

# Canada in the Network Age: Building an Infrastructure for Innovation and Inclusion

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ITU-APT

Regional Seminar on Broadband Wireless Access for  
the Asia-Pacific Region

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## We Are In The Network Age

*"Today's technological transformations are intertwined with another transformation - globalization - and together they are creating a new paradigm: the network age."*

United Nations Human Development Report, July 2001

- Instant access to knowledge
- Transforming business
- Borderless, global economies
- New ways of citizen - government engagement

*"Make the information and knowledge infrastructure accessible to all Canadians, thereby making Canada the most connected nation in the world."*

Speech from the Throne 1997

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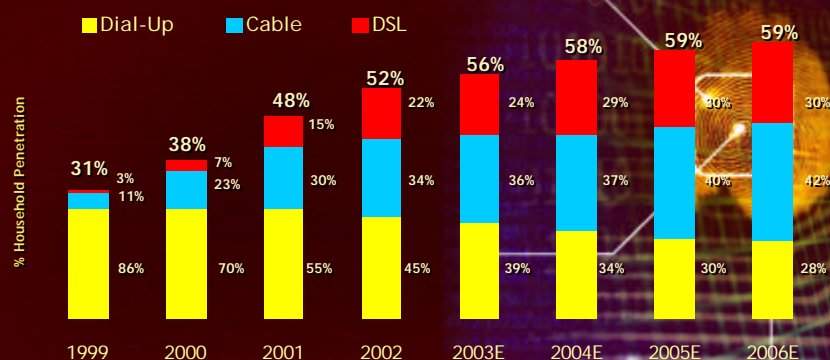
## We are Increasing Connectivity

- Connected 100% of schools and libraries by 1999
- Achieved median student-to-computer ratio of 1:5; 90% of computers in schools connected to the internet (Statistics Canada)
- Refurbished almost 500,000 computers for schools
- Connected 12,000 volunteer organizations to the Internet
- Established 6,800 public internet access sites
- Developed CA\*net4: the world's first national optical research and education network
- 64% households and 75% SMEs use the internet (Statistics Canada 2004, CFIB 2003)
- Recognized as # 1 in Government Online (Accenture 2001-04)

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## Canadians are Demanding High Speed

### Household internet Penetration from Home

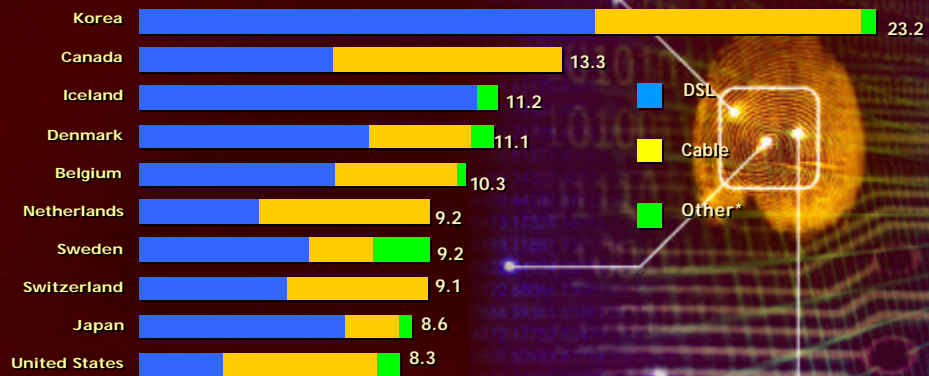


Source: The Yankee Group, September 2003, % household estimates based on Industry Canada calculations

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## Growing Use of Broadband...

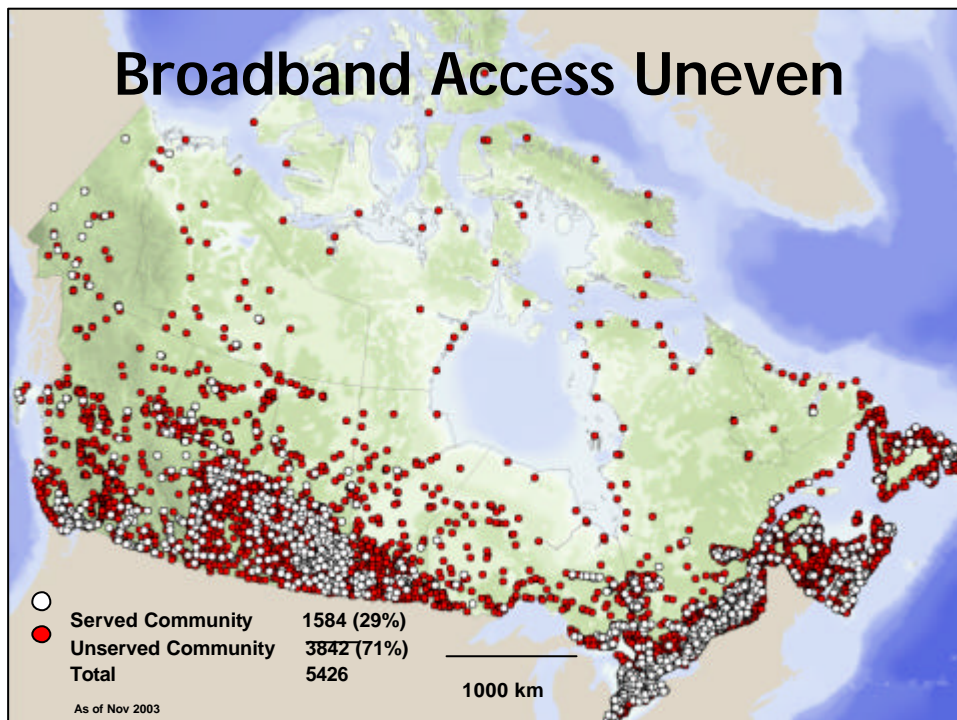
Broadband subscribers per 100 inhabitants  
Top 10 Countries - June 2003



\* Ethernet LANs, two-way direct satellite, fibre to the home, and fixed wireless.  
Source: OECD, ICCP Broadband Update, October 2003.

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## Broadband Access Uneven





## Broadband Commitment

"[We foresee] a Canada where the benefits of the 21st century economy are being reaped from coast to coast to coast -- on our farms, in our fishing, forest and mining industries, and in our rural communities where modern communications are helping to surmount the barrier of distance."

*Speech from the Throne 2004*

[www.broadband.ic.gc.ca](http://www.broadband.ic.gc.ca)

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## So What's Next ?

- Next Generation Networks
- Voice Over IP
- Peer to Peer
- GPS
- **WiFi/WiMAX**
- Mesh Networks
- 3G
- Ultra Wide Band
- Broadband Power Line (BPL)
- Software Defined Radio
- Smart Dust (RFID)
- New Satellites
- Satellite Radio
- Digital Audio Broadcasts
- DTV/HDTV
- PVR
- Video On Demand
- Grid Computing
- Quantum Computing
- Bio Computing
- Nanotechnology

**New Technologies = New Challenges**

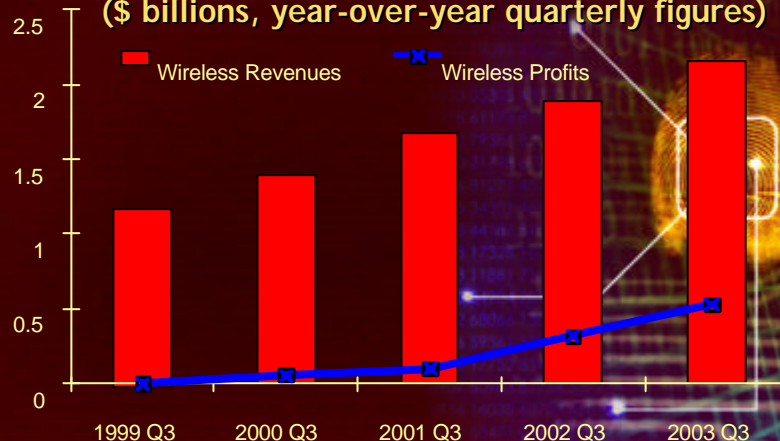
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# Wi-Fi WiMAX

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## Strong Wireless Growth

**Canadian Wireless Services Operating Revenues and Profits\***  
(\$ billions, year-over-year quarterly figures)



\* Operating Profits = Earnings Before Interest, and Taxes

Source: Statistics Canada, Quarterly Telecommunications Statistics, January 2004.

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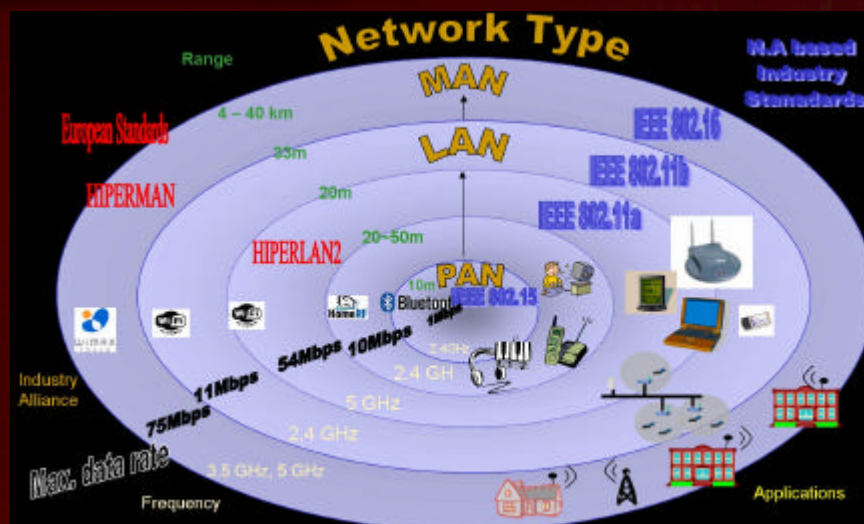
## Government of Canada: Doing Our Part

- 1996 LMCS systems at 28 GHz (1000MHz)
- 1999 Broadband wireless at 24/38 GHz (1200 MHz)
- 2000 MCS and MDS systems at 2.5/2.6 GHz (200 MHz)
- 2000 License exempt spectrum at  
2.4/5GHz for RLAN, Wi-Fi, and broadband access (400 MHz)  
59-64 GHz (5000 MHz)
- 2001 PCS auction at 2 GHz (40 MHz)
- 2004 FWA at 3.5 GHz (175 MHz)  
WCS at 2.3 GHz (30 MHz)

2004 Industry Canada to consider 455 MHz of globally harmonized spectrum in the 5 GHz bands for wireless access systems including Wi-Fi/WiMAX

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## Network Technologies below 10 GHz



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## Wi-Fi/WiMAX Opportunities...

**For manufacturers,  
service providers, users,  
economy and society**

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## Wi-Fi on the Move



***Wireless Internet  
on 401 & 400  
at selected highway  
service centres***



**But, Please Don't Wi-Fi and Drive**

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## Wi-Fi in Education

### University of British Columbia

- One of the largest WLAN networks in North America
- Coverage for the over 1000-acre campus
- More than 1200 access points in over 150 buildings
- Instant access to learning material

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## Wi-Fi: Improving Patient Care

### Network Databases of Key Information

Server

Primary Care

Cardiology

Lab

OR

Radiology

Pharmacy

Wi-Fi  
Access  
Point

Registration

Lab

Surgery

Pharmacy

Discharge



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## Wi-Fi: Health Care for Aboriginal Communities



Health Canada uses WIFI to connect health centres with doctors and nurses in over 150 remote First Nations communities.

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## Wi-Fi in Northern Canada



Photo: [www.tundrabuggytours.com](http://www.tundrabuggytours.com)

Churchill, Manitoba  
Population: 1000

Tundra Buggy Tours

- Wi-Fi network for polar bear watching
- Students, researchers are able to observe polar bears over the Internet

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## Wi-Fi: A Rapidly Developing Industry

- Nascent Industry
  - 2002 Wi-Fi revenues were \$2 billion\*
  - Compounded annual growth rate of 30% is projected through to 2006.\*
- Business models
  - Pricing and payment
  - Partnership between corporations
- Roaming Agreement
  - Bell, Microcell, Rogers and Telus
- Integrating with other services

\*Source: Infonetics Research, San Jose

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## WiMAX is catching up...

- Industry organization to promote and certify broadband wireless access equipment conforming to IEEE 802.16 and ETSI HiperMAN standards
- Fixed wireless access technology is here... cost is often high
- WiMAX promotes common platform and standard to lower the costs

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## WiMAX for last-mile connectivity

- Last mile broadband connection, hotspots, cellular backhaul, campus connection, etc.
  - Licensed and license-exempt frequency bands
  - Range up to 40 km; throughput up to 75 Mbps
  - Excellent potential for connecting rural communities
  - Timeline\*:
    - 1Q 2005: Begin certification
    - Early 2005 - WiMAX certified products commercial deployment for fixed outdoor
    - 2005/6 - WiMAX products commercial deployment for fixed indoor
    - 2006/7 - WiMAX products available for portable devices (PDAs, laptops, etc)
    - WiMAX expects to capture 60% of the overall BWA market by 2008
- \*Source: WiMAX Forum

### Helping to connect rural communities

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## Spectrum Challenges

- Global and Regional harmonization
- Canada: ongoing spectrum policy review
- Public discussion on new technologies such as UWB
- Black/grey market
- Antennas/Towers
- Suitable bands for license exempt consumer devices

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## Addressing Technical Challenges

- Security - "War Driving"
  - Hijacking of someone else's wireless connection
  - Using hijacked connection for illegal activities (e.g. child pornography)
  - November 24, 2003, Toronto
    - First Canadian Charges for Theft of Telecommunications
  - 802.11i recently ratified
- Power consumption for portable devices
- Mobility

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## Wi-Fi/WiMAX: The Road Ahead

- Improving the standard for higher efficiency and enhanced security
- Integration of services (cellular/PCS, Wi-Fi, WiMAX), licensed and licence-exempt
- Globally harmonized spectrum will enhance the growth of the wireless LAN/MAN industry
- More license-exempt services/applications will likely emerge
- Helping to provide broadband services to rural & remote communities

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## Industry Canada consultation on 5GHz

- Canada Gazette notice published on Feb 27, 2004, closed on June 1, 2004
- Consultation proposed to make available an additional 255 MHz of spectrum for wireless access systems in the band 5470-5725 MHz
- Total spectrum available at 5GHz = 555 MHz (5150-5350 MHz, 5470-5825 MHz)

## Policy & Technical Rules - Fall 2004

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<http://strategis.ic.gc.ca/spectrum>

Canada