

The rise of Voice Over Internet Protocol (VoIP)

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**ICT TRENDS AND CHALLENGES IN A
GLOBAL ERA**

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Agenda: The rise of VoIP

- **What is VoIP?**
 - **Definitions**
 - **How big is the market?**
 - **“Third coming” of Voice over IP (Skype, Vonage)**
- **VoIP around the world**
 - **Where it's legal, where it's tolerated**
 - **Regulatory conundrums**
- **Technology trends**
 - **Where will we be in 5 years' time?**
 - **Mini case study: Japan**

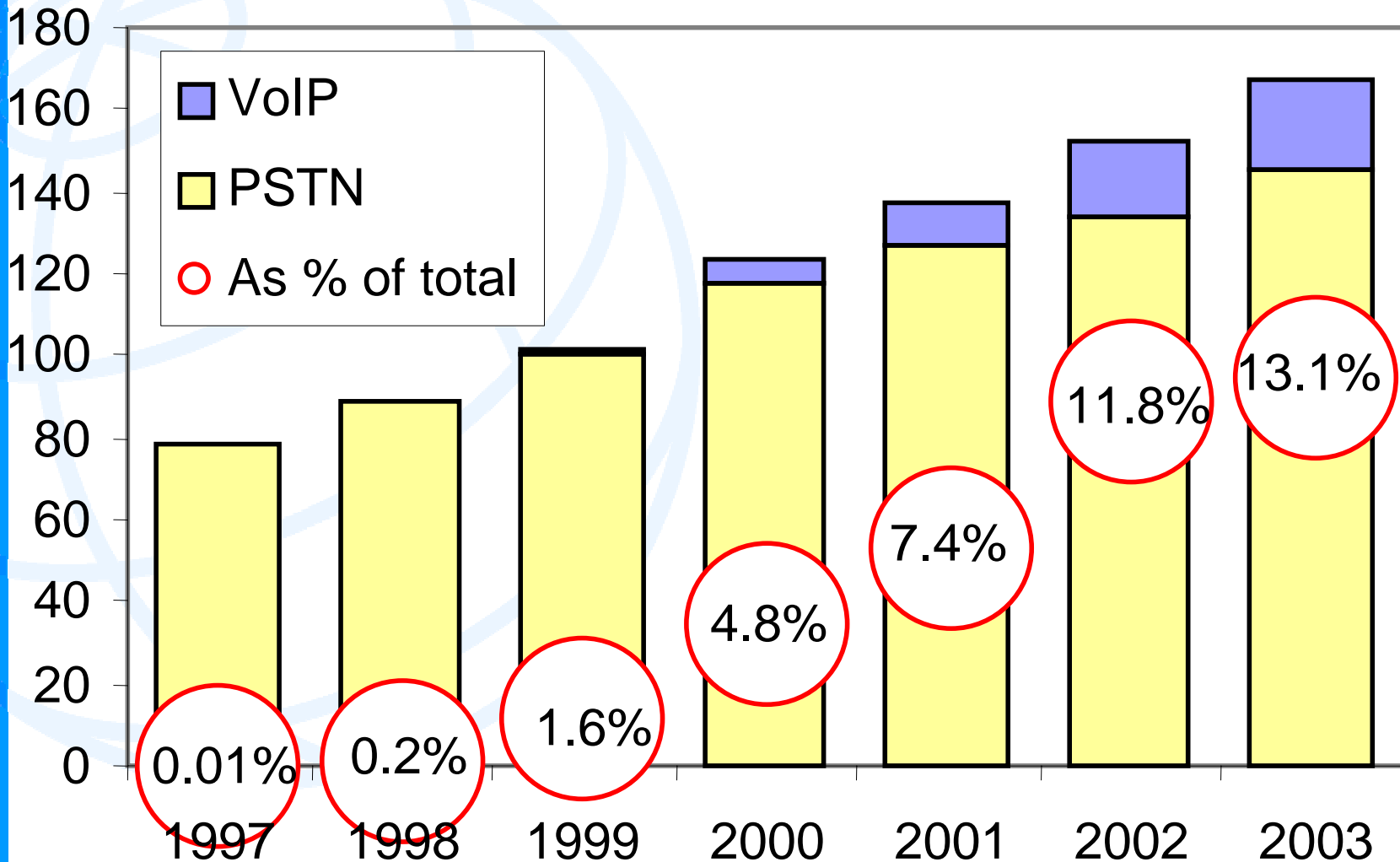


VoIP: What is it?

- **VoIP (or IP Telephony) is a generic term describing voice or fax carried over IP-based networks, such as the Internet.**
- **IP Telephony is important:**
 - **In the short-term, because it cuts the cost of calls, especially if routed over the public Internet**
 - **In the longer-term, because telecoms carriers are migrating their separate voice and data networks to converged IP-based networks**
- **Examples of IP Telephony Service Providers include Skype, Vonage, Net2Phone etc.**



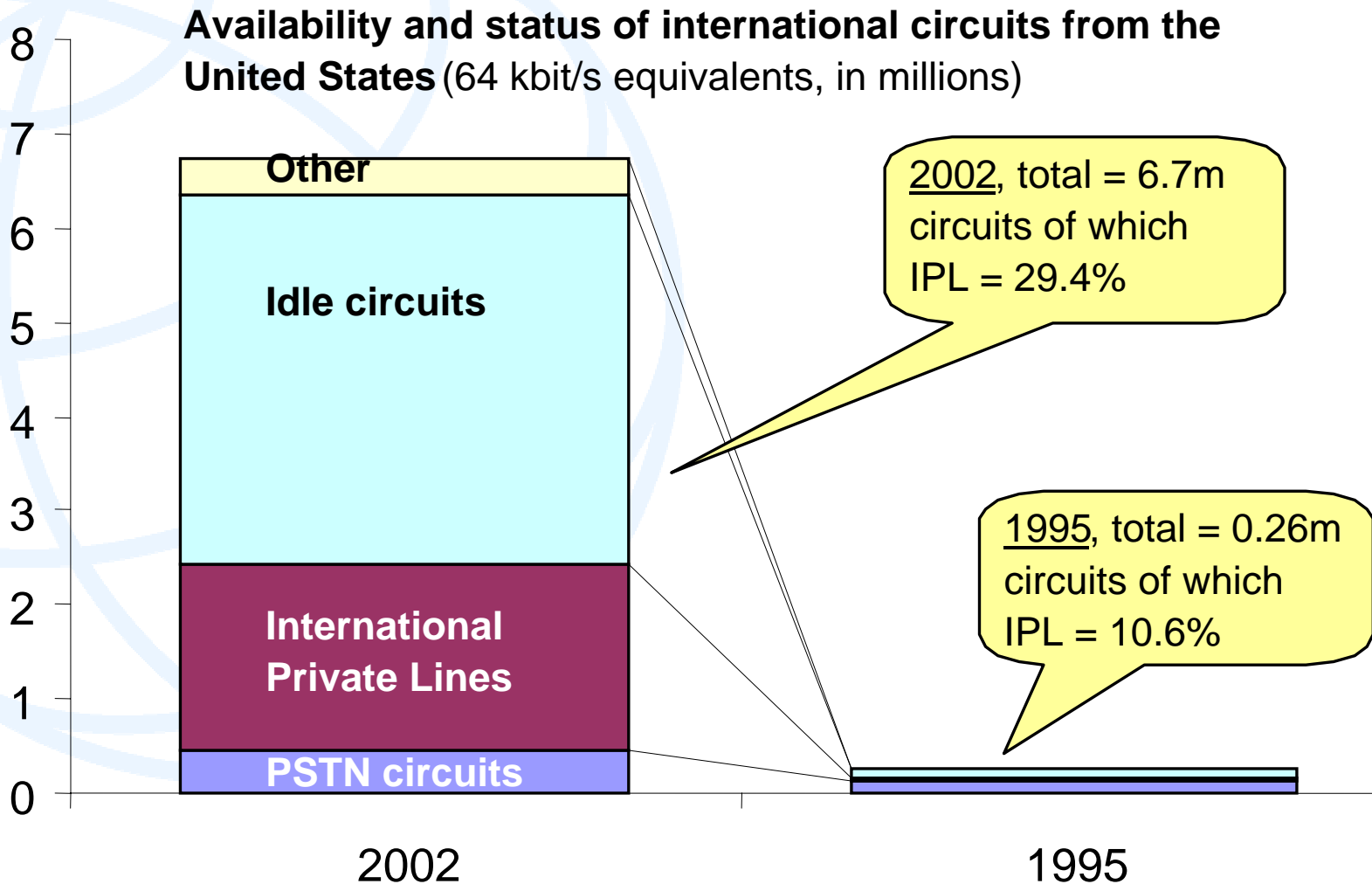
International voice traffic (in billions of minutes)





Changing mix of int'l circuits

Rise of international private lines

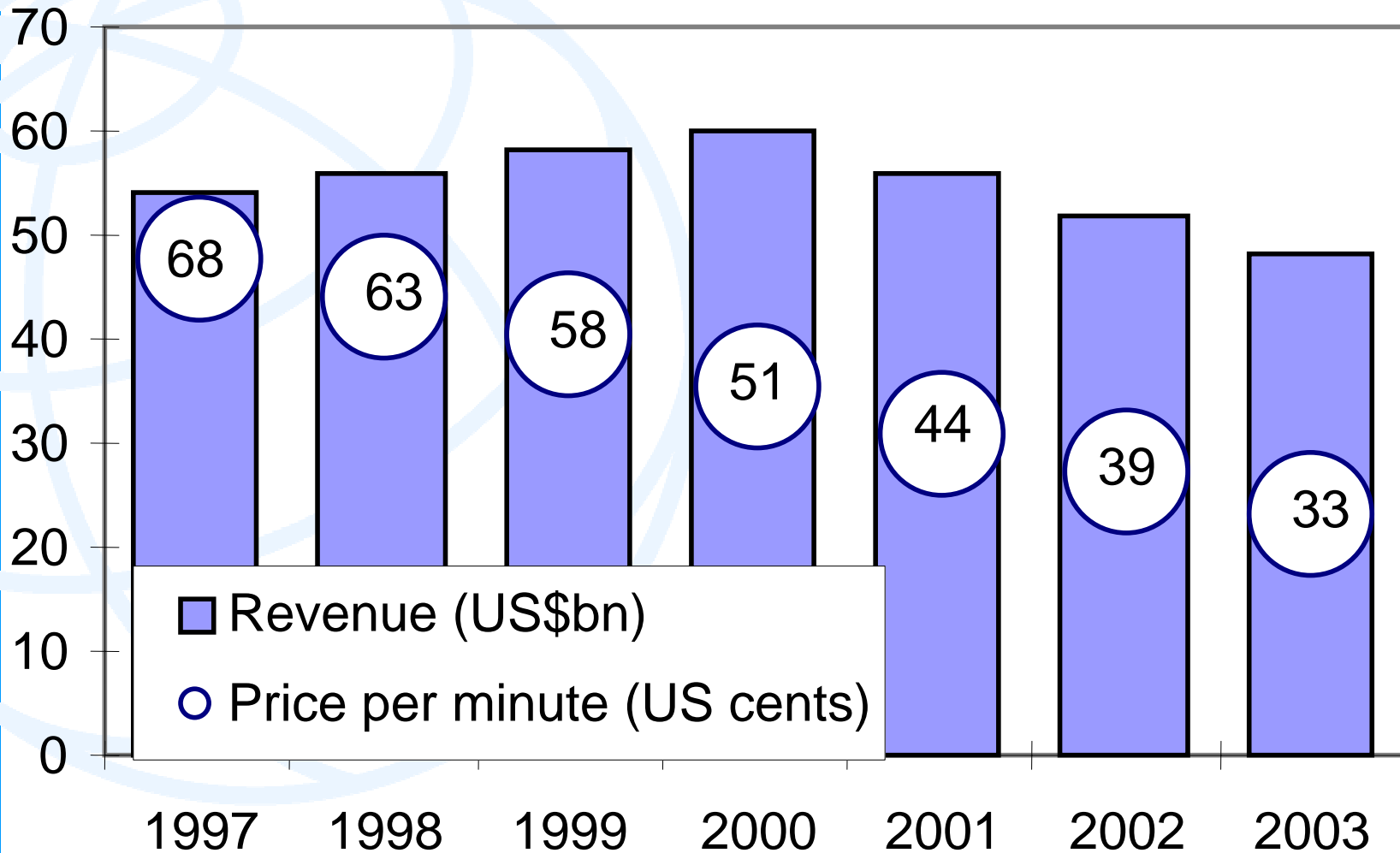


Source: ITU, adapted from FCC Circuit Status Report.



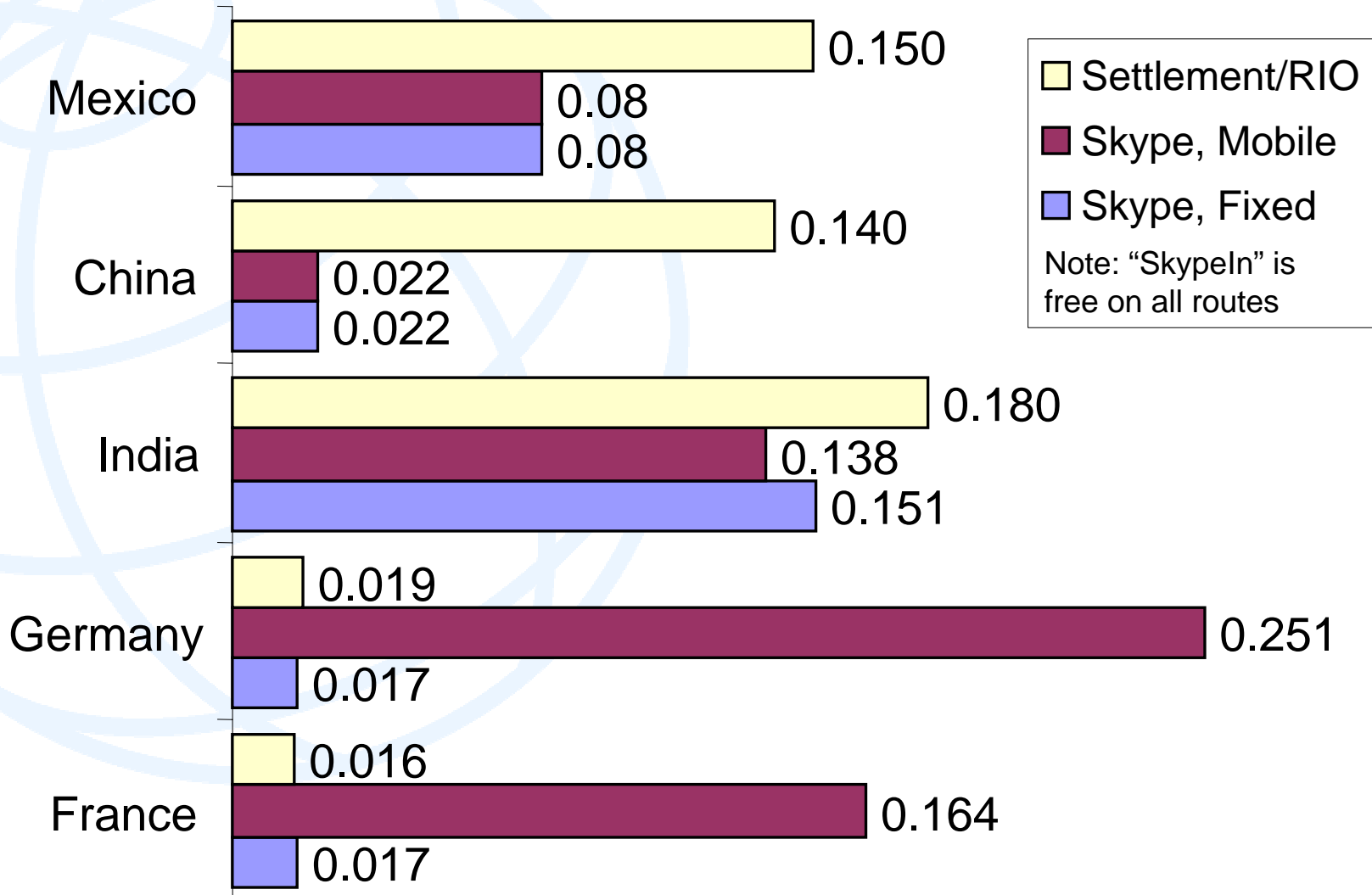
International voice traffic trends

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





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 (RIO) is for double tandem.

Source: Skype, FCC, Analysys.



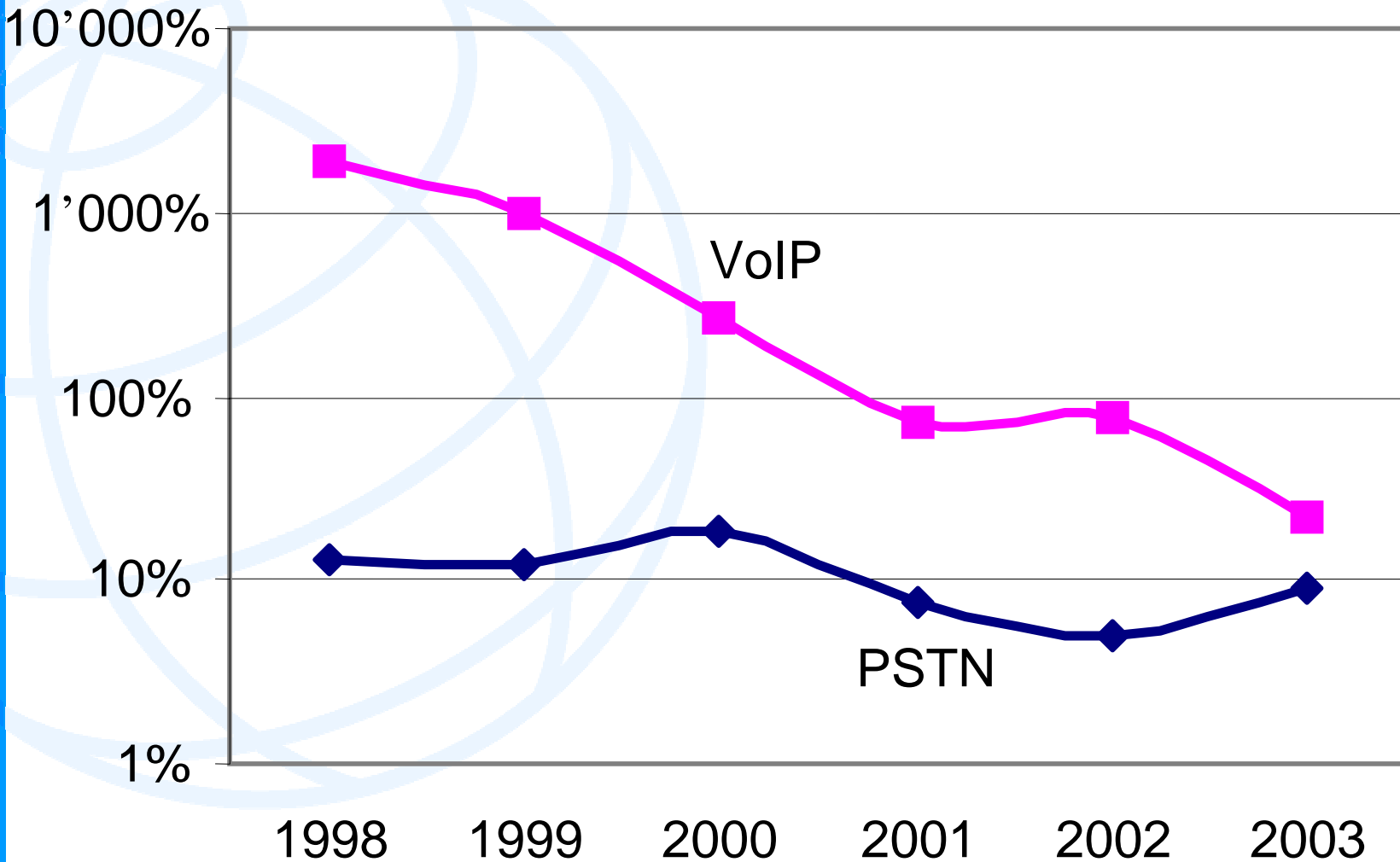
The “third coming” of IP Telephony

- **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

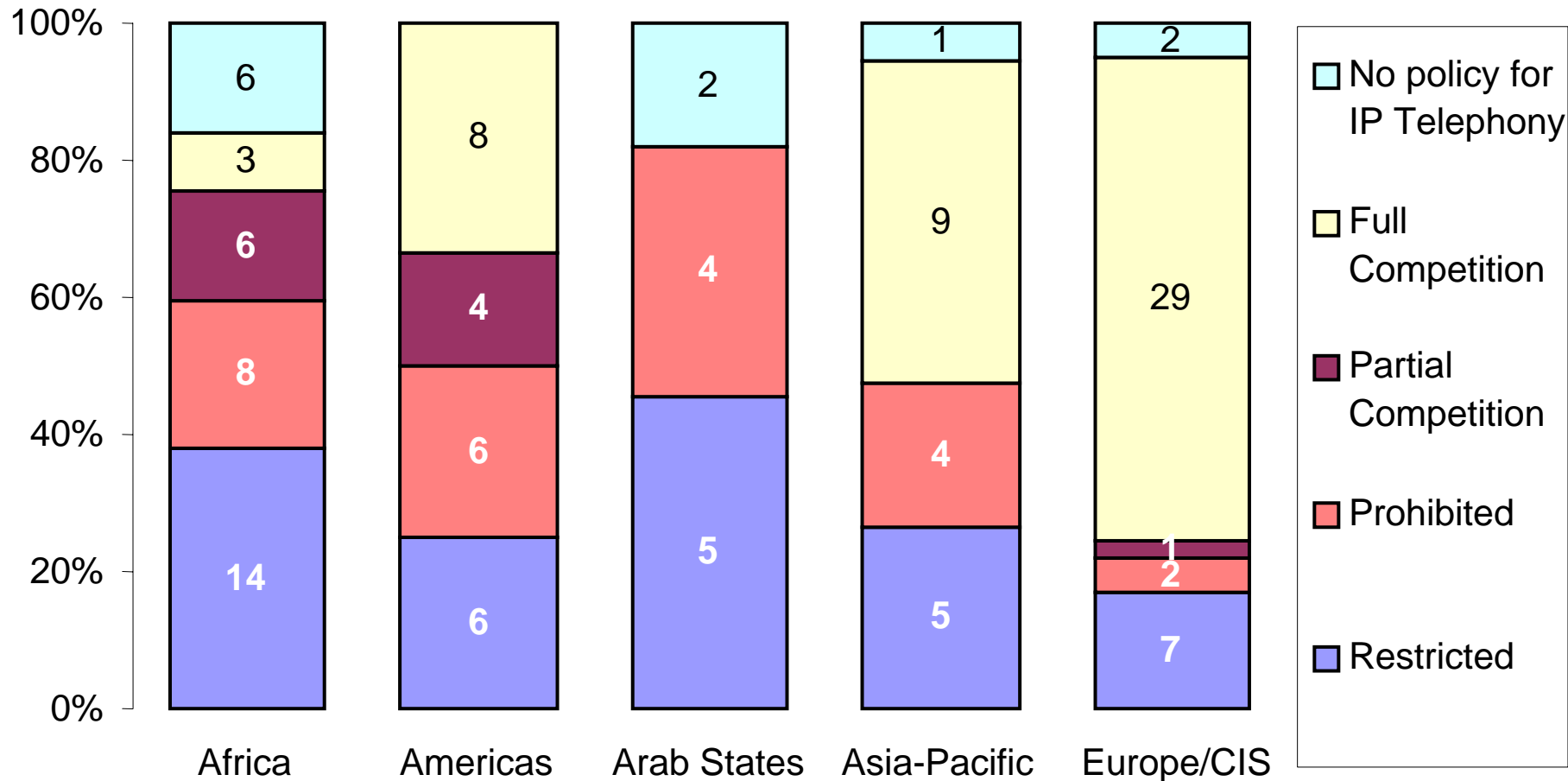
International voice traffic, in %



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

Regulatory status of IP Telephony

By region, 2004



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



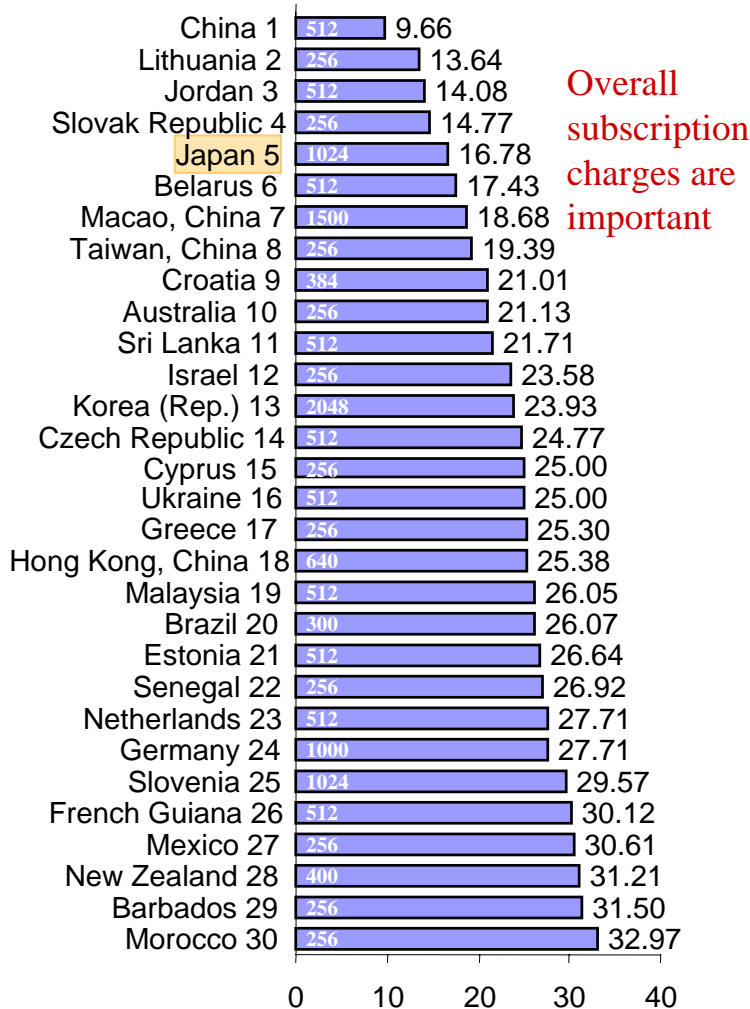
Mini case study: IP Telephony in Japan

- **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.**

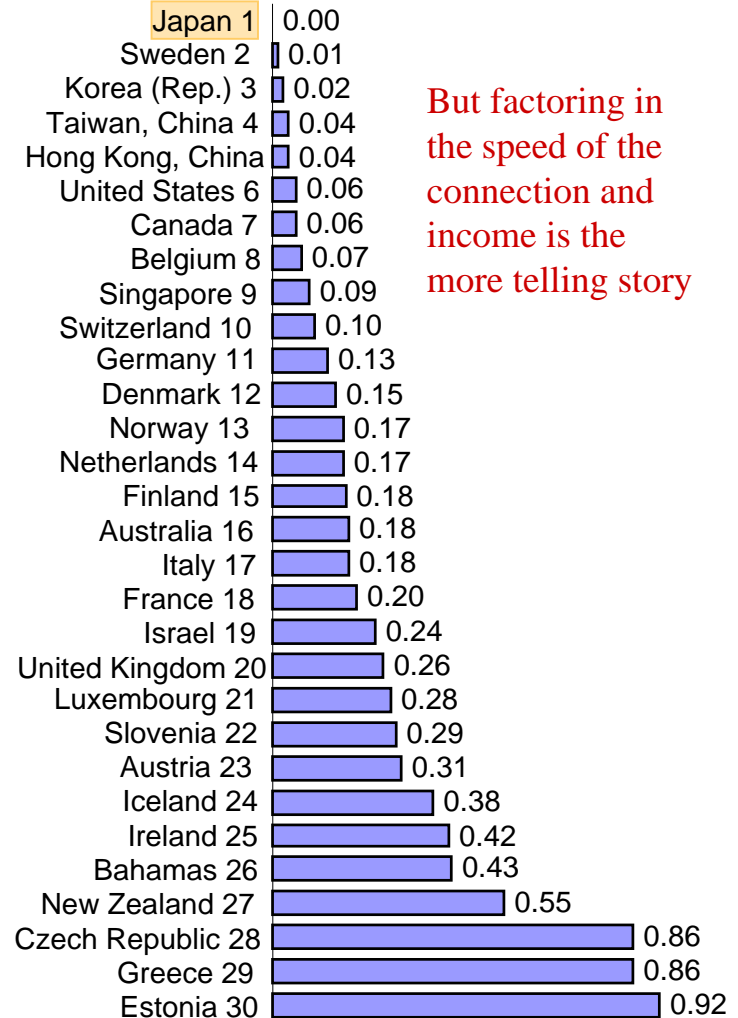


Japanese broadband prices are among the lowest in the world

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



Cost 100 kbit/s as % of monthly income



Source: ITU Internet Reports 2004: The Portable Internet.



Conclusions

- **VoIP is becoming increasingly popular with users as a way of reducing call prices**
- **VoIP is becoming increasingly popular with operators as a way of reducing costs, integrating with data services and reducing inter-operators interconnect**
- **Major new issues: VoIP over broadband and over mobile; location-independent numbering**
- **Regulators face tough challenges to maintain stance of technological neutrality and to remain one step ahead of the market**