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16 September 2003

Dial-up



Source: <http://web.mit.edu/17.577/www/images/lagos.jpg>

Broadband



Source: http://www.nolte.com/shared/images/what_trans-highway.jpg



What is broadband?

- **Fast connection to the Internet**
 - **Generally at least 5 times faster than a dial-up modem.**
- **Always-on connection**
 - **Connection usually stays active as long as the computer is turned on.**
- **Flat-rate billing**
 - **Unlimited Internet use each month after paying a flat rate.**



Broadband applications

“Broadband’s ‘killer application’ may yet be still to come”

- **Fast web browsing**
- **Voice over broadband**
- **Audio**
- **Video**
- **Online photo exchange**
- **Internet gaming**
- **E-health / telemedicine**
- **Teleworking**
- **E-education**
- **E-government**
- **Video conferencing**
- **Faster e-commerce**
- **Application service provisioning**



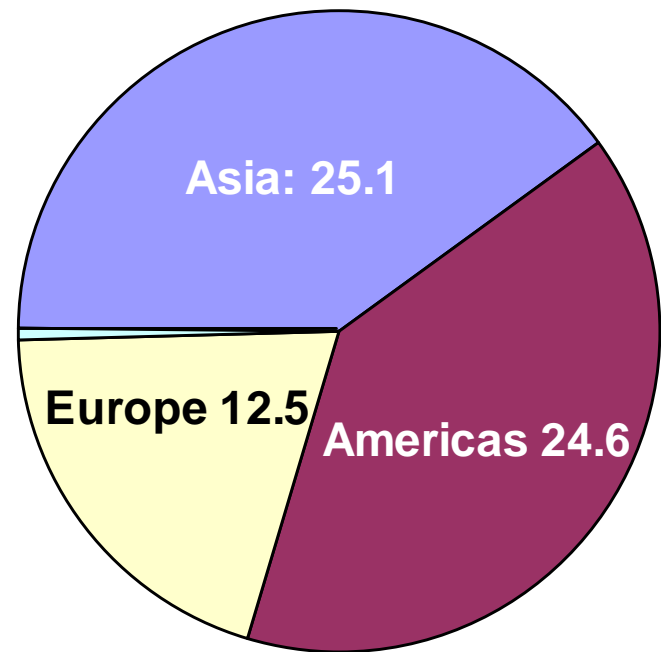
Broadband examples

- **Teleworking**
 - **Journalists abroad connecting to files at office**
- **Voice over broadband**
 - **Making free/inexpensive international calls over the Internet**
- **Multimedia files**
 - **Streaming audio from around the world at CD quality**
- **Online gaming**
 - **Players in Iceland competing against continental Europe**

Broadband facts

- **63 million subscribers worldwide (1% of the world) in over 80 countries (31 Dec 2003)**
- **94% of subscribers are in high-income economies**
- **Speeds vary from 0.256 Mbit/s to 100 Mbit/s**
- **Nearly 60% of broadband is delivered over telephone networks, 40% over cable**

Broadband subscribers, millions, by region, Dec 2002

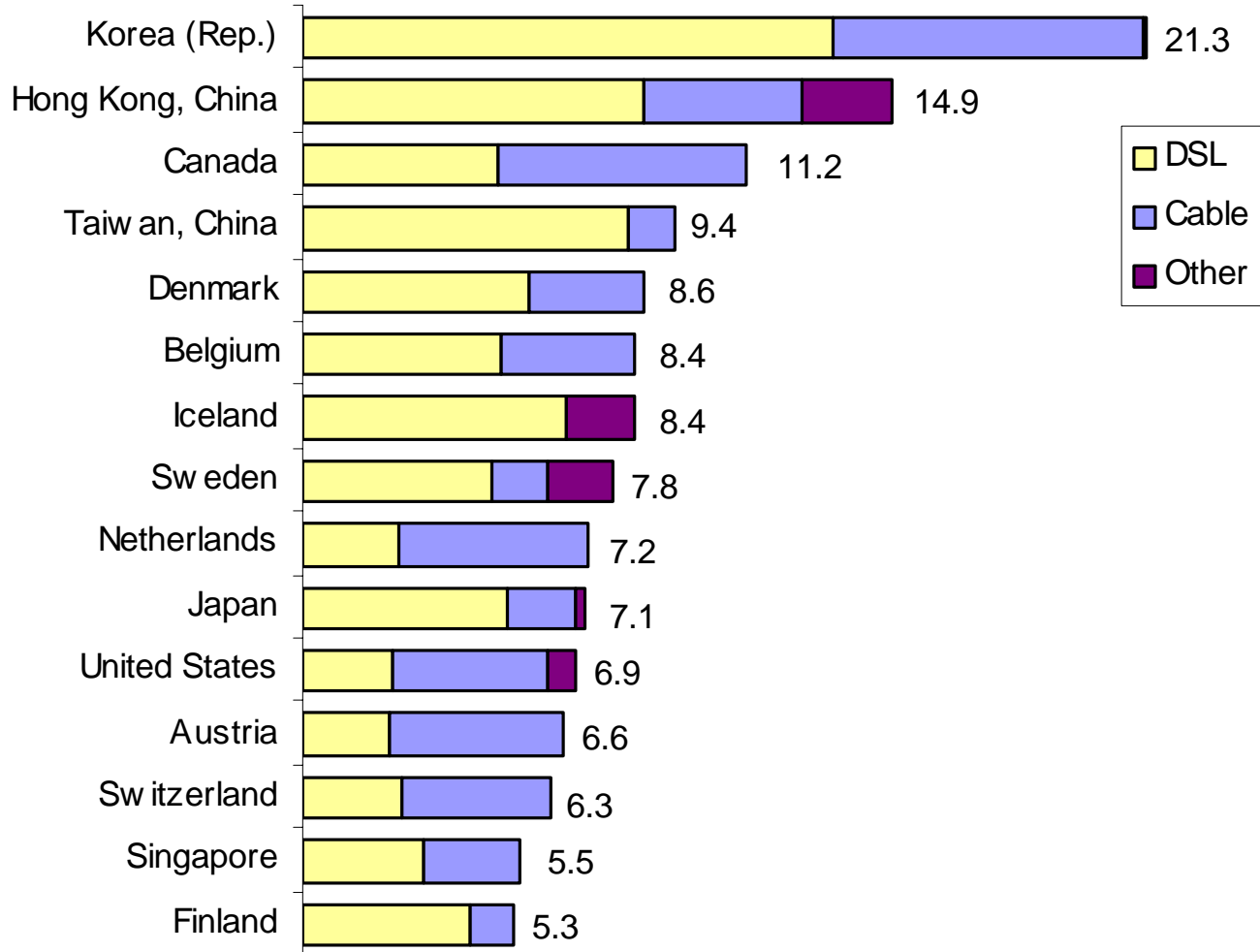


Africa: < 1 million

Oceania: < 1 million

Leading broadband economies

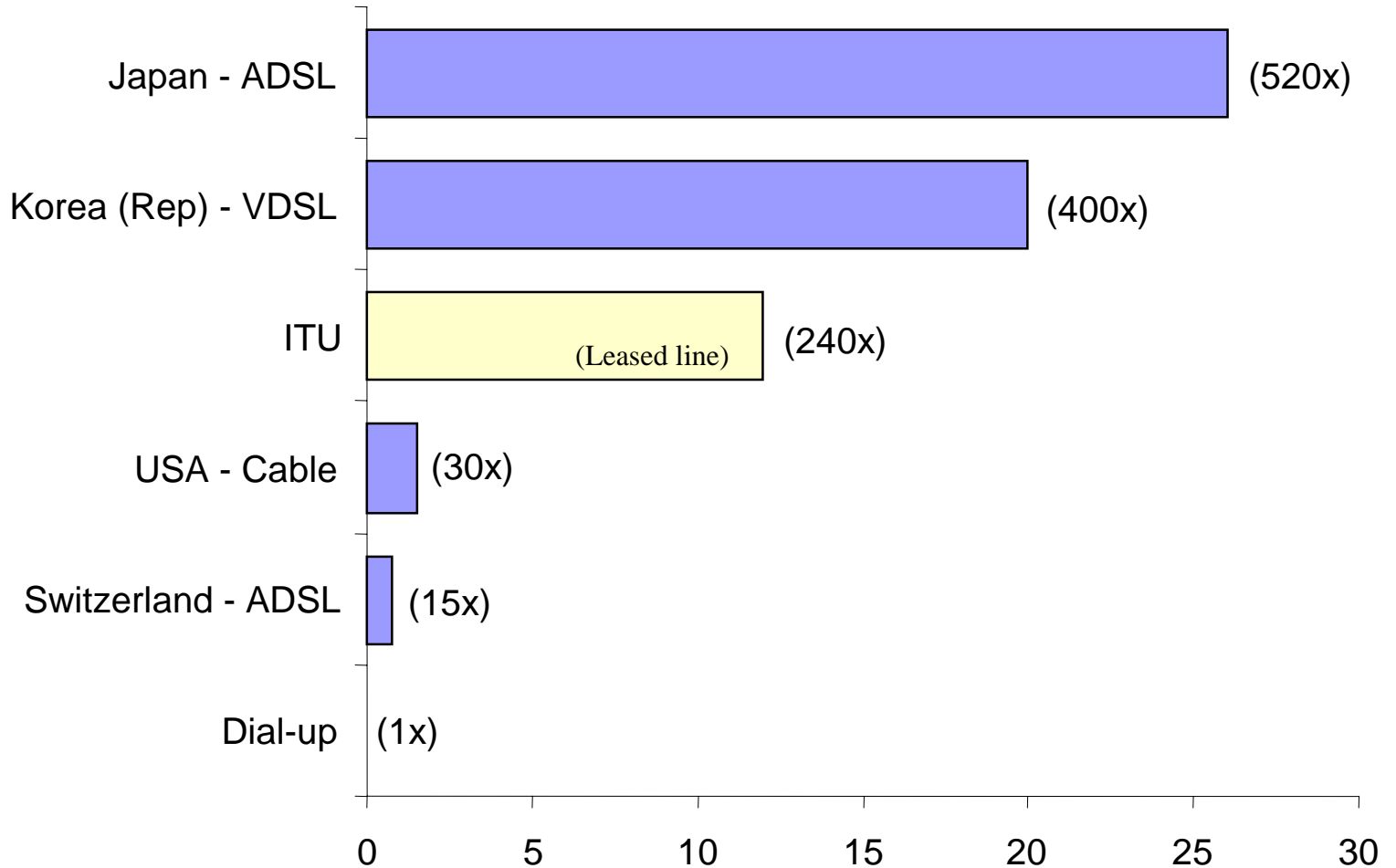
Broadband penetration, subs per 100 inhabitants, by technology, 2002





Relative broadband speeds

Broadband speed comparisons, Mbit/s, July 2003





Downloading DVD video

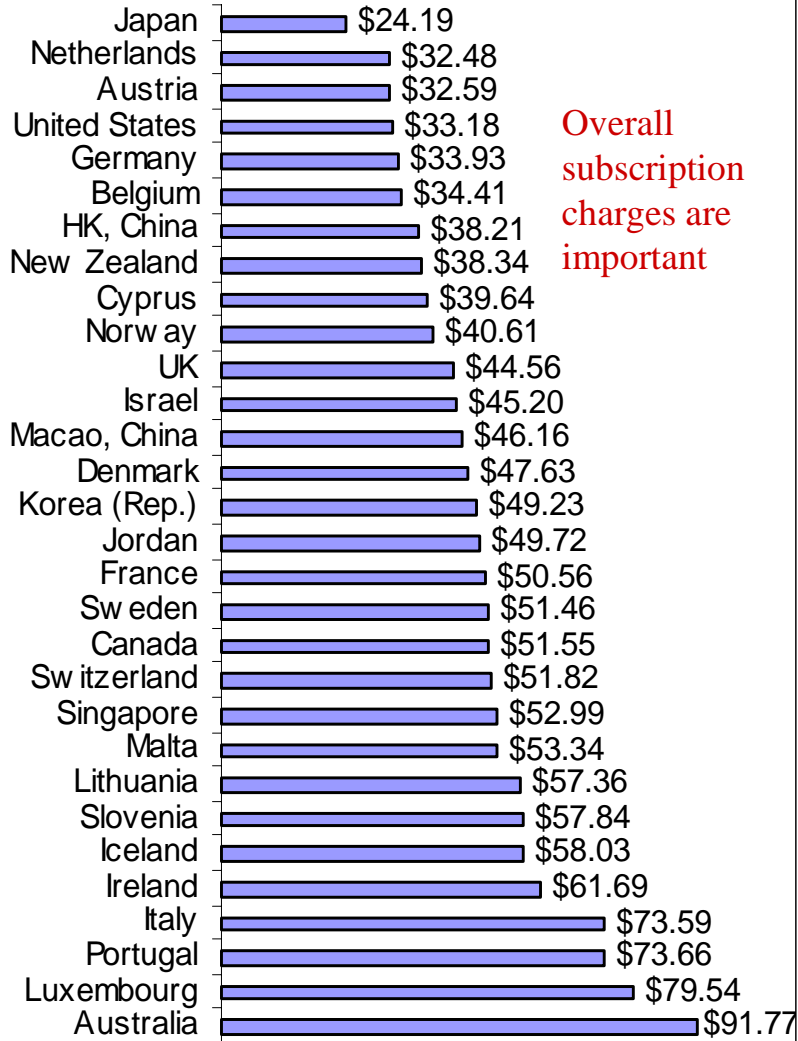
“Broadband’s high speeds will make true video-on-demand a reality”

- **Time needed to download a DVD over each Internet connection (4 gigabyte file)**
 - **Japan: ADSL (26 Mbit/s) – 20 minutes**
 - **Korea: VDSL (20 Mbit/s) – 26 minutes**
 - **ITU: Leased line (12 Mbit/s) – 44 minutes**
 - **USA: Cable modem (1.5 Mbit/s) – 6 hours**
 - **CH: ADSL (0.756 Mbit/s) – 12 hours**
 - **Dial-up (0.056 Mbit/s) – 7.5 days**



Broadband prices

Broadband subscription charges, July 2003, US\$



Overall subscription charges are important

Cost of 100 kbit/s as % of monthly income



But factoring in the speed of the connection and income is the more telling story



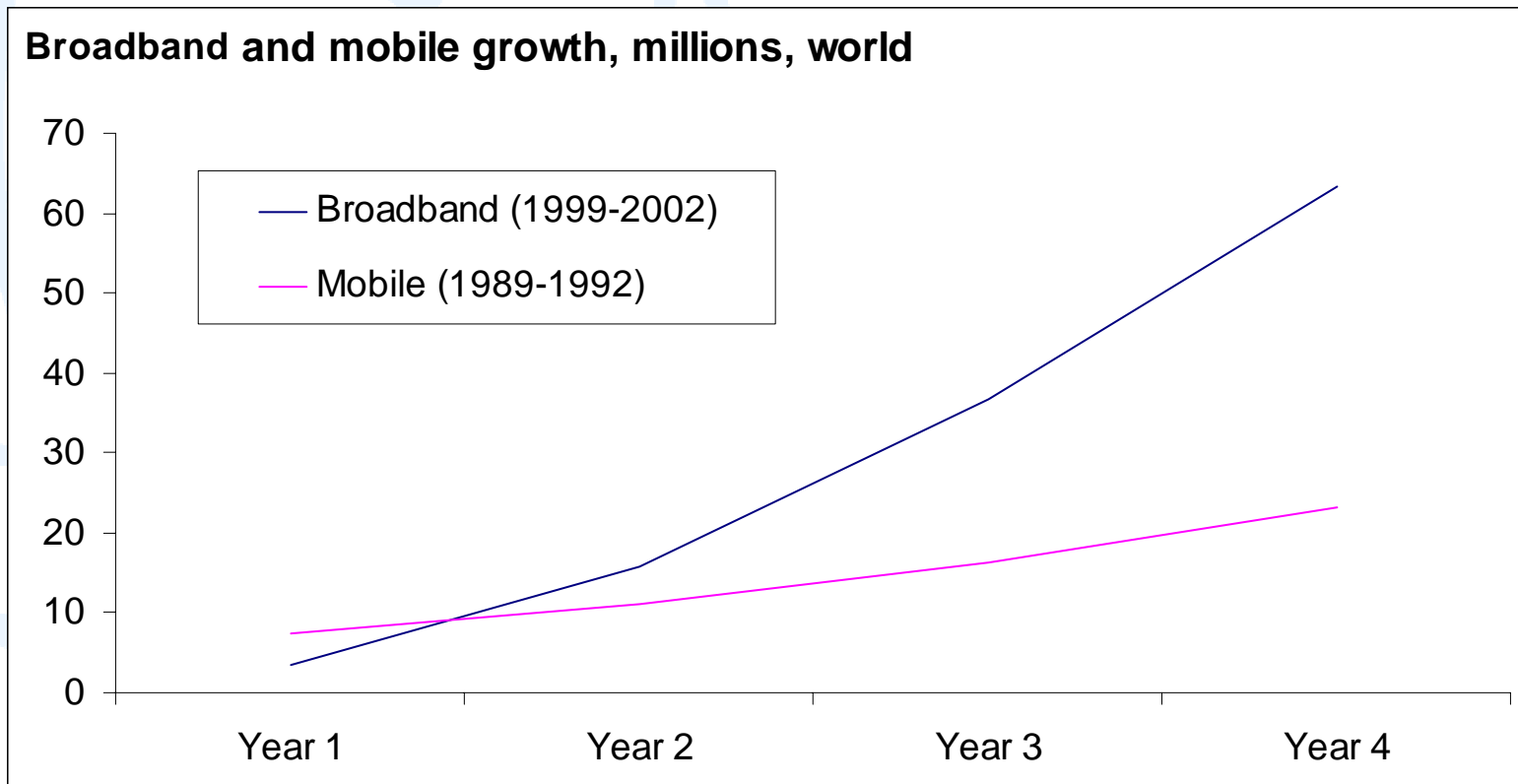
Why some economies succeed with broadband

- **Competition**
 - **There is no substitute for true market competition to expand networks and lower prices**
- **Government involvement**
 - **Economies where the government is actively involved in broadband promotion have higher penetration rates**
- **Integration of broadband applications in society**
 - **Korea has 25,000 cybercafés (open 24 hours) despite having the highest home broadband penetration in the world**

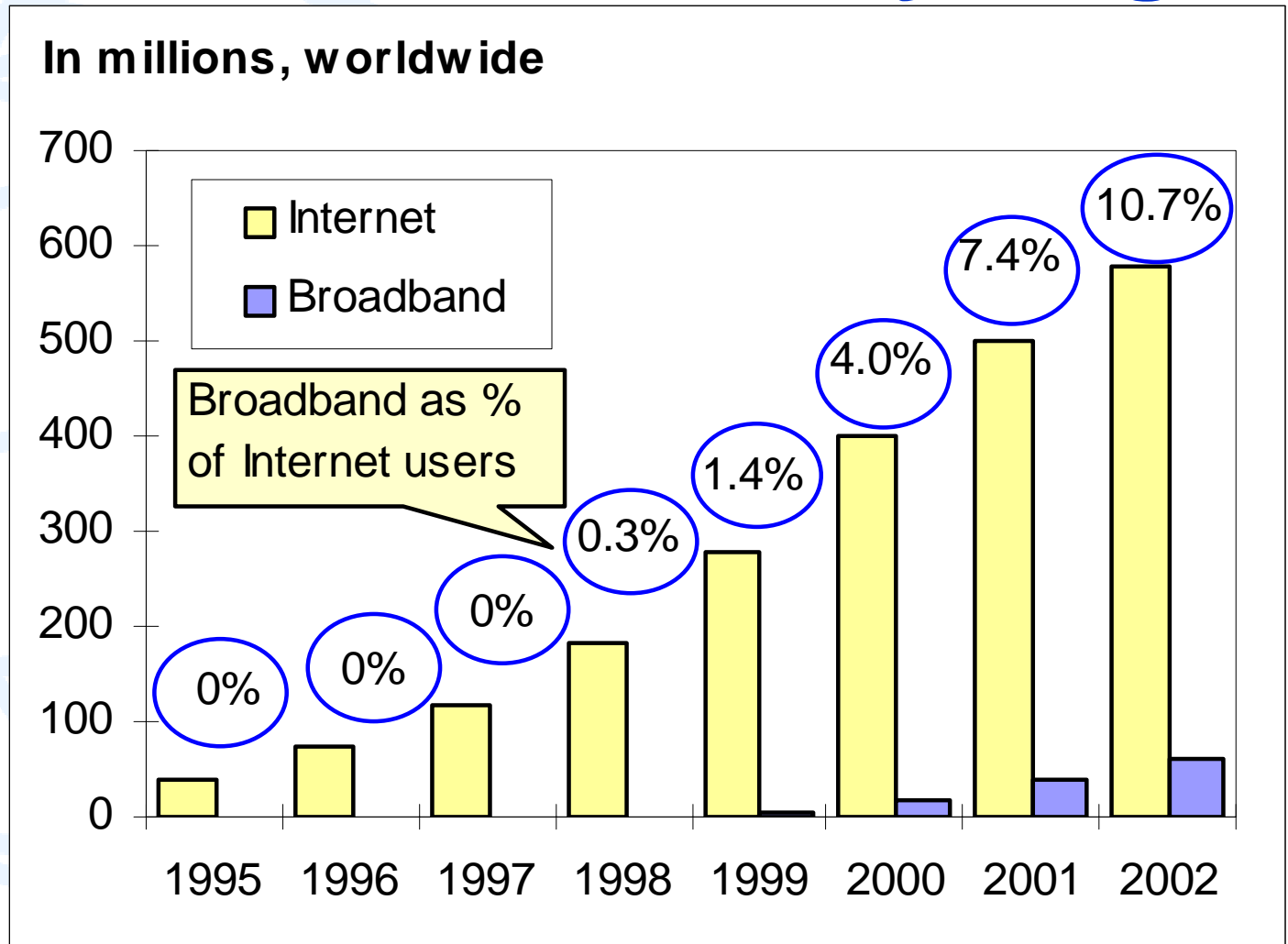


Broadband's fast growth

“Broadband access has quietly grown faster than mobile phones in their early stages”



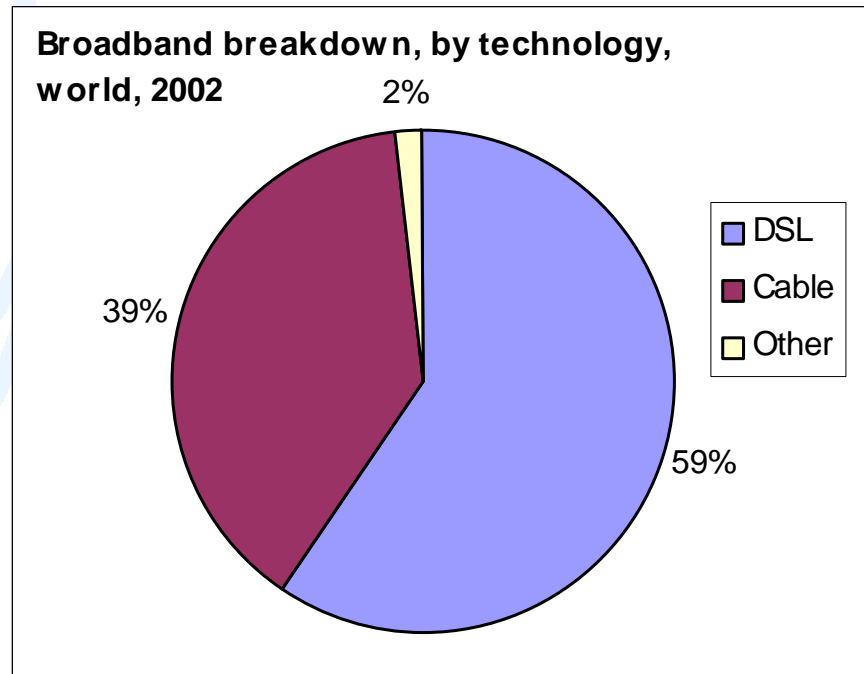
But it still has a way to go



Broadband networks

“While most current broadband networks are based on copper lines, fibre optic and wireless technologies are the broadband of the future”

- **Phone lines**
- **Coaxial cable lines**
- **Fibre optic cable**
- **Power lines**
- **Wireless**
 - **Radio waves**
 - **Lasers**
 - **Satellites**
 - **High/low altitude platform stations**



Source: ITU World
Telecommunication Indicators
Database

Developing and rural areas

“One wireless technology to reach remote areas, another to share the connection once it’s there”

- **Long range.**

- **Technologies such as WiMax and LMDS can transport large amounts of data over long distances. WiMax should be able to carry a 70 Mbit/s connection over 50 km.**

- **Short range**

- **WLAN technologies such as Wi-Fi can spread the connection over a short distance from the “landing spot” of long-range connection.**



Community networks

“If broadband doesn’t come to the town, the town builds out to reach broadband”

- **Tired of waiting for broadband, communities have installed their own broadband networks and built out to the Internet**
 - **Upper Canada Networks**
 - **Måtgränd, Sweden**
 - **STOKAB, Sweden (Stockholm)**
 - **UTOPIA, USA (Utah)**



Conclusion

- **Currently, faster web browsing, multimedia, voice and online gaming are driving broadband**
- **As broadband networks continue to expand rapidly, new and exciting applications should appear**
- **Leading broadband economies offer the world an excellent example of what works, having not only the fastest connections but the cheapest prices in the world**
- **While broadband is currently used mainly in developed economies, developing economies may be able to leap-frog using new technologies**

Thank you

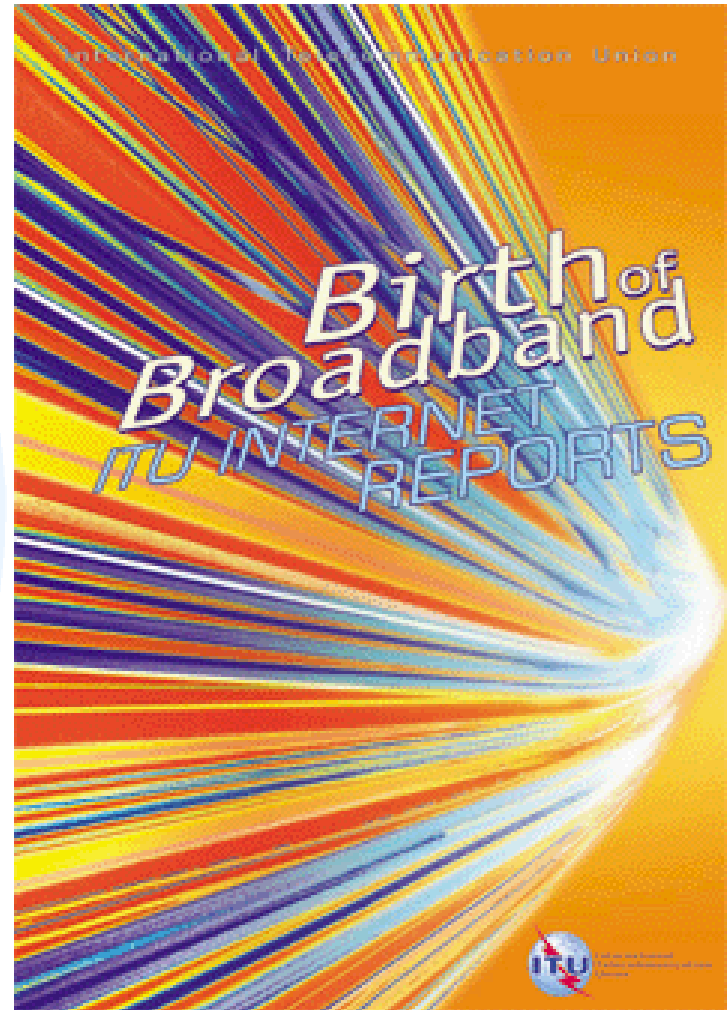
Birth of Broadband

- 130 pages of text
- 60 page statistical annex

- Available: 20 Sept 2003
- Price: 100 CHF

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<http://www.itu.int/birthofbroadband>