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

Johnston.Susan@ic.gc.ca

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."

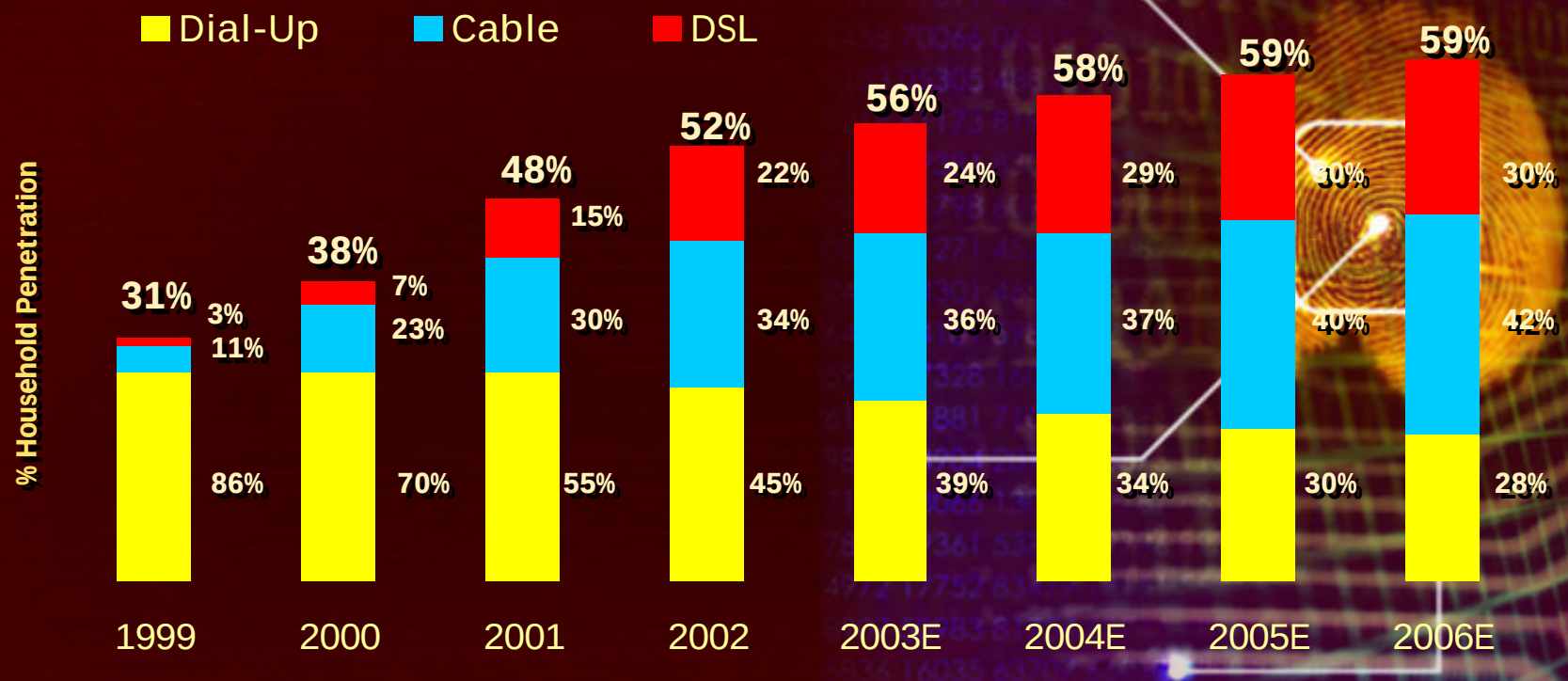
Speech from the Throne 1997

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)

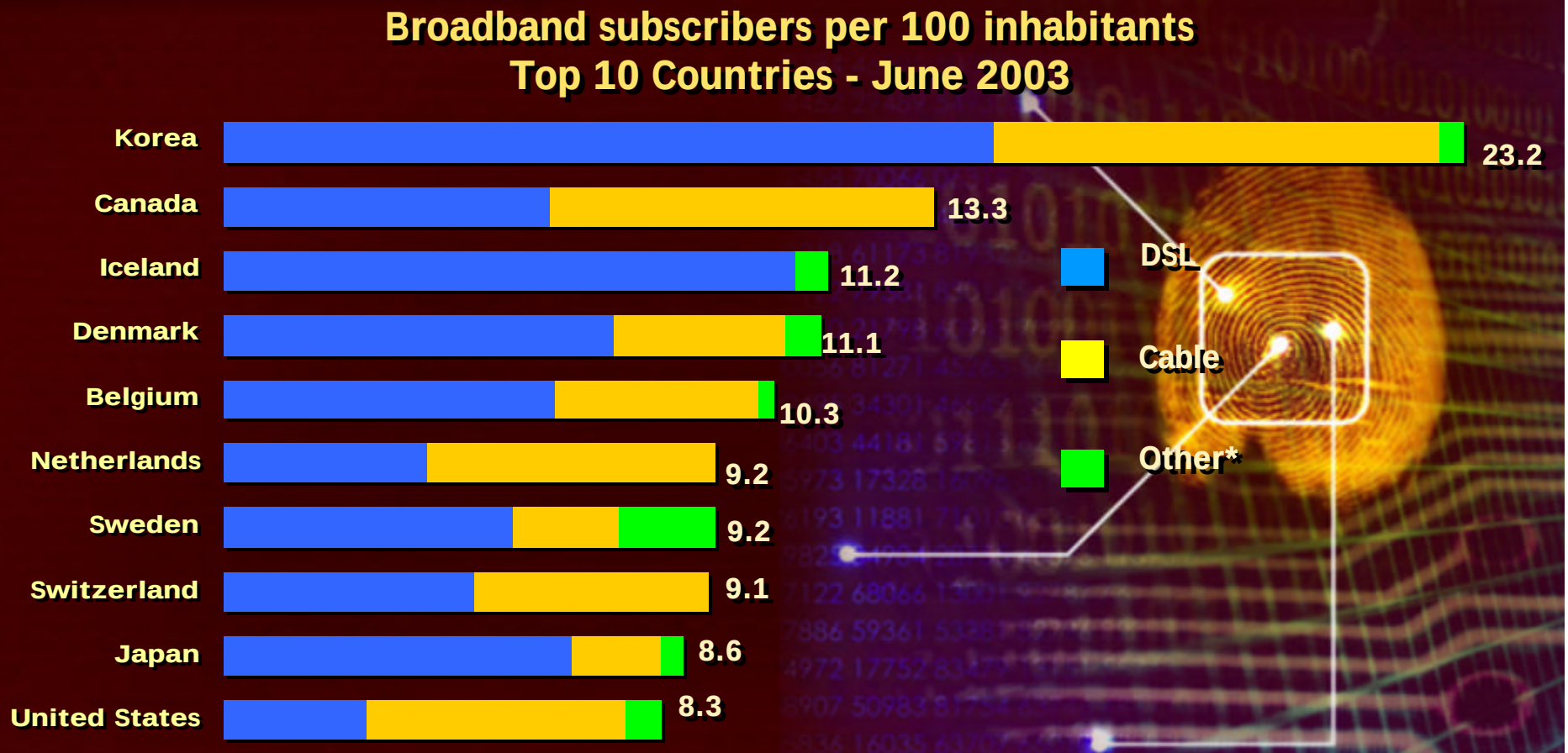
Canadians are Demanding High Speed

Household internet Penetration from Home



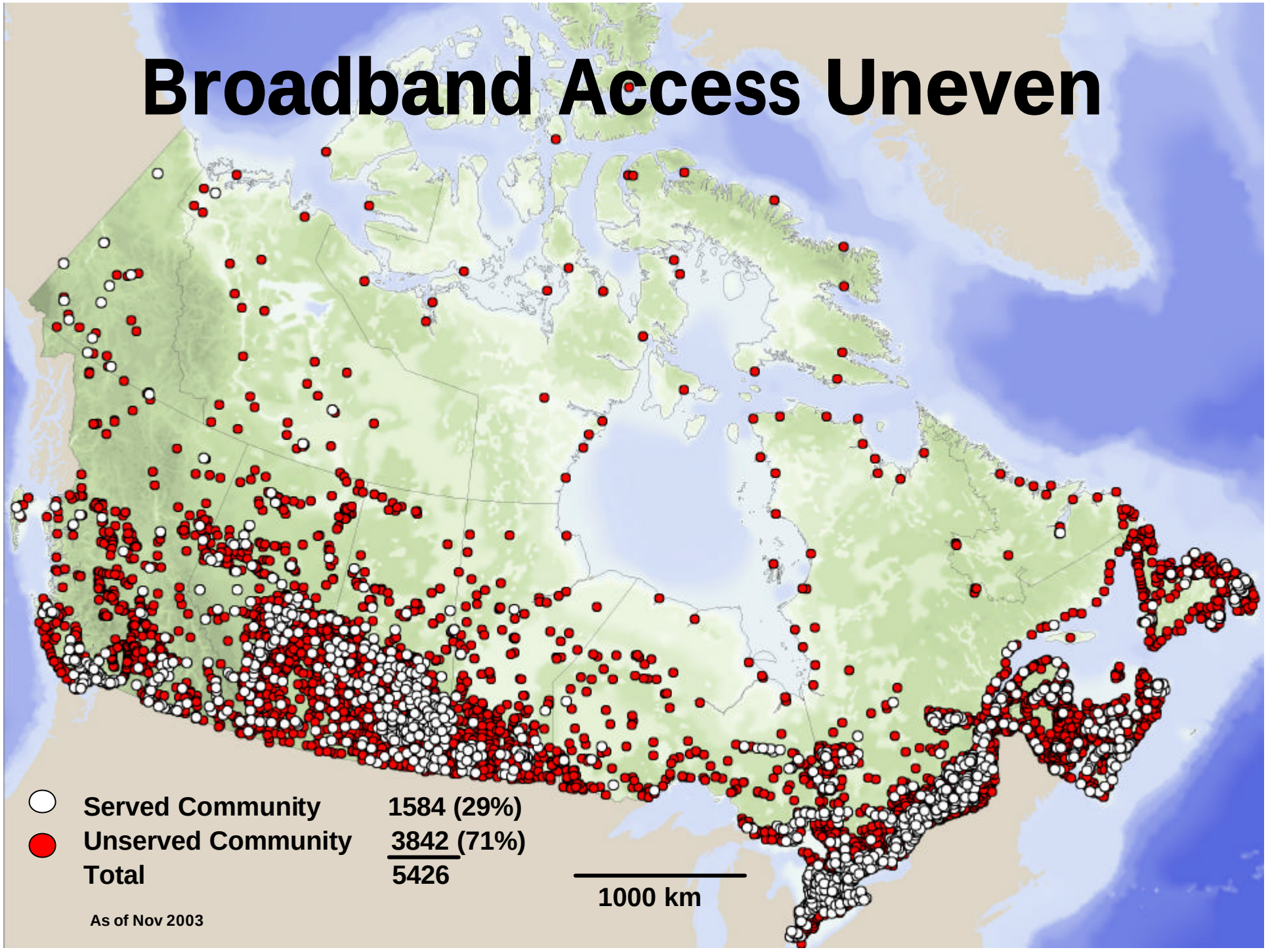
Source: The Yankee Group, September 2003, % household estimates based on Industry Canada calculations

Growing Use of Broadband...



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

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

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

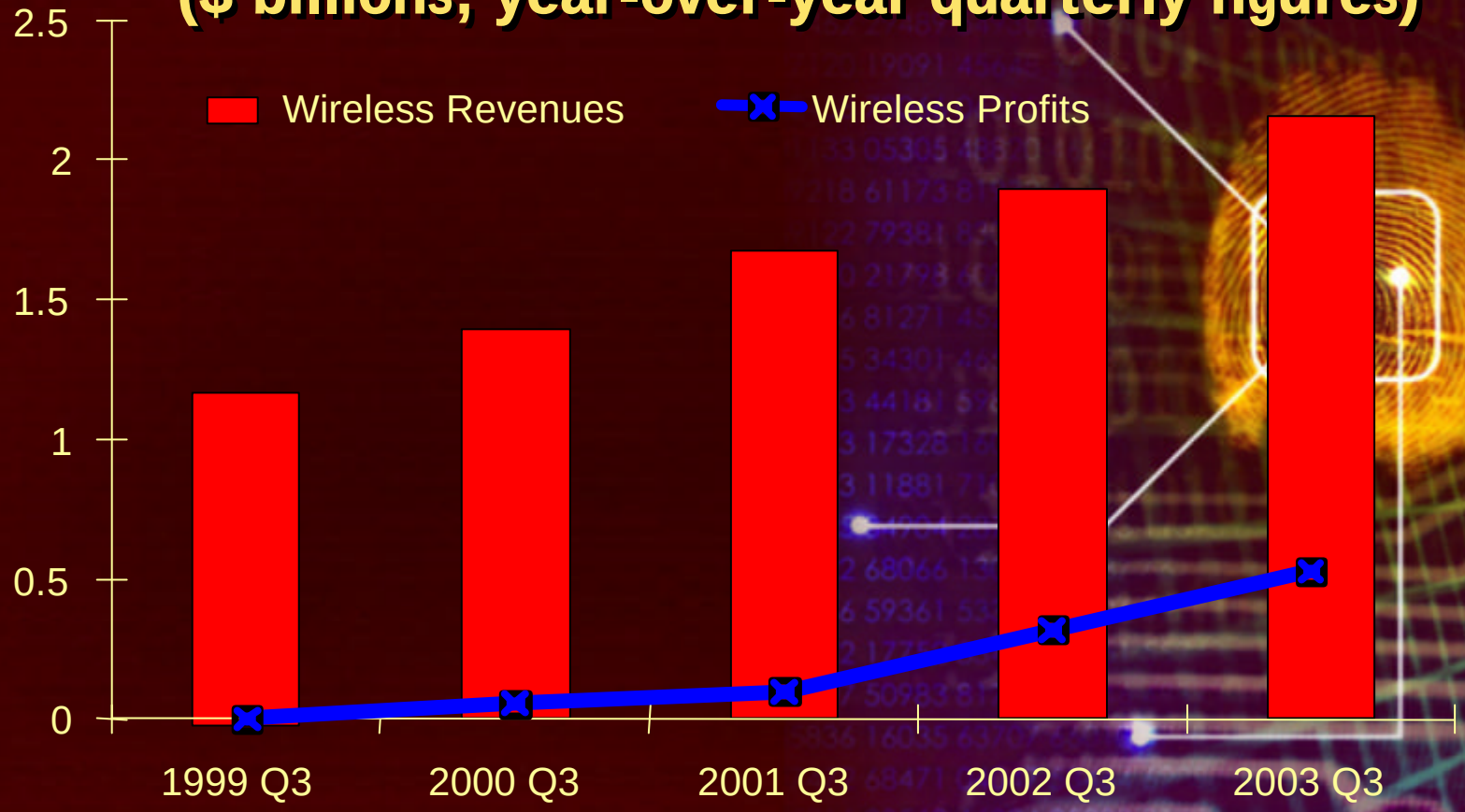
New Technologies = New Challenges

Wi-Fi
WiMAX

ITU-APT Regional Seminar on Broadband Wireless Access

Strong Wireless Growth

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



*** Operating Profits = Earnings Before Interest, and Taxes**

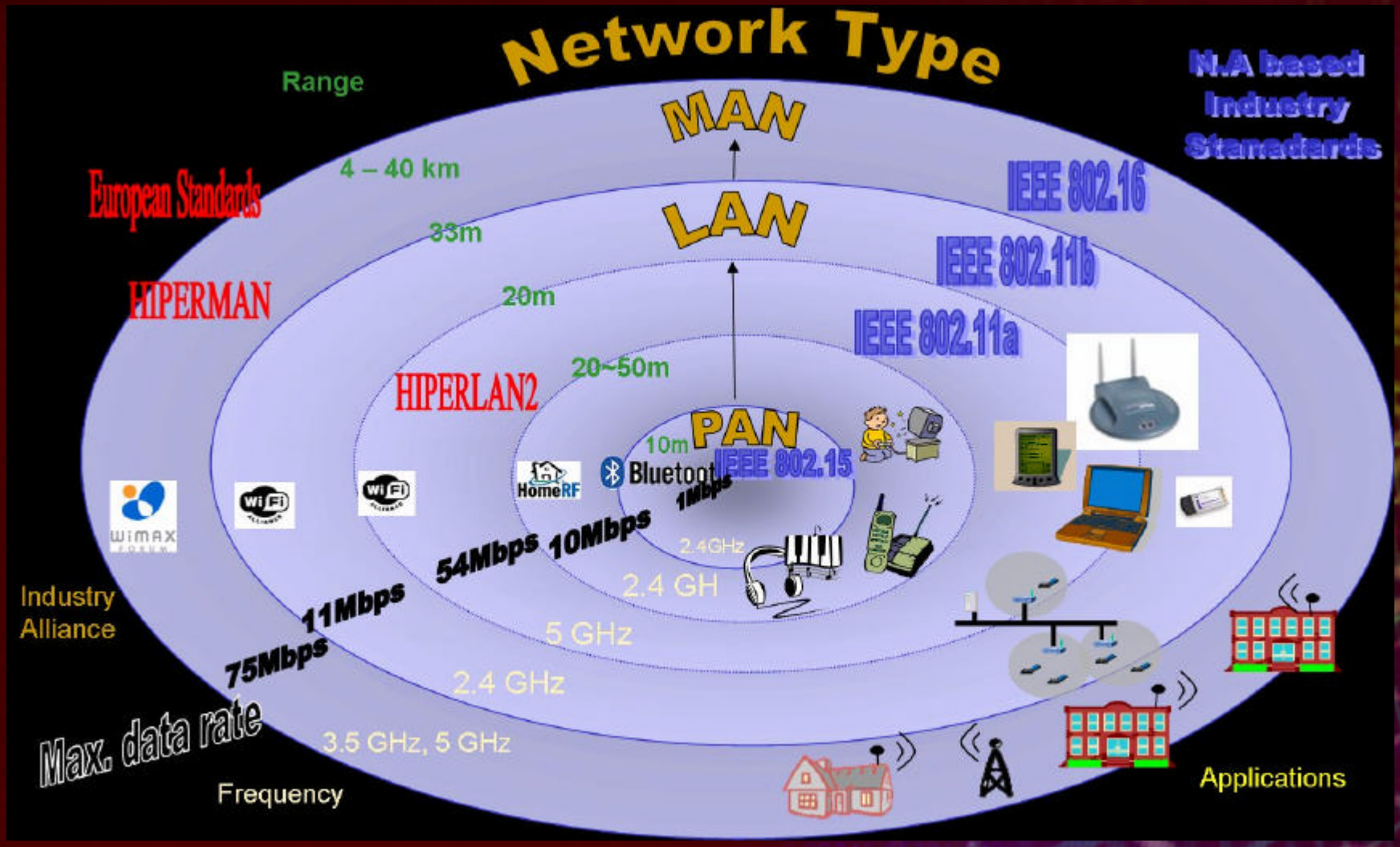
Source: Statistics Canada, Quarterly Telecommunications Statistics, January 2004.

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

Network Technologies below 10 GHz



Wi-Fi/WiMAX Opportunities...

For manufacturers, service providers, users, economy and society

Wi-Fi on the Move

Wireless Internet on 401 & 400

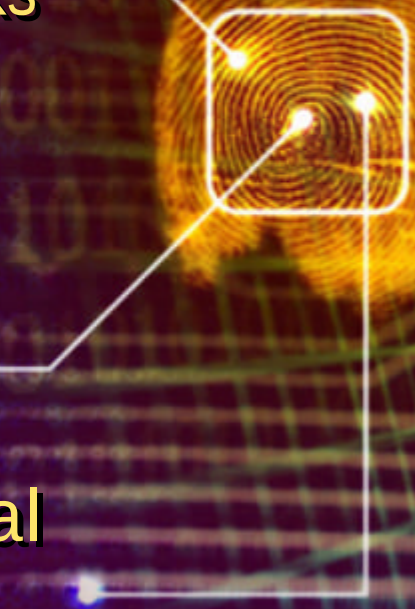
at selected highway service centres

But, Please Don't Wi-Fi and Drive

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



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

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.

Wi-Fi in Northern Canada

Photo: 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

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

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

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

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

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

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

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 Mz)

Policy & Technical Rules – Fall 2004


http://strategis.ic.gc.ca/spectrum
Canada