

STUDY ON INTERNET PROTOCOL TELEPHONY

March 2004



OBJECTIVE

- **This presentation is mainly aimed at describing the principal economic, technical, and regulatory features of IP Telephony, to help the members of this Working Group to better understand the service.**



CURRENT SITUATION OF IP TELEPHONY



DEFINITION OF IP TELEPHONY



The International Telecommunication Union (ITU) defines IP Telephony as a “generic term for the provision of voice, fax, and related services, partially or totally for IP networks with packet switching. IP telephony may also include applications that use or incorporate the transmission of voice and fax signals with other media such as text and images .”[\[1\]](#)

[\[1\]](#) ITU; World Forum for Telecommunication Policy (WFTP 2001) IP Telephony.



FEATURES OF IP TELEPHONY

CONVENTIONAL TELEPHONY

- Voice, data, and video transmission
- Traffic transmitted by PSTN
- A dedicated connection
- Voice is transmitted at a rate of 64Kbps
- A foreseeable, almost imperceptible bi-directional delay

IP TELEPHONY

- Transmission of voice, data, and video
- Traffic transmitted by an IP network
- A virtual connection
- Data are divided into packets and sent to the destination address, where the packets are reassembled and resequenced
- Delays occur that in some cases are minimal

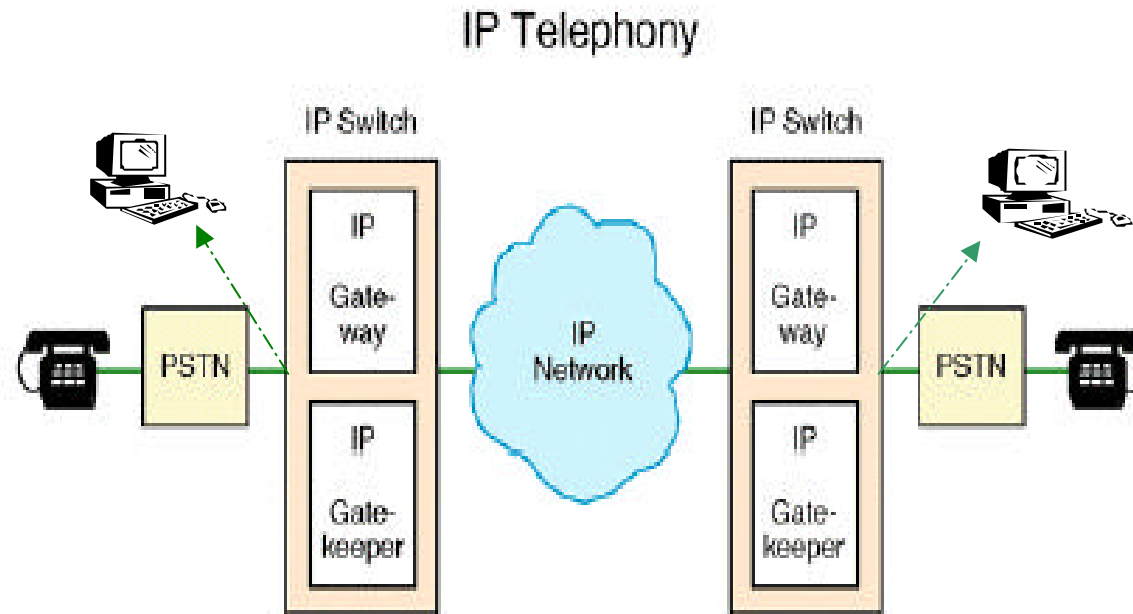


POSSIBLE CONFIGURATIONS OF IP TELEPHONY CALLS

CONFIGURATION	DESCRIPTION
PC to PC	It is the most basic method and requires that both users be similarly configured and simultaneously online.
PC to Telephone – Telephone to PC	This is a hybrid case in which a part of the PSTN is used; to do this, Internet providers recognize the telephone calls and provide access to the PSTN. Likewise, PC users need special software to make calls to the PSTN.
Telephone to Telephone	This configuration frequently involves a multi-stage dial-up with access numbers and a personal identification number. The call may be made over Internet, which provides lower quality. It permits closed groups to better use the infrastructure of their private virtual networks. The IP gateways are installed between the company's PBX and the IP network. Quality is satisfactory.

MOBILE TELEPHONY MARKET

This diagram represents the possible configurations for calls using IP Telephony, which vary according to terminal equipment and use of the PSTN.



ECONOMIC ISSUES

Consumers



- The most important characteristic of IP Telephony is that it can be less expensive than traditional telephony. Nevertheless, consumers will evaluate other factors when making their decisions, such as quality, reliability, and convenience.

Business



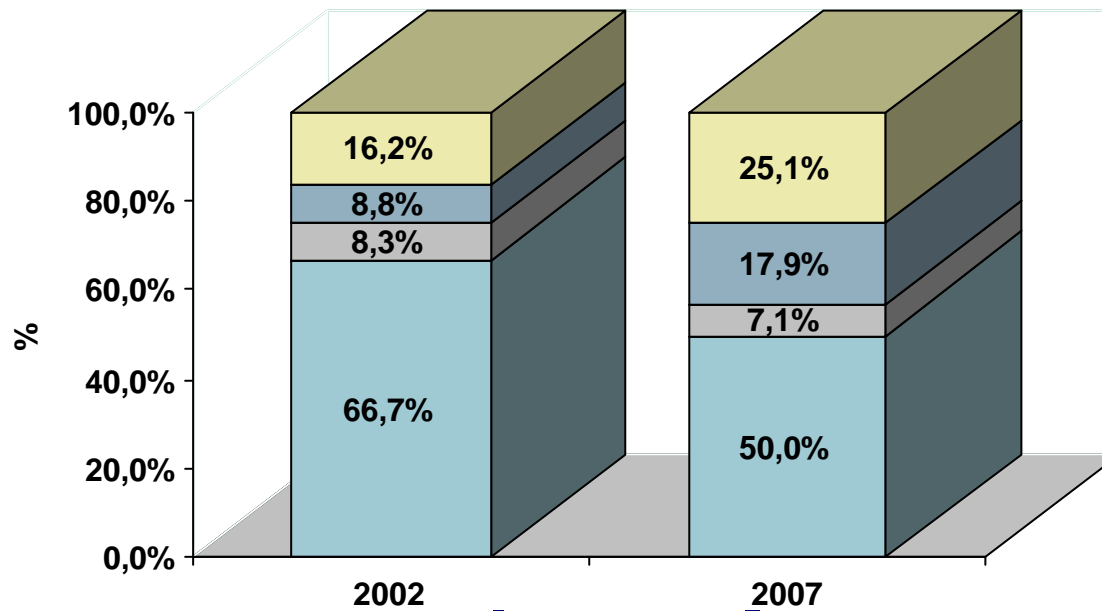
- This is reflected in the cost savings for the consumer and for businesses; the later will reduce the cost of long-distance service as well as the cost of administering a single network.

Industry

- This will exert an impact on established operators since it will affect the price of telephone service in every country, but the magnitude of the impact will depend on the level of competition in each market.

MARKET TRENDS IN DIFFERENT NICHES

EXPENDITURES FOR FIXED TELEPHONY SERVICES IN EUROPE
2002-2007



55% increase in expenses for data services

25% decline in expenses for voice service

■ Voice ■ Dial-Up ■ Wide Band ■ Data

Source: Analysis Research, 2003



REGULATORY IMPLICATIONS



REGULATORY IMPLICATIONS

- Regulatory policy does not show a clear trend in its handling of communication services aimed at data packets, which have been dealt with as an unregulated information service; nevertheless, IP transport accounts for a growing share of all telecommunications and regulators have no clear indications as to what course to adopt.
- Specific services that are not subject to regulation might benefit from unbalanced regulation during their transition phase.
- International experience shows that technological neutrality is crucial to policy regulation.



EXPERIENCE IN COUNTRIES STUDIED

Canada	The service is still essentially unregulated.
China	A permit is required to provide the service and the Ministry of this country is heavily promoting the service.
Spain	A private permit, general authorization or temporary authorization is required, depending on the configuration of the call.
United States	VoIP service is not considered a telecommunications service.
Peru	The ISPs are forbidden from providing real-time voice service.
England	Oftel is considering certain conditions to enable VoIP to become a public telephone service.

Sources: OECD y ITU.



INTERCONNECTION AND INTEROPERABILITY OF NETWORKS

- There is a series of questions concerning this type of network for which there are still no clear answers because, for a long time now, regulatory bodies have been establishing the regulatory framework for the interconnection of services provided in the PSTN but now the situation has become more complex.
- What is the solution for the interconnection requirements between large and small IP service operators?
- How will the interconnection mechanism be established with operators that provide the service via different technologies?
- Will interconnection tariffs be based on capacity or use, or will operators establish compensatory agreements between their networks?



COST IDENTIFICATION

- In a study by Martin B.H. Weiss and Junseok Hwang, the following conclusion was reached:
- IP telephony transmission and switching costs are **38** percent lower than switched circuit telephony costs, using a minimum rate of return of 5 percent and a capital equipment life of 10 years.
- This large cost difference was attributed to the reduction of transmission capacity between IP telephony exchanges; the compression and elimination of silence generates a **29** percent reduction in the use of capacity transmission in IP telephony.



ANALYSIS OF SERVICE TARIFFS

- Charges based on capacity are the major component of IP service prices and quality is an important variable that will also determine the price of IP telephony services, since in this service delays are unacceptable.
- In the case of switching services, however, charges based on use are the major price component.



SERVICE QUALITY

- In general, the architecture of the basic IP network leads to variable transmission times, especially when traffic is heavy, because there is no overall traffic management, the quality from one end to another cannot be guaranteed and as a rule packets are only transmitted under the best-effort arrangement.
- It is estimated that typical delays for national calls in the PSTN is between **50** to **70** milliseconds, while delays in international calls can go as high as between **150** – **500** milliseconds. The human ear begins to detect such delays when they exceed roughly **250** milliseconds. IP Telephony calls have delays ranging between **400** milliseconds and **2** seconds.



CONCLUSIONS

- An increase in global IP network traffic, as well as the range of applications, is expected.
- IP Telephony is part of a broader process aimed at launching IP-based networks.
- It is often deemed that a simplified regulatory structure is an important element to create favorable market conditions for investment in IP-based networks.
- It is thought that traditional telephony and its ample infrastructure will most likely coexist with, and be interconnected to, the IP-based infrastructure.