

Global trends in telecom development & new challenges for developing countries

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The original document is elaborated by Dr Tim Kelly, ITU/SPU. It has completed by Saburo Tanaka. The views expressed in this presentation are those of the authors, and do not necessarily reflect the opinions of the ITU or its membership. Authors can be contacted by e-mail at: Tim.Kelly@itu.int saburo.tanaka@itu.int



Agenda

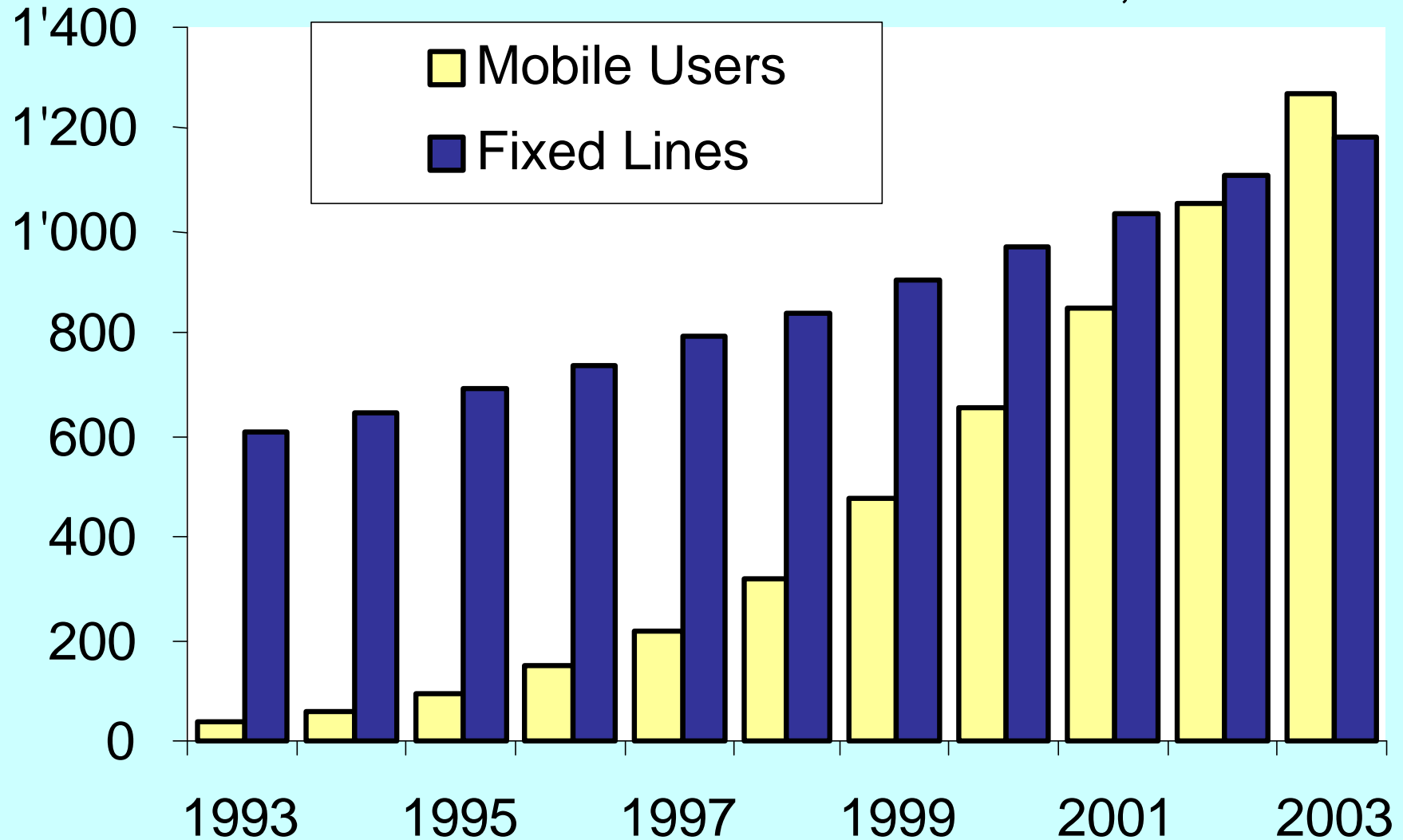
- **Market trends**
 - **Network evolution**
 - **Paradigm shift**
 - **Tariff evolution**

- **Challenges for developing countries**
 - **IP Telephony**
 - **Mobile service**
 - **Internet issue**



A Mobile Revolution

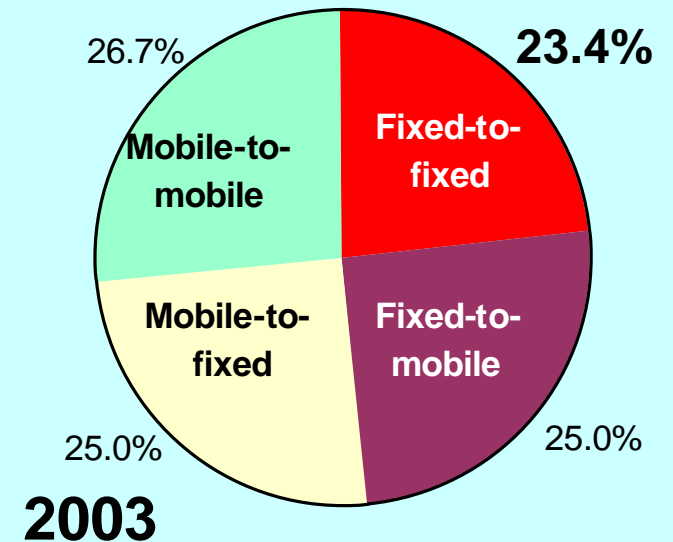
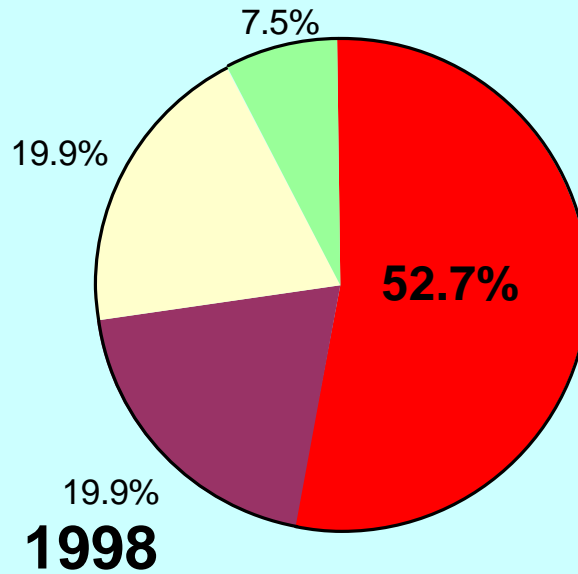
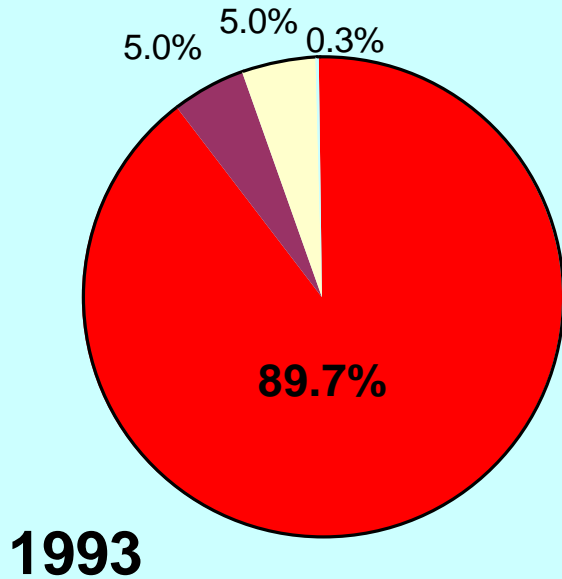
Fixed Lines vs. Mobile Users, worldwide, Million



Source: ITU World Telecommunication Indicators Database.



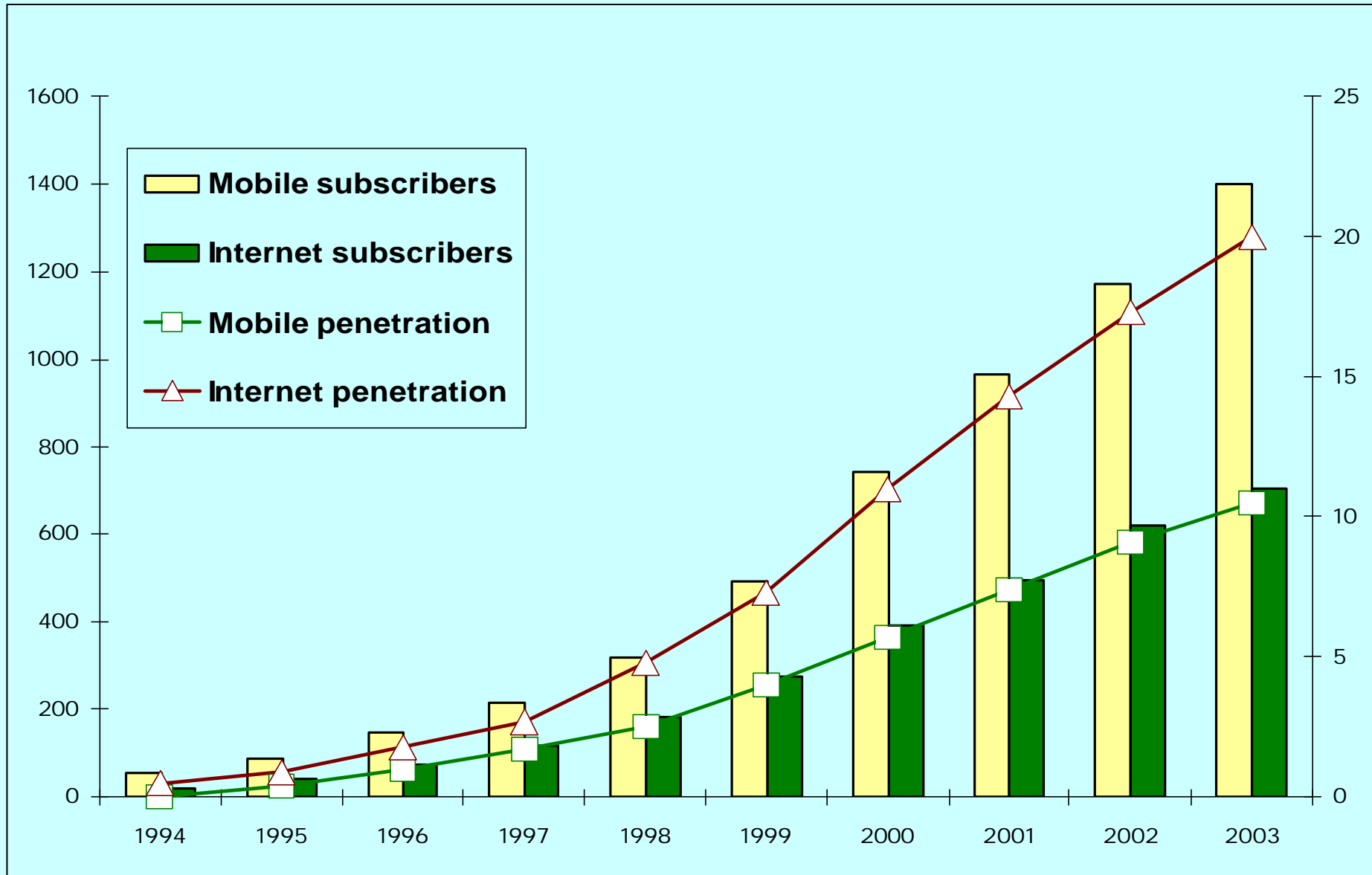
Calling opportunities worldwide



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

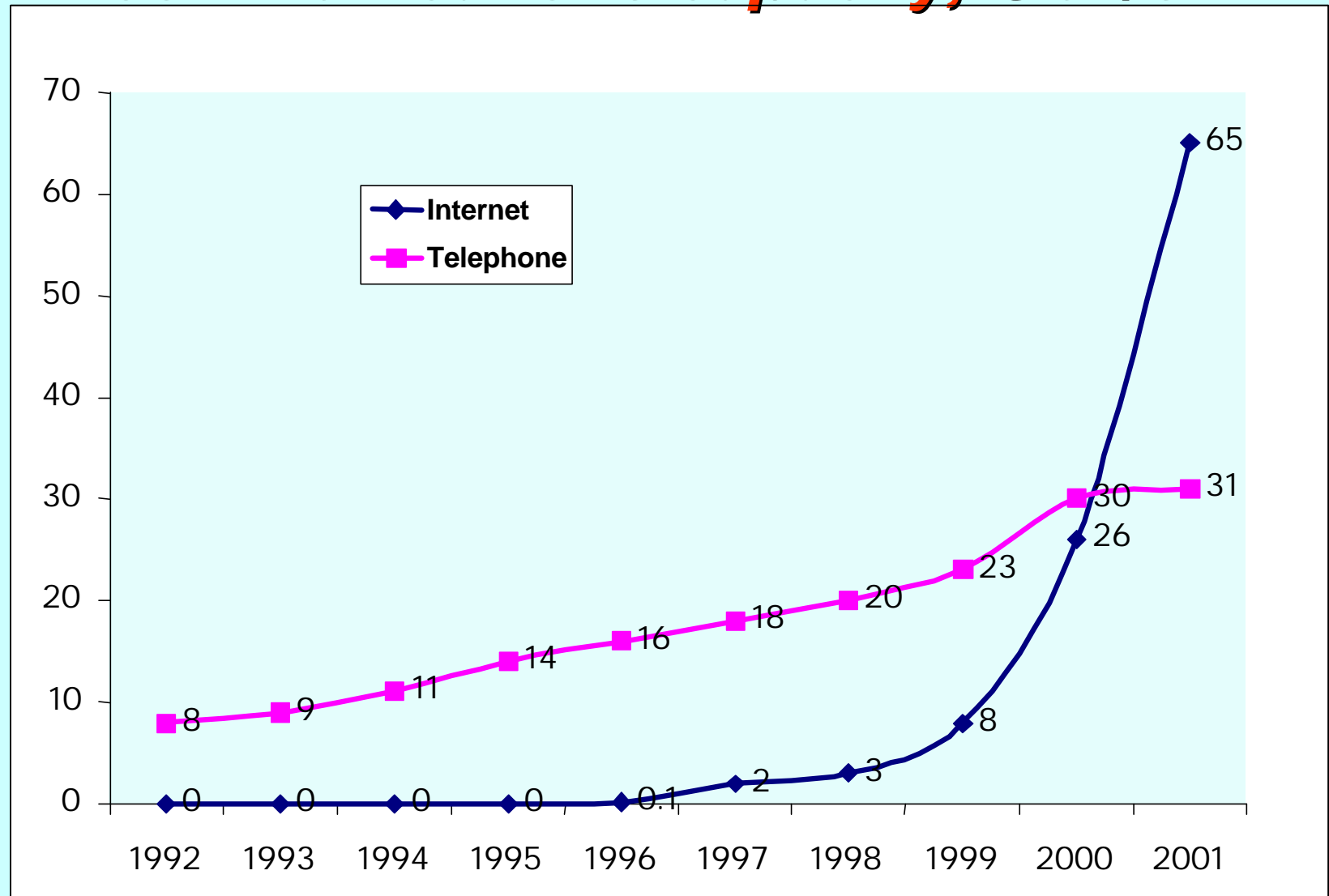


Impact of new technologies



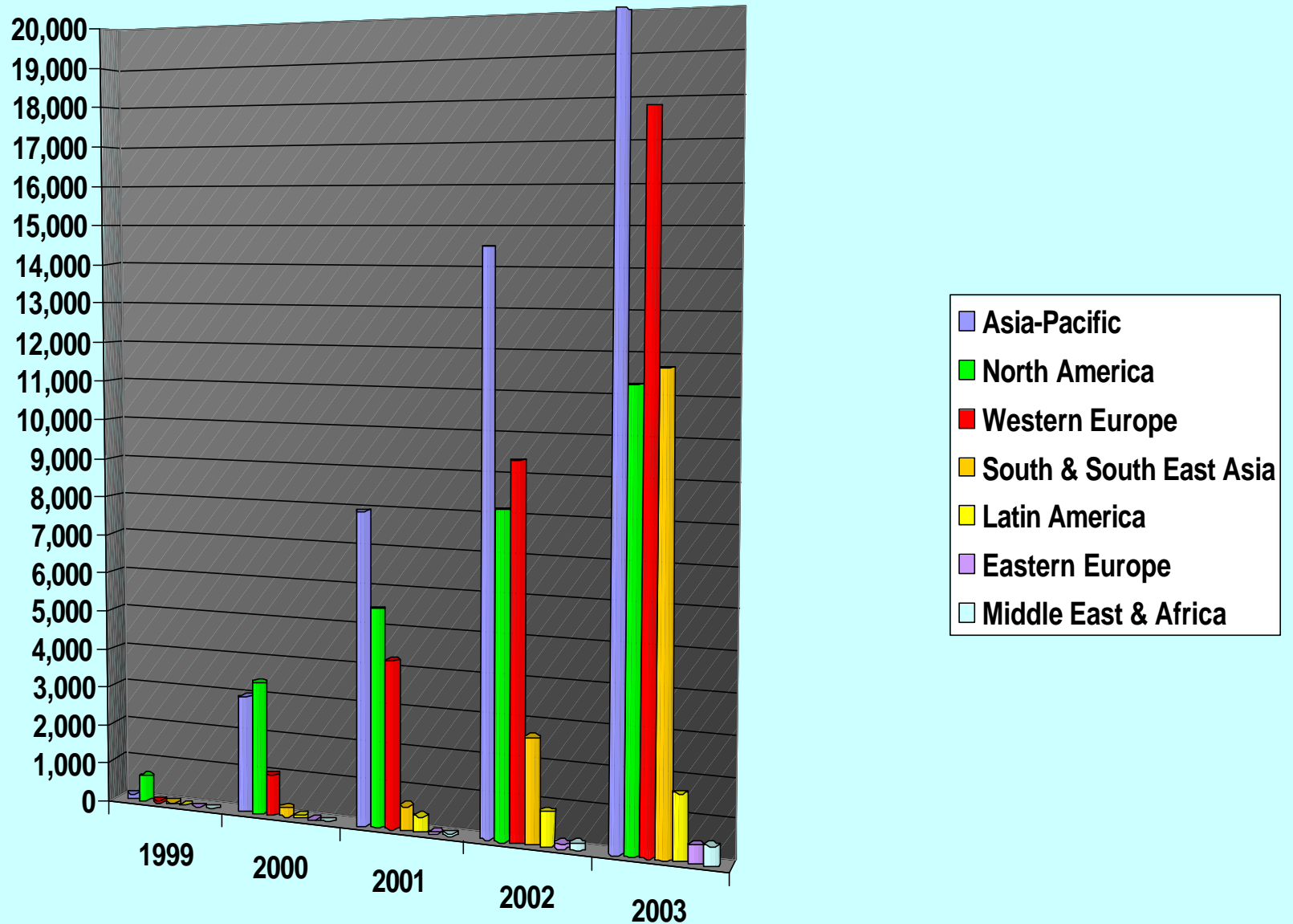


Asia-Pacific international communications capacity, Gbit/s



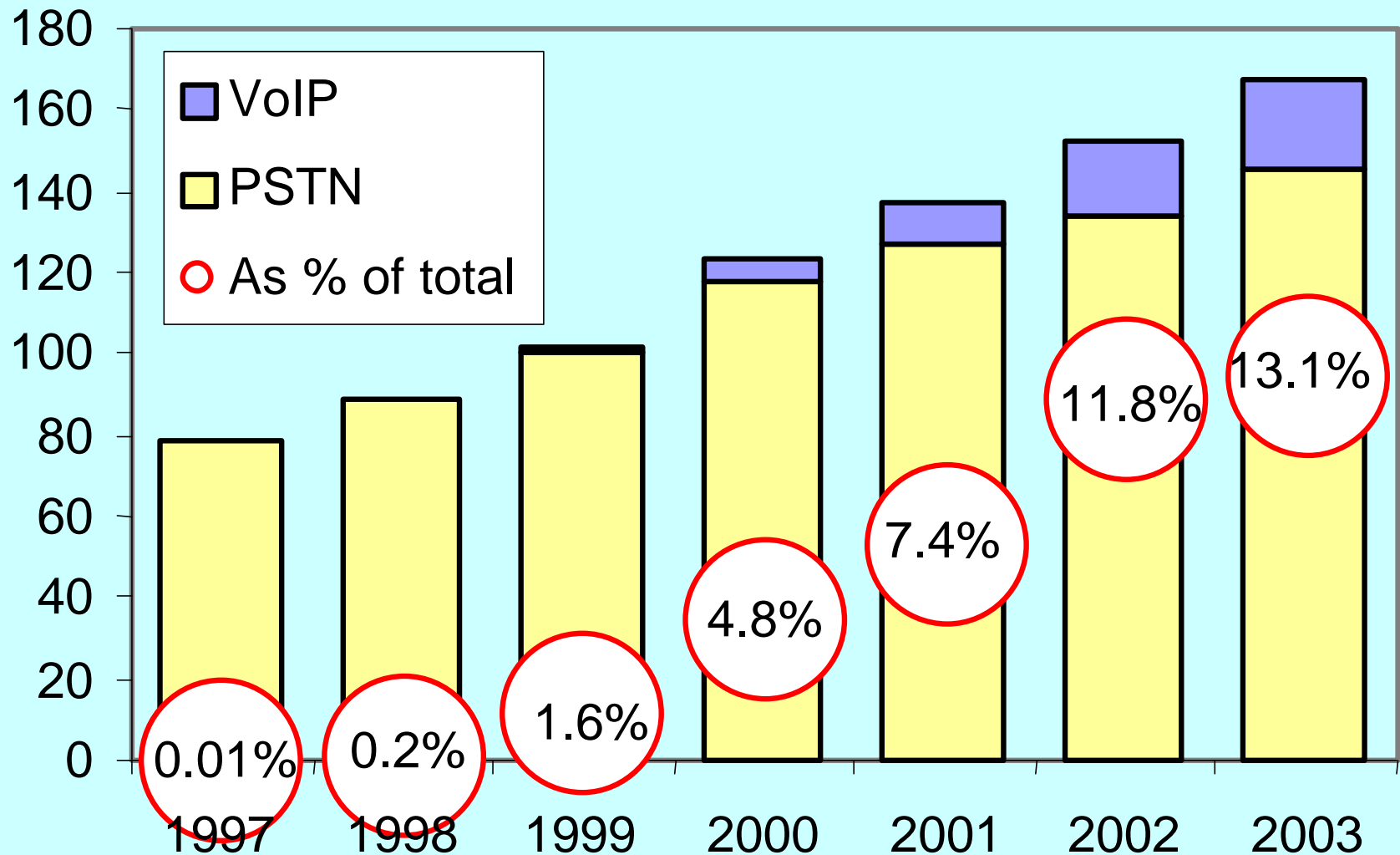


Growth In DSL Subscribers-Regional Division (000s) 1999-2003





International voice traffic (in billions of minutes)

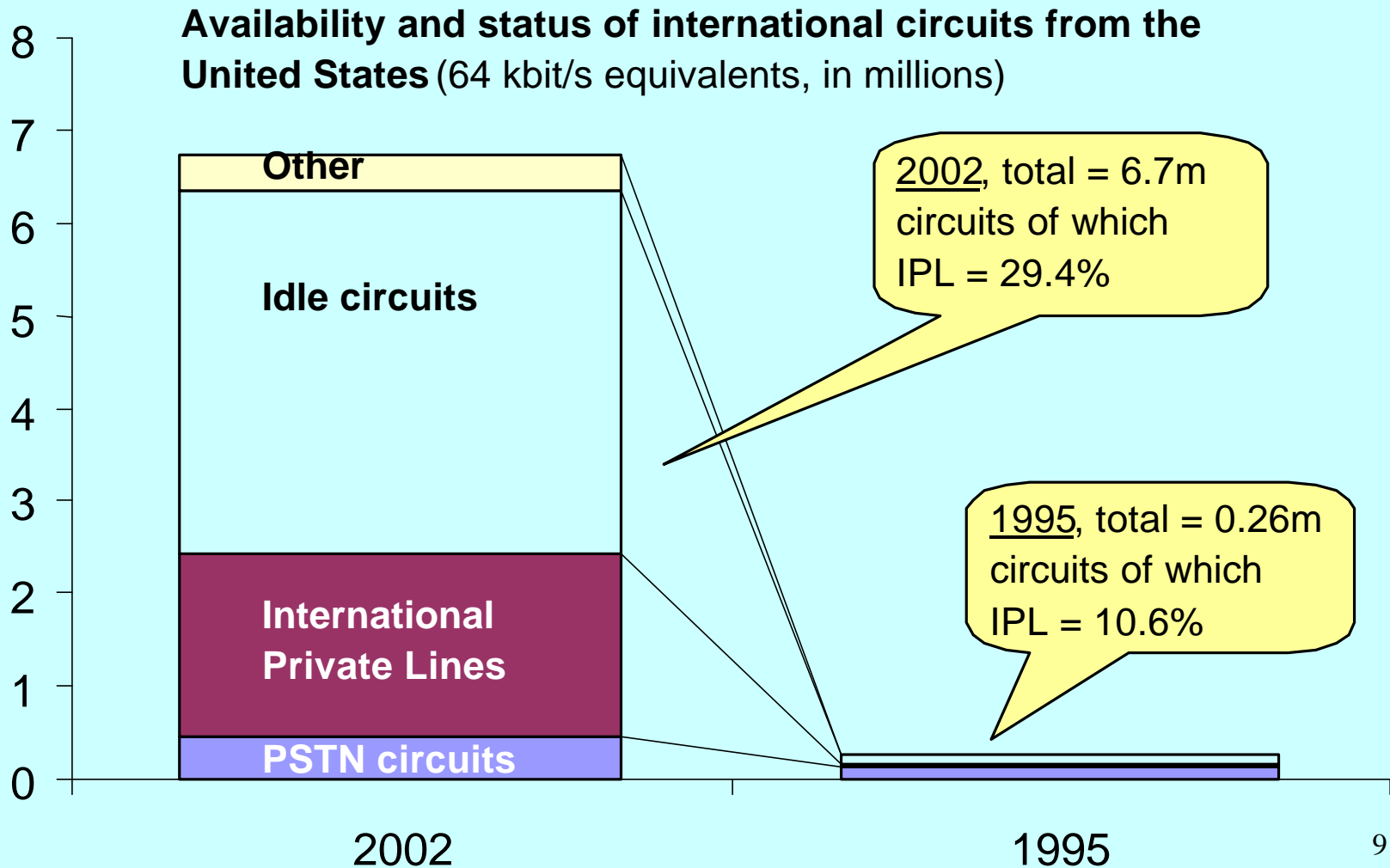


Source: ITU /
TeleGeography



Changing mix of int'l circuits

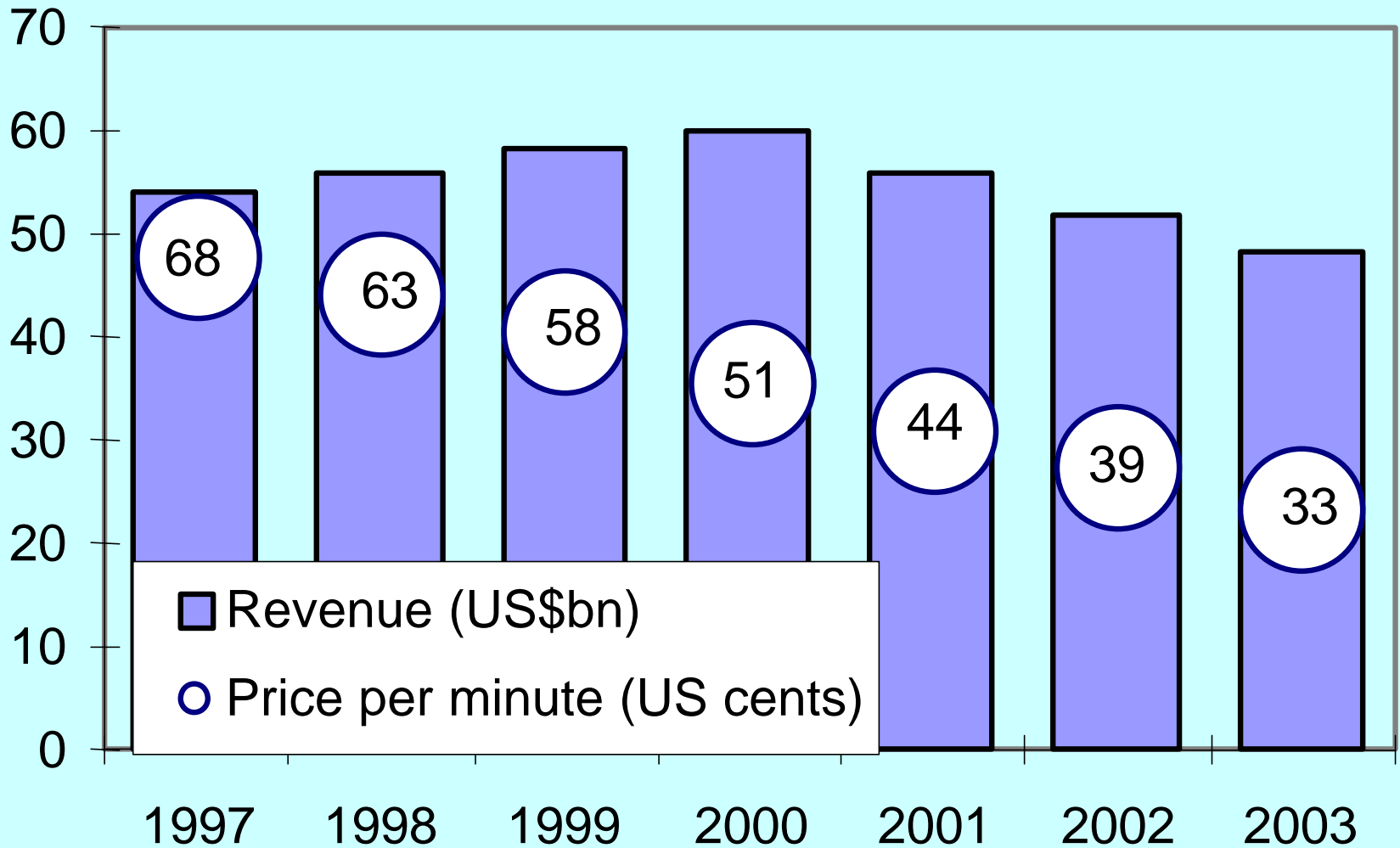
Rise of international private lines



Source: ITU, adapted from FCC Circuit Status Report.



International voice traffic trends ***Revenue (US\$bn) and price per min (cents)***

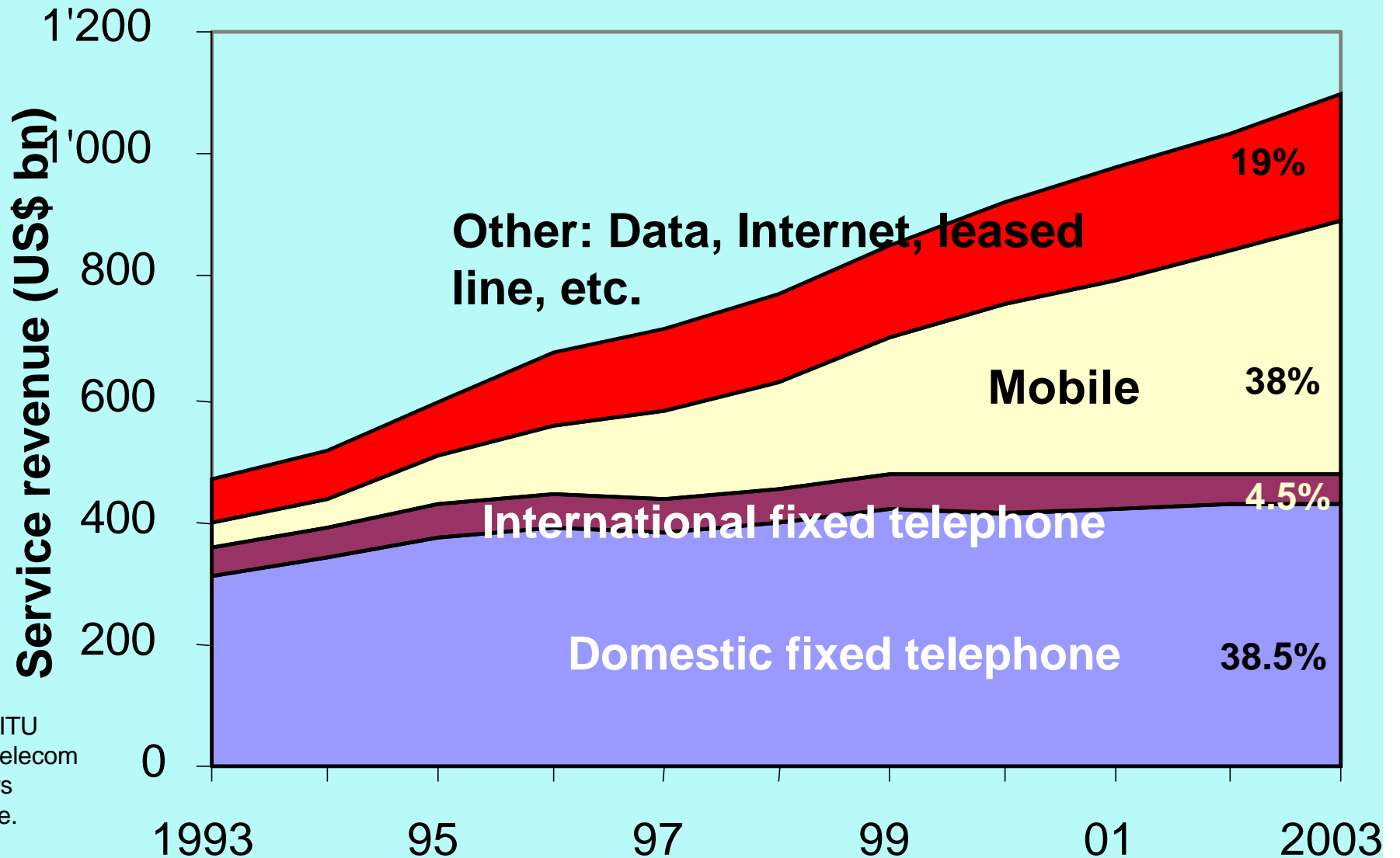


Source: ITU
World Telecom
Indicators
Database.



Sources of telecom revenue

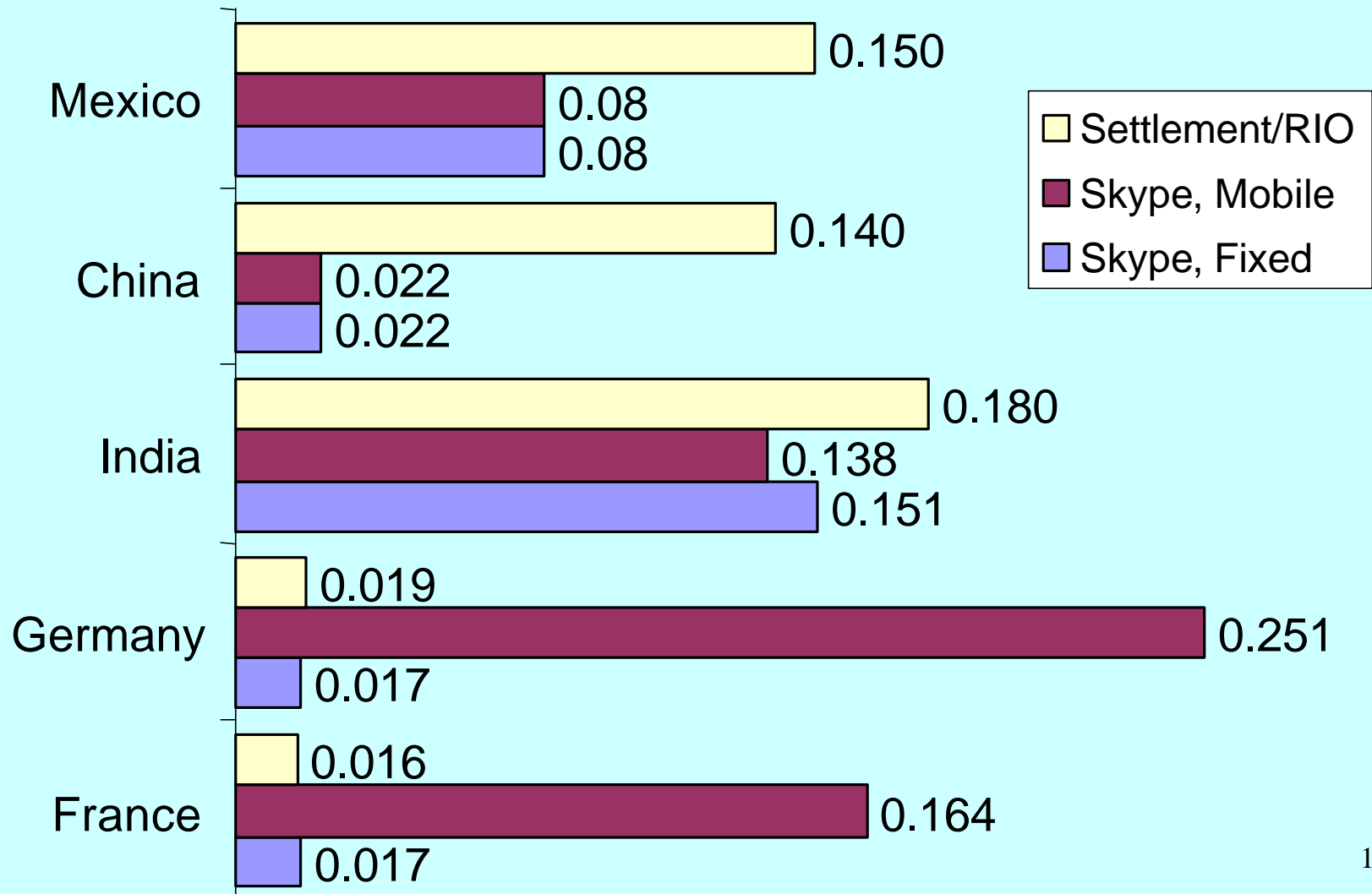
Worldwide, in US\$ billions



Source: ITU
World Telecom
Indicators
Database.



Selected rates for call termination In Euro cents per minute



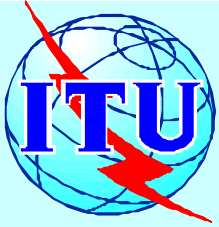
Note: Mobile and fixed rates are for SkypeOut. Settlement is from US and Reference Interconnect Offer is for double tandem.

Source: Skype, FCC, Analysys.

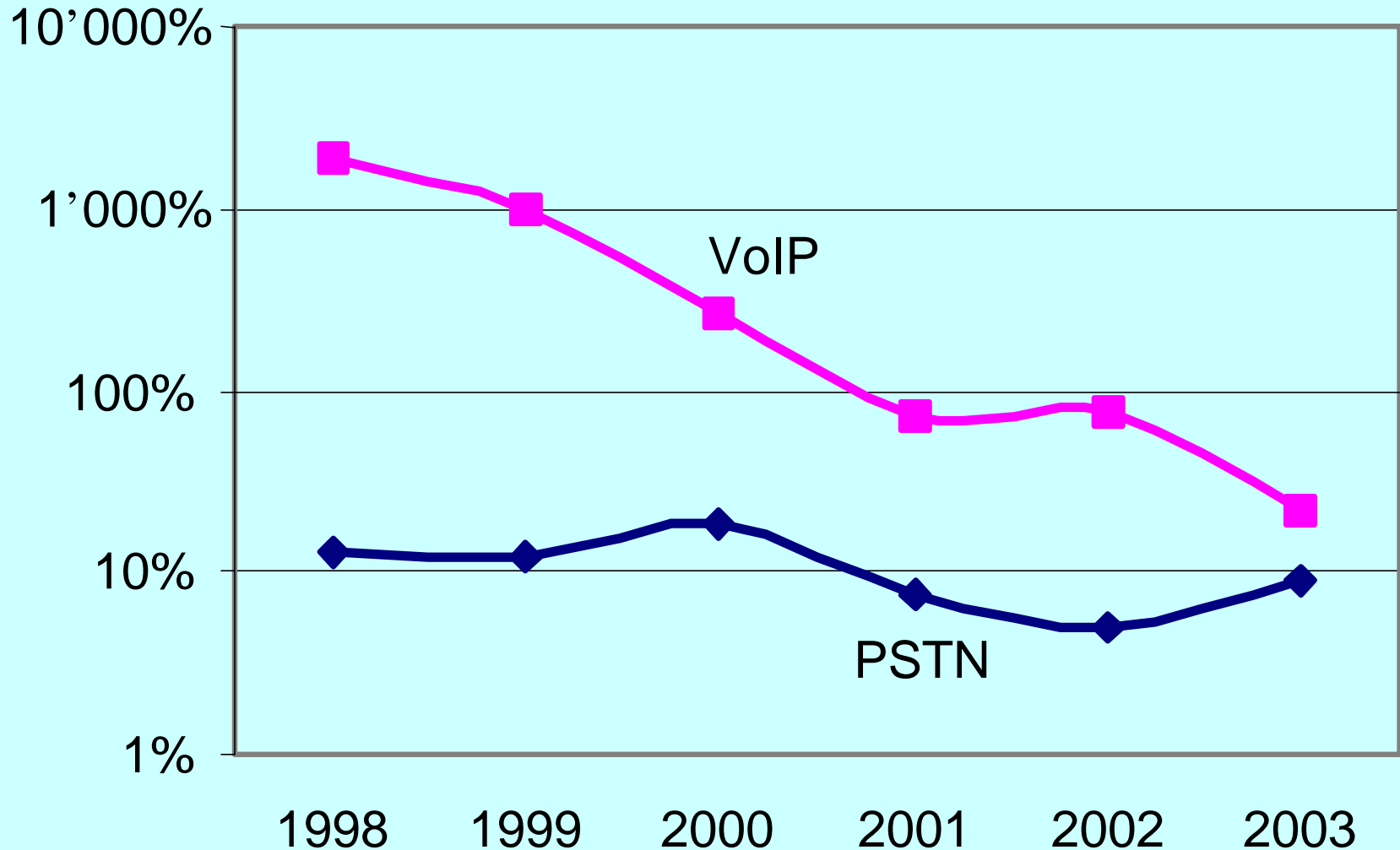


The “third coming” of IP Telephony

- **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

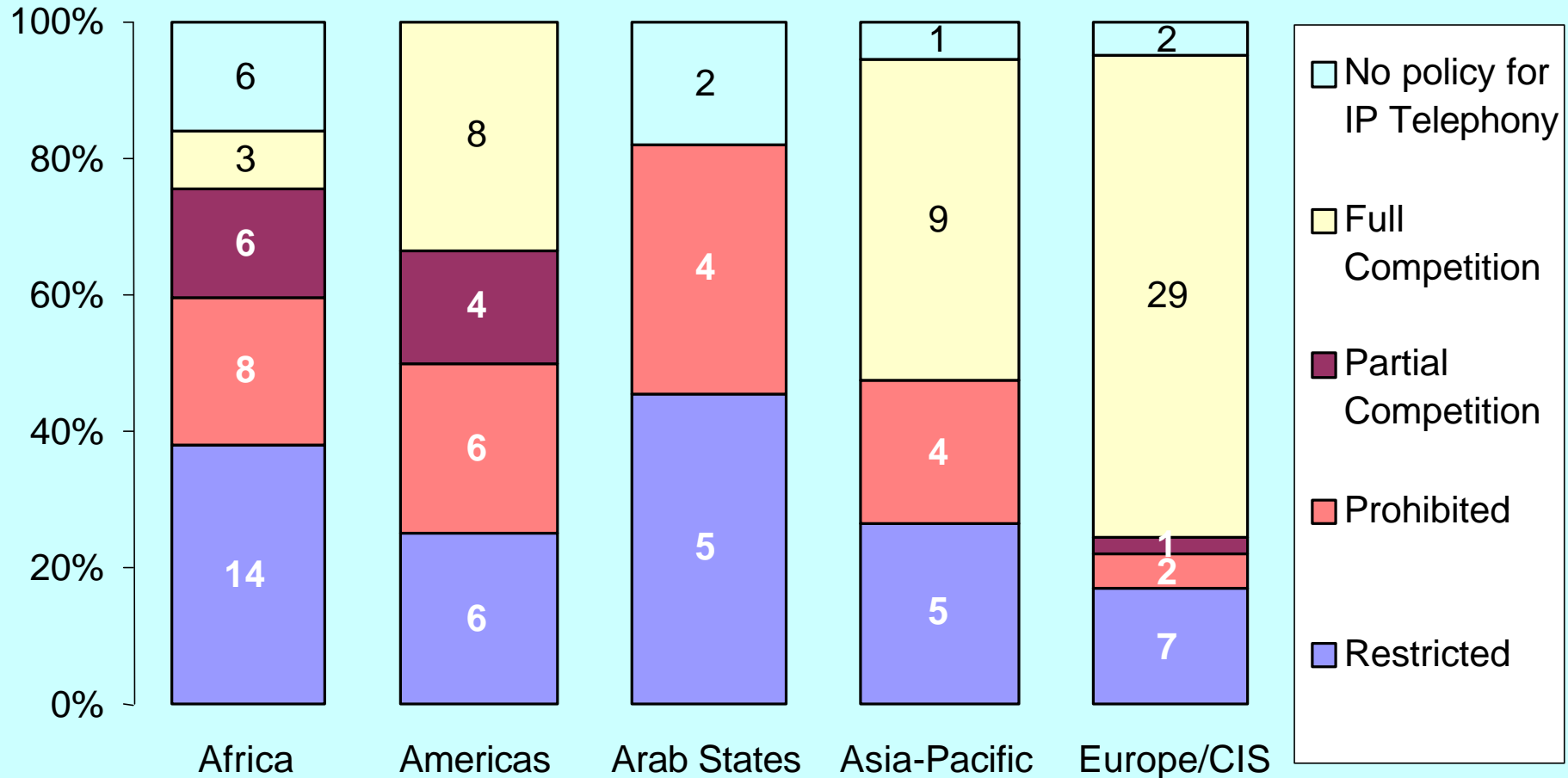


Annual growth rates ***International voice traffic, in %***



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

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

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-independent VoIP numbers**
- **Voice over IP over mobile**
 - **Voice will increasingly travel over data channel in mobile networks to provide discounted calling prices**



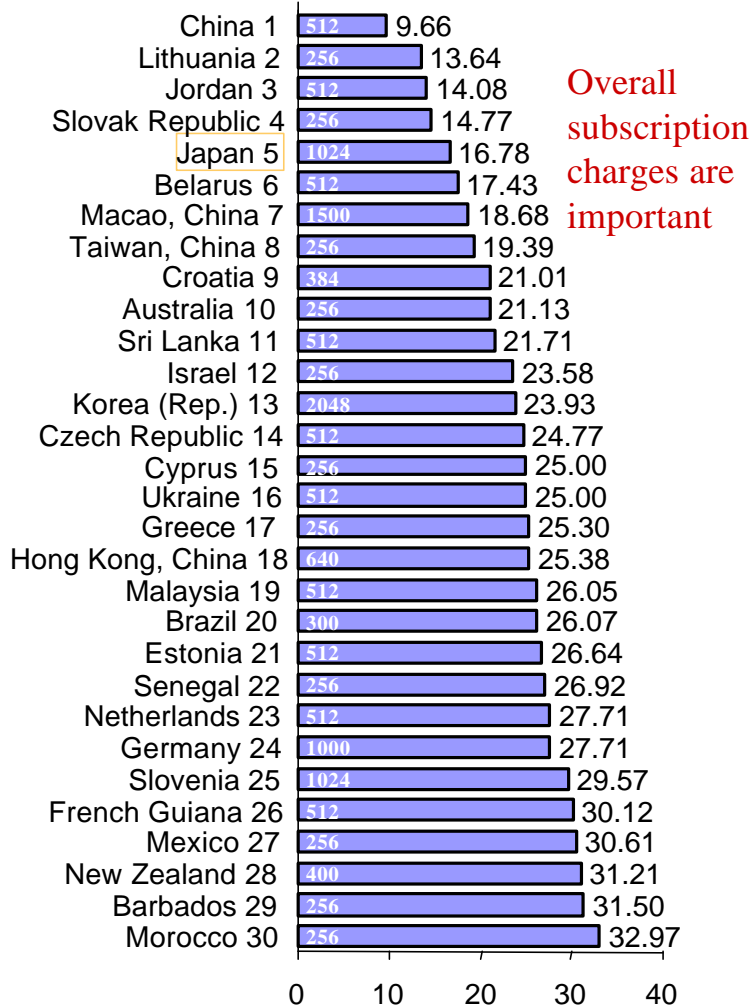
Mini case study: IP Telephony in Japan

- **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 market 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.**

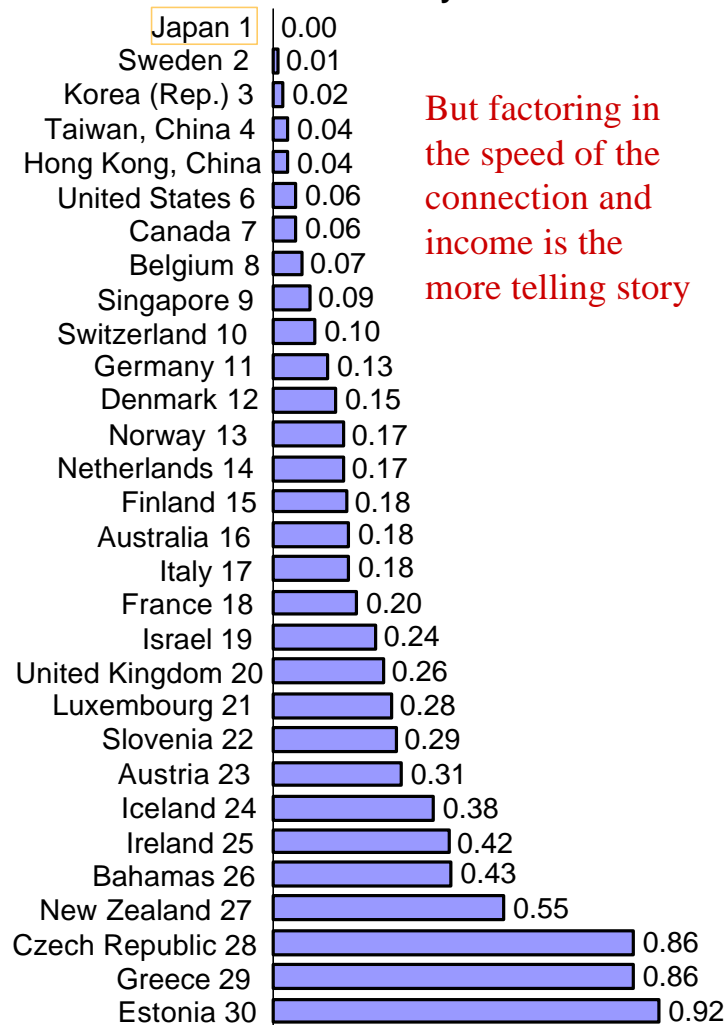


Japanese broadband prices are among the lowest in the world

Broadband monthly sub. prices, US\$, July 2004



Cost 100 kbit/s as % of monthly income

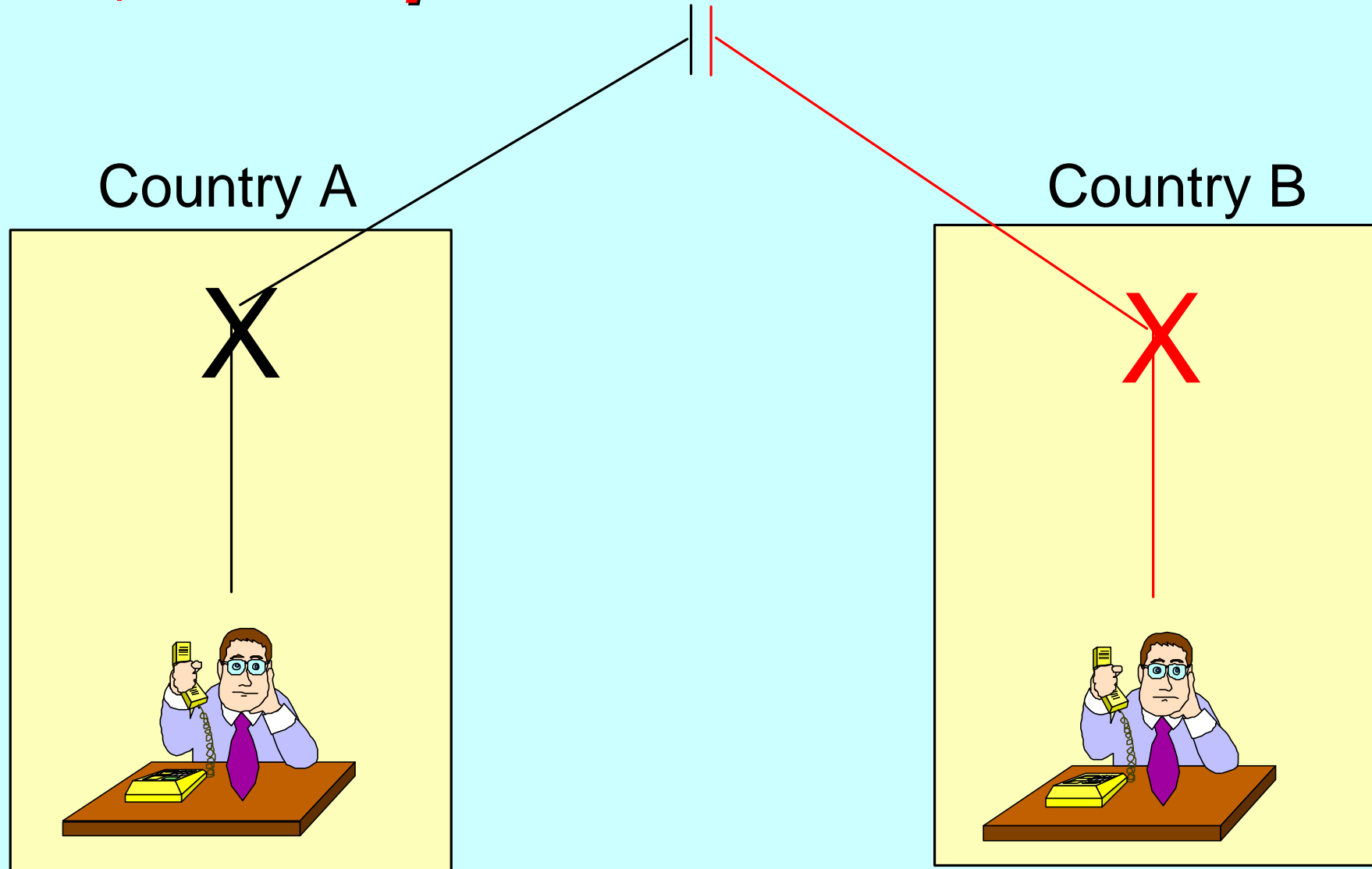


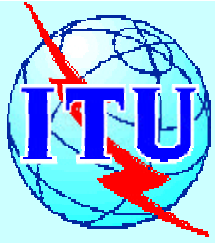
Source: ITU Internet Reports 2004: The Portable Internet.



Traditional regime: Joint provision of service

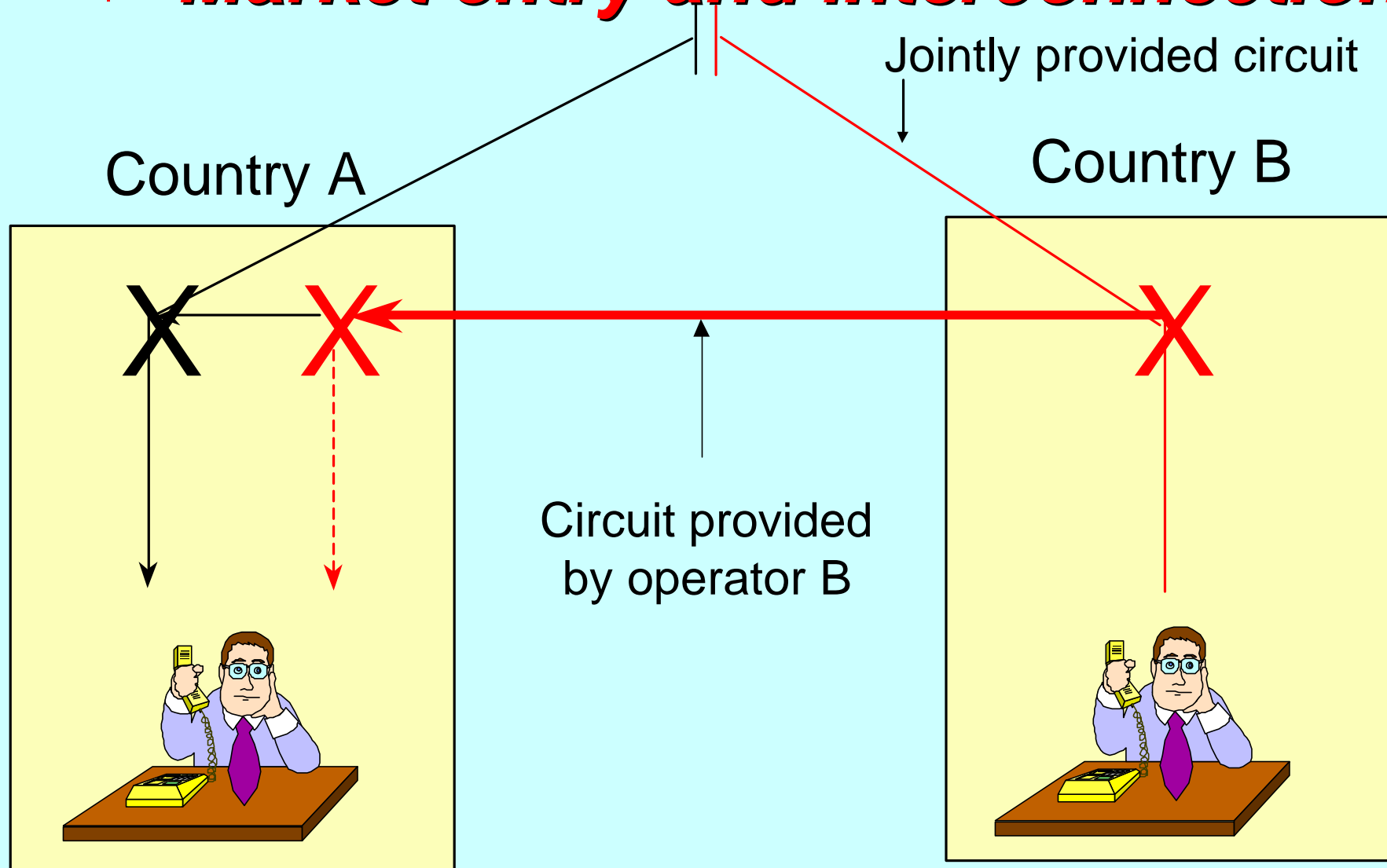
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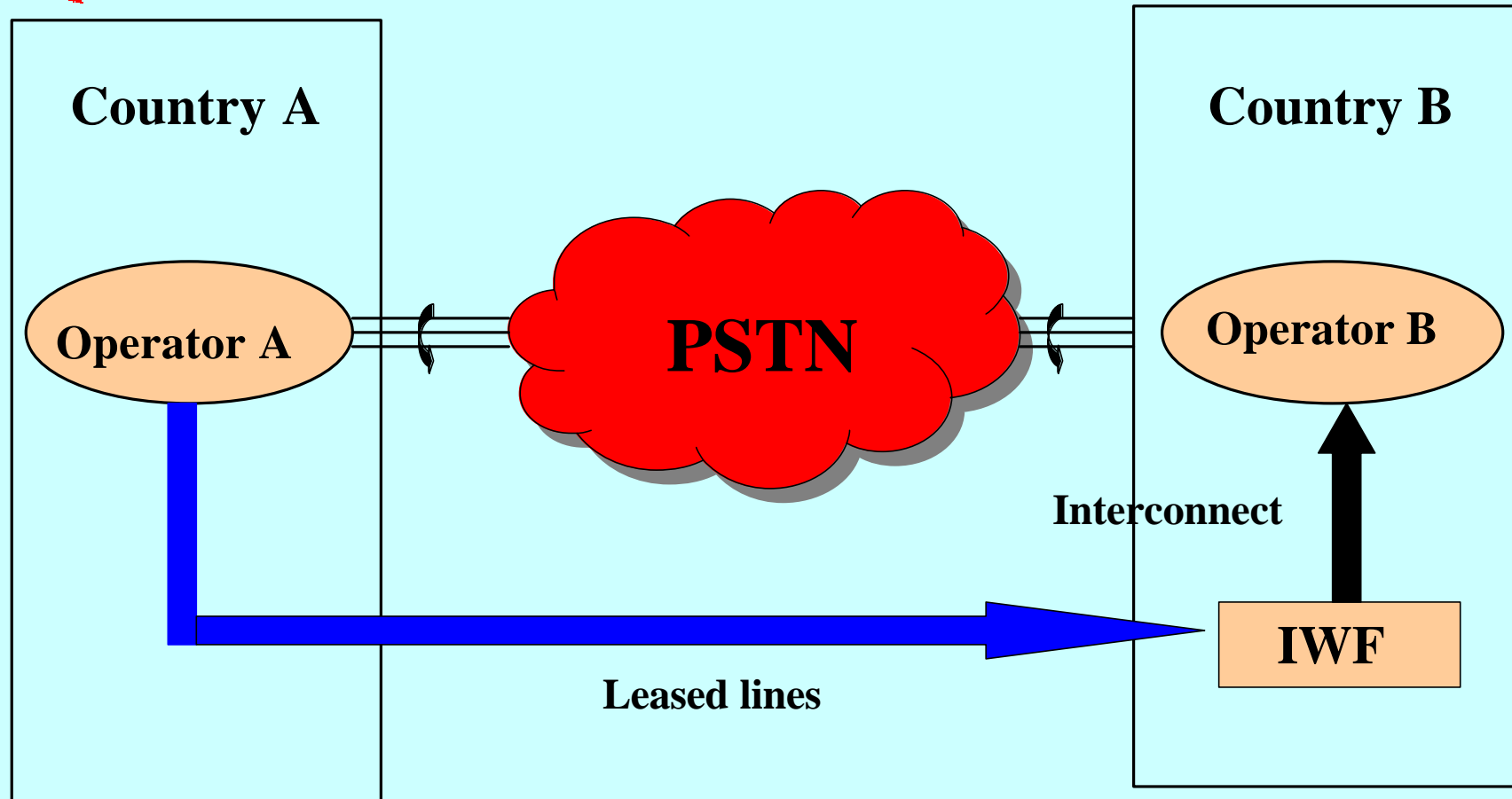
Emerging regime: Market entry and interconnection

21





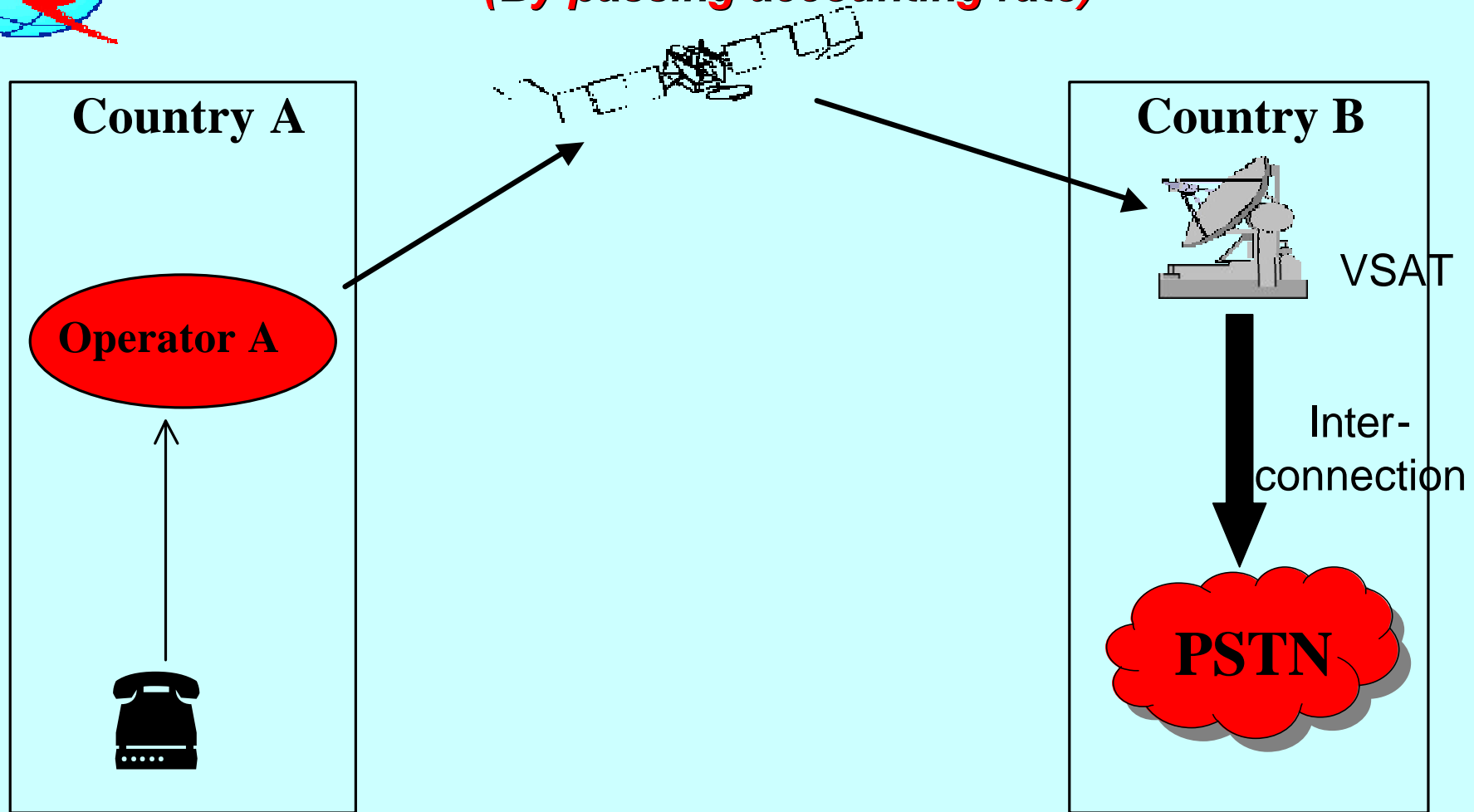
International simple resale (ISR) ***(By-passing accounting rate)***



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



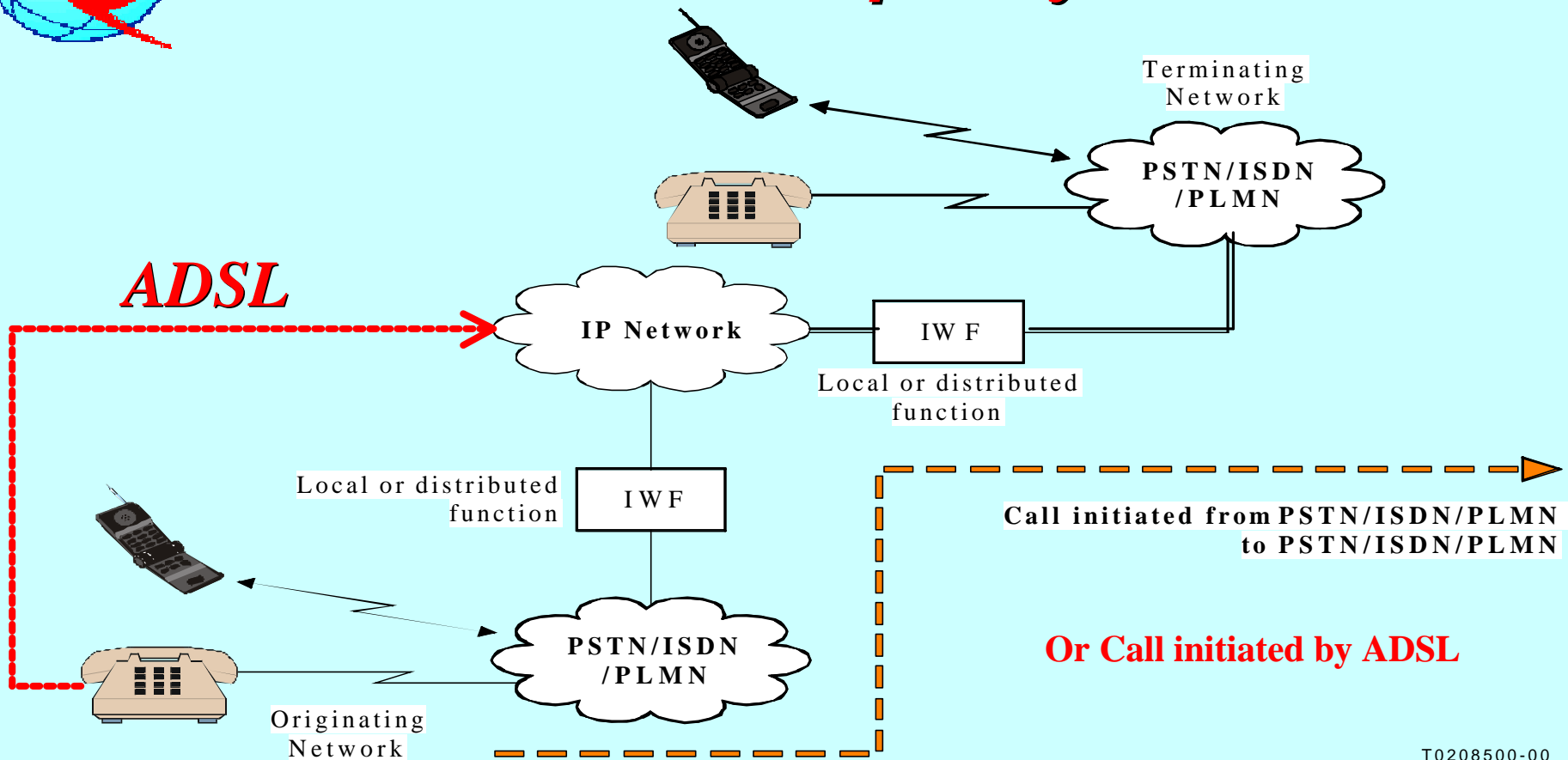
Telephone service using data transmission **(By-passing accounting rate)**



Voice is packetized = data transmission
Telephone regulations do not apply



IP Telephony



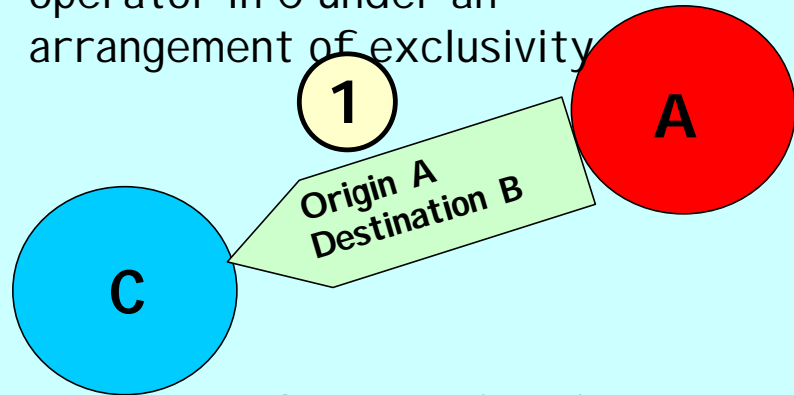
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Call from International Telecommunication Network (ITN) to another ITN via IP-based Network

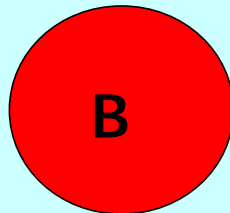


Refile and other practices using accounting rate system

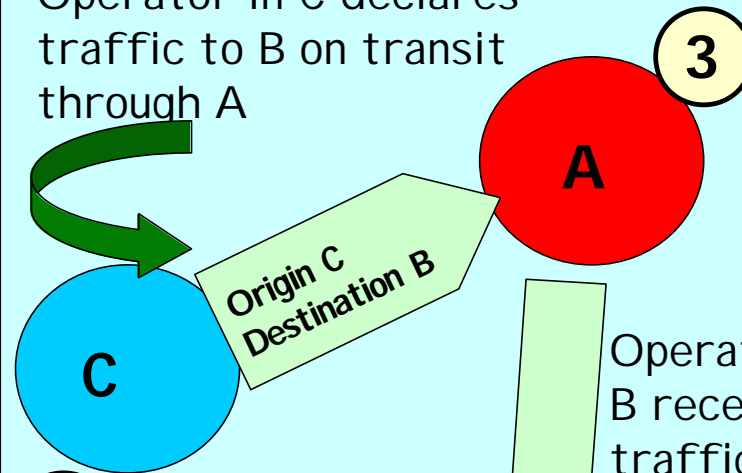
Operator in A sends traffic to operator in C under an arrangement of exclusivity



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

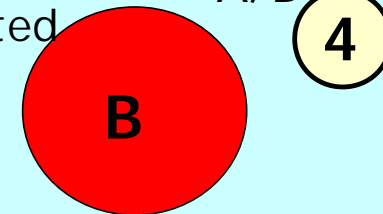


Operator in C declares traffic to B on transit through A



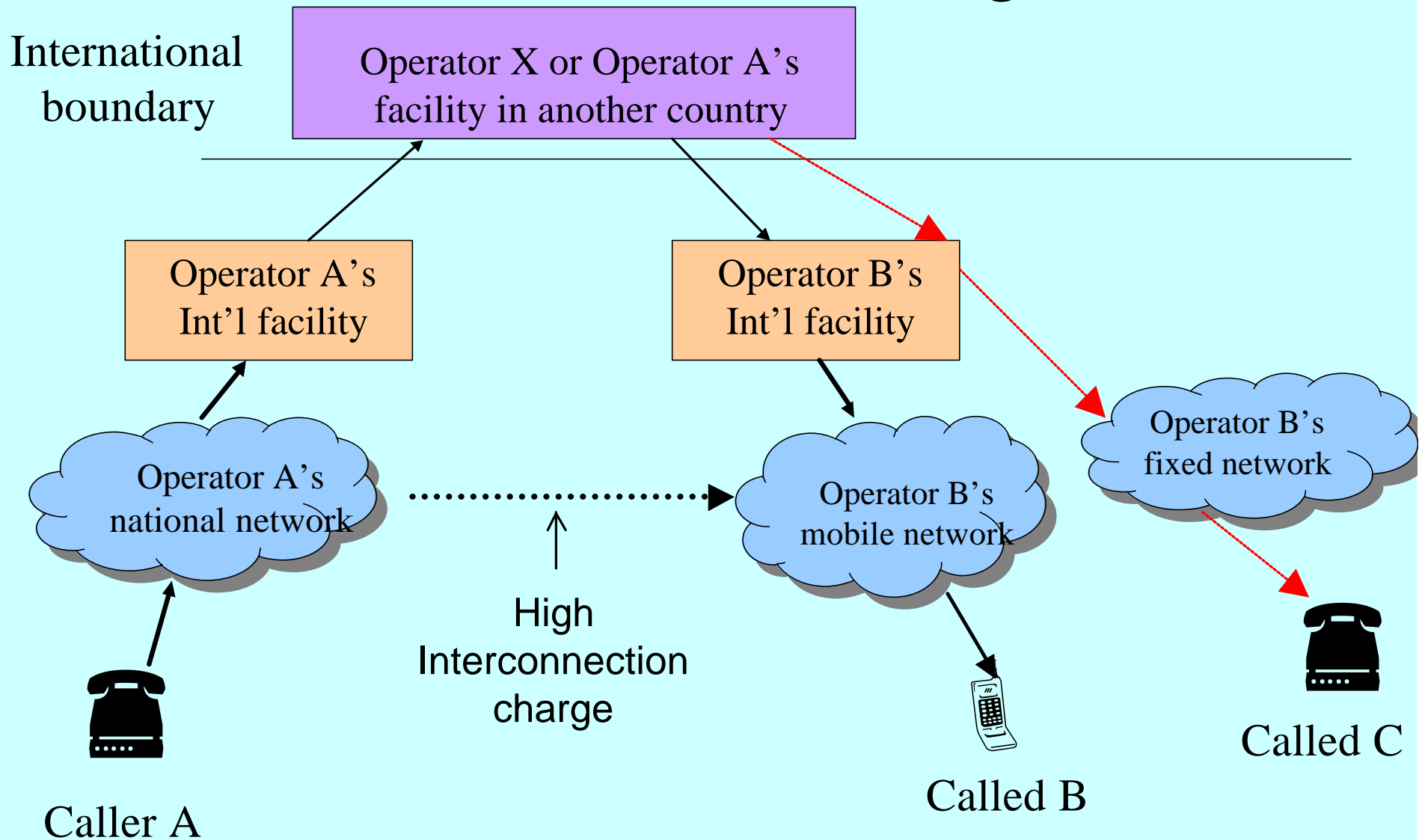
Operator in C "re-labels" the traffic as originated in C

Operator in B receives traffic at settlement rate C/B instead of A/B



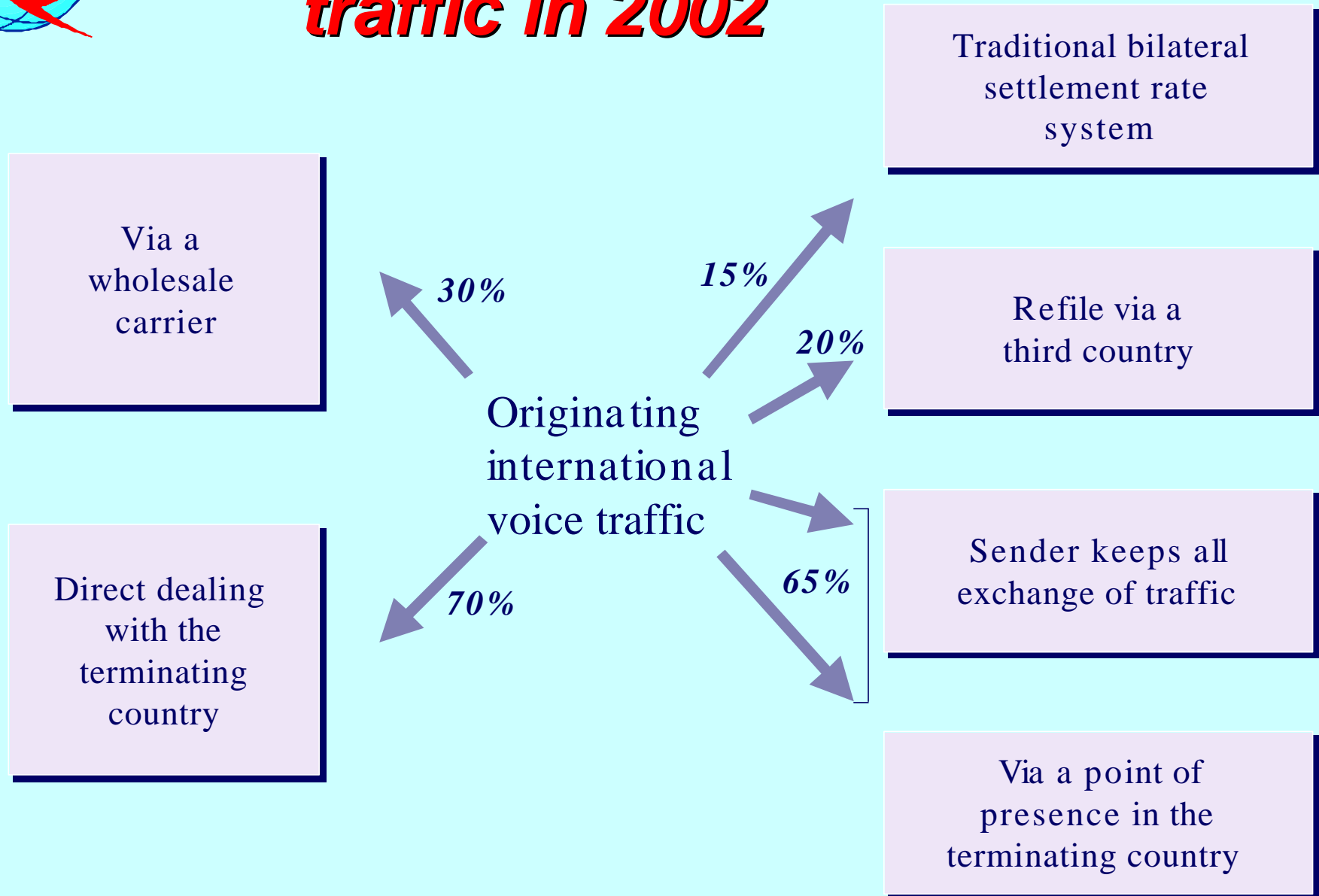


Mobile tromboning & high mobile termination charge





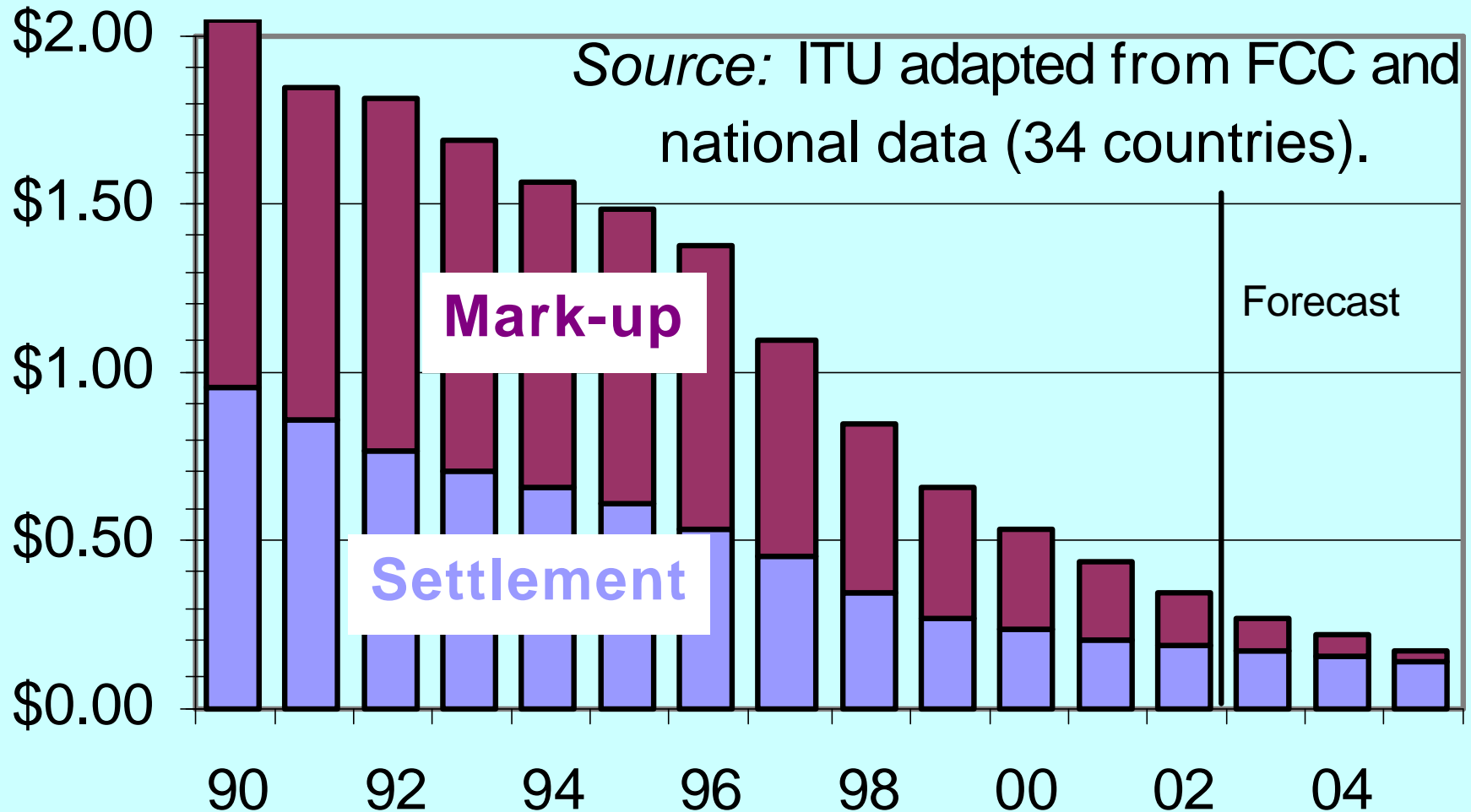
Delivering international voice traffic in 2002





Falling prices (1)

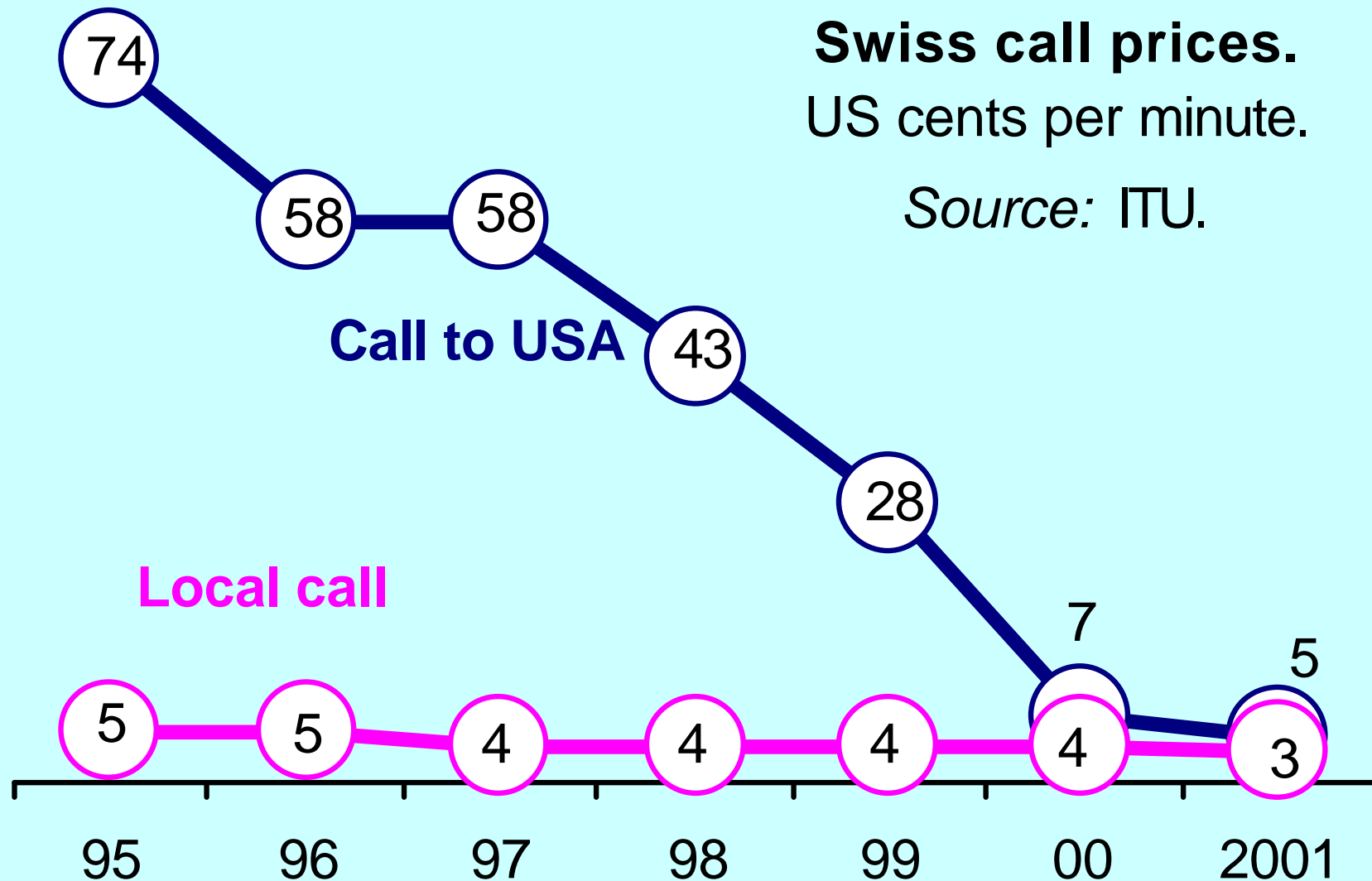
Average retail price of one minute call to USA.





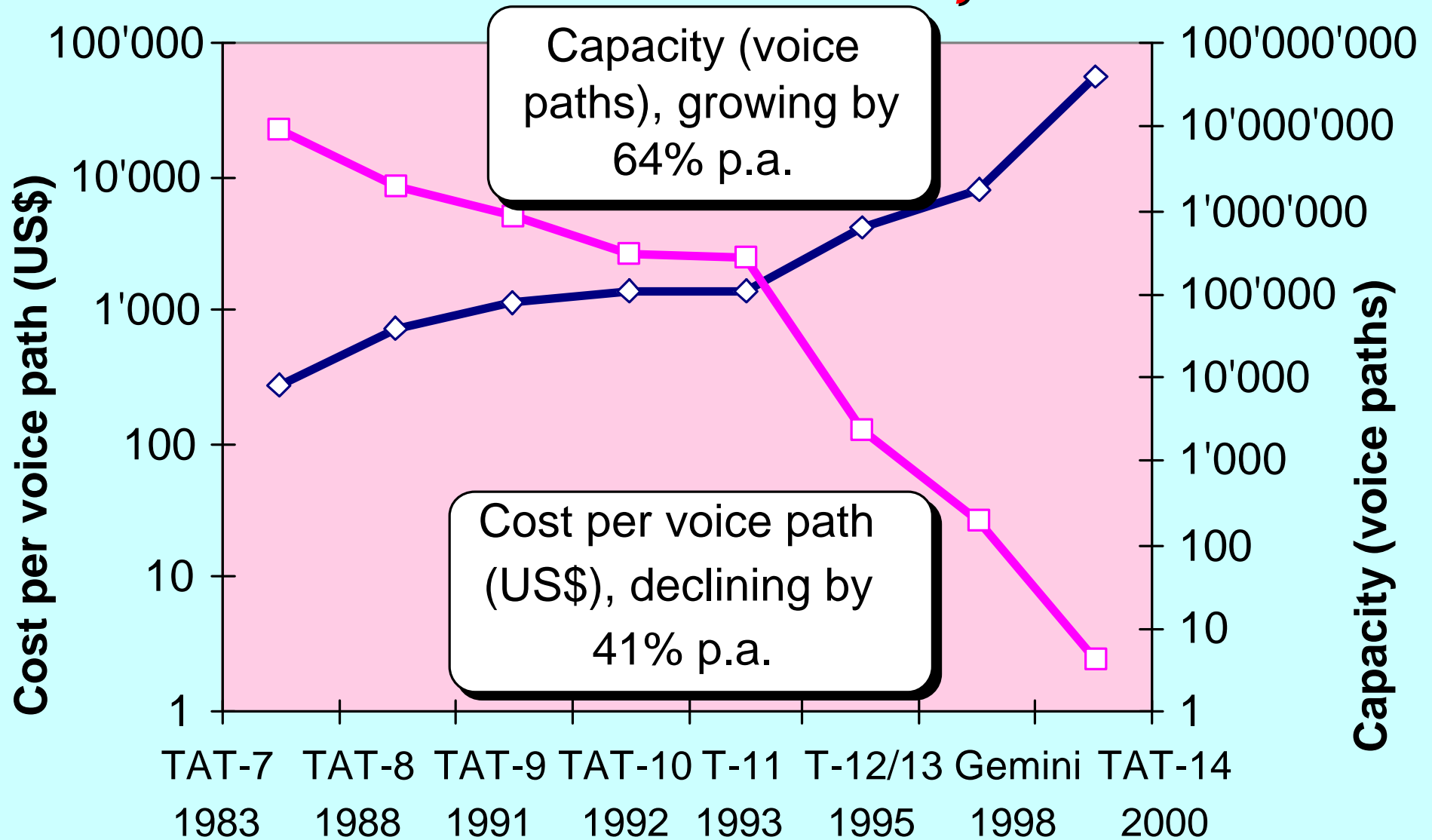
Falling Price (2):

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?**



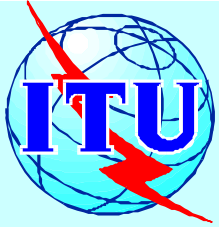
What do we bill for?

- **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

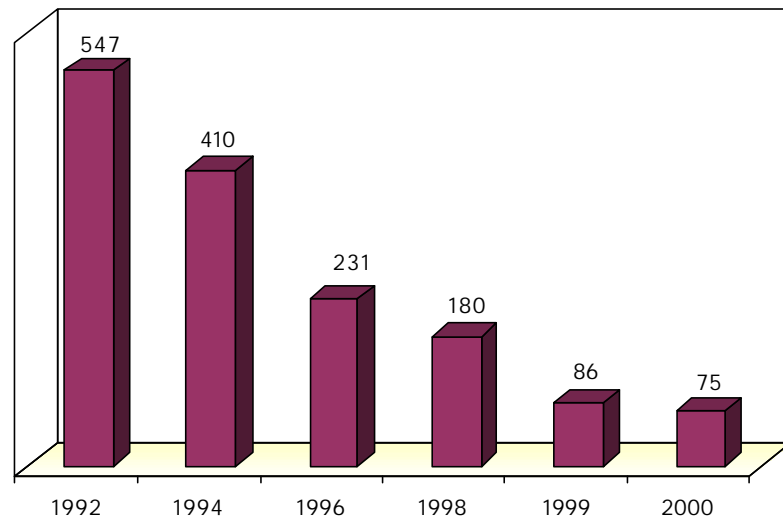
- **Service, tariff and technical issues**
 - **Alternative calling procedures**
 - **Public switched network to IP based network**
 - **Challenges related to mobile service**
- **Regulatory issues**
 - **Interconnection rules**
 - **Implementation of USO**
 - **Tariff Rebalancing**
- **Internet connectivity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



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

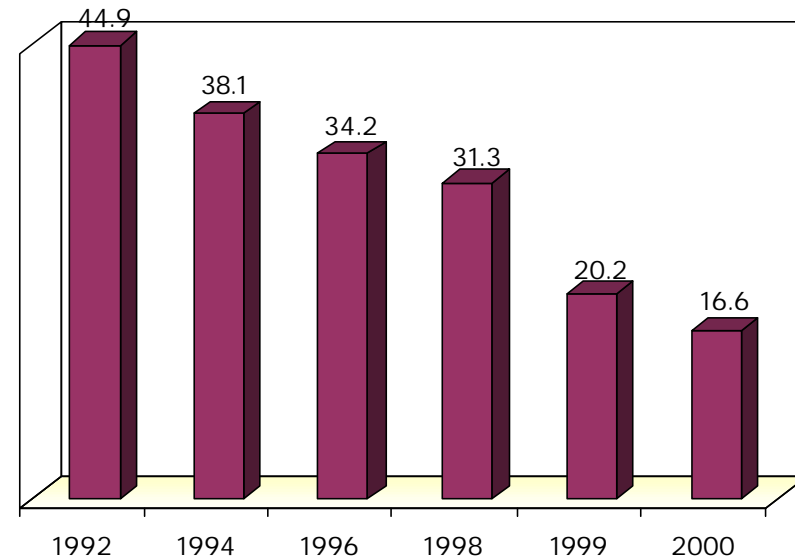
Connection charge, in US\$

CAGR, 1992-2000 = -32.1% p.a.



Monthly subscription, in US\$

CAGR, 1992-2000 = -9.2% p.a

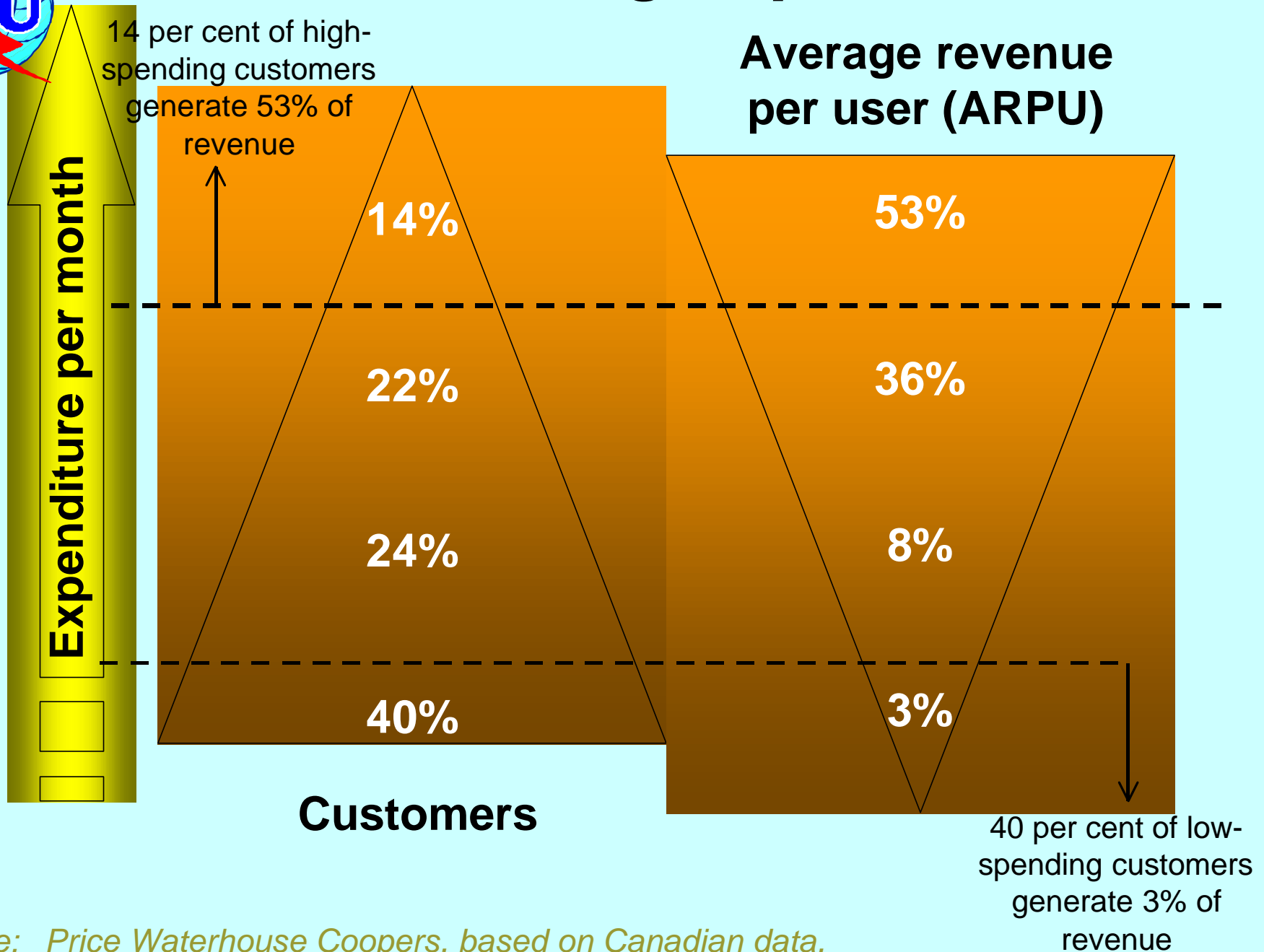


Note: CAGR = Compound Annual Growth rate.

Source: ITU "World Telecommunication Development Report 1999: Mobile cellular"



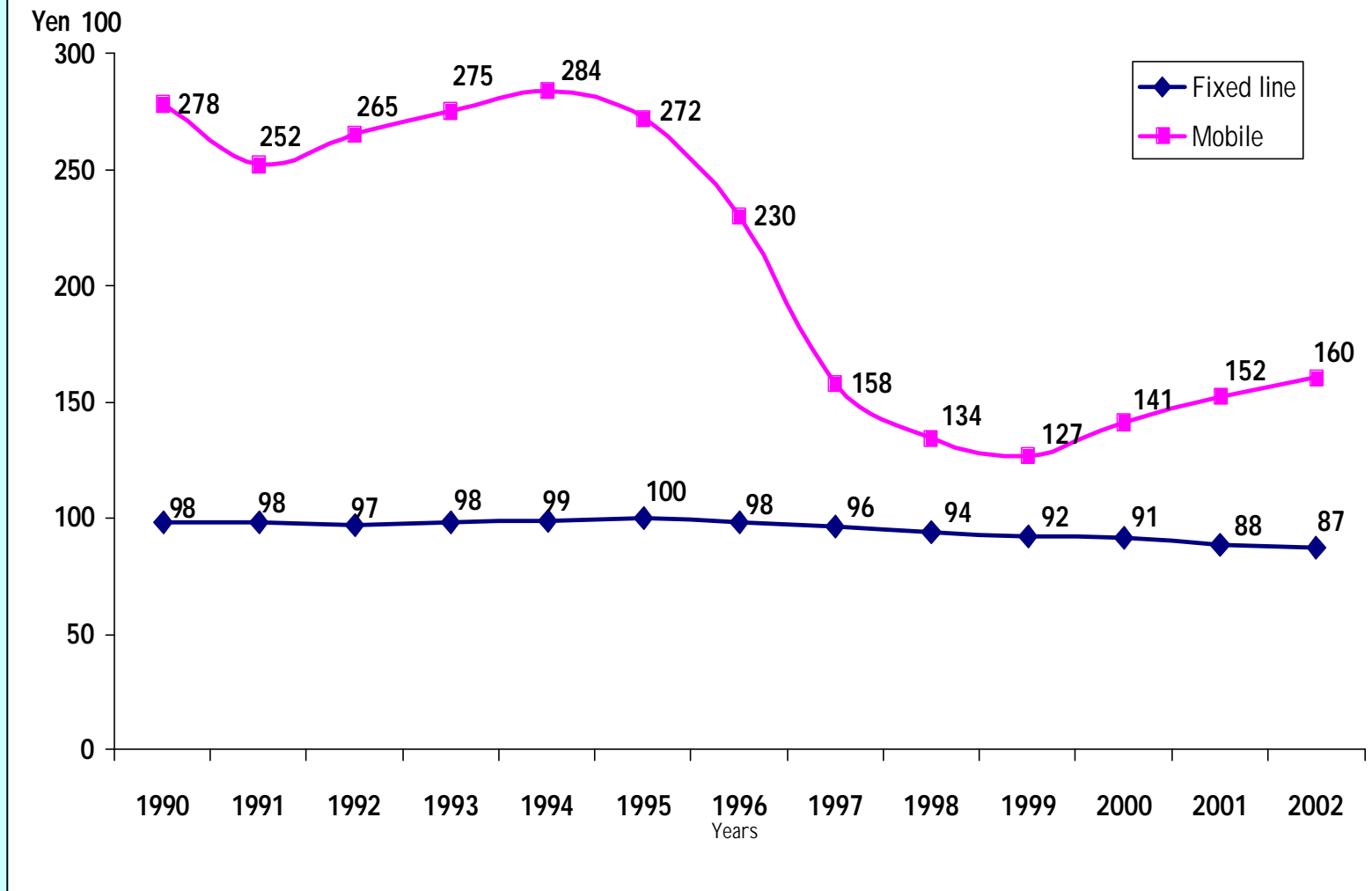
Cultivate the high-spenders



Source: Price Waterhouse Coopers, based on Canadian data.

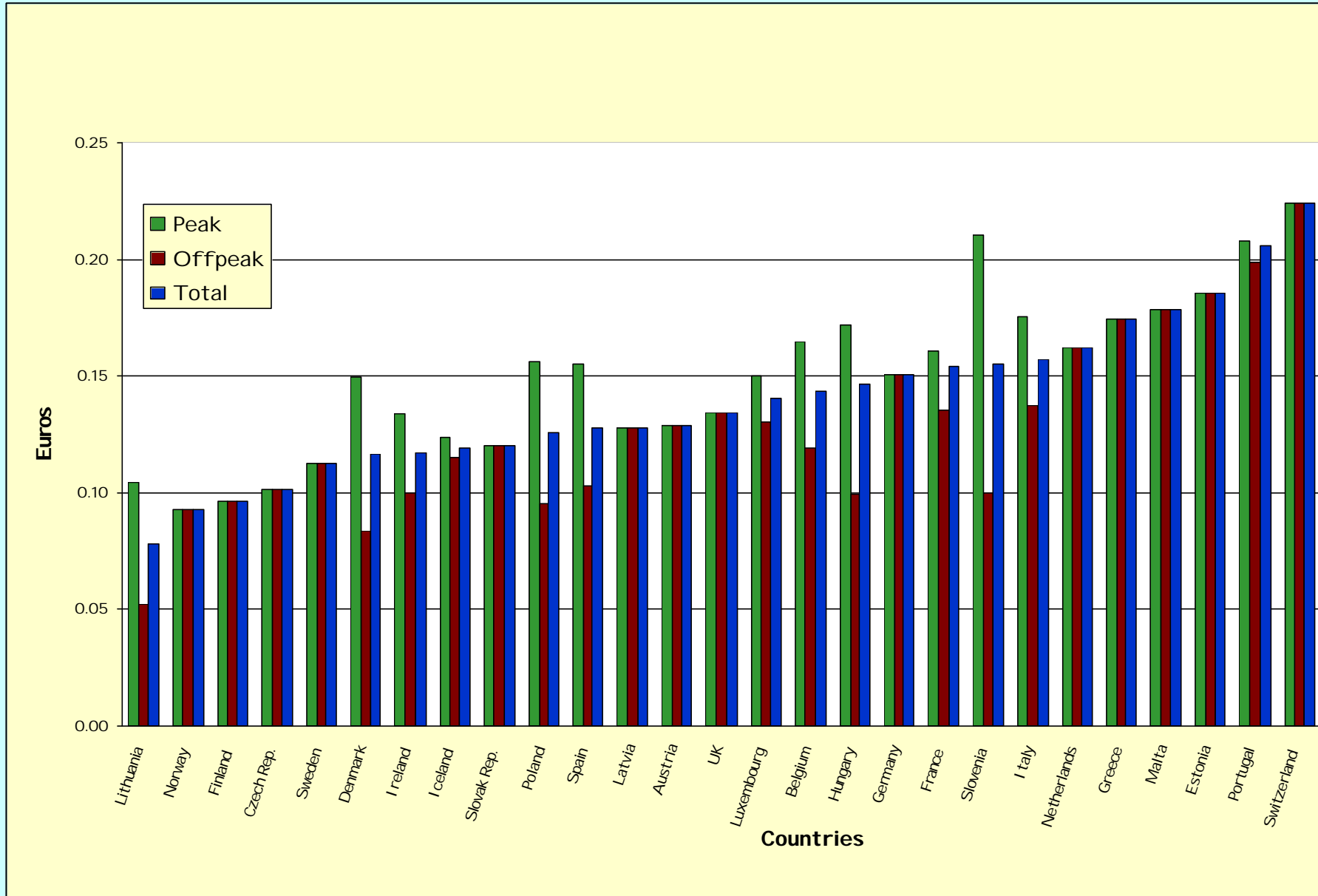


Mobile and Fixed-line ARPU in Japan



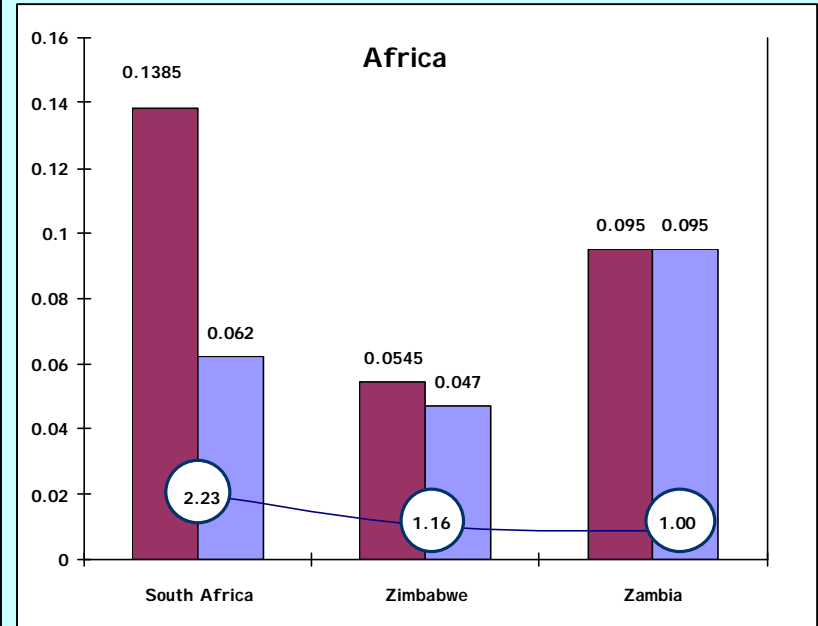
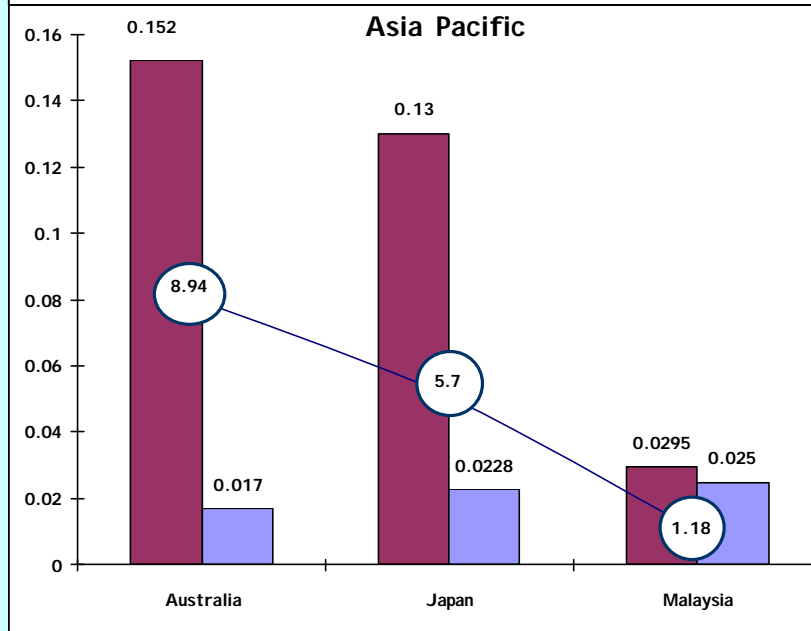
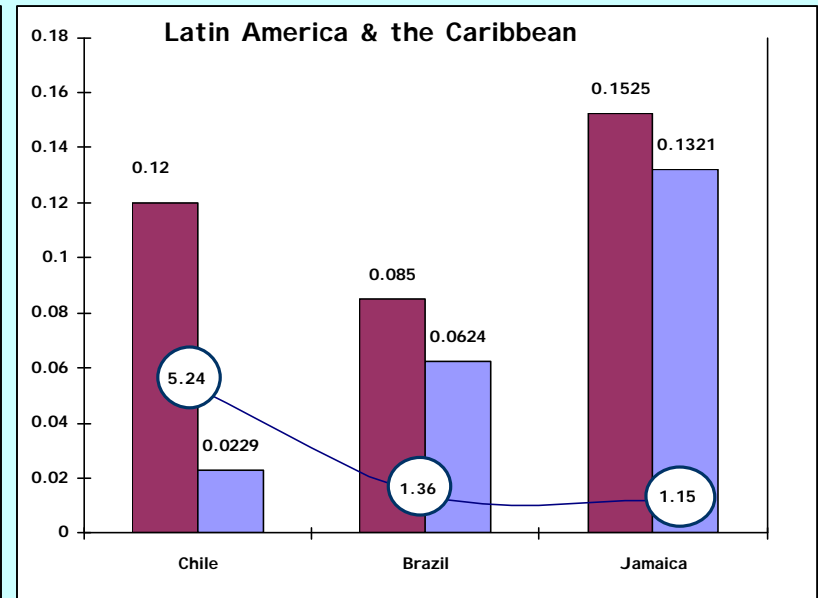
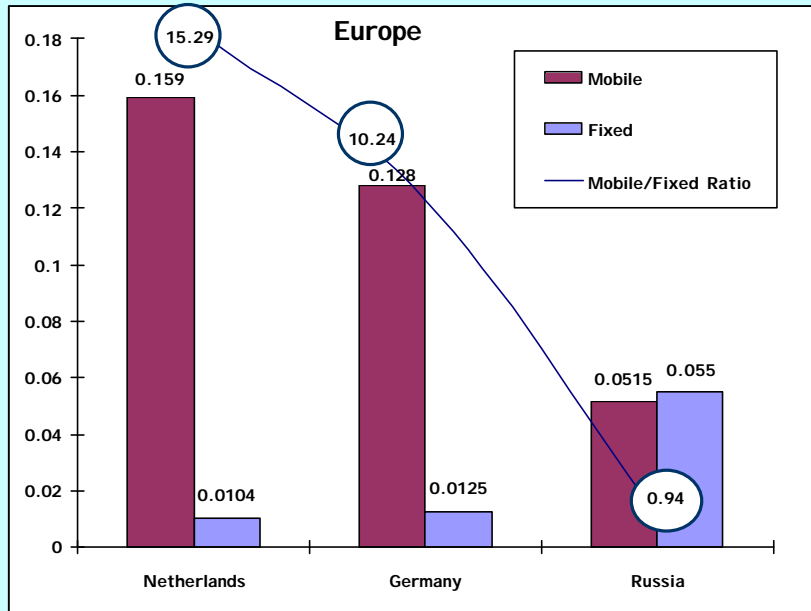


Average Mobile Termination Rate (European countries, July 2004)





Mobile and fixed Settlement rates, Mobile/Fixed ratio



From FCC data
 Notice of Inquiry
 October 2004

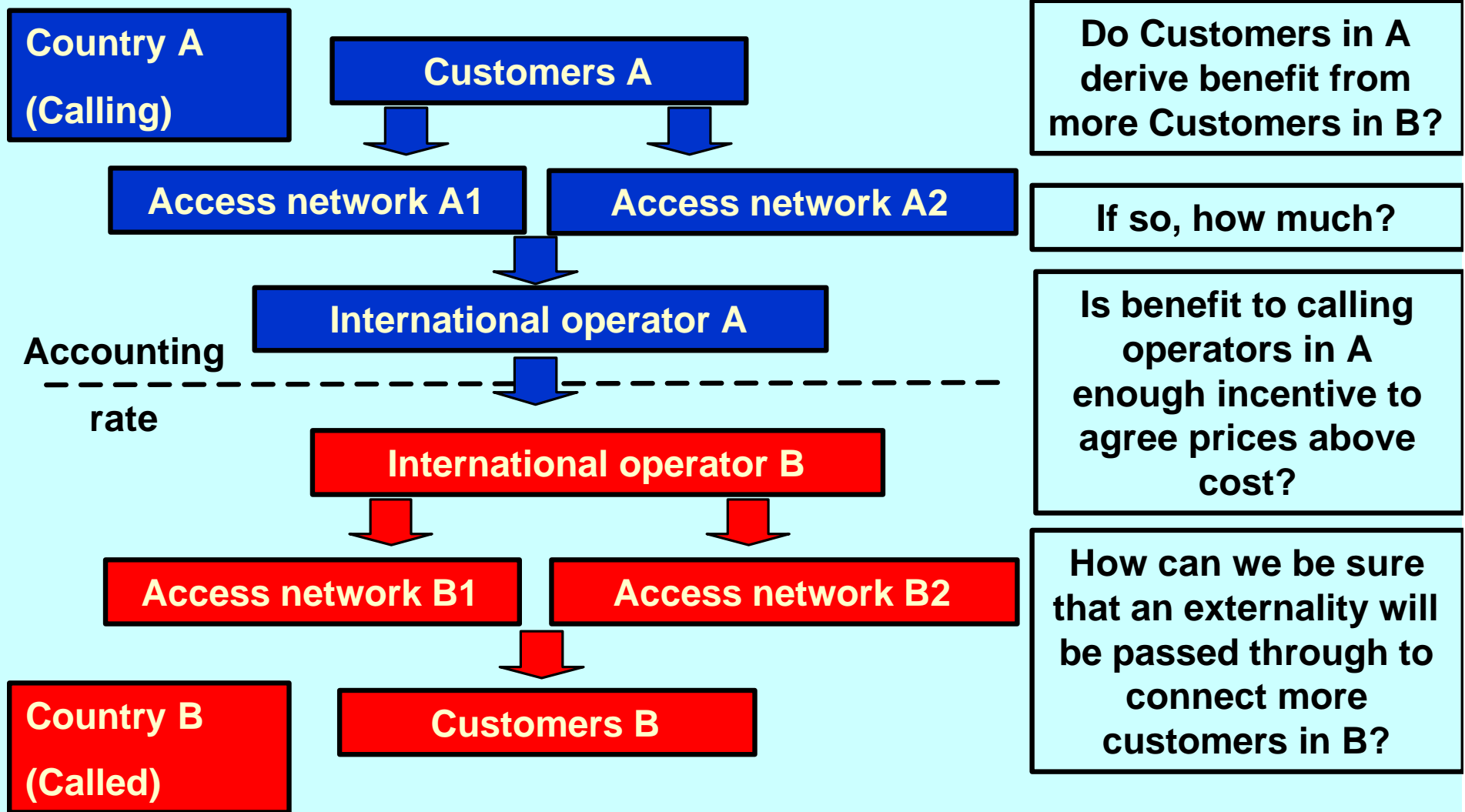


Network Externality

- **Universal Service Obligation Fund = Cross Subsidy**
 - **Not recognized as cost**
- **Network externality = 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**

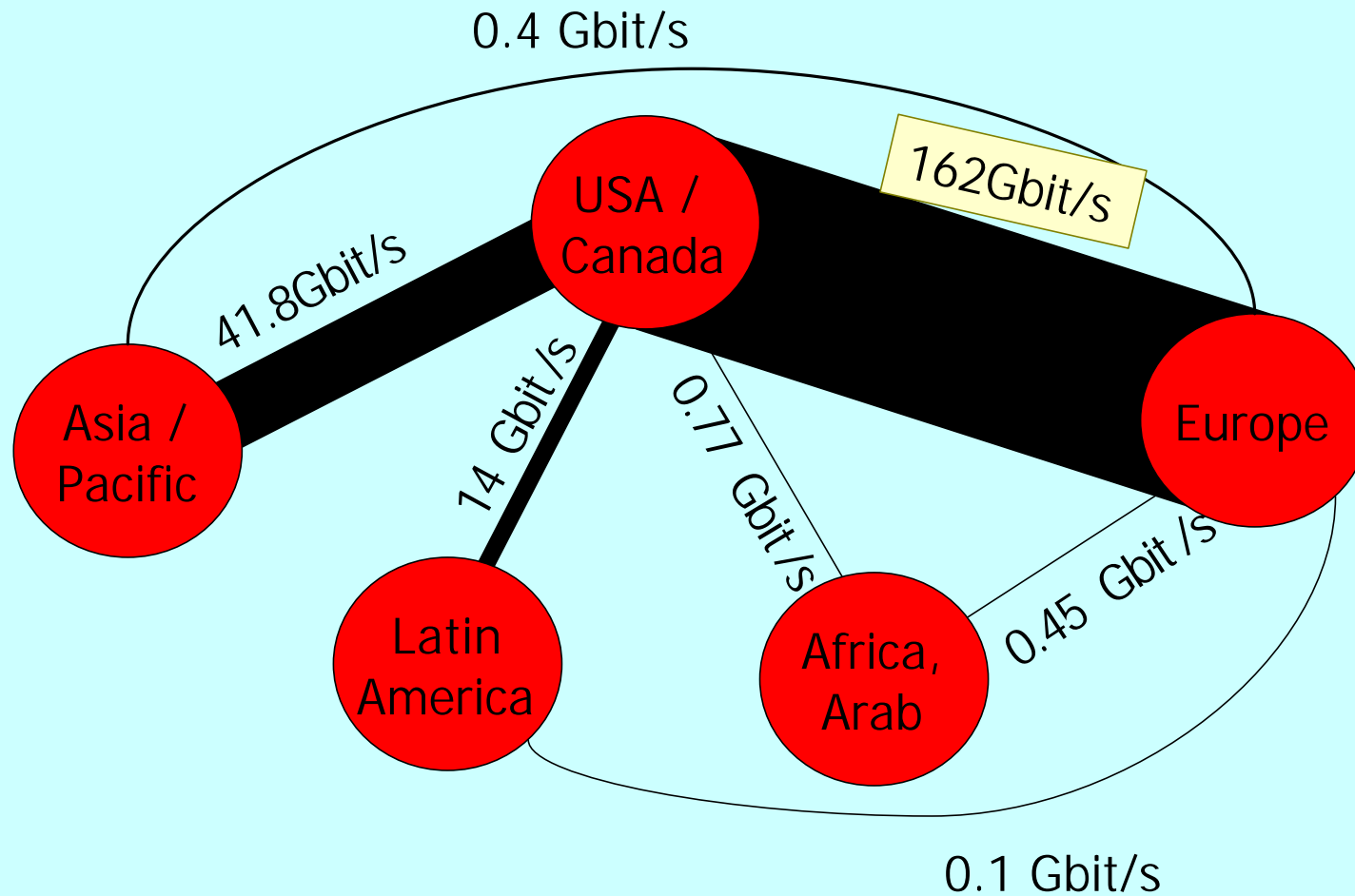


International externalities





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**