globalive Wireless (Wind Mobile)	Open	44.67	Mar 2015	20	AWS-3: Block GHI in 3 regions	2x15 (3 regions)		1755-1770, 2155-2170 (3 regions)	
Manitoba Telecom Services (MTS Allstream)	Open	40.6	Dec 2008	10	Manitoba only, Band B	2x10		1720-1730, 2120-2130	
Manitoba Telecom Services (MTS Allstream)	Open	7.9	Feb 2014	20	Tier-2 C1 Manitoba only	2x5 (1 zone)		777-782, 746-751	
Mobilicity	Open	227	Feb 2009	10	10 licences in Ontario (Bands C + D), British Columbia and Alberta (Band D)	2x10 / 2x5		(C: 1730-1735, 2130-2135) (D: 1735-1740, 2135-2140)	
Public Mobile	CDMA2000	51	Jul 2008	10			1x10		(1900MHz band)
Rogers Communications	Open	994	Dec 2008	10	59 licences in Bands A (+ F)	2x10		1710-1720, 2110-2120	
Rogers Communications	Open	2970.2	Feb 2014	20	22 licences: Tier-2 Bands A+B / C	2x12 (9 zones) / 2x6 (4 zones)		(698-710, 728-740) / (710-716, 740-746)	
Rogers Communications	Open	19.9	May 2015	20	2500MHz 41 licences in C, E bands	2x10 (giving total 2x20 in the band)		(C: 2520-2530, 2640-2650 [36 zones]) / (E: 2540-2550, 2660-2670 [5 zones]) (added to existing spectrum in B / C / D bands across all provinces)	(existing 1x20MHz in 13 urban markets)

Operator	Type	Price Paid (USD million)	Date Issued	Term (Years)	Licence Name	Block (MHz) Paired	Block (MHz) Unpaired	Frequency Range (MHz) Paired	Frequency Range (MHz) Unpaired (within)
SaskTel Mobility	Open	65.4	Dec 2008	10	Saskatchewan only, Bands B + C	2x15		1720-1735, 2120-2135	
SaskTel Mobility	Open	6.9	Feb 2014	20	Tier-2 C1 Saskatchewan only	2x5 (1 zone)		777-782, 746-751	
Telus Communications	Open	875	Dec 2008	10	59 licences in Bands F, E (+A)	2x10 / 2x5		(F: 1745-1755, 2145-2155) (E:1740-1745, 2140-2145)	
Telus Communications	Open	1031.3	Feb 2014	20	16 paired Tier-2 licences in C / C2 / A+B; 14 unpaired in D+E	2x6 (6 zones) / 2x5 (6 zones) / 2x12 (2 zones)	1x12 (7 zones)	(710-716, 740-746) / (751-756, 782-787) / (698-710, 728-740)	716-728
Telus Communications	Open	1196.7	Mar 2015	20	AWS-3: 15 blocks (J1/J2) in 8 regions	2x10 (7 regions) / 2x5 (1 region)		1770-1780, 2170-2180 (7 regions) / 1775-1780, 2175-2180 (Southern Ontario)	
Videotron	Open	551.2	Mar 2009	10	17 licences in Quebec (and section of Ontario), Bands B, C, D, E	2x10 + 2x5		(within 1720-1745, 2120-2145)	
Videotron	Open	210.5	Feb 2014	20	7 Tier-2 licences in Band C1	2x5 (7 zones)		746-751, 777-782	
Videotron	Open	25.19	Mar 2015	20	AWS-3: Block GHI in 4 regions	2x15 (4 regions)		1755-1770, 2155-2170 (4 regions)	

Notes: Further information on licences in Wireless Key Legislation section
Sources: Industry Canada

Subscribers Market Share by Network

Subscribers (Mar 2015)
- Rogers Communications (33.0%)
- Telus Communications (28.9%)
- Bell Canada Enterprises (28.2%)
- Globalive Wireless (2.9%)
- Videotron (2.3%)
- Other Players (4.7%)
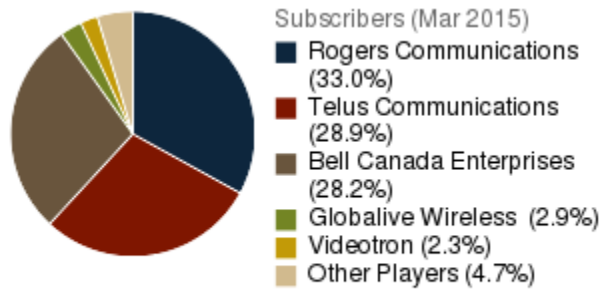
Sources: *operators*

Market Share History

Provider Name	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015
Rogers Communications	34.0%	33.8%	33.6%	33.4%	33.0%	33.0%
Telus Communications	27.9%	28.8%	28.8%	28.8%	28.9%	28.9%
Bell Canada Enterprises (BCE)	28.3%	28.3%	28.3%	28.3%	28.3%	28.2%
Globalive Wireless (Wind Mobile)	2.4%	2.5%	2.6%	2.7%	2.8%	2.9%
Videotron	1.8%	1.9%	2.0%	2.1%	2.2%	2.3%
SaskTel Mobility	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Manitoba Telecom Services (MTS Allstream)	1.8%	1.8%	1.8%	1.8%	1.8%	1.7%
Mobilicity	0.6%	0.6%	0.6%	0.5%	0.6%	0.6%
Eastlink	0.1%	0.1%	0.2%	0.2%	0.2%	0.3%
Public Mobile	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%

Market Share History
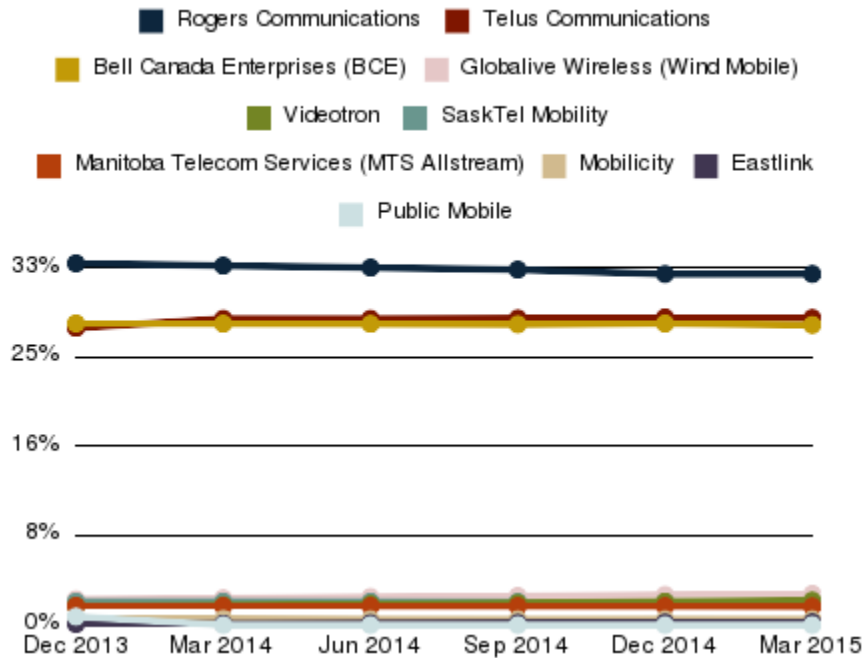
Sources: *operators*

Quarterly Subscribers by Operator

Provider Name	Subscribers	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015
Bell Canada Enterprises (BCE)	Total	7,925,032	7,908,596	7,951,487	8,035,193	8,118,702	8,102,714
Eastlink	Total	27,000	39,000	52,000	60,000	68,000	75,000
Globalive Wireless (Wind Mobile)	Total	676,209	702,125	741,000	775,000	812,000	839,000
Manitoba Telecom Services (MTS Allstream)	Total	501,388	498,957	501,678	505,006	506,586	501,195
Mobilicity	Total	175,000	165,000	155,000	155,000	158,637	158,000
Public Mobile	Total	222,000	0	0	0	0	0
Rogers Communications	Total	9,503,000	9,432,000	9,439,000	9,497,000	9,450,000	9,479,000
SaskTel Mobility	Total	615,694	616,500	617,000	617,500	618,083	618,500

Provider Name	Subscribers	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015
Telus Communications	Total	7,807,000	8,039,000	8,088,000	8,195,000	8,281,000	8,289,000
Videotron	Total	503,300	521,600	551,300	589,400	632,800	662,100
Bell Canada Enterprises (BCE)	3G	4,620,000	4,440,000	4,080,000	3,700,000	3,250,000	2,830,000
Globalive Wireless (Wind Mobile)	3G	676,209	702,125	741,000	775,000	812,000	839,000
Manitoba Telecom Services (MTS Allstream)	3G	351,000	356,000	360,000	360,000	345,000	324,000
Mobilicity	3G	175,000	165,000	155,000	155,000	158,637	158,000
Public Mobile	3G	80,000	0	0	0	0	0
Rogers Communications	3G	6,300,000	6,080,000	5,840,000	5,550,000	5,160,000	4,700,000
SaskTel Mobility	3G	422,433	430,000	427,000	423,000	415,000	405,000
Telus Communications	3G	4,800,000	4,550,000	4,100,000	3,810,000	3,450,000	3,280,000
Videotron	3G	503,300	521,600	551,300	581,400	588,800	570,100
Bell Canada Enterprises (BCE)	4G (LTE)	900,000	1,200,000	1,600,000	2,050,000	2,600,000	3,100,000
Eastlink	4G (LTE)	27,000	39,000	52,000	60,000	68,000	75,000
Manitoba Telecom Services (MTS Allstream)	4G (LTE)	18,000	27,000	41,000	58,000	85,000	106,000
Rogers Communications	4G (LTE)	1,200,000	1,600,000	1,950,000	2,300,000	2,800,000	3,320,000
SaskTel Mobility	4G (LTE)	12,000	24,000	45,000	71,000	99,000	122,000
Telus Communications	4G (LTE)	810,000	1,150,000	1,700,000	2,100,000	2,650,000	3,000,000
Videotron	4G (LTE)	0	0	0	8,000	44,000	92,000

Notes: Telus has excluded machine-to-machine (M2M) subscriptions from its wireless total since 1 April 2013 (when it removed 76,000 M2M accounts from the figure). Bell Mobility excluded 99,100 M2M connections at the end of December 2013 from its subscriber figures. By that date Rogers had around one million M2M connections (which are believed not to be present in its subscriber totals, current or historic).

Annual Country Subscriber Growth

Year	Total	Growth (%)	Pop. Pen. (%)	3G	3G Growth (%)	4G (LTE)	4G (LTE) Growth (%)
2009	22,976,904	6.3	68.4	4,250,000	73.1	0	
2010	24,811,668	8.0	73.1	6,622,600	55.8	0	
2011	26,496,088	6.8	77.2	10,901,600	64.6	85,000	
2012	27,560,934	4.0	79.4	15,338,518	40.7	812,000	855.3
2013	27,955,623	1.4	79.6	17,927,942	16.9	2,967,000	265.4
2014	28,645,808	2.5	80.7	14,179,437	-20.9	8,346,000	181.3

Quarterly Country Subscriber Growth

Period	Total	Growth (%)	3G	3G Growth (%)	4G (LTE)	4G (LTE) Growth (%)
Dec 2012	27,560,934	1.2	15,338,518	6.8	812,000	44.9
Mar 2013	27,536,310	-0.1	16,382,619	6.8	1,112,500	37.0
Jun 2013	27,675,283	0.5	17,596,551	7.4	1,482,000	33.2
Sep 2013	27,941,497	1.0	18,298,066	4.0	2,137,800	44.3
Dec 2013	27,955,623	0.1	17,927,942	-2.0	2,967,000	38.8
Mar 2014	27,922,778	-0.1	17,244,725	-3.8	4,040,000	36.2
Jun 2014	28,096,465	0.6	16,254,300	-5.7	5,388,000	33.4
Sep 2014	28,429,099	1.2	15,354,400	-5.5	6,647,000	23.4
Dec 2014	28,645,808	0.8	14,179,437	-7.7	8,346,000	25.6
Mar 2015	28,724,509	0.3	13,106,100	-7.6	9,815,000	17.6

MVNO Market Commentary

At the end of March 2015 it was estimated that mobile sub-brands accounted for around 22% of subscribers of the three nationwide Canadian mobile network operators (MNOs) –

Rogers, Telus and Bell – whilst a further approximately 1.2% of the major MNOs' users were customers of independent mobile virtual network operators (MVNOs)/resellers. This yields an approximate MVNO customer total (including MNO-owned separate mobile brands, or 'flanker' brands) of six million users at that date, up from a figure of 5.55 million at the end of December 2013 – as extrapolated from regulator CRTC's latest available report, which notes that roughly 21% of Rogers/Telus/Bell mobile network users were sub-brand customers and around 1% independent MVNO users, while the MVNO/resale sector accounted for 13%-14% of total revenues.

Of the three national network operators, Rogers has been the most open to signing MVNO agreements, while Bell and Telus have been relatively reticent in agreeing MVNO access deals, unless the venture involves some level of ownership. In a consultation with the CRTC in Q4 2014, Rogers submitted that it currently has direct agreements with eight independent MVNOs operating on its network, up from five reported back in 2007 (while it has several more resellers operating indirectly via an MVNE such as Cityfone). Rogers says it has also held recent discussions with other companies seeking wholesale MVNO access. Telus submitted that it has no current active relationships with independent MVNOs (contradicting PC Mobile which indicates it resells post-paid Telus network services). While claiming that it is 'willing to negotiate' with prospective MVNOs, Telus also noted that its relatively lower amount of spectrum – compared to Rogers and Bell – constrained prospective MVNO capacity on its network – although this issue may have been alleviated somewhat following further spectrum auctions in 2015 since the consultation took place.

MNO Sub-brands

Fido, a sub-brand of Rogers since November 2004, is the largest MVNO by subscribers in Canada, with a long-established strong presence in the urban and youth segments, where it has repositioned its focus in recent times, from pre-paid to post-paid users. Virgin Mobile Canada, reportedly the market's second largest MVNO, was originally launched in March 2005 as a joint venture of Richard Branson's Virgin Group and Bell, predominantly aimed at the youth market. Virgin was fully taken over by Bell in July 2009 in a move aimed at counteracting increasing competition, and the Virgin brand continued as a distinct service and, like Fido, was realigned towards the post-paid market. Telus meanwhile aimed to take on Fido and Bell's then-pre-paid MNO-owned sub-brand Solo (now defunct, see below) in March 2008 with the launch of its own youth oriented, discounted virtual operator called Koodo Mobile. In July 2010 Rogers ramped up competition at the lower end of the market once more when it introduced a new standalone so-called 'no-frills' discount wireless brand named Chatr in response to an influx of value-for-money competition from new mobile licensees.

Public Mobile, a new entrant to the facilities-based mobile sector in 2010, was swallowed up by Telus in November 2013, and remains as a low-budget pre-paid MVNO in Toronto and Montreal. Meanwhile, another relatively small MNO, Mobilicity, was acquired by Rogers in June 2015 after it ran into financial difficulty, and given the discount service provider's seemingly loyal customer base, it is likely that the brand will survive as an MVNO in its five-city footprint, in a similar manner to Public Mobile.

Finally, Cityfone – another 100% owned MVNO on the Rogers network – acts as a mobile virtual network enabler (MVNE) for several other brands, including Primus Canada – a well-established nationwide reseller of fixed line, international, internet, wireless and business data services (see company profiles for details).

Independent Budget MVNOs

A series of independent MVNOs/branded resellers hit the Canadian market between 2004 and 2006, including some of the country's major retail brands, generally focusing on budget and consumer reward/loyalty schemes. Although they have not made a significant impact in

terms of subscriber numbers, the surviving independent retailer discount brands competing in today's market (June 2015) include: President's Choice (PC Mobile), Sears (Sears Connect), 7-Eleven (7-Eleven SpeakOut) and Petro-Canada Mobility (see company profiles for details).

Among other Canadian budget MVNOs, a relative newcomer, ZoomerWireless (part of the ZoomerMedia group), markets itself as 'Wireless made simple' with a loyalty scheme and plans starting at CAD16.20 per month (with a choice of seven smartphones, LTE access and data add-ons at mid-2015). Similarly focused on low-end appeal, Good2Go Mobile (Canadian sister of a US namesake MVNO) is typical of the sector with its promises: 'No contracts. No credit checks. No security deposits. No monthly fees, activation charges or deactivation penalties.' Another budget-focused MVNO, DCI Wireless specialises in the business sector (happy to claim a modest 15,000 clients at mid-2015) and is part of full-service fixed and wireless reseller DCI Telecom, founded in 1994. Elsewhere, exclusive money-saving offers come from MVNOs attached to brands in other fields, notably banks: branded mobile resellers Simply Connect, Talk & Earn and Talk & Save are available exclusively to customers of Scotiabank, Bank of Montreal and Royal Bank of Canada respectively.

International User MVNO Niche

In the potentially lucrative international user niche, PhoneBox is an innovative MVNO on the Rogers network that as of June 2015 offers daily, weekly and monthly plans targeting students and international visitors, including offering relatively high data volume plans for heavy users. Launched in May 2011, PhoneBox has expanded its retail locations to Vancouver, Calgary, Toronto and Montreal. Nationwide reseller Primus Canada has a long-established presence in the discounted international call segment, having expanding its low-cost international fixed/voice-over-internet protocol calling tariffs to its mobile operations in 2005.

UK-based international/ethnic specialist MVNO group Lycamobile has been repeatedly rumoured to be preparing a launch in Canada (targeting distinct ethinc groups e.g. Chinese) to build on its existing North American presence in the US, but this had not materialised by June 2015. In the 4Q14 CRTC consultation on wholesale access Lycamobile participated alongside France's Orange Group (potentially weighing up an international Francophone customer strategy), and submitted that the Canadian MNOs were unwilling to partner full MVNOs on their networks. With the regulator concluding post-consultation that it would refrain from recommending MVNO access be mandated, there is no guarantee that the status quo will change.

Elsewhere, iRoam is a Canadian international roaming specialist, which has consolidated two other existing brands in the field, Brightroam and G3 Wireless. iRoam markets SIM cards locally as an MVNO on Rogers' network, with a single iRoam SIM usable globally through partnerships with 340 cellular roaming network partners. Note that another North American roaming specialist, Roam Mobility, although based in Vancouver, is strictly aimed at Canadians travelling in the US and Mexico, and does not actually provide coverage within Canada.

Multi-play Bundling MVNOs

While Videotron (now a fully fledged MNO in Quebec) originally offered its mobile service as an MVNO with Rogers, other major Canadian cablecos have not followed suit (Eastlink also opting to roll out its own network supplemented by roaming). Giving an insight into why, Cogeco Cable said during the CRTC's 4Q14 wholesale services consultation that it would only move forward with an MVNO plan 'if there is … an enforceable order to give [wholesale mobile network] access, and if the rates at which this access is provided are actually dictated by the regulator.' However, in line with the government's focus on encouraging facilities-based competition, the CRTC did not introduce mandated MVNO

access or specific support for full MVNOs, meaning that the cablecos' wireless plans are likely to remain on hold.

M2M, Data and Hybrid MVNOs

The lucrative machine-to-machine (M2M) market is expanding rapidly, presenting opportunities for niche brands utilising third-party mobile infrastructure. One such company, KORE Telematics, operates as an MVNO over Rogers' network, as part of a North American/ Australian group which bills itself as 'the world's largest specialised provider of wireless services for the M2M marketplace, powering hundreds of solution providers and application providers worldwide, including everything from vehicle location to utility metering, payment processing, landfill monitoring, asset management, offender tracking and more.' Founded in 2003, KORE also owns the Canadian mobile brands Zero Gravity Wireless and RacoWireless.

OnStar is an MVNO on the Bell network, specialised in in-vehicle wireless connectivity services, providing M2M applications alongside data add-on bundles. OnStar's range of in-vehicle communications features advertised at mid-2015 includes: Automatic Crash Response, Emergency Services, Roadside Assistance, 4G LTE with Built-In Wi-Fi Hotspot, OnStar 'RemoteLink' Mobile App, Hands-Free Calling Minutes, Vehicle Diagnostics and Dealer Maintenance Notification. Existing contracts between OnStar and vehicle manufacturers were cited as a significant factor in delaying Bell's timetable for phasing out its CDMA network; currently (June 2015) OnStar is migrating away from CDMA to LTE connectivity. Note that M2M connections are not included in wireless subscriber counts.

In the data-only/hybrid segment, Cansel Connect operates as an MVNO over Rogers' network to provide customers with 'Cansel CONNECT' data-only SIMs, which can be used seamlessly on both Rogers' cellular network and Can-Net's Virtual Reference Network which has over 260 stations across the country ('the fastest growing positioning network in Canada').

Lifestyle Niches

Tapping into other niche user segments, Telus launched the retail brand Caya (standing for 'come as you are') aimed at supporting 'lesbian, gay, bisexual and transgender [LGBT] customers among others' in October 2010; there were four Caya retail locations in Vancouver as of June 2015, but the brand had not been expanded to a full-blown MVNO service.

Defunct MVNOs

Solo Mobile was a discount wireless sub-brand introduced by Bell in the summer of 2005, with sales restricted to Ontario, Quebec, British Columbia and Alberta. However, Bell increasingly focused on the Virgin Mobile alternative sub-brand after the group consolidated 100% of Virgin Mobile Canada in 2009, and the Solo brand ceased marketing to would-be customers in Q4 2011 and stopped activating new users altogether in Q2 2012.

In April 2011 Telus launched an additional discount mobile brand in Western Canada – reviving the Clearnet cellular brand that it bought in 2000 – to offer unlimited voice and messaging tariffs to users based in Alberta and British Columbia. However, after a 'trial' period the Clearnet venture ceased signing up new customers in June 2012.

CityWest (formerly known as CityTel), a provider of fixed line, broadband, TV, IP and data services across north-west British Columbia, previously operated as an MVNO, but it took the decision in December 2013 to discontinue its mobile services and transfer all cellular customers to Telus, in a move which was completed over the following year.

MVNO Launches

MVNO	Launch	Current Host	Target Market	Status	Notes
7-Eleven SpeakOut	Nov 2005	Rogers Communications	Budget	Live	Ztar Mobile Canada acts as MVNE
Cansel Connect		Rogers Communications	Data	Live	Data/M2M services
Chatr Wireless	Jul 2010	Rogers Communications	Budget	Live	Sub-brand of Rogers
Cityfone	2002	Rogers Communications	Budget	Live	Also MVNE for (Jun-15): Primus, Talk & Earn, Talk & Save, Simply Connect, Sears Connect, ZoomerWireless
DCI Wireless		Rogers Communications	Business	Live	
Fido	Nov 2004	Rogers Communications	Youth	Live	Sub-brand of Rogers
good2GO Mobile		Rogers Communications	Budget	Live	Ztar Mobile Canada acts as MVNE
iRoam (Canada)		Rogers Communications	International	Live	iRoam consolidated Brightroam and G3 Wireless
KMTS Mobility		Bell Canada Enterprises (BCE)	Bundled	Live	regional Ontario-based operator, owned by the Bell group
Koodo Mobile	Mar 2008	Telus Communications	Budget	Live	Sub-brand of Telus
KORE Wireless Canada	2004	Rogers Communications	M2M	Live	KORE also owns the brands Zero Gravity Wireless and RacoWireless
NorthernTel		Bell Canada Enterprises (BCE)	Bundled	Live	North-eastern Ontario full-service telco; part of the Bell group; plans to transfer all mobile accounts to Bell by end of summer 2015
Northwestel		Bell Canada Enterprises (BCE)	Bundled	Shut Down	Transferred mobile customers to parent Bell in June 2014
OnStar (Canada)		Bell Canada Enterprises (BCE)	M2M	Live	In-vehicle M2M/voice/data specialist

MVNO	Launch	Current Host	Target Market	Status	Notes
PC Mobile	Q2 2005	Bell Canada Enterprises (BCE)	Budget	Live	Bell network used for pre-paid services; PC Mobile indicates that Telus network is used for post-paid services since 2013
Petro-Canada Mobility	Q4 2006	Rogers Communications	Budget	Live	Ztar Mobile Canada acts as MVNE
PhoneBox	May 2011	Rogers Communications	International	Live	Aimed largely at students and other international visitors (marketed in Vancouver, Calgary, Toronto and Montreal)
Primus Canada	Oct 2004	Rogers Communications	Budget	Live	Cityfone (a subsidiary of Rogers) acts as MVNE
Public Mobile	Dec 2013	Telus Communications	Budget	Live	Taken over by Telus in Nov-13, and its own CDMA network shut down in Jul-14 having migrated to the Telus network
Sears Connect	Q1 2005	Rogers Communications	Budget	Live	Cityfone (a subsidiary of Rogers) acts as MVNE
Simply Connect		Rogers Communications	Budget	Live	Exclusive to Scotiabank customers; Cityfone acts as MVNE
Talk & Earn		Rogers Communications	Budget	Live	Exclusive to Bank of Montreal customers; Cityfone acts as MVNE
Talk & Save		Rogers Communications	Budget	Live	Exclusive to Royal Bank of Canada customers; Cityfone acts as MVNE
Telebec		Bell Canada Enterprises (BCE)	Bundled	Live	Rural Quebec operator; part of the Bell group; plans to transfer all mobile accounts to Bell by end of summer 2015
Virgin Mobile Canada	Mar 2005	Bell Canada Enterprises (BCE)	Youth	Live	Originally a joint venture, became a wholly-owned Bell sub-brand in May 2009
ZoomerWireless		Rogers Communications	Budget	Live	

Quarterly MVNO Subscriber Growth

Period	Total	Growth (%)	MVNO Market Share (%)
Dec 2012	5,100,000	2.0	18.5

Period	Total	Growth (%)	MVNO Market Share (%)
Mar 2013	5,200,000	2.0	18.9
Jun 2013	5,300,000	1.9	19.2
Sep 2013	5,400,000	1.9	19.3
Dec 2013	5,552,000	2.8	19.9
Mar 2014	5,620,000	1.2	20.1
Jun 2014	5,700,000	1.4	20.3
Sep 2014	5,800,000	1.8	20.4
Dec 2014	5,904,000	1.8	20.6
Mar 2015	6,000,000	1.6	20.9

Notes: Figures include MNO-owned sub-brands and independent MVNOs/resellers
Sources: CRTC, estimates

Subscriber Growth

Subscribers (Mar 2015)
28,724,509
Growth (last 12 months)
2.9%

Dec 2013   Mar 2015
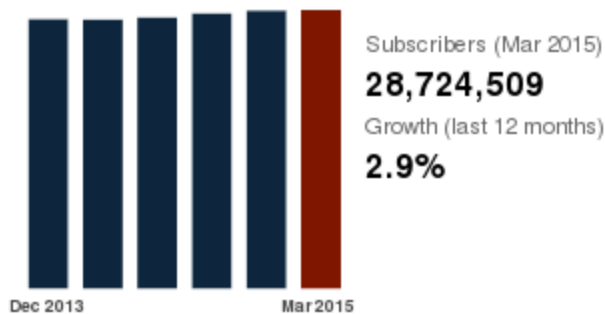
Sources: *operators*

Main Players

Rogers Communications

333 Bloor Street East
10th floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 416 935 3532
Fax +1 416 935 3597
http://www.rogers.com

In December 1983 Rogers Cantel won a public wireless licence, launching cellular services in July 1985 in Montreal and Toronto, and in 1989 it became a wholly owned subsidiary of Toronto-based Rogers Communications. In 2000 the company became known as Rogers

Wireless Communications and until late 2003 operated under the brand Rogers AT&T, by virtue of the US company's stake in it, but AT&T sold its 34% back to Rogers Communications for CAD1.77 billion in October 2004. The sale increased Rogers' equity interest in Rogers Wireless to 89.3%, which it later upped to 100%, while the group paid CAD1.4 billion for rival cellco Microcell in November 2004. The integration of Rogers' national GSM850MHz/1900MHz network with Microcell's 'Fido' GSM-1900 networks in major cities was completed in late 2005, with Fido continuing to exist as a sub-brand of Rogers (see Fido profile). In July 2007 Rogers Communications amalgamated its cable, wireline and wireless divisions, dropping the 'Wireless' from the mobile unit's name in the process.

In terms of 2G technology, Rogers operates a GSM/GPRS network covering 95% of the population as of June 2015, the only major 2G/2.5G network of its kind in Canada. Between 2003 and mid-2005 Rogers upped its average 2G data transmission speeds to 100kbps-200kbps by rolling out an EDGE platform covering at least 93% of the population. With all major centres covered, in late 2006 it embarked on a plan to extend GSM coverage to additional small communities, beginning with rural northern British Columbia. Rogers also operated TDMA and AMPS networks, providing 85%/93% digital/analogue coverage, until both were switched off at the end of May 2007.

Moving on to 3G infrastructure platforms, Rogers deployed 3G/3.5G W-CDMA/HSDPA technology operating in the 850MHz/1900MHz frequency bands in selected metropolitan areas via a supply contract with Ericsson in February 2006. In November 2006 it commercially launched 3.5G services in Greater Toronto and the surrounding Golden Horseshoe region, initially datacard-only, but after launching HSPA handsets, in early April 2007 Rogers claimed the first launch in North America of video calling for handset users. By the end of that year the HSPA network covered 28 cities, or around 60% of the population, rising to three-quarters of the population (including the 25 largest markets) by December 2008. In September 2009 Rogers launched commercial HSPA+ services, upping theoretical maximum downlink speeds for handset and computer users from 7.2Mbps to 21Mbps. Initially covering Vancouver, Calgary, Toronto, Ottawa and Montreal, steady expansion of the HSPA+ footprint saw it reach the majority of major markets across the country within nine months, including: Victoria, Edmonton, Regina, Saskatoon, Kitchener, Hamilton, Windsor, Quebec City, Trois-Rivieres, Halifax, Moncton and St. Johns. By mid-2010 HSPA+ reached 250 locations in 26 main markets, in ten provinces. One year later Rogers had completed the upgrade to HSPA+ across its entire 3.5G footprint (serving 90% of the population at that date, up from 85% a year earlier), and by June 2015 it claimed over 91% HSPA+ population coverage. Its 3G wireless data services offer maximum theoretical download capabilities of up to 42Mbps (although real speeds are much lower), in sections upgraded with dual-carrier (DC) HSPA+ technology (generally high demand urban areas).

As of June 2015 Rogers operates its 2G/3G services using 25MHz of radio spectrum in the 850MHz range nationwide and 60MHz in the 1900MHz band nationwide with the exceptions of southwest Ontario, northern Quebec and the Yukon, Northwest and Nunavut territories, where it holds 40MHz-50MHz in the 1900MHz range (while it notes that in the future 850MHz/1900MHz spectrum will be repurposed for 4G/5G services). Much of Rogers' radio network is interconnected by its own fibre-optic and broadband microwave transmission infrastructure.

Rogers acquired 20MHz (2×10MHz) of Advanced Wireless Services (AWS-1) spectrum in the 1700MHz/2100MHz range across all 13 provinces/territories (59 licensed regions) in July 2008, costing just short of CAD1 billion, which it utilised to launch Canada's first commercial 4G Long Term Evolution (LTE) network in Ottawa in July 2011. Following the LTE network rollout in partnership with Ericsson, Rogers introduced 4G mobile broadband data services, initially via USB modems, promising maximum data speeds of up to 75Mbps (download), with typical downstream speeds of 12Mbps-25Mbps. The first phase of the 4G network covered an area of Ontario from Arnprior in the west of the province to

Orleans in the east, as well as the Hull and Gatineau areas (Quebec). In September 2011 Rogers expanded the LTE network to Greater Toronto (including areas such as Mississauga, Brampton, Vaughan, Richmond Hill and Markham), Montreal and Greater Vancouver (including West and North Vancouver, Port Coquitlam, Delta, Langley, Surrey and Maple Ridge), to reach LTE coverage of around 5.5 million people or roughly 15% of the population. Rogers activated the first LTE smartphones in Canada over its network in October 2011, adding to the existing LTE device line-up of laptop modems and tablet computers, with voice services provided via Circuit Switched Fallback (CS Fallback), while in April 2012 its LTE footprint reached population coverage of nearly twelve million (or around 35%) encompassing fresh locations including St Johns, Calgary and Halifax; by September that year its LTE network included cities such as Victoria, Edmonton, Regina and Quebec City, and covered 54% of the population. By the end of 2012 Rogers had expanded LTE to 25 regional markets and 60% of the population, a percentage which reached 73% by the end of 2013 (covering roughly 120 large and smaller markets across the country), 76% by June 2014, and over 84% by June 2015, having utilised multiple 4G frequency bands (see below).

Meanwhile, the cellco claimed to be the first carrier in North America to launch LTE international data roaming, via an agreement activated in Hong Kong in January 2013, and claimed another first with a Canada-Europe LTE data roaming deal (with Swisscom) in August 2013, while the following month Rogers initiated LTE roaming on AT&T's US network.

Rogers also holds 4G wireless broadband spectrum in the 2500MHz-2690MHz (2600MHz a.k.a. '2500MHz') band (see below for details), which it has utilised to augment existing LTE coverage and capacity, and in November 2012 it switched on commercial dual-band 2100MHz/2600MHz LTE services in areas within every city covered by its LTE network at that date. In May 2013 Rogers 'rebranded' its multi-band LTE network (initially dual-band 2600MHz/AWS-1) under the banner 'LTE Max', a name referring to multi-band network zones rather than specific services/products, providing theoretical maximum speeds of 150Mbps (typical speed 12Mbps-40Mbps) supported by a range of smartphones, tablets and USB modems/mobile hotspots. Having covered more than 60 markets across the country including all major urban centres with 'LTE Max' within a year of launch, the cellco declared it would make 150Mbps services available wherever it owns sufficient spectrum.

Following Canada's 'digital dividend' spectrum auction in January-February 2014, Rogers embarked on a comprehensive national LTE rollout across small and large cities using the 700MHz band. Rogers was the biggest spender by far in the 700MHz auction, acquiring the prime 2×12MHz blocks across Southern Ontario, Eastern Ontario, Southern Quebec, Eastern Quebec, British Columbia, Alberta, Newfoundland, Nova Scotia and New Brunswick, plus 2×6MHz across Northern Quebec, Northern Ontario, Manitoba and Saskatchewan (covering all provinces/territories except Yukon, Northwest Territories and Nunavut), giving a licensed 99%-plus Canadian population footprint. Rogers noted that its investment of CAD3.292 billion for a total of 22 regional licences compared favourably in value terms to the United States' 2008 700MHz auction, where the top 25 US markets sold for USD4.50 per MHz/population, while Rogers paid CAD4.32 (USD3.94 at February 2014 exchange rates) per MHz/population for 700MHz concessions in the major Canadian markets with licence terms (20 years) 33% longer than their US equivalents.

Rogers augmented its commercial 4G LTE mobile services with the switch-on of 700MHz frequencies in April 2014 (as soon as licensing conditions allowed), beginning in selected Vancouver (British Columbia), Calgary (Alberta) and Toronto (Ontario) locations, while the majority of available LTE devices already supported the band. In Q3 2014 Rogers began a concerted effort to expand 700MHz LTE in rural and urban areas of Ontario, British Columbia, Alberta, Quebec and New Brunswick, with the project continuing nationwide at June 2015.

Rogers took an evolutionary step forward in October 2014 by launching Canada's first commercial LTE-Advanced (LTE-A) mobile broadband services for handset and other mobile device users in twelve cities, namely Vancouver, Edmonton, Calgary, Windsor, London, Hamilton, Toronto, Kingston, Moncton, Fredericton, Halifax and Saint John, with more markets across the country being switched on in due course. The LTE-A network sections utilise Rogers' national 700MHz and AWS-1 spectrum.

Voice-over-LTE (VoLTE) was finally launched on 31 March 2015, giving Rogers' customers access to HD voice, video calls and faster call setup times over its all-IP 4G network across Canada, while users may also place a VoLTE call whilst simultaneously web browsing/video streaming at LTE speeds. The first available VoLTE enabled handset was the LG G3 Vigor, with more VoLTE-ready devices lined up for the remainder of the year.

Rogers won additional 4G spectrum in the 2500-2690MHz ('2500MHz') band in Canada's Broadband Radio Service (BRS) spectrum auction in April-May 2015, spending CAD24.09 million on 41 regional licences across nine provinces (Newfoundland & Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia). The new 2500MHz licences augmented its existing nationwide spectrum holdings in the band which it accumulated via a 50/50 WiMAX joint venture with Bell Canada called Inukshuk Wireless; Rogers switched off its fixed/nomadic 2500MHz WiMAX service in March 2012, and in November that year Inukshuk's commercial 2500MHz spectrum was redistributed equally between Rogers and Bell (after one-third of the spectrum was 'returned' as unusable guard band frequencies) as per a December 2011 agreement. In the Q2 2015 BRS auction, Rogers purchased 2×10MHz Frequency Division Duplexing (FDD) spectrum in all Canadian provinces except those where it already owns 2×20MHz; this resulted in Rogers owning 2×20MHz of 2500MHz FDD frequencies in all ten provinces, while it also retains 20MHz unpaired Time Division Duplexing (TDD) 2500MHz spectrum in 13 major urban markets in Ontario, Quebec and British Columbia, including Toronto, Montreal, Ottawa, Quebec City, Victoria and Vancouver.

Rogers did not purchase any 'AWS-3' licences (a band augmenting the AWS-1 range) in Industry Canada's auction of February-March 2015.

In June 2015 Rogers gained more contiguous AWS-1 spectrum to upgrade 4G services when it received Industry Canada's permission for the acquisition of small cellular rival Mobilicity for CAD440 million and the unused mobile spectrum of cableco Shaw Communications for CAD350 million. Rogers agreed to transfer all of Mobilicity's AWS frequencies to up-and-coming rival Wind Mobile in return for receiving a 10MHz portion of Wind's existing AWS spectrum in Southern Ontario, whilst Rogers retained Shaw's 20MHz AWS licences across British Columbia and Alberta while transferring the remainder of Shaw's frequencies to Wind. Rogers said the frequency acquisition would 'immediately boost speed and quality' for its wireless customers in Southern Ontario, British Columbia and Alberta. Simultaneously, Rogers acquired Mobilicity's approximately 155,000 users on a 3G network covering Toronto, Ottawa, Calgary, Edmonton and Vancouver, whilst the CAD440 million purchase price was offset by Mobilicity's tax losses valued at CAD175 million which were noted as an additional asset. Mobilicity had outstanding secured and unsecured debt totalling approximately CAD600 million; the target company's secured debt holders apparently chose the offer from Rogers over a higher value bid from national rival Telus – which had three takeover offers for Mobilicity blocked by Industry Canada in 2013/14 – on the basis of being more likely to gain government approval.

In a similar move to the Rogers-Shaw deal, in May 2013 Rogers agreed in principle a price of CAD180 million to acquire Videotron's unused AWS-1 spectrum in the Greater Toronto area after March 2014 when Videotron's five-year moratorium on licence transfer expired, but the transaction remains subject to approval under the federal spectrum transfer policy which blocks any transactions leading to 'undue' spectrum concentration, and no money had changed hands by June 2015.

Rogers' 3G and 4G LTE services in certain areas are provided via network sharing arrangements with the following:

• Manitoba Telecom Services (MTS), covering 96% of the population of Manitoba (3G and LTE, under a cost-sharing venture launched in Q3 2009 and extended to LTE in June 2013);

• Small independent operator TBayTel, serving the combined Rogers/TBayTel customer base in northwest Ontario (3G only, under a strategic partnership begun in Q4 2010); and

• Videotron, providing LTE services across Quebec and the Ottawa area (via a May 2013 agreement to build and operate shared LTE infrastructure, while also sharing some existing infrastructure); in the first ten years Videotron agreed to pay Rogers CAD200 million while Rogers will pay Videotron CAD93 million based on a fair value assessment; the shared LTE 2100MHz infrastructure went live in September 2014).

Rogers reported a total of 6.76 million subscribers with smartphone devices at 31 March 2015, equivalent to 83% of its post-paid subscriber base, up from 76% (6.14 million) a year earlier, 71% (5.59 million) two years previously, and 60% (4.57 million) in March 2012. In the first quarter of 2015 it activated/upgraded a gross 700,000 smartphones (compared to 579,000 in Q1 2014). Reflecting an emphasis on post-paid voice and data plans, Rogers reported net quarter-on-quarter losses of 37,000 pre-paid customers in 1Q15 (compared to 73,000 net pre-paid losses in 1Q14), although it also lost a net 26,000 post-paid customers in January-March 2015 (compared to 2,000 net post-paid additions in the year-ago quarter). Year-on-year, it added a net 63,000 post-paid users (down from prior year net growth of 198,000) for a total of 8.139 million, and lost a net 16,000 pre-paid SIMs (on the back of 142,000 net pre-paid losses the previous year), to reach a base of 1.340 million at end-March 2015. Rogers claims that the recent adoption of Canada's Consumer Code (involving a transition from a three-year to two-year contract model) has slowed overall wireless subscriber growth.

Rogers posted a 2% y-o-y increase in wireless network service revenue to CAD1.672 billion in 1Q15 which it largely attributed to continued adoption of its 'Share Everything' packages (introduced in September 2013) which allow users to pool data usage with other devices on the same account, and generate higher ARPU partly by encouraging customers to access other Rogers products such as video content streaming (for instance sports content like 'Rogers NHL GameCentre LIVE'). Share Everything packages represented 38% of the post-paid base at the end of March 2015, up from 30% the previous quarter, with these subscribers accounting for 60% of 1Q15 gross additions. Rogers also announced that over one million Share Everything users had used its 'Roam Like Home' cheap international roaming feature since its launch in November 2014, while these customers were now using five times more data than previously (and actually used more data over the border in the US than in Canada); encouraged by the surge in roaming data usage, Rogers extended the Roam Like Home offer to 35 European countries in Q2 2015. Rogers wireless data ARPU represented roughly over 55% of total mobile ARPU in Q1 2015, up from 51% in 1Q14 (when wireless data revenue exceeded voice revenue for the first time) and 45% in 1Q13. Furthermore, recent data ARPU increases have offset continuing voice ARPU decline, and blended ARPU rose y-o-y in Q1 2015 to CAD58.8, up from CAD57.6 in the same quarter of 2014.

Amongst its data and value added range, Rogers has provided mobile TV including real-time access to TV content since September 2005, while a new online video service, 'Rogers On Demand Online', launched as an advertising-funded web service in November 2009, before its relaunch as a paid-for online rental streaming service for film/TV titles in autumn 2010, initially available to Rogers' fixed broadband and mobile laptop users, but subsequently expanded across a range of devices including smartphones and tablets in 2011-2013. In the alternative convergence field, in March 2011 the company introduced a Wi-Fi voice service for smartphones, named 'Wi-Fi Calling for Business', based on Unlicensed Mobile Access (UMA) spectrum, enabling mobile calls over company Wi-Fi networks which do

not count towards monthly voice plan minutes. Continuing down the road of convergence, in February 2012 Rogers launched a cellular/online service 'Rogers One Number' for its wireless subscribers, allowing them to text and talk from a computer and video chat with other Rogers One Number users using their mobile phone number. July 2013 saw Rogers take convergence further with the launch of a fixed line replacement service – home and small business phone solutions operating on its cellular network; Rogers Wireless Home Phone/Business Phone is available in regions across Canada where Rogers' residential (cable network-based) and business landline (cable and some PSTN) services are not available.

Rogers has also grown rapidly in the machine-to-machine (M2M) sector. In September 2013 it surpassed over one million M2M connections and aims to continue multiplying its network and partner agreements to seize opportunities across sectors including automotive, healthcare, retail and managed services. That month Rogers and US counterpart Sprint formed a partnership to expand marketing of the 'Sprint Velocity' in-car infotainment and telematics solution from the US to Canada, while in February 2014 Rogers launched an in-store M2M platform called 'Mobile Shopper'. The operator plans to grow its traditional M2M business to include 'big data and analytics', and is developing its own cloud-based hosted data analytics offering. In Q1 2015 Rogers deployed the GSMA Embedded SIM Specification of the M2M World Alliance, thereby reducing cost and time in enabling globally connected devices.

In addition to its long-established alternative sub-brand Fido, Rogers responded to the influx of value-for-money competition from new mobile licensees in July 2010 with the launch of a new no-frills discount wireless brand named 'Chatr' (see Chatr Wireless profile). Also in July 2010 Rogers bought mobile virtual network operator (MVNO) Cityfone, a former Fido reseller, for CAD24 million. A similar arrangement could arise following Rogers' aforementioned takeover of Mobilicity in June 2015, via a proposal to continue the Mobilicity brand as an MVNO after being acquired by Rogers. Previously, another Fido-based brand, Simpro, was integrated into Rogers after going bankrupt, while the operations of Sprint Canada Wireless (bought in 2005) were also consolidated into Rogers.

Independent MVNOs/resellers which operate over Rogers' infrastructure as of June 2015 include: Primus Canada, Sears Connect, 7-11 Speak Out, good2go Mobile, KORE Wireless (an M2M service provider which also owns the Zero Gravity and RacoWireless brands), Petro-Canada Mobility, iRoam (which has consolidated Brightroam and G3 Wireless), PhoneBox, Simply Connect, Talk & Earn, Talk & Save, CityWest (a regional northern British Columbia operator), ZoomerWireless and DCI Wireless.

Rogers Communications Inc (RCI) is listed on the Toronto Stock Exchange (TSX) and New York Stock Exchange (NYSE), but voting control is held by Rogers Control Trust, the trustee of which is a subsidiary of a Canadian chartered bank, with the beneficiaries being family members of former RCI chief Ted Rogers who died in December 2008. As of 31 March 2015 private holding companies controlled by Rogers Control Trust owned 90.9% of voting ('Class A') shares and approximately 28% of equity.

On 1 July 2007 RCI completed an amalgamation with wholly owned subsidiaries Rogers Cable (including Rogers Telecom) and Rogers Wireless, which ceased to be separate corporate entities. The restructuring placed Rogers' cable, wireline and wireless operations under the Rogers Communications umbrella.

Telus Communications

555 Robson Street
Vancouver, British Columbia V6B 3K9
Canada
Tel. +1 604 432 2151

Telus narrowly overtook Bell as Canada's second largest mobile operator by subscribers in 2013, and claimed a user base of 8.289 million at end-March 2015, up by 471,000 in twelve months (including acquisitions), or 187,000 more users than its close competitor. Despite the rivalry, Telus operates a national shared 3G HSPA-based network launched in November 2009 via a rollout partnership with Bell, and a 4G Long Term Evolution (LTE) network launched in February 2012 which also utilises Telus-Bell network access sharing, and reached 91% population coverage by June 2015. Telus's original analogue AMPS network (launched in 1986) was decommissioned in Q4 2008, while two other legacy systems are in the process of being decommissioned: a CDMA mobile network and an integrated digital enhanced (iDEN) network, both of which are being replaced by LTE services.

In a move aimed at competing more effectively with the GSM/W-CDMA/HSDPA services of market leader Rogers (and newer entrants) and boosting international roaming revenues, in October 2008 Telus and fellow CDMA-based operator Bell announced a 50/50 strategic partnership to roll out a nationwide 3.5G W-CDMA/HSPA/HSPA+ network. Telus and Bell agreed to share equally the USD1 billion-plus rollout costs, and each are responsible for roughly half of the coverage requirements under their network sharing agreement. The joint HSPA+ network offered coverage of 93% of the population and 20,000 towns and cities when it launched commercially in November 2009, ahead of schedule, at a cost to Telus of CAD600 million. The province of Saskatchewan was covered via an additional infrastructure partnership with SaskTel in August 2010, while the Bell/Telus HSPA+ network was expanded to Manitoba in February 2011. By the end of Q1 2013 Telus claimed HSPA+ coverage of over 98% of the population via the shared infrastructure – a figure that was virtually unchanged by mid-2015, with the 3G rollout essentially complete.

In March 2011 Telus launched a commercial network upgrade enabling theoretical maximum mobile data speeds of 42Mbps (download) via Dual Carrier (DC) HSPA+ technology in selected areas across the country, initially for laptop modems. First-phase coverage zones included the greater Toronto area, Vancouver and its environs, Edmonton, Calgary, Fort McMurray, Whistler and Camrose (Telus' DC-HSPA+ testing site), and rollout continued across other urban centres including Winnipeg, reaching over 70% of Telus' HSPA network by end-2011. DC-HSPA+ handsets were made available in Q1 2012, while the DC-HSPA+ coverage footprint had exceeded 80% by mid-2015.

To enable its evolution to next generation services, Telus spent CAD882 million on the purchase of 59 regional frequency concessions in Industry Canada's Advanced Wireless Services (AWS-1) 2100MHz/1700MHz paired spectrum band auction in July 2008, giving it an average bandwidth of 16.2MHz in regions across Canada.

In April 2011 Telus announced plans to build LTE networks using its AWS frequencies in major cities in the second half of the year, with rollout to rural areas planned via 700MHz band spectrum (won in February 2014, see below). In February 2012 commercial LTE services were launched, promising peak download speeds of up to 75Mbps, with an expected average of 12Mbps to 25Mbps; announced alongside the launch, Chinese vendor Huawei Technologies won a contract with Telus to provide LTE radio access network equipment across Canada. The LTE network initially went live in 14 metropolitan areas: Vancouver, Calgary, Edmonton, Toronto (and the Greater Toronto Area), Kitchener, Waterloo, Hamilton, Guelph, Belleville, Ottawa, Montreal, Quebec City, Halifax and Yellowknife, including coverage achieved via reciprocal network access agreements with Bell. Telus claimed LTE coverage of 24.7 million Canadians (around 70% of the population) by mid-2013, including 90% of British Columbia's population. In September 2013 LTE (multi-band) coverage reached 79% of the population (and nearly 170 markets), rising to 81% (in more than 200 communities throughout the country) by mid-2014, and 91% by mid-2015.

Telus began phasing in upgraded LTE speeds in 2014, promising to double the peak 4G mobile data rates to 150Mbps, to bring its range in line with Rogers and Bell, while as of June 2015 it says its LTE network is capable of peak download speeds of up to 110Mbps (with typical speeds of 12Mbps to 45Mbps). Outside 4G areas, Telus' HSPA+ services enable theoretical peak data speed of 21Mbps (typical speeds of 4Mbps to 6Mbps) while its DC-HSPA+ delivers typical speeds of 7Mbps to 14Mbps (of the maximum theoretical 42Mbps expected).

In February 2014 Telus won 16 paired and 14 unpaired 700MHz licences covering around 95.7% (33.48 million) of the population, with a 700MHz presence in all provinces/territories, costing CAD1.143 billion. Telus earmarked the 700MHz band to expand LTE into rural areas, extending its national 4G LTE footprint from the approximate 80% population coverage at that date to 97% in a time-window 'well in advance' of the licences' stipulated deadlines, as well as adding much needed urban capacity.

In March 2015 Telus purchased 15 spectrum licences in the AWS-3 band for CAD1.5 billion, augmenting its existing 4G LTE AWS-1 frequencies by adding 20MHz of 1700MHz/2100MHz paired spectrum in each of Quebec, British Columbia, Alberta, Saskatchewan and Manitoba, as well as 10MHz in Southern Ontario.

In May 2015 Telus secured 122 licences for 40MHz of 2500MHz band 4G mobile spectrum in every province and territory across Canada, paying a total of CAD479 million.

Wireless network revenues increased by 6.4% year-on-year to CAD1.54 billion in the first quarter of 2015, driven by a 19% increase in mobile data revenue, reflecting subscriber growth, increased customer adoption of higher-rate two-year plans, higher data usage from continually rising smartphone adoption and other data-centric devices, increased data roaming and the expansion of LTE network coverage. Blended ARPU increased by 3.2% in 1Q15 to CAD62.34, Telus' 18 consecutive quarter of year-on-year ARPU growth. Smartphone users were equivalent to over 80% of Telus' post-paid customers by end-March 2015, compared to 68% two years earlier and a sharp increase from 38% just four years previously.

In Q4 2013 Telus ceased marketing its national iDEN network-based 'Mike' branded services including the popular push-to-talk (PTT) service 'Direct Connect', and started to turn down the iDEN network in favour of new-generation services including 3G/4G-based PTT product 'Telus Link', which it launched that month. On 1 October 2013 the cellco removed from its reported post-paid wireless subscriber base a portion (around 94,000) of the remaining Mike subscribers – representing those who, in its judgment were 'unlikely to migrate to our new services'.

In the machine-to-machine (M2M) market, in April 2013 Telus revealed it had 76,000 such connections active on its cellular network (with no further figures released by mid-2015), which it discounted from its overall reported subscriber base. During 2014 Telus developed what it called Canada's first Internet of Things (IoT) marketplace to assist businesses incorporating connected devices.

In the mobile virtual network operator (MVNO) sector, in September 2006 Telus struck an agreement to bring the Amp'd brand from the US to its network. However, the data-focused MVNO shut down in July 2007 following bankruptcy, and this setback prompted Telus to come up with a new sub-brand of its own. It did so in March 2008 with the launch of a youth oriented, discounted virtual operator called Koodo Mobile, which was expanded to include smartphone/data plan offerings in 2011, and continues to compete against rivals' sub-brands such as Virgin and Chatr as of mid-2015 (see Koodo Mobile profile). Telus has been reticent in forming agreements with independent MVNOs, and in a regulatory consultation on the wholesale wireless market in Q4 2014 the operator was documented as having no current active independent MVNO agreements – although this contradicts information from reseller

PC Mobile (President's Choice) which states on its website that it offers post-paid services via a partnership with Telus since 2013.

Telus was blocked from buying smaller cellco Mobilicity in June 2013 by Industry Canada under the federal spectrum transfer policy – which opposes the transfer of AWS wireless spectrum from recent market entrants to nationwide incumbent operators (Telus, Bell or Rogers). Two further approaches by Telus for Mobilicity were blocked under the federal policy, in October 2013 and May 2014. When rival Rogers was permitted to purchase Mobilicity in June 2015, albeit as part of a spectrum swap also benefitting smaller player Wind Mobile, Telus was rumoured to be considering legal action (unconfirmed at the end of that month).

In October 2013 Telus agreed to purchase 100% of small cellular rival Public Mobile, with over 200,000 pre-paid users, following approval from Industry Canada of the transfer of Public's 1900MHz G-block mobile frequency licences to Telus. The takeover received final approval from the Competition Bureau in November 2013, and Public Mobile's CDMA networks covering Toronto, Montreal and other areas of Ontario and Quebec were shut down in July 2014 following a campaign to migrate users to Telus. Public Mobile continues as a distinct sub-brand in the pre-paid sector (see Public Mobile profile). The acquired company's G-block spectrum aligns with matching spectrum that Telus holds in western Canada, and Telus is expected to reuse the frequencies to bolster its LTE network. On 1 January 2015 Telus fully incorporated Public Mobile into its operating metrics.

Telus has expanded its services into Canada's Far North regions to compete with the Bell group there for the first time. Customers in the Northwest Territories and Yukon could sign up for Telus mobile services starting September 2013 (initially in Whitehorse and Yellowknife).

Having operated 2.5G CDMA2000 1x services since 2002 and 3G 1xEV-DO from November 2005, Telus discontinued large swathes of its EV-DO mobile data network in March-June 2014 across the entire province of British Columbia, and all of Alberta except initially Edmonton and Calgary), and in Q4 2014 it closed the EV-DO network altogether, while promising that CDMA voice services – now re-allocated to a different part of their existing 800MHz spectrum band – would remain operational for the time being; CDMA voice is now thought to be earmarked for shutdown by end-2015.

Regarding corporate structure, Telus Corporation formed a new wireless unit, Tele-Mobile Company (trading as Telus Mobility), headquartered in Ontario, in 2001 through an amalgamation of Telus Communications' wireless operations in Alberta, British Columbia and Quebec (including QuebecTel Mobilite), and the national cellular operations of Clearnet. In October 2000 the Telus group had acquired 100% of Clearnet in a CAD6.6 billion (USD6.5 billion) merger, before establishing Telus Communications at the start of 2001 from the merger of Telus and BC Telecom, based in Alberta and British Columbia respectively. In 2003 all the group's mobile licences were transferred to Tele-Mobile Company, but in November 2005 Telus Corporation integrated Telus Mobility and Telus Communications in a single operating structure, in order to focus on customer groups rather than distinct products, and all licences were transferred back to Telus Communications in 2006.

Telus Communications is a wholly owned subsidiary of Telus Corporation, which is a distributed company listed on the stock markets in Canada (TSX symbol: T) and the US (NYSE symbol: TU). At 1 January 2015 the company estimated that its ownership was 84% Canadian, whilst approximately 70% of shares were held by institutions and 30% by retail investors. Under a move approved in October 2012 Telus reformed its legacy dual-class shareholding structure by exchanging its non-voting shares into common shares on a one-for-one basis; common shares were subsequently listed on the NYSE for the first time.

Bell Canada Enterprises (BCE)

1 Carrefour Alexander Graham Bell
Building A, 4th Floor
Verdun, Quebec H3E 3B3
Canada
Tel. +1 888 9326666
Fax +1 514 7665735
http://www.bce.ca
http://www.bell.ca

Nationwide mobile operator Bell Canada – via its Bell Mobility division – was a CDMA-only provider before introducing a W-CDMA/HSPA-based network in November 2009 covering 93% of the population at launch. Bell built the HSPA+ network via an investment sharing project with Telus Communications, enabling the pair to directly compete with mobile market leader Rogers Communications, as well as putting them on a level playing field technology-wise with a clutch of newcomers appearing on the market in late 2009 and 2010. By the end of June 2015 the HSPA+ network had been expanded to over 98% of the population (having reached virtual completion at least one year earlier), while Bell's legacy CDMA-based networks began to be decommissioned in 2014, with EV-DO data services scheduled for shutdown on 1 July 2015 and the final CDMA switch-off set for January 2017. In the meantime, Bell entered the 4G mobile arena in September 2011 with the launch of Long Term Evolution (LTE) services, which reached 91% of Canadians by June 2015, with plans to reach 98% LTE coverage by the end of 2015 (see below for details).

In October 2008 Bell formed a strategic partnership with CDMA-based rival Telus to roll out a nationwide 3.5G W-CDMA/HSPA/HSPA+ network, to give customers the broadest possible range of 3G wireless services. The move was aimed at levelling the playing field with mobile market leader Rogers whose GSM/UMTS system at the time boasted superior international roaming support, a more popular device range and applications such as video calling which the CDMA-based players lacked. Bell and Telus each took responsibility for half of the coverage requirements under a network sharing agreement, equally splitting the USD1 billion-plus rollout budget, using Nokia Siemens Networks (now Nokia Networks) and Huawei Technologies as vendors. The HSPA+ network was launched on time in November 2009, covering 93% of the population and 20,000 towns and cities, and more than 1.2 million square kilometres – wider coverage than Rogers' equivalent network. During 2010 deals were struck to fill in HSPA coverage gaps in regions such as Saskatchewan (in partnership with SaskTel) whilst Bell extended HSPA+ coverage into more rural areas such as Northern Quebec in 2010/11. By mid-2012 HSPA+ population coverage reached over 97%, and this percentage stood at 'above 98%' by June 2014, and remained at this level at end-June 2015, with rollout now complete. Meanwhile, video calling was offered for the first time by Bell upon launch of the HSPA network – initially on-net only – before Bell, Rogers and Telus implemented inter-network video calling in February 2010. For mobile internet/data services, the HSPA+ network offered theoretical peak data speeds of 21Mbps/5.76Mbps (down/upload) for handset, modem and other device users, until November 2010 when Bell upgraded maximum data speeds to 42Mbps via Dual Carrier (DC) HSPA+ technology, initially in Toronto for compatible USB dongle users. By March 2011 the 42Mbps footprint also covered Vancouver, Calgary, Edmonton and Winnipeg, with 70% of Canadians covered by Bell's DC-HSPA+ services six months later, a percentage that grew to over 83% by June 2015.

Following a 4G LTE testing phase begun in summer 2010 with vendors Ericsson and Nokia, in September 2011 Bell launched commercial LTE mobile broadband services using the AWS-1 (1700MHz/2100MHz) spectrum band, initially for modem users in selected urban areas of Toronto, Mississauga, Hamilton, Kitchener-Waterloo and Guelph, slightly ahead of original schedule after being prompted by rival Rogers' summer launch. In Q4 2011 Bell

released its first LTE handsets and tablets, and in 1Q12 its 4G network reached 14 major urban centres: Montreal, Quebec City, Ottawa, London, Calgary, Edmonton, Vancouver, the Greater Toronto Area (GTA), Halifax, Hamilton, Kitchener-Waterloo, Guelph, Belleville and Yellowknife. Also in that quarter China's Huawei won a contract to provide LTE radio access network equipment for Bell's continued expansion, adding Peterborough and Whitehorse to the footprint the following quarter. Bell has reciprocal LTE network access agreements in place with Telus, and this partnership enabled the pair's first LTE launches in the province of Saskatchewan (in April 2013).

By June 2015 Bell's LTE population coverage had reached 91% (via a combination of multi-band AWS/2500MHz/700MHz spectrum, see below), up from 81% twelve months earlier (and 70% at mid-2013), while it is targeting a 98% LTE footprint by the end of 2015. Mobile broadband coverage is augmented by Bell's network of Wi-Fi hotspots across Canada; at mid-2015 these included over 4,000 public hotspots at McDonald's, Tim Hortons and Chapters/Indigo retail outlets, in addition to 'thousands of private Wi-Fi networks managed through the Bell Business Markets unit at enterprise customer locations.'

As at June 2015 Bell advertises typical LTE speeds ranging between 12Mbps and 40Mbps (up from '12Mbps to 25Mbps' promised at mid-2014), with peak theoretical speeds of up to 150Mbps in the majority of areas as of June 2015 (up from 75Mbps a year earlier). The LTE network automatically hands off users to the next fastest speed available when outside LTE areas, either DC-HSPA+ (typical 7Mbps-14Mbps) or HSPA+ (typical 3.5Mbps-8Mbps).

In June 2015 Bell began the rollout of an LTE-Advanced (LTE-A) network upgrade offering peak mobile data download speeds of up to 220Mbps, compared to its previous maximum LTE speed of 150Mbps. Initially, LTE-A is supported by selected 'CAT 6' devices (including the Samsung Galaxy Note Edge, Samsung Galaxy S6/Edge and HTC One M9). The first cities/areas to receive Bell's LTE-A services will be: Greater Toronto Area, Fredericton, Sydney, Charlottetown and Halifax. Reportedly, Bell is providing the 220Mbps speeds via its Band 7 (2500MHz) spectrum and carrier aggregation (CA) between Band 4 (AWS) and Band 2 (PCS 1900MHz) to reach those speeds (alongside its LTE 700MHz services).

To enable its next generation evolution, Bell spent CAD741 million on 2100MHz band wireless frequency allocations in the government's Advanced Wireless Services (AWS-1) spectrum auction in July 2008, including 20MHz blocks in Ontario (including Toronto and surrounding areas), the Atlantic Provinces and northern Canada, as well as 10MHz covering Quebec and western Canada. Bell used these frequencies for its initial LTE rollout across major cities.

In the digital dividend auction of February 2014 Bell paid CAD565.7 million for 17 paired 700MHz spectrum licences plus 14 unpaired 700MHz frequency concessions, covering a licensed footprint across all provinces/territories and roughly 95% of the population; Bell announced its 700MHz rollout would enable it to achieve its multi-band LTE coverage goal of 98% (from around 80% at that date) by reaching smaller towns, rural locations and remote communities across the country including the Far North. On 2 April 2014 Bell officially acquired its 700MHz licences and on the same day launched Canada's first commercial 700MHz LTE services – compatible with the majority of its smartphones, initially only covering Hamilton, Ontario. Later that year it embarked on its nationwide expansion of LTE-700 services, and as of mid-2015 it remained on target to complete the Canada-wide rollout by the end of 2015.

In March 2015 Bell Mobility bought additional 4G spectrum via 13 'AWS-3' (1700MHz / 2100MHz) regional licence blocks costing CAD499.9 million, representing a population footprint of 13.49 million.

In May 2015 Bell spent CAD29 million to acquire additional 2500-2690MHz ('2500MHz') spectrum (51 licences in twelve provinces/territories) to support 4G LTE services in Eastern

and Western Ontario, Quebec, Atlantic Canada, Alberta, British Columbia and the Far North Territories. The new 2x10MHz licences, added to existing Bell spectrum in the band (courtesy of joint venture Inukshuk Wireless, see Broadband section), gave it 2x20MHz of 2500MHz bandwidth in all ten provinces except Saskatchewan (2x10MHz) plus larger bandwidth in the Territories (where a 40MHz spectrum cap does not apply): Yukon (2x40MHz), Nunavut (2x30MHz) and Northwest Territories (2x30MHz).

Supported by fibre-optic backbone network rollouts by its wireline division, the majority of Bell's radio access network is linked by 100Mbps-plus fibre backhaul infrastructure; the cellco reported in February 2010 that three-quarters of its 3G base stations were connected to this high speed transmission network. However, by September 2014 approximately 25%-30% of all Bell 2G/3G/4G cell sites remained connected via microwave, because fibre is not always available or cost-effective in all locations, particularly in rural parts of the country. To upgrade the transmission in such locations, that month Bell deployed the first commercial 4×4 multiple-input multiple-output (MIMO) microwave wireless backhaul system in Canada, with the first live link providing 1.6Gbps of capacity over a single 40MHz channel, via which the cellco aims to more than double the capacity of its wireless backhaul network to meet growing 4G data traffic demands.

The most notable mobile virtual network operator (MVNO) operating over the Bell network is Virgin Mobile Canada, which in March 2005 introduced straightforward pre-paid calling plans predominantly aimed at the youth market, before moving into the contract user segment in early 2008. However, the MVNO, formed as a 51/49 joint venture between Richard Branson's Virgin Group and Bell, is now wholly-owned by Bell, which paid CAD142 million to increase its stake to 100% and gain exclusive, long-term rights to the Virgin Mobile brand in a deal completed in July 2009 (see Virgin Mobile Canada profile). An existing wholly-owned Bell virtual brand, Solo Mobile, was wound down in favour of the Virgin business after the latter's consolidation (with Solo ceasing to activate new customers in Q2 2012). The only known independent resellers/MVNOs offering services over Bell's network at June 2015 were PC Mobile (a brand of retailer President's Choice) and OnStar (a connected car service specialist). Other regional Bell group companies technically operate as regional MVNOs/sub-brands, including Ontario-based KMTS Mobility, and rural operators NorthernTel (Ontario) and Telebec (Quebec), although the latter two companies are in the process of transferring all mobile accounts to Bell by the end of summer 2015. Another regional telco, Northwestel, already transferred its mobile customers (including Yukon-based subsidiary Latitude Wireless) to parent Bell in June 2014.

In July 2009 Bell wrapped up another strategic acquisition, the CAD135 million purchase of retail chain The Source, with around 750 stores across Canada (including La Source in Quebec), which exclusively offers Bell and Virgin wireless products since January 2010; in total at mid-2015 there were over 1,600 Bell-branded and The Source outlets across Canada. Meanwhile in May 2015 Bell completed a deal to take 50% of another retailer, Glentel, with rival Rogers taking the other 50% ownership in the chain, which has 494 outlets across Canada.

Following March 2011's completion of parent group BCE's re-acquisition of broadcaster CTVglobemedia (previously offloaded in 2006), Bell Mobility immediately launched an expanded and enhanced version of its mobile TV service for smartphones and tablet computers, including live and on-demand access to new content from CTV, TSN, RDS and other brands in Canadian news, sports and entertainment media. In March 2012 Bell indicated it had roughly 250,000 mobile TV users (compared to the group's pay-TV base of around 2.1 million), while in H2 2013 it began developing its own 'TV Everywhere' platform to give access to shared content across fixed, mobile and web-based platforms, while its line-up was boosted by BCE's acquisition of the pay-TV channels of Astral (gaining regulatory clearance in June 2013). The mobile TV service went from strength to strength, reaching 1.335 million users at end-March 2014 (latest reported figure), up 67% in a year, and as at June 2015 it had over 35 live and twelve on-demand mobile TV channels on smartphones

and tablets. Furthermore, 'CraveTV', Bell Media's new on-demand video streaming service, was launched in December 2014, supported by an expanded suite of 'TV Everywhere GO' products.

By 31 March 2015 smartphone users accounted for 77% of Bell's total post-paid subscriber base, up from 74% one year earlier (68% in 1Q13 and 52% in 1Q12). Bell reports that LTE is driving smartphone sales, hand-in-hand with usage of mobile TV, social media, gaming and business data services. Bell indicated that by Q1 2015 its total customers 'using LTE' represented a number equivalent to roughly 45% of its post-paid subscriber base; subsequently at the end of Q1 2015 Bell reported that 52% of Bell's post-paid subscribers were 'using LTE-compatible devices'.

Bell's Q1 2015 wireless revenues jumped up by 9.7% year-on-year to CAD1.637 billion (from CAD1.492 billion in 1Q14) as service revenues grew 8.1% to CAD1.500 billion, driven by a higher post-paid subscriber mix and growth in blended ARPU attributable to more customers on two-year plans and greater data usage. The increasing take-up of smartphones, tablets and laptops contributed to year-on-year wireless data revenue growth of 24.5% in the first three months of 2015 (up from 17.5% in Q1 2014) and blended ARPU growth of 5.3% year-on-year (an improvement on the 3.5% blended growth rate recorded a year earlier), to stand at CAD60.83 per month. Wireless data now accounts for more than half of total Bell wireless service revenues. Product revenues increased 35.1% to CAD127 million in 1Q15, reflecting higher sales volumes of premium smartphones and more handset upgrades compared to the year-ago period. In Q1 2015 the Bell Canada Enterprises group reported that its revenue mix by segment was: wireline 57%, wireless 31% and Media division 12%.

Elsewhere, the group continues to develop mobile banking, which had taken off in 2014 with the full-blown launch of services in partnership with Royal Bank of Canada in January that year (piloted in 2Q13), and a subsequent series of mobile payment partnerships signed with other financial institutions. Amongst other technological developments aimed at its smartphone users, in February 2012 Bell introduced wireless High Definition (HD) voice services, and in April 2012 it introduced a 'next generation, instant-contact' push-to-talk-over-cellular (PoC) service operating on compatible smartphones, with North American roaming capabilities, designed to supersede its existing 'Bell 10-4' PoC service.

Under a wider restructuring deal between BCE and fellow BCE group member Aliant (later Bell Aliant), on 7 July 2006 Bell Mobility acquired Aliant's wireless operations in Atlantic Canada, including around 750,000 subscribers (having offered mobile services since 1985). Services in the Atlantic provinces remained under the 'Aliant' brand so as to cause minimum disruption to customers. On 31 October 2014 BCE completed its acquisition of all shares of Bell Aliant that it did not already own – upping its stake from 44% to 100% for CAD3.95 billion – and from 1 January 2015 Bell Aliant's operations are included within Bell Canada, with no longer any regional segregation in the company's results.

Regarding legacy networks, Bell launched CDMA IS-95A services in Q1 1997 and CDMA2000 1xRTT in Q1 2002, reaching 2.5G coverage of 95% of the population in Ontario and Quebec within two years (matching its original analogue AMPS system – eventually decommissioned in December 2008). Bell also expanded 1xRTT coverage across Atlantic Canada plus parts of Western Canada, subsequently reaching 99% of Ontario's and Quebec's population, 97% of Atlantic Canada's population, and major cities in Alberta and British Columbia, or over 90% of the country's population in total; national coverage was achieved through network access agreements with other CDMA operators. 3G CDMA2000 1xEV-DO services were launched in November 2006, and within two years its EV-DO network reached 90% of the population, with the majority upgraded with 3.5G Rev A technology, enabling enhanced data and value added services (VAS), as well as machine-to-machine (M2M) services. Existing M2M contracts via third-parties with automotive manufacturers were said to be a factor in delaying Bell's timetable of phasing out its CDMA-based networks, with its deadline of January 2017 likely to make it the last remaining of Canada's major CDMA

operators. Rural communities are likely to be the final users of CDMA, for instance in sparsely populated parts of Ontario and Quebec: Bell Aliant (see above) previously (from Q3 2006 until end-2014) reported the mobile operations of its consolidated subsidiary telcos in Ontario and Quebec, NorthernTel and Telebec, which had 148,000 digital CDMA and analogue wireless users between them at end-2014, but current and historical figures of NorthernTel and Telebec were amalgamated into the main Bell group figures from 1 January 2015 following the delisting of Bell Aliant.

In the M2M sector, Bell currently serves customers in the automotive, transportation, utilities/energy, security, healthcare and government sectors with M2M solutions including connected cars, asset tracking, fleet management, wireless backup connectivity, wireless point of sale, remote monitoring, telematics and digital signage, having largely migrated M2M platforms from CDMA to LTE by mid-2015. In the latest available figures, Bell claimed 99,100 M2M connections at the end of December 2013 (which it discounted from its mobile subscriber figures at that date), while it was noted that the figure was a tenth the size of rival Rogers' M2M base. In September that year, Bell launched its 'M2M Management Centre' secure online portal offering Canadian businesses a comprehensive suite of tools to manage connected devices, developed with Ericsson.

Bell Canada Enterprises Inc (BCE) has fully distributed ownership; its shares are listed in Canada on the Toronto Stock Exchange (TSX) and in the United States on the New York Stock Exchange (NYSE). Its shares are approximately 85% Canadian-owned.

Globalive Wireless (Wind Mobile)

1 Adelaide Street East
Suite 1400
Toronto, Ontario M5C 2V9
Canada
Tel. +1 877 445 8606
Fax +1 416 640 1089
http://www.windmobile.ca
http://www.globalive.com

Globalive Wireless (Wind Mobile) was issued with 30 regional wireless spectrum concessions in the paired 2100MHz/1700MHz band in March 2009, giving it extensive coverage of all Canadian provinces except Quebec. It won the spectrum for a total investment of CAD442 million in 2008's AWS-1 auction, mostly funded by its original Egyptian – and later Russian – financial backers, who also committed investment of around USD700 million in Canada over its first four years. Wind contracted Nokia Siemens Networks (now Nokia Networks) and Alcatel-Lucent to roll out a 3G/3.5G all-IP mobile network in July 2009, before launching commercial voice, text and data services in December 2009, initially in Toronto and Calgary. The next cities to receive coverage were Edmonton, Ottawa, Vancouver and Hamilton (near Toronto) in 2010 as the Wind network reached major urban centres in all its licensed regions by the end of that year. It added Kitchener-Waterloo as its sixth 'major centre' covered in August 2011, while national coverage was provided via a roaming deal with Rogers Communications at a flat rate for all calls. By the end of 2012 Wind had increased its HSPA network coverage to over 13.5 million people and 21 'key markets', up from around 12.5 million people a year earlier (and roughly half of its licensed populace), utilising near to 1,300 live cellular network sites. At end-2013 Wind reported that its network now covered 14.1 million of the population via 1,363 cell sites, serving approximately 41% of the Canadians at that date. With around 45% population coverage by mid-2015, markets covered included: Vancouver, Abbotsford, Whistler, Edmonton, Calgary, Windsor, London, St Thomas, Woodstock, Kitchener-Waterloo, Guelph, Cambridge, Toronto, Hamilton, St Catharines, Niagra Falls, Welland, Barrie, Peterborough, Kingston and Ottawa. Furthermore, Wind now has three national roaming agreements, having added to Rogers and Bell deals

with a Telus agreement in December 2014, enabling it to guarantee 98% national network/ roaming coverage (with these moves prompted by Canada's telecoms regulator the Canadian Radio-television and Telecoms Commission (CRTC) banning exclusivity clauses in domestic mobile roaming agreements earlier in the year).

Meanwhile, in November 2011 Wind also launched faster HSPA+ (21Mbps) data services, which it has continued to expand, reaching around a third of its network footprint in the first six months of rollout, with roughly 70% of the network footprint able to receive HSPA+ services by end-2013. At end-June 2014 Wind confirmed that its network was now 100% HSPA+ enabled across all (1,412 active) base stations. Also that month Wind disclosed that it had begun the implementation of Dual Carrier (DC)-HSPA+, to enable peak theoretical 42Mbps mobile data speeds, equipping 360 cell sites with DC-HSPA+ technology in an initial phase.

The newcomer initially concentrated on undercutting the incumbent cellcos' tariffs and offering simple voice and text tariffs, as well as unlimited data packages, and no hidden fees or long contracts – although this meant customers having to pay the full cost of a handset upfront. From 3Q11 Wind raised handset subsidies and broadened its range of high-end handsets, expanding its target market to overlap more with the incumbent operators across all their brands, including their higher value customer segments; this action subsequently drove lower churn and higher ARPU. As of June 2015 it offered four smartphone plans priced at between CAD35 and CAD50 per month, plus a basic 'talk and text' CAD25 plan, with all plans including unlimited Canada-wide calls/texts (and the upper-tier packages featuring US-wide unlimited calling/roaming). Three monthly data-only plans offered at that date ranged from CAD15 (1GB) to CAD35 ('unlimited' – fair usage policy), while it also offers a CAD15 unlimited US roaming add-on package. Wind has been actively moving its focus to contract customers instead of its original pre-paid niche, and by the end of 2013 Wind disclosed that 55% of its user base was on monthly contracts, increasing to at least 60% by end-March 2015.

Meanwhile, the prospects for sourcing funding for crucial upgrades to 4G LTE technology looked in doubt due to a freeze on new investment by Wind's foreign parent, Russian-backed Vimpelcom (via Egypt-based subsidiary Global Telecom Holding [GTH]), which began looking to exit the company after its attempt to gain full control failed to win government approval in June 2013 (see Ownership). The future appeared bleak for Wind when, on the eve of January 2014's 700MHz 'digital dividend' 4G LTE licence auction, the cellco was forced to withdraw from the bidding after Vimpelcom refused to commit any financial backing.

After the foreign investment dried up, Wind's founder Anthony Lacavera repeatedly indicated that the company was seeking consolidation with another new entrant to the Canadian market to achieve economies of scale and multiply wireless resources including frequencies, and become a strong national operator. Quebec-based full-service operator Videotron, holder of widespread 700MHz spectrum, had looked the most likely to enter such a partnership, but the idea has not been followed through as yet. Lacavera calculated that to remain competitive Wind needed funding of CAD400 million to CAD500 million to build an LTE network, and as it appeared that domestic merger possibilities had dried up, the Canadian entrepreneur teamed up with a Canadian/US investor consortium to buy out GTH/ Vimpelcom in November 2014 (see Ownership) and press ahead with securing the necessary LTE spectrum.

In Canada's March 2015 'AWS-3' auction of additional 2100MHz (3G/4G) spectrum (some set aside for newer entrants), Wind Mobile capitalised on a relative lack of competition – as financially stricken rival Mobilicity failed to place bids – and paid a minimal amount of CAD56.4 million for three regional 2x15MHz licences in Southern Ontario, British Columbia and Alberta, covering a population of 18.14 million. The funding for the LTE-suitable concessions came via its new US/Canadian fund investors.

Even more positive developments followed in June 2015, when Industry Canada approved a series of deals involving Wind Mobile receiving AWS-1 spectrum licences previously held by Mobilicity and Shaw Communications after Rogers agreed to buy Mobilicity plus Shaw's dormant licences. Effectively doubling Wind's spectrum capacity in British Columbia, Alberta, Saskatchewan, Manitoba and Northern & Eastern Ontario, the transactions gave Wind 26 new licences – 16 from Shaw (10MHz in parts of British Columbia, Alberta, Saskatchewan and Northern Ontario) and ten from Mobilicity (all of Mobilicity's AWS spectrum – across Ontario, British Columbia and Alberta), while in return Rogers took a 10MHz portion of Wind's spectrum holdings in Southern Ontario to give the bigger cellco more contiguous frequencies. 'This new spectrum acquisition means Wind Mobile now has a 20MHz AWS-1 corridor from Victoria [on the Pacific Coast] to Ottawa [on the Ontario/ Quebec border],' declared Wind's current CEO Alek Krstajic, who added that the windfall would enable the operator to deploy new technology and accelerate the development of its upcoming LTE network and other services.

Wind expects to turn EBITDA positive in FY 2015 on the back of its continuing upturn in both revenues and subscriber numbers, based on operational figures which are indeed encouraging: it had 839,000 subscribers at the end of March 2015, up from 702,000 one year earlier, whilst Wind earned CAD350 million revenue in FY 2014, and has 1,200 employees and a retail network of 300 stores and dealers.

Wind Mobile's sister companies in Canada's Globalive Communications group include residential long-distance telephony reseller Yak Communications and OneConnect (a provider of voice-over-internet protocol [VoIP] services to SMEs).

Globalive Wireless Management Corp (trading as Wind Mobile) was established by Canada's Globalive Communications (via Globalive Investment Holding Corp) in 2008. In September 2014 Wind's then-majority equity holder, Egypt-based Global Telecom Holding (GTH, a subsidiary of Russian-backed Vimpelcom) agreed to sell its entire interest in Wind Mobile to the then-controlling (voting) shareholder Globalive Capital (formerly AAL Holdings), itself controlled by Wind's founding chairman Anthony Lacavera, in partnership with a Canadian/ US investor consortium under the name AAL Acquisitions Corp. Upon federal approval in November 2014 control of the company was transferred from Globalive Capital to AAL Acquisitions Corp, led by Canadian hedge fund West Face Capital with other members including Tennenbaum Capital Partners, LG Capital Investors, Serruya Private Equity and Novus Wireless Communications. The value of the deal including debt was reported as roughly CAD300 million (USD264 million), while Vimpelcom/GTH announced the majority equity stake alone was bought for approximately CAD135 million.

Prior to the November 2014 ownership transfer, GTH (renamed from Orascom Telecom Holding [OTH] in September 2013) – a majority-owned unit of Netherlands-headquartered Vimpelcom since an April 2011 merger – indirectly owned 65.08% of equity in Wind Mobile, but its voting share was limited to a maximum 33.00% indirect share by foreign ownership rules. GTH, via its holding unit Telecom Holding Canada (Malta) Limited, held a 32.02% voting share ahead of the November 2014 divestment (whilst Globalive Capital, majority owned by Anthony Lacavera, held an indirect 66.7% voting interest and 34.3% economic stake).

Following a legislative amendment exempting all Canadian telecoms operators with 10%-or-less market share from foreign ownership restrictions in June 2012, GTH proposed converting its non-voting shares into voting shares, to raise its indirect voting stake in Wind Mobile from 32.02% to 65.08% (subject to federal permission), and in January 2013 Anthony Lacavera and GTH agreed a secondary deal under which GTH would take an indirect 99.3% stake in the cellco. However, after a review and discussions with the government, GTH withdrew its request to acquire full control of Wind Mobile on 19 June 2013. No official explanation was released by the companies or the government, but there were unsubstantiated claims by commentators that 'national security concerns' were behind

Ottawa's non-approval. Potential negative factors were rumoured to include the Russian majority ownership of Vimpelcom, or the use of Chinese-built technology (Wind having deployed solutions including Huawei's high definition [HD] voice technology in its core network), while Mr Lacavera gave somewhat ambiguous comments on the issue, saying that 'Vimpelcom made statements about there never having been a [network security] breach … and I would echo those statements. Cybersecurity threats are by far one of the biggest threats facing our nation.' Having failed to complete a takeover, Vimpelcom proceeded to seek a buyer for its stake in Wind.

Meanwhile, in March 2013 Mr Lacavera proposed a joint offer to buy back Wind Mobile from Vimpelcom/GTH in collaboration with Wind's original financial backer, Egyptian businessman Naguib Sawiris' investment firm Accelero Capital - but this move was ruled out after the federal government separately blocked Accelero's attempted purchase of Canadian long-distance/enterprise telco Allstream (part of Manitoba Telecom Services) in October 2013 for unspecified 'national security' reasons. Following this setback, Mr Sawiris was quoted as saying that he was 'done' with the Canadian acquisitions market. Another rumoured potential bid for Wind Mobile, from Fairfax Financial Holdings (Canadian device maker BlackBerry's largest individual shareholder) disappeared from the radar in Q4 2013, while another possible option appeared in June 2013 when, following the withdrawal of Vimpelcom's control bid, US mobile giant Verizon was reported to have tabled an initial buyout offer for Wind Mobile of roughly USD700 million. Rumours were stoked by the Canadian government reportedly viewing Verizon as the 'most likely' overseas group to help support a federal policy of encouraging a strong fourth mobile competitor, but in September 2013 Verizon announced that it was not planning to enter Canada's wireless market, claiming that reports of its acquisitive interest had been exaggerated.

Wind was subject to intense scrutiny under the country's previous foreign ownership policy. Following a review prompted by complaints from competitors, the Canadian Radio-television and Telecoms Commission (CRTC) ruled in October 2009 that Wind Mobile did not meet ownership and control requirements under the Telecommunications Act, but this judgement was overridden by Industry Canada in December 2009, permitting the cellco to launch immediately with no structural changes. In a surprise twist in February 2011, a petition from rivals Telus and Public Mobile – alleging Wind was controlled by overseas interests – led to the Federal Court overturning the ministry's ruling on Wind's ownership and ordering it to comply with the CRTC's original decision by altering its financing structure to include more Canadian investors. However, both the federal government and Wind appealed the decision in the Federal Court of Appeal, which on 8 June 2011 ruled in favour of the government and Wind, deciding that in December 2009 the Cabinet had acted properly in agreeing with the minister for Industry Canada to vary the CRTC's judgement; the appeal court also confirmed that Wind was a 'Canadian owned and controlled' telecoms carrier under the Telecommunications Act.

SaskTel Mobility

10th Floor
2121 Saskatchewan Drive
Regina, Saskatchewan S4P 3Y2
Canada
Tel. +1 306 7775638
Fax +1 306 3597475
http://www.sasktel.com

The province of Saskatchewan's regional incumbent operator SaskTel began offering analogue mobile services in 1989, and by 2000 its network had been built out to cover 90% of the province's population. In 1998 it began overlaying its network with 2G CDMA technology, and since the end of 2003 CDMA2000 1xRTT-based services have been

available throughout SaskTel's digital coverage area, enhanced with 3G 1xEV-DO based data services in late-2005 (see below). In April 2010 it notified its remaining 3,200 analogue users that the legacy 1G network would be closed down within twelve months. At that date its number of CDMA cellular towers had reached more than 500, giving it digital coverage of 98% of Saskatchewan's population, but SaskTel had already entered the next phase of its evolution, announcing the consumer launch of a W-CDMA/HSPA network across the province in August that year, while 4G mobile Long Term Evolution (LTE) services followed less than three years later, in January 2013 (see below). In May 2014 SaskTel announced it was decommissioning its 1xEV-DO / Rev A mobile data network, which it did at the end of September 2014; while it is continuing to offer 2.5G 1x-based CDMA voice and data services for remaining compatible device users, this platform is also slated for closure around the end of 2015. Roughly 10% of its handset users had CDMA devices at end-March 2015.

In January 2010 SaskTel awarded a contract to Nokia Siemens Networks (now Nokia Networks) to build the core network component of a W-CDMA/HSPA network across Saskatchewan, including mobile soft-switching and a packet core solution with 'direct tunnel' functionality, as well as harmonised subscriber management systems. In March 2010 Huawei Technologies was chosen as a secondary supplier, providing a SingleRAN software-defined radio platform. SaskTel entered into agreements to share HSPA infrastructure with Bell and Telus, giving the dual benefits of accelerating the expansion of the jointly funded HSPA network across Saskatchewan and giving national roaming access to the regional operator's mobile customers. In August 2010 SaskTel launched its commercial HSPA+ mobile network, initially covering Regina, Saskatoon, Moose Jaw, Weyburn, Estevan, Yorkton, Swift Warman, Hepburn Current, Prince Albert, North Battleford, Buffalo Pound, White City, Melville, Dalmeny, Martensville, Waldheim and most connecting highways. By the end of 2010 the HSPA+ network covered approximately 98% of the population of Saskatchewan, following an investment of around CAD170 million, with the same approximate footprint as of mid-2015, offering a theoretical maximum throughput of 21Mbps/5.8Mbps (down/uplink) province-wide. Speeds of up to 42Mbps (theoretical) are available in urban areas including Regina and Saskatoon following an upgrade based on dual-carrier (DC)-HSPA+ technology launched in late 2011, while in FY 2012 SaskTel invested CAD86 million to increase coverage and improve services on its HSPA network and to prepare its infrastructure for the introduction of LTE technology the following year (see below), and it invested a further CAD79 million on wireless services in 2013, out of a total fixed/wireless CAPEX of CAD356 million that year, while wireless CAPEX dipped in FY 2014 to CAD45 million; total CAPEX for the year dropped to CAD283 million. In 2015, SaskTel plans to invest a total of CAD37.8 million in wireless network enhancements, including CAD18.2 million for 3G W-CDMA/HSPA+ (which it markets as '4G'), and CAD14.6 million for ongoing 4G LTE expansion.

SaskTel spent CAD66 million on its 4G frequency licences in the 2100MHz/1700MHz bands covering Saskatchewan, in the Advanced Wireless Services (AWS-1) spectrum auction of July 2008. In February 2014 it paid CAD7.6 million for further Saskatchewan spectrum in the 700MHz band to expand LTE coverage and capacity with the aim of future-proofing its systems for a smooth transition to all-IP standards.

SaskTel launched its mobile LTE (Frequency Division Duplex – FDD) network in January 2013 in Regina, Saskatoon and surrounding areas of the two cities; subsequent launches took place in locations including Prince Albert, Weyburn, Moose Jaw, Yorkton, Swift Current, Estevan and North Battleford and by mid-2014 it claimed comprehensive LTE coverage in the main population centres of its home province. Meanwhile, in Q4 2014 SaskTel began repurposing 850MHz band spectrum from its recently closed EV-DO network to add extra capacity for 4G LTE services. By January 2015 SaskTel estimated that over half its mobile subscribers had LTE-capable devices, although actual network user figures might differ.

In October 2014 SaskTel unveiled a new push-to-talk-over-cellular (PoC) service running on 3G/4G networks, which will eventually replace the existing '10-4' PoC service operating

on its CDMA network. Also that month it selected US-based BroadSoft's BroadWorks Telephony Application Server to support fixed and mobile all-IP services for business and consumer customers, as well as voice-over-LTE (VoLTE) and unified communications (UC).

SaskTel Mobility is a wholly owned subsidiary of Saskatchewan Telecommunications (SaskTel), itself a wholly owned subsidiary of Crown Investments Corporation.

Videotron

300, Viger Avenue East
Montreal, Quebec H2X 3W4
Canada
Tel. +1 514 281 1711
Fax +1 514 380 9527
http://www.videotron.com

Quebec-based cableco Videotron introduced a quadruple-play option with the launch of cellular services in August 2006 – initially on the basis of a mobile virtual network operator (MVNO) over Rogers Communications' GSM network. It introduced discounted packages of cable TV, cable internet access, digital cable telephony and bundled mobile call minutes, and 83,000 Videotron customers had subscribed to the resold mobile service by the end of 2009, but in the interim the company undertook the rollout of its own 3G network across Quebec. Having secured province-wide 2100MHz/1700MHz frequencies in the July 2008 Advanced Wireless Services (AWS) spectrum auction, it paid CAD555 million for its licences in March 2009. Including the spectrum fee, Videotron committed CAD1 billion in developing the 3G network, and chose Nokia Networks as its W-CDMA/HSPA wireless equipment supplier for a five-year period. It launched commercial services over an HSPA+ network in September 2010, initially covering Montreal and Quebec City, and simultaneously ceased marketing MVNO services (which had 20,000 remaining users at the last report in March 2011). By mid-2011 Videotron had expanded its mobile network coverage to more than four million people, and by the end of 2012 Videotron said that its HSPA+ network was available to nearly seven million people in Quebec and the greater Ottawa area (eastern Ontario), including virtually its entire Quebec cable service footprint (reportedly rising to over seven million by mid-2015). Nationwide coverage for the cableco's mobile customers is provided via roaming on the Rogers network, courtesy of an exclusive agreement struck in July 2009. Videotron announced expanded cross-Canada roaming coverage in May 2015; over 95% of Canada's population is covered via its roaming arrangements. By the end of March 2015 Videotron had signed up 662,000 handset- and modem-based mobile subscribers, having grown steadily from 522,000 a year earlier, 421,000 in March 2013 and 313,000 in Q1 2012.

In early 2011 Videotron added tablet computers to the range of devices available to HSPA users, and in March that year it began testing dual-carrier (DC) technology to double maximum theoretical download speeds to 42Mbps, while backhaul support for advanced mobile data services is provided via more than 90% of Videotron's mobile antennas being linked by fibre-optics to its wired network (consisting of more than 25,000km of fibre cable). In H2 2012 Videotron rolled out commercial DC-HSPA+ services, but looking to the next stage of network evolution, in May 2013 it signed an agreement with Rogers to build and operate a shared Long Term Evolution (LTE) network across Quebec and the Ottawa area. The 20-year deal, which includes the sharing of some existing infrastructure, is a cost-saving arrangement under which Rogers and Videotron will maintain their own products, services, billing systems and customer data. Over the first ten years of the contract, Videotron will pay Rogers CAD200 million, and Rogers will reciprocate to the tune of CAD93 million. Separately, Rogers agreed in principle to pay CAD180 million to acquire Videotron's unused AWS spectrum in the Greater Toronto area (acquired via the 2008 auction), although this deal is currently subject to regulatory approval, and must undergo a review under the federal

spectrum licence transfer framework; as of end-June 2015 the government had not issued a decision on the proposed frequency deal.

In Canada's 700MHz 4G licence auction in January-February 2014, Videotron expanded its wireless licence reach outside its home province to southern Ontario, Alberta and British Columbia, as well as buying additional spectrum in Quebec. Videotron announced its satisfaction in gaining access to potential 4G LTE coverage of 80% of Canadians for a significantly lower price than its larger cellular rivals. It bought seven paired 700MHz licences for CAD233.3 million, covering a licence footprint of 28.02 million people in four provinces. It officially received the 700MHz licences in April 2014. In June that year Videotron's parent Quebecor Media announced: 'Our vision is to provide Canadians with a new high quality, low-cost wireless choice and real wireless competition … Under the right conditions, we are ready, willing and able to become Canada's fourth wireless competitor.'

Spending on Videotron's LTE network rollout essentially accounted for the CAD83.3 million increase in parent group Quebecor's 2014 annual CAPEX, and in September that year Videotron launched commercial services over its new 4G LTE network, four years to the day after launching the original 3G cellular network. LTE mobile broadband services reached nearly 90% of Quebec's population at launch, and supports speeds of up to 150Mbps, with data packages aimed at consumers and businesses. The LTE 2100MHz network was established via Videotron's infrastructure building/sharing partnership with nationwide operator Rogers Communications, and the new network covers Ottawa (eastern Ontario) as well as Quebec under the agreement, while Videotron continues to mull the potential expansion to other parts of the country utilising its 700MHz spectrum licences in other provinces. The company has also said it would consider a joint venture expansion partnership with another 'second-tier' cellco, most likely Wind Mobile, whilst also indicating it was waiting for the government/regulator to finalise new wireless wholesale/roaming rules (eventually published in May 2015) before it decided on its expansion strategy, but public word on this was still pending at 30 June 2015.

In March 2015's 'AWS-3' 3G/4G licence auction Videotron purchased four additional regional 2100MHz frequency blocks for a total of CAD31.8 million, covering a 9.890 million population footprint in Quebec and Eastern Ontario. Furthermore, it spent another CAD186.9 million on 2500MHz 4G licences across Quebec, Ontario, Alberta and British Columbia in May the same year.

Videotron is a wholly owned subsidiary of Quebecor Media.

Manitoba Telecom Services (MTS Allstream)

PO Box 6666
333 Main Street
Winnipeg, Manitoba R3C 3V6
Canada
Tel. +1 204 941 8244
Fax +1 204 958 3549
http://www.mts.ca
http://www.allstream.com

Manitoba Telecom Services (MTS) operates its own W-CDMA/HSPA, 4G Long Term Evolution (LTE) and legacy CDMA2000-based mobile networks in Manitoba, while offering its customers national 2G/3G/4G roaming via strategic partnering arrangements. It had retained more than 50% of wireless subscriber and revenue market share in the province at end-March 2015, despite toughening competition as all three national wireless incumbents – Rogers, Bell and Telus – ramp up their efforts in Manitoba. Following a major expansion of its digital mobile services in 2001, in November 2002 MTS launched CDMA2000 1xRTT

services in Winnipeg, and by the end of 2004 the 2.5G network had reached roughly 97% of the province's population. 3G services based on 1xEV-DO were introduced in March 2006, in Winnipeg and Brandon, in partnership with Nortel Networks, and the 3G CDMA system was subsequently expanded to 72% of Manitoba's population. MTS followed the lead of national CDMA operators Bell and Telus in rolling out a W-CDMA/HSPA network using existing frequencies, and in September 2009 the Manitoban firm received regulatory approval for its proposal to share the costs of deploying an HSPA+ network covering its home province with Rogers Communications. Under the agreement between the two cellcos, MTS was granted access to Roger's national 3.5G network as a roaming partner, and entitled to launch a nationwide wireless business offering through a wholesale arrangement. MTS's HSPA+ network was launched across Manitoba at the end of March 2011, providing voice and data services at peak speeds of up to 21Mbps to over 97% of the province's population, and delivering data speeds up to seven times faster than its EV-DO network. MTS invested more than CAD100 million in its HSPA network launch.

In June 2012 MTS selected Ericsson as an exclusive partner to supply it with a 4G LTE mobile network. Under the deal – of undisclosed value – Ericsson provided an LTE radio network and Evolved Packet Core network, as well as policy control and subscriber management systems. MTS switched on Manitoba's first 4G services in Winnipeg and Brandon in August 2012, under a CAD20 million-plus LTE annual investment budget. In June 2013 MTS extended its network sharing agreement with Rogers to encompass 4G LTE services, taking advantage of Rogers' faster dual-band 'Max' LTE network (with coverage switched on in Manitoba that month), and also providing nationwide LTE roaming to MTS customers, while going forward MTS and Rogers are sharing costs of deploying and operating LTE infrastructure in Manitoba. MTS's provincial 4G network at mid-2015 covered areas including Winnipeg, Brandon, Victoria Beach, Grand Beach, Portage la Prairie, Selkirk, Steinbach and Ste Anne.

MTS scrapped ambitions to expand out of its Manitoba base to become a national wireless carrier; after assembling a consortium with the Canada Pension Plan Investment Board and Blackstone Capital Partners to bid for nationwide spectrum, partnership talks folded in May 2008, and MTS bid alone in Canada's Advanced Wireless Services (AWS) spectrum auction, paying CAD41 million for a 35MHz block of 2100MHz band frequencies in Manitoba only.

MTS paid CAD8.8 million for a 700MHz 4G licence covering Manitoba in February 2014; the licence covers a population footprint of 1.207 million and will allow the operator to expand existing LTE coverage. Similarly, in May 2015 the carrier paid CAD2.24 million for a Manitoba 2500MHz 4G licence to give it further LTE capacity.

It is anticipated that MTS will continue to support CDMA services for existing subscribers and roaming users up until Q4 2016 before switching off its CDMA network and reusing its frequencies.

Manitoba Telecom Services' ownership is fully distributed; it is listed on the Toronto Stock Exchange (TSX).

Eastlink

PO Box 8660, Station A
Halifax, Nova Scotia B3K 5M3
Canada
Tel. +1 902 4461939
Fax +1 902 4928580
http://www.eastlink.ca

Atlantic Canada-based cableco Bragg Communications (trading as Eastlink) launched commercial mobile services in February 2013 over its Ericsson-built 3G/4G HSPA+/Long Term Evolution (LTE) network initially covering Nova Scotia (including Halifax) and Prince Edward Island (PEI). The launch came nearly five years after Eastlink won Advanced Wireless Services (AWS) 2100MHz/1700MHz band mobile licences in 19 zones across its maritime core region plus Ontario and Alberta in July 2008. In the Atlantic Canadian provinces, Eastlink holds the widest blocks of AWS spectrum – 30MHz in each of Nova Scotia, Newfoundland, New Brunswick and PEI – giving it scope for the development of dual 3G/4G services. Its AWS spectrum cost it a total of CAD25.6 million, a fraction of the cost of licences in other parts of Canada as the areas covered by the cableco are relatively sparsely populated compared to the country's largest urban centres. The launch of mobile services cost it a total of CAD200 million.

Eastlink explained that the long delay between licensing and launching mobile services allowed it to learn from observing the competitive reaction to new market entrants, and it decided to adopt 4G LTE to steal a march on the other newcomers who all used their AWS spectrum to launch 3G services. Eastlink offered a smartphone line-up from a wide range of manufacturers from the outset. It is also focusing on discounted multi-play bundles of TV, mobile and fixed broadband/telephony, offering mobile services at existing retail outlets across Nova Scotia and PEI in a first phase, and opening at least six new stores in 2014; the company previously set a target of rolling out 350 3G/4G cell sites across Nova Scotia and PEI alone (unconfirmed at mid-2015). Having previously stopped reselling Rogers Communications' wireless services in 2011, Eastlink struck an agreement under which Rogers now provides roaming services to give the former's mobile customers wider coverage (with Eastlink expanding roaming facilities in 2015 to roam on the networks of Bell and Telus as well).

Enabling it to expand its LTE services in a cost effective manner, Bragg (Eastlink) secured four paired 700MHz 4G mobile licences covering the four Atlantic Canada provinces in February 2014; it paid CAD20.3 million for the licences covering a population of 3.1 million. As of June 2015 Eastlink has LTE coverage in most of Nova Scotia and PEI, which it calls 'the largest in Atlantic Canada.' After winning its 700MHz spectrum, Eastlink said it would continue expanding its LTE coverage into more communities in Atlantic Canada, although it did not release a specific rollout schedule. A recent expansion announced by Eastlink saw residents in the Greater Sydney and Glace Bay (Nova Scotia) areas gain access to its LTE services in August 2014. In addition, Eastlink says it is also focusing on capturing a slice of the high-spending business wireless customer market.

Eastlink is fighting regional multi-play competition from Bell Canada (including its Bell Aliant division) which has been poaching its cable/bundled customers with IPTV/fibre broadband services in Atlantic Canada, whilst Eastlink must also compete with national cellcos expanding their LTE networks across the Atlantic provinces.

Future-proofing itself, Eastlink bought four 'AWS-3' 4G licences (complementary to its existing AWS-1 spectrum) in Atlantic Canada and Northern Ontario (covering 3.101 million people) for CAD9.96 million. It also purchased additional 4G LTE spectrum in the 2500MHz (BRS) band in May 2015 for CAD4.82 million, giving it additional wireless capacity in Newfoundland and Labrador, PEI, Nova Scotia, New Brunswick, Ontario and Alberta.

Bragg Communications, trading as Eastlink, is part of the Bragg Group, which is privately owned by the Bragg family of Nova Scotia.

Mobilicity

Woodbridge, Ontario
Canada

Data & Audio Visual Enterprises Wireless (DAVE Wireless, trading as Mobilicity) won 3G mobile spectrum worth CAD243.2 million covering ten of Canada's largest urban areas (population: 16.1 million) in the Advanced Wireless Services (AWS-1) frequency auction of July 2008, and was awarded its operating licence in February 2009. It selected Swedish technology provider Ericsson in August 2009 to build a 3.5G network enabled with HSDPA/ HSPA+ technology, before signing a nationwide cell site sharing agreement with Bell in September 2009 and a nationwide network roaming agreement with Rogers the following month. Mobilicity launched commercial services over its 3.5G network in the Greater Toronto area in May 2010, before expanding its network coverage to Vancouver, Edmonton, Calgary and Ottawa in November that year. Mobilicity struck a chord with city-based consumers with its simple, pre-paid voice, text and data plans without contracts, credit checks or 'hidden' charges, while also offering unlimited voice/text/data option (only applicable in the five urban areas covered by its own network). In October 2012 Mobilicity launched a commercial upgrade to 21Mbps (maximum) HSPA+ data speeds across its network, but financial troubles resulted in further expansion plans beyond the aforementioned five cities being suspended. Mobilicity entered a restructuring process in May 2013, with more than CAD450 million in debt and incurring losses of around CAD30 million per month according to court filings that month.

Mobilicity received three separate takeover offers from Telus (valuing the company at CAD350 million-CAD380 million) between June 2013 and April 2014 but all were blocked by Industry Canada under a federal policy of opposing the transfer of wireless spectrum from recent market entrants to nationwide incumbent operators.

It was surprising therefore, when Rogers Communications received government approval to acquire 100% ownership of Mobilicity including its 155,000 remaining users for CAD440 million in June 2015. Industry Canada confirmed that it had approved the deal as part of a series of transactions involving Rogers transferring all of Mobilicity's AWS-1 (1700MHz/ 2100MHz) frequencies to up-and-coming rival Wind Mobile while splitting spectrum from a separate deal (with cableco Shaw) between Wind and Rogers, whilst Wind agreed to give Rogers a portion of its existing frequencies in return. The CAD440 million purchase price is offset by tax losses valued at approximately CAD175 million which Rogers will acquire. At the time of its sale, Mobilicity reportedly had outstanding secured and unsecured debt totalling approximately CAD600 million, including accrued interest and financing costs; the company's original equity backers invested approximately CAD250 million.

Meanwhile, Mobilicity founder John Bitove – backed by his holding company Obelysk – and a group of Mobilicity employees made an offer to Industry Canada to become a mobile virtual network operator (MVNO) to continue operating the Mobilicity brand as a distinct operation over the new owner Rogers' network.

Mobilicity is 100% owned by Rogers Communications, following a takeover deal struck in 2015.

Previously DAVE Wireless (trading as Mobilicity) was owned by Obelysk (16.1% equity, 62.6% voting share), which is the diversified investment arm of Toronto entrepreneur John Bitove, and Quadrangle Capital Partners of New York (75.9% equity, 22.4% voting share), which is a global investor in the telecoms and media sectors.

Fido

Montreal, Quebec H5A 1K3
Canada
Tel. +1 514 9372121
Fax +1 514 8466980
http://www.fido.ca/

Fido is a sub-brand of nationwide cellco Rogers Communications, run as a separate mobile virtual network operator (MVNO), retaining its own retail chain, customer service call centres, network servers and its own chief executive officer. Having established a prominent presence in the urban, youth and pre-paid mobile segments, it has increasingly shifted its focus to the post-paid market. Fido was launched as Microcell Solutions in 1996, operating its own wireless network in major cities, and became a subsidiary of Rogers in November 2004 when the latter paid CAD1.4 billion for it, thereby becoming Canada's largest mobile operator and helping boost the group's presence in the teenage/young adult niche. Shortly after the takeover Rogers also bought and integrated Sprint Canada, a telecoms reseller that was an MVNO partner with Microcell.

As of June 2015 Fido offers all the mobile connectivity options of its parent, i.e. GSM/EDGE, W-CDMA/HSPA+ and 4G LTE, via a range of post-paid and pre-paid packages for smartphones, tablets, 4G mobile hotspots and Fido home phone (i.e. a fixed line replacement), with options to bundle a device or bring-your-own-device (BYOD). Fido users also gain access to loyalty/reward schemes, e.g. 'FidoDollars'. In April 2015 Fido revamped its packages with its new 'Fido Pulse' plans which include exclusive-to-Fido video channel content (from 'youth media' company VICE, also owned by Rogers) and a Spotify Premium music streaming subscription for the duration of a two-year contract, alongside more flexible data options, unlimited evening (from 5pm)/weekend Canada-wide calls and unlimited Canada-wide text/picture/video messaging. Fido Pulse BYOD plans (June 2015) range from CAD33 per month inclusive of 300 all-day Canada-wide minutes and 300MB data, up to CAD88 for unlimited all-day calls/texts and 5GB. Fido's pre-paid 'zonal' packages – allowing unlimited pay-as-you-go local calling within the city of activation (plus unlimited national messaging) – were one of its original unique selling points, although these pre-paid options have been scaled back in terms of availability, and are now restricted to Toronto, Gatineau, London and Ottawa.

At the time of acquisition by Rogers in Q4 2004, Fido had 1.275 million customers. While official figures have not been reported since, the company has confirmed that its user total continued to swell past two million as an MVNO, with unconfirmed reports in 2013 that numbers had exceeded three million.

Fido Solutions (Fido) is owned by Rogers Communications.

Virgin Mobile Canada

720 King St West
Suite 905
Toronto, Ontario M5V 2T3
Canada
Tel. +1 888 9992321
http://www.virginmobile.ca

Virgin Mobile Canada was launched as a 50/50 joint venture mobile virtual network operator (MVNO) between Virgin Group and Bell Canada in March 2005. The youth-oriented brand initially aimed to gain market share in what was then an under-exploited pre-paid sector. In May 2009 Bell bought the other half of Virgin Mobile Canada for CAD142 million, in a deal that included it taking exclusive, long-term rights to use Sir Richard Branson's Virgin trademark. The move prompted Bell to phase out its existing wholly owned virtual mobile

sub-brand, Solo, while Virgin has continued as a separate entity with its own retail network, customer services, website, etc. Bell's 2009 takeover of retail chain The Source went hand-in-hand with the expansion of the Virgin brand, and the latter's website displayed 774 Virgin Mobile/The Source outlets across Canada as of June 2015.

At that date Virgin Mobile Canada advertised a range of 20 smartphones, plus the options of a basic no-frills handset or SIM-only services, with post-paid and pre-paid packages including specialised tablet plans. Customers are also offered a subscription to Mobile TV with 40 live and on-demand channels. Basic monthly voice/data packages range from CAD35 to CAD50, all including unlimited weekend/evening (5pm-7am) calls, Canada-wide calling and unlimited worldwide SMS messaging from Canada. Premium packages also include unlimited (any time) call minutes and unlimited MMS messaging to Canada and the US, packaged with 1GB data for CAD60 per month, ranging up to CAD95 per month with 5GB inclusive. There are also various exclusive offers and promotions for Virgin subscribers.

Virgin Mobile Canada subscriber figures are not publicly disclosed, and are wrapped up in the total figures reported for Bell Canada.

Virgin Mobile Canada is wholly owned by Bell Canada Enterprises (BCE).

Koodo Mobile

200 Consilium Place, Suite 300
Scarborough, Ontario M1H 3J3
Canada
Tel. +1 866 9956636
https://www.koodomobile.com/

In March 2008 Telus launched Koodo Mobile as a youth oriented, discounted virtual operator, and in 2010 Koodo's prices were lowered further to compete with rival discount brands of Rogers and Bell. Koodo was originally based solely on basic talk and text services, but expanded to include smartphone/data offerings in 2011. As at June 2015 Koodo offered a range of 15 smartphones and a basic handset option, with pre-paid and post-paid packages with no fixed-term contracts and no cancellation charges, foregrounding Canada-wide calling. Koodo's marketing highlights the 'Tab' concept aimed at making high-end devices more affordable to low-end customers: when the user's Tab balance reaches zero, their monthly bill is reduced, while users who leave may keep their phone if they settle any remaining Tab balance. The sub-brand operates via a chain of Koodo Mobile stores and its own website.

Koodo Mobile is owned by Telus Communications.

Chatr Wireless

333 Bloor Street East, 8th Floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 800 4859745
http://www.chatrwireless.com/

Rogers Communications responded to the influx of value-for-money competition from new mobile licensees in July 2010 with the launch of a new discount wireless sub-brand named Chatr Wireless, initially focusing on pre-paid unlimited talk and text services for urban users via its own website, with data bundles subsequently added to its no-frills package range. As a second sub-brand for the Rogers group – with original 'pre-paid urban' brand

Fido being repositioned towards post-paid – Chatr Wireless emphasises no credit checks, no contracts and simple, affordable plans paid for upfront, with unlimited flat-fee local and national calling/messaging plans available, plus a choice of data add-ons. As at June 2015 an Unlimited Local Talk plan costs CAD20 a month (outside of local talk zones pay-per-use charges apply).

Chatr Wireless is owned by Rogers Communications.

Public Mobile

Suite 4400, 100 King Street West
1 First Canadian Place
Toronto, Ontario M5X 1B1
Canada
Tel. +1 617 345 7221
Fax +1 617 345 7201
http://www.publicmobile.ca

The takeover of regional player Public Mobile by nationwide operator Telus received comptroller approval in November 2013, and Public Mobile's CDMA networks were shut down in July 2014 following a campaign to migrate its 200,000-plus exclusively pre-paid users to the Telus network. Public Mobile now operates as a separate pre-paid discount sub-brand on the Telus network, using marketing slogans such as 'no contract, no credit check, no surprises.'

BMV Holdings (trading as Public Mobile) spent CAD52 million on four 10MHz blocks of PCS 'G-block' 1900MHz band frequencies in the July 2008 spectrum auction covering a population of around 18 million in southern Ontario and southern Quebec. Targeting 'first-time mobile users and recent immigrants' Public Mobile launched no-frills pre-paid-only voice/SMS services over a CDMA-based network in Toronto in May 2010, expanding to Montreal the next month, offering unlimited flat-rate calls within its own network zones. Initially lacking data services altogether, in April 2011 it launched data-capable handsets and an unlimited e-mail service, while in November that year it deployed a 3G CDMA2000 1xEV-DO network upgrade and launched budget Android smartphones with unlimited data plans. Via a vendor financing/rollout contract with Chinese equipment partner ZTE, by early 2013 over nine million people could access Public's on-net services in Ontario (including Toronto and cities in its environs from Hamilton up to Oshawa) and Quebec, but further plans to cover all urban areas in its licence footprint were suspended. In June 2013 Public Mobile changed hands, and the purchasing funds Thomvest and Cartesian abandoned their original plan to compete for 700MHz licences and instead began looking at mergers. Thomvest and Cartesian talked about creating a strong fourth wireless player by merging with one or more fellow newcomers, but eventually settled for a buyout by national incumbent Telus.

In October 2013 Telus Corporation agreed to buy 100% ownership of Public Mobile, following approval from Industry Canada of the transfer of Public's 1900MHz G-block mobile frequency licences to Telus. The takeover received final approval from the Competition Bureau on 29 November 2013. James Moore, Minister of Industry, explained the government's approval: 'G-block spectrum licences were acquired in the 2008 spectrum auction but were not part of the 2008 AWS set-aside [aimed at encouraging new entrants and subject to stricter controls on spectrum transfers]. G-block spectrum is not used for the latest data plans and smartphones in Canada and is of a significantly lesser value than other types of spectrum. This transaction does not materially change the spectrum concentration of incumbents in this country and therefore will not diminish competition.'

Public Mobile, the trading name of BMV Holdings, was originally owned by a consortium including: M-C Venture Partners, Columbia Capital Equity Partners (both US-based),

Canadian pension fund OMERS and other Canadian and US investors. In June 2013 Canadian investment firm Thomvest Seed Capital and US private equity firm Cartesian Capital bought the company for an undisclosed price (Thomvest taking the controlling stake) while a small group of other investors retained 'tiny' stakes in the cellco at that date, ahead of the subsequent sell-on deal to Telus four months later.

Cityfone

#101 - 3991 Henning Drive
Burnaby, British Columbia V5C 6N5
Canada
Tel. +1 866 3053663
http://www.cityfone.net

British Columbia-based Cityfone, founded in 1997, is a mobile virtual network operator (MVNO) on the network of Rogers Communications, and was acquired by the latter for CAD24 million in July 2010 (having previously been a reseller on the Fido network, bought by Rogers in 2004), claiming 44,000 users at the time of acquisition. Cityfone offers post-paid-only wireless services under its own brand, with a choice of lower-end smartphones and feature phones, and supporting LTE data services. As of June 2015 Cityfone customers had the option of one-year or two-year contracts (categorised as Lite, Individual, Smartphone, Family, bring-your-own-device [BYOD] or Wireless Home Phone).

Cityfone also resells Rogers' nationwide voice/data services via white label partnerships with major Canadian brands including banks, retailers and alternative telecoms providers, acting as a mobile virtual network enabler (MVNE). As of June 2015 Cityfone's mobile reseller partners include: Primus Canada, Bank of Montreal (Talk & Earn), Royal Bank of Canada (Talk & Save), Scotiabank (Simply Connect), Sears Canada (Sears Connect) and ZoomerMedia (ZoomerWireless).

Cityfone is owned by Rogers Communications.

PC Mobile

1 President's Choice Circle
Brampton, Ontario L6Y 5S5
Canada
Tel. +1 416 2042600
http://www.pcmobile.ca

PC Mobile is the mobile virtual network operator (MVNO) brand of President's Choice, a part of Canada's Loblaws group, and its mobile services are sold alongside the group's other areas including food products, home goods and financial services. PC Mobile was launched in 2005 as a pre-paid-only reseller on Bell's network, but in 2013 it launched a new post-paid service based on the Telus network, according to its website (while the pre-paid service reportedly remained on the Bell network). As of June 2015 PC Mobile offered national (97% population) coverage and options of pre-paid services or a choice of five post-paid monthly voice/data plans priced from CAD30 to CAD80. All post-paid plans (on a two-year commitment) include unlimited access for the following: on-net mobile calling, Canada-wide calling to designated family numbers, Canada-wide evening (5pm onwards) and weekend calls, and international outgoing/incoming text/picture/video messaging. The provider stresses that it does not have any geographical calling rate zones.

PC Mobile leverages the President's Choice retail brand via the group's Mobile Shop outlets – launched in 2011 – at locations where the company's other products such as groceries are sold, while running a loyalty points programme shared between all group product areas.

PC Mobile is owned by Loblaws Inc.

Sears Connect

290 Yonge St., Suite 700
Toronto, Ontario M5B 2C3
Canada
Tel. +1 416 3621711
http://www.searsconnect.ca

Retail giant Sears Canada operates 113 department stores across the country, plus hundreds of other outlets, travel agencies and other services, while its shopping catalogue is distributed to over three million households. It leverages this brand awareness for its mobile reseller division, Sears Connect, which operates since 2005 over the Rogers Communications network, whilst also offering resold long-distance fixed telephony. Cityfone (a subsidiary of Rogers) acts as the mobile virtual network enabler (MVNE) for Sears Connect, while customers receive billing and contracts from Cityfone, not Sears. As of June 2015 Sears Connect is heavily focused on the post-paid segment, offering a range of 'affordable rate plans, no system or network access fees and 100% Canadian-based customer service', with the added incentive that users earn double Sears Club reward points every month. At that date monthly plans ranged between CAD18 and CAD45 with a modest range of seven bundled handsets (including five smartphones), all on two-year, monthly contracts and with access to 4G LTE network services. Pay-per-use services can also be bought, but are not foregrounded by the brand.

Sears Connect is owned by Sears Canada Inc.

Primus Canada

5343 Dundas St.W., Suite 400
Etobicoke, Ontario M9B 6K5
Canada
Tel. +1 888 5028380
http://wireless.primus.ca

Primus Canada markets itself as the largest alternative telecoms service provider in Canada, operating as a reseller over fixed and wireless networks across the country. Primus offers a range of consumer and business services available nationwide including fixed telephony, fixed internet, long-distance calling, voice-over-internet protocol (VoIP), mobile, managed services, data centre hosting and enterprise IP telephony. Primus Canada was founded in 1997 and has since grown to more than 650 employees, with offices in Canadian cities including Vancouver, Edmonton, Calgary, Toronto, Ottawa, London and Edmundston.

Primus joined the cellular market in October 2004, reselling the network capacity of national operator Rogers Communications, and today its customers can access the full extent of Rogers' mobile footprint including LTE network access for high speed data services. Primus' website confirms that as at June 2015 Cityfone (a subsidiary of Rogers) acts as the mobile virtual network enabler (MVNE) for its mobile service. At that date Primus was offering a limited promotional rock-bottom CAD9 per month (usually CAD18) price for its most basic 'Simple Talk' (no data) package. Despite Primus offering discounted bundles of its home

phone, international calling and fixed internet services, its website did not allow the option of adding its mobile service to a bundle as of June 2015.

Primus Telecommunications Canada was acquired by US-based investment firm York Capital Management in July 2013.

7-Eleven SpeakOut

Suite 2400
13450 102nd Ave
Surrey, British Columbia V3T 0C3
Canada
Tel. +1 604 5860711
http://www.speakout7eleven.ca
http://corp.7-eleven.com/corp/7-eleven-canada

Convenience store group 7-Eleven Canada launched pre-paid cellular services in November 2005 via its mobile virtual network operator (MVNO) 7-Eleven SpeakOut, which piggybacks on the national network of Rogers Communications. The group has the advantage of owning more than 450 retail stores across much of Canada, and sells its mobile services in all provinces except Quebec (whilst also not present in the three Far North Canadian territories). As of June 2015 7-Eleven SpeakOut's website makes the bold claim that it 'offers the most simplistic mobile phone service on the planet', delivered pre-paid-only on the basis of: 'Buy the cell phone, buy your airtime, start talking, texting and surfing'.

7-Eleven SpeakOut is owned by 7-Eleven Canada Inc, itself part of US-based 7-Eleven Inc.

Petro-Canada Mobility

150 - 6 Avenue SW
PO Box 2844
Calgary, Alberta T2P 3E3
Canada
Tel. +1 866 7883475
http://mobility.petro-canada.ca/

Gas station chain Petro-Canada runs Petro-Canada Mobility, a national mobile virtual network operator (MVNO) on Rogers' network, focusing on basic services. As of June 2015 it offered two simple no-contract pre-paid cellphone plans – Anytime Plan and Monthly Plan – plus a limited promotional 'Social Plan' package including extra data. Petro-Canada also awards customers a 'free' phone if purchasing CAD100 of airtime upfront. SIM cards, credit top-ups and phones are available at participating Petro-Canada locations and online.

Petro-Canada Mobility is a brand of Petro-Canada, owned by Calgary-based Suncor Energy Inc.

Telebec

555, Avenue Centrale
Val-d'Or, Quebec J9P 1P6
Canada
http://www.telebec.com

Rural Quebec telecoms operator Telebec was established in 1969 and steadily grew through a series of acquisitions, mergers and strategic integrations. Telebec claims a subscriber base of approximately 150,000 using a range of services including fixed broadband and mobile voice/data, with customers located in 300 municipalities spread across 750,000 square kilometres of Quebec territory. This wide geographical footprint is bounded to the north by the James Bay territory, to the south by Venise-en-Quebec (near the US border), to the west by Ville-Marie in Abitibi-Temiscamingue, and to the east by the Iles-de-la-Madeleine. Having previously been reported under the Bell Aliant division (since 2007), with the integration of the latter into Bell Canada Enterprises (BCE), Telebec was moved directly under the BCE umbrella on 3 November 2014.

Telebec's mobile services are offered over Bell's network essentially as a mobile virtual sub-brand, but by the end of summer 2015 all wireless customer accounts will be transferred to Bell (similar to recent changes at some other Bell regional group divisions); mobile phone numbers and price plans will remain unchanged. As of June 2015 Telebec was also running a campaign to migrate users off Bell's legacy CDMA system which is being phased out, and over to HSPA and LTE services.

Telebec is part of Bell Canada Enterprises (BCE).

Northwestel

301 Lambert StreetY1A 4Y4
Whitehorse, Yukon Territory Y1A 4Y4
Canada
Tel. +1 867 6685300
Fax +1 867 6687079
http://www.nwtel.ca

Incorporated in 1978, Northwestel delivers a range of telecoms and TV services to a population of 120,000 northern Canadians in 96 communities scattered throughout Yukon, the Northwest Territories, Nunavut, northern British Columbia and northern Alberta – the largest geographical telephone operating area in the Western hemisphere. Employing 600 staff, NorthWestel offers landline, fixed internet and TV directly to its customers, and although it previously offered wireless services as a virtual operator on its parent group Bell Canada's network, in June 2014 its mobile brand was discontinued. As at June 2015 it acts merely as an authorised dealer for Bell-branded mobile services at Northwestel retail outlets, while the wireless section of the Northwestel website redirects to the main Bell site.

Northwestel is owned by Bell Canada Enterprises (BCE).

NorthernTel

850 Birch Street South
Timmins, Ontario P4N 7J4
Canada
http://www.northerntel.ca/

Part of the Bell group, full-service north-eastern Ontario operator NorthernTel has existed since 1905, and has 250 employees serving around 66,000 telecoms customers across an 83,000km rural service area. Its mobile services are offered over the Bell network essentially as a mobile virtual sub-brand, but by the end of summer 2015 all NorthernTel's wireless customer accounts will be transferred to Bell (similar to recent changes at some other Bell regional group divisions). On its website as of June 2015, NorthernTel assures its users that wireless services will continue without interruption, and mobile phone numbers and price

plans will stay the same. Having previously been reported under the Bell Aliant division (since 2007), with the integration of the latter into Bell Canada Enterprises (BCE), Telebec was moved directly under the BCE umbrella on 3 November 2014.

NorthernTel is part of Bell Canada Enterprises (BCE).

Broadband

Market Commentary

Canada was home to approximately 12.4 million fixed and fixed-wireless broadband subscribers in the residential and business sectors at the end of March 2015, up 1.8% year-on-year. 'Household penetration' – measured as the total consumer and enterprise broadband connections amongst total Canadian households – was estimated at 88.9% by that date, after passing 85% at the end of 2012, squeezing into the lower-end of the top 20 countries in the world, narrowly behind the United States in terms of penetration. With the Canadian Radio-television and Telecommunications Commission (CRTC) calculating in 2011 that around 99% of the population was already covered by a broadband network with a speed of at least 1.5Mbps, the regulator set December 2015 as an initial target date for reaching '100%' population coverage with broadband speeds of at least 5Mbps (download) and 1Mbps (upload). In line with this goal, the government spent CAD225 million in 2010-2013 to upgrade services to dozens of communities which previously had either minimal internet speeds or no internet access at all. Although the target date has been pushed back, progress has continued, and in its 2014 federal budget Ottawa committed an additional CAD305 million to expand and upgrade broadband internet in rural and Northern communities, promising 280,000 additional rural households access to 5Mbps/1Mbps service by end-2017, while the CRTC says it will continue to review the broadband targets. In October 2014 the government issued a call for internet service providers (ISP)s to apply for funding to build wired or wireless infrastructure to extend and enhance broadband connectivity to underserved households, under the 'Connecting Canadians' programme. The call for applications closed in January 2015, and the first projects were selected for funding in the spring that year, with initial rollouts getting underway over the summer months. According to the latest targets stated on the Connecting Canadians website as of June 2015, 98% of households will have access to at least 5Mbps broadband speeds via the subsidised ISP projects.

Cable broadband – which is provided by Rogers Communications, Shaw Communications, Videotron, Cogeco, Eastlink and a number of other smaller players – accounted for the majority of connections at the end of March 2015 (54%, up by one percentage point in a year), with xDSL remaining in second place (37%, down by four points in the same period). Until recently the major telcos' ongoing fibre-optic broadband rollouts in the residential market have remained predominantly based on fibre-to-the-node (FTTN)/fibre-to-the-kerb configurations, meaning that last-mile connections were largely based on copper wire xDSL lines, which when utilising VDSL2/bonding or ADSL2+ technologies support the expansion of advanced services including IPTV. However, telcos such as Bell Canada (led initially by its Atlantic division Bell Aliant) have now ramped up their investment in direct fibre, including fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) across eastern Canada. Bell Aliant virtually completed its phasing out of FTTN network architecture in 2014 in favour of widespread FTTH rollouts in cities and towns across Atlantic Canada, reaching a million FTTH premises passed by the beginning of 2015. Outside of the Aliant footprint, Bell Canada's largest single FTTH concentration to date is in the Quebec City area (due to a predominance of overhead infrastructure enabling low-cost fibre deployment), although it has also followed a policy of direct fibre rollout in new-build developments in Quebec and Ontario. In the first quarter of 2015 Bell Canada indicated that its new-build FTTH programme alongside the Quebec City fibre development added up to a total of around one million directly fibre-fed premises (additional to the Aliant network's million-strong FTTH footprint), making Bell the clear leader in Canadian fibre broadband coverage. Bell further ramped up its FTTH efforts in June 2015 by announcing the imminent rollout of a 1Gbps FTTH service across Toronto (again utilising cheaper aerial infrastructure in partnership with

the city's electricity utility), and released a list of other cities which could see a 1Gbps launch as early as Q4 2015 (see company profile for further details).

In western Canada, and in certain parts of Ontario where it also operates, Telus Communications has generally emphasised its expansion of FTTN/VDSL2/ADSL2+ infrastructure – providing coverage of over 2.8 million homes with this high speed architecture by June 2015, of which around 2.6 million premises could access speeds up to 50Mbps. However, Telus has simultaneously followed a low-key programme to deploy FTTH/FTTB in selected green-field sites. As of Q2 2015 the western Canadian incumbent indicated that it was ready to shift gear and begin focusing more heavily on direct fibre – in May 2015 Telus chairman Darren Entwistle stated that fibre-to-the-premises (FTTP) is the company's investment priority going forward, both in the enterprise and residential sectors.

Several of the big-hitting cablecos, including Rogers, Shaw and Cogeco, have also begun implementing plans to diversify from their HFC-based cable networks to deploy FTTH connections in new-build projects (see company profiles for details). While DOCSIS 3.0-based HFC cable services are superior to xDSL in terms of raw download speeds, they have limitations on upload rates compared to FTTH, although alternatively, DOCSIS 3.1 upgrades could be employed by the cablecos at a future date to address this.

In Manitoba and Saskatchewan, regional incumbents MTS and SaskTel are also implementing their respective rollouts of direct fibre infrastructure, with SaskTel joining early-adopter MTS in the commercial FTTH segment in August 2012. All major operators are motivated to deploy very high speed access networks on the basis of attracting more lucrative triple-play video, data and voice customers, and in general this strategy has paid dividends in terms of offsetting lower revenues in legacy wireline services (alongside some evidence of helping to slow down the rate of local line losses at traditional telcos).

The largest broadband operator by subscribers is Bell Canada (now consolidating the current and historical results of the Bell Aliant division since the latter's delisting in November 2014). Bell reported a total of 3.298 million users at the end of March 2015 – up by a substantial 134,575 year-on-year – with Bell identifying a recent 'pull-through' effect from its burgeoning IPTV service to raise its internet base, following a period where its customer total remained relatively flat. Bell Canada's market share had previously stagnated, but helped by its multi-play bundling power, its percentage of subscribers rose slightly to 26.6% at end-March 2015, compared to 26.0% a year earlier. Shortly after, in April 2015 the group celebrated passing one million IPTV subscribers.

The second, third and fourth largest broadband ISPs are all cablecos. Rogers and Shaw fight closely for the number two spot, with Rogers slightly ahead of Shaw in terms of customer volume at the end of March 2015, although it should be noted that Rogers' overall base includes a small portion of non-cable business connections and Shaw's actual reporting period ends one month earlier, at end-February. Shaw pioneered 250Mbps premium cable internet offerings in 2011 – a move which, while being emulated by other major CATV operators, was actually retracted by Shaw in 2014 as it did not see sufficient demand for the premium package to warrant the extra speed, and it therefore reduced the limit back to 120Mbps. Ontario is home to the overwhelming majority of Rogers' broadband subscribers, with users clustered around three population centres: Greater Toronto, Ottawa and the Guelph-London corridor; Rogers' cable infrastructure passed around 4.1 million households out of a country total of roughly 13.8 million by March 2015. Meanwhile, nearest rival Shaw's cable broadband services are also available in approximately 4.1 million households in Alberta, British Colombia, Manitoba, Ontario and Saskatchewan. Trailling Rogers and Shaw in terms of market share, Videotron's cable services are almost exclusively focused on Quebec, where its cable network covers more than 90% of homes in the province.

Rounding out the top five broadband ISPs is Telus, which is also the second largest broadband provider in the western provinces of Canada, behind Shaw. DSL-based Telus has

fought against the cablecos (especially Shaw) through popular offers and relatively generous (compared to Bell Canada) data plans, and recently its IPTV services have come to the fore. Telus had an IPTV subscriber base numbering around 818,000 at the end of March 2015, up from about 732,000 a year earlier, with its broadband base also improving by 82,000 over the same period, thanks partly to its IPTV bundling strategy. Telus was less inhibited than Bell in launching IPTV, as it had no 'legacy' TV service in place to cannibalise, whereas Bell had a clash of priorities in the early days of IPTV: expanding its advanced multi-play fibre-assisted services while simultaneously serving a well-established satellite TV user base.

The country's largest rural broadband specialist Xplornet is currently in the process of migrating its 3500MHz WiMAX networks in various regions to TD-LTE access technology to boost connection speeds, and the hybrid satellite/fixed-wireless provider will be assisted in its ongoing upgrade programme by its 2500MHz licence win in May 2015. By the end of June 2015 it had announced commercial TD-LTE launches in two provinces, Alberta and New Brunswick, while promising a nationwide rollout by the end of 2017. Meanwhile, Rogers and Bell also offer fixed-wireless access based on TD-LTE technology in the 2300MHz/3500MHz bands via a joint network partnership, Inukshuk, through which the pair previously operated 2500MHz WiMAX-type rural broadband services, before splitting the 2500MHz frequencies between them in 2012 to expand their 4G mobile services instead. Other regional operators of fixed-wireless TD-LTE networks include SaskTel, while other 3500MHz spectrum holders include Telus, Tbaytel, ABC, Cintek, Cogeco, Chatham Internet Access, ccRoute and Netago.

The CRTC states that there are around 500 ISPs in the domestic internet access market. A regulatory decision enforced in February 2013 raised the wholesale rates which smaller independent ISPs pay to major cable broadband network operators, but on the other hand it simultaneously cut Bell Canada's wholesale rate it charges ISPs in half, whilst also bringing business sector wholesale ISP access rates into line with the residential segment. This had the knock-on effect of making such ISPs eligible for credit from Bell for several months – in some cases substantial enough to help fund significant new investments throughout 2013 and carrying momentum into 2014/15. Primus Canada, reportedly the country's biggest 'independent' ISP, confirmed that in certain parts of the country the wholesale rate decisions helped competition significantly, while also noting that Canadian ISPs are focusing on penetrating the lucrative business sector as they attempt to become less reliant on residential customers, who have increasingly defected to larger telcos and cablecos who offer attractive internet, TV and home phone bundles. For its part, Primus – traditionally a reseller – has installed fibre-optic infrastructure in Ottawa to offer carrier-based Ethernet services to organisations. Another independent, Toronto-based Accelerated Connections, which serves businesses across the country, says that the CRTC's capacity-based wholesale billing regulation resulted in savings re-invested in expanding its data centre division for offering cloud and co-location services to businesses, plus expanding other revenue streams including infrastructure-as-a-service and business telephony, whilst helping to attract new large multi-site customers; Accelerated Connections is also aiming for acquisitions to fuel a plan to grow by '250% in five years'. In another example, Montreal-based AEI Internet, serving some 10,000 residential subscribers and 1,000 business customers in Quebec and Ontario, said the CRTC wholesale rulings 'turned things around' for its operations. A new player in the business-only sector in Quebec is Fibrenoire, which provides internet connectivity and private network services to more than 1,000 Quebec businesses and owns a 4,500km fibre-optic network stretching from Quebec City to Montreal and the Ottawa area. Despite competing against formidable larger rivals including Bell and Cogeco's business division, Fibrenoire expects to double revenues to CAD50 million within three years, while institutional investor Novacap Technologies bought an equity stake to help fund the expansion, including Fibrenoire's purchase of three fibre-optic networks, lessening the need to rent network access.

Addressing the broadband needs of Far North communities of Canada, in August 2014 Prime Minister Stephen Harper announced the northern component of the Connecting Canadians

programme. The CAD50 million northern component will extend and augment satellite capacity, bringing service at a targeted 3Mbps-to-5Mbps to an estimated 12,000 households in Nunavut and the Nunavik region of Quebec. This investment advances the government's priority to promote social and economic development in the North, as outlined in its Northern Strategy. The call for ISP applications for the northern component closed in January 2015 and the first project funds began to be allocated during spring 2015.

Networks

Provider Name	Access	Technology	Frequency	Launch	Status	Network Details
Bell Canada Enterprises (BCE)	BFWA				Live	Jun-15: certain rural locations
Bell Canada Enterprises (BCE)	DSL	ADSL		1997	Live	Jun-15: >70% (est. incl. Bell Aliant), >95% of Ontario/Quebec; Dec-07: ~54.5% (not including Bell Aliant)
Bell Canada Enterprises (BCE)	DSL	ADSL2+		Jul 2006	Live	
Bell Canada Enterprises (BCE)	DSL	VDSL		2004	Live	Originally launched to condominiums in Toronto, Ottawa and Montreal (since deployed VDSL2)
Bell Canada Enterprises (BCE)	DSL	VDSL2			Live	Jun-15: ~4.5m homes; Jun-13: >3.5m homes (Mar-10: ~1.8m homes)
Bell Canada Enterprises (BCE)	LAN/FTTx	FTTB		2004	Live	Jun-15: >2,000 buildings; (Jun-11: ~1,450 buildings) (since Aug-08 'deploying to all new-build multi-dwelling buildings in Quebec-Windsor corridor', plus some business premises)
Bell Canada Enterprises (BCE)	LAN/FTTx	FTTH		Mar 2012	Live	Jun-15: claims ~2m homes (incl. 1m in Bell Aliant footprint); 'Gigabit' project starting Jun-15 to significantly expand FTTH (e.g. goal of 1.1m homes in Toronto alone)
Bell Canada Enterprises (BCE)	LAN/FTTx	FTTN		May 2006	Live	Jun-15: >5m homes; Dec-12: 5m homes (Jun-12: >4m homes) (Mar-10: 3.1m homes in Montreal and Greater Toronto) (Mar-09: 2.5m homes) (last-mile access xDSL)
Bell Canada Enterprises (BCE)	TD-LTE		2300/3500		Live	Jun-15: offered by Inukshuk joint venture in provinces Canada-wide
Bell Canada Enterprises (BCE)	WiMAX	Pre-WiMAX	2500	Apr 2006	Shut Down	Shut Jan-12. (operated via Inukshuk joint venture) Jun-11: 204 towns, ~65% (Dec-08: 63%, 7.8m homes) (Mar-08: 56%)

Provider Name	Access	Technology	Frequency	Launch	Status	Network Details
Cogeco Cable	Cable	HFC			Live	Feb-15: 1.682m homes (~12%) in Quebec and Ontario (Feb-14: 1.65m homes) (Feb-13: 1.61m homes) (Aug-12: 1.598m) (Aug-11: 1.57m) (Feb-11: 1.54m) (Feb-10: 1.51m)
Cogeco Cable	Cable	HFC (DOCSIS 2.0)			Live	Feb-15: 1.632m homes (97% of HFC cable footprint)
Cogeco Cable	Cable	HFC (DOCSIS 3.0)		Jul 2009	Live	Feb-15: 1.581m homes (94% of HFC cable footprint); Feb-14: 1.495m homes (91% of Cogeco's broadband homes and 89% of its cable homes passed)
Cogeco Cable	LAN/FTTx	FTTH		2012	Live	Jun-15: 'deploying FTTH in new residential developments which meet specific criteria of size, proximity to the existing plant and service penetration rate'
Eastlink	Cable	HFC		1997	Live	Jun-15: Nova Scotia, Prince Edward Island, Newfoundland, parts of New Brunswick, Quebec, Ontario, Alberta, British Columbia (level of service varies by area; some areas via subsidiaries)
Eastlink	Cable	HFC (DOCSIS 2.0)			Live	
Eastlink	Cable	HFC (DOCSIS 3.0)		2010	Live	Jun-15: Nova Scotia, Prince Edward Island, Newfoundland, parts of New Brunswick, Quebec, Ontario, Alberta, British Columbia
Manitoba Telecom Services (MTS Allstream)	DSL	ADSL			Live	Jun-15: 85% of Manitoba population (since 2007)
Manitoba Telecom Services (MTS Allstream)	DSL	VDSL2			Live	Jun-15: combined VDSL2/FTTH: 70% of Manitoba homes; Jun-13: VDSL2: 15 cities including Winnipeg, Brandon, Portage
Manitoba Telecom Services (MTS Allstream)	LAN/FTTx	FTTB			Live	Jun-15: Allstream: ~3,100 fibre-fed buildings; Jan-14: 3,003 buildings; Sep-13: 2,953 buildings; Sep-12: 2,644 buildings
Manitoba Telecom Services (MTS Allstream)	LAN/FTTx	FTTH			Live	Jun-15: 16 cities/towns in Manitoba; Mar-14: 14 cities/towns incl. >95% homes in Winnipeg, Brandon, Portage (Jun-13: 12 cities) (Jun-12: 8 cities) (May-10: parts of Winnipeg, 3 other towns) (plan: 120,000 homes in >20 towns/cities in 2015)

Provider Name	Access	Technology	Frequency	Launch	Status	Network Details
Rogers Communications	Cable	HFC			Live	Jun-15: 4.09 million homes (~30%); Dec-12: 3.81m homes; Sep-11: 3.74m homes; Mar-10: 3.61m homes; Apr-09: 3.4m homes
Rogers Communications	Cable	HFC (DOCSIS 3.0)		Oct 2009	Live	Jun-15: ~29% (98% of cable footprint); Jun-14: >90% of cable footprint
Rogers Communications	DSL	ADSL			Live	Jun-15: very small number of SMEs only; phased out for other users
Rogers Communications	LAN/FTTx	FTTB			Live	Jun-15: Rogers Business Solutions served >7,800 on-net fibre connected buildings (5,500 at end-2012)
Rogers Communications	LAN/FTTx	FTTH			Live	Jun-15: limited availability in consumer market - locations in Toronto and Atlantic region - but plans to widen rollout
Rogers Communications	TD-LTE		2300/3500		Live	Jun-15: offered by Inukshuk joint venture in provinces Canada-wide
Rogers Communications	WiMAX	Pre-WiMAX	2500	Apr 2006	Shut Down	Shut down Mar-12 (Jun-11: 204 cities and towns, ~65%) (Dec-08: 63%, 7.8m homes) (Mar-08: 56%)
SaskTel	DSL	ADSL		1997	Live	Jun-15: 100% 'high speed internet access' coverage of Saskatchewan, since Dec-10 (Dec-09: 99%) (Dec-08: DSL alone 86.4%)
SaskTel	LAN/FTTx	FTTH		Aug 2012	Live	Jun-15: >100,000 homes passed in Saskatchewan; Dec-13: ~75,00 homes passed; Dec-12: >30,000 homes passed
SaskTel	Satellite				Live	
SaskTel	TD-LTE		2500	Nov 2013	Live	Jun-15: 59 TD-LTE towers in rural areas of Saskatchewan; Dec-13: twelve towers
SaskTel	WiMAX	Pre-WiMAX	2500	Dec 2004	Live	Jun-15: rural areas of Saskatchewan
Shaw Communications	Cable	HFC			Live	Jun-15: 4.1m homes (>30%) (Jun-14: 4.07m homes) (Mar-13: 4.0m homes) (Mar-12: 3.9m) (May-11: ~3.65m) (Feb-10: ~3.5m)
Shaw Communications	Cable	HFC (DOCSIS 2.0)			Live	
Shaw Communications	Cable	HFC (DOCSIS 3.0)		Feb 2009	Live	Jun-15: >3.7m homes (>90% cable footprint) (Jun-13: >3.6m households [>90% of cable footprint])

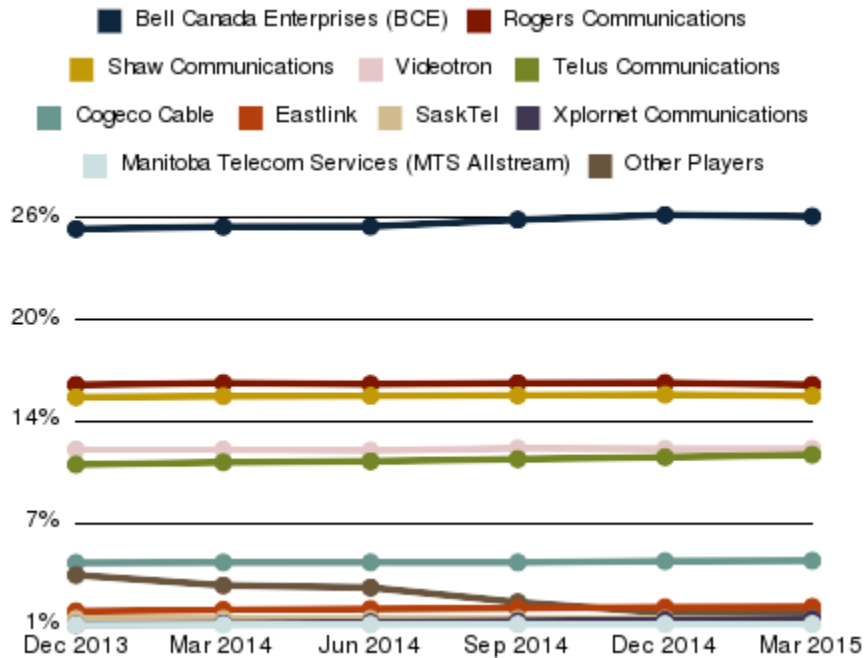| Provider Name	Access	Technology	Frequency	Launch	Status	Network Details
Shaw Communications	LAN/FTTx	FTTH		2011	Live	Jun-15: limited deployment in selected locations (trial 1Gbps services launched in 2Q10)
Telus Communications	DSL	ADSL		1997	Live	Jun-15: total high speed broadband 2.8m homes (20%) in British Columbia, Alberta and eastern Quebec (Sep-13: 2.6m homes)
Telus Communications	DSL	ADSL2+		2007	Live	Jun-15: ~2.8m homes (~20%) in British Columbia, Alberta and eastern Quebec; Dec-13: 2.7m homes; Dec-12: 2.4m homes
Telus Communications	DSL	VDSL2		2009	Live	Jun-15: ~2.6m homes in British Columbia, Alberta and eastern Quebec (~19%); Jun-14: ~2.5m homes; Dec-13: 2.4m homes; Dec-12: ~2.0m homes
Telus Communications	LAN/FTTx	FTTB/FTTH		2011	Live	Jun-15: company reports continued rollout of direct fibre including GPON 'in selected areas' (no figures); Jun-14: limited deployments in new-build developments
Telus Communications	LAN/FTTx	FTTN			Live	Jun-15: British Columbia, Alberta, Quebec (supporting ADSL2+/VDSL2 last mile internet and IPTV - see ADSL2+/VDSL2)
Videotron	Cable	HFC			Live	Jun-15: >90% of homes in Quebec (Dec-13: cable network passed 2.743 million premises) (May-10: ~90% of homes in Quebec)
Videotron	Cable	HFC (DOCSIS 3.0)		Feb 2008	Live	Jun-15: >90% of homes in Quebec (Dec-13: cable network passed 2.743 million premises) (May-10: ~90% of homes in Quebec)
Xplornet Communications	Satellite				Live	Launched '4G satellite broadband' with national scope in Feb-12 (in addition to existing satellite rural service); second '4G' satellite live Nov-12
Xplornet Communications	TD-LTE		3500	Dec 2014	Live	Jun-15: New Brunswick, Alberta; Dec-14: New Brunswick (also owns 2500MHz and 2300MHz spectrum)
Xplornet Communications	WiMAX	802.16e	3500	Mar 2011	Live	Jun-15: ~500 BTS (est.); Mar-13: 385 active BTS (network scope >1,200 BTS) (Mar-11: launched in Ontario) (deployed 55 new WiMAX BTS in Jan-12-Mar-13, plus upgraded 125 existing BTS to WiMAX in same period)
Xplornet Communications	WiMAX	Pre-WiMAX	3500	Dec 2007	Live	Jun-15: Western Canada, Quebec (status unknown - most users previously upgraded to other platforms)

Retail Subscribers Market Share by Provider
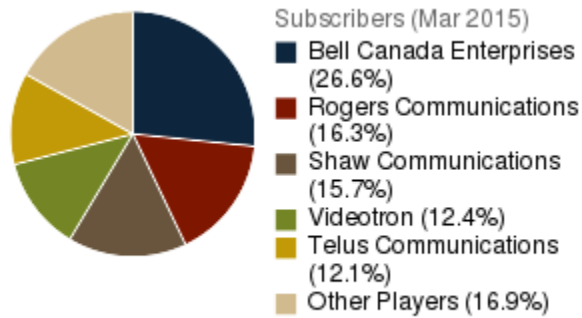
Subscribers (Mar 2015)

- Bell Canada Enterprises (26.6%)
- Rogers Communications (16.3%)
- Shaw Communications (15.7%)
- Videotron (12.4%)
- Telus Communications (12.1%)
- Other Players (16.9%)

Notes: Includes residential and business markets.
Sources: *operators*

Market Share History

	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015
Bell Canada Enterprises (BCE)	25.8%	26.0%	26.0%	26.4%	26.7%	26.6%
Rogers Communications	16.3%	16.4%	16.4%	16.4%	16.5%	16.3%
Shaw Communications	15.6%	15.6%	15.7%	15.7%	15.7%	15.7%
Videotron	12.4%	12.4%	12.3%	12.5%	12.4%	12.4%
Telus Communications	11.5%	11.6%	11.7%	11.8%	11.9%	12.1%
Cogeco Cable	5.5%	5.5%	5.5%	5.5%	5.6%	5.6%
Eastlink	2.6%	2.6%	2.7%	2.7%	2.8%	2.8%
SaskTel	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Xplornet Communications	1.7%	1.8%	1.9%	2.0%	2.0%	2.1%
Manitoba Telecom Services (MTS Allstream)	1.7%	1.7%	1.7%	1.8%	1.8%	1.8%

Market Share History

Legend:
- Bell Canada Enterprises (BCE)
- Rogers Communications
- Shaw Communications
- Videotron
- Telus Communications
- Cogeco Cable
- Eastlink
- SaskTel
- Xplornet Communications
- Manitoba Telecom Services (MTS Allstream)
- Other Players

Notes: Includes residential and business markets.
Sources: *operators*

Quarterly Subscribers by Operator

	Dec 2013	Mar 2014	Jun 2014	Sep 2014	Dec 2014	Mar 2015
Bell Canada Enterprises (BCE)	3,136,636	3,163,170	3,180,808	3,245,063	3,297,026	3,297,745
Cogeco Cable	668,257	672,981	676,802	679,584	692,911	698,247
Eastlink	310,000	321,000	330,000	337,000	346,000	350,000
Manitoba Telecom Services (MTS Allstream)	208,331	210,842	213,947	215,744	217,348	219,198
Rogers Communications	1,984,000	2,004,000	2,006,000	2,022,000	2,034,000	2,026,000
SaskTel	254,873	255,500	256,500	257,500	258,547	260,000
Shaw Communications	1,893,252	1,906,019	1,918,418	1,930,401	1,944,449	1,942,630
Telus Communications	1,395,000	1,416,000	1,431,000	1,453,000	1,475,000	1,498,000
Videotron	1,506,000	1,510,200	1,510,400	1,533,800	1,537,500	1,543,100
Xplornet Communications	210,000	220,000	230,000	240,000	250,000	260,000

Annual Country Subscriber Growth

Year	Total	Growth (%)	H'hold Pen. (%)	DSL	Cable	Fibre/ LAN	WiMAX	Other
2009	9,670,000	5.8	74.7	3,898,000	5,385,000	42,000	345,000	
2010	10,477,000	8.3	79.9	4,262,000	5,756,000	59,000	400,000	
2011	10,932,000	4.3	82.1	4,416,000	5,961,000	105,000	450,000	
2012	11,500,000	5.2	85.2	4,685,000	6,225,000	180,000	410,000	
2013	12,144,000	5.6	88.8	4,797,000	6,525,000	396,000	426,000	
2014	12,356,000	1.7	89.3	4,614,000	6,740,000	555,000	447,000	

Notes: Includes residential and business markets. For Canada, 'WiMAX' category includes all fixed-wireless broadband
Sources: operators, CRTC, OECD (government sourced), ITU

Quarterly Country Subscriber Growth

Period	Total	Growth (%)	DSL	Cable	Fibre/LAN	WiMAX	Other
Dec 2012	11,500,000	1.2	4,685,000	6,225,000	180,000	410,000	
Mar 2013	11,680,000	1.6	4,798,000	6,270,000	202,000	410,000	
Jun 2013	11,859,000	1.5	4,921,000	6,301,000	232,000	405,000	
Sep 2013	11,970,000	0.9	4,872,000	6,395,000	298,000	405,000	
Dec 2013	12,144,000	1.5	4,797,000	6,525,000	396,000	426,000	
Mar 2014	12,183,000	0.3	4,760,000	6,570,000	423,000	430,000	
Jun 2014	12,243,000	0.5	4,718,000	6,633,000	455,000	437,000	
Sep 2014	12,296,000	0.4	4,665,000	6,689,000	500,000	442,000	
Dec 2014	12,356,000	0.5	4,614,000	6,740,000	555,000	447,000	
Mar 2015	12,400,000	0.4	4,590,000	6,750,000	610,000	450,000	

Notes: Includes residential and business markets. For Canada, 'WiMAX' category includes all fixed-wireless broadband.
Sources: operators, CRTC, OECD (government sourced), ITU

Subscriber Growth

Subscribers (Mar 2015)
12,400,000
Growth (last 12 months)
1.8%

Dec 2013   Mar 2015
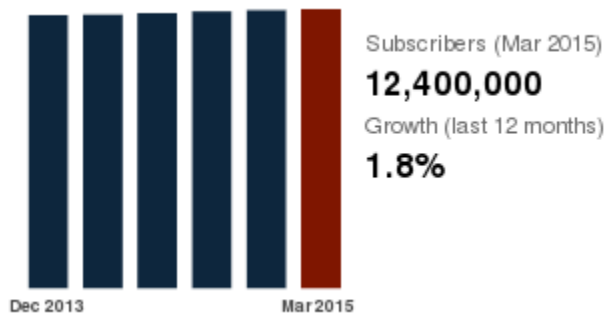
Notes: Includes residential and business markets.
Sources: *operators, CRTC, OECD (government sourced), ITU*

Subscriber Growth by Technology
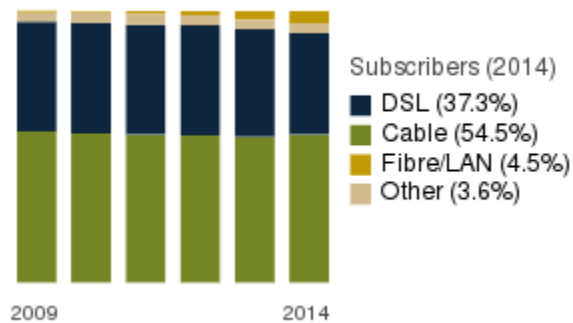
Subscribers (2014)
■ DSL (37.3%)
■ Cable (54.5%)
■ Fibre/LAN (4.5%)
■ Other (3.6%)

2009   2014

Notes: Includes residential and business markets.
Sources: *operators, CRTC, OECD (government sourced), ITU*

Dial-up Internet Users Growth

Subscribers (2014)
76,000

2009   2014
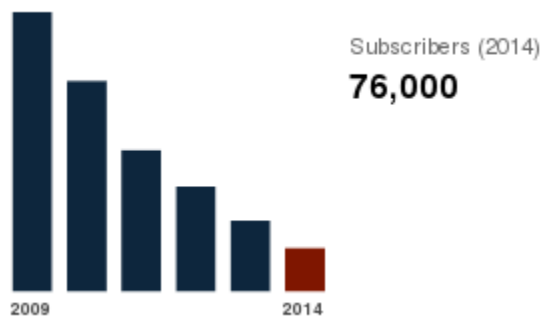
Sources: *CRTC*

Subscription Plans

Provider	Access	Product Name	Speed Downstream	Upstream	Cap/ Limit	Set-up Fee	Monthly Cost	Local Currency	Date Observed
Telus Communications	DSL	Internet 15	15Mbps	1Mbps	150GB		USD52.52	CAD58.00	Jun-2015
Telus Communications	DSL	Internet 25	25Mbps	5Mbps	250GB		USD57.05	CAD63.00	Jun-2015
Telus Communications	DSL	Internet 50	50Mbps	10Mbps	400GB		USD70.63	CAD78.00	Jun-2015
Telus Communications	LAN/ FTTx	Internet 100	100Mbps	20Mbps	500GB		USD79.69	CAD88.00	Jun-2015
Bell Canada Enterprises (BCE)	DSL	Fibe Internet 15 (DSL via FTTN)	15Mbps	2Mbps	50GB	CAD49.95	USD50.67	CAD55.95	Jun-2015
Bell Canada Enterprises (BCE)	DSL	Fibe Internet 25 (DSL via FTTN)	25Mbps	6Mbps	125GB	CAD49.95	USD59.72	CAD65.95	Jun-2015
Bell Canada Enterprises (BCE)	DSL	Fibe Internet 50 (DSL via FTTN)	50Mbps	6Mbps	250GB	CAD49.95	USD68.78	CAD75.95	Jun-2015
Bell Canada Enterprises (BCE)	LAN/ FTTx	Fibe Internet 175 (FTTH)	175Mbps	175Mbps	300GB	CAD49.95	USD85.08	CAD93.95	Jun-2015
Bell Canada Enterprises (BCE)	LAN/ FTTx	FibreOP Internet 100/30 (Bell Aliant)	100Mbps	30Mbps	Unlimited		USD72.40	CAD79.95	Jun-2015

			Speed						
Provider	Access	Product Name	Downstream	Upstream	Cap/ Limit	Set-up Fee	Monthly Cost	Local Currency	Date Observed
Bell Canada Enterprises (BCE)	LAN/ FTTx	FibreOP Internet 150/30 (Bell Aliant)	150Mbps	30Mbps	Unlimited		USD85.98	CAD94.95	Jun-2015
Bell Canada Enterprises (BCE)	LAN/ FTTx	FibreOP Internet 300/30 (Bell Aliant)	300Mbps	30Mbps	Unlimited		USD99.57	CAD109.95	Jun-2015
Bell Canada Enterprises (BCE)	LAN/ FTTx	FibreOP Internet 450/350 (Bell Aliant)	450Mbps	350Mbps	Unlimited		USD226.34	CAD249.95	Jun-2015
Rogers Communications	Cable	Internet 30	30Mbps	5Mbps	100GB	CAD64.94	USD58.85	CAD64.99	Jun-2015
Rogers Communications	Cable	Rogers Ignite 60	60Mbps	10Mbps	100GB	CAD64.94	USD67.91	CAD74.99	Jun-2015
Rogers Communications	Cable	Rogers Ignite 100u	100Mbps	10Mbps	Unlimited	CAD64.94	USD76.96	CAD84.99	Jun-2015
Rogers Communications	Cable	Rogers Ignite 250u	250Mbps	20Mbps	Unlimited	CAD64.94	USD86.02	CAD94.99	Jun-2015
Rogers Communications	LAN/ FTTx	Ultimate Fibre (limited availability)	350Mbps	350Mbps	2TB	Unknown	USD204.65	CAD225.99	Jun-2015
Cogeco Cable	Cable	Express 15	15Mbps	2Mbps	95GB		USD49.76	CAD54.95	Jun-2015
Cogeco Cable	Cable	Turbo 30	30Mbps	10Mbps	175GB		USD58.82	CAD64.95	Jun-2015
Cogeco Cable	Cable	Ultimate 55	55Mbps	10Mbps	275GB		USD69.68	CAD76.95	Jun-2015

Provider	Access	Product Name	Speed Downstream	Upstream	Cap/ Limit	Set-up Fee	Monthly Cost	Local Currency	Date Observed
Cogeco Cable	Cable	Ultimate 55 Unlimited	55Mbps	10Mbps	Unlimited		USD96.85	CAD106.95	Jun-2015
Cogeco Cable	Cable	Ultimate 120	120Mbps	10Mbps	425GB		USD85.98	CAD94.95	Jun-2015
Cogeco Cable	Cable	Ultimate 120 Unlimited	120Mbps	10Mbps	Unlimited		USD113.15	CAD124.95	Jun-2015
Cogeco Cable	Cable	Ultra 250	250Mbps	20Mbps	525GB		USD90.51	CAD99.95	Jun-2015
Cogeco Cable	Cable	Ultra 250 Unlimited	250Mbps	20Mbps	Unlimited		USD104.09	CAD114.95	Jun-2015
Shaw Communications	Cable	Internet 5	5Mbps	512kbps	65GB	0	USD45.28	CAD50.00	Jun-2015
Shaw Communications	Cable	Internet 15	15Mbps	512kbps	150GB	0	USD54.33	CAD60.00	Jun-2015
Shaw Communications	Cable	Internet 30	30Mbps	2.5Mbps	300GB	0	USD63.39	CAD70.00	Jun-2015
Shaw Communications	Cable	Internet 60	60Mbps	3Mbps	450GB	0	USD81.50	CAD90.00	Jun-2015
Shaw Communications	Cable	Internet 120	120Mbps	6Mbps	800GB	0	USD108.67	CAD120.00	Jun-2015
Videotron	Cable	Hybrid Fibre 5	5Mbps	1Mbps	10GB	CAD59.95	USD32.55	CAD35.95	Jun-2015
Videotron	Cable	Hybrid Fibre 10	10Mbps	1.5Mbps	60GB	CAD59.95	USD45.23	CAD49.95	Jun-2015
Videotron	Cable	Hybrid Fibre 30	30Mbps	10Mbps	130GB	CAD59.95	USD48.85	CAD53.95	Jun-2015

| | | | Speed | | | | | | |
Provider	Access	Product Name	Downstream	Upstream	Cap/Limit	Set-up Fee	Monthly Cost	Local Currency	Date Observed
Videotron	Cable	Hybrid Fibre 60	60Mbps	10Mbps	200GB	CAD59.95	USD62.44	CAD68.95	Jun-2015
Videotron	Cable	Hybrid Fibre 120	120Mbps	20Mbps	300GB	CAD59.95	USD82.36	CAD90.95	Jun-2015
Videotron	Cable	Hybrid Fibre 200	200Mbps	30Mbps	500GB	CAD59.95	USD118.58	CAD130.95	Jun-2015

Main Players

Bell Canada Enterprises (BCE)

1 Carrefour Alexander Graham Bell
Building A, 4th Floor
Verdun, Quebec H3E 3B3
Canada
Tel. +1 888 9326666
Fax +1 514 7665735
http://www.bce.ca
http://www.bell.ca

Bell Canada (including former sister division Bell Aliant) is the country's largest fixed broadband internet service provider (ISP), serving 3.298 million residential and business high speed customers at the end of March 2015, up from 3.163 million twelve months earlier, with the growth boosting its market share by approximately 0.6 percentage points year-on-year to around 26.6%. Bell's largest subscriber concentrations are in Ontario and Quebec, where more than 92% of homes and businesses were covered by its xDSL-based broadband network at that date (up from 87% at end-2007). Bell's high speed internet access footprint in Ontario and Quebec reached 97% of homes and businesses by that date, primarily via DSL, or wireless broadband technology in some rural areas. It has rolled out extensive fibre-to-the-node (FTTN) and VDSL infrastructure to upgrade connection speeds and offer advanced multi-play services across its DSL footprint, and has deployed direct fibre-optic access based on fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) in selected areas, while June 2015 saw the announcement of an acceleration in FTTH rollout (see below). Consumer fixed broadband access is offered under the banners 'Bell Fibe' / 'Bell Internet', and 'FibreOP' / 'High-Speed Internet' (in Bell Aliant areas), while the group also offers IP-based voice/data services for businesses. Pay-TV services (rebranded from 'ExpressVu' to 'Bell TV' in August 2008) are based on both direct-to-home (DTH) satellite and IPTV – the latter launched commercially in Atlantic Canada as 'Bell Aliant TV' (DSL-based) in 2005 and under the 'FibreOP TV' (FTTH-based) brand in September 2009, and elsewhere in Ontario/Quebec as 'Fibe TV' in September 2010, with Bell boasting more than a million IPTV users by mid-2015.

Wholly owned group division Bell Aliant provides triple-play services to residential and business customers in the four Atlantic provinces – Nova Scotia, New Brunswick, Newfoundland & Labrador and Prince Edward Island – and in rural/regional areas of Ontario and Quebec. Having previously owned 44% of Bell Aliant, Bell Canada Enterprises consolidated 100% of the regional operator in November 2014, and consequently from 1 January 2015 onwards (n.b. and historically restated) the group's reportable segments consist of Bell Wireless, Bell Wireline and Bell Media, with no geographical divisions. There are 2.5 million households in Bell Aliant's territory across Atlantic Canada and rural Ontario and Quebec, over 85% of which are covered by Bell Aliant's high speed DSL/fibre/fixed-wireless internet services – including over 970,000 premises covered by FibreOP FTTH – while internet penetration is estimated at 70%-75% across the operating region, where facilities-based competition is keen as approximately 77% of the households in the Aliant territory had a cable-based telecom alternative at end-2014 (compared to 33% in 2006).

Bell Canada's consumer packages based on FTTN/ADSL2+ infrastructure were introduced to Toronto, Montreal and Ottawa in mid-2006, originally called 'Sympatico Optimax', and subsequently 'Max', utilising fibre nodes within 1km of homes. By the end of 2006 one million xDSL homes in Montreal and Greater Toronto were served by FTTN nodes, rising to 1.7 million at end-2007, 2.4 million at end-2008 and 3.1 million across these two urban regions by Q1 2010. In February 2010, having rolled out VDSL2 local access

lines to 1.8 million homes, Bell launched a new FTTN/VDSL2-based internet service under the 'Bell Fibe' brand for customers in Montreal and Toronto, initially offering download speeds of up to 25Mbps (up from the previous top speed of 16Mbps offered over FTTN/ADSL2+ connections) and maximum upload speeds of 7Mbps. During 2013 Bell doubled the FTTN/VDSL top download speed to 50Mbps, and as at 30 June 2015 it offered Bell Fibe Internet packages for FTTN/VDSL users at 15Mbps-50Mbps (download) and 2Mbps-10Mbps (maximum upload, although typical uplink is lower), by which date its FTTN footprint passed more than five million homes.

Meanwhile, Bell carried out an extensive FTTH deployment across the Quebec City region in 2010/12, whilst it also adopted a policy of rolling out FTTH in new-build urban and suburban single-dwelling housing developments in Ontario and Quebec from the second half of 2010 onwards. The FTTH rollout in Quebec City was economical due to the predomination of 'aerial' infrastructure – above-ground wiring mainly mounted on utility poles as opposed to underground ducts – covering around 85% of the city, making the cost per home passed 'competitive with FTTN.' The FTTH service was commercially launched in Quebec City in March 2012, under the Bell Fibe brand shared with FTTN/VDSL services, following an investment of CAD225 million in the regional project. As of June 2015 Bell Fibe Internet FTTH-based customers are offered symmetric download/upload speeds of 175Mbps (unchanged in over two years, while having discontinued an alternative 50Mbps symmetric package option in 2012). Fibe FTTH packages offer a speed guarantee on the stated upload and download speeds.

Meanwhile, Bell Aliant's FTTH (FibreOP) service debuted in Atlantic Canada in September 2009, and has since been rolled out in communities across the division's six-province footprint, passing close to a million premises by the end of 2014, and superseding Bell Aliant's previous FTTN infrastructure, which had been virtually discontinued by end-2014. Aliant upgraded maximum fibre (downlink) speeds to 170Mbps in Q4 2010 before introducing new symmetrical down/uplink options the following year, and rolling out faster speeds up to 250Mbps in 2012 (partly to compete with Atlantic Canadian cableco Eastlink's high speed HFC-based services); by June 2015 Aliant customers were offered an upgraded premium FTTH speed of 500Mbps, while FibreOP users are given 'unlimited' FTTH data volumes, unlike other Bell customers who have all monthly data volumes capped.

By the end of March 2015, Bell indicated that its FTTH footprint – including the newly consolidated Bell Aliant FibreOP network and the group's other aforementioned FTTH rollout programmes across Ontario and Quebec – now reached roughly two million premises.

In June 2015 Bell ramped up the fibre initiative by announcing it was launching 1Gbps FTTH services under the Gigabit Fibe banner, initially for 50,000 homes and businesses in Toronto during summer 2015, with a target of eventually delivering 1Gbps fibre to 1.1 million premises across the city. Bell will also launch Gigabit Fibe in other cities in Ontario, Quebec and the Atlantic provinces before the end of 2015. Services will initially offer a maximum 940Mbps speed but will rise to the promised 1Gbps or higher in 2016 as modem equipment is upgraded. Bell is investing CAD1.14 billion in the gigabit infrastructure project, while in the initial Toronto rollout it is working with electric utility Toronto Hydro to gain access to existing aerial poles. The Toronto project alone will involve 27 upgraded Bell Central Office facilities across the city, 9,000km of new fibre, both underground via more than 10,000 manholes and on approximately 80,000 Bell and Toronto Hydro utility poles; around 70% of the city's Gigabit Fibe network will be aerial and 30% underground. Other cities primed for Gigabit Fibe deployment include Quebec City, locations in Montreal, Laval, Blainville, Gatineau, Joliette, Saint-Jerome, Chicoutimi, Sherbrooke, Vaudreuil/Valleyfield, St John's, Charlottetown, Halifax, Saint John, Fredericton, Moncton, Sudbury, North Bay, Peterborough and Kingston.

Additionally, since August 2008 Bell has followed a strategy of deploying FTTB facilities to any new-build condominiums and other multi-dwelling buildings throughout the Quebec-

Windsor corridor, noting that in Toronto, Montreal and other densely populated urban areas, up to 25% of customers live in apartment blocks. The FTTB network delivers approximately 60Mbps (maximum downlink) connections.

For customers outside its Fibe/FibreOP footprint, Bell continues to offer ADSL packages with download speeds capped at 5Mbps (reduced from 6Mbps in 2012), 2Mbps or 500kbps.

To encourage multiple service sign-ups, discounts are given to customers signing up to more than one Bell voice/data/TV service, known as the Bell Bundle / Bell Aliant Bundle, including a Bell Home Phone fixed line or a mobile subscription but excluding VoIP, which is only marketed to business clients (see Wireline section). The group also offers its broadband subscribers free access to its public Wi-Fi hotspots, including more than 4,000 public hotspots at commercial premises including McDonald's, Tim Hortons and Chapters/Indigo retail outlets across Canada as of mid-2015 (roughly unchanged year-on-year but up from 2,000 at mid-2012), in addition to 'thousands of hotspots managed through the Bell Business Markets unit at enterprise customer locations'.

Bell Canada was initially in no hurry to launch IPTV whilst it focused on its nationwide DTH satellite-based digital services, while since 2004 Bell TV has also offered digital TV via VDSL lines, but only to residents of selected condominiums in Toronto, Ottawa and Montreal, under the name 'Bell TV for condos'; the VDSL-based video service is distinct from IPTV. Although IPTV has been available for Bell Aliant customers since 2005, the parent group suspended launch plans in all other areas in 2007. Finally, in May 2010 the telco set out its pay-TV strategy, noting that Bell TV's DTH presence was greater in suburbia than densely populated urban areas – partly because condominium towers in major cities often disallow the mounting of exterior satellite dishes – and therefore it was betting on IPTV to steal market share from cable-based rivals Rogers and Videotron in Toronto and Montreal respectively. In September 2010 Bell Canada's IPTV service, available exclusively bundled with Fibe internet packages, was officially launched under the Bell Fibe TV banner (a year after Aliant's FibreOP TV). At launch Bell Canada's IPTV footprint fell short of its FTTN/VDSL2 coverage, with 500,000 households in selected areas of Toronto and Montreal able to access Fibe TV, and by March 2011 it had reached 800,000 IPTV-capable homes passed. However, under a quickened rollout Fibe TV was made available to more than two million homes (reaching most areas of Montreal, Toronto and Quebec City) by March 2012, 3.3 million by end-2012, and 3.5 million homes across Ontario and Quebec provinces at end-March 2013, before adding another one million homes to the IPTV footprint to reach 4.5 million (excluding Bell Aliant) households by end-March 2014 (Quebec: 65% of total homes passed; Ontario: 59% of total homes passed), aiming for an eventual target in 2016 of more than 80% of Bell Canada (excluding Aliant) households. IPTV coverage of over six million homes (including Bell Aliant) had been rolled out by 1 January 2015 (latest available data), up from 5.1 million a year before on a pro forma basis. The company has attributed its broadband growth in the last couple of years to a pull-through effect of Fibe TV activations and continuing fibre service expansion. Its claims are evidenced by positive net customer addition rates in areas within its IPTV footprint, offsetting internet user net losses outside the IPTV footprint due to higher DSL churn and aggressive competition. Bell continues to see its TV subscriber numbers grow, adding more than 150,000 net new customers in 2014, and another 27,000 in the first quarter of 2015 to reach 2.658 million total TV customers at the end of March 2015, making it Canada's second largest television provider. IPTV growth is offsetting satellite TV losses: Bell added 60,683 IPTV users to its base during 1Q15 to reach 990,000 that quarter (before crossing the one million mark in April 2015), while DTH customer losses in the first quarter reached 33,873 (losses which widened from 26,155 in the year-ago quarter) to leave Bell with 1.67 million satellite TV subscribers. Meanwhile, in May 2015 Bell launched the 'Fibe TV app', giving multi-screen access to hundreds of live channels and over 7,000 hours of on-demand content at home or on mobile devices, available to all Bell Fibe TV customers as a free iOS and Android download.

In the same month as its Fibe TV launch, Bell's parent BCE extended its ambitions for pay-TV dominance by agreeing to raise its stake in the country's largest private broadcaster CTVglobemedia from 15% to 100%, for CAD1.3 billion (totalling CAD3 billion including debt), broadening Bell's content assets for delivery across its mobile, online and TV platforms. It completed the deal in March 2011 when the Canadian Radio-television and Telecommunications Commission (CRTC) gave regulatory approval, and made CTV part of the Bell Media unit. CTVglobemedia was established as Bell Globemedia in 2001 but BCE sold a majority holding in 2006, before deciding to re-acquire the company minus the Globe & Mail newspaper.

In March 2012 BCE agreed to acquire broadcasting content provider Astral Media in a deal valued at CAD3.4 billion including CAD380 million debt, but the CRTC vetoed the original transaction on the grounds that it gave Bell an unfair level of control of the television market. A revised offer (involving divesting various TV/radio channels) was approved by the Competition Bureau, Quebec Superior Court and Astral's shareholders, and finally given CRTC permission in June 2013. BCE integrated Astral – Canada's largest pay-TV channel provider – into Bell Media, to improve its competitive position against Quebecor, parent of pay-TV and telecoms operator Videotron in largely-francophone Quebec, as Astral owns the largest line-up of French-language pay-TV channels.

Bell Media division's new subscription video content service 'CraveTV' launched in December 2014, boasting over 10,000 hours of TV content, and costing CAD4 per month. Available online and on iOS- and Android-based mobile phones and tablets as an authenticated streaming service, at launch subscriptions were restricted to those also subscribing to either Bell Fibe TV, Bell Aliant FibreOP TV, Bell Satellite TV, Telus Optik TV or Eastlink cable, although additional pay-TV companies and platforms (such as Smart TVs, games consoles and other mobile operating systems) are being added to the list of those supporting CraveTV in due course.

Bell says it is the country's largest B2B provider, generating approximately CAD4 billion in annual revenue from the segment and serving around 96 out of Canada's top 100 companies. Data hosting and cloud computing services are flagged as the fastest area of growth in the enterprise space, and Bell operates 26 data centres as of June 2015, including centres located in British Columbia, Alberta and Ontario recently acquired through a takeover of Q9 Networks, and its latest data centre opened by Bell Aliant that month in Saint John.

In the fixed-wireless broadband sector, Inukshuk Wireless Partnership is a 50/50 joint venture established in 2005 by Bell Canada and Rogers. By June 2015, the Inukshuk network partnership had the capability to offer fixed-wireless LTE-based internet access in most regions of the country using jointly-held 2.3GHz (WCS) and 3.5GHz wireless spectrum, having upgraded from pre-WiMAX network technology. Inukshuk holds 20MHz of usable 2.3GHz spectrum primarily in Eastern Canada, including population centres in Southern and Eastern Ontario, Southern Quebec, and smaller holdings in New Brunswick, Manitoba, Alberta and British Columbia. Inukshuk also holds 3.5GHz licences (between 50MHz-175MHz bandwidth) in most major population centres across Canada. Inukshuk also originally held 2500MHz spectrum across the country, via which Bell provided WiMAX-type nomadic wireless broadband ('Bell Internet Portable') and a fixed service ('Bell Internet Rural') nationally, but the 2500MHz service was decommissioned in Q1 2012, while the usable 2500MHz resources (excluding one-third returned under government policy and designated as guard bands) were distributed equally to Rogers and Bell in Q4 2012 and reused for their respective mobile LTE services (see Wireless section).

Elsewhere, Bell West, Bell's competitive local exchange carrier (CLEC) in western Canada, offers broadband services in Alberta and British Colombia; since late 2005 Bell West has provided a high speed service over a state-funded next generation network (NGN), the Alberta SuperNet, which covers over 420 communities in the province.

BCE's total CAPEX was CAD3.717 billion in 2014, down by 4.1% from CAD3.571 billion in 2013. Annual spending included CAPEX of CAD3.142 billion at Bell Canada/Bell Media – up by CAD141 million or 4.7% – and CAD575 million at Bell Aliant (up by CAD5 million or 0.9%). In April 2015 BCE announced plans to invest CAD20 billion in capital from 2015 to the end of 2020, notably in rolling out advanced fibre and mobile networks.

BCE's quarterly total operating revenues climbed 2.8% year-on-year to CAD5.240 billion in January-March 2015. Adjusted net earnings were CAD705 million in 1Q15, up from CAD626 million in the year-ago quarter, reflecting a 3.6% adjusted EBITDA increase to CAD2.094 billion in the three-month period. In Q1 2015 BCE's revenue mix by segment was: Wireline 57%, Wireless 31% and Media 12%. Broken down further, the revenues by service category were split: Fixed Broadband & TV 37%; Wireless 31%; Fixed Voice 20%; and Media 12%.

Note: see also www.bellaliant.net

Bell Canada Enterprises Inc (BCE) has fully distributed ownership; its shares are listed in Canada on the Toronto Stock Exchange (TSX) and in the United States on the New York Stock Exchange (NYSE). Its shares are approximately 85% Canadian-owned.

Rogers Communications

333 Bloor Street East
10th floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 416 935 3532
Fax +1 416 935 3597
http://www.rogers.com

Quadruple-play mobile, cable TV, broadband and fixed telephony provider Rogers Communications competes closely with Shaw Communications for the title of largest cable network operator in Canada. Rogers had 1.983 million basic cable TV subscribers at the end of March 2015, down from 2.107 million a year earlier, as an ongoing downward trend accelerated year-on-year in the face of intensifying competition from rival pay-TV services including IPTV and satellite alongside over-the-top (OTT) video streaming alternatives. However, demand for Rogers' high speed cable internet has not diminished, and by the end of March 2015 it provided cable/fibre broadband access to 2.004 million residential customers, up from 1.981 million a year earlier, partly attributed to its constant network expansion. By that date Rogers' cable infrastructure passed 4.085 million households in Ontario, New Brunswick and Newfoundland & Labrador, up from 3.990 million homes twelve months earlier, continuing a steady, gradual expansion of recent years. Ontario has around 90% of its cable customers, with subscribers clustered around three population centres: Greater Toronto, Ottawa and the Guelph-London corridor. It offers cable-based triple-play digital/ analogue TV, broadband internet and telephony services, with both internet access and local/ long-distance voice connections available to 100% of homes passed, having covered the last remaining areas with triple-play during 2011, and having upped coverage from 2008's metrics of 97% (internet) and 96% (voice). 1.13 million of Rogers' customers took its cable telephony service at 31 March 2015, although this was down by 33,000 in twelve months (see Wireline section), while over 99% of its cable network offers digital TV, taken by 89% of basic cable subscribers at end-March 2015 (up from 85% a year before).

As of June 2015 Rogers' HFC cable-based 'Ignite' broadband packages offered an entry-level speed of 30Mbps/5Mbps (down/upload) to new customers, having trebled its entry-level downlink speed over the past year, and doubled the speed in each of the two previous years. At the same date the top HFC cable speed stood at 250Mbps/20Mbps, unchanged from mid-2014, but an improvement on the premium 150Mbps/10Mbps speed offered in

2013 and 75Mbps/2Mbps in 2012. Cable broadband speeds are offered at 5Mbps (entry-level) up to 20Mbps (top-tier package) at mid-2015. Rogers deployed Data Over Cable Service Interface Specification (DOCSIS) 3.0 technology to boost access speeds on its HFC network in 2009, initially enabling the launch of 50Mbps (download) packages across Greater Toronto in the third quarter of that year, before expanding coverage of premium DOCSIS 3.0-based packages to over 90% of its cable broadband footprint in 2011, and by mid-2015 it reported that DOCSIS 3.0 supported 250Mbps downlink across 98% of its cable footprint. Meanwhile, in major urban areas, in 2010/11 Rogers said it began deploying fibre-to-the-curb (FTTC) network architecture to support its DOCSIS-based broadband, with the main aim of improving reliability and cutting maintenance via a reduction in the number of active network devices in deployment. However, in a branch away from its HFC-based consumer services, in the first half of 2013 it deployed GPON-based fibre-to-the-home (FTTH) symmetrical down/upload connections for consumers in selected locations in Toronto and the Atlantic region, previously available to Rogers' corporate customers only. The 'Ultimate Fibre' GPON service enables 350Mbps performance, and although at June 2015 it remained strictly limited in availability to a handful of locations, the company intends to continue investing in high speed fibre expansion.

Rogers is also sticking to a goal of launching an IPTV product on the market before the end of 2015, in contrast to major domestic cable rivals which have put such development on hold in 2014/15 in favour of 'intermediate' hybrid digital solutions. To give it a head start, Rogers is participating in an international working group of more than 150 cable operators led by US giants Comcast and Time Warner Cable to develop next-generation standards for an upcoming IPTV set-top box-based solution. A Rogers' spokesperson said of the project in 1Q15: 'We think delivering the best experience for our customers requires the open-ended innovation available via IP Video, instead of an off-the-shelf, hybrid solution like TiVo. Rogers remains committed to launching its standards-based TV-over-IP.'

In the meantime, Rogers formed a partnership with rival cableco Shaw to jointly launch a subscription video-on-demand (SVOD) streaming service named 'Shomi' in November 2014 initially for their own customers. Shomi is focused on offering 'the most popular movies and TV shows' on a wide range of in-home and mobile devices, while in June 2015 Rogers and Shaw indicated they were about to expand the SVOD service to users of any internet service provider (ISP), thereby competing directly with OTT players such as Netflix. Prior to this, Rogers' existing on-demand range included online TV service 'Rogers On Demand Online', which it launched free of charge to CATV, mobile, fixed telephony and broadband customers in November 2009, before introducing paid-for online rental streaming service for film/TV content in autumn 2010 and widely expanding the supported range of in-home and mobile devices in subsequent years.

Rogers has continued a steady pattern of acquiring smaller cablecos, including Aurora Cable in June 2008 (adding 16,000 CATV, 11,000 broadband and 2,000 cable telephony users), Kincardine Cable in August 2010 (6,000 customers) and Compton Communications in February 2011 (6,000 TV, 4,000 broadband and 4,000 cable telephony users), all three firms based in Ontario. Filling a gap in its southern Ontario footprint, in February 2013 Rogers snapped up Hamilton-based Mountain Cablevision from Shaw in January 2013 (including 40,000 CATV, 30,000 internet and 30,000 telephony users over a HFC network), paying CAD400 million, and most recently it bought another Hamilton operator, Source Cable, for CAD160 million in November 2014 (acquiring 16,000 TV, 16,000 internet and 11,000 phone users, while raising Rogers' cable homes passed by 26,000).

Meanwhile in the enterprise sector, January 2010 saw Rogers purchase data network service provider Blink Communications from Oakville Hydro for CAD131 million, while in January 2011 the CAD425 million acquisition of Atria Networks gave Rogers an additional 5,600 route kilometres of fibre-optics and 3,800 on-net buildings in Ontario, and an existing customer base of over 1,100 enterprise, public sector and wholesale clients. The consolidation of Atria into Rogers' Business Solutions division (RBS, see below) also

added 4,000 broadband data circuits and annual revenues estimated at CAD80 million. Rogers subsequently purchased BlackIron Data from Primus Telecommunications Group in April 2013 for around CAD200 million (including eight data centres across Canada and approximately 4,000 customers), before integrating the asset into RBS. Following further acquisitions in September 2013 – Pivot Data Centres for CAD155 million and Granite Networks for CAD6.3 million (both then integrated into the former BlackIron Data operation) – and the launch of 'Alberta's first Tier III certified data centre' in mid-2014, Rogers had expanded data centre operations to 15 locations nationwide by June 2015.

The RBS division offers local and long-distance telephony, data services, internet access and IP-based solutions to businesses and government clients, as well as wholesale services for carriers. Through the acquisition of Call-Net (and subsidiary Sprint Canada) in July 2005, Rogers gained a national wireline access network, although it subsequently sold off most of its circuit-switched (copper) lines and PSTN co-location exchange sites (see Wireline section), while it initially offered xDSL in areas outside its cable footprint including parts of Western Canada, but has since phased out DSL (with 1,000 retail DSL lines in March 2011 the final reported figure). Today, Rogers provides dedicated connections to businesses on request with symmetrical bandwidth between 1Mbps and 1Gbps, using Ethernet and direct fibre technologies. At the end of 2014 RBS served 7,800 on-net fibre connected buildings (up from 7,300 at end-2013 and 5,500 two years earlier); RBS' fibre also passes adjacent to 23,000 'near-net' buildings. RBS posted CAD382 million annual revenue in 2014, up from CAD374 million the previous year, as growth in 'next-generation services' including data centres accounted for 72% of turnover and offset the ongoing decline in legacy services revenue. Supporting all divisions including cable, RBS and its wireless business, Rogers also operates a North American transcontinental fibre-optic network that extends over 38,000 route kilometres at mid-2015.

In the fixed-wireless broadband sector, Inukshuk Wireless Partnership is a 50/50 joint venture established in 2005 by Rogers and Bell Canada. At June 2015 the Inukshuk network offers TD-LTE fixed-wireless internet access in provinces across the country using jointly held 2.3GHz and 3.5GHz wireless spectrum, having upgraded from pre-WiMAX network technology. Inukshuk holds 20MHz of usable 2.3GHz spectrum primarily in Eastern Canada, including population centres in Southern and Eastern Ontario, Southern Quebec, and smaller holdings in New Brunswick, Manitoba, Alberta and British Columbia. Inukshuk also holds 3.5GHz licences (between 50MHz-175MHz bandwidth) in most major population centres across Canada. Inukshuk also originally held 2500MHz spectrum across the country, via which Rogers provided WiMAX-type nomadic wireless broadband under the 'Portable Internet' brand from April 2006 until March 2012, targeting travelling users and those lacking fixed broadband access. The usable 2500MHz resources (excluding designated guard bands) were distributed equally to Rogers and Bell in Q4 2012 and reused for mobile LTE services (see Wireless section).

Rogers' cable network operations (including cable TV, internet and telephony, but excluding Media operations and RBS) had a turnover of CAD3.467 billion in full-year 2014, down slightly from CAD3.475 billion the previous year (reversing 2013's 3% sales increase), as 7% internet turnover growth failed to completely offset 4% drops in both TV and telephony revenues. In FY 2014 the revenue mix of the group's 'Cable' reporting segment was CATV 50% (down from 52% in 2013), internet 36% (up from 33%) and Home Phone 14% (having peaked at 15% the year before). Cable accounted for 27% of Rogers Communications' consolidated operating revenues of CAD12.9 billion in 2014.

Rogers Communications Inc (RCI) is listed on the Toronto Stock Exchange (TSX) and New York Stock Exchange (NYSE), but voting control is held by Rogers Control Trust, the trustee of which is a subsidiary of a Canadian chartered bank, with the beneficiaries being family members of former RCI chief Ted Rogers who died in December 2008. As of 31 March 2015 private holding companies controlled by Rogers Control Trust owned 90.9% of voting ('Class A') shares and approximately 28% of equity.

On 1 July 2007 RCI completed an amalgamation with wholly owned subsidiaries Rogers Cable (including Rogers Telecom) and Rogers Wireless, which ceased to be separate corporate entities. The restructuring placed Rogers' cable, wireline and wireless operations under the Rogers Communications umbrella.

Shaw Communications

Suite 900
630, 3rd Avenue SW
Calgary, Alberta
Canada
Tel. +1 403 750 4500
Fax +1 403 750 4501
http://www.shaw.ca
http://www.shawbusinesssolutions.ca

Shaw Communications provides triple-play TV, broadband internet and digital telephony over a cable network which at June 2015 passed approximately 4.1 million homes (or 30% of all Canadian households), up from 4.03 million homes two years earlier, in the provinces of British Columbia, Alberta, Saskatchewan, Manitoba and Ontario. At that date Shaw had 1.882 million basic cable TV customers (over 90% of them digital), albeit that this figure has been on the wane recently – dropping from 1.978 million one year earlier and over 2.1 million two years previously, a trend influenced by TV viewers 'cutting the cord' and opting for over-the-top (OTT) video streaming services instead. Meanwhile its cable broadband internet customer base has fluctuated in recent years, but has now returned to growth, reaching 1.950 million by June 2015, up from 1.918 million a year earlier. Standalone cable internet customers had surpassed 420,000 by that date, up from 300,000 two years previously. Shaw fights closely for the title of largest Canadian cable TV provider with Rogers Communications, as well as the claim to be the largest cable broadband provider with the same operator (while both trail DSL/fibre-based Bell Canada in terms of the overall fixed broadband market). Shaw is the largest broadband ISP in the Western Canadian region, but faces fierce competition from its chief Western Canadian telecoms rival Telus which has expanded IPTV/multi-play services in direct competition with Shaw's cable-based bundles. Approximately 70% of Shaw's cable TV subscriber base is clustered in and around five major urban markets in Western Canada: Vancouver and Victoria (British Columbia); Calgary and Edmonton (Alberta); and Winnipeg (Manitoba). Completing its triple-play range, Shaw has offered 'Digital Phone' cable modem local telephony services over a private managed broadband network since the first quarter of 2005, which it expanded to all five provinces covered and over three-quarters of homes passed by end-2007; by the start of June 2015 Digital Phone network coverage reached 96% of homes passed, with 1.342 million telephony subscribers. Discounts are given for bundling internet connections with TV and telephony services, while all Shaw internet subscribers get free access to the company's own network of 65,000 Wi-Fi hotspots (see below for details). Meanwhile, Shaw's satellite TV subsidiary Shaw Direct (formerly known as Star Choice) had 820,000 direct-to-home (DTH) TV customers at mid-2015, down from 887,000 a year earlier and 905,000 two years before. DTH allows Shaw to serve TV customers outside its cable footprint and compete with larger satellite rival Bell TV.

Shaw offers cable modem internet services with downstream/upstream speed limits of up to 120Mbps/6Mbps as of June 2015, having discontinued a faster premium 250Mbps/15Mbps consumer package in July 2014 (while continuing to allow existing 250Mbps contract customers to access their original speeds where possible). In February 2009 Shaw introduced its first 100Mbps service based on a deployment of DOCSIS 3.0 technology in Saskatoon, before rolling it out to Calgary, Edmonton and Vancouver over the following year, and over 90% of its cable footprint by mid-2011, and the fourth quarter of that year saw the introduction of 250Mbps peak downstream speeds, but although 250Mbps capabilities were

phased in at locations across the network (covering 17% of customers by September 2012 – latest available figure), the demand was apparently not sufficiently high to continue marketing the 250Mbps speed to new consumer customers (although business users may still order higher bandwidth).

Shaw also offers on-demand programming available to its subscribers via TV, laptop/PC or other devices, having launched a video-on-demand website in mid-2010, and in September 2012 its first 'TV everywhere' (multi-screen/device) product, 'Shaw Go', introduced streaming TV content on mobile devices, marketed in coordination with the operator's Wi-Fi rollout. A new subscription video-on-demand (SVOD) online streaming service, 'Shomi', was jointly launched by Shaw and Rogers in November 2014, initially available to cable TV/internet subscribers of Shaw or Rogers, but the joint venture partners revealed that during summer 2015 Shomi will be opened up to subscribers of any internet service provider (ISP); Shomi enables access to a video library of over 15,000 titles, including 300-plus series and over 1,000 movies, and is seen as an attempt to compete with OTT streaming services such as Netflix in the TV cord-cutter segment. As of June 2015 Shaw was also working with Comcast to initiate technical trials of the US cable giant's cloud-based 'X1' platform in Canada, aimed at offering customers the promise of 'seamless' multiple-screen services across various devices both in and out of the home. In early 2015 Shaw abandoned an existing development project for an end-to-end IPTV solution which it had started in 2013, having assessed other options; the aborted IPTV project resulted in an asset write-down of CAD55 million.

Shaw's aims of sharing broadcasting content across multiple platforms were boosted by its acquisition of the broadcast channel line-up of CanWest Global Communications in October 2010, renaming the division Shaw Media; approximately CAD1 billion was required to complete the acquisition, including repayment of loans and breakage of related currency swaps. Shaw stated that the aim of the purchase was to combine programming content with its cable and satellite distribution network to create a 'vertically integrated entertainment and communications company.' In September 2011 Shaw received regulatory permission to combine its cable-based division (Shaw Cable) with its satellite TV service (Shaw Direct), allowing additional service bundling options.

In late-2010 Shaw commenced trials of a 1Gbps fibre-to-the-home (FTTH) internet service, which it launched in very limited selected areas the following year. The cableco is aiming to deploy FTTH in new housing developments, using a physical passive optical network (PON) coupled with RF over Glass (RFoG). The configuration allows cable operators to deploy FTTH whilst continuing to use traditional cable back-end systems. By mid-2015 Shaw had not announced a significant widening of its FTTH rollout.

Shaw has acquired several regional cablecos to expand its network, including Pemberton Cable, Saltspring Cablevision, Whistler Cable Television and Grand Forks, all in British Columbia, and Norcom Telecommunications in Kenora, Ontario (all during 2006). In February 2009 the company closed the acquisition of the Campbell River cable system in British Columbia, before assimilating two other small cable networks serving interior regions of the same province, Lake Broadcasting (October 2010) and Sun Country Cablevision (June 2011). Meanwhile, Shaw looked to expand its network coverage in Ontario from its existing north-western base in the province, to southern areas, when it paid CAD300 million for Hamilton-based Mountain Cablevision in November 2009, but in January 2013 it inked a strategic agreement to sell the asset to Rogers; the transaction included a CAD250 million deposit for Mountain (with a subscriber base of roughly 40,000 cable TV, 30,000 internet and 30,000 telephony users), although the final price was not publicised. Back on the expansion trail, in April 2013 Shaw paid CAD225 million for Enmax Envision, a fibre network operator and business telecoms provider in Calgary and surrounding areas of Alberta, which Shaw subsequently integrated with its business division. To augment its existing data centre operations in Calgary, in July 2014 Shaw agreed to purchase US-based data centre provider ViaWest for USD830 million plus USD370 million debt, and in September that year Shaw

consolidated ViaWest into its group, in the process establishing a new Business Infrastructure Services division.

The Business Infrastructure Services division specialises in data centre colocation, cloud and managed services to North American businesses. This division operates alongside Shaw's Business Network Services division which – through a national fibre-optic backbone network – provides data networking, video, voice and internet services as well as satellite video services, and fleet tracking services to North American businesses and public sector entities; it also develops and manages the inter-city fibre network that serves as the primary backbone for Shaw's broadband internet customers. By the start of June 2015 Shaw reported 175,700 business cable internet subscribers (equivalent to approximately 9.0% of its broadband total).

Shaw opted to build out a significant Wi-Fi broadband network after ditching plans for a cellular network rollout (see below), and 'Shaw Go Wi-Fi' was deployed at over 1,500 sites in Calgary, Edmonton, Vancouver, Victoria and Winnipeg by mid-2012, while twelve months later it covered all cities across Shaw's operational cable footprint in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario. In June 2014 Shaw announced that the Shaw Go Wi-Fi network had 40,000 Wi-Fi hotspots – while over one million devices had been registered on the network – and the Wi-Fi footprint reached 65,000 hotspots by June 2015, with over 660,000 internet customers registered on the Wi-Fi network connecting over 1.8 million devices.

Shaw won mobile spectrum licences mainly covering the Western and Prairie provinces in July 2008's AWS-1 auction, which it received in September 2009 after paying the CAD190 million total bid price, but in September 2011 it abandoned cellular rollout plans, citing the level of investment required to compete with existing cellcos. In January 2013 Shaw agreed to give Rogers Communications an option to purchase its mobile spectrum after a five-year blanket government ban on AWS licence transfers to incumbents expired – in Shaw's case in September 2014 – exercisable only with permission from Industry Canada and the Competition Bureau. Despite previously indicating its opposition to the Shaw-Rogers deal under federal licence transfer policy, in June 2015 Industry Canada gave the final green light to the arrangement, and Shaw received a total of CAD350 million from Rogers for the spectrum, including an initial CAD50 million to purchase the option plus a CAD200 million down payment (both in 2013) and a final CAD100 million upon exercise of the option.

Shaw's total revenue for its fiscal nine-month period ending 31 May 2015 rose by 4.2% to CAD4.145 billion, while it posted net income of CAD604 million for the same period, although this figure dropped by 13.1%, mainly due to the aforementioned write-down related to its aborted IPTV project. Consumer division revenue fell slightly, by 0.6% to CAD2.814 million, while Business Network Services revenue was up 7.5% to CAD387 million, and Business Infrastructure Services posted nine-month revenues of CAD178 million (with no comparable previous figure). Shaw's Media division saw revenues slide 2.0% to CAD848 million in the same period.

As of June 2015 the Shaw Family Group (J R Shaw and family, plus corporations owned and/or controlled by J R Shaw and family) held approximately 79% of the outstanding voting ('Class A') shares of Shaw Communications. The Shaw Family Group elects a majority of the board of directors and controls the vote on matters submitted to shareholders. Shaw Communications is floated on the Toronto Stock Exchange (TSX) and the New York Stock Exchange (NYSE).

Telus Communications

555 Robson Street
Vancouver, British Columbia V6B 3K9
Canada

Tel. +1 604 432 2151
Fax +1 604 432 2151
http://www.telus.com

Full-service operator Telus is the largest telecoms provider in Western Canada (British Columbia [BC] and Alberta) in terms of fixed network voice/data customers and revenues. It launched commercial ADSL services in 1998 (originally under the 'Velocity' brand), and at the end of March 2015 had 1.498 million fixed broadband internet access subscribers (largely xDSL with a relatively small portion of direct fibre connections). It added 82,000 net new broadband customers in the twelve months to March 2015, similar to the annual growth rates of the previous three years – i.e. 74,000, 85,000 and 74,000 net additions respectively. Telus' growing IPTV operations in western Canada proved a factor in encouraging higher uptake of its internet services and fighting the competition. At the end of 1Q14 Telus had the fifth largest high speed ISP subscriber base in the country after Bell Canada, Rogers Communications, Shaw Communications and Videotron, and the second largest in the western provinces behind Shaw.

Since 2006 Telus has stepped up its focus on expanding and upgrading its broadband networks to support a wide range of new services. That year around CAD225 million was invested in network upgrades for mostly rural parts of BC, Alberta and eastern Quebec, on top of previous investments of more than CAD1.2 billion in its broadband infrastructure. A further CAD700 million spending plan was ploughed into extending high speed internet services to at least 450 additional remote communities in those three provinces in 2007/09. Also in 2007, Telus began fibre-to-the-node (FTTN) network upgrades in selected areas while rolling out 30Mbps maximum download capabilities via VDSL last mile connections, and in 2008/09 it continued to invest in increasing speed and coverage of broadband infrastructure in BC, Alberta and Quebec. The upgrades included the expansion of ADSL2+ internet packages offering consumers maximum download speeds of 15Mbps, under the 'Turbo' banner. ADSL2+/VDSL2 coverage reached 2.1 million households in BC, Alberta and eastern Quebec by the end of 2010, including 87% of the telco's top 48 incumbent (ILEC) markets in Alberta and BC. A new brand 'Optik' was launched based on the VDSL2 platform in June that year, offering feature-rich IPTV services (detailed below) bundled with 25Mbps maximum internet connection speeds. Meanwhile, in November 2011 Telus was the first Canadian operator to deploy 'VDSL2 bonding' technology which it debuted in Rimouski and Eastern Quebec, achieving speeds of 50Mbps. The ADSL2+/VDSL2 footprint covered 2.3 million homes in the three provinces by March 2012, and as of June 2015 the ADSL2+/VDSL2 service area had reached 2.8 million households (or around 20% of all Canadian homes) across BC, Alberta and Eastern Quebec, up from 2.7 million at end-2013 and 2.4 million at end-December 2012. Furthermore, by June 2015 Telus' 50Mbps-capable VDSL2 coverage had reached 93% of the high speed footprint, or around 2.6 million homes – equivalent to 19% of all households.

In another new investment project, during 2010 Telus partnered with property developers to begin rolling out fibre-to-the-home (FTTH) broadband access using gigabit passive optical network (GPON) technology, in green-field residential developments only. In March 2012 it said it was continuing to deploy FTTH in new-build residential areas, as well as fibre-to-the-building (FTTB) in new-build multi-dwelling units, and in its 2014 annual report Telus noted the 'continued rollout of GPON in selected areas' but without giving specific details. By Q2 2015, however, the western Canadian incumbent indicated that it was ready to shift gear and begin focusing more heavily on direct fibre – in May that year Telus' chairman stated that fibre-to-the-premises (FTTP) is the company's investment priority going forward, both in the enterprise and residential sectors.

IPTV is a major weapon in Telus's fight for subscribers, and it has become Canada's largest provider of the TV-over-broadband service. In December 2005 it launched broadband TV under the 'TELUS TV' banner in selected areas of Albertan cities Calgary and Edmonton, and parts of Lower Mainland (BC), and expanded it to select districts of Vancouver in

2006 on a trial basis. The xDSL-based service includes video-on-demand (VoD) and, since December 2006, pay-per-view content. In early 2008 it added HDTV and, at the end of that year, personal video recorder (PVR) services; meanwhile it expanded TELUS TV in several areas of Quebec and finally began mass marketing IPTV across Calgary and Edmonton. Telus signed up its 100,000th IPTV customer in April 2009 and the following month made an agreement with Bell Canada to expand its pay-TV footprint by reselling the 'Bell TV' direct-to-home (DTH) satellite TV service under the 'TELUS Satellite TV' brand. The DTH service was launched commercially in BC and Alberta in July 2009. To watch TELUS TV (IPTV) customers must also subscribe to 'TELUS Home Phone' fixed telephony and/or a broadband package from the 'TELUS High Speed' range, and discounts are offered on bundled services.

At the launch of its Optik brand in June 2010 Telus introduced new multi-service packages for users in BC and Alberta within its FTTN/VDSL footprint featuring upgraded 'Optik TV' IPTV services with a range of features based on Microsoft Mediaroom software, such as multi-tuner PVR allowing networking of all TVs in the home. Telus reported that it 'substantially completed' the migration of its IPTV user base to Mediaroom technology in July 2011. In November 2010 Optik TV was expanded to Victoria, BC, after the telco announced it was investing an annual CAD70 million in Greater Victoria. Also that month Telus expanded IPTV services to the northern British Columbian city of Prince George. In February 2012 Telus extended Optik TV content to mobile devices for existing Optik customers, under the 'Optik On The Go' banner, using Cisco's cloud-based Videoscape Media Suite to manage and publish content across multiple screens. In Q4 2013 Telus enhanced Optik On The Go by launching live TV on smartphones and tablets to complement the library of over 5,000 VoD titles already available on the mobile and PC platform. Optik TV customers have access to 13,000-plus VoD titles and more than 185 HD channels. At the end of March 2015 the Optik IPTV service was available to 'more than 2.8 million homes' (having reported a 2.8 million home footprint the previous year) in cities across British Columbia, Alberta and eastern Quebec (where it expanded to in early 2012), and Telus had an estimated 818,000 IPTV subscribers, up from around 732,000 a year earlier. By that date it reported a total of 937,000 pay-TV (IPTV and DTH) subscribers, up from 842,000 twelve months previously.

Telus first unveiled its 'digital home strategy' in 2004, targeting residential customers with a suite of integrated services based on its xDSL platform. It was one of the first companies in North America to transform its network with IP-based technology, migrating 100% of its long-distance voice traffic to its IP network by mid-2005. In 2005/06 it signed a series of supply agreements with equipment vendors to develop its IP infrastructure: in July 2005 it ordered Alcatel's Ethernet-IP equipment to expand its broadband access coverage and to increase subscriber bandwidth; in November 2005 it contracted Nokia (now Nokia Networks) to supply it with the D500 IP DSLAM multi-service platform, equipped with ADSL2+ technology; and in September 2006 the Finnish vendor was awarded a further three-year, CAD150 million contract to provide integration and installation services for Telus's next generation IP broadband network. Telus's focus on the IP field has raised its profile in the large-client data services market. A number of acquisitions in 2008, including health sector specialist Emergis, helped boost annual data (including internet and IPTV) revenues by 17% that year – becoming the largest sub-segment in Telus' wireline division – and data turnover grew by 3.6% the following year, 5.7% in 2010, 14% in 2011 and by 12% in 2012. The CAD318 million annual net increase in data revenue in 2012 easily offset the CAD150 million net decline in Telus's legacy wireline voice revenues in the same period, and this trend continued in 2013, when Telus posted annual data revenues of CAD3.210 billion, up by 10.8% from CAD2.900 billion the previous year. This data performance drove up Telus' total wireline division turnover to CAD5.440 billion in full-year 2013, up by 3.8% from CAD5.246 billion in 2012, despite legacy local voice access revenue which dropped by 5.7% from CAD1.416 billion to CAD1.335 billion. In 2014 data revenue continued to climb strongly: up by 8.1% to CAD3.470 billion, once more offsetting voice turnover decline and supporting a pro forma 2.7% rise in total wireline revenue reported at CAD5.420 billion.

Elsewhere, in the business market, Telus aims to expand cloud computing services in higher-margin segments with managed solutions, by leveraging the addition of two new 'intelligent' data centres in BC and Quebec. Also in the cloud solutions segment, the November 2014 launch of TELUS Cloud Collaboration provided enterprises with access to a full suite of unified communications services, alongside TELUS Cloud Contact Centre – a fully featured contact centre solution hosted in the cloud (both powered by Cisco). In a similar vein, Telus launched Business Connect, a 'complete integrated communications solution designed to meet the specific needs of small businesses' in March 2015, offered in conjunction with cloud-based provider RingCentral, consisting of a suite of communications tools for office and mobile use.

Telus Communications is a wholly owned subsidiary of Telus Corporation, which is a distributed company listed on the stock markets in Canada (TSX symbol: T) and the US (NYSE symbol: TU). At 1 January 2015 the company estimated that its ownership was 84% Canadian, whilst approximately 70% of shares were held by institutions and 30% by retail investors. Under a move approved in October 2012 Telus reformed its legacy dual-class shareholding structure by exchanging its non-voting shares into common shares on a one-for-one basis; common shares were subsequently listed on the NYSE for the first time.

Videotron

300, Viger Avenue East
Montreal, Quebec H2X 3W4
Canada
Tel. +1 514 281 1711
Fax +1 514 380 9527
http://www.videotron.com

Montreal-based Videotron is an integrated communications company offering cable television, broadband internet access, residential and business local telephony, multimedia products and mobile telephony, with a hybrid fibre coaxial (HFC) cable network which passed 2.777 million premises in Quebec at end-2014 (latest available data), up from 2.743 million premises a year earlier, representing more than 90% of the province's households, with roughly 40,000km of coaxial cable and more than 25,000km of fibre-optics. As of 31 March 2015 it served 1.771 million cable TV customers in Quebec (down by 40,000 in a year), 88% of them digital TV users (up from 85% a year earlier). At the same date it had 1.543 million subscribers to its cable modem internet access services, up from 1.419 million a year earlier. Also at end-March 2015 it had 1.345 million cable telephony subscribers, as well as 662,000 mobile voice and data subscribers on its own 3G/4G network. The cellular network, launched in September 2010 (and upgraded to 4G LTE exactly four years later), completes a quadruple-play service line-up to help keep up the pressure on Videotron's competitors. The cableco also offers video-on-demand (VoD) movies and TV content under the 'Illico On-Demand' banner, and in June 2010 it launched a new website-based television service to fight competition from online content providers. 'Illico Web' allows Videotron's existing customers to view television channels and movies over the internet at any location (with mobile customers also offered access via a portal), and also programme personal video recorders (PVRs) remotely. Videotron's eventual aim is to expand Illico Web's content range to 'mirror' its cable TV offerings. February 2013 saw the launch of 'Illico Club Unlimited', an online VoD service offering 'the largest collection of French-language TV and movies in Canada', which attracted 178,000 customers by the end of 2014 (up from 60,000 at end-2013), and in June 2014 Videotron expanded the availability of VoD services once more by introducing a version of its Illico mobile app for the Apple iPad tablet – following the launch of Illico iPhone availability in April that year.

Videotron has upgraded its broadband services in phases based on the rollout of DOCSIS 3.0 technology, allowing it to launch commercial 50Mbps (download) packages for residential

users in selected areas in February 2008. In April 2009 Videotron extended 'Ultimate Speed' 30Mbps and 50Mbps packages to 70 municipalities surrounding Montreal, and nearing a million homes and businesses in more than 100 municipalities. In August 2009 the premium packages were extended across the eastern part of Quebec, and by the end of that year the cableco completed the 'Ultimate Speed' rollout (30Mbps and 50Mbps) to a total of more than three million Quebec households and premises. In September 2010 the operator introduced speeds of 120Mbps under the name 'Ultimate Speed 120', initially available to 80% of homes in the Quebec City region, before being expanded to approximately the firm's entire cable footprint within six months. In May 2012 Videotron launched its fastest-yet broadband service with download speeds of up to 200Mbps and upstream rates of up to 30Mbps, initially in the Quebec City area, and in April 2014 the Ultimate Speed 120Mbps and 200Mbps packages were announced as available across half of Videotron's service area (following an expansion to an additional 400,000 premises in areas including Montreal's North Shore and South Shore suburbs). While the 200Mbps package remained its top-speed offer as of June 2015, Videotron offers discounts on most internet packages if the customer subscribes to a second service, e.g. cable TV, fixed or mobile telephony.

In March 2015 Videotron acquired 4Degrees Colocation and its data centre, the largest in Quebec City for around CAD35 million, providing its Videotron Business Solutions division additional capabilities in offering bundled services to Quebec businesses.

The largest cable operators in Canada, including Videotron, are required to provide third-party ISPs with access to their cable systems at mandated cost-based rates. Several third-party ISPs are interconnected to Videotron's cable network to provide retail internet access.

Videotron reported FY 2014 revenues of CAD778.2 million, a CAD34.2 million (4.6%) yearly increase. Broken down by segment, the results are as follows:

- Turnover derived from cable TV services decreased by CAD8.1 million (-2.9%) to CAD268.2 million in 2014; while

- Revenues from internet access services increased CAD12.3 million (5.9%) to CAD222.2 million;

- Turnover from cable telephony increased CAD1.9 million to CAD120.6 million;

- Revenues from mobile network services increased CAD23.9 million (40.1%) to CAD83.5 million; and

- Sales attributed to Videotron Business Solutions increased CAD1.0 million to CAD16.8 million in 2014.

Videotron is a wholly owned subsidiary of Quebecor Media.

Cogeco Cable

5, Place Ville-Marie
Suite 915
Montreal, Quebec H3B 2G2
Canada
Tel. +1 514 874 2600
http://www.cogeco.ca
http://www.cogecodata.com

Cogeco Cable provides cable TV services over a network which passed 1.682 million homes at the end of February 2015 (up from 1.66 million two years earlier), approximately two-

thirds of which are in Ontario and one-third in Quebec. At the same date, close to 100% of homes passed were served by a two-way cable system allowing broadband internet access (compared to 96% four years earlier), whilst 97% were served by DOCSIS 2.0 standard and 94% by higher-speed DOCSIS 3.0. Furthermore, 99% had access to Cogeco Digital Phone cable-based local telephony (up by six percentage points in four years), while 99% of homes passed could receive its digital TV service (unchanged in four years) and over 97% (95% four years earlier) could access video-on-demand (VoD). Over the years Cogeco has expanded by organic and acquisitive means; since the firm was started in 1972 it states that it has acquired and integrated around 40 cable/telecoms companies.

Cogeco's high speed internet subscriber base grew to 698,000 at 28 February 2015 (more than 70% of whom reside in Ontario and less than 30% in Quebec), up from 673,000 a year earlier. Cogeco also chalked up roughly 470,000 cable telephony subscribers by that date, although this figure is declining gradually, having returned to the same level it reached in 2012. Its basic cable TV subscriber base is also on the slide, standing at 780,000 at end-March 2014, down by 36,000 on a net annual basis (a similar loss rate to the 37,000 net decrease the previous year. Cogeco offers discounts for bundling TV/internet/voice products, and at end-February 2015, 70% of its customers subscribed to two or more of its services (compared to 68% in February 2014 and 67% in February 2013), including 34% double-play (32% in 2014 and 30% in 2013) and 36% triple-play (unchanged in a year but down from 37% in February 2013). Cogeco enhanced its TV services offering with the launch of the interactive TiVo digital multi-screen platform in Ontario in November 2014, and in Quebec in March 2015. Cogeco opted for the TiVo in-home/mobile multi-screen solution after abandoning an IPTV project as a result of 'unexpected performance issues encountered with the platform', booking an impairment of CAD32.2 million related to the aborted IPTV development.

In July 2009 Cogeco launched 50Mbps (downstream) internet services based on DOCSIS 3.0 in selected areas of Ontario, before expanding the premium speeds across the majority of its cable footprint. Since then it has upped its top speed several times, with 'Ultimate' 120Mbps packages introduced in 2014, and by June 2015 Cogeco was offering a 250Mbps (download / 20Mbps (upload) broadband line (where available) with the option of a 525GB monthly data cap or 'unlimited' usage.

Cogeco Cable is also deploying fibre-to-the-home (FTTH) technology, although services were available on a limited basis in selected new residential developments as of June 2015, using a FTTH platform called Radio Frequency over Glass (RFoG) which has backward and forward compatibility with certain cable systems. As of mid-2015 Cogeco says it is deploying FTTH in 'all new residential developments which meet specific criteria of size, proximity to the existing plant and service penetration rate'.

Cogeco aims to utilise its network infrastructure to increase its penetration of the enterprise market. Its inter-city optical fibre transmission network spans at least 10,800km, while it has increased its infrastructure footprint through acquisitions, such as the March 2008 asset purchase of MaXess Networx, the telecoms division of EnWin Energy, the city of Windsor's energy utility. In July 2008 it made a similar but bigger purchase when it completed the CAD204 million acquisition of Toronto Hydro Telecom, the telecoms division of municipal energy utility Toronto Hydro Corporation. The subsidiary, since renamed Cogeco Data Services, came complete with extensive fibre infrastructure in Greater Toronto, with a portfolio of data communications and other services including Ethernet, private line, VoIP telephony, high speed internet access, dark fibre, data storage, cloud computing, data security and co-location to businesses and organisations in the area. Cogeco Data Services operates a network in Greater Toronto and Greater Montreal spanning at least a combined 2,250km connecting over 1,075 commercial buildings. This presence includes a 665km-plus fibre network connecting at least 680 commercial buildings in the Toronto area, and has been expanded via acquisitions such as Quiettouch and MTO (a fibre network in and around Montreal spanning over 1,500km and connecting roughly an additional 400 buildings).

Extending its business data provider capabilities, in April 2013 Cogeco completed the acquisition of Vancouver-based internet infrastructure operator Peer 1 for approximately CAD666 million, enhancing its data centre capabilities in key growth areas such as managed hosting, dedicated hosting, cloud services and colocation. Combined with Cogeco's existing data centre facilities the acquired operation served 10,000 additional businesses worldwide through 19 data centres and 21 points of presence (PoPs) across North America and Europe. Cogeco Data Services launched its 20th data centre, near Toronto, in June 2013, and claimed a total of 56 North American and European PoPs. In 2014 Cogeco reported that Peer 1 alone accounted for around 10% of its total group revenues, while in May 2015 the group announced it was merging Cogeco Data Services and Peer 1.

Cogeco also gives free access to its Wi-Fi hotspot network in Ontario for its broadband package subscribers, and by June 2015 it had rolled out more than 800 hotspots across at least 21 cities in the province, including Burlington, Oakville, Hamilton, Kingston and Windsor. In addition Cogeco Data Services inherited a Wi-Fi mesh network in Toronto built by Toronto Hydro. The municipal company set up 'The One Zone' as a commercial venture covering part of the downtown area; usage has been reported as 'steady' thanks to business travellers and downtown workers, although user numbers have not been reported.

At the end of February 2012 Cogeco sold its Portuguese cable subsidiary Cabovisao for a cash consideration of approximately CAD59.3 million, but in November 2012 it completed a new international acquisition, US cableco Atlantic Broadband, for USD1.36 billion. Atlantic Broadband is ranked the 13th-largest cable TV operator in the US.

CAPEX in Cogeco's Canadian cable services segment reached CAD214.4 million in its fiscal year ended 31 August 2014, a similar figure to the CAD216.0 million spent during the previous twelve-month period.

As of June 2015 Cogeco Cable was 32.0% owned by Cogeco Inc (which has 82.5% voting rights), with the remainder (subordinate voting shares or common shares) floated on the Toronto Stock Exchange (TSX). Cogeco Inc is itself controlled by Gestion Audem Inc (which owns over 70% of voting rights of Cogeco Inc, with below 20% of equity), and is listed on the TSX. Rival cableco Rogers Communications has increased its stake incrementally via the stock exchange (although denying any interest in a takeover bid); in November 2010 Rogers paid CAD39.2 million for 892,000 subordinate shares in Cogeco Cable and CAD35.7 million for 946,000 subordinate shares in Cogeco Inc, following which it owned 39.9% of Cogeco Inc's subordinate shares and about 35.5% of the company's equity. The Audet family, who control the bulk of voting rights in Cogeco, have not revealed any plans to sell in the near future.

Manitoba Telecom Services (MTS Allstream)

PO Box 6666
333 Main Street
Winnipeg, Manitoba R3C 3V6
Canada
Tel. +1 204 941 8244
Fax +1 204 958 3549
http://www.mts.ca
http://www.allstream.com

Manitoba Telecom Services (MTS) is the incumbent full-service telecoms provider for consumers and businesses in Manitoba, and provides national long-haul and business communications across Canada via its Allstream division, which it purchased in June 2004. MTS has rolled out xDSL broadband and next generation IP infrastructure across Manitoba, to support applications including digital broadcasting. It has also rolled out high speed

fibre-optic connections for commercial buildings, and is phasing in direct fibre access for consumers in selected areas under the 'FiON' banner (see below). As of June 2015 MTS's fixed broadband services covered 85% of Manitoba's residents, a percentage it has claimed since the end of 2007 after rolling out DSL access to ten additional communities that year. On 1 January 2010 MTS realigned its business units based on geographic markets instead of customer type. It replaced the 'Consumer Markets' division (which superseded its 'MTS (Manitoba)' division in 2006) with a new 'MTS' unit, and replaced its 'Enterprise Solutions' division (which superseded its 'Allstream (National)' division in 2006) with a new 'Allstream' unit. The corporate account base in Manitoba, previously part of the Enterprise Solutions division, became part of the MTS unit (joining the existing Manitoban consumer and SME base), and the small-business account base across Canada, previously part of the Consumer Markets division, moved over to the Allstream unit (alongside the existing nationwide medium-to-large business clients).

MTS is expanding fibre-to-the-home (FTTH) high speed access services for Manitoban consumers and businesses in phases. In 2010 it deployed a FTTH network in new-build neighbourhoods of Winnipeg, and three towns north of the city (Selkirk, St. Andrews and St. Clements). MTS set a target of rolling out FTTH and VDSL broadband access to 65% of Manitoban households by the end of 2014, in a project costing CAD125 million, and it surpassed this goal, claiming a combined FTTH/VDSL2 footprint of 70% of Manitoban homes by June 2015. The telco's 'FiON'-branded direct fibre services pass more than 120,000 homes in at least 16 towns and cities in MTS's home province providing IPTV and ultra-high speed internet to customers. The FTTH rollout has been integrated with existing VDSL networks in Winnipeg, Brandon and Portage (cities where 95% of homes have been served by VDSL or FTTH since 2011). Other FiON-served cities/towns include Selkirk, Dauphin, Steinbach, Thompson, The Pas, Opaskwayak Cree Nation and Lorette, among others.

By end-March 2015 MTS's national Allstream unit had 30,000km-plus of local and long haul broadband fibre-optic IP infrastructure over which it offers a full range of integrated communications solutions, including IP-VPNs. In addition to larger corporate clients, during 2008 the group expanded its previously Manitoba-only services for small businesses to selected cities in western provinces, and in 2010 MTS embarked on a three-year project to expand Allstream's IP fibre network, including extending direct fibre connections to 675 additional multi-tenant buildings that are within 200 metres of its existing national network, and enhancing Ethernet capabilities in its colocation areas. Allstream connected over 2,700 buildings to its IP fibre network by end-2012 and had over 3,100 on-net buildings by the end of March 2015.

In mid-2012 Allstream said it counted 'more than 65,000 businesses' — large, mid-sized and small — among its overall national customer base (across all services in its range), while at the end of March 2014 (latest available data) it disclosed that its IP connection services had 37,000 customers across Canada; it added that this represented nearly 600,000 connection points, with an average of 16 IP connections per enterprise customer (using services including 'IP Connectivity', 'Unified Communications', 'Managed IP Services' and a range of voice services).

MTS is depending on high speed internet access, wireless and other services to pick up the slack from its steadily declining local and long-distance telephony revenues. It launched IPTV over DSL connections in the Winnipeg area in January 2003 after winning a broadcasting licence the previous August, before expanding to the Brandon area. To support triple-play applications, it uses Microsoft's 'Mediaroom' multi-service software access platform and technology from Alcatel-Lucent. By 2011 95% of homes in Winnipeg were covered by the IPTV service, which offers video-on-demand (VoD) and high definition TV ('MTS Ultimate TV'). By June 2015 MTS's IPTV was available in locations including Winnipeg, Brandon, Portage La Prairie, Selkirk, Dauphin, Steinbach, Thompson and The

Pas, while at 31 March 2015 MTS had a total of 107,863 IPTV subscribers, although seeing growth of less than 2,000 net new IPTV users over a year.

In miscellaneous developments, in September 2006 MTS expanded its provincial reach by purchasing Valley Cable Vision, a rural cable and internet provider in southern Manitoba with 3,700 customers. In December 2010 the company sold the bulk of its IT consulting business, part of its enterprise division, to PricewaterhouseCoopers Canada, while in July that year MTS won a ten-year, CAD100 million contract from the government of Manitoba to provide IP network services. In September 2013 MTS acquired Epic Information Solutions, a provider of IT infrastructure and managed services, and in December that year it announced plans to build a new multi-tenant data centre in Manitoba, with the aim of positioning itself as 'a leading provider of server colocation, managed hosting and cloud services in Manitoba.' The operator also provides Wi-Fi wireless internet access hotspots in its home province.

In May 2013 MTS agreed an ill-fated deal to sell its Allstream national long-distance and business telecoms division to Egyptian-owned investment group Accelero Capital for CAD520 million; however, Accelero – the investment vehicle of Naguib Sawiris, a former investor in Canadian cellco Wind Mobile – was blocked from completing the purchase in October 2013 by a federal government decision, reportedly on unspecified 'national security' grounds. MTS Allstream's consolidated results were impacted by approximately CAD35 million due primarily to a combination of non-recoverable, transaction-related expenses and restructuring costs incurred in contemplation of the transaction.

Facing tough competition, MTS announced in May 2015 that it is cutting a quarter of the workforce at Allstream, whilst also reducing CAPEX at the unit.

Manitoba Telecom Services' ownership is fully distributed; it is listed on the Toronto Stock Exchange (TSX).

Eastlink

PO Box 8660, Station A
Halifax, Nova Scotia B3K 5M3
Canada
Tel. +1 902 4461939
Fax +1 902 4928580
http://www.eastlink.ca

Atlantic Canada-based Eastlink (formerly Bragg Communications) is the fifth largest Canadian cable TV provider by subscribers, which received its first cable licence in Nova Scotia in 1971, and was the first North American cableco to bundle triple-play CATV, internet and local telephony on one user bill in 2000. Eastlink today offers cable-based services in eight provinces: Nova Scotia, Prince Edward Island, Newfoundland & Labrador, New Brunswick (small-scale coverage), Quebec, Ontario, Alberta and British Columbia. It has grown via acquisition, purchasing twelve cable systems in Atlantic Canada in 1978-1998 including K-Right, Keddy's, Island Cable and Halifax Cablevision (which merged with Bragg Communications in 1998 under the Eastlink banner), while in 2001 it acquired Nova Scotia cable assets from Shaw Communications. In 2007 Eastlink acquired larger cableco Persona from a private equity consortium for an undisclosed price, giving it control of mostly rural networks in an additional seven provinces. Persona's units were rebranded under the Eastlink banner in phases, including Atlantic Canada in 2008, Ontario and Quebec in 2009 and Western provinces in 2010, with the exception of two Persona subsidiaries in British Columbia – Delta Cable (Fraser River Delta) and Coast Cable (Sunshine Coast), which have maintained their original brand. Along the way Eastlink acquired various other regional network operators, including: Amtelecom (2007, ILEC and cable TV provider in regions of south-western and central Ontario); Rush Communications (2007, Nova Scotia); Bluewater

(2008, south-western Ontario) and Northern Cablevision (rural Alberta). More recently, Eastlink agreed to buy Bruce County, Ontario-based quadruple-play telco Bruce Telecom from Kincardine municipal council for CAD26.5 million in January 2014. Eastlink's annual revenues reached CAD589.9 million – divided into CAD310.6 million ('cable'), CAD273 million ('internet', assumed to include IP-based telephony network revenues) and CAD6.3 million (advertising) – in 2010 (the most recently reported figures from the privately owned group), whilst annual net income reached CAD53.8 million. At the end of that year Eastlink reported 457,000 cable customers, a figure which it claimed had grown to roughly half a million by mid-2013, and at end-March 2015 it was estimated that the group had at least 550,000 cable customers across eight provinces, roughly 350,000 of whom subscribed to cable modem-based broadband internet – a 2.8% share of the overall market. The company has more than 1,700 employees.

Having launched Nova Scotia's first cable broadband service in Halifax in 1997, Eastlink has more recently been spending heavily to upgrade its various scattered cable network acquisitions, to expand advanced multi-play services including high speed broadband, home telephony and interactive TV features. In 2005 it was the first company in Atlantic Canada to introduce internet speeds up to 10Mbps, and upgraded to a 100Mbps top-speed in 2010 via DOCSIS 3.0 technology. March 2012 witnessed the launch of 200Mbps (download) cable broadband packages, initially available in and around Halifax, Nova Scotia, but steadily being expanded across Nova Scotia and other provinces. As of June 2015 the cableco's fastest download speed remained at 200Mbps, whilst a 'TV anywhere' platform ('Eastlink To Go') – launched in 2013 – enables customers to watch TV programmes on their computer, tablet or smartphone.

As of June 2015, premium high speed cable broadband (up to 200Mbps) under the Eastlink brand had comprehensive coverage across three provinces – Nova Scotia, Newfoundland & Labrador and Prince Edward Island – plus parts of New Brunswick, Ontario, Alberta, Quebec and British Columbia. In certain areas broadband at various speeds is offered under separate branding via sister operations (including Coast Cable and Delta Cable).

Supporting its widely distributed operations (which also include a non-cable presence in Manitoba), in 2010 Eastlink completed a coast-to-coast fibre transmission network that stretches from St. John's, Newfoundland, to Delta, British Columbia, and delivers residential and public sector/business communications services (offered since 2000).

Eastlink also offers a fixed-wireless internet service in some parts of rural Nova Scotia, but the Motorola Canopy-based network falls far short of original promises of covering '100% of civic addresses' in the province. In 2009 it launched the rural fixed-wireless service in Caledonia (in partnership with the Broadband For Rural Nova Scotia public sector initiative), and by mid-2015 it was available in locations including Lunenburg, Shelburne, Kings Counties, Annapolis, Hants, Digby, Yarmouth and Queens. Download/upload speeds are up to 1.5Mbps/500kbps. Eastlink was given until the end of 2014 by the provincial government to provide broadband internet services to 100% of residential and business premises in Nova Scotia. Around 99% of Nova Scotia's inhabitants already had high speed access, leaving approximately 1,000 unserved homes and businesses, mostly in relatively remote locations. Having not confirmed if its met the 100% target, it is likely that Eastlink could cover the required areas with its LTE mobile broadband services, launched in 2013 (see Wireless profile for details); it won additional 700MHz band LTE frequencies in February 2014, suited for expanding rural mobile broadband coverage.

The group's Eastlink International Holding unit made its first venture into overseas communications markets in the second quarter of 2011 when it bought Cable & Wireless Bermuda for around USD70 million, later that year renaming the Bermudan telco LinkBermuda.

Bragg Communications, trading as Eastlink, is part of the Bragg Group, which is privately owned by the Bragg family of Nova Scotia.

Xplornet Communications

300 Lockhart Mill Road
PO Box 9060
Woodstock, New Brunswick E7M 6B5
Canada
Tel. +1 506 328 8853
http://www.xplornet.com

Xplornet Communications (formerly Barrett Xplore) was established in 2004 and provides fixed-wireless and satellite internet services under the name Xplornet, with a strong focus on rural subscribers. Its broadband services are available in every Canadian province and territory: Ontario, Quebec, New Brunswick, Newfoundland & Labrador, Nova Scotia, Prince Edward Island, Manitoba, Alberta, British Columbia, Saskatchewan, Nunavut, Yukon and Northwest Territories. As the country's leading rural broadband provider, its customers' locations range from just outside of major urban centres to the farthest reaches of the country. Xplornet reported signing up over 200,000 broadband internet subscribers by the end of 2013, and was estimated to have increased this total to approximately 260,000 by end-March 2015 – a market share of 2.1%. The majority of these customers use WiMAX-type access networks or direct satellite broadband but the company aims to migrate many to a new Time Division-Long Term Evolution (TD-LTE) network (see below).

Xplornet rolled out pre-WiMAX 3500MHz fixed-wireless broadband networks in the two-year period 2007-2009 across regions including New Brunswick, western Canada and Quebec. The firm also won a number of government grants to fund rollouts to underserved rural communities, and in April 2009 the New Brunswick provincial government and Xplornet made an agreement under which all residents and businesses in the province were provided access to high speed services by July the following year. In October 2010 the operator began upgrading to 802.16e WiMAX under a USD75 million contract with Alvarion, covering the upgrade or installation of 1,200 towers, and launched commercially in Ontario in March 2011, before expanding to other regions, helped by various 3.5GHz spectrum transfer deals struck with other licensees. Xplornet's other existing solutions offered speeds of up to 5Mbps on pre-WiMAX connections or via 'Ka band' satellite-based services (initially offering up to 2Mbps, but upgraded to 3Mbps in April 2013). In 2012 Xplornet reported that it built over 50 new fixed-wireless '4G' WiMAX base stations (upgradeable to TD-LTE) and upgraded a further 100 existing towers that year, while by mid-2013 it disclosed that it had 385 active '4G' fixed-wireless WiMAX towers, all software-upgradeable to LTE standard, and by the end of 2014 Xplornet implemented further deployments/ upgrades to take its total to roughly 500 4G WiMAX/TD-LTE sites.

In December 2014 Xplornet launched commercial TD-LTE fixed-wireless broadband offering end-user speeds of 25Mbps in New Brunswick; several rural areas of the province were initially covered, around the communities of Fredericton, Moncton, Saint John, Miramichi, Dieppe, Sackville, Shediac, Bouctouche, Sussex, Woodstock, Grand Falls and St. Stephen, with more areas to follow. In March 2015 Xplornet's TD-LTE service entered its second province, Alberta, with 25Mbps packages offered to users in the Grande Prairie region, and in May 2015 it announced further rural locations in Alberta could now receive TD-LTE services. Xplornet says it will continue to roll out the upgraded speeds to other rural communities across Canada, aiming to make 25Mbps internet available nationwide by 2017.

Meanwhile, to assist its high speed wireless broadband expansion, in May 2015 Xplornet acquired 42 blocks of 2500MHz spectrum in rural areas across Canada in Industry Canada's auction, paying CAD25.43 million for licences across Newfoundland & Labrador, Prince

Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Alberta and British Columbia.

Under a plan to offer fixed-wireless/satellite broadband access to 'every Canadian', even in very remote communities, Xplornet purchased 100% of the capacity on two new satellites which went live during 2012 (ViaSat-1 and Hughes Network Systems' EchoStar XVII [formerly Jupiter]). Since February 2012 Xplornet has marketed a '4G satellite broadband' service nationally – expanding from a base of 400 dealers counted at the outset – focusing on rural and remote customers. The additional capacity from EchoStar XVII (capable of providing download speeds up to 25Mbps) expanded the high speed footprint in particular across British Columbia, Manitoba, New Brunswick and Newfoundland, while Xplornet's service coverage is augmented by existing capacity on additional Ka band satellites. In May 2014 Xplornet secured all of the residential capacity covering Canada on two upcoming satellites, ViaSat-2 and Echostar XIX (both set for launch in mid-2016), under contracts worth up to USD275 million and around USD200 million respectively, which the ISP said will boost connection speeds and data throughput for its customers with a multiplication of bandwidth efficiency.

Ploughing other revenue channels, in Q2 2012 Xplornet partnered Shaw Communications to launch a discounted package bundling Shaw Direct satellite TV channels and Xplornet's internet connections initially targeting rural markets in Ontario, Quebec and Alberta, before being rolled out on a national basis later that year.

Xplornet Communications Inc (formerly Barrett Xplore Inc) is privately owned. In October 2013 the ISP completed a CAD158 million private financing transaction, including CAD148 million of new debt and equity. Previous similar transactions included a CAD125 million financing in June 2012 (a combination of debt and equity from existing investors); this followed a CAD230 million funding tranche raised in 2011.

SaskTel

10th Floor
2121 Saskatchewan Drive
Regina, Saskatchewan S4P 3Y2
Canada
Tel. +1 306 777 5638
Fax +1 306 359 7475
http://www.sasktel.com

Regional full-service telco SaskTel was the first in Canada to roll out commercial ADSL services in late 1996. It allocated CAD310 million in the period 2006-2010 to a Next Generation Access Infrastructure (NGAI) programme, in addition to further spending on other IP-based projects including IPTV rollouts. The five-year NGAI programme boosted bandwidth for end-users in the province's ten largest urban areas, including the installation of fibre-to-the-curb (FTTC) in all ten cities. In June 2006 SaskTel contracted Alcatel to upgrade its IP network to provide bandwidth of up to 40Mbps and enable the spread of new services such as high definition TV (HDTV) and voice-over-internet protocol (VoIP) telephony; Alcatel previously provided SaskTel with its IP/MPLS, optical and access solutions as well as its middleware platform for TV services. SaskTel is also continuing to connect additional rural communities via fixed wireless access (FWA) technologies. In November 2008 the government of Saskatchewan and SaskTel announced a joint-funded three-year Rural Infrastructure Programme to deliver high speed internet to 100% of the province. The CAD129 million project involved an expansion of the existing rural CommunityNet high speed network, and a partnership with a satellite firm in order to provide access to the most remote areas; rural backbone infrastructure was also upgraded. At the end of 2010 SaskTel announced that 'high speed internet access services were available to 100% of the

Saskatchewan population', up from 99% (in 350 locations) in December 2009, 86% two years earlier and 75% in 2004. Additionally, as part of the Rural Infrastructure Programme, in rural areas SaskTel upgraded around 200 communities covered by its lowest-grade 'High Speed Internet Basic' services from download speeds of 1.5Mbps (maximum) to 5Mbps. Despite the previous claims of ubiquitous coverage, in March 2013 SaskTel revealed that it was expanding broadband internet to 50 additional rural Saskatchewan communities over the course of a year while upgrading 200 rural communities' existing broadband services to higher speeds.

In total, from 1987 to the end of 2011, SaskTel invested approximately CAD4 billion in its wireline, wireless and broadband networks. CAPEX in 2011 was CAD266 million, down by CAD39 million compared to 2010, but spending jumped upwards again in 2012 to CAD320 million, including CAD137 million on improving its wireline network and CAD50 million on the first phase of a fibre-to-the-premises (FTTP) project, which aims to deliver direct fibre broadband to businesses and consumers across Saskatchewan's nine largest urban centres by 2017. Having trialled services in selected areas of Regina and Saskatoon, in August 2012 SaskTel launched its first commercial FTTP services in Moose Jaw under the 'infiNET' banner, offering data speeds of up to 200Mbps/60Mbps (download/upload) and allowing up to seven High Definition (HD) IPTV set-top boxes in one home/premises. The FTTP launch forms part of a seven-year CAD670 million investment programme to deploy direct fibre to all areas of Saskatoon, Regina, Moose Jaw, Weyburn, Estevan, Swift Current, Yorkton, North Battleford and Prince Albert. The FTTP network passed 42,000 homes by end-2013 (with 16,000 connected to FTTH services), after SaskTel budgeted total CAPEX investment of CAD400 million that year (on wireless and fixed networks). Alcatel-Lucent is acting as the primary infrastructure provider to implement the direct fibre access programme, and the French-US vendor also partnered SaskTel in September 2013 in trialling fibre-optic data transmission enabling the delivery of data at speeds of up to 400Gbps over a network originally built for 10Gbps traffic, which the telco said could enable 'immediate' upgrade to 100G transmission, moving to 400G in the future as and when needed. FTTP rollouts continued in spring 2014 when the infiNET network reached Prince Albert, and by January 2015 the FTTP network passed over 100,000 homes in Saskatchewan, offering commercial data speeds of up to 260Mbps, with a 40% take-up rate in premises passed by the network (i.e. over 40,000 customers connected to direct fibre). SaskTel has budgeted CAD313 million in CAPEX for 2015, up from CAD282.7 million spent in full-year 2014, of which CAD177 million is being allocated for the core Saskatchewan network, while CAD45 million is earmarked for its FTTP network to connect 18,000 additional fibre homes in Regina, Saskatoon, Moose Jaw, Prince Albert and Swift Current (compared to CAD50.4 million FTTP CAPEX in 2014).

Between 2012 and 2014, SaskTel migrated users of a legacy rural high speed wireless internet service to a new TD-LTE system, returning the legacy Wireless Broadband Internet (WBBI) spectrum to the regulator after receiving an extension to 31 March 2015 (just ahead of an April 2015 spectrum auction). In September 2013 SaskTel launched its new TD-LTE-based fixed-wireless internet service, under the 'Fusion' banner, and by the end of 2014 it had 59 operational TD-LTE base stations across the province, with the service providing connection speeds of 5Mbps.

Elsewhere, SaskTel shut down its government-backed 'Saskatchewan! Connected' free Wi-Fi service (which had been available in four cities) in September 2013, but stressed that it continued to provide free Wi-Fi in selected areas and intends to continue deploying hotspots as demand dictates.

At the end of March 2015 SaskTel had an estimated 260,000 fixed broadband internet customers, up from 258,500 at the start of the year and 255,500 at end-March 2014. It maintains an approximate share of over 70% of all internet access customers in its home province. SaskTel's IPTV services under the 'Max Entertainment' banner reached 103,000

customers in Saskatchewan at the same date; the IPTV service includes video-on-demand (VoD), and has included HDTV since October 2006.

The telco posted annual revenues in 2014 of CAD1.231 billion, up from CAD1.206 billion the previous year, driven by wireless, IPTV ('maxTV'), internet and data services which offset the ongoing decline in traditional wireline services. Annual net profit fell to CAD76.4 million from CAD90.7 million due to continued investment in networks.

SaskTel is a wholly owned subsidiary of Crown Investments Corporation.

Wireline

Market Commentary

At the end of December 2014 Canada was home to an estimated total of 17.19 million PSTN and voice-over-internet protocol (VoIP) telephony lines, down 3.5% from 17.82 million a year earlier, and having fallen by more than three million lines in five years from 2009's total of 20.35 million. Of these, Canada's nine largest fixed telephony players collectively accounted for 15.78 million local voice lines at end-2014, down by 3.5% or 585,000 net lines from 16.36 million at end-2013, in keeping with the recent trend that has seen the main protagonists losing a combined net annual total of roughly half a million lines per annum. However, the aggregated results from these nine heavyweights – Bell Canada (including Bell Aliant), Telus Communications, Shaw Communications, Videotron, Rogers Communications, Manitoba Telecom Services (MTS Allstream), Cogeco Cable, Saskatchewan Telecommunications (SaskTel) and Eastlink – does not tell the whole story. The four largest traditional PSTN operators Bell, Telus, MTS and SaskTel all lost subscribers in 2014 as they had done for the preceding ten years in a row, shipping an aggregate 606,000 PSTN lines in twelve months, although it was noted that this drop was slightly less steep than the 759,000 wireline connections lost by the quartet in 2013, which was in turn less than the 823,000 lines they shed in 2012. Meanwhile, the group of five major multi-service cable TV network operators which had spent the last decade steadily increasing their telephony bases – at the expense of the PSTN operators – finally reached the point of customer base stagnation in 2014, adding just a net 10,000 cable telephony users between them. The large cablecos – Rogers, Videotron, Shaw, Cogeco and Eastlink – had seen their collective annual IP voice line additions diminish from 129,000 lines added in 2013, 286,000 in 2012 and 370,000 net additions in 2011. Predominantly cable-based, Rogers' remaining PSTN enterprise-only user base also continued to diminish over the same period; historically, Rogers offered both PSTN and cable voice services to residential users, but it completed the phasing-out of PSTN lines in the consumer segment in 2011, with its legacy PSTN services now purely in the business market.

When comparing the recent financial and operational performance of PSTN/cable voice telephony operations, the cablecos have clearly come out on top, achieving an upward revenue and customer trend in contrast to the PSTN-based telcos' downward slide. However, since 2011 the picture has been less clear cut, as cablecos too begin to feel the pressure from competition in the mature telecoms market, and PSTN operators' triple-play convergence strategies boost their ability to retain existing customers and win new ones from cablecos. Since the advent of price deregulation in the urban local telephony sector in July 2007 (see Wireline Key Legislation), PSTN operators now have the freedom to offer bundled service tariffs in local telecoms exchange areas which have been deregulated (the so-called 'forborne exchanges')—i.e. in the majority of areas which have adequate competition. Partly due to the incumbents' ability to compete effectively via their triple-play and quadruple-play ranges, the aforementioned group of large cablecos' combined voice subscriber volume growth has slowed, while other factors include natural drop-off in the cablecos' subscriber growth rate as they satisfy demand in a given area, as well as experiencing the same mobile substitution faced by PSTN services – and to some extent substitution for access-independent VoIP services (see below). In general, the cablecos seem unconcerned by the weak demand for new voice lines, as they focus on growing broadband subscriptions and higher value add-on content services.

Local and long-distance retail wireline revenues have fallen steadily, from CAD11.403 billion in 2009 to CAD9.493 billion in 2013, and an estimated CAD9 billion in 2014. Nonetheless, the CRTC says that there remain over 100 providers of local access services

and over 150 providers of long-distance services. In addition to its large incumbent local exchange carriers (ILECs) – Bell Canada (including Bell Aliant), Telus, MTS and SaskTel – Canada was home to 32 independent small ILECs (or SILECs) as of June 2015 (excluding regional players owned by large national groups), down from 36 in 2010. SILECs historically were regional monopoly service providers prior to the introduction of competition. They offer a host of services including local, long-distance, wireless, internet, data and private lines. SILECs are either municipally or independently owned, and serve mainly rural areas, typically with fewer than 25,000 subscribers, between them accounting for less than 2% of the population. Because of the limited size of their footprints, they tend not to provide facilities-based long-distance services, but they do offer a range of local voice, data, internet and wireless services.

According to the CRTC the market played host to 69 competitive local exchange carriers (CLECs*) at end-June 2015, up from 65 at mid-2014, with 50 CLECs listed five years earlier in mid-2010. The CLECs have taken sizeable chunks out of the incumbents' market shares, especially in urban areas.

In terms of the revenue market share of ILECs in their respective areas (excluding their out-of-territory operations), in 2013 (latest available figure) the ILECs retained a 70% share of local access turnover, down from 79% in 2009. Also in 2013 the ILECs claimed 64% of long-distance revenues (including calling cards), down from 65% the previous year (although up from 60% in 2009).

Resellers first entered the telecoms sector via the long-distance market in the late 1980s, and there were 742 such operators registered with the regulator as of mid-2015, up from 668 a year earlier, and 604 at mid-2013. Since they do not own transmission facilities, resellers are not classed as domestic carriers and so are not subject to foreign ownership restrictions, neither are they subject to rate regulation. Resellers are generally focused on domestic long-distance (DLD)/international long-distance (ILD) services but also provide business customers with local and other services, and residential customers with internet access. One prominent example is Primus Telecommunications Canada, also a well-established VoIP provider. In April 2010 Primus said it had over one million customers across a service range of long-distance and local telephony, VoIP, wireless and ADSL/dial-up internet (with no more recent figures available, although the company's overall user base is thought to have declined). As of June 2014 Primus presents itself as the largest 'alternative telecommunications service provider' in Canada, although anecdotal evidence claims that Yak Communications (part of the Globalive group) is the largest long-distance call reseller. The CRTC reported that in 2013 (latest available figure), the 'top five' resellers earned 2% of revenues in the telecom market, virtually unchanged from the previous year.

The four largest cablecos by revenues — Rogers, Shaw, Videotron and Cogeco — all launched their 'primary line' local cable telephony services in 2005, based on their own managed VoIP-based networks, also referred to as 'access-dependent' VoIP. Eastlink was the first cableco to launch local telephony services, in Atlantic Canada way back in November 1999. As another alternative, access-independent (or unmanaged) VoIP lines numbered 1.033 million at end-2013 (latest available figure at end-June 2015), up from 861,000 a year earlier, and 404,000 at end-2011, the CRTC reported after restating previous data. In January 2004 Primus was the first to launch a VoIP service (subsequently branded 'TalkBroadband') in Canada, which it marketed to its roughly 900,000 (at the time) long-distance resale customers. Navigata (subsequently bought by SaskTel) launched three months later in eight cities in Alberta and British Colombia, and the following July Sprint Canada (now part of Rogers) launched a VoIP service for residential and SOHO users. High profile US-based operator Vonage has also focused on marketing local 'nomadic' VoIP services in provinces across Canada. Responding to the growing threat from VoIP, Bell Canada initially launched its own residential IP telephony service in January 2005, despite the risk of cannibalising its own revenues, but changed its mind in February 2008 and stopped actively marketing the service. Meanwhile, Telus declined to extend its business-user VoIP service to the consumer

segment, until a cautious indication at the end of 2010 when the telco disclosed that it was deploying residential IP-based voice technologies into 'fibre-based communities' and was working with vendors and other industry players to assess the technical applicability and evolving cost profiles of proactively migrating legacy customers onto IP-based platforms. However, the aforementioned SaskTel/Navigata service, branded WebCall, was discontinued by the Saskatchewan telco in March 2009 because of rock-bottom subscriber take-up. It seems that there is not room for everybody in the pure VoIP market, and the ILECs' cautious strategies in this field can only partly be explained by the regulator's previous reluctance to give them freedom in setting their own IP tariffs (granted alongside PSTN tariff deregulation, see VoIP Legislation).

In December 2012 consumers and businesses in the far northern Canadian communities of Yellowknife, Whitehorse and Inuvik were offered a choice of local telephony provider for the first time, when Iristel expanded its VoIP-based local telephone service to the North. Iristel's CLEC local phone service is being sold in Yellowknife through Iristel's associate ICE Wireless and Global Storm; in Whitehorse through Midarctic Technology Services and Polar Group ICT; and in Inuvik by New North Networks, with customers allowed to keep their existing fixed phone numbers. Previously, Northwestel, part of Bell Canada, was the sole local telephony provider in the far northern regions. In December 2013 the CRTC set forth a framework under which Northwestel must modernise its fixed and mobile networks over the next four years at a cost of CAD233 million.

Notes: *CLEC services include ILECs' out-of-territory operations, e.g. Bell Canada (incumbent in Ontario and Quebec) offering services in western Canada.

Small Incumbent Local Exchange Carriers

Ontario	Quebec	British Columbia
Amtelecom Limited Partnership	CoopTel	CityWest
Brooke Telecom Co-operative Ltd.	La Cie de Telephone de Courcelles Inc.	
Bruce Telecom	La Compagnie de Telephone de Lambton Inc.	
Cochrane Telecom Services	La Compagnie de Telephone de St-Victor	
Execulink Telecom Inc.	La Compagnie de Telephone Upton Inc.	
Gosfield North Communications Co-operative Limited	Le Telephone de St-Ephrem inc.	
Hay Communications Co-operative Limited	Sogetel inc.	
Huron Telecommunications Co-operative Limited	Telephone Guevremont Inc.	
Lansdowne Rural Telephone Co. Ltd.	Telephone Milot Inc.	
Mornington Communications Co-operative Limited		
Nexicom Telecommunications Inc.		
Nexicom Telephones Inc.		
North Frontenac Telephone Corporation Ltd.		
NRTC Communications		
Ontera		
People's Tel Limited Partnership		
Quadro Communications Co-operative Inc.		
Roxborough Telephone Company Limited		
TBayTel		
Tuckersmith Communications Co-operative Limited		

Ontario	Quebec	British Columbia
Wightman Telecom Ltd.		
WTC Communications		

Notes: Northwestel (Yukon, North West Territories, Nunavut), NorthernTel/Telebec (Ontario, Quebec), Dryden Municipal Telephone System (Ontario) and Kenora Municipal Telephone System (Ontario) are all excluded from SILEC list due to being owned by the BCE (Bell Canada / Bell Aliant) group.

Sources: CRTC, operators

Networks

Provider Name	Local Access Type	Licence(s)
Bell Canada Enterprises (BCE)	Wireline	Local, Long-distance, International
Cogeco Cable	Cable	Local, Long-distance, International
Eastlink	Cable	Local, Long-distance, International
Manitoba Telecom Services (MTS Allstream)	Wireline	Local, Long-distance, International
Rogers Communications	Wireline	Local, Long-distance, International
Rogers Communications	Cable	Local, Long-distance, International
SaskTel	Wireline	Local, Long-distance, International
Shaw Communications	Cable	Local, Long-distance, International
Telus Communications	Wireline	Local, Long-distance, International
Videotron	Cable	Local, Long-distance, International

Annual Statistics by Operator

Provider Name	Type	Reporting Period	2009	2010	2011	2012	2013	2014
Bell Canada Enterprises (BCE)	Total lines (PSTN)	December	9,788,221	9,251,579	8,730,431	8,136,309	7,595,569	7,130,852
Cogeco Cable	VoIP subscribers	September	281,608	357,597	418,270	471,484	484,000	469,273
Eastlink	VoIP subscribers	December			145,000	170,000	190,000	200,000
Manitoba Telecom Services (MTS Allstream)	Total lines (PSTN)	December	579,413	553,663	530,896	507,007	486,833	467,860
Rogers Communications	Total lines (PSTN)	December	383,000	192,000	109,000	65,000	40,000	30,000

Provider Name	Type	Reporting Period	2009	2010	2011	2012	2013	2014
Rogers Communications	VoIP subscribers	December	937,000	1,003,000	1,052,000	1,074,000	1,153,000	1,150,000
SaskTel	Total lines (PSTN)	December	543,000	528,546	514,351	492,070	464,204	437,486
Shaw Communications	VoIP subscribers	September	829,717	1,096,306	1,233,041	1,363,744	1,359,960	1,375,334
Telus Communications	Total lines (PSTN)	December	4,048,000	3,739,000	3,593,000	3,406,000	3,254,000	3,169,000
Videotron	VoIP subscribers	December	1,014,000	1,114,300	1,205,000	1,264,900	1,348,500	1,349,000

Notes: Company figures may not sum to country total due to variations in metrics reported by the companies and on occasion unavoidable double-counting. Total Lines (PSTN) represents all lines in service which the company owns (retail and wholesale), while Retail Lines (PSTN) and Local Subscribers (PSTN) represent the lines/subscribers of the company's own service/brand (and as such excludes wholesale services).

Annual Country Mainlines Growth

Year	Total (PSTN + VoIP)	Total Growth	Total Pen.	PSTN Lines	PSTN Pen.	VoIP Subs	VoIP Pen.
2009	20,350,000	-2.9%	157.1%	16,900,000	130.5%	3,450,000	26.6%
2010	19,936,000	-2.0%	152.1%	15,950,000	121.7%	3,986,000	30.4%
2011	19,450,000	-2.4%	146.0%	15,100,000	113.4%	4,350,000	32.7%
2012	18,855,000	-3.1%	139.7%	14,150,000	104.8%	4,705,000	34.9%
2013	17,820,000	-5.5%	130.2%	12,947,000	94.6%	4,873,000	35.6%
2014	17,188,000	-3.5%	124.2%	12,298,000	88.9%	4,890,000	35.3%

Mainline Growth
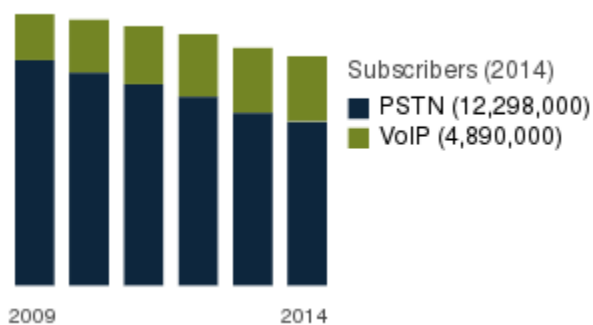
Sources: *CRTC, operators, estimates*

Main Players

Bell Canada Enterprises (BCE)

1 Carrefour Alexander Graham Bell
Building A, 4th Floor
Verdun, Quebec H3E 3B3
Canada
Tel. +1 888 9326666
Fax +1 514 7665735
http://www.bce.ca
http://www.bell.ca

Bell Canada, the country's largest fixed telecoms operator and integrated communications group, was incorporated in 1880 by a Special Act of the Parliament of Canada and took its current corporate form as Bell Canada Enterprises (BCE) in 1983 under the Canada Business Corporations Act (April 1982). The company's 'Wireline' division covers services including local and long-distance telephony, high speed internet (xDSL and direct fibre), IP-based voice and data services for businesses, direct-to-home (DTH) satellite-based television ('Bell TV') and IPTV ('Fibe TV' / 'FibreOP TV'). In Q4 2014 Bell Aliant – the incumbent regional telco in Atlantic Canada which previously operated as a separate sister telco of Bell Canada – was fully consolidated by Bell Canada Enterprises (BCE) and integrated into the Wireline division/reporting area (see table on Bell Canada company profile page for historical Bell Aliant figures). Before the integration of Bell Aliant, Bell Canada operated its fixed network services mainly in Ontario and Canada, whilst businesses in western Canada are served via another wholly owned division, Bell West. Another subsidiary, Northwestel, operates across the vast but sparsely populated Far North regions – Yukon, Northwest Territories and Nunavut (plus parts of northern British Columbia).

Bell Canada is the largest local access carrier in Canada, although its overall PSTN line total fell from 7.596 million at the beginning of 2014 to close out the year with 7.131 million (with all figures now including Bell Aliant). At that date residential users made up 53.5% of the total, down slightly from 54.0% three years before. The rate of line loss suffered by Bell's consumer fixed line service (named 'Bell Home Phone' since August 2008) saw a recent slowdown, helped by regulatory changes in April 2007 giving it greater control over tariffs and freedom to offer discounted service bundles as well as actively pursue all former customers. It re-introduced the multi-service 'Bell Bundle' in May 2007 to focus on signing up users to two or more products from: Home Phone, Long-Distance, Internet, TV and Wireless. Between August 2007 and 2012 the Canadian Radio-television and Telecommunications Commission (CRTC) approved Bell's applications for deregulation of local telephony service tariffs in areas representing over 90% of its residential access lines in Ontario and Quebec (more than 220 areas) and over 80% of its business lines in the two provinces (more than 60 areas). However, although the line loss rate slowed in 2011 – attributed to the company's residential service bundling capabilities largely driven by the increasing availability of IPTV, competitive retention offers, and customer win-back strategies – this still represented a line loss of 5.9% or 374,000 of its total, and in 2012 the rate of erosion climbed to 7.5% as Bell lost a net 457,000 lines that year, before shedding another 403,000 lines in 2013 and a further 465,000 lines in 2014.

Residential net line losses in full year-2014 stood at 299,000 (leaving it with 3.816 million consumer telephony subscribers) compared to losses of 288,000 in 2013, 336,000 in 2012, and 333,000 in 2011, driven by competition and technological substitution to wireless and internet-based services (although Bell noted lower rates of customer churn in Fibe TV coverage areas). Business PSTN access line losses stood at 166,000 in 2014, more than the 115,000 business lines shed in 2013, blamed on the ongoing conversion of voice lines to IP-

based services, continued weak demand for new installations, and higher wholesale customer deactivations.

Bell's total local access lines at the end of Q1 2015 were 7,017,161, a 6.0% decline compared to twelve months earlier (pro forma); this included a beginning-of-year adjustment to reduce subscribers by 4,409 for deactivations as a result of the CRTC's decision to eliminate a 30-day notice period required to cancel services. Local access revenues declined 5.0% to CAD824 million in the first quarter of 2015, a slight improvement over the 6.2% erosion in Q1 2014. Long-distance telephony revenues were down 5.8% to CAD213 million in Q1 2015, a significant improvement over the 12.1% year-over-year decline experienced in 1Q14, reflecting increased sales of international long-distance minutes.

Bell Canada's 16,000km-plus fibre-optic backbone reaches all major and many smaller metropolitan centres in Canada as well as New York, Chicago, Boston, Buffalo and Seattle. In February 2008 Bell announced the completion of its national transport network with the 286km Whistler-Vancouver fibre-optic cable. In September 2008 Bell bought 40Gbps fibre-optic technology from Nortel Networks to quadruple maximum transmission speeds on its Montreal-New York, Toronto-Chicago and Toronto-Montreal long-distance routes, and during 2011 it completed the 40Gbps transmission upgrade of fibre spanning more than 7,800km across Canada. The next backbone upgrade phase began in 2012, under which Bell has deployed 100Gbps technology in stages on key traffic routes.

The company is aiming to migrate 100% of its core traffic onto its national IP/MPLS network. By the end of 2005 78% of what it terms 'migrateable traffic' on its core network was IP-based, and a year later it reported that the process of moving traffic from circuit-based infrastructure to IP technology was ongoing, without giving statistics. In the second half of 2007 it said the transition to the newer transport platform was 'accelerating', and in Q1 2008 the telco reported to TeleGeography simply that migrations would continue to be driven by client demand. Since the end of 2008 it said that all 'NGN services', such as virtual private networks (VPNs, see below), were now exclusively delivered over IP infrastructure. In addition, the company's domestic metropolitan networks provide access to IP-based services at Gigabit speeds while continuing to provide for traditional voice and data services. To reach high value business customers, Bell Canada has placed over 320,000 fibre strand kilometres in most cities in Ontario, Quebec and the Atlantic provinces, as well as in western cities such as Vancouver, Edmonton, and Calgary. These systems also provide for the transport of internet traffic to and from high speed customers.

In terms of IP solutions, Bell Canada has aggressively rolled out services to business customers. It is phasing out a range of legacy data services including frame relay and ATM to encourage corporate clients to switch to IP-based services such as IP VPNs. Bell has offered voice-over-internet protocol (VoIP) telephony to business customers since 2004, and in January 2005 it launched a similar service for consumers under the name Digital Voice, which it rolled out to several major cities over the next two years, promoting it as a 'primary line' substitute for traditional fixed line services but with the benefit of advanced features. A lower cost 'secondary line' version was also rolled out with a wider coverage area across Ontario and Quebec. However, the telco ceased investment and marketing for Digital Voice in February 2008.

Demonstrating some of the ongoing trends in wireline, a government 'cut-the-cord' programme is aimed at phasing out a large number of 'Bell Centrex' lines, of which 273,000 were provided to federal government departments in Ontario and Quebec at March 2014 (down from 295,000 two years earlier), with a total of around 120,000 of these lines earmarked for deactivation in 2014/15 to save CAD28.8 million on the federal telephone bill. At one department alone – Shared Services Canada – an estimated 50,000 lines are to be dumped by that agency alone over three years by moving to a VoIP-based calling service, while other state departments are moving to cellular-based options, although 'security concerns' are said to have slowed this programme down.

Bell Aliant Consolidation

Bell Canada Enterprises decided in July 2014 to buy out public minority shareholders in its associated subsidiary Bell Aliant for a total consideration of approximately CAD3.95 billion. BCE concluded the initial phase of the Bell Aliant share offer in September 2014, and the 100% buyout and delisting was announced as complete on 1 November 2014. Before the 100% buyout, BCE owned 44.1% of Bell Aliant, which on 1 January 2011 changed its name from Bell Aliant Regional Communications Income Fund when it reverted to a corporate structure from an income trust.

Bell Aliant History

Atlantic Canada-based Bell Aliant (formerly Aliant Telecom) was formed in 1999 from the merger of NBTel, Island Telecom, Maritime Telegraph & Telephone Company and NewTel Enterprises. Under a restructuring strategy unveiled by its controlling owner BCE in March 2006, Aliant's wireline assets – in Nova Scotia, Prince Edward Island, New Brunswick, and Newfoundland & Labrador – were merged with Bell Canada's rural telephony business in Ontario and Quebec. The new Bell Aliant also took a controlling stake in regional fixed line operator Bell Nordiq, including small incumbent local exchange carriers (ILECs) NorthernTel and Telebec, while Aliant Mobility with around 750,000 mobile subscribers was transferred to Bell's wireless division Bell Mobility. Telebec and NorthernTel had a combined total of around 250,000 local access lines at the time of their merger into Bell Aliant. Elsewhere, in 2008 Bell Aliant bought Kenora Municipal Telephone System, a small ILEC in northwest Ontario and in January 2013 it purchased Dryden Municipal Telephone System in northern Ontario to fill in coverage gaps. Following the Canadian Radio-television and Telecommunications Commission's (CRTC's) introduction of local telephony price deregulation for ILECs in August 2007, by the end of 2013 Bell Aliant had been granted the freedom to set tariffs and customise service bundles (regulatory 'forbearance') in approximately 200 local exchange areas for residential services and around 50 exchanges for business services, spread across all six of its provinces. These exchanges translated to approximately 45% of the residential local telephone lines in the Bell Aliant footprint and a third of business local lines, with the relatively low percentages reflecting the rural nature of much of Aliant's coverage zones, as deregulation centred on urban (i.e. the most competitive) markets. Aliant completed the Eastern Ontario Regional Network backbone (with core fibre infrastructure covering approximately a million residents in the region) in 2012, while at the end of 2013 it completed a 2,040km fibre network serving 20-plus First Nations communities in the remote regions of northwestern Ontario.

Attempted Takeover of Bell

A long-running buyout deal for BCE collapsed in December 2008; in June 2007 BCE had agreed to its proposed 100% takeover by a consortium led by its then-largest single stakeholder Ontario Teachers' Pension Plan and including US investment funds Providence Equity Partners, Madison Dearborn Partners and Merrill Lynch Global Private Equity, and Toronto-based Dominion Bank. Shareholders voted overwhelmingly in favour of a CAD51.7 billion cash and debt buyout in September 2007, and by March 2008 the Competition Bureau and the Canadian Radio-television and Telecommunications Commission (CRTC) added their approval. A completion target of May 2008 was missed, as legal challenges were brought by Bell bondholders claiming the debt-heavy deal unfairly devalued bonds; the following month the Supreme Court rejected the case. In July 2008 terms were finalised with banks funding the purchase, but the deal could not be closed following a crucial report from auditor KPMG in late November 2008 which ruled that a post-buyout BCE would fail a solvency test under a huge debt load. In May 2009 Ontario Teachers' Pension Plan reportedly sold most of its BCE shares.

Note: see also www.bellaliant.net

Bell Canada Enterprises Inc (BCE) has fully distributed ownership; its shares are listed in Canada on the Toronto Stock Exchange (TSX) and in the United States on the New York Stock Exchange (NYSE). Its shares are approximately 85% Canadian-owned.

Telus Communications

555 Robson Street
Vancouver, British Columbia V6B 3K9
Canada
Tel. +1 604 432 2151
Fax +1 604 432 2151
http://www.telus.com

Telus Communications is the second biggest telco nationwide after Bell Canada in terms of both combined fixed network voice and internet users, and by total fixed line and broadband revenues. It was formed in January 2001 from the merger of Telus and BC Telecom, based in Alberta and British Columbia respectively. The merger, together with the August 2001 acquisition of QuebecTel (now Telus Quebec), created the largest fixed line operator in western Canada and the second largest in the country after Bell Canada. Parent group Telus Corporation formed a nationwide wireless unit, Telus Mobility (the trading name of Tele-Mobile Company), in the same year through an amalgamation of Telus Communications' wireless operations in Alberta, British Columbia and Quebec, and, later, the wireless operations of Clearnet. In November 2005 Telus Corporation merged the operational structure of Telus Mobility and Telus Communications, although the two remain distinct companies, the latter based in British Columbia and the former headquartered in Ontario. As part of its restructuring, Telus has simplified its main reported business areas to 'Wireline' (including internet/data) and 'Wireless'.

Telus is a full service incumbent local exchange carrier (ILEC) in western Canada (British Columbia and Alberta) and eastern Quebec offering local, long-distance, data, internet, entertainment (including IPTV) and other services to consumers and businesses; its wireline network gives access to almost every urban and rural home and business in its incumbent territories. It also provides local and long-distance wireline services, data, IP and managed services in other regions as a competitive local exchange carrier (CLEC), while its Partner Solutions division serves wholesale customers including full-service carriers, resellers, internet service providers (ISPs), CLECs and cable TV companies. In its core markets of British Columbia and Alberta, it was estimated that Telus' share of residential local telephony subscribers dropped below 50% for the first time in 2012, down from 54% two years earlier, and compared to around 66% at the end of 2008. Telus and cable-based rival Shaw Communications compete fiercely in western Canada, with Telus recently losing residential fixed line telephony customers to managed voice-over-internet protocol (VoIP)-based local cable services offered by Shaw as well as access-independent VoIP providers such as Vonage. In the corporate segment, Telus has invested effort in raising its profile amongst large clients, and in 2009 began a seven-to-ten-year contract worth up to CAD900 million with the Government of Quebec, to deliver and manage the province's next generation data network.

Telus's number of local access lines in service decreased by 2.6% year-on-year to 3.169 million at the end of 2014, following a 4.4% drop in 2013, and a 5.2% decline in 2012. Also in 2014 residential lines fell by 5.3% (compared to 7.0% the previous year) to 1.556 million, and business lines increased by a tiny fraction (halting a declining trend of the last few years) to 1.613 million. It is notable that during that year Telus' business fixed lines overtook its residential lines for the first time, while it claims to provide fixed (office) and mobile communications solutions to more than 250,000 small and medium-sized enterprises (SMEs) across Canada.

Between 2007 and 2012 Telus received approval for deregulation of local telephony services in regional markets covering more than three-quarters of its residential lines (mostly in non-high cost, i.e. urban, areas) across its ILEC footprint of British Columbia, Alberta and eastern Quebec, as well as at least 75% of business lines in the same areas. The regulatory changes allowed Telus to set its own prices, offer improved value service bundles and make immediate 'win-back' marketing approaches to customers who switch providers, giving it ammunition to fight back against the predominantly cable-based CLECs which have been eating away at its core customer base.

In 2001 Telus activated its 10,000km-plus coast-to-coast fibre-optic backbone network which interconnects cities between Halifax and Vancouver and extends into the US via points of presence (PoPs) in Albany, Buffalo, Chicago, Detroit, New York and Seattle. The network is fully integrated with Telus's extensive metropolitan networks in Alberta and British Columbia and connects into networks constructed in Montreal, Ottawa, Toronto and elsewhere. The company began migrating toll voice traffic onto its next generation network (NGN) in July 2003. By mid-2005 it had transferred 100% of its long-distance voice traffic to IP, as part of its ongoing transformation of the Telus network to a single IP platform designed to carry all voice, video and data applications. In the end-user market, Telus offers carrier-grade hosted and managed VoIP telephony to businesses in Ontario and Quebec under the 'IP-One' banner, launched in 2004, but has been reluctant to commit full-blooded investment to an equivalent service for residential customers.

However, at the end of 2010 Telus disclosed that it was deploying residential IP-based voice technologies into 'fibre-based communities' and is working with vendors and other industry players to assess the technical applicability and evolving cost profiles of proactively migrating legacy customers onto IP-based platforms. Telus' ongoing investments in fibre-to-the-node (FTTN) and access technologies such as fibre-to-the-home (FTTH) and VDSL2 (see Broadband section) should enable a smoother future evolution of IP-based telephony. Demonstrating the possibilities, Telus' new business VoIP platform can also support consumer services and over-the-top capabilities. In 2012/13 Telus continued developing its next generation IP telephony solutions for business users, with which it intends to replace existing, 'end-of-life' business VoIP platforms as well as taking advantage of the capabilities of fibre access. In December 2013 Telus contracted Ericsson to deploy an IP Multimedia Subsystem (IMS), for the purpose of offering convergent services in voice, data and video calling over both wireline and wireless networks.

In the three months ending 31 March 2015 Telus' wireline voice revenue declined by 7.5% year-on-year to CAD382 million. This was in direct contrast to the wireline division's data services and equipment turnover, which climbed 7.2% to CAD903 million in the same quarter.

Telus Communications is a wholly owned subsidiary of Telus Corporation, which is a distributed company listed on the stock markets in Canada (TSX symbol: T) and the US (NYSE symbol: TU). At 1 January 2015 the company estimated that its ownership was 84% Canadian, whilst approximately 70% of shares were held by institutions and 30% by retail investors. Under a move approved in October 2012 Telus reformed its legacy dual-class shareholding structure by exchanging its non-voting shares into common shares on a one-for-one basis; common shares were subsequently listed on the NYSE for the first time.

Rogers Communications

333 Bloor Street East
10th floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 416 935 3532

Rogers Communications' hybrid fibre-coaxial (HFC) cable network infrastructure passed around 4.09 million households by June 2015, offering triple-play internet, TV and telephony services. Around 90% of its cable TV subscribers are in Ontario, with other clusters in New Brunswick and Newfoundland & Labrador. It also operates as a national, full-service facilities-based alternative telecoms provider, offering cable voice-over-internet protocol (VoIP)-based local access, long-distance and internet services to residential customers in Canada's largest metropolitan areas. For businesses and government departments, it offers local, enhanced voice, long-distance, data and IP solutions. Rogers' residential local telephony services are offered under the Home Phone brand, and are exclusively based on cable after circuit-switched platforms were phased out in 2011 (see below). Business customers are served by Rogers' Business Solutions (RBS) division, which has consolidated a string of fibre network and business services providers in recent years (see Broadband section for details). Rogers operates a North American transcontinental fibre-optic network extending over 38,000 route kilometres, connecting Canada's largest markets while also reaching key US markets.

The Home Phone brand was launched on 1 July 2005 following the acquisition of Call-Net and its wholly owned subsidiary Sprint Canada. In an earlier deal with Bell Canada in November 2004, Call-Net had agreed to acquire over 4,500 business customers and network facilities in eastern Canada; the deal was completed in the third quarter of 2005, adding around USD50 million to Rogers' annual revenues. Through the acquisition of Sprint Canada, Rogers gained an established SME and consumer long-distance, VoIP and internet client base, as well as a fibre-optic metro area network (MAN) in Montreal, and a local telephony access network based on co-location in the PSTN switching centres of the incumbent local exchange carriers (ILECs) covering five major cities and 33 municipalities (over a third of all households). By the end of 2010 the number of co-locations had been expanded from 150 to 179 in 63 municipalities in and around Toronto, Vancouver, Calgary, Ottawa and Montreal, with many linked via MANs. Where Rogers lacks its own local access facilities to reach a business customer's premises, it utilises local loop unbundling (LLU). However, in the residential segment, ever since the launch of Home Phone the company focused strongly on growing its cable telephony line base and actively migrating home users away from the circuit-switched product, to gain extra revenues from triple-play bundling.

Rogers' digital voice-over-cable local telephony service offers 'primary line quality' VoIP-based telephony utilising PacketCable and DOCSIS technology standards, transmitted over its own managed broadband IP multimedia network (and by June 2015 it also offered access to the IP voice network via GPON-based fibre-to-the-home [FTTH] connections available in limited areas). In July 2006 Rogers broke Bell Aliant's regional monopoly on local telephony in the Atlantic province of New Brunswick, and by end-2011 cable Home Phone connections were available to virtually 100% of homes passed by Rogers' TV network, up from 99% two years earlier and 90% at the end of 2007. Rogers' total residential cable voice (IP) lines in service stagnated in 2014, falling by a net 3,000 lines to 1.150 million, and reversing net growth of 7% in FY 2013. The number of telephony users at end-2014 represented nearly 57% of its cable TV subscribers, compared to 54% a year earlier, due to the fact that its CATV base is shrinking (offset by a continuing rise in cable internet users, see Broadband section). As of June 2015 Rogers' mobile division also offered a 'fixed line replacement' home/office phone service operated over cellular infrastructure (but which is not included in its fixed telephony statistics).

Rogers completed the process of selling off its remaining PSTN residential business during 2011. In the third quarter of 2010 its Cable division announced that it was divesting most of the assets related to the remaining circuit-switched telephony operations, which it had been steadily migrating onto its cable network, with residential PSTN customers falling from 350,000 at end-2006 to 76,000 at the time of the announcement. Under this

arrangement, most of its co-location sites and related equipment were sold. In addition, the sale involved residential circuit-switched lines, with the customers served by these facilities being migrated from Cable to a third-party reseller starting in Q3 2010 and continuing over the first half of 2011. Rogers retains a PSTN voice user base in the enterprise sector only, with an estimated 30,000 business subscriber lines remaining by the end of 2014, down from 109,000 reported at the end of 2011.

Rogers previously provided an access-independent VoIP service under the name Internet Phone, available to most users with any high speed internet connection, but it wound down marketing the option in 2008.

Rogers Communications Inc (RCI) is listed on the Toronto Stock Exchange (TSX) and New York Stock Exchange (NYSE), but voting control is held by Rogers Control Trust, the trustee of which is a subsidiary of a Canadian chartered bank, with the beneficiaries being family members of former RCI chief Ted Rogers who died in December 2008. As of 31 March 2015 private holding companies controlled by Rogers Control Trust owned 90.9% of voting ('Class A') shares and approximately 28% of equity.

On 1 July 2007 RCI completed an amalgamation with wholly owned subsidiaries Rogers Cable (including Rogers Telecom) and Rogers Wireless, which ceased to be separate corporate entities. The restructuring placed Rogers' cable, wireline and wireless operations under the Rogers Communications umbrella.

Shaw Communications

Suite 900
630, 3rd Avenue SW
Calgary, Alberta
Canada
Tel. +1 403 750 4500
Fax +1 403 750 4501
http://www.shaw.ca
http://www.shawbusinesssolutions.ca

Triple-play cableco Shaw Communications is based in Calgary, in the western Canadian province of Alberta, and operates a hybrid fibre-coaxial (HFC) network in British Columbia, Alberta, Saskatchewan, Manitoba and Ontario which passed 4.1 million homes at the end of May 2015. It launched local telephony services under the Digital Phone brand in Calgary in February 2005, before expanding coverage to Edmonton, Winnipeg, Victoria, Saskatoon, Kelowna, Thunder Bay (Ontario) and many other smaller urban centres. It offers a serious challenge to regional incumbent telcos, especially Telus Communications (Alberta and British Columbia), Manitoba Telecom Services (MTS, Manitoba) and SaskTel (Saskatchewan). In 2008/09 Shaw expanded Digital Phone's footprint to various smaller markets, including Prince George, British Columbia and its surrounding areas, as well as expansions in the vicinities of Red Deer, Lethbridge and Edmonton, all in Alberta. During 2010 the Digital Phone footprint was expanded across markets including Campbell River, Winfield, Kimberly and Fernie in British Columbia, as well as Stony Plain in Alberta; in 2011 the service was made available in a number of smaller communities in British Columbia, Alberta and Manitoba; and during 2012 Digital Phone coverage was expanded in the Kootenay region of British Columbia to locations including Fairmont, Invermere and Radium. By June 2015 Digital Phone was available to 96% of homes passed by Shaw's cable network, virtually unchanged year-on-year but up from 90% six years earlier.

After Shaw's cable voice customer base overtook that of Rogers Communications in 2010, it repeated the feat in 2011 by surpassing Videotron to claim the title of largest cable telephony provider. More recently, growth has stagnated, and in 2014/15 Shaw indicated it

was lessening focus on its home phone service while increasing emphasis on broadband and 'high value' services. At end-May 2015 Shaw reported 1.342 million total (consumer and business) telephony subscribers, down from 1.374 million a year before (and representing 71% of its 1.882 million basic cable TV users). Breaking down the figures, Shaw reported 280,000 business telephony subscribers (20.9% of its telephony total), up by 20,000 in twelve months, and 1.062 million residential voice lines, down by 52,000 in the same period.

Shaw's Digital Phone utilises PacketCable technology and DOCSIS specifications. Customers' phone lines are connected into modems at the premises, converting calls into data packets for carrying to an IP-based softswitch, whereupon they are routed via Shaw's own private managed broadband IP network or converted back into traditional telephone signals for connection to PSTN numbers. Shaw says its managed voice-over-internet protocol (VoIP) platform allows it to ensure a more consistent level of quality and reliability than access-independent VoIP providers which use the public internet to route calls. Digital Phone provides 'primary' and 'secondary' lines. Primary Rate Interface ('PRI') services are offered for medium to larger businesses.

As of June 2015 the Shaw Family Group (J R Shaw and family, plus corporations owned and/or controlled by J R Shaw and family) held approximately 79% of the outstanding voting ('Class A') shares of Shaw Communications. The Shaw Family Group elects a majority of the board of directors and controls the vote on matters submitted to shareholders. Shaw Communications is floated on the Toronto Stock Exchange (TSX) and the New York Stock Exchange (NYSE).

Videotron

300, Viger Avenue East
Montreal, Quebec H2X 3W4
Canada
Tel. +1 514 281 1711
Fax +1 514 380 9527
http://www.videotron.com

Montreal-based Videotron operates a cable network covering 2.777 million premises in Quebec at the end of 2014 (up from 2.743 million premises a year earlier), reaching more than 90% of households in the province. At that date it had 1.782 million basic TV customers (down by 43,000 in a year), while it provided primary line voice-over-internet protocol (VoIP)-based local cable telephony services to 1.349 million, up by around 500 in twelve months, with growth now stagnating following a steady rise from just over a million at the end of 2009. The quadruple-play operator's cable voice footprint covers over 95% of its network, making it a serious rival to incumbent copper wire-based operator Bell Canada (including Bell Aliant). Having launched voice services in early 2005, delivered via its own managed IP network, Videotron extended cable telephony to business users a year later, and in September 2006 it contracted Nortel Networks to supply it with next generation network (NGN) upgrades to expand its VoIP service beyond its main footprint of Montreal, Quebec City and Chicoutimi. The upgrade also allowed it to enlarge its range of multimedia services, and it has introduced convergent options such as voicemail access via e-mail, and promised other features including video calling for cable users in the future. Since October 2007 it has also offered a 'softphone' access-independent nomadic VoIP option, with local phone numbers, to compete with software-based broadband telephony applications from the likes of Skype, Vonage and Primus. In January 2011 Videotron signed a sourcing deal with India's Tata Communications to route 100% of its international voice traffic through Tata's network.

Revenues from Videotron's cable telephony service increased by CAD1.3 million, or 0.3%, to CAD475.1 million in the year to 31 December 2014, primarily as a result of increases in

ARPU and in the cableco's number of business lines, partially offset by a decrease in long-distance revenues.

Videotron is a wholly owned subsidiary of Quebecor Media.

Manitoba Telecom Services (MTS Allstream)

PO Box 6666
333 Main Street
Winnipeg, Manitoba R3C 3V6
Canada
Tel. +1 204 941 8244
Fax +1 204 958 3549
http://www.mts.ca
http://www.allstream.com

Winnipeg-based Manitoba Telecom Services (MTS) is the successor to crown corporation The Manitoba Telephone System, created in 1908. In June 2004 it completed a CAD1.5 billion acquisition of business communications provider Allstream, giving it a strong presence on the national stage and making it the third largest wireline group (PSTN, not cable) in Canada after Bell Canada Enterprises and Telus Corporation. The news of the acquisition was not well received by MTS shareholder Bell Canada, which until then had enjoyed a close relationship with what had been a small regional operator posing little threat to its dominance. Bell sought an injunction against the merger, and when that failed it claimed damages for financial loss resulting from MTS breaking its service agreements. MTS agreed to pay Bell Canada CAD75 million to compensate for early contract termination. On 1 January 2010 MTS realigned its business units based on geographic markets instead of customer type. It replaced the 'Consumer Markets' division (which superseded its 'MTS (Manitoba)' division in 2006) with a new 'MTS' unit, and replaced its 'Enterprise Solutions' division (which superseded its 'Allstream (National)' division in 2006) with a new 'Allstream' unit. The corporate account base in Manitoba, previously part of the Enterprise Solutions division, became part of the MTS unit (joining the existing Manitoban consumer and SME base), and the small-business account base across Canada, previously part of the Consumer Markets division, became part of the Allstream unit (alongside the existing nationwide medium-to-large business clients). After persistent reports that the Allstream division would be sold off – heightened by the Canadian government's lifting of foreign ownership restrictions on telecoms operators with less than 10% of market revenues in June 2012 – a deal was struck to offload the national enterprise telecoms unit to Egyptian-backed Accelero in May 2013. However, in October that year the deal was blocked by a federal government decision, without a clear reason. Accelero had offered CAD520 million for the national unit.

MTS is the pre-eminent full service provider in Manitoba and offers a full suite of wireline voice, high speed data, wireless and TV services. In the years since 2005 MTS gradually lost local telephony customers to mobile substitution and to direct competition in Manitoba, chiefly from cable operator Shaw Communications. Local lines in service dropped by more than 190,000 in eight years to stand at 468,000 by the end of 2014, although MTS estimated at that date that it retained close to 70% and 80% market shares in the respective residential and business local access markets in Manitoba.

Allstream's local access voice services range as of June 2015 includes: legacy ISDN PRI; 'Business Line' (POTS line); SIP (Session Initiation Protocol) Trunking IP telephony service; 'Hosted Collaboration Solution' (delivered over the Allstream MPLS network, integrating SIP trunking for PSTN connectivity, supporting advanced Unified Communications applications); and Centrex lines. Allstream's long-distance voice services include: Business Long-Distance (access options are switched [EEA] or dedicated [DS1,

DS3 or ISDN PRI]); Long-Distance Calling Card; and a wholesale 'VoIP Access' service. Furthermore, Allstream promises 40% savings when switching from legacy services to IP, and was thought to have over 60,000 IP-based customers across Canada at end-March 2015, having reported 37,000 a year earlier.

Allstream claims a presence in all major markets nationwide, and calculates that it is able to serve 65% of all Canadian businesses. In December 2007 it announced the completion of its coast-to-coast long-haul and local fibre-optic IP broadband network when it switched on its Newfoundland section. By end-2014 its optical fibre networks spanned over 30,000km, up from 27,900km in December 2008. At end-March 2015 Allstream served over 3,100 directly fibre-fed buildings on its IP network, having steadily expanded coverage, while in May 2013 the division expanded its SIP Trunking service to enable it to reach an additional 10,000 mid-size and large enterprises across Canada, supporting converged voice/data services. However, facing tough competition and aiming to make cost savings, MTS announced in May 2015 that it was significantly cutting Allstream's workforce and investment budget.

Manitoba Telecom Services' ownership is fully distributed; it is listed on the Toronto Stock Exchange (TSX).

SaskTel

10th Floor
2121 Saskatchewan Drive
Regina, Saskatchewan S4P 3Y2
Canada
Tel. +1 306 777 5638
Fax +1 306 359 7475
http://www.sasktel.com

Full-service regional operator Saskatchewan Telecommunications (SaskTel) began life as part of the Saskatchewan Department of Railways, Telegraphs and Telephones, which was established in 1908. In 2001 SaskTel expanded, acquiring Vancouver-based Navigata Communications (then called RSL COM Canada) for approximately CAD17 million, gaining a business user portfolio including local, long-distance, voice-over-internet protocol (VoIP [WebCall]), internet access and high speed data services in British Columbia, Alberta, Ontario and Quebec. The telco consolidated Navigata in May 2006 and renamed it Expansion Division to reflect its out-of-territory (or competitive local exchange carrier [CLEC]) operations. SaskTel's WebCall VoIP service gave consumers in Saskatchewan, Alberta and British Columbia access to local geographic phone numbers they could use nomadically and access-independently. However, by March 2009 WebCall had as few as 400 users and was operating at a significant loss, and the residential VoIP service was shut down.

Facing increasing pressure on traditional voice revenues from CLECs and mobile substitution, at the start of 2006 SaskTel announced a five-year plan to invest CAD310 million in expanding next generation network (NGN) infrastructure to support new services. Entering the next phase of fixed network evolution, SaskTel began a seven-year CAD670 million programme for the commercial deployment of fibre-to-the-premises (FTTP) direct high speed access infrastructure in 2011, with commercial services launched in August 2012 (see Broadband section for details).

In mid-2015 SaskTel began utilising Zhone Technologies' MXK platform as part of its programme to migrate its legacy voice network from TDM to IP, aiming for operational cost savings as well as integrating its wireline and wireless networks whilst enhancing the user experience. SaskTel is heading towards evolving its voice architecture to IMS and wholly integrating its wireline and wireless networks; while the initial focus of the MKX gateway

deployment is on its voice network, SaskTel also wants to provide an array of other IP-based services on the same platform.

SaskTel International is a subsidiary of the telco which markets technological and software solutions expertise to clients around the world. In July 2009 it cancelled a management contract with Tanzania Telecommunications Company Ltd (TTCL) early, citing local funding problems, but it has other strategic initiatives in the US, Africa and Latin America.

SaskTel is a wholly owned subsidiary of Crown Investments Corporation.

Cogeco Cable

5, Place Ville-Marie
Suite 915
Montreal, Quebec H3B 2G2
Canada
Tel. +1 514 874 2600
http://www.cogeco.ca
http://www.cogecodata.com

Cogeco Cable operates triple-play video, broadband internet and telephony services over a cable TV network passing 1.682 million homes in Canada at end-February 2015 (its fiscal mid-year point), approximately two-thirds of which are in Ontario and the other third in Quebec. Its cable-based local voice telephony service was launched in the summer of 2005 under the name 'Digital Phone' (currently branded 'Home Phone' in the residential market) and had a total of around 469,000 subscribers at 28 February 2015 (roughly split 66%/ 34% Ontario/Quebec), down from 480,000 a year earlier, although up from 457,000 three years earlier. 99% of homes passed were able to access the telephony service, an increase of six percentage points in four years. Cogeco continues to expand Home Phone services to new communities, for instance reaching the Quebec municipalities of Ste-Rosalie and Notre-Dame-du-Bon-Conseil in 2013. The cable voice service is provisioned over Cogeco's own managed IP platform using the DOCSIS technology standard to ensure reliable and continuous packet data transmission in real time as well as good quality. The company serves business customers with telephony and broadband/data services in addition to its consumer operations (See Broadband section for more details).

As of June 2015 Cogeco Cable was 32.0% owned by Cogeco Inc (which has 82.5% voting rights), with the remainder (subordinate voting shares or common shares) floated on the Toronto Stock Exchange (TSX). Cogeco Inc is itself controlled by Gestion Audem Inc (which owns over 70% of voting rights of Cogeco Inc, with below 20% of equity), and is listed on the TSX. Rival cableco Rogers Communications has increased its stake incrementally via the stock exchange (although denying any interest in a takeover bid); in November 2010 Rogers paid CAD39.2 million for 892,000 subordinate shares in Cogeco Cable and CAD35.7 million for 946,000 subordinate shares in Cogeco Inc, following which it owned 39.9% of Cogeco Inc's subordinate shares and about 35.5% of the company's equity. The Audet family, who control the bulk of voting rights in Cogeco, have not revealed any plans to sell in the near future.

Eastlink

PO Box 8660, Station A
Halifax, Nova Scotia B3K 5M3
Canada
Tel. +1 902 4461939

Fax +1 902 4928580
http://www.eastlink.ca

Eastlink launched Canada's first cable local telephony service in Nova Scotia in November 1999 over a fibre-optic network, and claimed another national first by adding a triple-play, single-bill CATV/internet/telephony bundle the following year. The cableco expanded its local telephony service to Prince Edward Island in 2001 and New Brunswick in 2004, and in 2006 the operator's telephony footprint reached 95% of its Atlantic Canadian cable subscribers. Eastlink has continued to expand cable telephony services to other areas in its eight-province footprint, including various communities in Ontario and Western Canada, an expansion which remained ongoing as of June 2015. It offers local and long-distance voice services over its own IP-based fibre network for residential and business customers, as well as additional services for business clients including Metro Ethernet services.

Bragg Communications, trading as Eastlink, is part of the Bragg Group, which is privately owned by the Bragg family of Nova Scotia.

Country Directory

Regulators

Canadian Radio-television and Telecoms Commission (CRTC)

Les Terrasses de la Chaudiere
Central Building
1 Promenade du Portage
Quebec City, Quebec J8X 4BI
Canada
Tel. +1 819 997 0313
Fax +1 819 994 0218
http://www.crtc.gc.ca

Industry Canada

Economic Development Agency
11th Floor, East Tower
C.D. Howe Building
Ottawa, Ontario K1A 0H5
Canada
Tel. +1 613 995 9001
Fax +1 613 992 0302
http://www.ic.gc.ca

Service Providers

7-Eleven SpeakOut

Suite 2400
13450 102nd Ave
Surrey, British Columbia V3T 0C3
Canada
Tel. +1 604 5860711
http://www.speakout7eleven.ca
http://corp.7-eleven.com/corp/7-eleven-canada

Bell Canada Enterprises (BCE)

1 Carrefour Alexander Graham Bell
Building A, 4th Floor
Verdun, Quebec H3E 3B3
Canada
Tel. +1 888 9326666
Fax +1 514 7665735

http://www.bce.ca
http://www.bell.ca

Chatr Wireless

333 Bloor Street East, 8th Floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 800 4859745
http://www.chatrwireless.com/

Cityfone

#101 - 3991 Henning Drive
Burnaby, British Columbia V5C 6N5
Canada
Tel. +1 866 3053663
http://www.cityfone.net

Cogeco Cable

5, Place Ville-Marie
Suite 915
Montreal, Quebec H3B 2G2
Canada
Tel. +1 514 874 2600
http://www.cogeco.ca
http://www.cogecodata.com

Eastlink

PO Box 8660, Station A
Halifax, Nova Scotia B3K 5M3
Canada
Tel. +1 902 4461939
Fax +1 902 4928580
http://www.eastlink.ca

Fido

800 De La Gauchetiere Street West
Suite 4000
Montreal, Quebec H5A 1K3
Canada
Tel. +1 514 9372121
Fax +1 514 8466980
http://www.fido.ca/

Globalive Wireless (Wind Mobile)

1 Adelaide Street East
Suite 1400
Toronto, Ontario M5C 2V9
Canada
Tel. +1 877 445 8606
Fax +1 416 640 1089
http://www.windmobile.ca
http://www.globalive.com

Koodo Mobile

200 Consilium Place, Suite 300
Scarborough, Ontario M1H 3J3
Canada
Tel. +1 866 9956636
https://www.koodomobile.com/

Manitoba Telecom Services (MTS Allstream)

PO Box 6666
333 Main Street
Winnipeg, Manitoba R3C 3V6
Canada
Tel. +1 204 941 8244
Fax +1 204 958 3549
http://www.mts.ca
http://www.allstream.com

Mobilicity

Woodbridge, Ontario
Canada
Tel. +1 416 736 3388
http://www.mobilicity.ca

NorthernTel

850 Birch Street South
Timmins, Ontario P4N 7J4
Canada
http://www.northerntel.ca/

Northwestel

301 Lambert StreetY1A 4Y4
Whitehorse, Yukon Territory Y1A 4Y4
Canada
Tel. +1 867 6685300

Fax +1 867 6687079
http://www.nwtel.ca

PC Mobile

1 President's Choice Circle
Brampton, Ontario L6Y 5S5
Canada
Tel. +1 416 2042600
http://www.pcmobile.ca

Petro-Canada Mobility

150 - 6 Avenue SW
PO Box 2844
Calgary, Alberta T2P 3E3
Canada
Tel. +1 866 7883475
http://mobility.petro-canada.ca/

Primus Canada

5343 Dundas St.W., Suite 400
Etobicoke, Ontario M9B 6K5
Canada
Tel. +1 888 5028380
http://wireless.primus.ca

Public Mobile

Suite 4400, 100 King Street West
1 First Canadian Place
Toronto, Ontario M5X 1B1
Canada
Tel. +1 617 345 7221
Fax +1 617 345 7201
http://www.publicmobile.ca

Rogers Communications

333 Bloor Street East
10th floor
Toronto, Ontario M4W 1G9
Canada
Tel. +1 416 935 3532
Fax +1 416 935 3597
http://www.rogers.com

SaskTel

10th Floor
2121 Saskatchewan Drive
Regina, Saskatchewan S4P 3Y2
Canada
Tel. +1 306 777 5638
Fax +1 306 359 7475
http://www.sasktel.com

SaskTel Mobility

10th Floor
2121 Saskatchewan Drive
Regina, Saskatchewan S4P 3Y2
Canada
Tel. +1 306 7775638
Fax +1 306 3597475
http://www.sasktel.com

Sears Connect

290 Yonge St., Suite 700
Toronto, Ontario M5B 2C3
Canada
Tel. +1 416 3621711
http://www.searsconnect.ca

Shaw Communications

Suite 900
630, 3rd Avenue SW
Calgary, Alberta
Canada
Tel. +1 403 750 4500
Fax +1 403 750 4501
http://www.shaw.ca
http://www.shawbusinesssolutions.ca

Telebec

555, Avenue Centrale
Val-d'Or, Quebec J9P 1P6
Canada
http://www.telebec.com

Telus Communications

555 Robson Street
Vancouver, British Columbia V6B 3K9
Canada

Tel. +1 604 432 2151
Fax +1 604 432 2151
http://www.telus.com

Telus Corporation

555 Robson Street
Vancouver, British Columbia V6B 3K9
Canada
Tel. +1 604 697 8044
Fax +1 604 432 9681
http://www.telus.com

Videotron

300, Viger Avenue East
Montreal, Quebec H2X 3W4
Canada
Tel. +1 514 281 1711
Fax +1 514 380 9527
http://www.videotron.com

Virgin Mobile Canada

720 King St West
Suite 905
Toronto, Ontario M5V 2T3
Canada
Tel. +1 888 9992321
http://www.virginmobile.ca

Xplornet Communications

300 Lockhart Mill Road
PO Box 9060
Woodstock, New Brunswick E7M 6B5
Canada
Tel. +1 506 328 8853
http://www.xplornet.com

Last Updated: 30 June 2015