Global Internet Connectivity and the digital divide

Dr Tim Kelly,
International Telecommunication Union,
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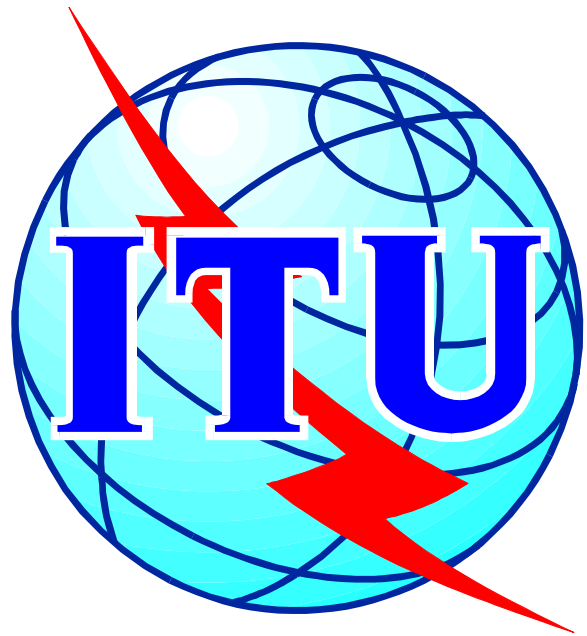
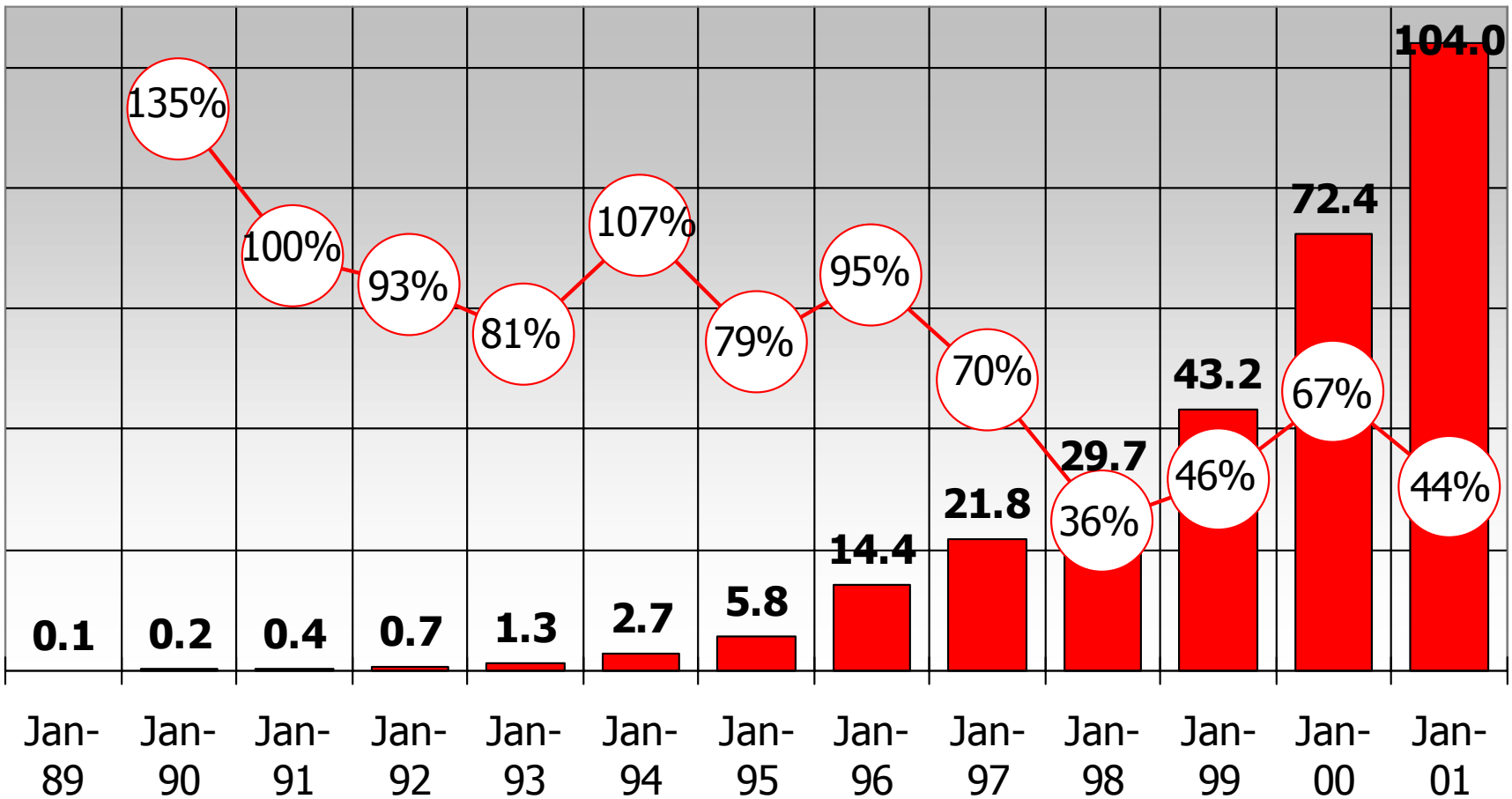


The views expressed in this paper are those of the author and may not necessarily reflect the opinions of the ITU or its membership. Tim Kelly can be contacted at tim.kelly@itu.int.

Agenda

- Global Internet Connectivity
  - ⇨ Internet and the digital divide
  - ⇨ The divide is narrowing but LDCs are falling behind
  - ⇨ Some international comparisons
- Connectivity issues
  - ⇨ Myths and misses
  - ⇨ Is Internet connectivity different from telecom connectivity?
  - ⇨ The “Internet latecomer” problem
- Conclusions
  - ⇨ Without connectivity, the digital divide will not be bridged
  - ⇨ ITU Internet diffusion case studies

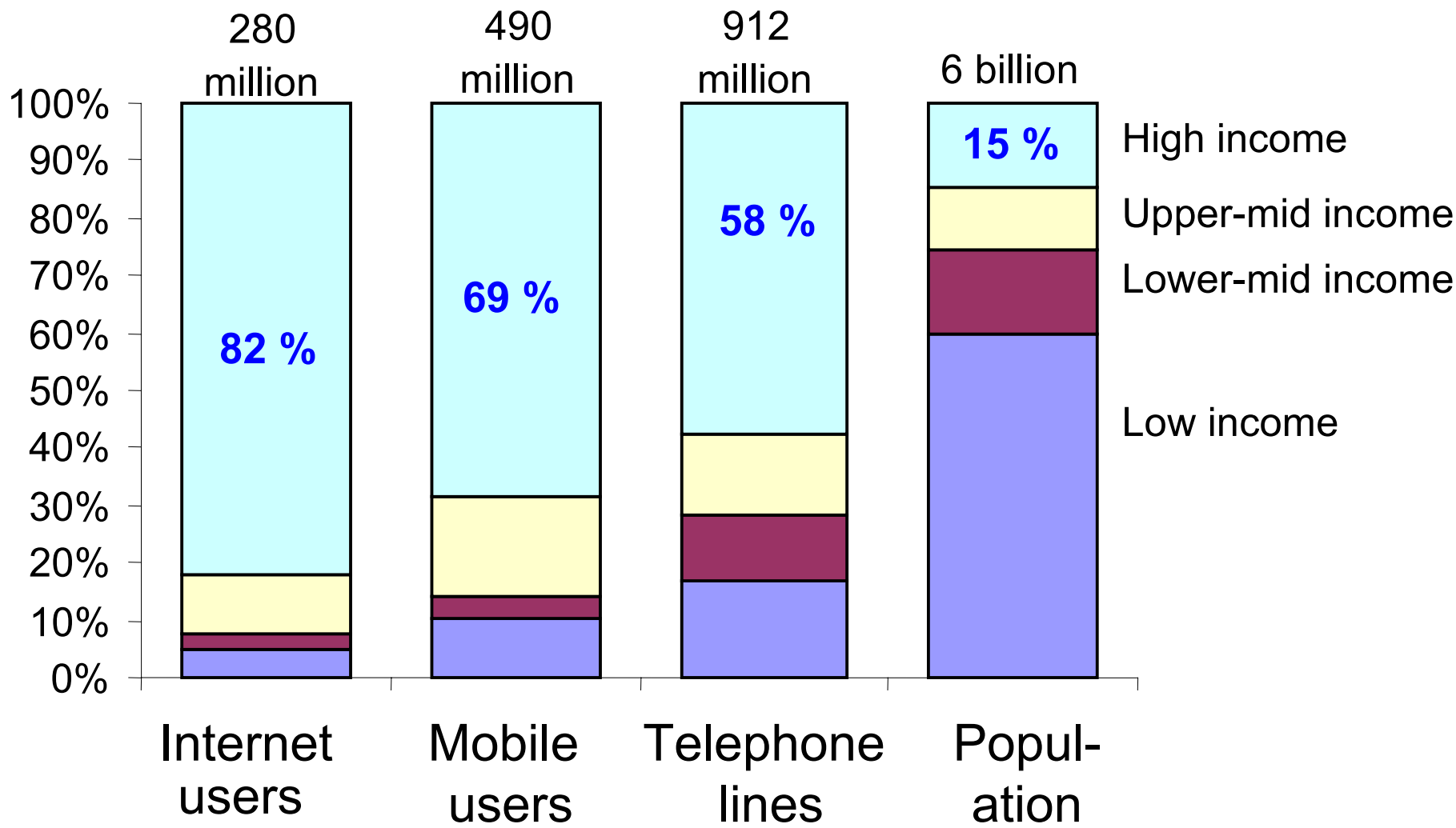
Number of Internet host computers, in millions, and annual growth in %



Source: ITU, adapted from Internet Software Consortium <www.isc.org>.

Digital divide = Infrastructure divide

User distribution, by income group, Jan 2000



Source: ITU World Telecommunication Indicators Database.

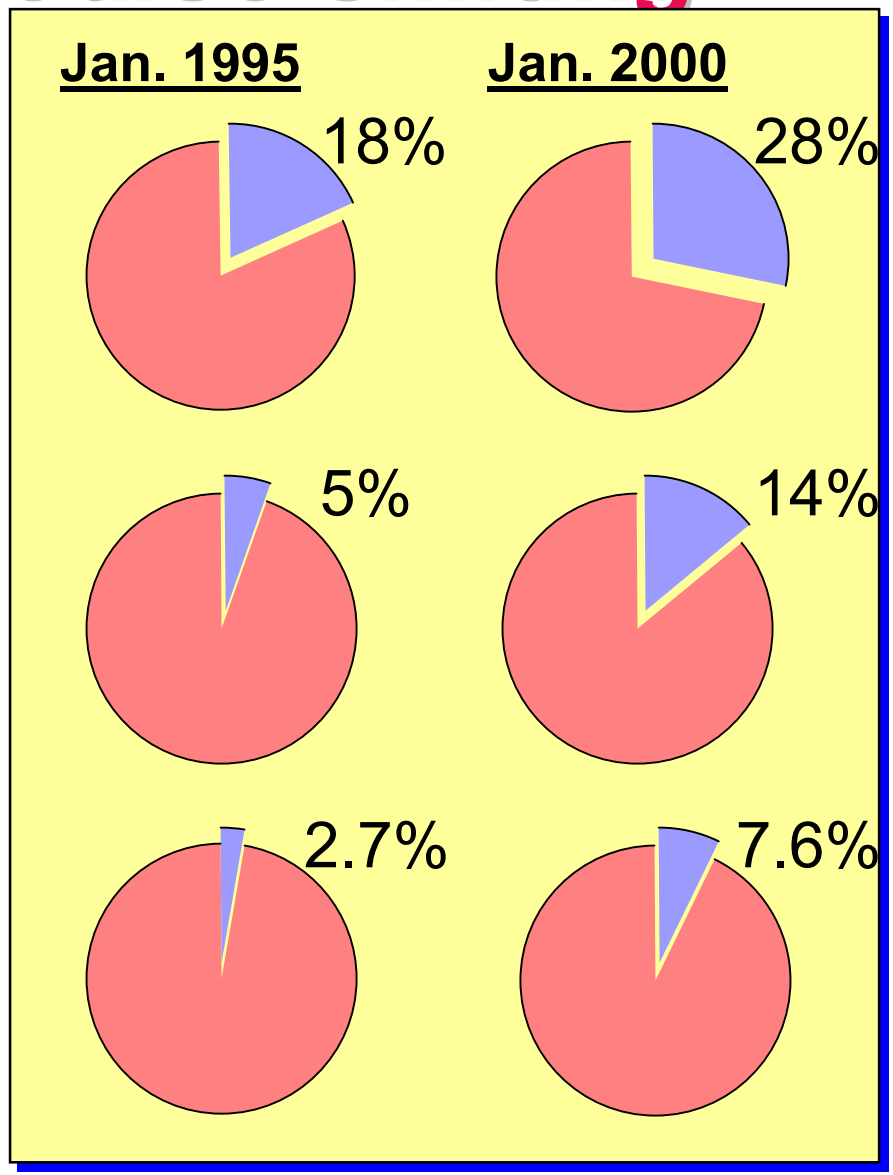
The digital divide is shrinking, but also shifting

Share of low and lower-middle income countries in:

Telephone main lines

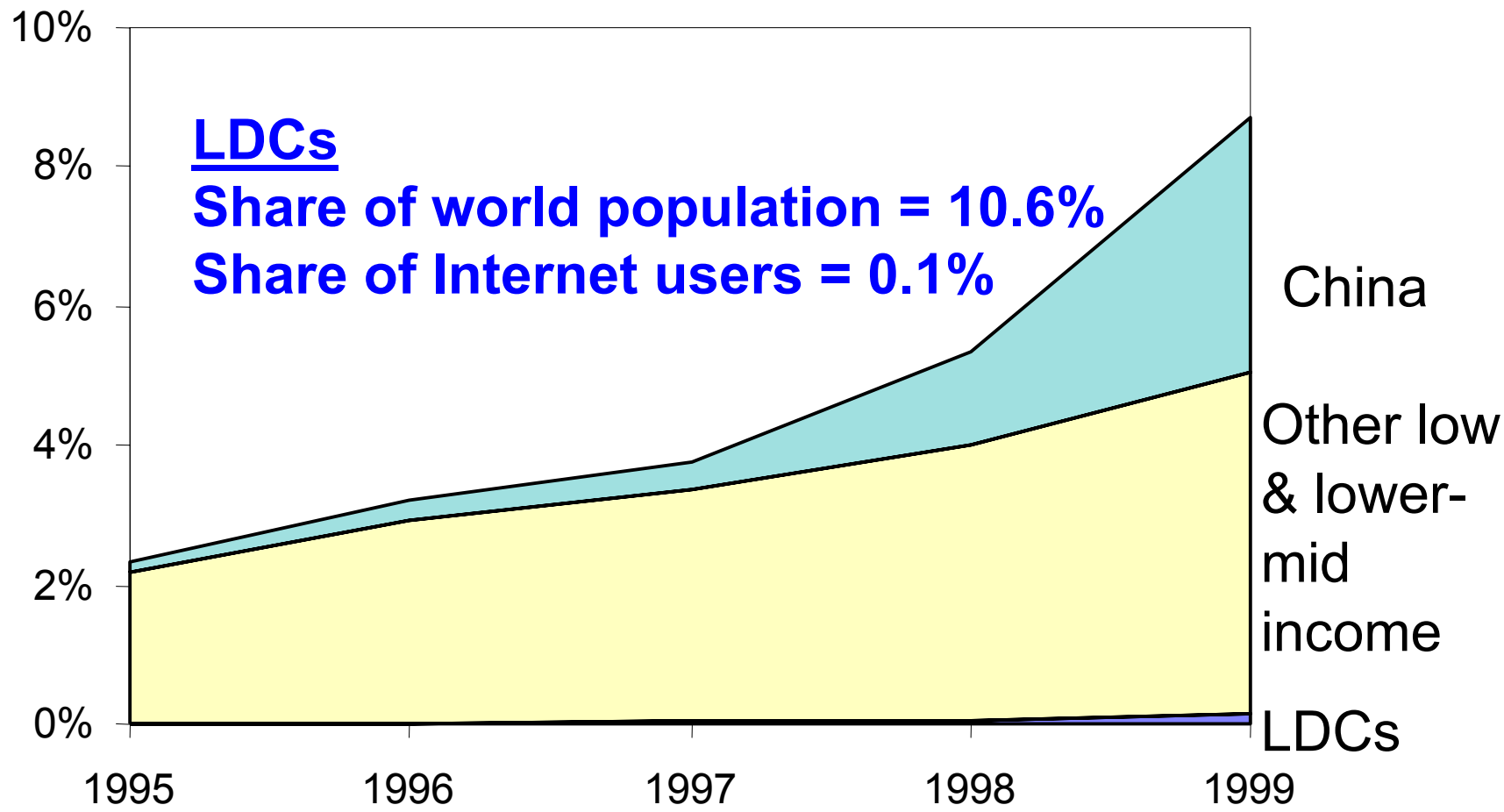
Mobile subscribers

Estimated Internet Users



Source: ITU World Telecommunication Indicators Database.

LDCs falling further behind:
Share of worldwide Internet Users



Telecom connectivity and Internet connectivity: What's the difference?

Telecom world

- Platform is jointly-provided circuits (cost-sharing)
- Operators typically guarantee end-to-end connectivity
- Financial arrangements based on negotiated settlement rates
- Cash flows from core to periphery of network

Internet world

- Platform is leased circuits (full-circuit paid by connecting operator)
- Internet exchange points typically guarantee only efficient routing of traffic
- Peering between Tier 1 IXPs; traffic exchange payments from Tier 2 IXPs
- Cash flows from periphery to core of network

Connectivity: Myths and misses

- The total bandwidth available in the United States is increasing three-fold every year. Therefore there will soon be universal connectivity.
- Some 264 economies have Internet access. Therefore the whole world is connected.
- Bandwidth across the Atlantic will soon amount to more than 1 Mbit/s for every person in North America and Europe. Therefore usage will soon be too cheap to meter

Connectivity: Myths and misses

WRONG!

Connectivity is about distribution, not about total quantity

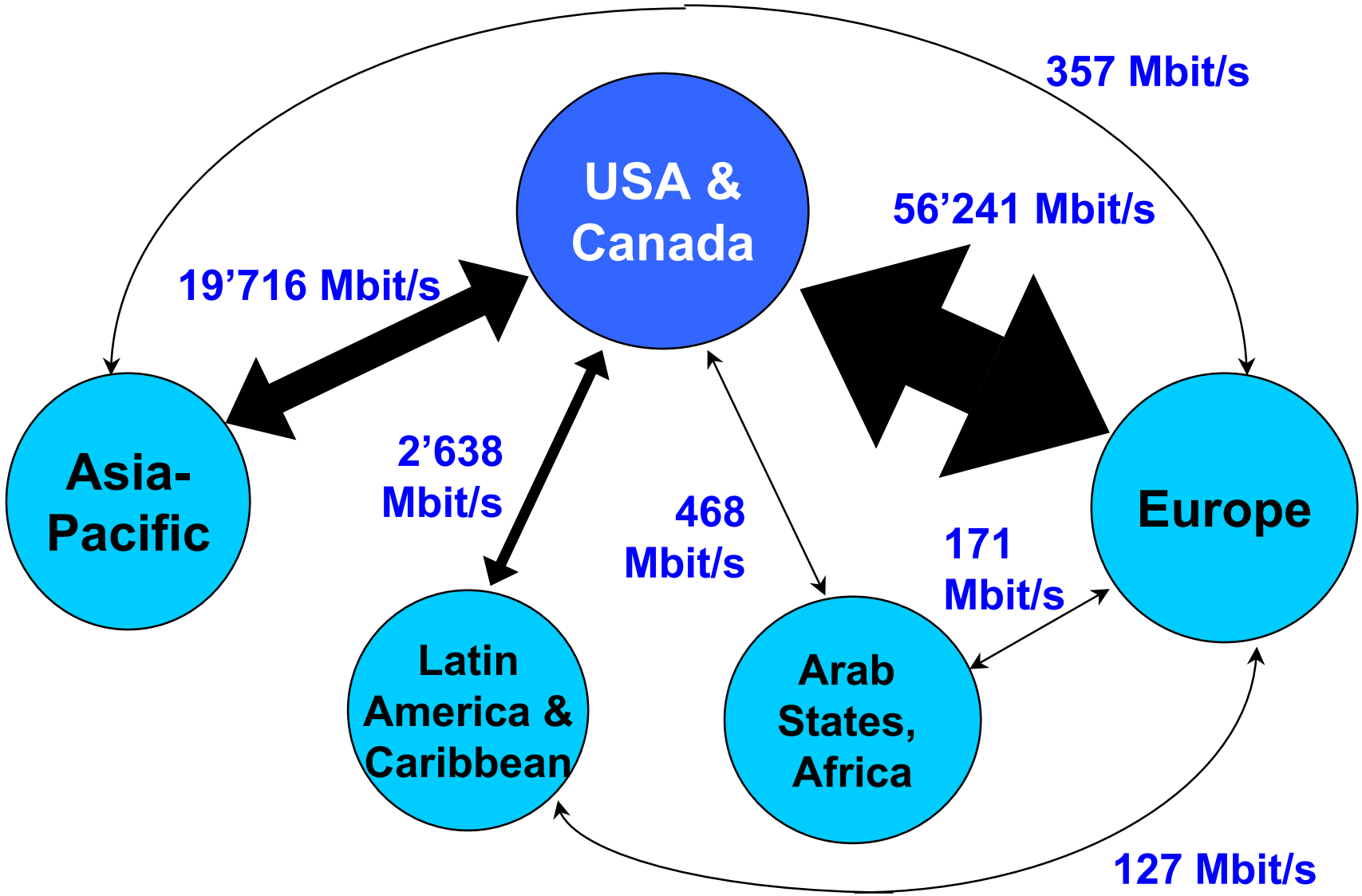
WRONG!

The majority of countries have less connectivity than a single ADSL link

WRONG!

The vast majority of fibre optic cable is left dark and is made available only when price is right

Inter-regional Internet backbone



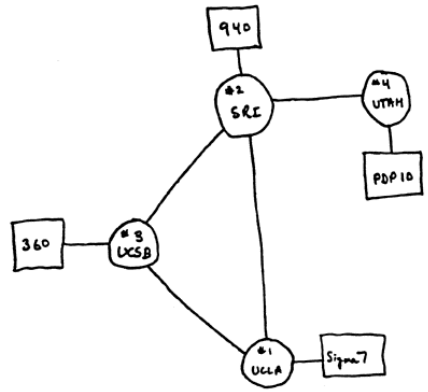
Source: TeleGeography Inc., Global Backbone Database. Data valid for Sept. 2000.

Inequalities in Inter-continental Internet bandwidth

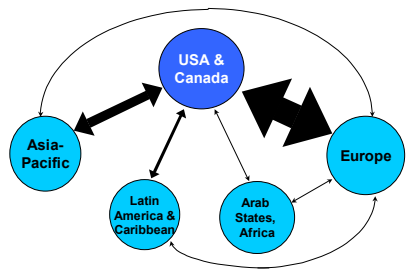
- **Singapore**
  - ⇨ Estimated 950’000 Internet users (Dec 1999)
  - ⇨ Around 800 Mbit/s international capacity (June 2000)
  - ⇨ Around 20 kbit/s per user (assuming 1 hour per day)
- **Egypt**
  - ⇨ Estimated 200’000 users (Dec 1999)
  - ⇨ Around 26 Mbit/s international capacity (May 2000)
  - ⇨ Around 3 kbit/s per user (assuming 1 hour per day)
- **Uganda**
  - ⇨ Estimated 25’000 users (Dec 1999)
  - ⇨ Around 2 Mbit/s international capacity (Feb 2000)
  - ⇨ Around 1.9 kbit/s per user (assuming 1 hour per day)

The "Internet latecomer" problem

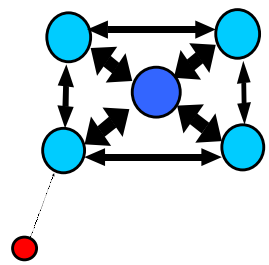
- In the beginning, the Internet was:
  - ⇨ North American
  - ⇨ Not-for-profit
  - ⇨ Used primarily for email & file transfer



- By the mid-1990s, the Internet had:
  - ⇨ Spread to the OECD countries
  - ⇨ Begun "privatisation" of the backbone
  - ⇨ Become primarily a channel for the Web



- By 2005, the Internet may be:
  - ⇨ Available throughout the world
  - ⇨ A fully commercial undertaking
  - ⇨ Used primarily for multimedia streaming



Two LDC "success stories"

- **Nepal**
  - ⇨ 16-fold increase in IP connectivity in 8 months following liberalisation of VSAT market in 1999
  - ⇨ Lowest IP access prices in South Asia
  - ⇨ BUT, opening up VSAT market has lead to a drastic fall in incoming telephone traffic and settlements
- **Uganda**
  - ⇨ Rapid increase in network growth following introduction of second national operator, MTN Uganda
  - ⇨ First country in Africa where mobilephone outnumbered fixed-line telephones
  - ⇨ BUT, entire national capacity is less than 2 Mbit/s

Source: Internet Diffusion Case Studies at: http://www.itu.int/ti/casestudies

Conclusions

- International digital divide initiatives have focused on using ICTs to extend access to healthcare, education, governance etc
  - ⇨ BUT, without connectivity, demand side initiatives are largely irrelevant
- Lack of connectivity is a particular barrier in the LDCs. Market opening, esp. of international gateway, can help
  - ⇨ BUT, for LDCs, losses on international traffic can outweigh gains made on Internet connectivity
- Developed country policy-makers claim to see no linkage between telecom and Internet issues
  - ⇨ BUT, for developing countries, the two are generally inseparable

ITU Internet Diffusion Case Studies

- 2000
  - ⇨ 6 studies covering Bolivia, Egypt, Hungary, Nepal, Singapore, Uganda
- 2001
  - ⇨ Regional focus on ASEAN
- Purpose:

  "To understand the factors that may promote or retard the development of the Internet in different countries"

www.itu.int/ti/casestudies