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# **Communications Regulatory Agency Symposium**

## **Influence of Liberalization of IP Telephony on the Telecommunication Market in Bosnia & Hercegovina**

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# Presentation Content

- ◆ **Technical variants and “flavors” of VoP**
- ◆ **IP telephony: an ITU/global perspective**
- ◆ **The EU approach**
- ◆ **Regulation in Central/Eastern Europe**
- ◆ **Regulatory concerns**
- ◆ **Economic aspects**
- ◆ **Options & solutions**



# INTERNET TELEPHONY



# Different histories complicate convergence

## **Internet...**

Developed as lightly-regulated, highly competitive market of privately-owned access firms

## **Fixed telephony...**

Developed as state-owned, regulated monopoly

But in most countries telcos are being reorganized for market competition & privatization

Where this restructuring preceded the Internet's rise, IP telephony is not seen as a threat.



# Economic differences complicate convergence

## Fixed telephony...

- Customers pay regulated tariffs that reflect pricing policies more than physical costs
- Price depends on duration & distance spanned by call
- International settlements

## Internet...

- End-user prices based on competition, ISP's real costs
- Monthly or hourly rates, distance insensitive
- Private “peering” arrangements outside the settlements process
- *Dial-up users pay for **both** Internet access & local telephone service*



# What drives convergence despite the differences?

## From the Internet side:

- Openness & flexibility of Internet Protocol
  - *Can deliver almost any content, including voice*
- As more bandwidth is installed, proportion of multi-media content increases, relative to text
- Economic opportunity for underselling telco service - created by long-distance phonecalls being so overpriced



# What drives convergence despite the differences?

## From the telephone side:

### ◆ *Changing Demand*

- Demand for local and international fixed voice service is flat or declining...
- Demand for data transport growing rapidly
  - Many phone systems now carry more IP data than voice



# What drives convergence despite the differences?

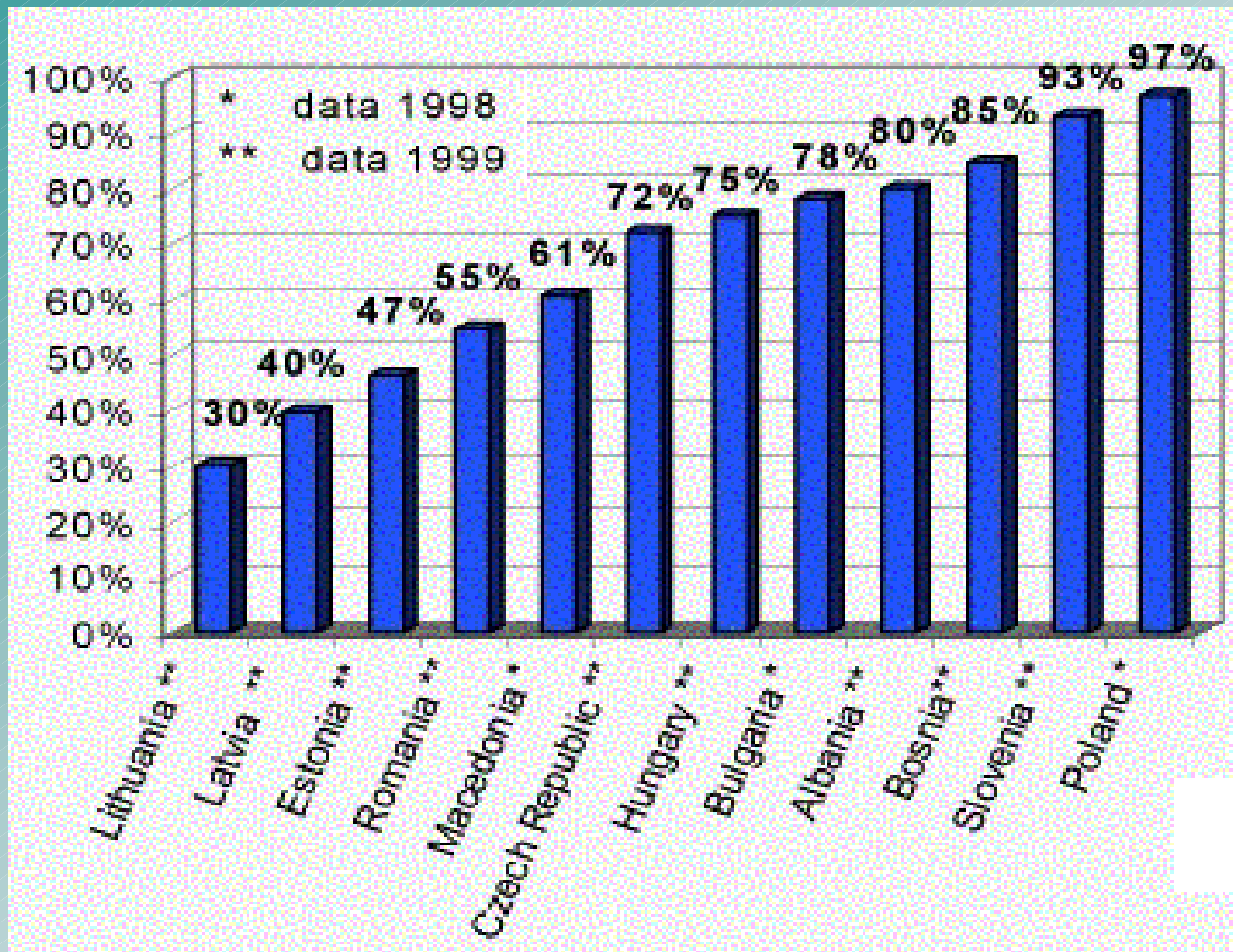
## From the telephone side:

### ◆ *Digitalization*

- Packet-switching equipment is cheaper & more versatile than circuit-switching equipment
- Technicians with packet-switching experience now more plentiful than in circuit-switching



# Network Digitalization (1999)



**Source: European Survey of the Information Society (2000)**



# Regulatory Issues

## **License, authorize, register, prohibit, ignore?**

If licensed, should it be service- or facilities-based?

If prohibited, what exactly is prohibited?

- Fax over IP? How is that different from sending a PDF file?

## **Definitions**

Is IP Telephony “voice” or “data”?

- Was key issue, less important as all telephony “goes digital”

What is “real-time”?

- This now the key issue

Monopoly vs. competitive telecommunication services



# Regulatory Issues

If IP telephony allowed, regulators may need to consider providers' rights...

- To interconnect with local loop and other “essential facilities” like international leased lines
- To assign phone numbers to customers
- To list assigned numbers in national/local directory services

Encouraging *domestic* IP telephony could be a cheaper/faster way to achieve “universal access” than expanding the circuit-switched network.

- How to do that?



# Broader Regulatory Issues

Should regulation be technologically neutral (so that “functionally equivalent” services are subject to similar rules)...?

- Thus distinguishing between IP telephony via phone and via PC?

...Or should regulation encourage technologies with the greatest potential value to society?



# Voice over IP (VoIP) can be...

## “Streaming audio” from websites

“Online broadcasting” or “audio publishing”

- BBC, Radio B92, reading to children or blind, etc.

## Voice E-mail

One-way, not in real-time

- VPIM = “Voice Profile for Internet Mail” (IETF)
- MIME = “Multipurpose Internet Mail Extensions”
- Important step toward “Unified Messaging”



# Voice over IP (VoIP) can be...

## Part of a multimedia protocol-suite

H.323: “Enhanced Videoconferencing”

- Developed for audio/video/text-sharing on LANs
- Now the most widely-used call-setup-and-control protocol for Internet Telephony

## ...or something like a phone-call

But VoIP requires more investment & link management than asynchronous data transfer



## **Cheaper than circuit-switched, but more expensive than non-voice**

Some incumbent telco's use VoIP to reduce their costs, without telling public

- With compression, up to 80% less bandwidth needed.
- Also reduces settlements payout.

But adequate quality of service requires more bandwidth than non-voice

- to eliminate lost packets, jitter, queuing delays.

Solution: transmit over managed, dedicated links.

- IPv.6 will help, too.



# **Related “Voice-over-Packet” (VoP) Protocols**

**Voice over Ethernet**

**Voice over ISDN**

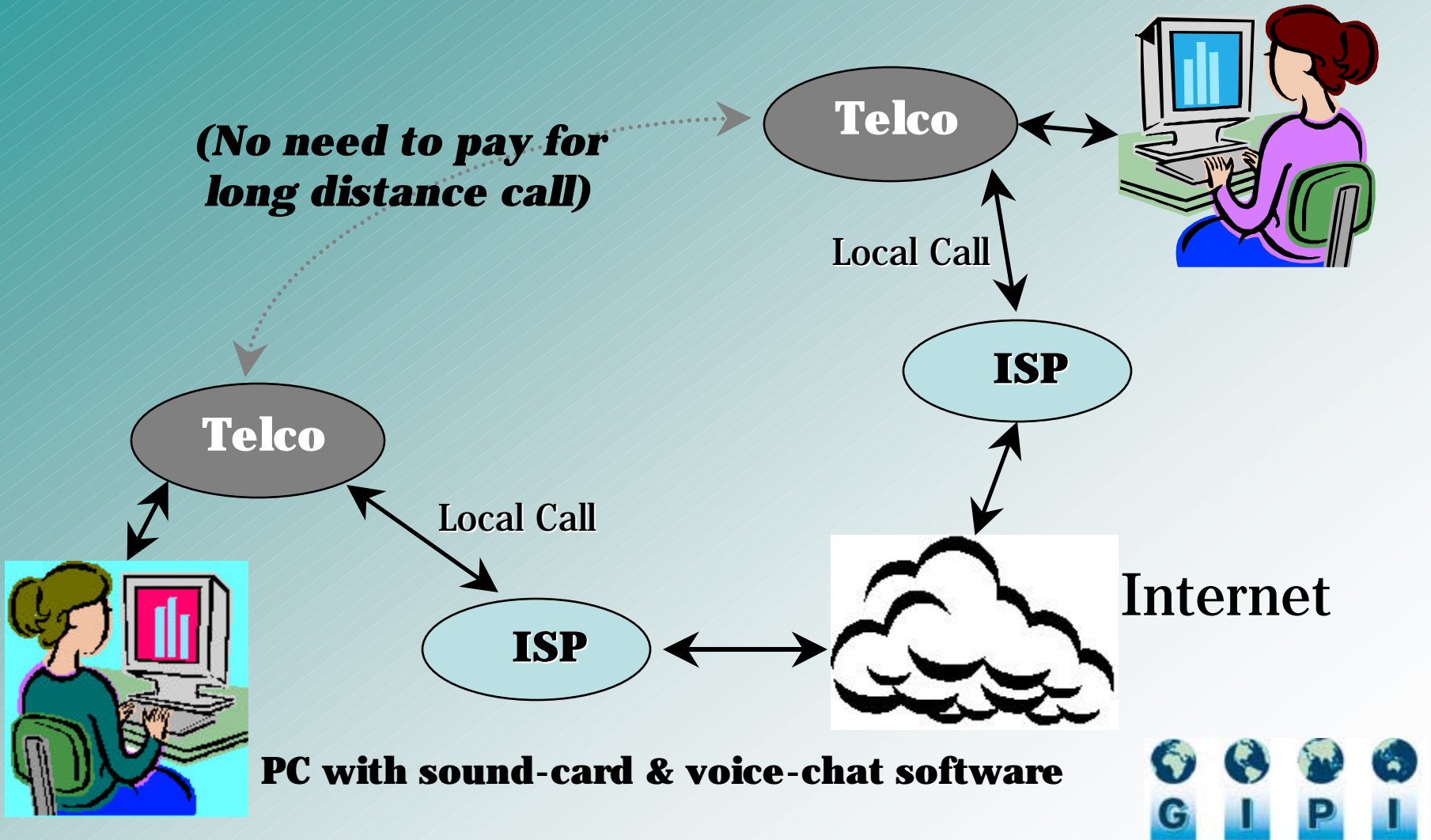
**Voice over xDSL**

**Voice over Frame Relay**

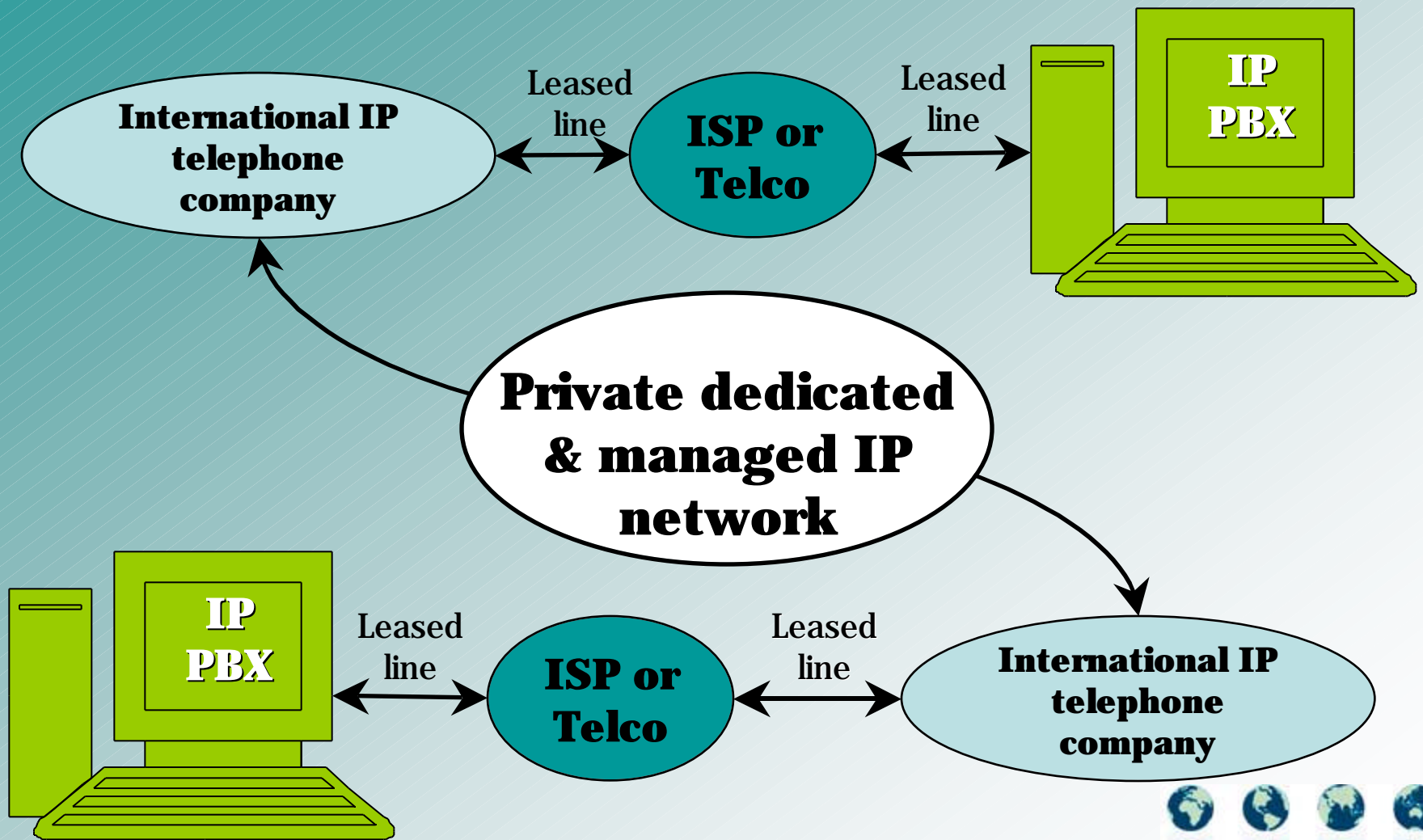
**Voice over ATM**



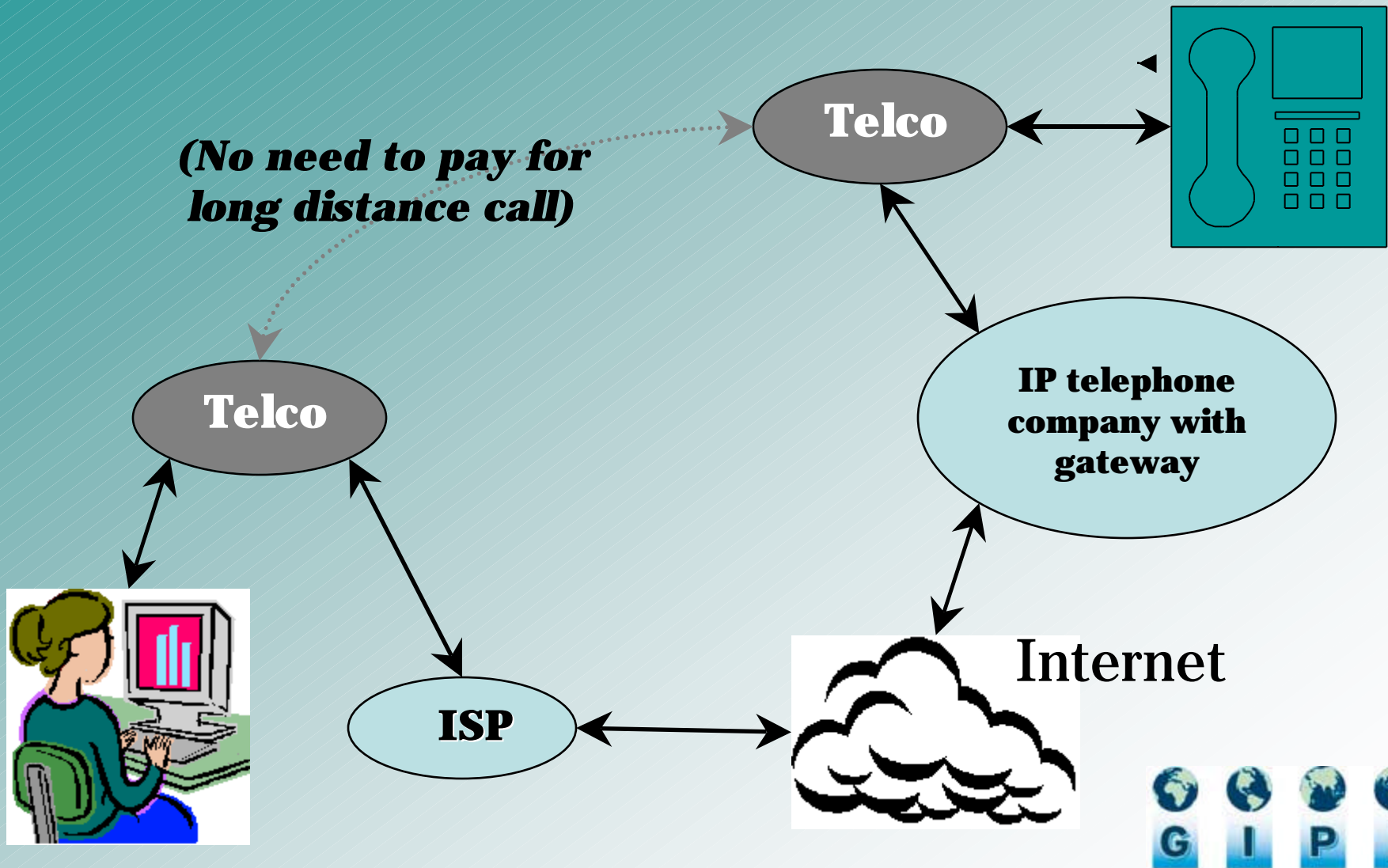
# PC-to-PC voice communication



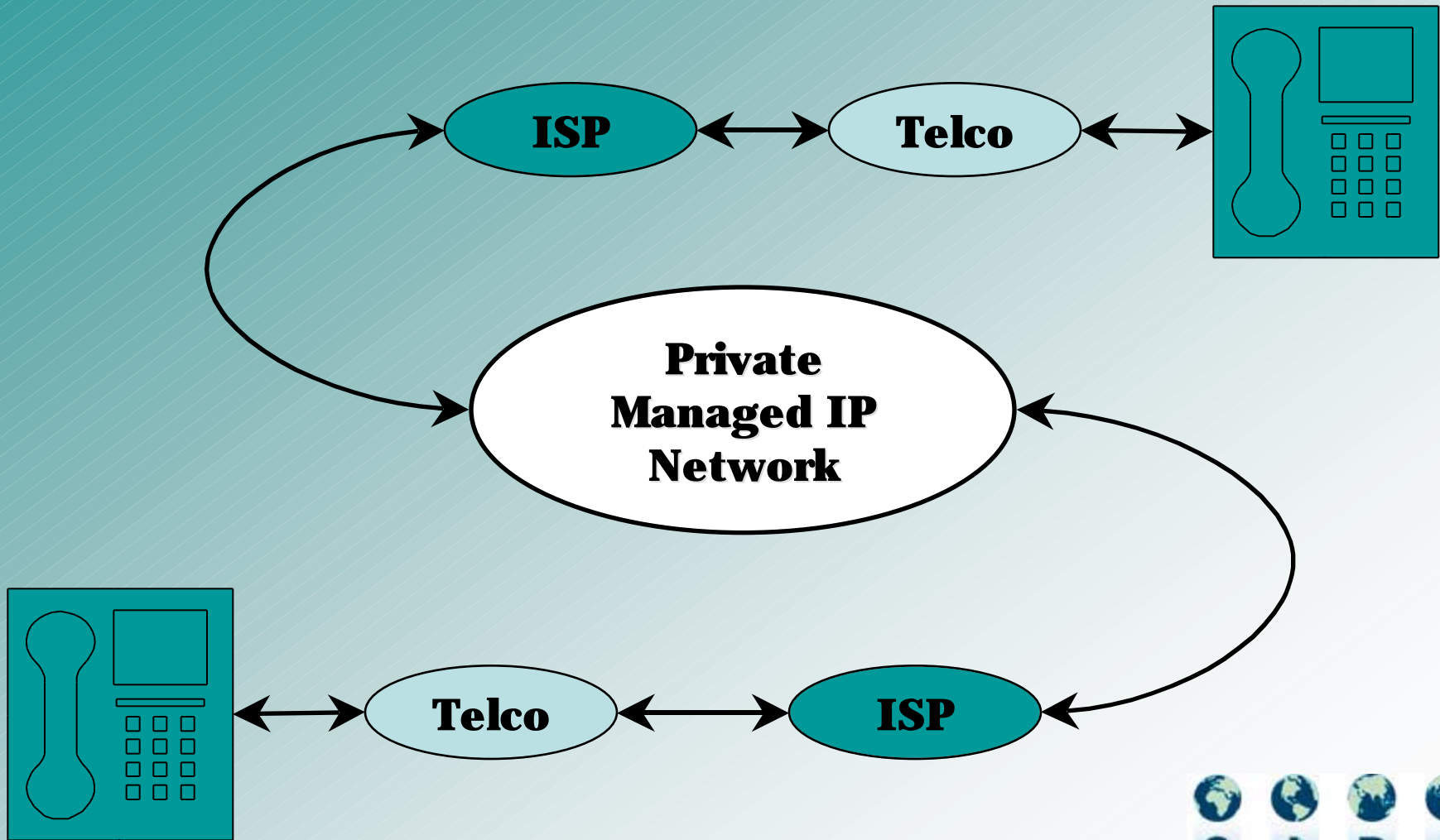
# PBX-PBX IP voice communication



# PC-to-phone voice communication



# Phone/phone IP voice communication



# 4 Stages of IP Telephony Development

## **PC-to-PC (since 1994)**

Connects PC users online simultaneously

Very cheap, good for chat, but poor audio quality & inconvenient

## **PC-to-Phone (since 1996)**

PC users use gateway to make long distance calls

Increasingly such services are “free” (e.g., Dialpad.com)

## **Phone-to-Phone (since 1997)**

Accounting rate bypass

Low-cost market entry (e.g., using calling cards)

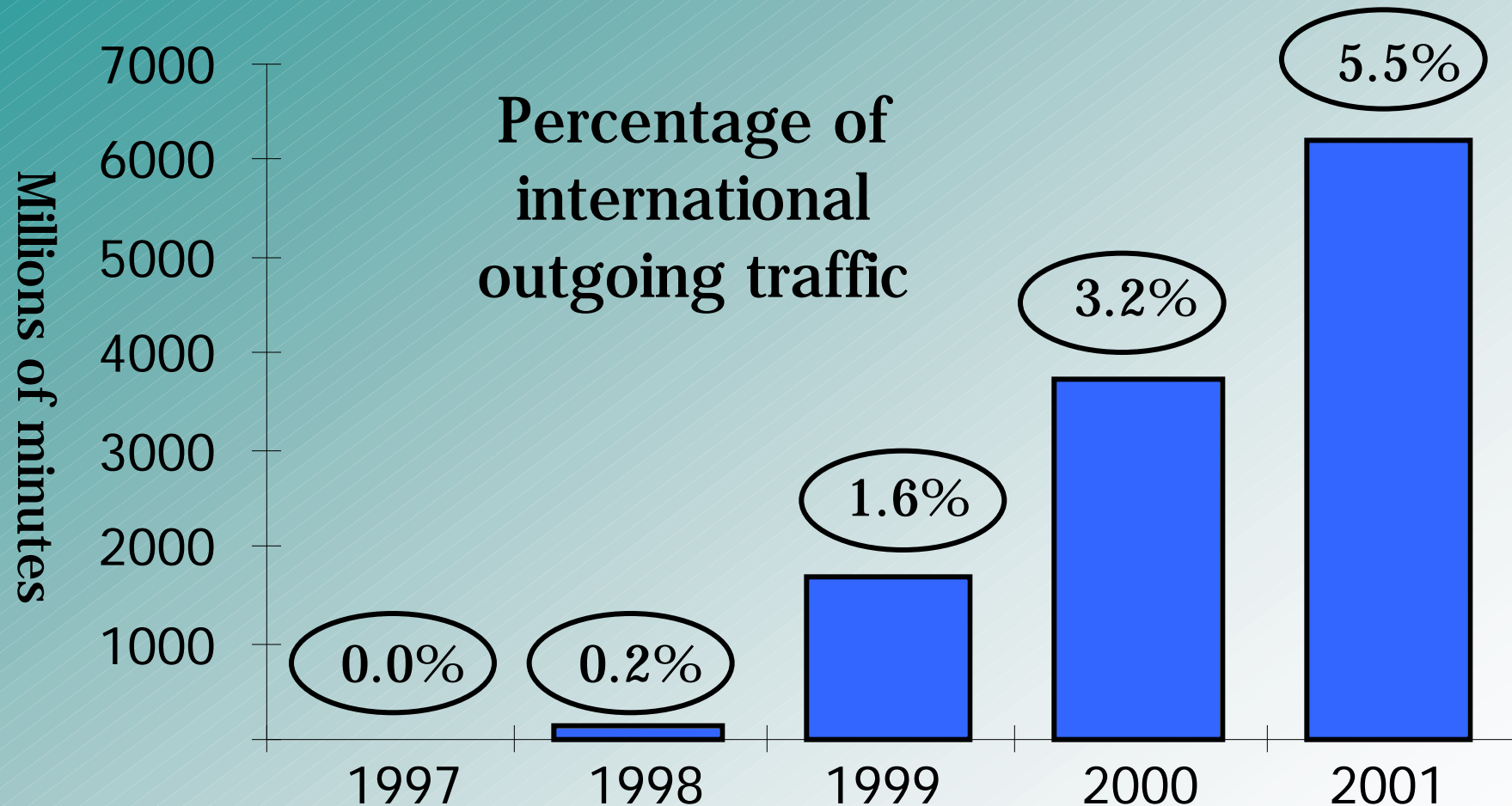
## **Voice/Web integration (since 1998)**

“Click to talk” interaction with websites & call centers

Enhanced voice services (Unified Messaging, etc.)



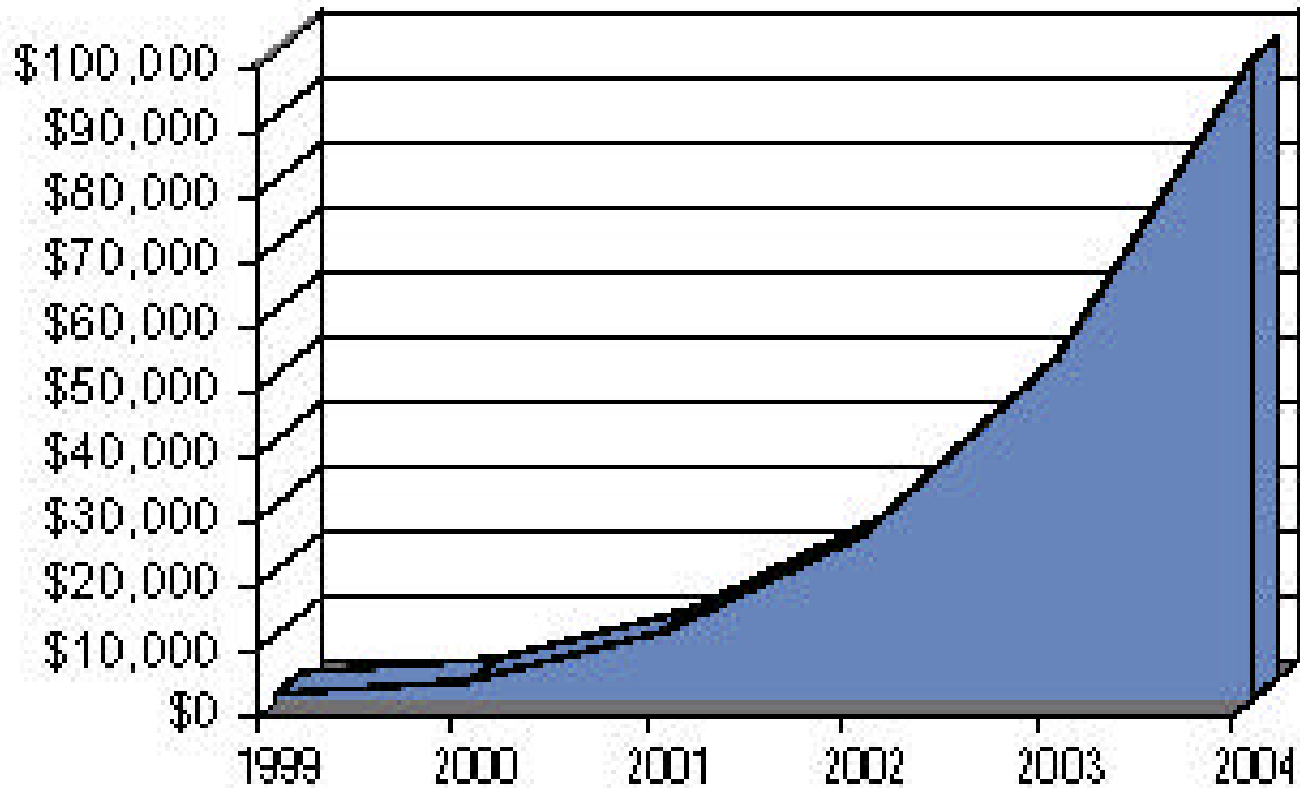
# Growth of IP Telephony traffic



**Source: ITU Internet Reports, adapted from TeleGeography Inc.**



## Total Worldwide VoP Revenue (\$Millions)



Source: "World VoIP Markets" (Frost & Sullivan, 2002)



# ITU's Position on IP Telephony

## ◆ ACTIVELY SUPPORTIVE

### Engaged in important standards activity:

- Interoperability of PSTN and IP networks
- Integrated management of voice & data transmission
- Numbering & addressing
- Signalling & routing principles

### Collaboration with IETF on implementation of ENUM protocol


- ENUM = DNS-based mapping of telephone numbers to Uniform Resource Locators (URLs) & IP addresses



# Countries either...

 do not regulate IP telephony at all.

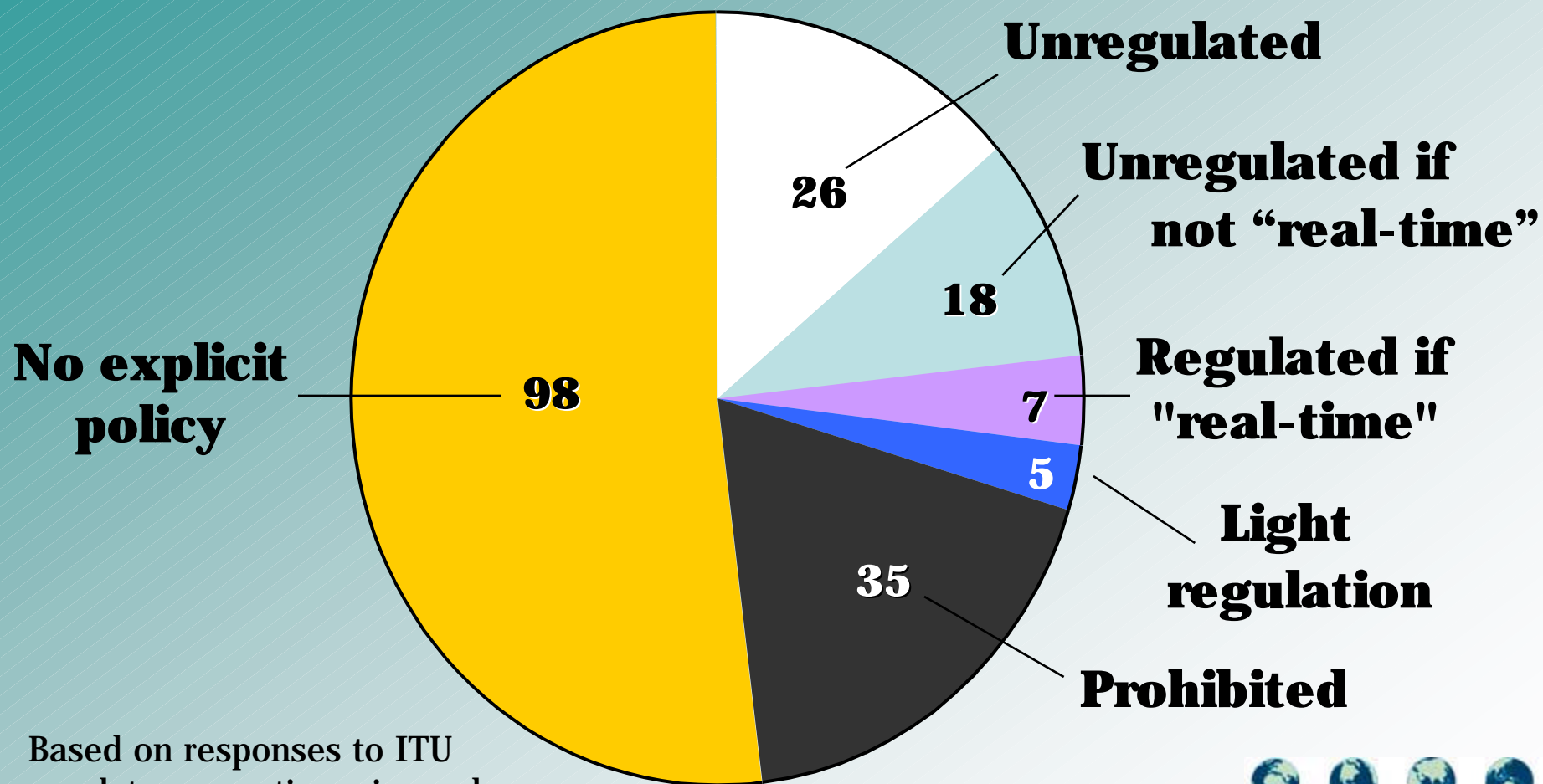
 regulate some forms of IP telephony.

 prohibit some or all forms of IP telephony.

 have not yet addressed the issue.



# IP Telephone Policies of 189 ITU Members (March 2001)



Based on responses to ITU regulatory questionnaire and inputs to WTPF-01



# 31 Countries that Ban Internet Telephony

Azerbaijan	Bahrain	Belize	Botswana
Burundi	Cambodia	Cameroon	Cote d'Ivoire
Croatia	Cuba	Eritrea	Ethiopia
Gabon	Jordan	Macedonia	Mauritius
Mozambique	Myanmar	Nicaragua	Nigeria
Pakistan	Panama	Paraguay	Qatar
Senegal	Swaziland	Thailand	Togo
Turkey	Trinidad & Tobago	Togo	



# The Prohibiting Countries

Mostly places where fixed telephony is still a state-owned monopoly

Primarily in Africa & Central America

Total number of prohibiting countries is decreasing:

Between 1999 & 2001, 8 countries that prohibited IP telephony began to allow it within limits



**“Prohibited  
but  
Prevalent”**



# Reasons cited for allowing IP telephony

- ◆ Encourage emerging technologies
- ◆ Encourage migration to IP-based networks
- ◆ Give public more freedom of choice
- ◆ Push down long-distance prices to benefit consumers & stimulate trade
- ◆ Uncertain about how best to regulate this rapidly evolving technology



# Reasons cited for prohibiting IP telephony

- ◆ Internet access is generally discouraged
- ◆ Not enough international IP bandwidth for voice
- ◆ Incumbent's license prevents new market entrants from offering such services
- ◆ To protect PSTN monopoly from competition & loss of revenue



## **From the ITU Secretary-General's Final Report on IP Telephony (2001):**



“Some Member States have chosen to promote the Internet for text and data services, but not for voice. Their objective may be to protect the incumbent operators from potential competition. The risk in such an approach however, lies in the fact that those operators may be ill-prepared for operating in the future global environment.”



# Transmission delays for telephony

ITU-T Recommendation G.114 (rev. 2.96):

0-150 milliseconds = acceptable for most user applications

150-400 milliseconds = some user applications may be degraded

>400 milliseconds = generally unacceptable

Regulators using time-delay to distinguish between IP telephony/VoIP and traditional telephony mostly use *250 milliseconds* as the boundary.



# The EU Approach

Regulatory Framework for Electronic Communication Services issued last April

4 tests determine whether an Internet voice communication is “voice telephony.”

- Answer “yes” to all 4 tests or it is *not telephony*



# 1) Is it the subject of a commercial offer?

If offered free of charge, it is not telephony

If a PC user installs PC-to-PC voice-calling software on his own initiative, it is not telephony.

Advertising is a commercial offer.

But EU seems to “raise the threshold” by noting that “telephony” is using an IP network for voice in “a decisive drive for Internet subscribers...”

- Suggests that an *incidental* offer of VoIP service might not be considered “telephony.”



## **2) Is the communication provided for the public?**

Networks not offered for public use cannot be engaged in telephony even if they carry real-time switched voice.

- Office LANs, private user groups, etc.



### **3) Does the communication connect two public switched network termination points on the fixed telephone network?**

*Supplement to Directive 90/388/EEC:*

“If access to the Internet is obtained via *leased circuits*, the service could never be considered as voice telephony, even if the call terminates on the public switched network.”



## 3) continued...

*Supplement to Directive 90/388/EEC:*

“If the Internet user can only call other Internet subscribers whose computers are connected via a modem and who are using similar software, then this is also not ‘voice telephony’...”



## **4) Does the communication involve direct transport & switching of speech in real time?**

This is open to different interpretations:

- Does processing (compression, protocol conversion) put VoIP outside the category of “direct transport”?
- What is the definition of “real time”?



# IP Telephony in Central/Eastern Europe

Only the former Yugoslav republics (minus Slovenia) prohibit IP telephony as a competitive service.

Starting in 2003, all other CEE countries permit it.

- But only with 250ms delay, in two countries
- Otherwise, as unregulated or licensed service.



# Albania

ISP licenses amended in 2002 to forbid “real-time” voice transmissions.

But the regulator ruled that the delays inherent in Internet traffic prevent VoIP from ever being “real-time.”

*Therefore, all types of Internet voice communication are allowed!*

AlbTelecom protesting this decision by refusing to sign interconnection contracts with ISPs that offer IP telephony.



# Bulgaria

Since May 2001, the telecom law allows ISPs to offer voice communication services with transmission delay  $>250$  milliseconds.



# Croatia

Current policy on IP telephony not known, but Hrvatski Telekom's monopoly in fixed voice telephony, international data and leased lines ends 31 December 2003.



# Czech Republic

Regulator has been issuing General Licenses (authorizations) for VoIP services since 2000.



# Estonia

Telephony fully liberalized since 1 January 2001.

More than 20 licenses issued for telephone network operation without specifying the switching technology (packet or circuit).



# Hungary

The regulator and Ministry of Information and Communications both declared VoIP to be “data” rather than “telephony.”

Therefore VoIP services can be offered competitively.

Some 45 licensed VoIP service providers operate now in Hungary.



# Latvia

Some ISPs & GSM operators have offered VoIP services for years without authorization

- It was unclear whether LatTelecom's monopoly covered VoIP.

New telecom law ends LatTelecom's fixed voice monopoly on 1 January 2003.

Legality of IP telephony is certain from then, though regulatory conditions not yet decided.



# Lithuania

Some ISPs offer VoIP without specific authorization.

– 1998 telecom law did not address this issue

Lietuvos Telekomas' monopoly ends on 31 December 2002.

As in Latvia, legality of Internet telephony will be certain then but regulatory conditions not yet known.



# Macedonia

Telecom law gives MakTel a monopoly on “all forms of public telecommunication” until 1 January 2005.

ISPs only resell access to MakTel’s infrastructure.



# Poland

Communications ministry decided in 2000 that “VoIP” is not “telephony” so VoIP services don’t need a phone license.

More recently, the regulator dismissed the term “VoIP” as “jargon.”

VoIP providers now supposed to declare “data transmission” as their service offering when registering.

– No license or authorization needed for that.



# Romania

Until the end of 2002, VoIP supposed to be offered only to “closed user groups.”

But that term quite elastic: it could mean all the customers of a GSM operator.

Since last May, national hydroelectric company offers Voice over Frame Relay in competition with Rom Telecom.

Most telecom sectors liberalized already.

- Competition in the two final sectors – voice telephony and leased lines – begins 1 January 2003.



# Slovakia

Voice communication via Internet treated as a “data service” – and thus allowed – if transmission delay is  $>250$  milliseconds.



# Slovenia

Internet Telephony is a licensed service – distinct from Internet access – with its own area code for interconnection with Telekom Slovenije.



# Serbia

Sale contract of 49% of Telekom Srbija in 1997 gave them a monopoly in PSTN operation until 2005.

Yet they claim monopoly over *all* fixed telecoms.

Starting last June, TS blocked net access of all ISPs offering VoIP. Courts ordered service restored, but TS refused.

In September, telecom ministry said it was legal for ISPs to offer VoIP. TS still refuses to accept that.

TS and the ministry have filed criminal charges against each other...



## BiH Telecom Sector Policy (2001)

“In order to promote the use of the Internet and to remove constraints on efficient business communications, it is recommended that data communication services be liberalised and existing operators be deterred from abusing their monopoly positions... The proposed liberalisation *excludes the commercial provision of IP telephony...*”



# Regulatory Concerns

Regulating VoIP could embroil the CRA in specifying what software can and cannot be used by Internetters and what Internet content is permissible.

– Voice is the content of IP datagrams.

Enforcement might require monitoring by humans to determine if VoIP transmission is a recording, broadcast, synthetic speech or real-time conversation.



# Main Concern

IP telephony may reduce the incumbent telcos' income from international calling

- Their profits contribute significantly to public budget

But long-distance calling already in a down-trend, even without competing services

- Tariff re-balancing also likely in near future as competition begins & BiH adopts “best practices” in accounting & rate-setting



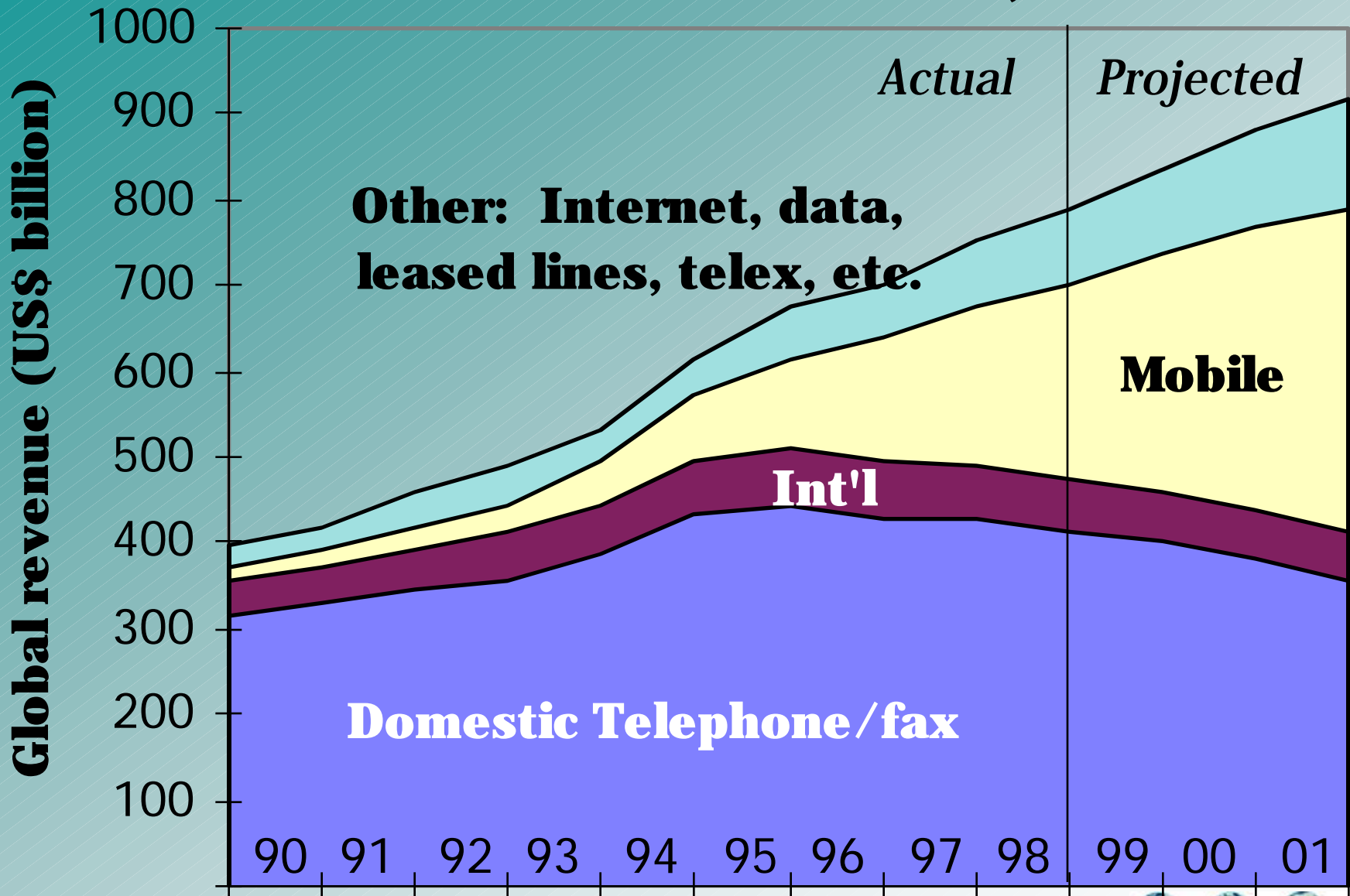
# Economic Impact of IP Telephony

Depends on:

- Quality of service
- How much telco revenue comes from long-distance and international calling
- Per-minute price-spread between international & local calls
  - If spread is narrow, international IP telephony is less attractive to customers, while telco earns from gain in local traffic for accessing ITP providers



# Telco Revenue Sources, 1990-2002



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



# BiH's Worsening Economy

	<u>2000</u>	<u>2001</u>
<b>Current Account Deficit</b>	\$918 million	\$1,006 million
<b>Current Account as % of GDP</b>	-20.4%	-22.2%
<b>Reconstruction Aid</b>	\$582 million	\$517 million
<b>Net Foreign Direct Investment</b>	\$150 million	\$130 million

*IMF Data*



# Shift from “win/lose” to “win/win” thinking

Protecting telco profits so they can contribute to the state budget is just moving money from one domestic pocket to another.

What BiH needs is to attract more *foreign* trade & investment – to draw money *into* the country.

Reducing international phone costs could help.

Then, increasing GDP should increase total call-minutes, benefitting the telcos.



**If CRA bans Internet telephony to  
protect Telekom BH's income,  
should e-mail be banned  
to protect BH Posta?**



# Regulatory Solutions

Allow telecom carriers to offer both monopoly and competitive services

But only through separate corporate entities (structural separation), and with the regulator setting rules for allocating the shared costs and for ensuring equal access to monopoly facilities and services.



# Regulatory Solutions

“Unbundle” access to the “local loop”

As required by the EU’s Communications Framework Policy

If IP telephone providers are licensed, their license should allow carriage of multi-media content

- Otherwise, investment in new domestic network facilities might not make economic sense



# Regulatory Solutions

Distinguish between IP telephone *applications* (end-user software) & IP telephone *services*

- Software should not be subject to CRA regulation

Let mobile operators use IP telephony to route international calls

- Mobile users already pay more than fixed customers for local calling



# Regulatory Solutions

If the concern is that ITSPs harm the public by reducing the incumbent telcos' profits, then perhaps “functionally equivalent” (phone-to-phone) ITSPs could be asked to contribute to a Universal Service fund, or alternatively, build networks in under-served areas.



**Thanks for listening**

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