



To regulate or not to regulate?

Voice over Internet Protocol, or VoIP in short, is one of the most contentious issues now facing regulators as we enter 2005. Much of the debate revolves around whether to define VoIP as an “information service” or a “telecommunication service”, according to ITU’s report *Trends in Telecommunication Reform 2004/2005: Licensing in an Era of Convergence*, released at the Global Symposium for Regulators held in Geneva in December 2004. The term “voice over Internet Protocol” has been used widely as a generic name for the transport of voice traffic using Internet Protocol (IP) technology. VoIP is one example of a cross-sector convergence technology that utilizes packet-switched networks (often, the Internet) to make voice telephone calls. By sharing bandwidth with other data or Internet applications, VoIP providers offer these telephone calls at often cheaper rates than conventional telephony. Consumers are increasingly moving to the Internet to make cheap calls. VoIP poses a challenge to incumbent carriers, some of which still retain exclusive rights to offer voice service in their countries.

Trends in Telecommunication Reform 2004/2005 highlights three broad phases in the

development of VoIP telephony markets. For the better part of its history, VoIP has been either largely left unregulated, such as in the European Union (EU) and the United States, or banned completely, particularly in countries where a telecommunication monopoly of the international gateway existed. In countries where VoIP services were unregulated, it essentially implied that VoIP services were mainly provided in an environment where VoIP operators were not given the same rights and obligations as traditional public switched telephone network (PSTN) operators. While that approach was functional at a time when VoIP services were provided to a niche market, VoIP’s gradual entry into the mainstream is making it increasingly difficult to maintain a regulatory distinction between public voice services provided over IP networks and voice services provided over PSTN.

Globally, there are more countries that prohibit VoIP today than those that allow it. Results from the annual ITU Telecommunication Regulatory Survey indicate that a total of only 49 ITU Member States have unambiguously declared VoIP legal (see Figure 1).

The growth of VoIP

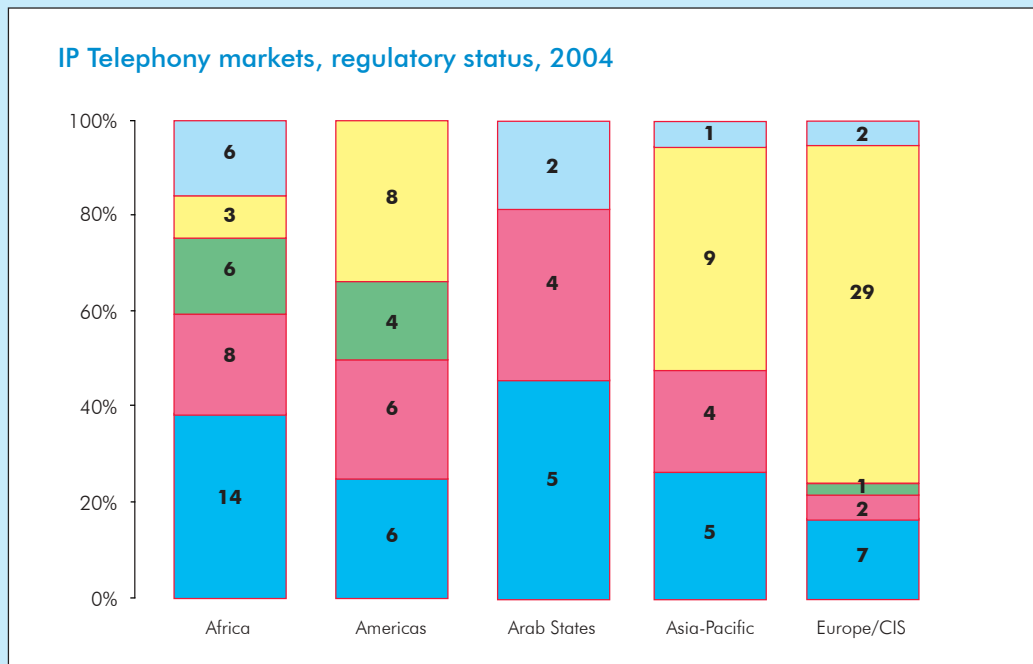
Flashback

Today, the market offers what might be termed “voice over broadband” (VoB), widening the appeal for VoIP. Broadband networks have become popular. And broadband Internet

access continues to grow worldwide. At the start of 2004, there were more than 102 million broadband subscribers in about 100 countries where broadband services were available. Users who have broadband access to the Internet generally experience fewer quality-of-service lapses than those who, in earlier days, experimented

Figure 1— IP Telephony: Who can do what, where?

Responses to the 2004 ITU Regulatory Survey concerning the regulatory status of IP Telephony (by region)



Note — The analysis is based on 132 ITU Member States that responded to questions on IP Telephony in the 2004 Regulatory Survey. Responses are shown by percentages of ITU Member States in each region that responded to the question, but the figures in the chart show the actual number of Member States in each category.

- **Restricted:** Only licensed PTOs are able to use IP-based networks or the public Internet for the conveyance of voice calls.
- **Prohibited:** All PTOs (even licensed ones) are prohibited from using IP-based networks or the public Internet for the conveyance of voice calls.
- **Partial competition:** Non-licensed PTOs may use either IP-based networks or the public Internet for the conveyance of voice calls.
- **Full competition:** All public telecommunication operators (PTO), whether licensed or not, may use both IP-based networks and the public Internet for the conveyance of voice calls.
- **No policy for IP Telephony:** The respondent did not answer this specific question, or indicated that there was no current policy, or that a new policy is currently being formulated.

Source: ITU World Telecommunication Regulatory Database.

with IP Telephony* over slow-speed, dial-up access. Almost 30 per cent of Internet subscribers have broadband access at speeds ranging from 256 kbit/s to 100 Mbit/s and more. In terms of penetration rate, the Republic of Korea was the leading economy at the start of 2004, with 23.3 broadband subscribers for every 100 inhabitants. In terms of absolute number of subscribers, the United States was the largest single broadband market at the start of 2004, with over 25 million subscribers. But that might not hold true much longer. China added 11 million new broadband users in 2003 to reach 13.5 million, and at current rates of growth, it was expected to overtake the United States by year-end 2004 as the

economy with the most broadband users. China had already overtaken the United States in terms of fixed lines in 2002 and mobile phones in 2001.

Companies marketing voice over broadband have tended to focus more on domestic long-distance and residential access rather than international calling. Vonage and Skype are some of the companies that are active in the VoB market. Vonage markets a flat-rate calling plan (unlimited calls in North America for USD 24.99) per month and international virtual numbers which allow for international calls to and from the United States at local call rates. Skype offers free and flat-rate calling plans based on a peer-to-peer network architecture, and claims over one million users. This new generation of voice services may well be integrated into instant messaging or chat services. Now regulatory concerns are less about whether or not to allow VoIP, but rather about how to regulate it.

VoIP services began to be offered in direct competition to public switched services between the mid-1990s and the peak of the "dotcom bubble" in 2000, using privately owned IP-based networks in addition to the public Internet. Companies such as DialPad, Genuity, iBasis,



The articles on VoIP have been adapted from Trends in Telecommunication Reform 2004/2005: Licensing in an Era of Convergence, written by a team of external authors and ITU staff composed of Doreen Bogdan-Martin, Susan Schorr, Nancy Sundberg, Tim Kelly and Eric Lie. More information on this sixth edition of Trends in Telecommunication Reform and on other ITU regulatory activities is available at www.itu.int/ITU-D/treg/

ITXC, Net2Phone or VocalTec, provided these new VoIP services, allowing users to make low-cost calls to and from ordinary telephones. The asset values of these companies collapsed with the global economic slowdown that began in 2000. Some of the companies were acquired by traditional public telecommunication operators (PTO), which were busy developing their own IP-based networks. This phase saw regulators in developed country markets lobbied to exempt Internet services from regulation. In developing country markets, VoIP continued to be restricted or prohibited.

At the very beginning of Internet telephony services in the early-to-mid-1990s, the public Internet was generally

used to provide these services. Companies such as Free World Dial-up, Firetalk and PhoneFree flourished during this period. Many of these companies promoted PC-to-PC applications that did not compete directly with public switched telephony providers. Some of these applications were inconvenient to use because they did not involve the use of normal telephones. Regulatory pressure to prohibit these services came mainly from monopoly PTOs in high-price locations who felt they were losing money through price arbitrage.

While many have argued that the absence of regulation in the past fostered the deployment of VoIP, there is also the possibility that public VoIP services would now stand to benefit from regulation relating to, among other things, interconnection, access to numbering resources and essential facilities access. ■

* This article uses the terms IP Telephony and VoIP interchangeably for services which use IP-based networks, including the public Internet, for the carriage of voice. Both terms, however, should be distinguished from "Internet telephony", which is applied to services which use the public Internet exclusively for the carriage of voice.

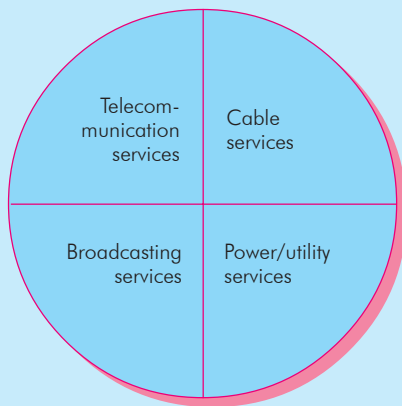
Changing business models

Major operators in developed countries, which traditionally had based their business plans on residential fixed-line subscribers, are now moving away from this business model. For instance AT&T, once synonymous with residential telephone service in the United States, announced on 22 July 2004 that it would no longer seek new residential fixed-line custom-

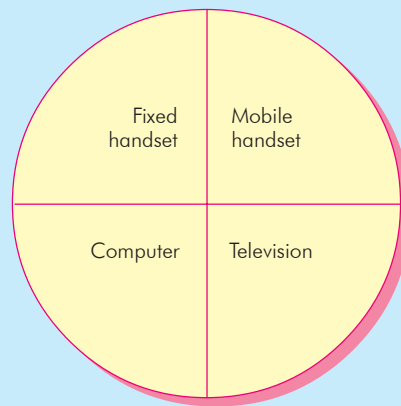
ers, underlining that it would stop investing in traditional consumer services and concentrate its efforts on business markets. Shortly after making this announcement, AT&T started marketing a VoIP-based service “CallVantage”, offering customers unlimited local calling for USD 19.99 per month plus flat-rate long-distance calls in North America for 4 US cents per minute.

Figure 2 — Different aspects of convergence

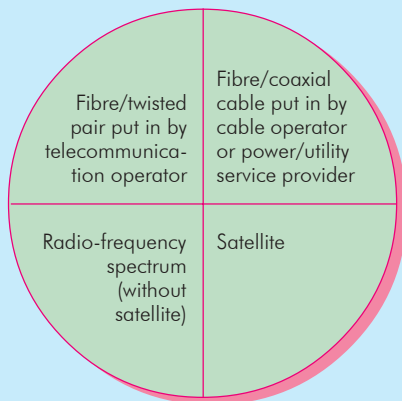
Circle A: Service provider convergence



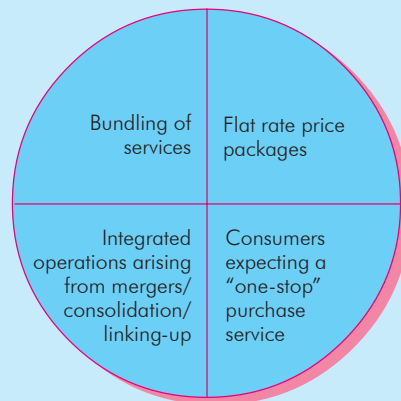
Circle B: Terminal equipment convergence



Circle C: Modes of delivery of service



Circle D: Market-related developments



Cable companies too are introducing VoIP services. Cablevision, Cox and Time Warner in the United States provide examples of this trend. In Europe, Siemens announced on 3 December 2004, that it had won an order for VoIP in the Netherlands. The Dutch cable network operator Casema has commissioned Siemens Communications to supply, instal and maintain what it calls the "SURPASS" solution that will permit nationwide voice transmission over the Internet Protocol. One of the decisive factors for awarding the order was that the VoIP solution from Siemens is already working well at Cablevision. The advantage for cable network operators is that they already have a solid customer base either through cable television or high-speed broadband Internet or both. Casema, for example, has 1.3 million subscribers and offers them cable television and broadband access, including video-on-demand. The framework contract announced in December last year envisages setting up the VoIP solution for around 80 000 subscribers as a first step. Following customer tests at year-end 2004, VoIP solutions are expected to be in operation in the first half of 2005.

Convergence is providing new business challenges as well as opportunities. Previously non-competing entities like cable television and telephone companies are now entering



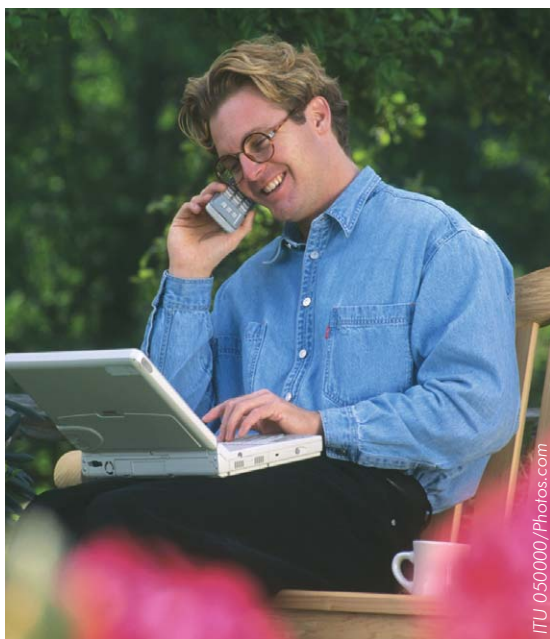
A number of companies are throwing their hats into the VoIP ring as convergence provides new business challenges and opportunities

each other's markets (see Figure 2). Incumbent fixed-line operators are increasingly looking for new services and applications to tap new revenue streams. Some are upgrading their existing infrastructure using technologies like digital subscriber line (DSL) to bring video downloads and television broadcasts to their customers via the Internet.

The declining value of the international voice market has coincided with a period of over-capacity on international routes, as well as a rise in VoIP traffic. VoIP minutes are typically priced at between one-fifth and one-tenth of the price of circuit-switched minutes, and so VoIP has added to volume while cannibalizing revenues.

Developing countries have been particularly hurt by this declining value of the international voice market because they have traditionally depended on incoming net settlement payments from carriers in more developed countries. During the 1990s, a net transfer of more than USD 50 billion passed from developed to developing countries under the workings of the international accounting rate system.¹ But that flow has been reduced to a mere trickle and might now have reversed. Operators in developing countries typically pay their developed-country partners for access to international Internet backbone connectivity. ■

¹ See ITU/TeleGeography Inc. (1999) "Direction of Traffic: Trading Telecom Minutes", Geneva, 330pp (see <http://www.itu.int/ITU-D/ict/publications/dot/1999/index.html>).



Consumers are increasingly moving to the Internet to make cheap calls

ITU_050000/Photos.com

VoIP around the world

Selected examples

Americas

Canada makes a distinction between Internet data applications, which are free from regulation, and Internet applications that provide an alternative to public switched voice services, which are regulated. IP Telephony between telephones, therefore, is subject to regulation. Providers of this service are treated like any other telephone service providers and must contribute to support the universal service fund.

Other countries, such as the United States, are considering whether VoIP is a telecommunication service or an "information service", which would be outside the scope of traditional telecommunication regulation. And so this issue remains unresolved, even in the United States. The Federal Communications Commission (FCC) appeared to be taking a different view of the issue than many state regulators. The state commission of Minnesota, for example, became embroiled in a dispute with a VoIP service provider. The two sides disagreed, essentially, on the provider's classification, with Minnesota asserting its jurisdiction over the company as a telecommunication service provider, and the company insisting it was an information service provider exempt from state regulation. In a ruling on VoIP in November 2004, the FCC ruled that they, and not state commissions, have the responsibility and obligation to decide whether certain regulations apply to IP-enabled services.

Peru's Ministry of Transport and Communications regards VoIP as a value-added service and does not regulate it under the country's Telecommunications Act.

Africa

South Africa announced a partial liberalization of VoIP in under-served areas in 2004 as part of its general market reform in advance of the introduction of a second national fixed-line op-

erator. Mauritius allows "network applications service providers" to obtain a licence to provide Internet telephony as long as no VoIP call terminates on a traditional fixed or mobile telephone in Mauritius. Egypt has granted Telecom Egypt monopoly rights to provide IP Telephony services. Algeria is developing legislation in VoIP.

Europe

The European Commission has taken the position that Internet voice services do not constitute voice telephony unless:

- they are offered commercially and separately to the public as voice services;
- they are provided to and from PSTN termination points;
- they are offered in real time at the same level of speech quality and reliability as offered by telephone companies on the PSTN.

The European Union maintains that VoIP does not fit the definition of telecommunications because it does not involve direct speech transport in real-time. Recent improvements, however, in the quality of service and the growth of the European VoIP market might eventually lead the European Commission to review its position.

VoIP is currently not subject to detailed regulation in Switzerland. The key criterion in determining whether a certain type of IP Telephony constitutes public telephone service is whether the service is "transmitted through direct transport and switching of speech in real time". VoIP services are not currently considered as involving real-time transmissions.

In Hungary, IP Telephony is allowed, provided that the delay is more than 250 milliseconds and packet loss is more than 1 per cent. Hungarian policy imposes sound-quality limits to prevent IP Telephony from serving as a perfect substitute for PSTN voice services. Bosnia and Herzegovina plans to liberalize VoIP in 2005.

Asia

Telecommunication services in the Republic of Korea are divided into facilities-based services and value-added services (VAS). PC-to-PC and IP phone-to-IP phone services are considered VAS. The Korean Government regulates VoIP very lightly, based on functional equivalence to traditional voice services. In Indonesia, the Government issued five licences authorizing "Internet telephony for public services", as part of a pilot project to establish the regulatory framework for Internet telephony. The Communication Authority of Thailand (CAT) has the monopoly right to award concessions to Internet service providers. CAT has the sole authority to use VoIP, which it now

employs for its international long distance calls. In India, VoIP is allowed, but only for computer-to-computer communications. India deregulated IP Telephony on 1 April 2002 following the ITU's World Telecommunication Policy Forum held in 2001 on the topic of "IP Telephony". India's proposed unified licence regime, however, would impose no restriction on VoIP telephony or other IP-enabled services, provided they are offered by operators with a unified licence that have duly paid all required registration charges. Viet Nam allows outbound Internet-based calls from one computer to another computer, and from a computer to a telephone, but prohibits inbound Internet phone calls. ■

VoIP in Jordan

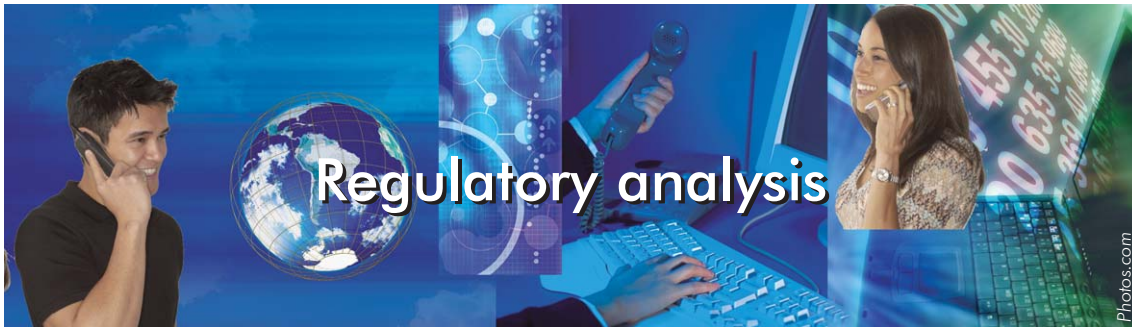
Jordan has tried to accommodate VoIP within its existing legal and regulatory framework. Jordan Telecom's licence allowed it to "have the sole and exclusive right in the country to operate a public switched voice service" until 31 December 2004. This "public switched voice service" is defined as "the provision of fixed voice telephone service to the public regardless of the technology used". In a statement on VoIP, the Telecommunications Regulatory Commission (TRC) of Jordan determined that the exclusivity conditions contained in Jordan Telecom's licence should not be allowed to stifle innovation or otherwise slow the advancement of technology in the country. On the other hand, TRC maintained that Jordan Telecom had an exclusive right to provide "public switched voice service" free of competition until its exclusivity period expired. TRC described VoIP as a transmission technology that allows the conveyance of voice calls over data networks. As such, VoIP is the functional equivalent of circuit-switched voice technology, TRC said. It clarified that any entity operating a commercially available voice service utilizing VoIP in competition with Jordan Telecom would be in violation of the company's exclusivity rights. Therefore, TRC determined that any operator of so-called "phone-to-phone"¹ VoIP service would clearly be in violation, as would any commercial entity that offered voice service to the public. This would include, for example, an operator of an Internet café that advertised the ability to make low-cost calls overseas using its PCs. Jordan Telecom's exclusivity rights, however, pertain only to competing

Jordanian providers of voice service, TRC said. This will not in any way constrain individuals' use of data communication networks for various purposes. TRC indicated that a user is free to employ a computer or other device, attached to the Internet or another data communication network, to make voice calls — so long as there is no involvement with a service provider in Jordan. Under the TRC's reading of Jordan Telecom's licence, then, there is no restriction on the private use of so-called PC-to-PC² or PC-to-phone³ VoIP, as long as there is no service provider in Jordan competing with Jordan Telecom in offering voice service. ■

¹ "Phone-to-phone" VoIP is when a user originates a call using a telephone connected to the public switched telephone network, and a VoIP service provider carries the call using a "gateway" that connects the call to its data network (or the public Internet), to another "gateway" connected to the public switched telephone network on the other end of the call that routes the call to another person on a receiving telephone.

² "PC-to-PC" VoIP is when a user uses a personal computer or other device to connect to the Internet or other data network, generally using a microphone or headset and which transmits voice calls to another computer or other device connected to the Internet where the other participant is located.

³ "PC-to-phone" VoIP is when a user uses a PC or other device connected to the Internet to transmit voice calls to a "gateway", which switches the call on to the traditional circuit switched network, usually close to where the terminating caller is located. The call is then routed to its destination and answered using a telephone handset.



VoIP has always divided regulators from its early beginnings. Some regulators have tried to ban it, and others have preferred to ignore it, by leaving it unlicensed. This “bifocal” approach has led to many regulatory dilemmas. In several countries, users are allowed to make IP phone calls, but no company is allowed to supply the service. As well, there are countries where some or all PTOs in the market are allowed to provide VoIP, but nobody is allowed to use it.

Consultations on VoIP

There are signs, though, that regulatory agencies are taking a more reasoned approach to VoIP. Globally, a number of regulatory authorities have held or are holding consultations on VoIP in their countries. Examples of regulatory issues raised by IP Telephony in general, and voice over broadband in particular, include universal access/service contributions, quality of service, virtual numbers, legal interception, taxation and inter-connection payments. A number of these issues were discussed at a joint meeting of the Latin America Regulators Association (REGULATEL) and the European Independent Regulators Group (IRG), held in Peru in November 2004. IRG has established a group with the mandate to study and propose common regulatory approaches within the European Union, Switzerland, Norway, Iceland and Liechtenstein.

In the United Kingdom, the Office of Communications (Ofcom) considers that VoIP could bring major consumer benefits and lead to significant changes in communication markets. Ofcom wants to ensure that VoIP providers can enter the market on a fair basis whilst also ensuring that consumers are adequately protected. Ofcom recognizes this as a high priority issue. Consequently, Ofcom is talking to stakeholders to identify, prioritize and review regulatory issues relating to VoIP and VoB. It has also been con-

sidering the strategic impact of VoIP as part of the “Strategic Review of Telecommunications”. A consultation on publicly available telephone services (PATS), emergency calls, and consumer information in relation to VoB services was published in mid-2004. Meanwhile, service providers like BT are moving quickly to establish a place in the market.

In Germany, the Regulatory Authority for Telecommunications and Posts (RegTP) has evaluated the results of its consultation on VoIP. RegTP presented these results at its Telecommunications Forum in Bonn in October 2004 on the topic “Voice over IP – Revolution or Evolution in the Telecoms Market?” According to RegTP, regulation will seek to create fair and predictable conditions for the spread of VoIP products and services. Among the central issues highlighted in the German consultation were access to emergency services and numbering. Access to emergency services is not just about who is obliged to provide access, but is also about clarifying technical matters such as the routing of emergency calls to the nearest emergency service centre. Technical experts were called upon to devise practicable and low-cost solutions.

On the issue of numbering, the German regulator published the rules for allocating national numbers (in the “032” range) in its Official Gazette in November 2004. In essence, national numbers are defined like local numbers, but — similar to mobile numbers — are not linked to a particular locality. RegTP’s assumption is that the new numbering resource will be used for VoIP. Under these rules, telephone service providers can now apply to RegTP for national numbers in blocks of 1000. And if all goes according to plan, the first allocations would be made in January 2005 (<http://www.regtp.de/en/index.html>). The regulator considers that VoIP could provide the

opportunity for innovation and new services and give a fresh boost to competition. As for customers, they stand to benefit from greater service diversity.

Some regulators have classified VoIP services as being functionally equivalent to other voice telecommunication services. In these cases, VoIP service providers are subject to the same regulatory codes as incumbent operators. For example, in April 2004 the Canadian Radio-television and Telecommunications Commission issued a preliminary view that its existing regulatory framework should apply to VoIP services. This judgement was based on the fact that VoIP offers voice communication services with the same key characteristics as traditional circuit-switched services.

The Finnish regulator, Ficora, has already decided in one case that the VoIP business of the former incumbent, SoneraTelia, is subject to the rules for public telephone service providers. France and Denmark have held consultations as well. In the United States, FCC has launched a rulemaking proceeding on Internet telephony. It is expected that the FCC will issue its VoIP policy during 2005. In the Philippines, the National Telecommunications Commission (NTC) has initiated a consultation on VoIP. And the United Arab Emirates is considering liberalizing VoIP in 2005.

Why this new, more accepting stance by regulators? The new stance is partly a result of the trend towards technology-neutral regulation. There is growing recognition that real-time, interactive voice telephony is the same, irrespective of the technical platform used to carry it. So even in competitive markets with minimal regulation, whatever regulation exists should be applied equally to all providers of services that are substitutable for each other. The new stance is also a recognition that IP-based networks will soon become the main bearer of voice traffic.

The hurdles **Virtual numbers**

The new types of voice over broadband services typically allow users to use a single "phone" number, no matter where in the world they may actually be, and regardless of whether they are

using a mobile or a fixed-line telephone. This offers obvious benefits for users, but raises regulatory concerns. For example, it may be difficult for emergency services to locate the origin of a particular emergency call. Callers may be confused if they do not know whether they are making a call to a mobile or a fixed-line number (and therefore do not know the tariff they will be charged).

Legal interception

Some regulatory agencies fear that voice over broadband services may open the way to ill-intended users to hide behind anonymity to conduct illegal activities (for example, drug dealing or terrorism). If the service is non-licensed, then it may be difficult for legal authorities to trace, or monitor, suspicious calls.

Taxation

Most countries now apply a sales tax to outgoing voice calls. This may be difficult to enforce and collect if the operator is not licensed. It may be also inefficient to tax only licensed operators, because this will encourage those licensed operators to shift more of their traffic onto untaxed VoIP platforms.

Interconnection payments

The completion of a long-distance or international call typically requires the cooperation of two or more PTOs, at the origin and destination of the call and for transit. The PTO handling call termination and transit may require interconnection payments from the originator of the call. But if incoming calls are "dumped" onto an operator's network, with no prior attempt to agree on an interconnection charge (or settlement payment), it may not be possible to levy interconnection fees. This is also true if calls are made to appear as if they are coming from a virtual number inside the call zone of the terminating operator. At low levels of traffic, operators are generally happy to let this pass as "sender-keeps-all" type traffic, but at higher traffic volumes, operators start to view this as fraud, and they may seek regulatory protection.

These are all issues that call for convergent regulation to deal with converging technologies. ■