



WITSA STATEMENT VOICE OVER INTERNET PROTOCOL(VoIP) September 2004

Introduction

At its most basic level, Voice over Internet Protocol (VoIP) is voice communication delivered over a data network rather than a circuit switched network. In an increasingly VoIP world, people will use any one of numerous intelligent devices instead of traditional telephones to send real-time, high-quality audio files over an Internet Protocol (IP) network to other people doing the same. The result? Telephone calls. Integrated messaging. Videoconferencing. Workgroup collaboration.

Not every VoIP call will begin and end in exactly the same way. Callers may use telephone handsets to reach others using computers and other intelligent devices ... use computers to reach parties with telephone handsets ... conduct telephone-to-telephone calls over the Internet instead of the public switched network. Or they may connect using one of several other "edge of the network" devices. In fact, VoIP is a continuum of services that all move and manage voice files and can integrate voice into other IP applications.

However the call goes through, VoIP has the potential to transform broadband demand, rearrange the competitive landscape, and usher in a new era of technology-driven, cost saving, consumer empowering communications. The combination of "IP" and "Voice" completely changes the nature of voice service from a simple utility function into a multifaceted information application, just like email, text messaging, and instant messaging.

But converting voice sound waves into digitized audio packets is just the first step in the VoIP journey. Much needs to happen in the next few years to realize the full promise of VoIP technology. Innovation must thrive, technology investments must be made, consumers must adopt this new broadband application, and policy makers must forebear from imposing today's outdated regulatory systems to this emerging set of voice enhanced information services.

In this Statement WITSA looks at the nature and benefits of Voice over Internet Protocol and describes the changes that need to take place to reach its full potential. It also identifies the key questions on the regulatory front that present VoIP's greatest challenges.

World Information Technology and Services Alliance

The World Information Technology and Services Alliance (WITSA) is a consortium of 60 information technology (IT) industry associations from economies around the world (list attached). As the global voice of the IT industry, WITSA is dedicated to:

- advocating policies that advance the industry's growth and development;
- facilitating international trade and investment in IT products and services;
- strengthening WITSA's national industry associations through the sharing of knowledge, experience, and critical information;
- providing members with a vast network of contacts in nearly every geographic region of the world; and
- hosting the World Congress on IT, the only industry sponsored global IT event.

Founded in 1978 and originally known as the World Computing Services Industry Association, WITSA has increasingly assumed an active advocacy role in international public policy issues affecting the creation of a robust global information infrastructure, including:

- increasing competition through open markets and regulatory reform;
- protecting intellectual property;
- reducing tariff and non-tariff trade barriers to IT goods and services; and safeguarding the viability and continued growth of the Internet and electronic commerce.

VoIP: How Does It Work...and What Does It Do?

Voice Over Internet Protocol is more a capability than a single service or device. In standard analog voice service, signals travel over the public switched network. With Voice over Internet Protocol, voice traffic is converted into a digital signal and transmitted over the Internet (including intranets or private IP networks) using packet technology. The distinction is critical—encompassing significant upsides and downsides for successful VoIP introduction.

Today, VoIP communication takes place in one of two basic ways: computer to computer or computer to telephone. In the case of the former, the computer (equipped with sound card, phone software and microphone) converts the analog voice signal to IP; in the latter, a telephone on the public switched network uses a VoIP gateway to make the conversion. In the future, telephone-to-telephone communication using VoIP may become the norm, again using VoIP gateways to move to and from an IP network. As IP pervades the networks, some VOIP calls will be all IP. The VoIP possibilities are by no means limited to telephone handsets, however. Future connections will no doubt include:

- Cell phones
With VoIP, cell phones will not only route telephone calls over the Internet but also become “click to talk” intercoms for immediate access to friends or family;
- PDA and Wi-Fi phones
Personal Digital Assistants will not only be used to make phone calls but also, when part of a Wi-Fi network, they will be used to create a private, in-house phone system; walk from room to room and transfer the call from IP device to IP device;
- Cable and DSL modems
Take laptops or desktops, add software and a headset, and start making calls right from the screen. Attach an adapter and legacy phones become IP phones for flat rate domestic calling; add free or low cost features like call waiting, caller ID or personalize a local exchange so that long distance become local calls;
- PBXs
Like an Internet server, an IP-enabled PBX allows users to dial in with IP phones or laptops and reach the Internet. In disaster situations, an off-site IP PBX could help assure continuity of business operations;
- Other hardware and software devices
Telephone companies will use intelligent routing, IP Centrex and other technologies to create software-defined networks.

IP networks make all of this “device diversity” possible. IP blurs the functional distinctions between devices: cell phones become personal digital assistants; Session Initiation Protocol (SIP) phones become Java computing devices; Wi-Fi handsets are transformed into endpoints for SIP calls. Just as with other types of Internet traffic, IP renders distance irrelevant for voice traffic as an application and can make phone numbers location independent of geography. IP also decouples voice as an application from traditional telecommunications networks, thus making it also potentially available on cable, fixed wireless, fiber, satellite and other transmission modalities.

Phasing in VoIP

Today, and for the foreseeable future, VoIP services will co-exist in a “mix and match” telecommunications world. Achieving end-to-end voice services over IP

networks that could eventually replace the existing circuit switched telephone networks will require significant capital and will occur in a phased approach. And few observers predict this new technology will be an easy replacement for today's public telephone networks. Most acknowledge that these legacy networks will coexist with new IP networks for years to come.

Part of the issue is simple **quality of service**. Often unknown to users of the Internet, transmission of data files like e-mail, video clips or music can be a far from flawless process. Packets of information are dropped in transit, reassembled incorrectly, or susceptible to other errors. Many of these problems are simply invisible to the typical computer user or, if they degrade system performance to some degree, are still considered tolerable.

To be successful, VoIP service must be clear, crisp, and reliable. VoIP traffic cannot drop packets, allow bit rates to slow, create appreciable delays, send echoes or introduce jitter—pulse variation that corrupts digital voice transmission. At the same time, however, the Internet is a best effort environment—a network of over 100,000 interconnected networks—an environment where the weakest link may play havoc with real-time services—like placing telephone calls. So how will the quality gaps get resolved?

Successful VoIP rollouts will depend on business strategies that leverage **hybrid networking environments**. Even today, leading companies and government agencies are implementing dedicated (or in-house) IP networks. Such networks take the place of local and long distance phone service inside the enterprise, but interface with the public switched network for external voice traffic. By creating a dedicated IP network, the enterprise can enjoy the many cost and productivity benefits of VoIP service, without falling prey to the “weakest link” aspects of the public Internet.

Another part of the solution will require innovation in state of practice networking technology. **New protocols** will make it possible for an increasing number of callers to make their VoIP connections from an increasing number of different devices and carriers. Session Initiation Protocol (SIP) is one important open standard in this area. Open standards in areas such as e-mail and websites led to explosive growth in these domains. An industry-wide, open standard in the VoIP device domain may likewise prove decisive in achieving widespread adoption.

The need for technology advances is not limited to standards and protocols. **New tools** will also help VoIP network managers partition data packets into more manageable, predictable pieces; create guidelines for how much bandwidth is needed for various types of service, and eliminate variations in bit rates that could otherwise degrade performance quality.

Perhaps the biggest barrier to VoIP is the consistency of **market capital**. The scale of the undertaking needed to build out IP networks is enormous. As an example, one leading telecommunications firm providing long distances services handles 350 million calls per day with fewer than 100 defects per million calls. Comparable VoIP networks must be scalable and dependable. Massive investments will be needed to

put VoIP on this kind of competitive footing. Companies and consumers will not embrace this technology in a significant way until it provides voice services of comparable quality to the public circuit switched network. Until a critical mass of buyers exist for these services, however, investors will be hesitant to provide the capital necessary to address performance quality and functionality concerns. Inadequate financial resources will mean fewer VoIP companies, less competition, and less innovation.

Phase 1 of introducing VoIP services has been to digitize and then packetize voice traffic over an IP backbone network. Digitization of voice began in long-distance networks during the early 1980s. Packetizing voice has been a more recent event, appearing with the introduction of voice enabled packet switches in existing IP backbone networks.

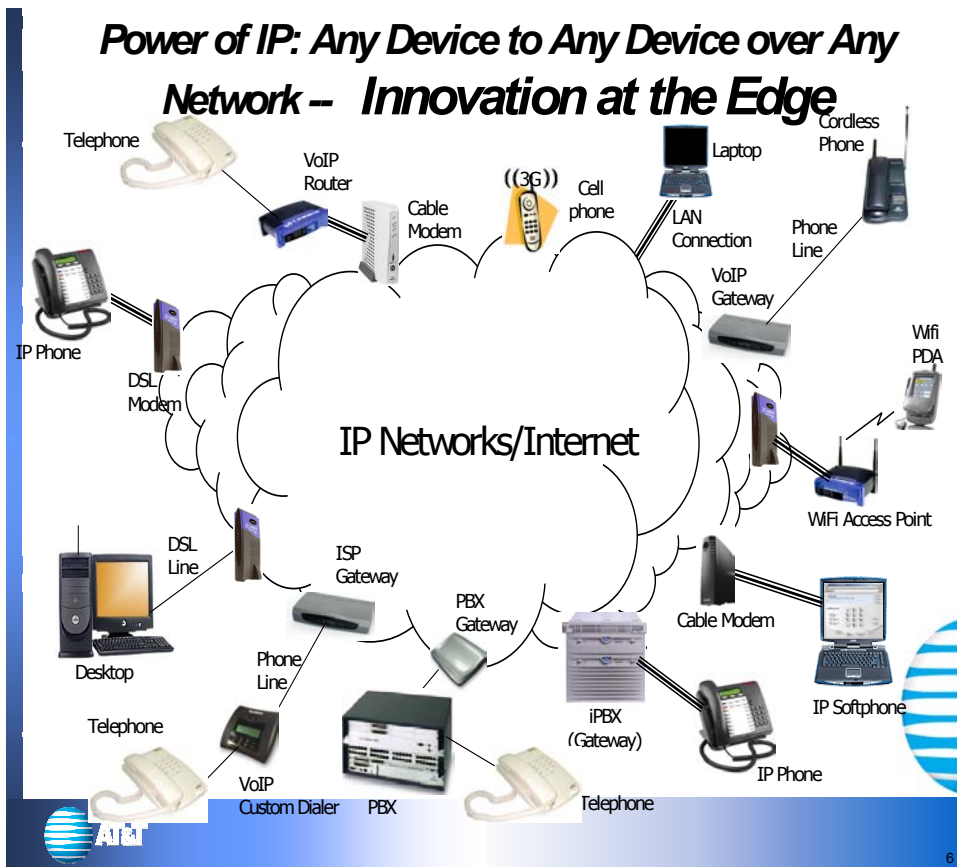
Long distance carriers and other large backbone providers have been making significant investments to provide voice service over their backbone facilities. This enables lower operating costs in the long term and the ability to offer combined voice and data enterprise services with a controllable quality of service over the backbone and privately provided facilities. But businesses need to be able to reach other parties who are not a part of their enterprise network; hence, the development of gateways that allow voice to be converted from packets back to a digital form (time division multiplexing) that the traditional phone networks recognize.

Some service providers have been quick to recognize the consumer market could also be addressed with this first phase of VoIP. The quality of service for a phone-to-phone IP offer would be acceptable to a large range of customers because such services—both local and long distance—are already accepted in the marketplace today. In this arrangement, a phone call is routed to a packet switch at the local phone company's central office for transmission on the IP network. Participation of the traditional end-point telephone companies mitigates any public safety issues. Some companies are moving ahead to provide phone to phone VoIP, while they are seeking to make the investment to move to the next stage for VoIP.

Phase 2 puts VoIP closer to the end user. It requires significant market capital to build out two-way broadband access that can supply the speeds and reliability required for real time IP applications, such as VoIP. Speed and access reliability concerns remain. Some businesses are experimenting with softphone services (phone capability via software on a computer) for their remote workers, who have broadband connections from home. Service providers have seen this as an emerging consumer market. A variation of phone-to-phone IP service, these providers use an adapter behind the high-speed modem to digitize and packetize the voice.

Phase 3 is IP everywhere. Voice calls would start as IP, move over networks as IP and end as IP. New, innovative real time services could be developed and rolled out over this type of platform in months and days instead of years. However, significant technical and operational barriers to phase three remain:

- Open standards for real time communication need to be further developed and widely adopted;
- New network management tools are needed to help companies and service providers to predict failures before they happen, mitigate denial of service and virus attacks, create policies for how much bandwidth is needed for various types of service, and eliminate variants that could otherwise degrade performance quality;
- Interconnection agreements between service providers and between IP network providers will be a necessity;
- Quality of Service (QoS), reliability and non-performance measures will need to be developed, negotiated and monitored;
- Significant investment of capital will also be required to provide the level of public safety required for today's public switched networks.



VoIP and Broadband: A Statement of Principles

- Service providers must have non-discriminatory interconnection from the broadband provider at fair and reasonable term and prices
- The wide resources of the Internet should be available, without discrimination by the broadband provider, while respecting applicable law
- Service providers should not be liable for the actions of end-users
- Device and application developers should adhere to open, interoperable standards.
- Users should have their choice of devices, services and applications independent of which broadband provider they use
- Users should respect copyright laws and other legal obligations related to the use of applications and networks
- Users should show respect for other users and their ISP by using firewalls, anti-virus software, anti-spam filters, not monopolizing bandwidth or otherwise degrading the network.

Conclusions: Time will Tell

Voice over Internet Protocol is an exciting technology with the potential to have a sweeping impact on voice and data networks and to drive demand for broadband services. Part of that impact involves eliminating distance as a significant pricing factor and dramatically lowering the cost of maintaining networks and placing calls; part involves collapsing the distinctions between various types of services and rewriting the business models of the companies that provide them; and part is creating a value added layer of applications that leverages the natural synergies of converged voice and data.

While initial concern about VoIP networks has focused on whether this technology will displace the phone company by providing low cost or no cost local and long distance dialing, the more vibrant and sustainable business of VoIP networking may lie in the productivity gains achieved by both enterprises and individuals. Corporate and government network managers will use the technology to achieve both cost and productivity savings as well as to offer newly affordable value added services. Consumers will use enhanced personal communications to simplify and organize their busy lives.

The challenges to providing a widely deployed and adopted, fully substitutable voice service are significant and costly, pushing that possibility into the future. Whether VoIP becomes a major rung in the ladder of progress or a minor footnote in the annals of the Internet will depend on ensuring a patient policy environment for the next several years. This will allow some difficult questions regarding public safety issues to be worked out in a balanced manner, for standards to be developed and widely adopted, for jurisdictional and taxation issues to be addressed. This in turn will accelerate the investments by industry needed to push IP/broadband networks closer to home and create the platform for the next generation of personal communication services for enterprises and consumers that will drive further broadband adoption.

Summary

1. WITSA supports continued build-out of IP infrastructure.
2. WITSA recommends that national and regional regulators consider forbearing VOIP services until the market has matured and it is more clear what, if any, regulation is required.

Appendix: WITSA Members

Argentina	Cámara de Empresas de Software y Servicios Informáticos (CESSI) URL: http://www.cessi.org.ar
Armenia	Armenian Union of Information Technology Enterprises (UITE) URL: www.uite.org
Australia	Australian Information Industry Association (AIIA) URL: http://www.aiia.com.au
Bangladesh	Bangladesh Computer Samity (BCS) URL: http://www.bcs-bd.org
Brazil	Sociedade de Usuários de Informática e Telecomunicações - Sao Paulo (Sucesu-SP) URL: http://www.sucesusp.org.br
Bulgaria	Bulgarian Association of Information Technologies (BAIT) URL: http://www.bait.bg
Canada	Information Technology Association of Canada (ITAC) URL: http://www.itac.ca
Chinese Taipei	Information Service Industry Association of Chinese Taipei (CISA) URL: http://www.cisanel.org.tw
Colombia	Colombian Software Industry Federation (FEDESOFIT) URL: www.fedesoft.org
Costa Rica	Costa Rican Chamber of Information and Communication Technologies URL: http://www.camtic.org
Czech Republic	Association for Consulting to Business (Asociace Pro Poradenství v Podnikání - APP) URL: http://www.asocpor.cz
Ecuador	Association Ecuatoriana de Tecnología de Información y Servicios (AETIS) URL: http://www.aetis.org.ec
Egypt	Egyptian Information Technology, Electronics and Software Alliance (EITESAL) URL: http://www.eitesal.org
Finland	Federation of the Finnish Information Industries (TIETOALAT) URL: http://www.finnishinformationindustries.net
France	Syntec Informatique URL: http://www.syntec-informatique.fr
Greece	Federation of Hellenic Information Technology and Communications Enterprises (SEPE) URL: http://www.sepe.gr
Hong Kong	Hong Kong Information Technology Federation (HKITF) URL: http://www.hkitf.org.hk
Hungary	Hungarian Association of IT Companies (IVSZ) URL: http://www.ivsz.net/
India	National Association of Software and Service Companies (NASSCOM) URL: http://www.nasscom.org

Indonesia	ASPILUKI - Indonesian Telematic Software Association URL: http://www.aspiluki.or.id
Israel	Israeli Association of Software Houses (IASH) URL: http://www.iash.org.il
Italy	Associazione Nazionale Aziende Servizi Informatica e Telematica URL: http://www.anasin.it
Japan	Japan Information Technology Services Industry Association (JISA) URL: http://www.jisa.or.jp
Jordan	Information Technology Association - Jordan (int@j) URL: http://www.intaj.net
Kenya	Computer Society of Kenya (CSK) URL: http://www.csk-online.org
Lebanon	Professional Computer Association of Lebanon (PCA) URL: http://www.pca.org.lb/
Lithuania	Association of the Information Technology, Telecommunications and Office Equipment Companies of Lithuania (INFOBALT) URL: www.infobalt.lt
Malaysia	Association of the Computer And Multimedia Industry Malaysia (PIKOM) URL: http://www.pikom.org.my
Mexico	Asociación Mexicana de la Industria de Tecnologías de Información (AMITI) URL: http://www.amiti.org.mx
Mongolia	Mongolian National Information Technology Association URL: http://www.ict.mn/midas
Morocco	l'Association des Professionnels des Technologies de l'Information (APEBI); URL: http://www.apebi.org.ma
Nepal	Computer Association of Nepal (CAN) URL: http://www.can.org.np
Netherlands	Federation of Dutch Branch Associations in Information Technology (Federatie Nederlandse IT - FENIT) URL: http://www.fenit.nl
New Zealand	Information Technology Association of New Zealand (ITANZ) URL: http://www.itanz.org.nz
Northern Ireland	Momentum - The Northern Ireland ICT Federation URL: http://www.momentumni.org
Norway	ICT Norway (IKT Norge) URL: http://www.ikt-norge.no
Palestine	Palestinian IT Association (PITA) URL: http://www.pita-palestine.org/
Panama	Asociación Panameña de Software (APS) URL: http://www.aps.org.pa
Philippines	Information Technology Association of the Philippines (ITAP) URL: http://www.itaphil.org

Poland	Polish Chamber of Information Technology and Telecommunications (Polska Izba Informatyki i Telekomunikacji - PIIT) URL: http://www.piit.org.pl
Portugal	Associação Portuguesa das Empresas de Tecnologias de Informação e Comunicações (APESI) E-mail: apesi@treal.pt
Republic of Korea	Federation of Korean Information Industries (FKII) URL: http://www.fkii.or.kr
Romania	Association for Information Technology and Communications of Romania (ATIC) URL: http://www.atic.org.ro
Russia	Russian Information & Computer Technologies Industry Association (APKIT) URL: http://www.apkit.ru
Senegal	Senegalese Information Technology Association (SIT'SA) URL: http://www.sitsa.sn/
Singapore	Singapore infocomm Technology Federation (SiTF) URL: http://www.sitf.org.sg
South Africa	Information Industry South Africa (IISA) URL: http://www.informationindustry.org.za
Spain	Spanish Association of Electronics, Information Technology and Telecommunications Companies (AETIC) URL: http://www.aetic.es
Sri Lanka	Sri Lanka Information and Communications Technology Association (SLICTA) E-mail: Ict@tci.lk
Sweden	The Association of the Swedish IT and Telecom Industry (IT-Företagen) URL: http://www.itforetagen.se
Tanzania	Tanzania Information and Communication Technologies Association (TICTA) URL: http://www.ticta.org/
Thailand	The Association of Thai Computer Industry (ATCI) URL: http://www.atci.or.th
Turkey	Turkish IT Services Association (TUBISAD) URL: http://www.tubisad.org.tr
Uganda	The Private-Sector ICT Association of Uganda (PICTA) URL: http://www.picta.or.ug/
United Kingdom	The Information Technology, Telecommunications and Electronics Association (Intellect) URL: http://www.intellectuk.org
United States	Information Technology Association of America (ITAA) URL: http://www.ita.org
Uruguay	Uruguayan Chamber of Information Technology (CUTI) URL: http://www.cusoft.org.uy
Venezuela	CAVEDATOS - Venezuelan Chamber of IT Companies URL: http://www.cavedatos.org.ve/
Vietnam	VINASA - Vietnam Software Association URL: http://www.vinasa.org
Zimbabwe	Computer Suppliers' Association of Zimbabwe (COMSA) URL: http://www.comsa.org.zw