Global trends in telecom development & new challenges for developing countries

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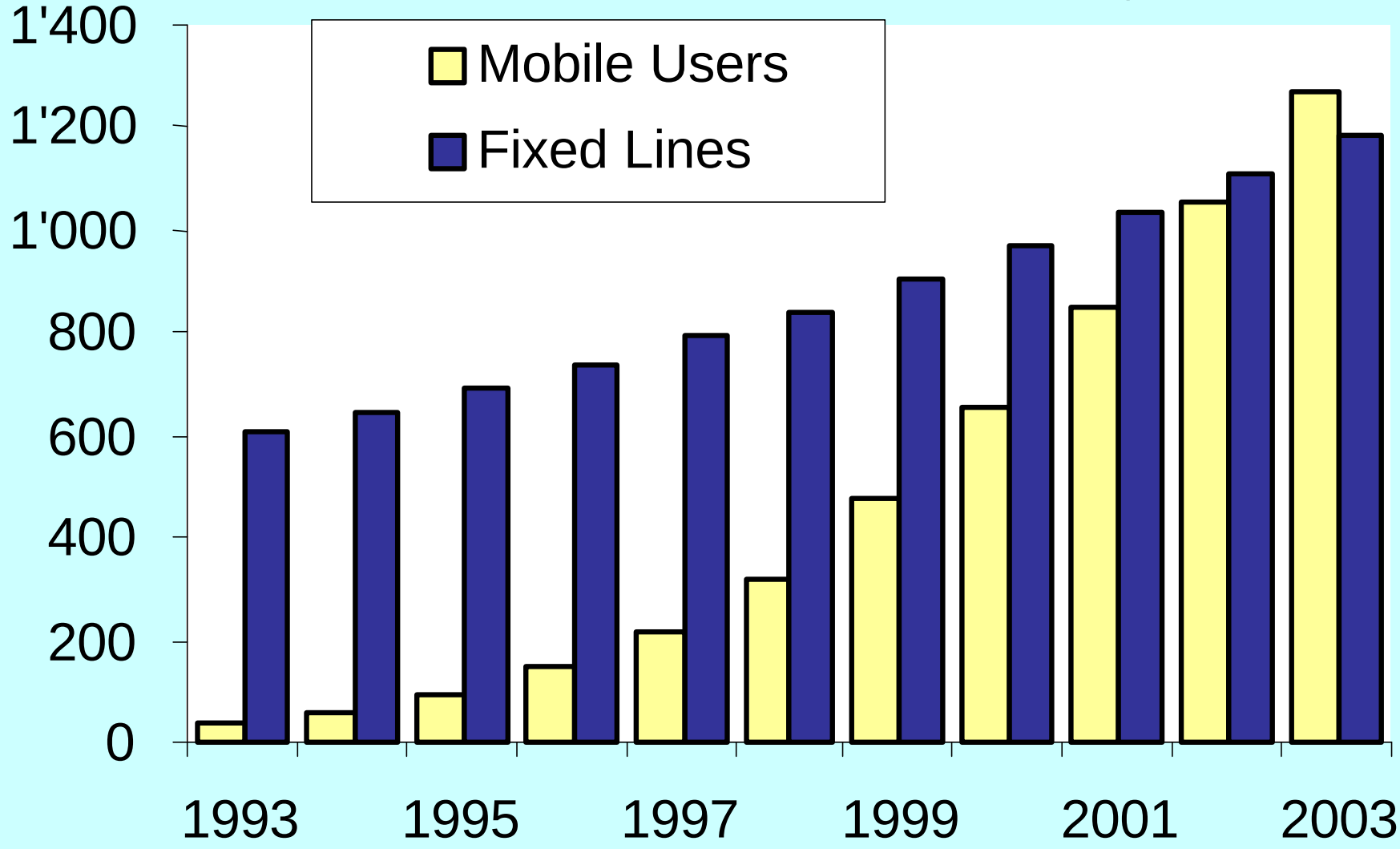
Agenda

- **Market trends**
  - **Network evolution**
  - **Paradigm shift**
  - **Tariff evolution**
- **Challenges for developing countries**
  - **IP Telephony**
  - **Mobile service**
  - **Internet issue**

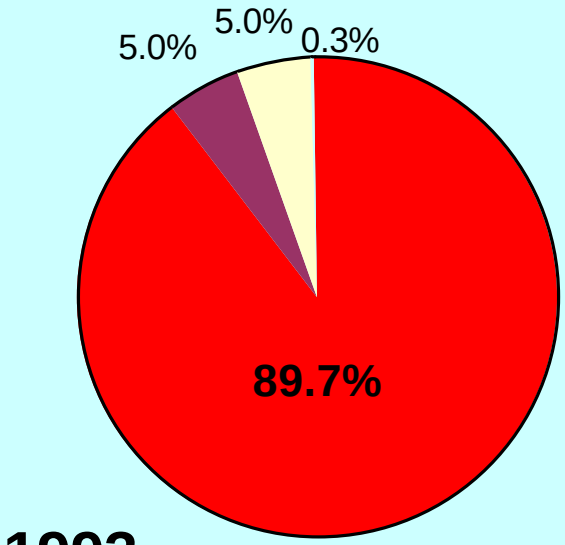
A Mobile Revolution

Fixed Lines vs. Mobile Users, worldwide, Million

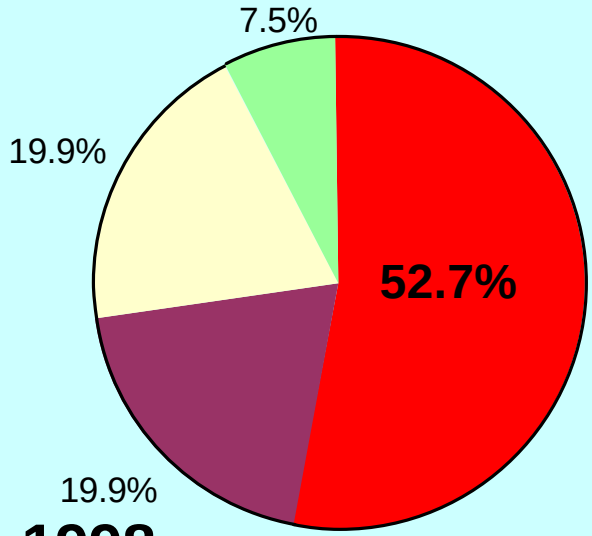


Source: ITU World Telecommunication Indicators Database.

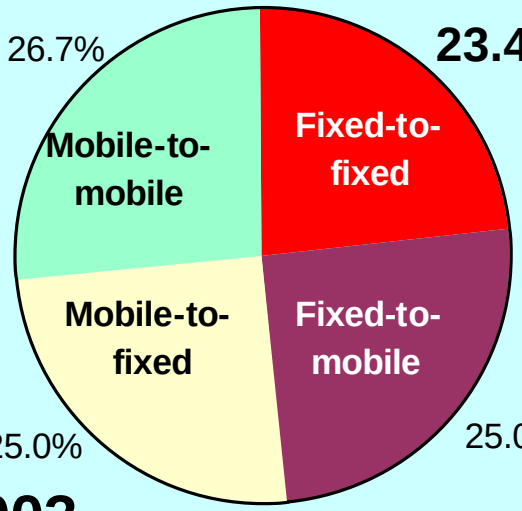
Calling opportunities worldwide



1993



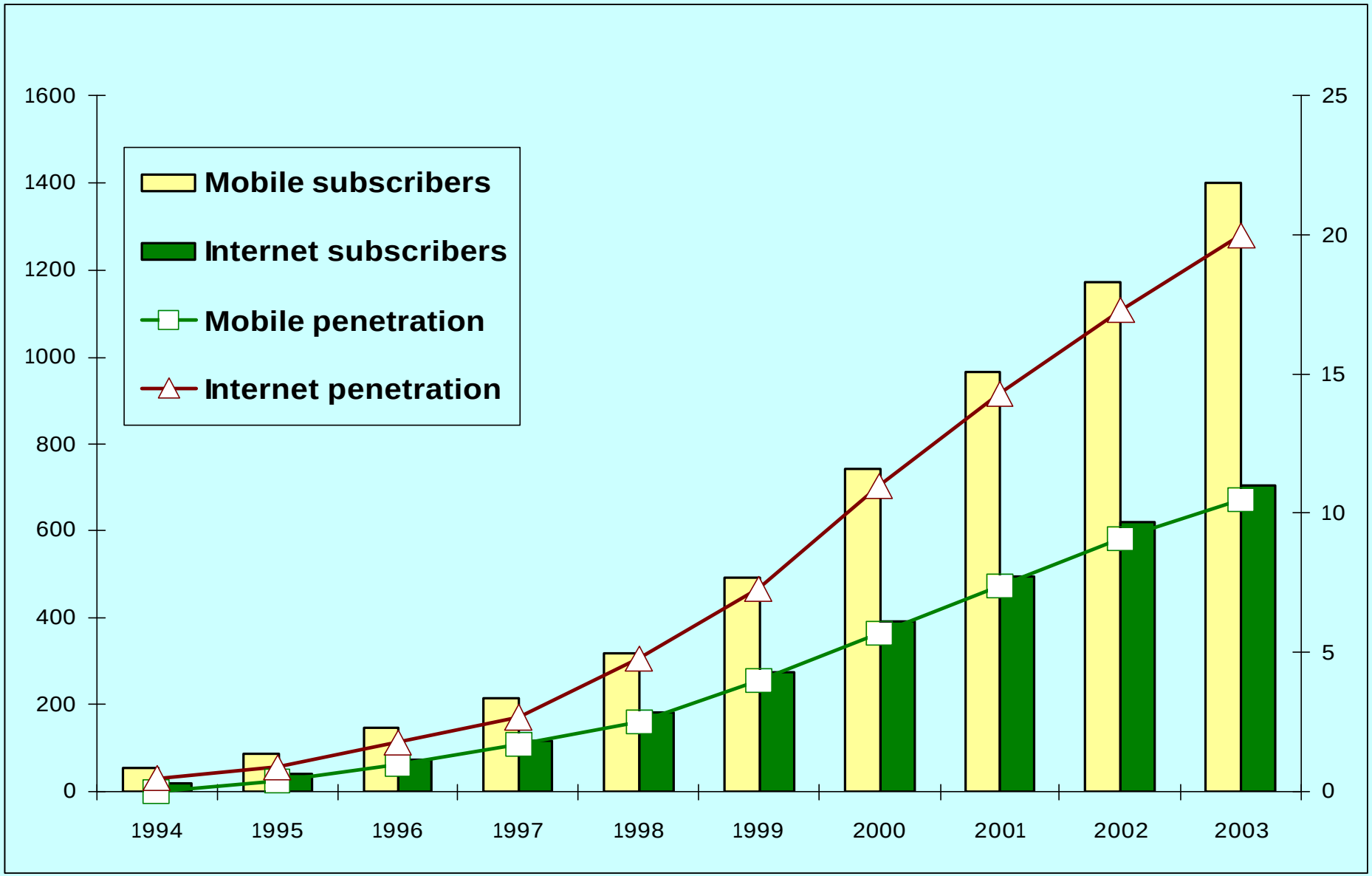
1998



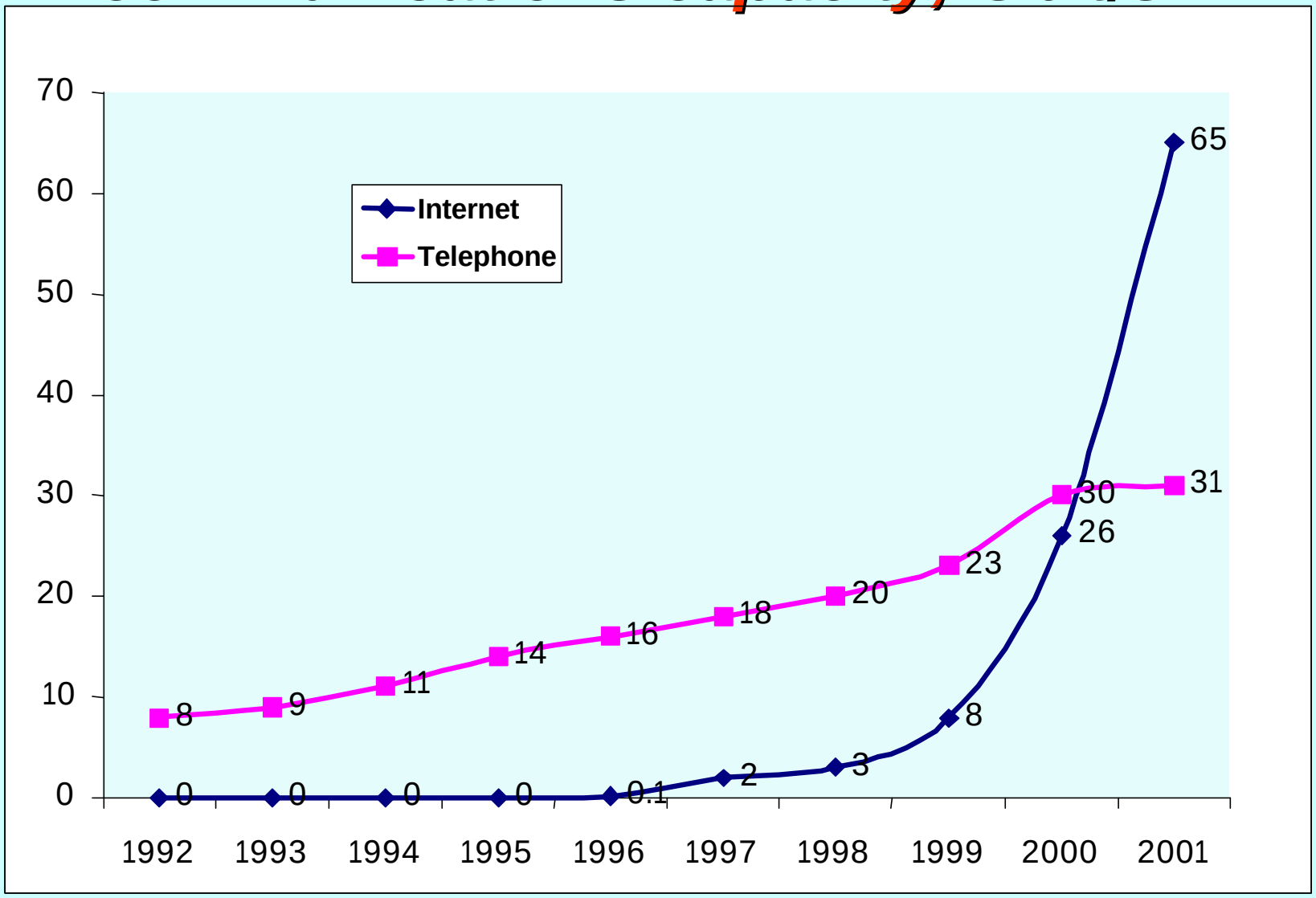
2003

Source: ITU Fixed-Mobile Interconnect website: http://www.itu.int/interconnect

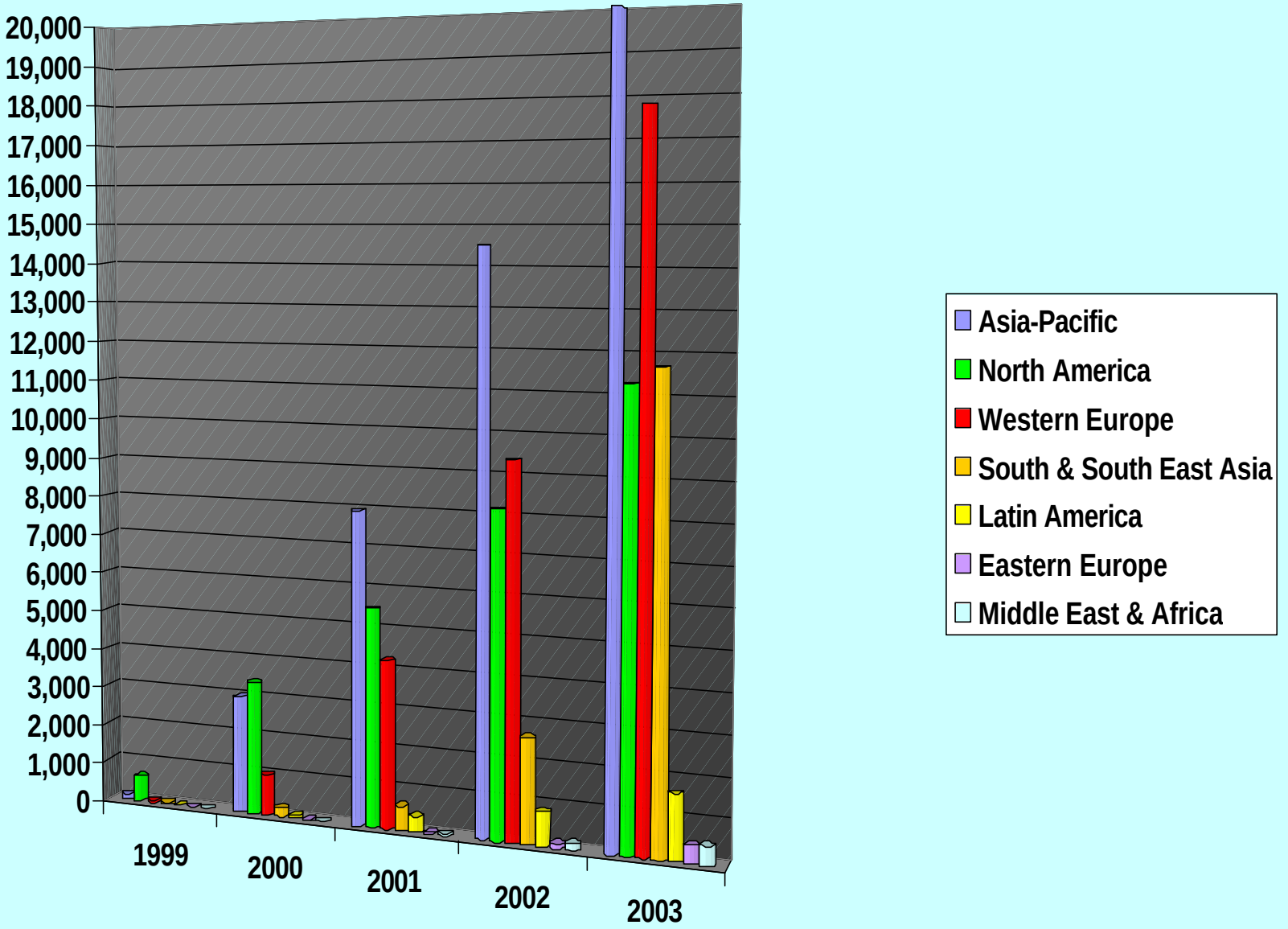
Impact of new technologies



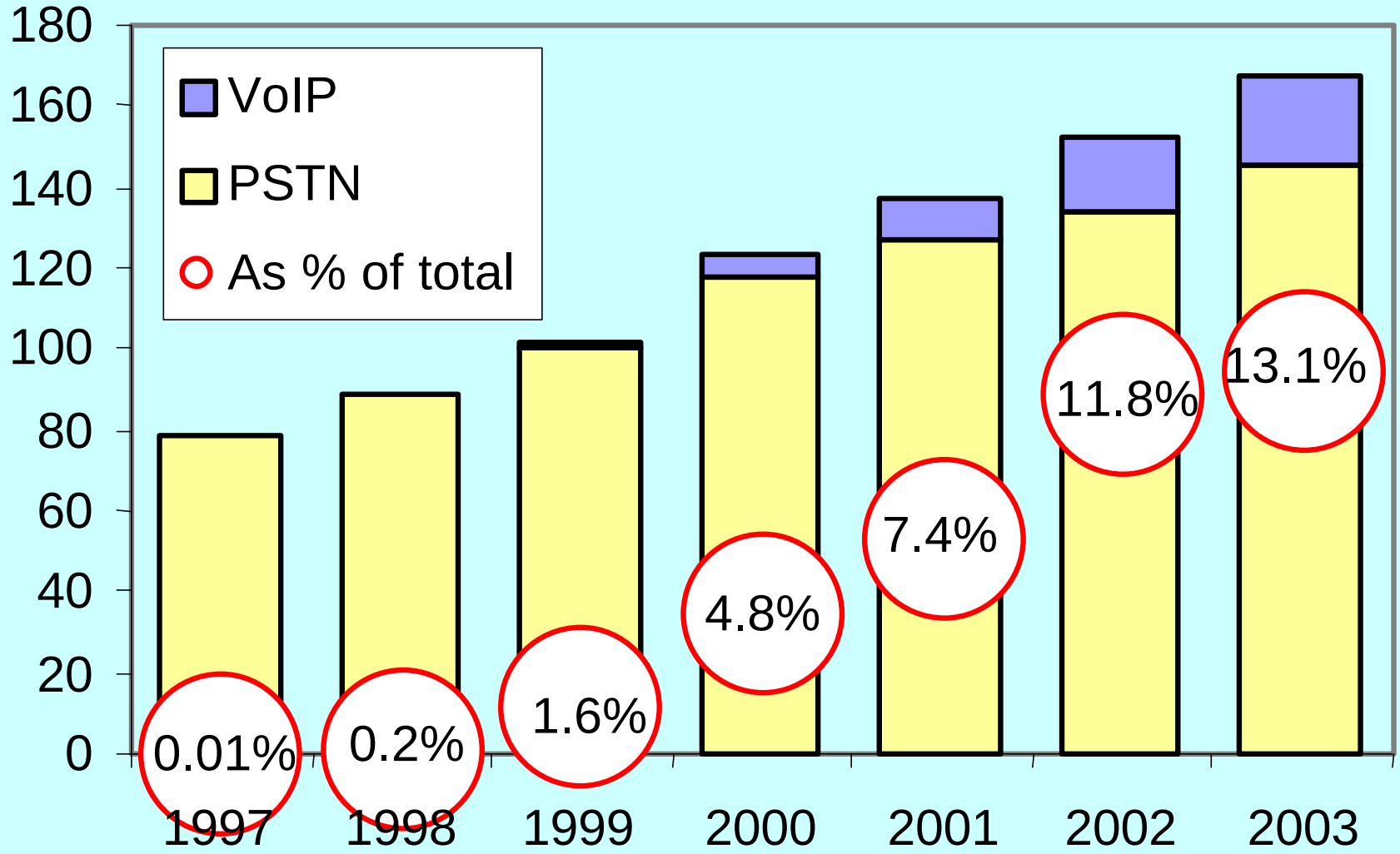
Asia-Pacific international communications capacity, Gbit/s



Growth In DSL Subscribers-Regional Division (000s)
1999-2003



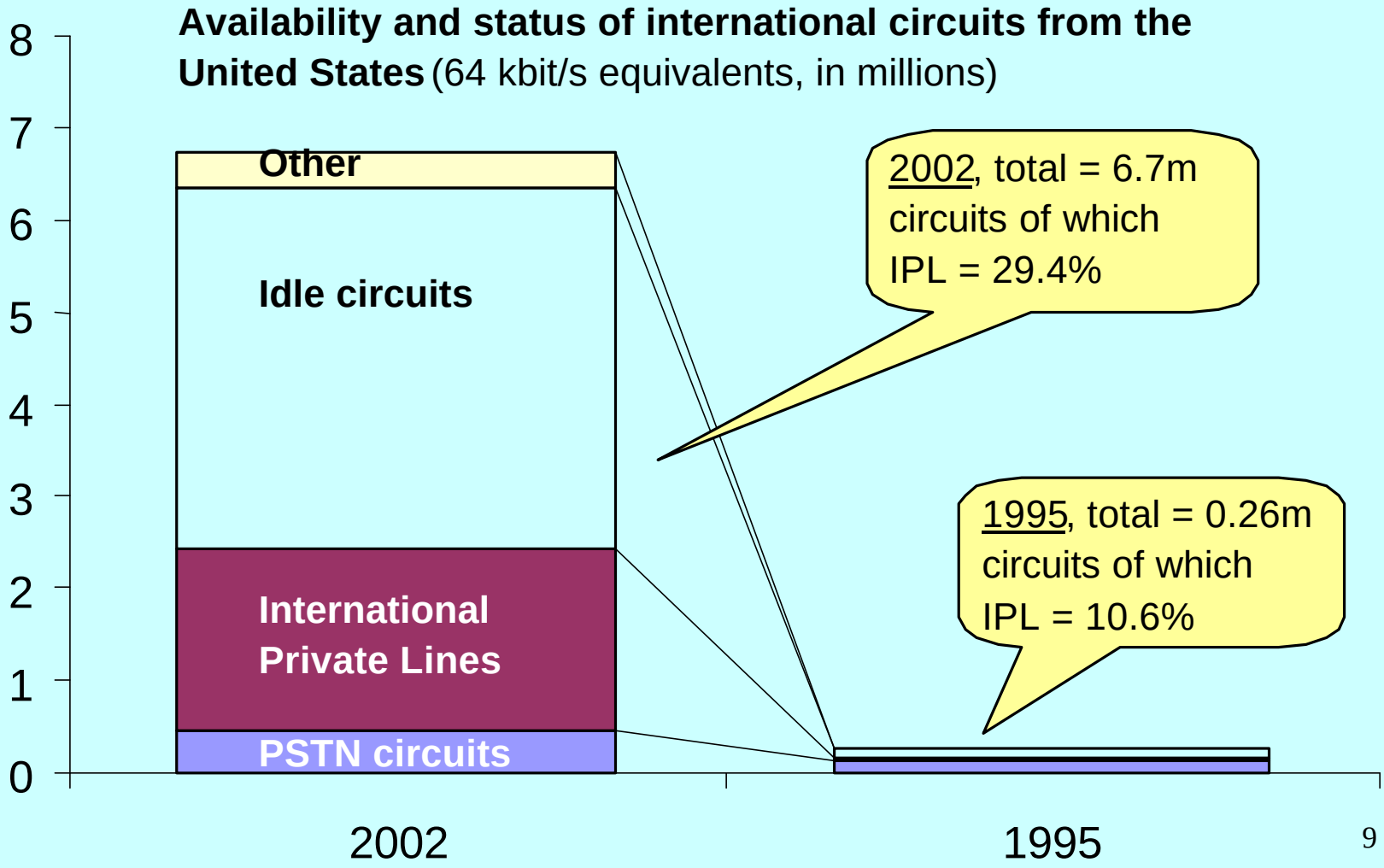
International voice traffic
(in billions of minutes)



Source: ITU / TeleGeography

Changing mix of int'l circuits

Rise of international private lines



Source: ITU, adapted from FCC Circuit Status Report.

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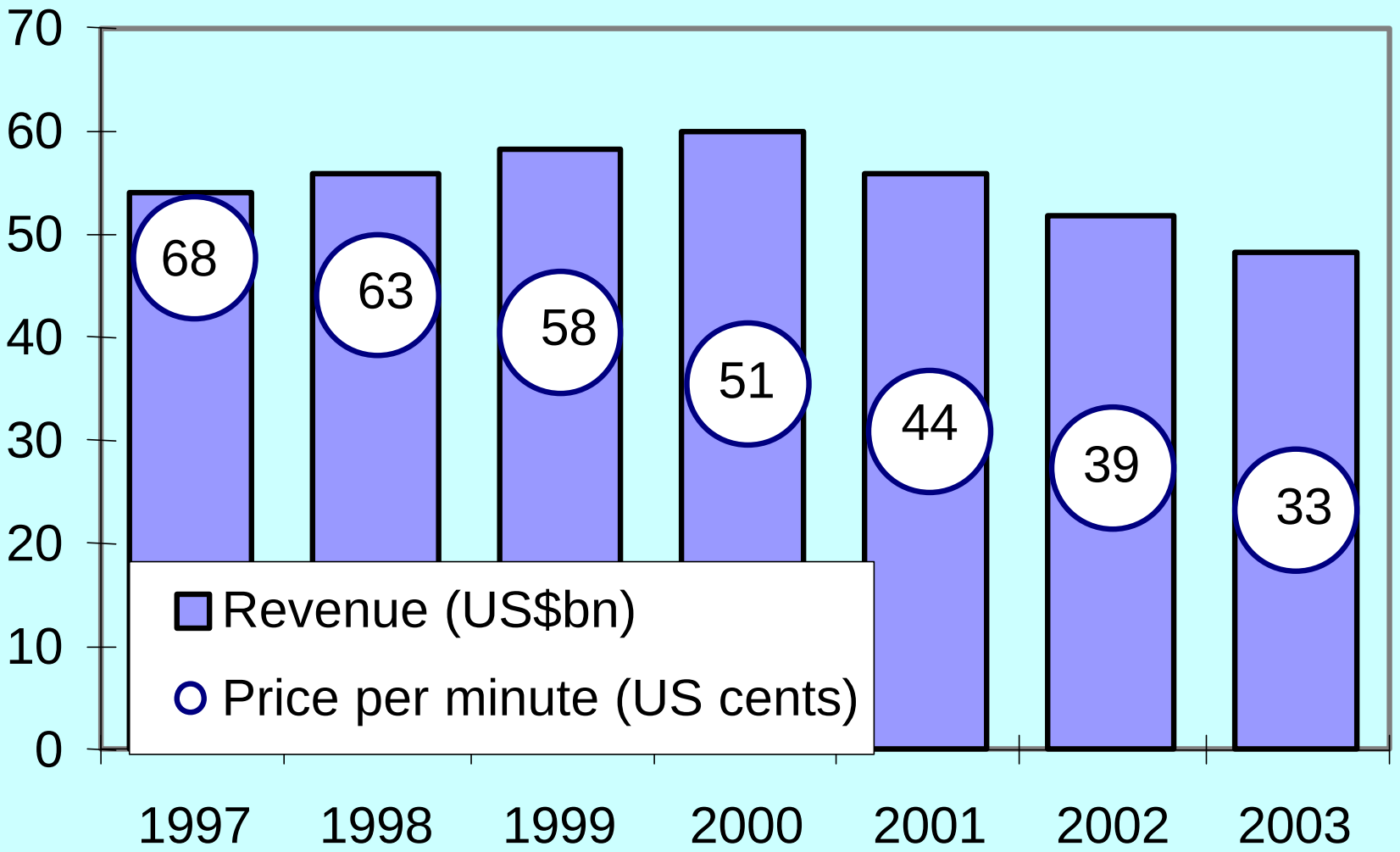
International voice traffic trends

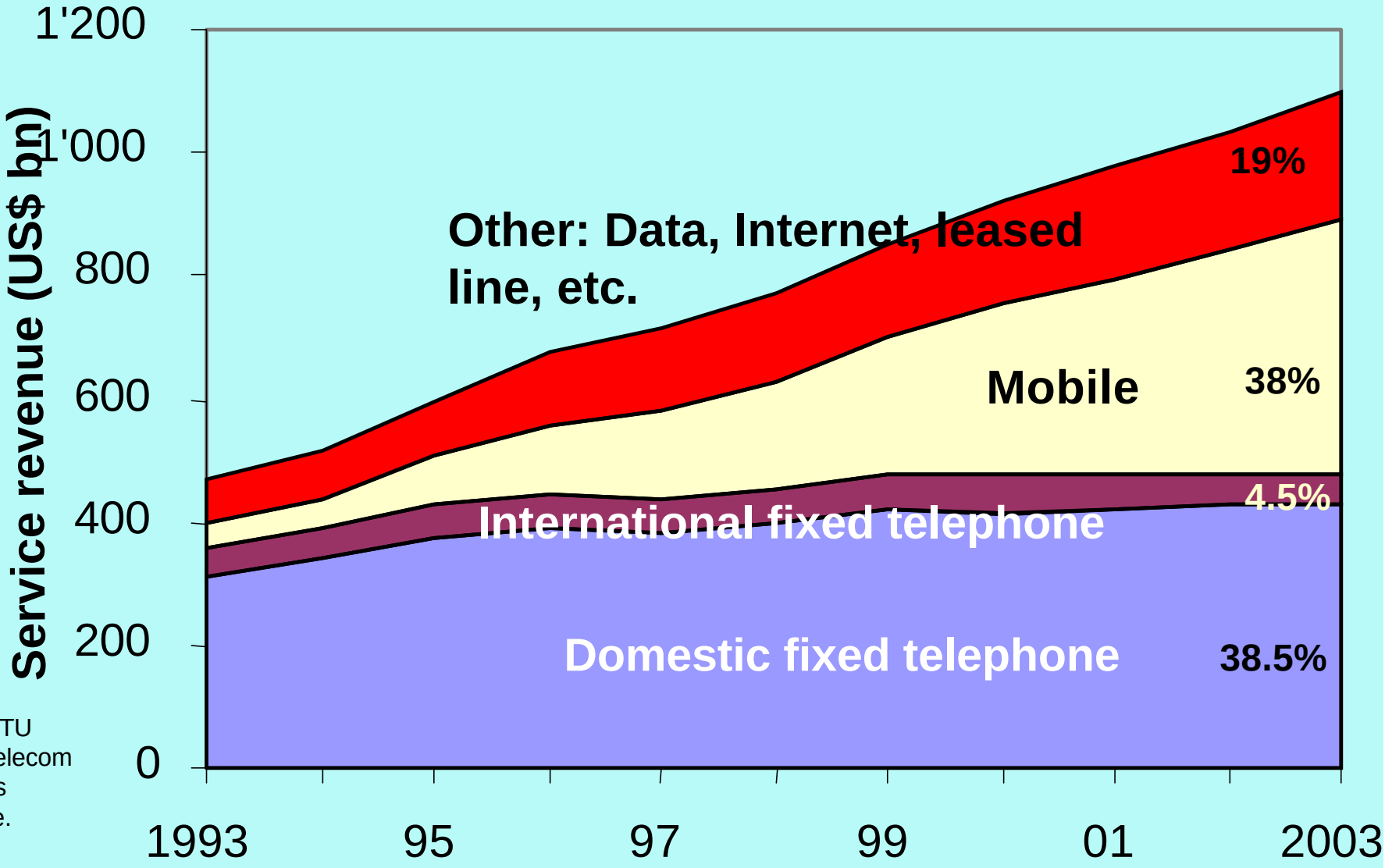
Revenue (US$bn) and price per min (cents)



Source: ITU World Telecom Indicators Database.

Sources of telecom revenue

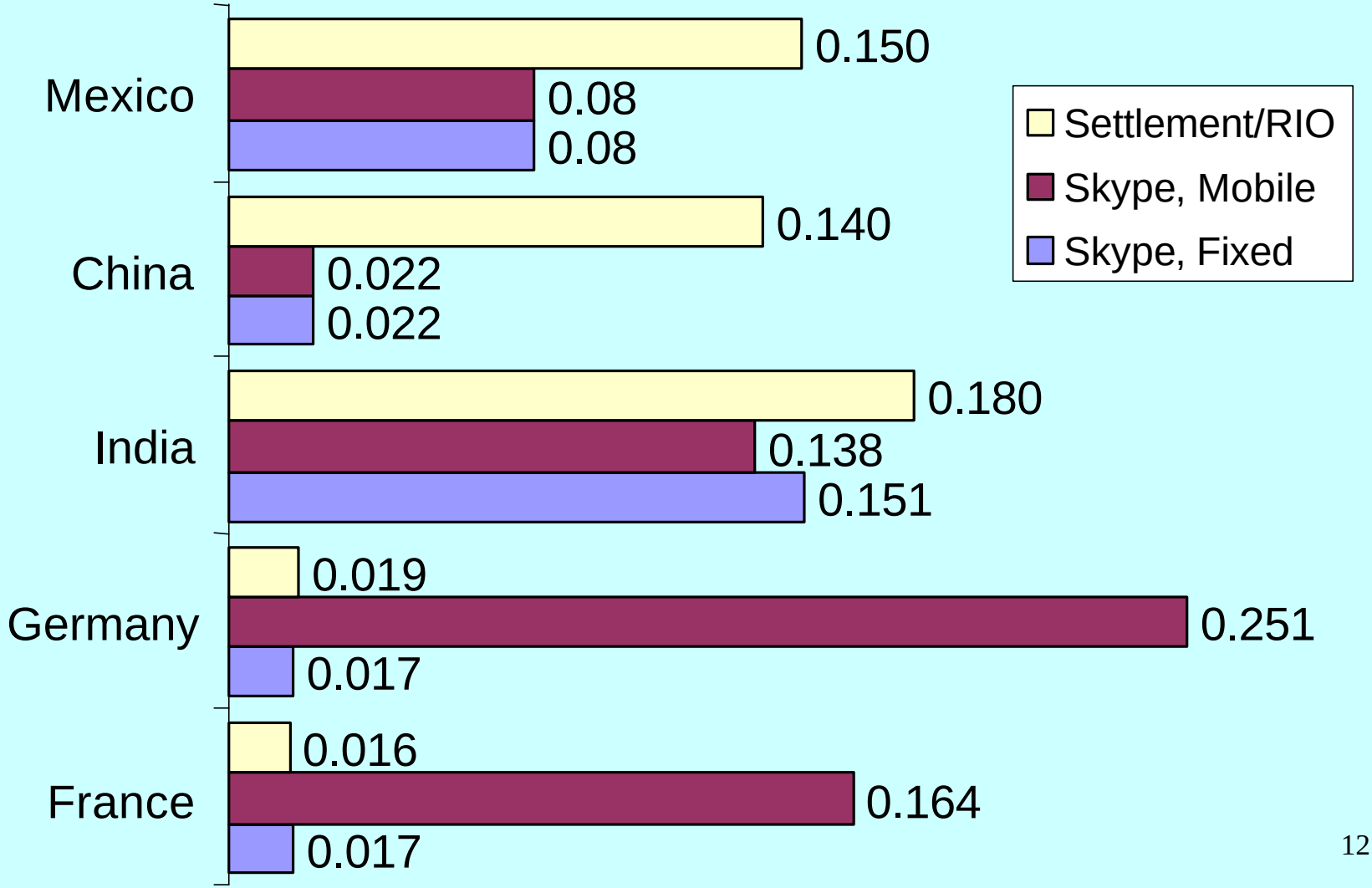
Worldwide, in US$ billions



Source: ITU World Telecom Indicators Database.

Selected rates for call termination

In Euro cents per minute



Note: Mobile and fixed rates are for SkypeOut. Settlement is from US and Reference Interconnect Offer is for double tandem.

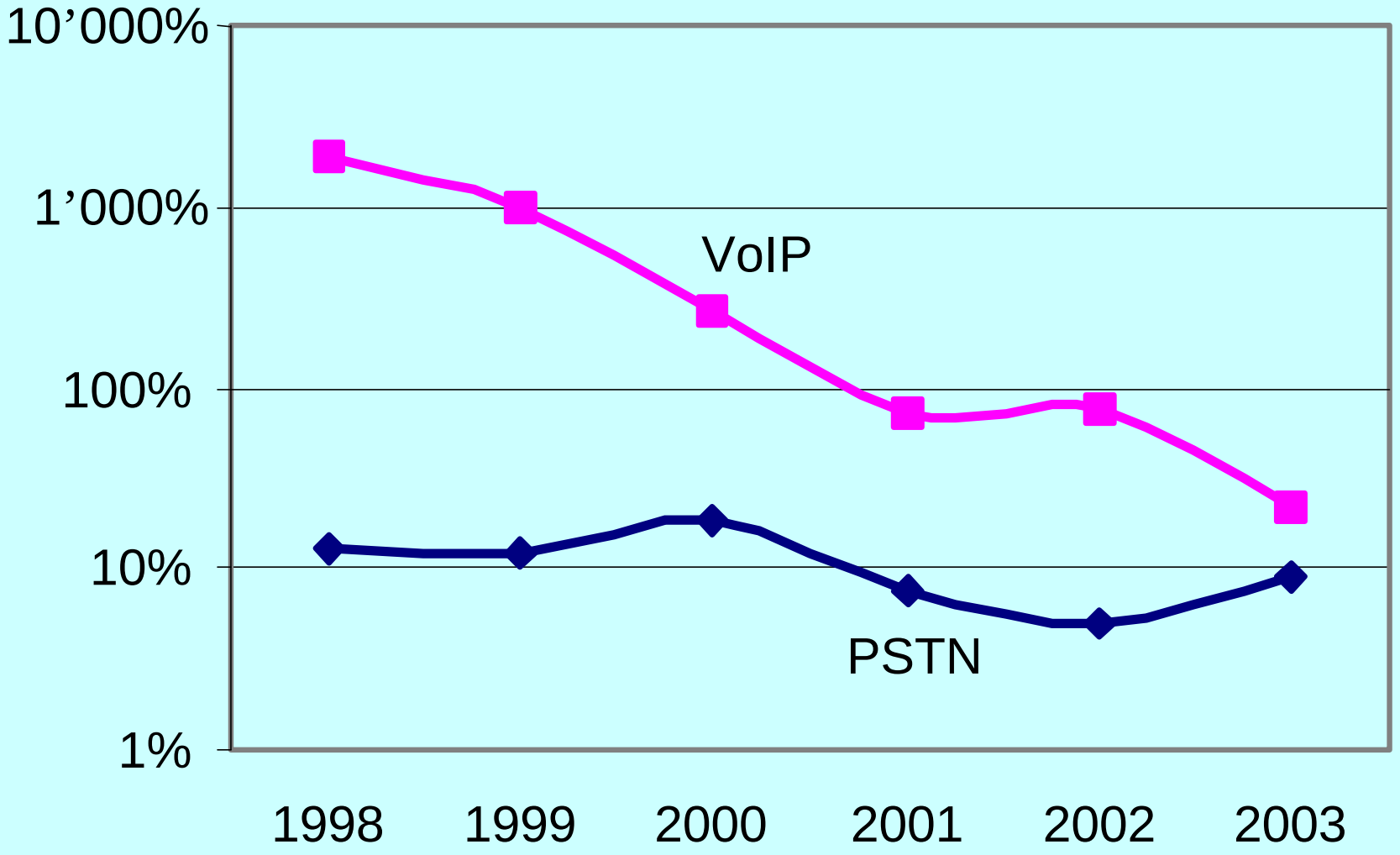
Source: Skype, FCC, Analysys.

The "third coming" of IP Telephony

- **1995-1999:**
  - **"Internet phone", offered primarily over the public Internet (e.g. FreeWorld Dial-up, DialPad)**
- **2000-2002**
  - **"VoIP", offered as discounted telephony over IP-based networks (e.g. Net2Phone, iBasis)**
  - **Collapse of dot.com bubble left many VoIP companies struggling as incumbent PTOs also offered VoIP services or acquired VoIP operators (e.g. China Telecom, Teleglobe)**
- **2003-present**
  - **"Voice over broadband", offered as free or flat-rate chat plus discounted calls to PSTN/mobile users (e.g. Vonage, Skype)**
  - **"Corporate IP", as users shift both data and voice to a unified IP platform**

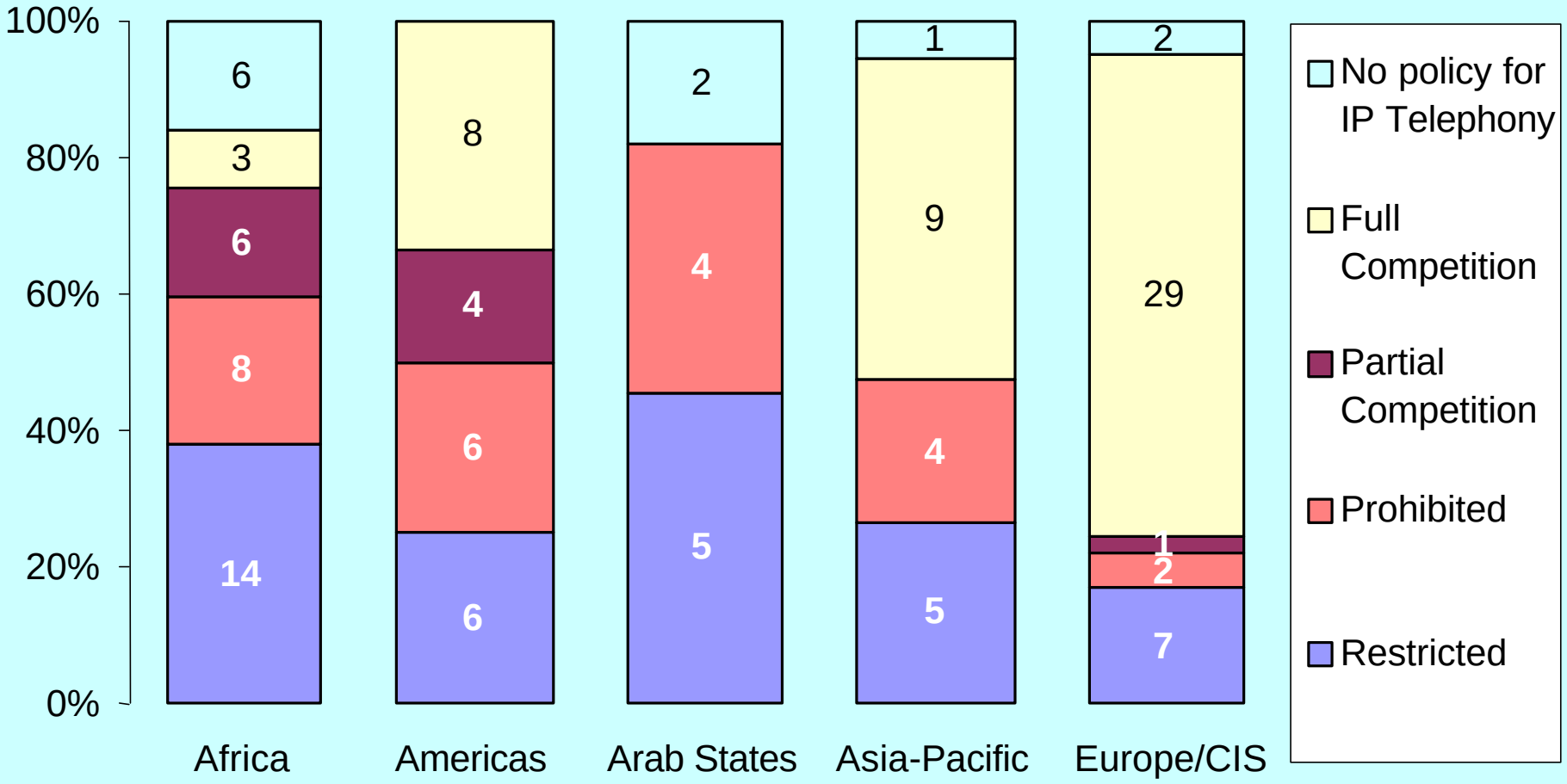
Annual growth rates

International voice traffic, in %



Note: Vertical scale is logarithmic.
Source: ITU / TeleGeography

Regulatory status of IP Telephony
By region, 2003



Note: Based on responses from 132 economies. "Prohibited" means no service is possible. "Restricted" means only licensed PTOs can offer the service. "Partial competition" means non-licensed PTOs may use either IP networks or the public Internet. "Full competition" means anyone can use or offer service.
Source: ITU (2005, forthcoming): General Trends in Telecom Reform"

Regulatory dilemmas

Examples of regulatory confusion or inconsistency in regulation of IP Telephony

Non-licensed PTOs may offer IP Telephony, but not licensed PTOs	*Users are able to make IP phone calls, but no company is licensed to provide it*	*Licensed PTOs are allowed to offer IP Telephony, but users are not allowed to use it*	*All PTOs are allowed to offer IP Telephony, but users are not allowed to use it*
Brazil	Barbados	Aghanistan	Bhutan
	Sri Lanka	Algeria	Congo DR
	Suriname	Antigua & Barbuda	Kyrgyzstan
	TYFR Macedonia	Indonesia	Togo
		Malawi	
		Mali	
		Morocco	
		Oman	
		Pakistan	
		Paraguay	
		Rwanda	
		Uganda	

Note: Based on responses to 2003/04 questionnaire from 132 economies. Only selected responses are shown.
"PTO" = Public Telecommunications Operator.
Source: ITU World Telecommunication Regulatory Database.

IP Telephony in five year's time

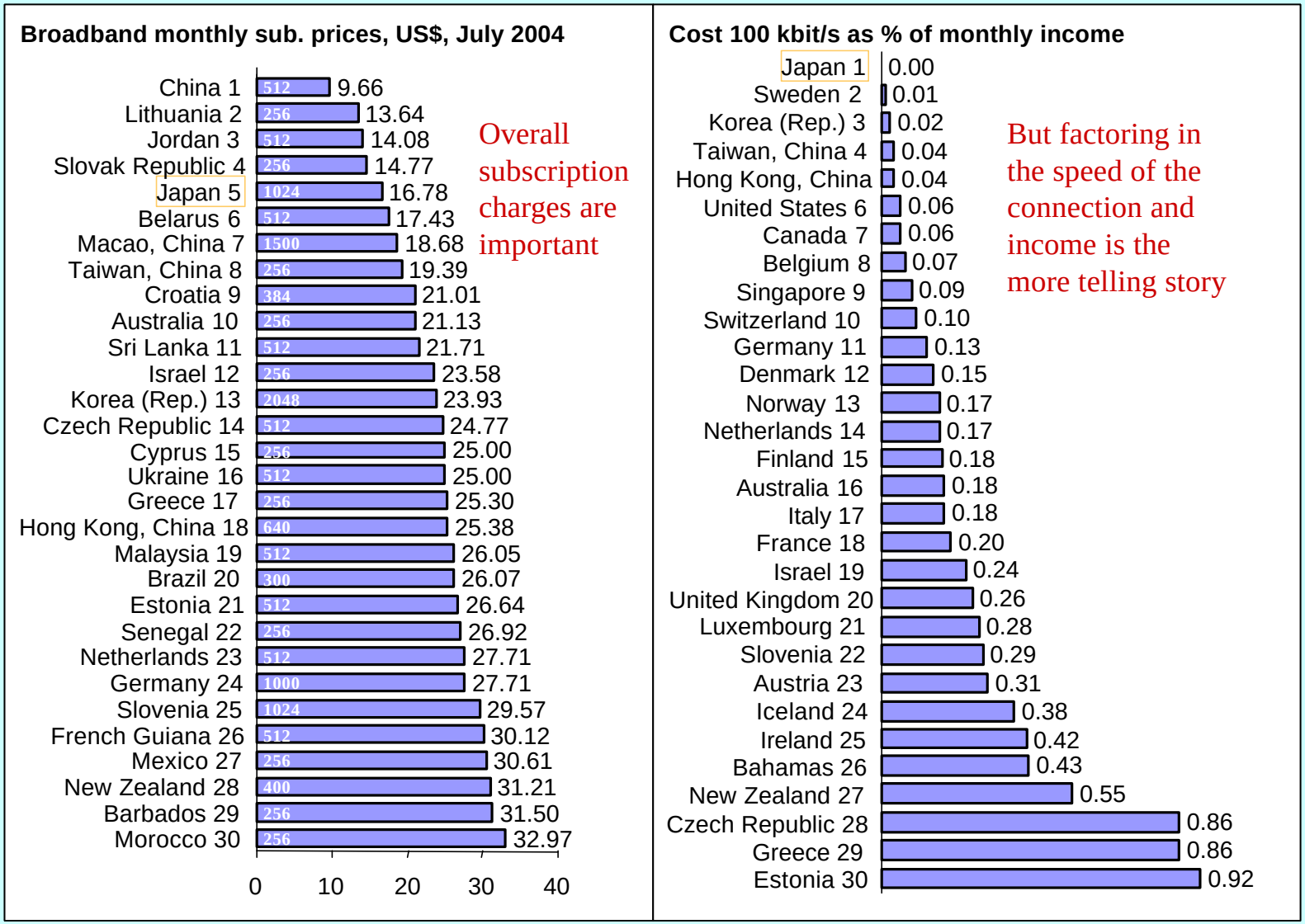
Major technological and regulatory trends

- **IP-based traffic indistinguishable from PSTN**
  - **Around 100 bn minutes of IP-based international traffic in 2008, or >50% of total**
  - **Many carriers will have all IP-networks**
  - **A majority of voice traffic will originate on wireless networks and much of it will be IP-based**
- **Numbering convergence**
  - **ENUM will allow calls to and from IP voice on multiple different devices**
  - **Numbering plan will allow for non-geographic and device-indendent VoIP numbers**
- **Voice over IP over mobile**
  - **Voice will increasingly travel over data channel in mobile networks to provide discounted calling prices**

Mini case study: IP Telephony in Japan

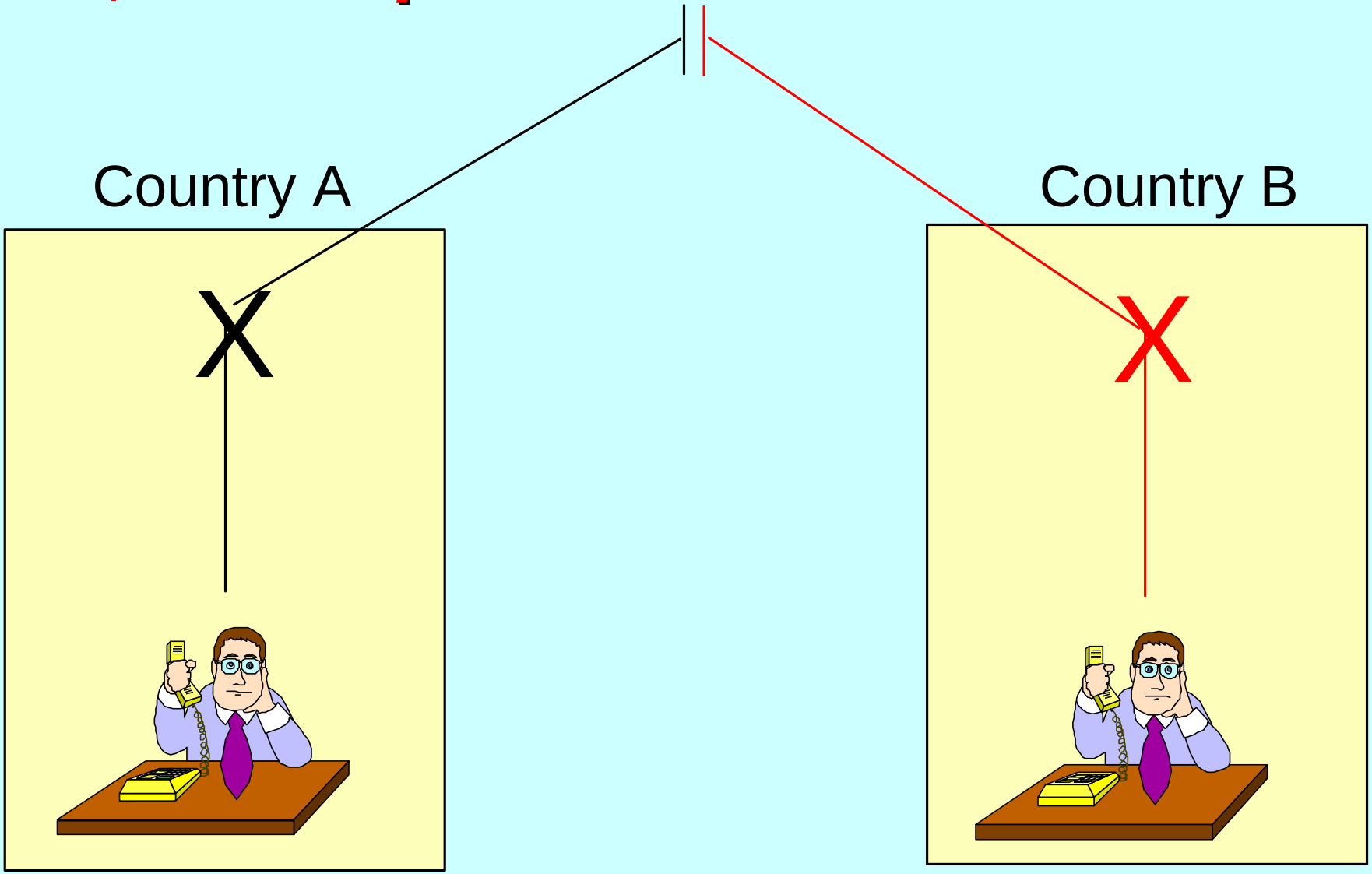
- **In 2000, Japanese Ministry (now MIC) introduced new rules on unbundling local loop and co-location**
  - **Rapid rise of DSL connections**
  - **Very low prices (<US$20 per month)**
  - **Service speeds in excess of 26 Mbit/s**
- **Yahoo BB! Entered marked in September 2001 with bundled DSL and VoIP**
  - **MIC defined numbering plan (prefix 050) for VoIP, allowing calls to be received on PCs**
  - **November 2002, >7m VoIP numbers allocated to ISPs**
  - **VoIP development consortium worked with MIC to establish standards for QoS, interconnection, tariffs, number allocation etc.**

Japanese broadband prices are among the lowest in the world

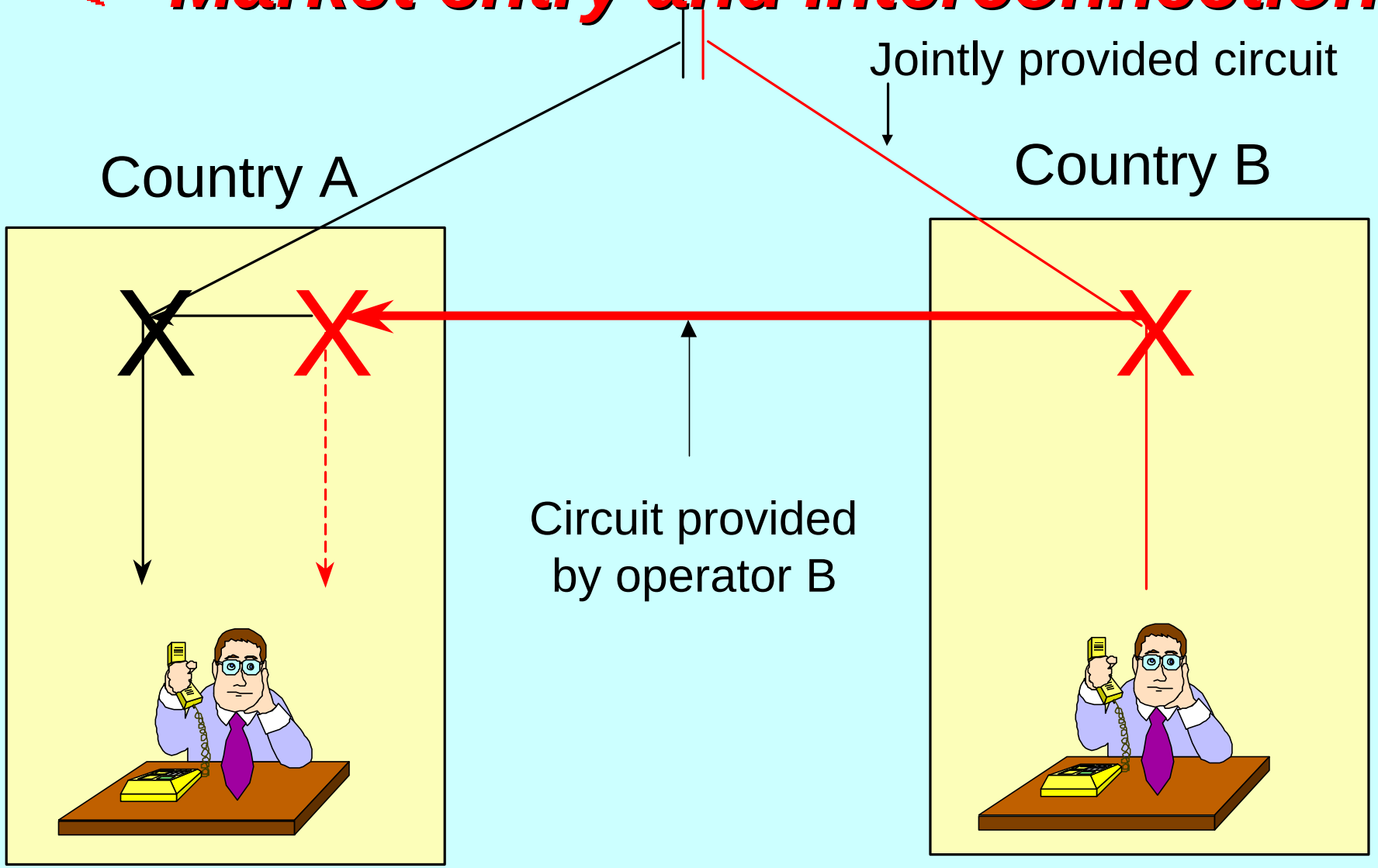


Source: ITU Internet Reports 2004: The Portable Internet.

Traditional regime: Joint provision of service

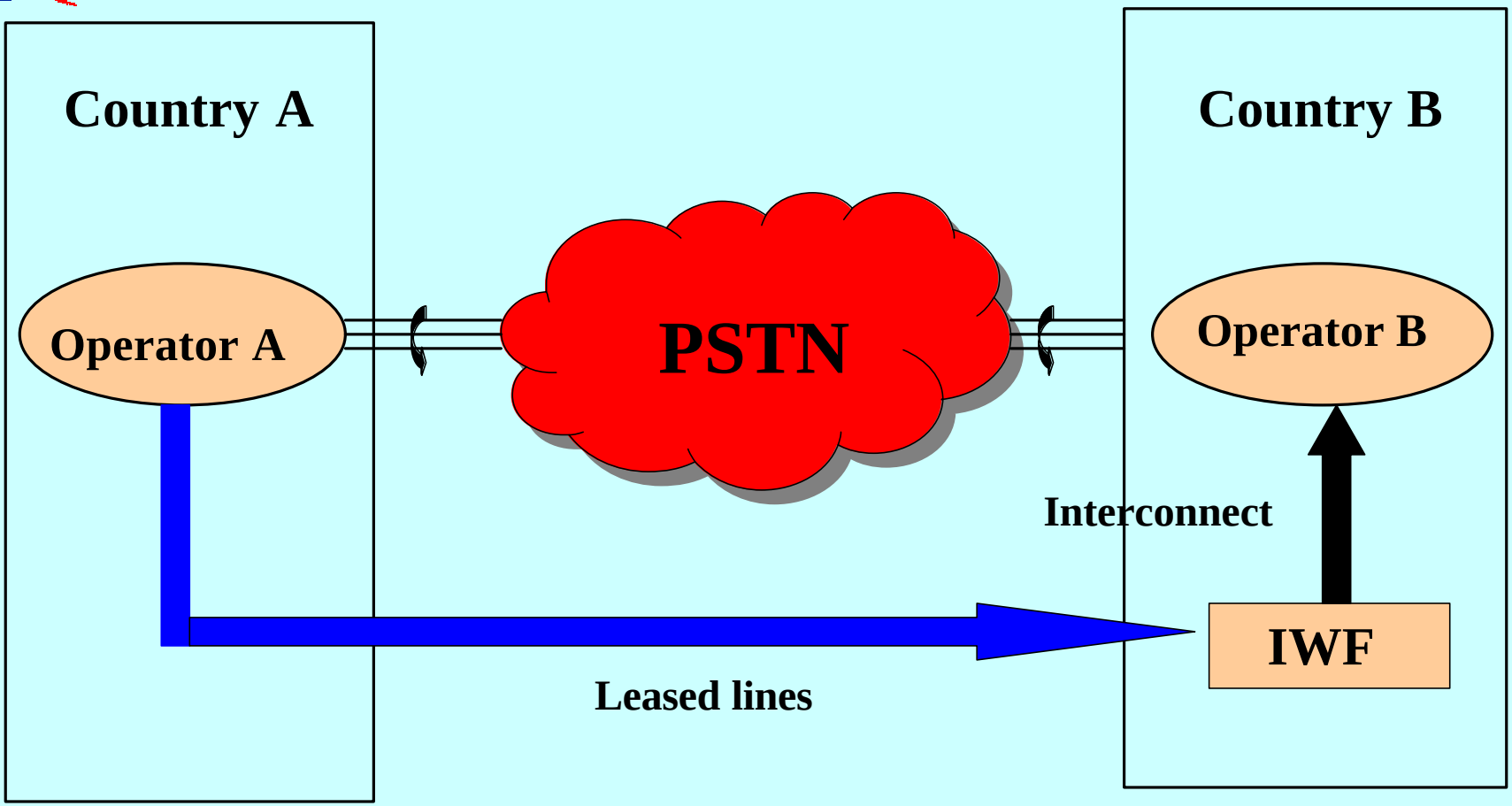


Emerging regime: Market entry and interconnection



International simple resale (ISR)

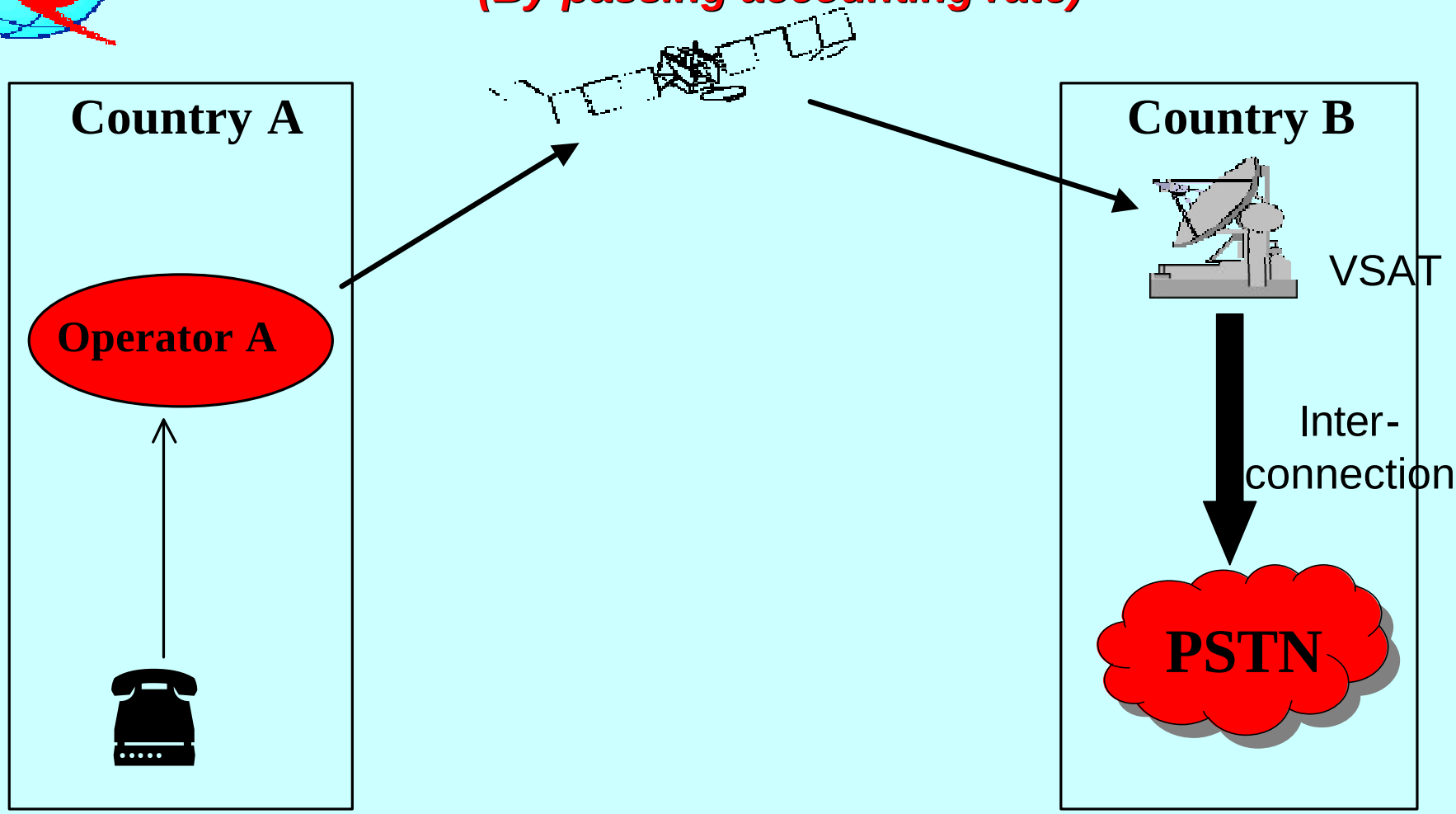
(By-passing accounting rate)



Once a foreign carrier accepts the benchmark rate, it can negotiate ISR arrangements with US carriers

Telephone service using data transmission

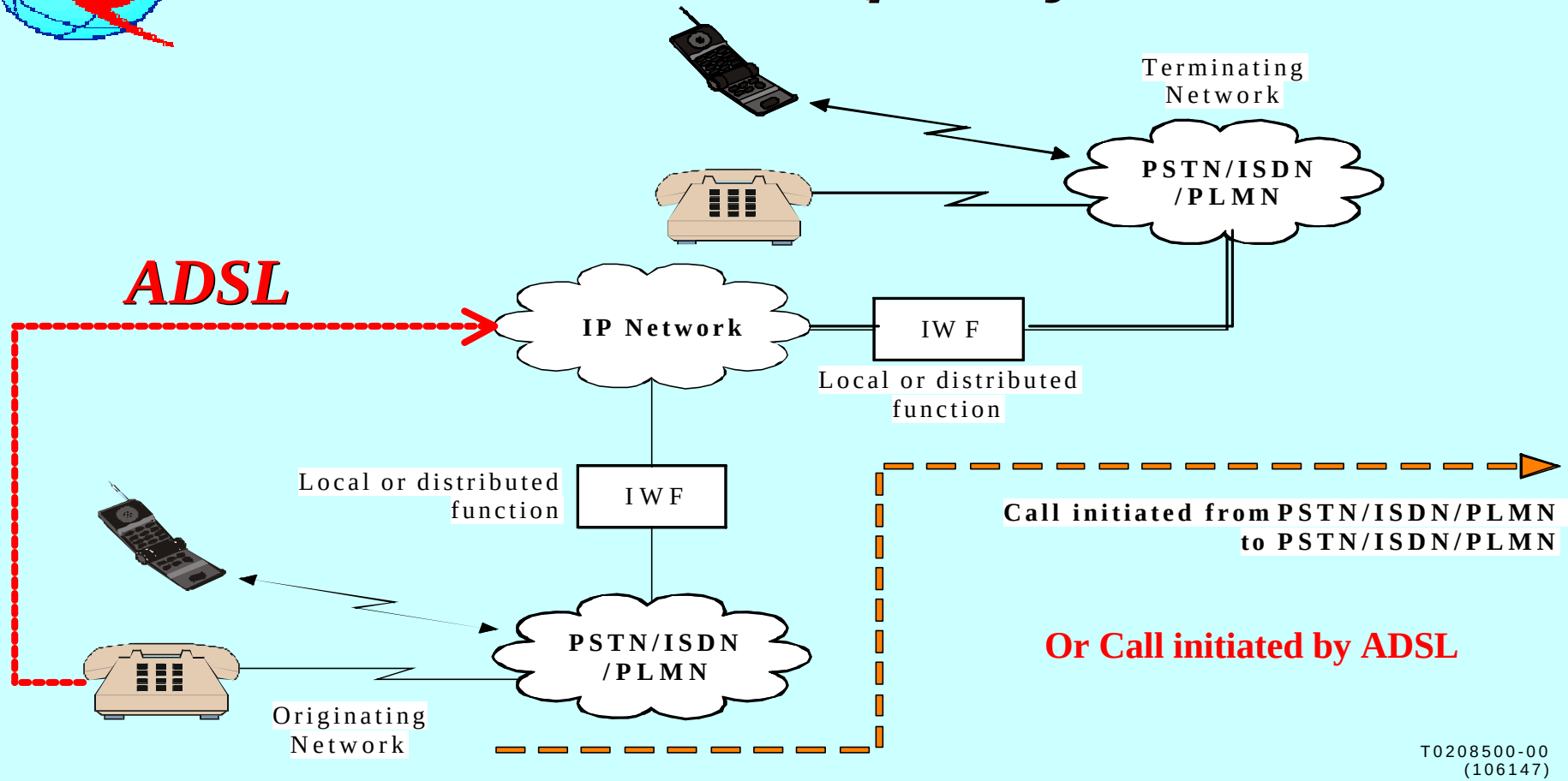
(By-passing accounting rate)



Voice is packetized = data transmission

Telephone regulations do not apply

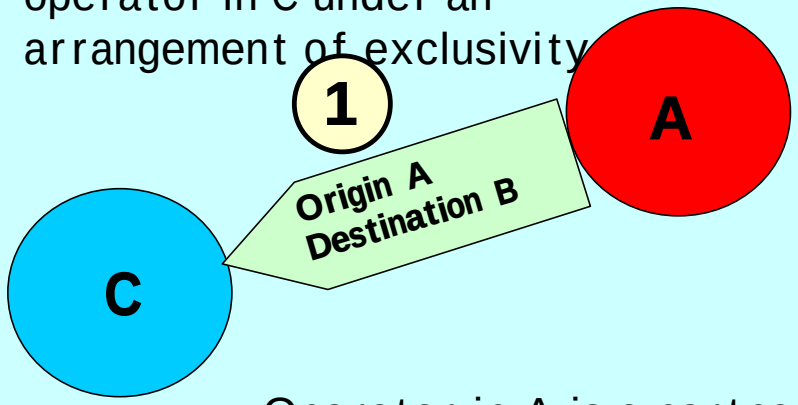
IP Telephony



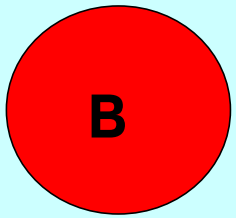
Call from International Telecommunication Network (ITN) to another ITN via IP-based Network

Refile and other practices using accounting rate system

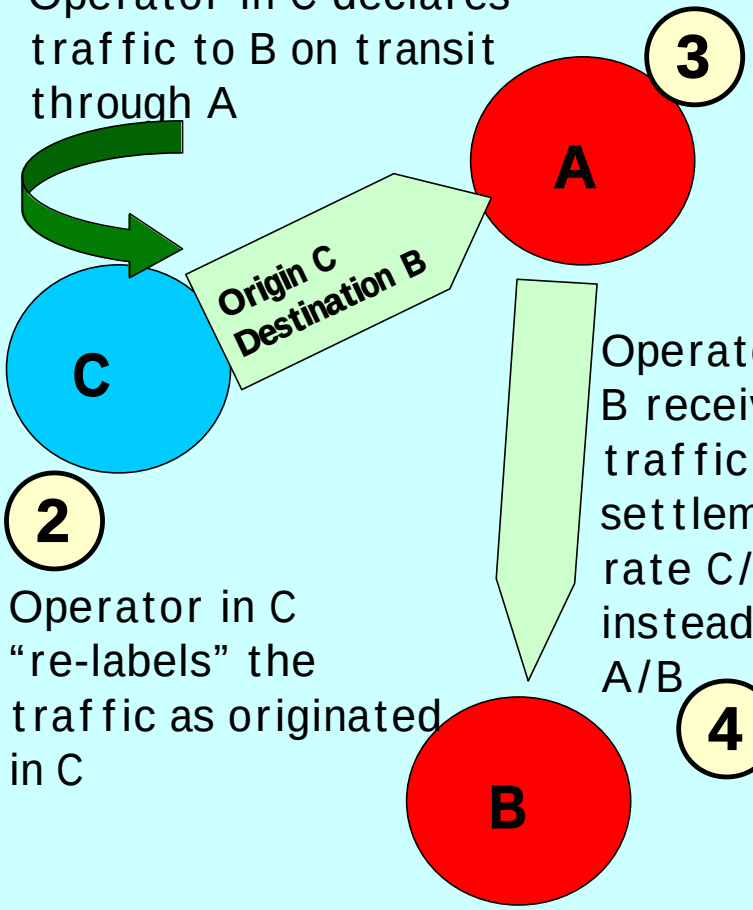
Operator in A sends traffic to operator in C under an arrangement of exclusivity



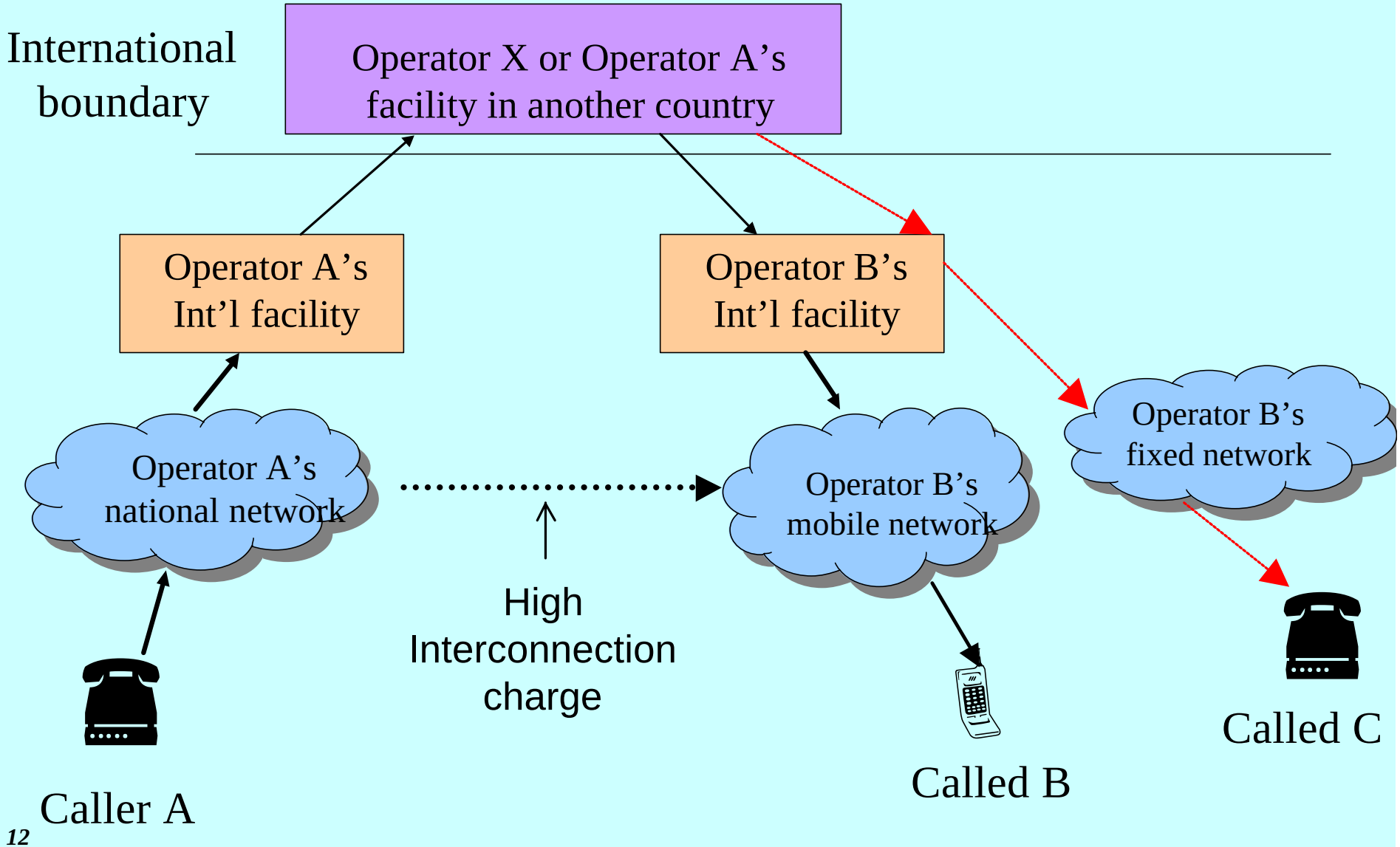
- Operator in A is a partner of operator in C
- Settlement rates A/B > C/B



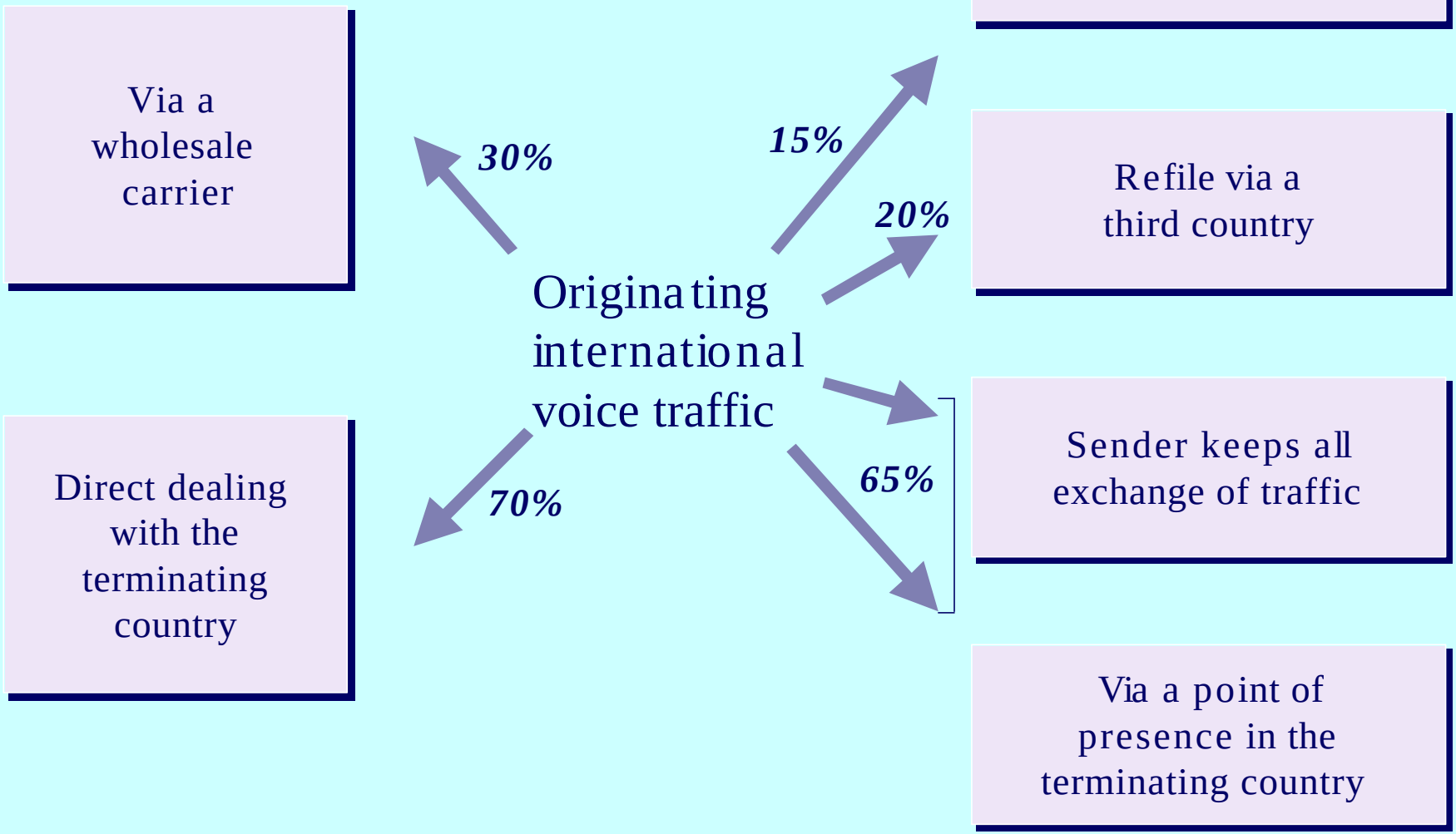
Operator in C declares traffic to B on transit through A



Mobile tromboning & high mobile termination charge

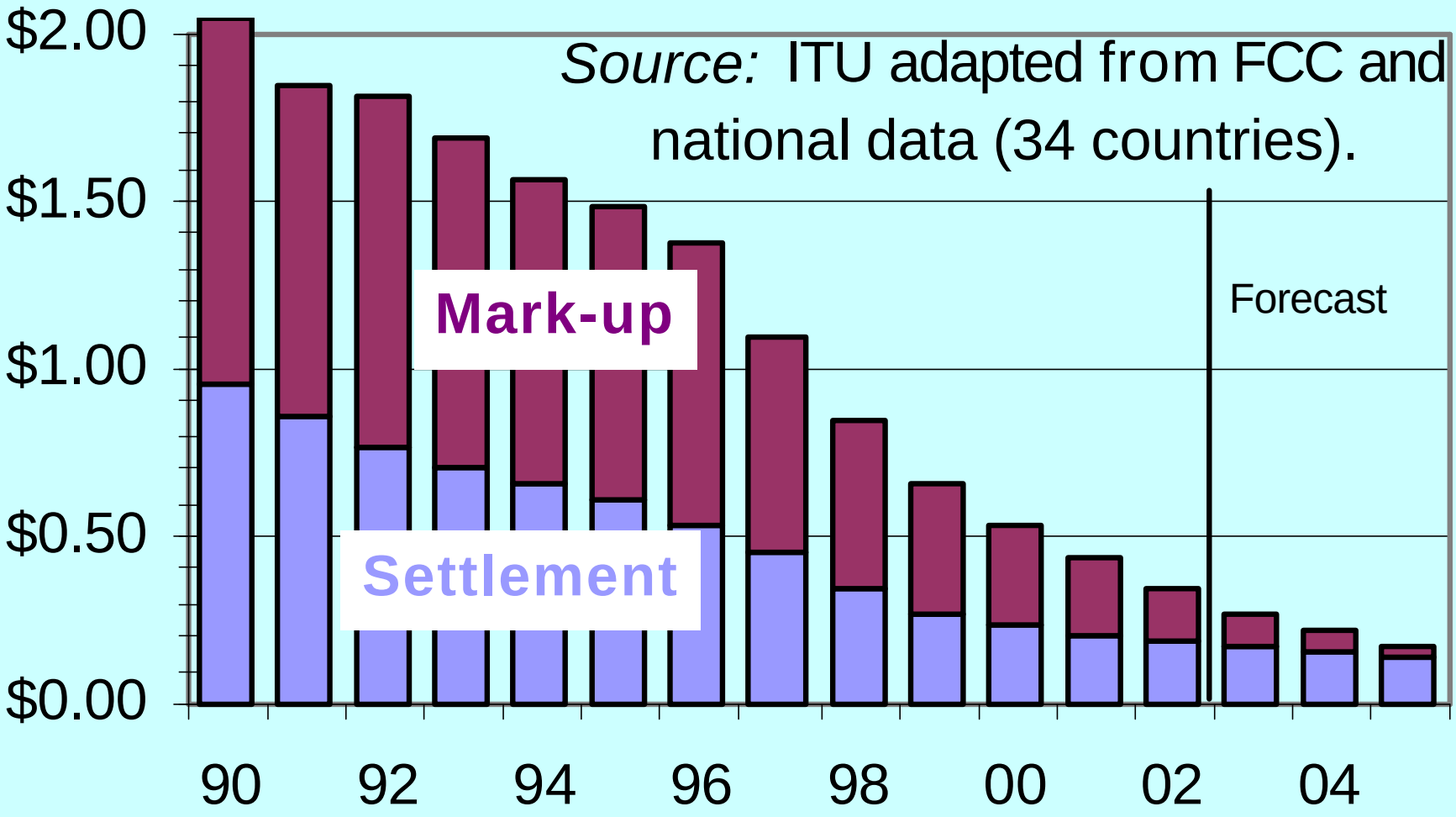


Delivering international voice traffic in 2002



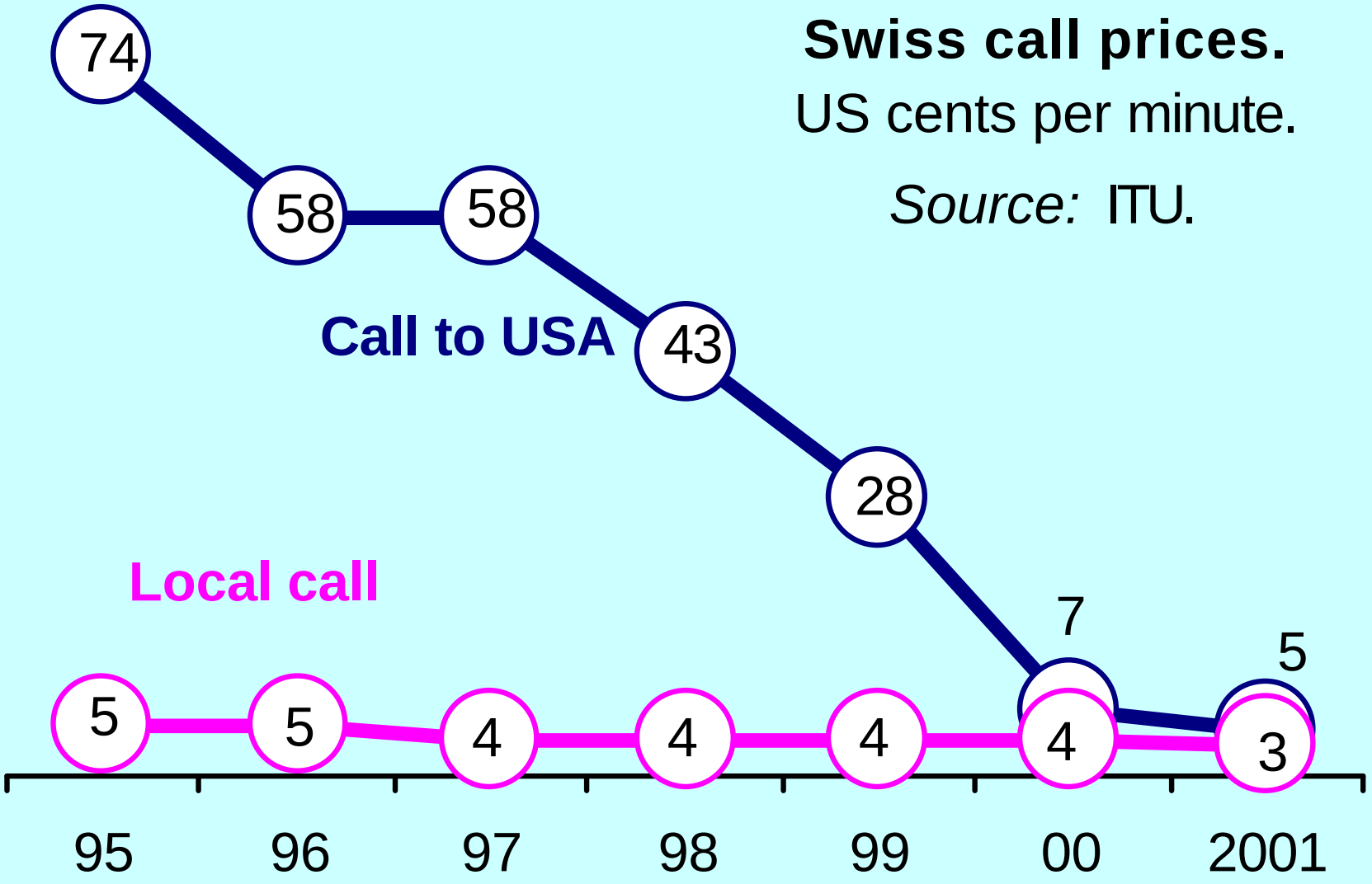
Falling prices (1)

Average retail price of one minute call to USA.

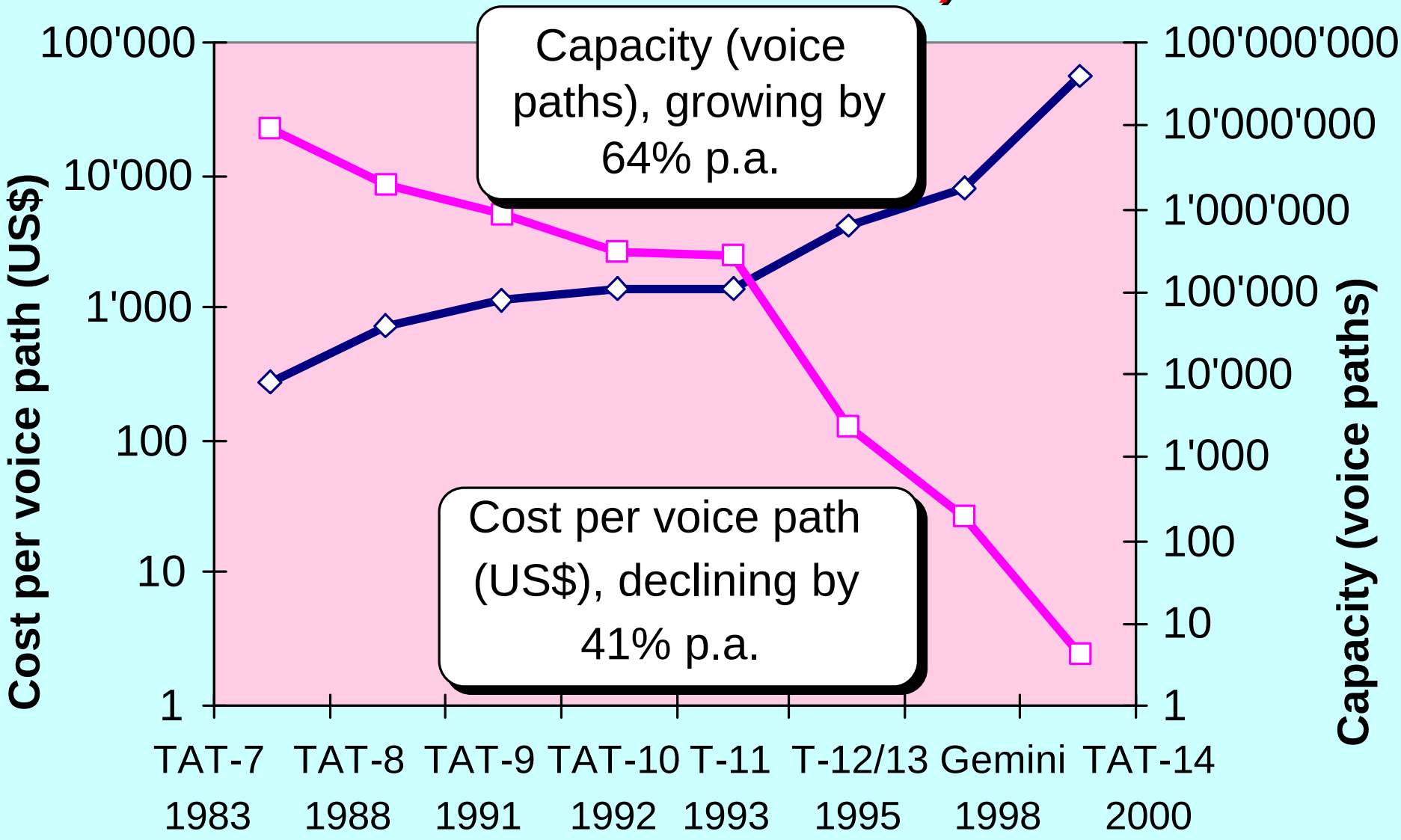


Falling Price (2):

SwissCom, price per minute of local call and call to US



Infrastructure capacity and costs, TransAtlantic cables, 1983-2000



Source: ITU, TeleGeography Inc., FCC.
Note: Voice-path numbers assume a compression ratio of 5:1 to number of circuits.

If distance is dead, and bandwidth is infinite …

What do we bill for?

What do we bill for?

- **Bill for network connection**
  - **Increasing integration of monthly telephone subscription and Internet subscription prices**
- **Bill for privacy/advertising**
  - **Privacy-protected customer pays premium**
  - **Customer agreeing to receive advertising pays less**
- **Bill for quality of service**
  - **Differentiated by transmission quality, waiting time, bandwidth on demand, value-added secretarial support, mail functions etc.,**
- **Bill for Billing**
  - **Customising of billing: by service, by user, by site**

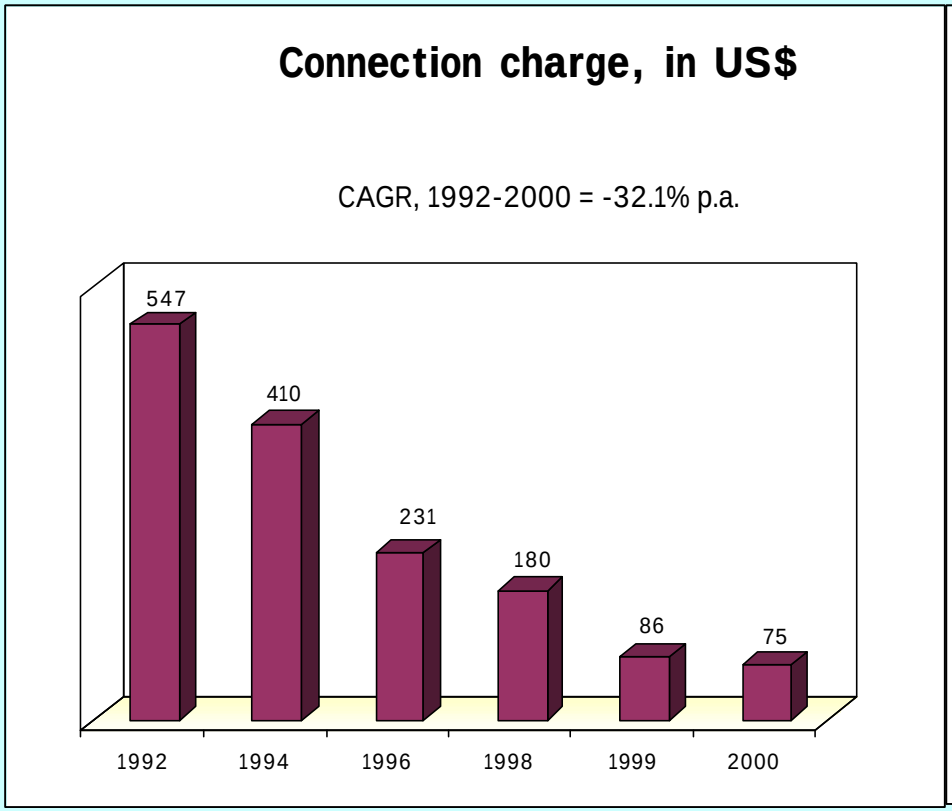
Internet, price and service trends

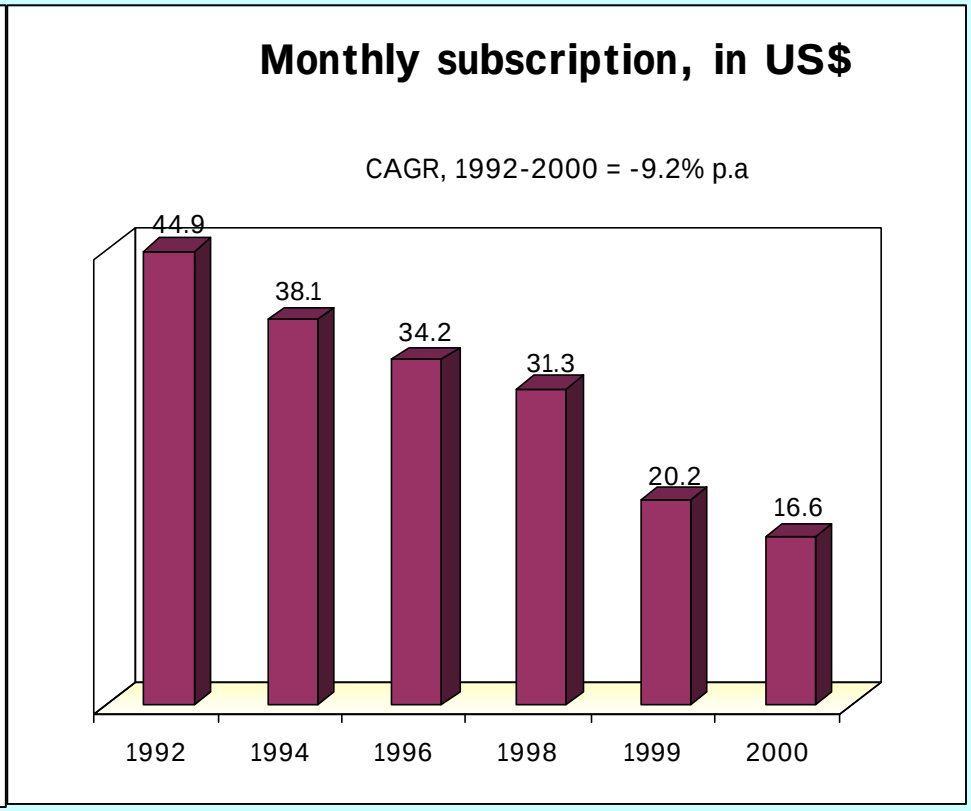
- **Towards a flat-rate price structure**
  - **All you can eat for US$20.00**
- **Towards lower service quality**
  - **“Best efforts” service delivery at lowest price**
- **Death of distance**
  - **Message to other side of earth costs same as a message sent next door**
- **Cross-promotion of Internet and other services**
  - **“Free PC” with three year’s ISP subscription**
  - **“Free Internet” with residential local loop charges**
- **Tendency towards industry concentration**
  - **AOL’s subscriber base > next ten ISPs added together**

Challenges for developing countries

- **Service, tariff and technical issues**
  - **Alternative calling procedures**
  - **Public switched network to IP based network**
  - **Challenges related to mobile service**
- **Regulatory issues**
  - **Interconnection rules**
  - **Implementation of USO**
  - **Tariff Rebalancing**
- **Internet connectivity in developing countries**
  - **Guideline for negotiating IIC**
  - **Traffic based negotiation**

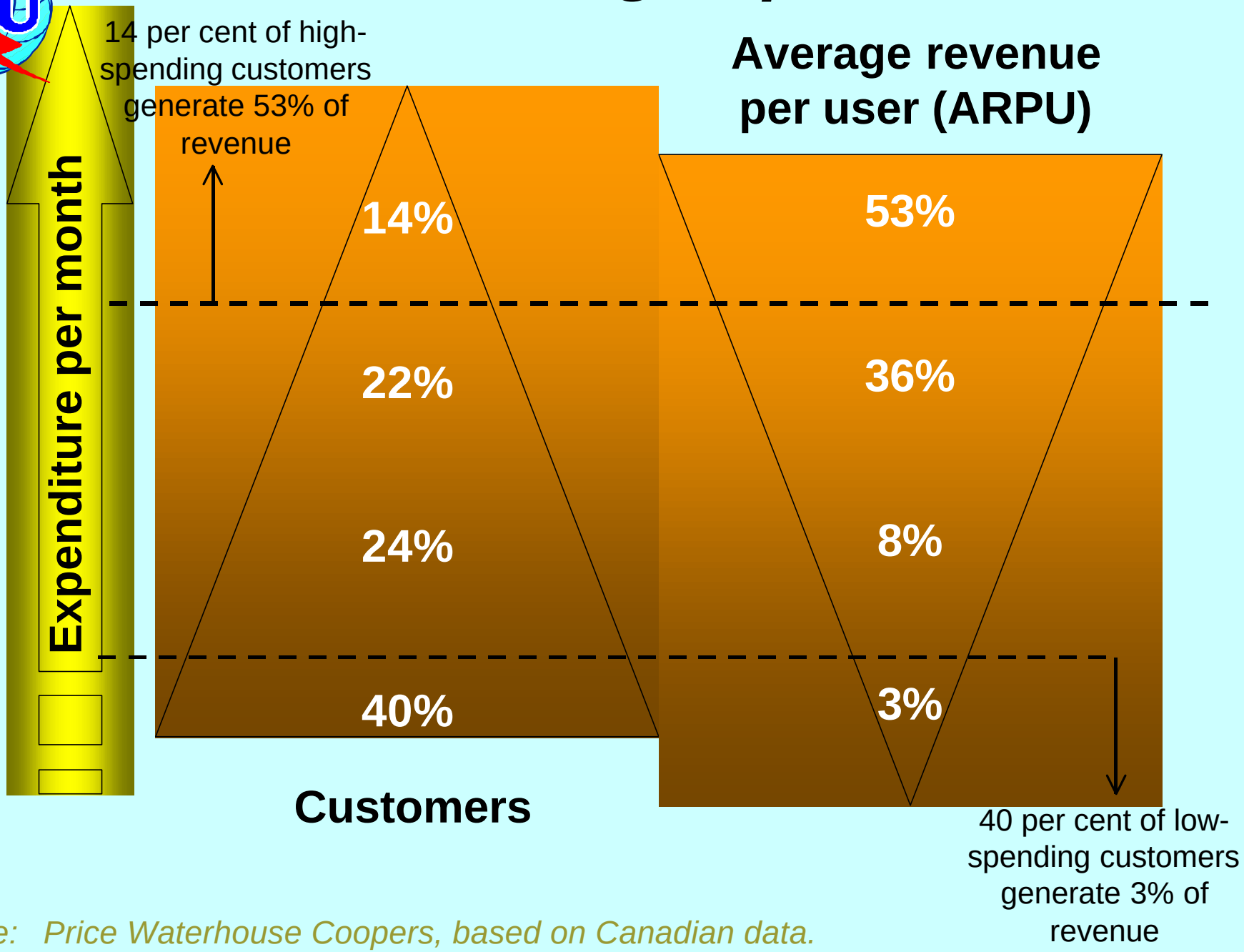
Declining prices for mobile access, global average, in US$, 1992-2000





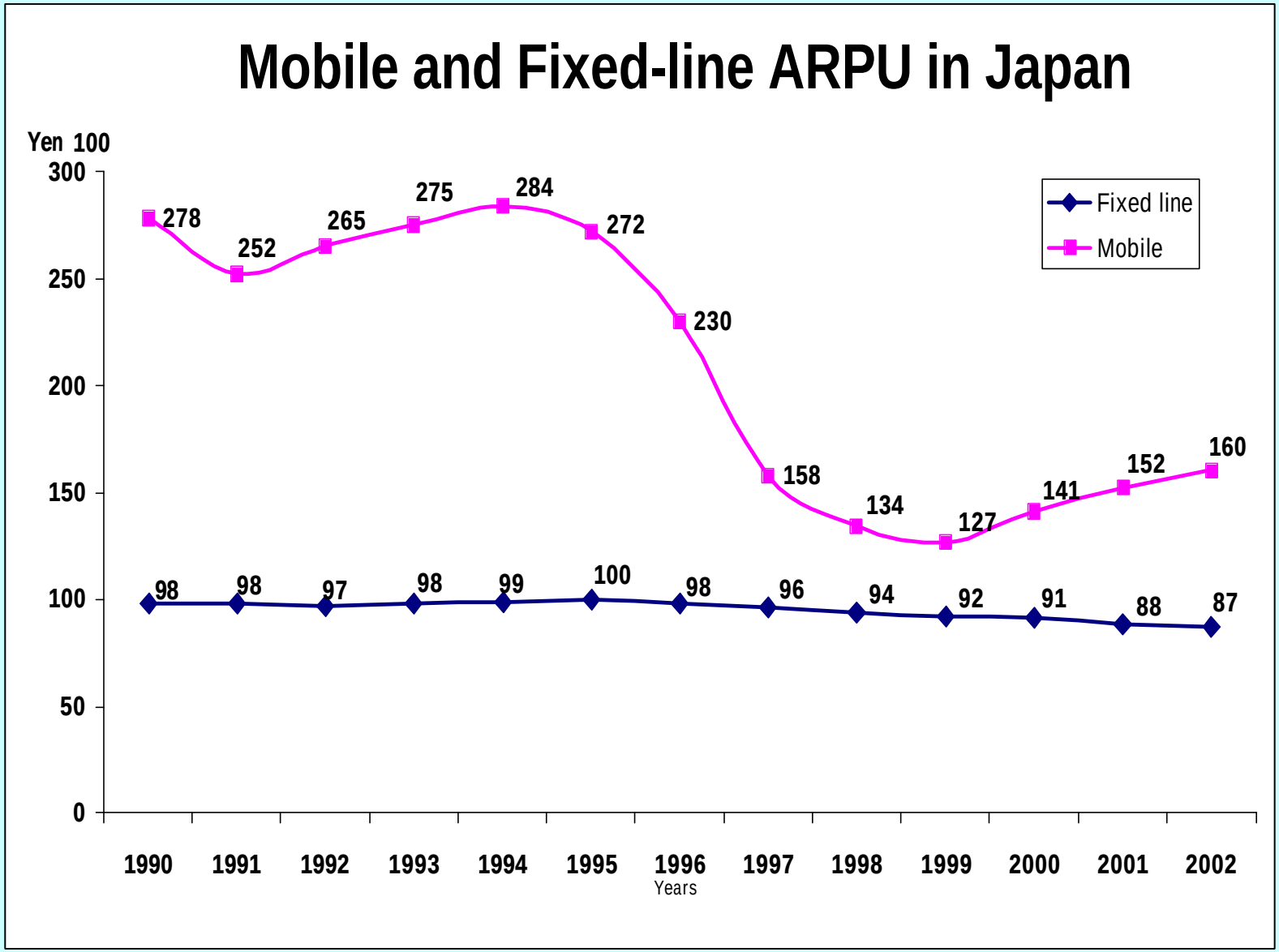
Note: CAGR = Compound Annual Growth rate.
Source: ITU "World Telecommunication Development Report 1999: Mobile cellular"

Cultivate the high-spenders

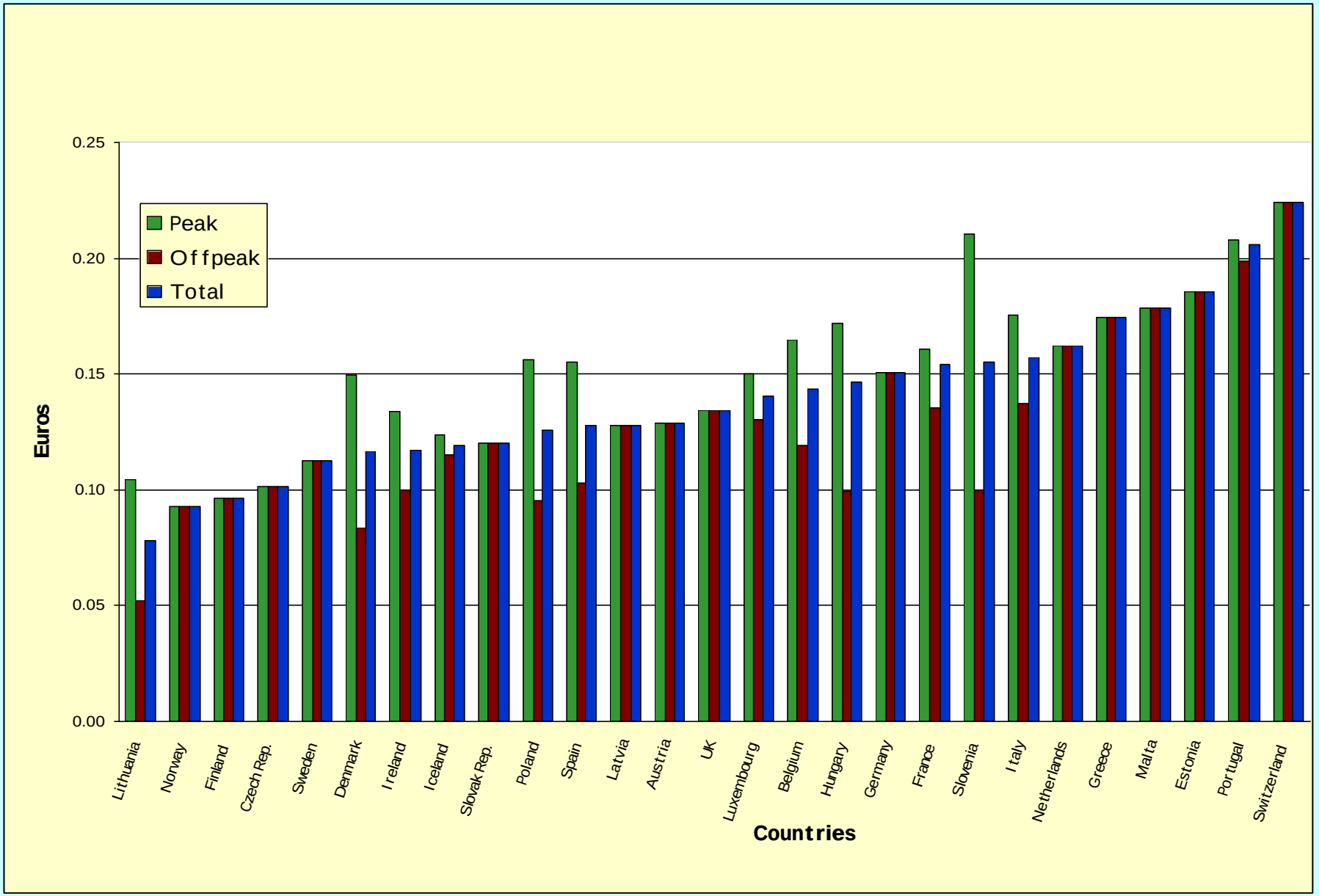


Source: Price Waterhouse Coopers, based on Canadian data.

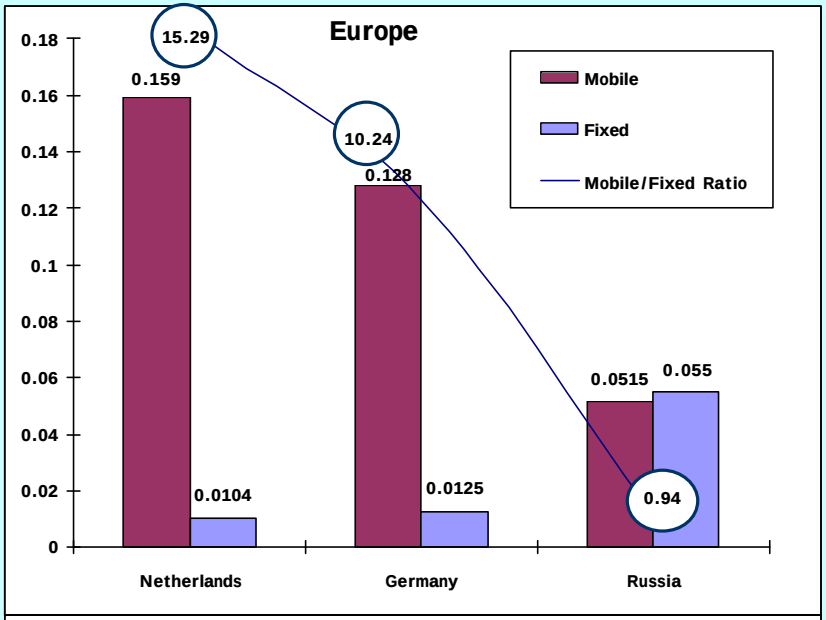
Mobile and Fixed-line ARPU in Japan

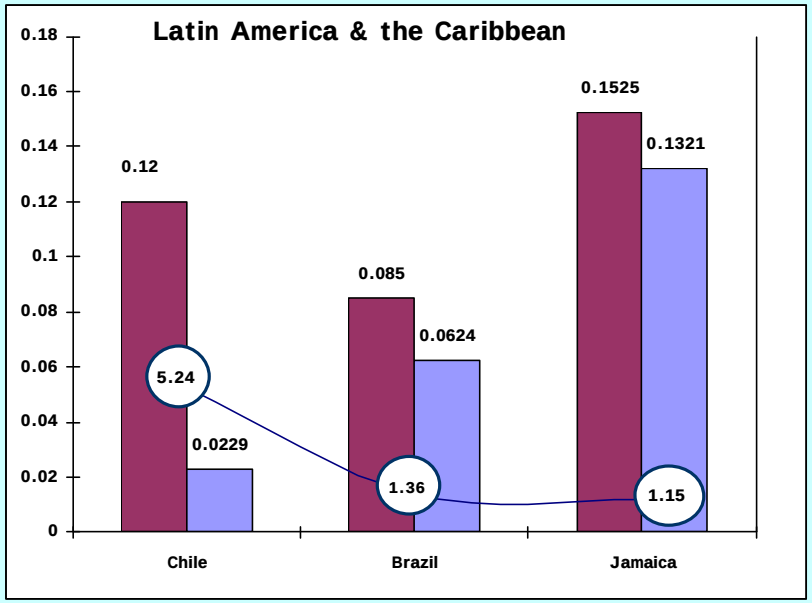


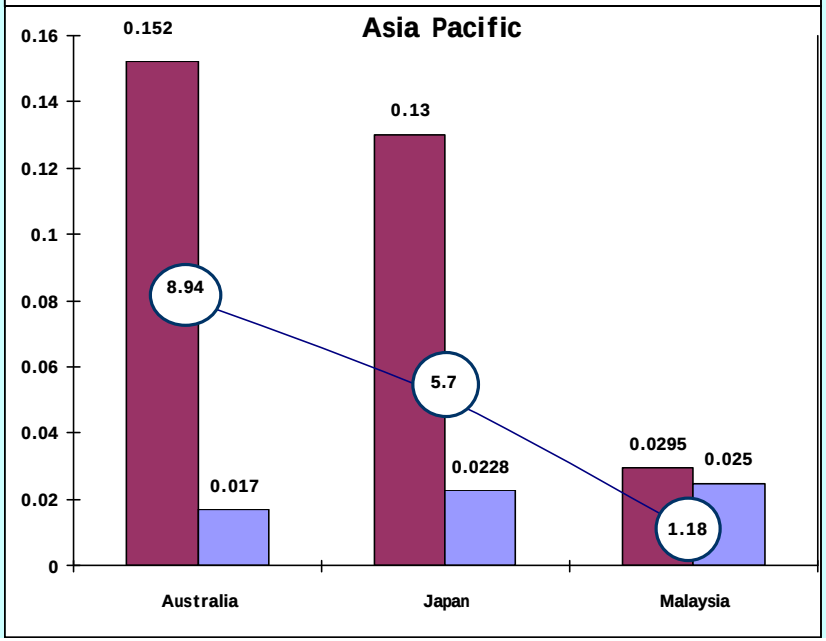
Average Mobile Termination Rate (European countries, July 2004)

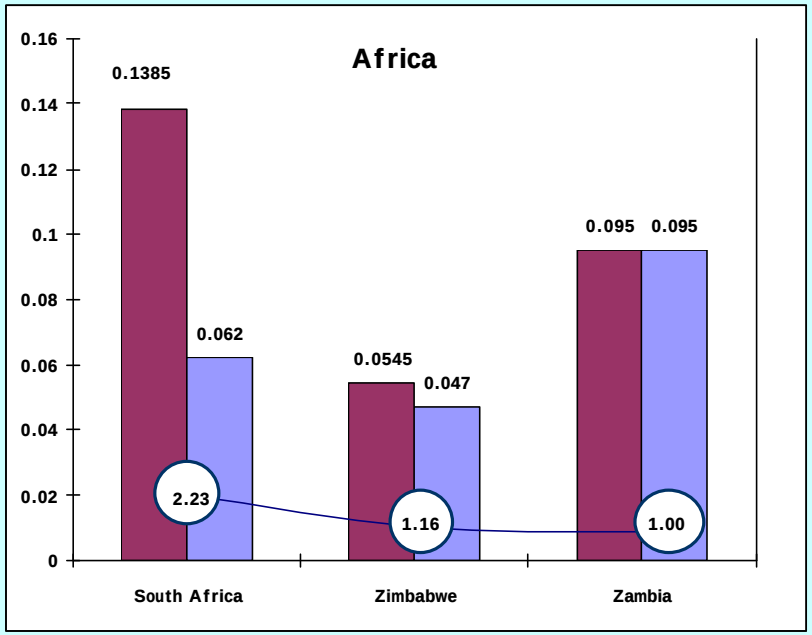


Mobile and fixed Settlement rates, Mobile/Fixed ratio









[From FCC data](#)

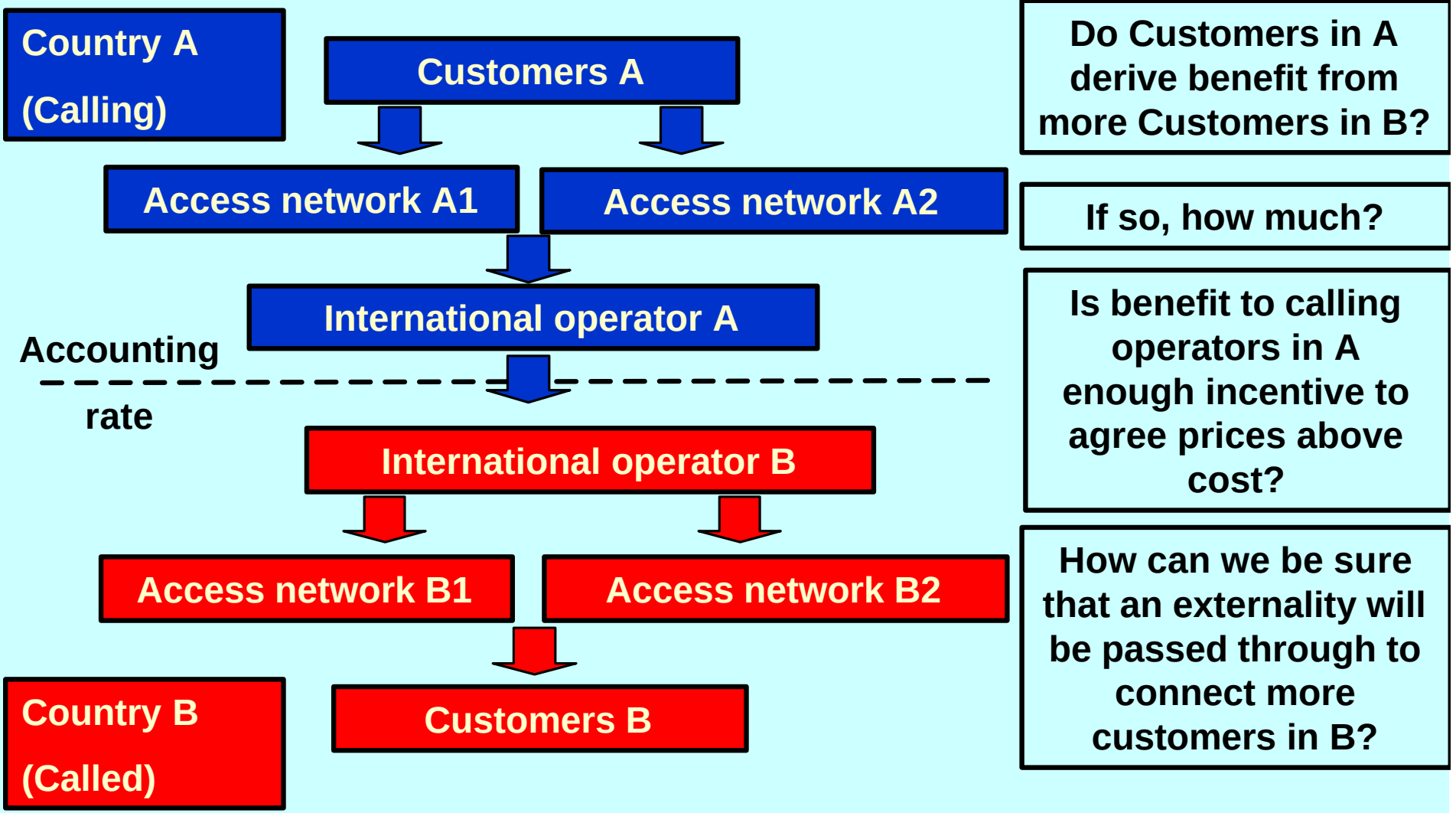
[Notice of Inquiry](#)

October 2004

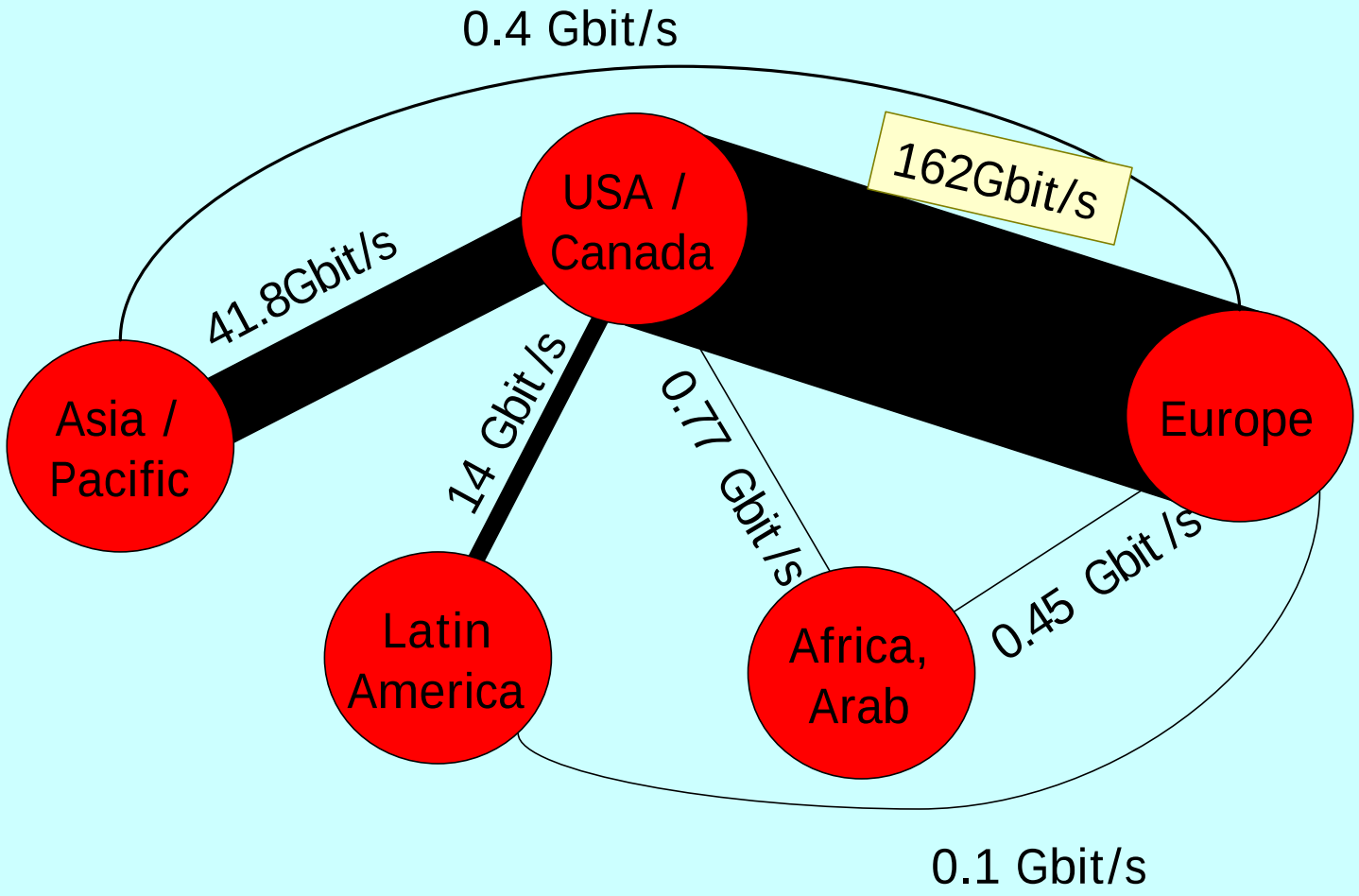
Network Externality

- **Universal Service Obligation Fund = Cross Subsidy**
  - **Not recognized as cost**
- **Network extremity = increase utility of a network to users**
  - **operators to provide incentives for users to join the network = this can be added to the usage price or to the monthly subscription fee**
- **the network externality effect has a solid basis in economic analysis and had successfully – at least with some regulators – been brought to bear by mobile operators on their case for higher termination rates**
  - **Can be used by the developing countries to enhancing take-up and roll-out of the network**

International externalities



Inter-regional Internet connectivity



Note: Gbit/s = Gigabits (1'000 Mb) per second.
Source: ITU adapted from TeleGeography.

Int'l Internet Connectivity (IIC)

- **In 2001, for telephony services, settlement payment to developing countries amount to around : 5 billion US$**
- **Now with decrease of accounting rates, they receive less and because of Internet payment developing countries pay some 2 billions US$**
- **SG3 adopted Recommendation D.50 on IIC**
  - **Fair sharing of Int'l Internet backbone network**
- **Barriers to Internet Connectivity**
  - **Regulatory Barriers**
  - **Economic Barriers**
- **What need to do?**
  - **Internet Exchange Point (IXP)=cost and service gains**