

# TEDICORE

## TEDICORE Submission to the

Department of Communications, Information Technology & the Arts

## TELECOMMUNICATION UNIVERSAL SERVICE OBLIGATION (USO) REVIEW

### Background

TEDICORE (Telecommunications and Disability Consumer Representation) welcomes the opportunity to contribute to the Department of Communications, Information Technology & the Arts (DCITA) Review of the *Telecommunications Universal Service Obligation (USO)* 2007.

TEDICORE is the voice of Australia's peak organisations of people with disabilities on telecommunications and is supported by the Commonwealth through the DCITA "Grants to Fund Telecommunications Consumer Representations" program. TEDICORE is administered by the Australian Federation of Disability Organisations. It represents the interests of people with a disability in relation to telecommunications issues and promotes equity and accessibility. TEDICORE has ongoing input from its Project Advisory Body (PAB) with members from a number of the peak disability bodies - Australian Association of the Deaf, Deafness Forum of Australia, Physical Disability Council of Australia, Women With Disabilities Australia, Communications Rights Australia and Blind Citizens Australia. The PAB has been chaired by Mr. Maurice Corcoran.

People with disabilities live in all areas of Australia. All use, or aspire to use, communications as part of their everyday lives. They require the same access to the full range of telecommunications services as the non-disabled. TEDICORE provides advice to government and the communications industry on the development of standards and codes, policies and programs which will maximise the equity of access to telecommunications for all Australians.

### Discussion

#### *Communications for People with Disabilities as a Legal Obligation*

TEDICORE believes that equitable access to communications should remain a legal obligation. There is already recognition of people with disabilities and access to goods and services in the Disability Discrimination Act 1992 and this is reflected in the Telecommunications (Consumer Protection and Service Standards) Act 1999 as an obligation.

To place this in an international context, the United Nations Convention on the Rights of Persons with a Disability (adopted by the UN on December 13, 2006) recognises the inalienable rights of people with disabilities with respect to communications. The UN Convention contains specific Articles on access to communications.

Article 4 outlines the General Obligations of signatories to the Convention with Paragraph (g) specifically noting the promotion of the use of new information and communication technologies (ICTs) "*suitable for persons with disabilities, giving priority to technologies at an affordable cost*". These services include Video over IP and Text over IP (ToIP) as well as the more commonly used Voice over IP (VoIP) and are of relevance in any discussion of the USO in Australia. The USO needs to apply to all modes of communications, with broadband, mobile and terrestrial networks delivering services to people with disabilities at an affordable cost.

Article 9 of the Convention considers general matters of accessibility, being concerned with enabling "*persons with disabilities to live independently and participate fully in all aspects of life*". In the context of communications this means ensuring that "*persons with disabilities have access, on an equal basis with others*:"

- ***to information and communications,***
- *including information and communications technologies and systems,*
- *and to other facilities and services open or provided to the public, **both in urban and in rural areas.***

The measures which signatories to this Convention are to put in place include the identification and elimination of obstacles and barriers to accessibility. These measures are to be applied to: "*....Information, communications and other services, including electronic services and emergency services*".

Australia is a signatory to this Convention, and is in the process of assessing the mechanisms which will need to be put in place for its ratification. The measures which TEDICORE proposes in this paper are informed by the Articles in this Convention.

The USO is designed to enable all people in Australia to have equitable access to basic telephony services. However, the obligation should now be for 'communications' – not just telephony. It is a key mechanism by which Australia will be able to meet its obligations to people with disabilities as outlined in this international Convention.

#### **RECOMMENDATION 1.**

That the function of the USO continue as a legal requirement so that people with disabilities have equitable access to communications technologies, based on the Articles in the United Nations Convention on the Rights of Persons with a Disability.

### ***Availability, Affordability and Accessibility***

TEDICORE believes that equity in communications has to refer to services which are available, affordable and accessible to people with disabilities. This means that the infrastructure should make suitable services available at the places where people with disabilities live, work and visit. The services they use need to be affordable. This means taking into account the unavoidable fact that people with disabilities are over-represented in the lowest income levels. Irrespective of income level, specialised expensive services need to be available at prices which are comparable to those paid by

people who are not disabled. It could be that assistive equipment must be used in order to enable people with disabilities to access communication services. Such equipment must also be made available in an equitable way, so that accessibility is not affected.

It is recognised in the Government Issues Paper that fixed phone services are decreasing in favour of mobile and Voice over IP services. It must also be recognised that there is a changing emphasis in the use of voice as the primary means of communications. Text communication is favoured in many forms such as SMS and Internet Chat. For people with disabilities, especially people who are Deaf or have a hearing or speech impairment, these forms of communication are very important. However, real-time text communication is necessary to ensure that the communication is a conversation with interruption and interjection in a manner similar to a conversation between hearing people. This is delivered by Text over IP. (Appendix A describes Text over IP in more detail.) Video conversations are also becoming increasingly popular for Deaf people.

Therefore, the concept of the Standard Telephone Service needs to be redefined to take this into account. The underlying mechanism of any-to-any connectivity is the major way to define this.

TEDICORE's approach to a review of the USO is predicated on it being used to deliver services which are available, affordable and accessible to people with disabilities.

#### **RECOMMENDATION 2.**

That the USO deliver **communications** which are accessible, affordable and available to all people in Australia including people with disabilities no matter where they work or reside.

## **Review Questions**

TEDICORE will only be responding to specific questions in this submission based on their relevance for people with disabilities.

### ***Chapter 1: The USO in a changing telecommunications environment***

**Q. 1.1.** Should the USO continue to operate as an obligation on service providers to serve all customers, or should it be recast as a consumer right or guarantee (in tandem with commercial service delivery)?

The USO should definitely continue to be an obligation on service providers to serve all customers. It needs to continue as a legal obligation but be expanded to incorporate communications forms beyond voice telephony as outlined above. The communications environment has changed significantly since the inception of the USO and so needs to reflect the methods by which Australians use various technologies. People now consider a combination of voice, text and video communication as the norm. This means that the USO should accommodate this through the provision of equitable fixed and mobile telephony as well as broadband-based communications.

## **Chapter 2: The nature of basic phone services**

The *Telecommunications USO Review Issues Paper* repeatedly mentions the role of the USO in promoting efficient and effective voice services. The Telecommunications (Consumer Protection and Service Standards) Act 1999 specifically refers to people with disabilities through the provision of "equivalent services" for those who, because of disability, are unable to access the basic voice service. TEDICORE emphasises that it is reviewing the USO from a viewpoint of the necessity to provide these equivalent services at all times and in all locations. People with disabilities especially Deaf people subscribe to 3G mobile networks and to Internet services for their communication needs. These give access to voice, MMS, SMS, data and video and as such they are keenly used by people who cannot readily access basic voice services. For people who are Deaf, Video over IP is of particular importance.

The Allen Group consulting report<sup>1</sup> on mobile phone services undertaken for the Australian Mobile Telecommunications Association (AMTA) shows the penetration of mobile services in the marketplace. There were 16 million services in 2004-05 (81% of the population), and approximately 20 million services were projected by 2005-06 for 94% of the population. Current figures put the market penetration at 98% of the population.

MarketClarity<sup>2</sup> gives projections of a similar burgeoning of the IP services market with 1.4 million VoIP services in 2006-07 and a projection of 4.8 million by 2011.

ACMA's Communication Report 2005-06 (p. 51) states that there were 11.26 million fixed-line telephone services and that the number has been declining. This is in line with international projections from the ITU.<sup>3</sup>

It is important that mobile and IP-based services take their place beside the fixed line networks, for which demand is reducing, and become part of the USO.

For people with disabilities, access to a Disability Equipment Program (DEP) is essential. TEDICORE has advocated for the development of an independent DEP<sup>4</sup>. For people with disabilities unable to use a phone directory, access to a free directory assistance service, irrespective of whichever service provider is subscribed to, is also essential. Priority Assistance to registered eligible people and the provision of a usable interim service are also essential. These services should all be part of the USO.

**Q.2.1.** Should the defined legislated service linked to the USO, the STS, continue to be the benchmark service for the universal service providers?

The currently defined STS is of great importance for people with disabilities due to its inclusion of equivalent voice services. However, it has itself become outmoded by technological changes. The definition of the STS needs to be upgraded to cater for the current and future communication needs of all Australians including people with disabilities. This can be done by incorporating interoperability in a new definition of the

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<sup>1</sup> AMTA (2005) *Australian Mobile Telecommunications Industry: Economic Significance*, the Allen Consulting Group, accessed online at: [http://www.amta.org.au/amta/site/amta/downloads/pdfs\\_2005/AMTA%20Industry%20Report%20%20Exec%20Summary%202005.pdf](http://www.amta.org.au/amta/site/amta/downloads/pdfs_2005/AMTA%20Industry%20Report%20%20Exec%20Summary%202005.pdf)

<sup>2</sup> Information accessed online at: <http://www.marketclarity.com.au>

<sup>3</sup> ITU (2007) *The Future of Voice: Framing the debate*, accessed online at: <http://www.itu.int/osg/spu/ni/voice/presentations/S1-1-Kelly-Ponder.ppt>

<sup>4</sup> TEDICORE (2002) *TEDICORE Position Paper: the development of a new Telecommunications Disability Program*, accessed online at: [http://www.tedicore.org.au/documents/dep\\_position\\_paper.rtf](http://www.tedicore.org.au/documents/dep_position_paper.rtf)

STS that applies to 'communication' rather than 'telephone'. But, as the STS is just the definition of a term, the USO must specifically define the requirement and then use the new standard service definition.

**Q.2.2.** Which feature of the current STS should be provided as part of universal access to basic phone services, and which features could be optional?

All the features of the STS as currently defined should remain. However its definition needs to be expanded to apply to more than fixed line services. It is a 'service' that should not be restricted to any particular access technology.

**RECOMMENDATION 3.**

That the definition of basic phone services be expanded to 'basic communication services' such as mobile and include Voice over IP, Text over IP and Video over IP over all access technologies including wireless and mobile.

**Q.2.3.** What types of network technologies are suitable for the delivery of basic phone services? For example, could universal service be delivered by mobile networks or over a broadband data network using VoIP?

The current government Broadband Guarantee sets an example of a program that supports broadband delivery to consumers throughout Australia. It is defined on the Departmental website as follows:

"Any Australian who is unable to access a metro-comparable broadband service (a minimum 512/128kbps data speed, 1GB per month data usage and a total cost, over three years, including installation and connection fees of \$2,500 GST inclusive) at their principal place of residence or small business will be eligible to receive a subsidised service under the Australian Broadband Guarantee."

As VoIP and mobile communications are now common-place, the broadband delivery mechanism for VoIP throughout Australia can and should be considered as universal service.

Naturally, Deaf people and people with hearing or speech impairments need an equivalent service to voice and thus Text over IP and Video over IP are required as well as VoIP. For Deaf people using Video over IP, it is necessary to use synchronous speeds of 512 kbps to enable clear two-way conversation by AUSLAN (Australian Sign Language). With the growing use of video services, mainstream users will require this bandwidth capability as well.

The model of the Broadband Guarantee should be used and made into a legislative obligation under the USO. This means that there can be competition among providers throughout Australia while at the same time providing certainty for consumers with disabilities that they will obtain the bandwidth to communicate via VoIP, Text over IP or Video over IP depending on their needs.

**RECOMMENDATION 4.**

That the model of the Broadband Guarantee becomes a legislative obligation under the USO. This should deliver minimum broadband speeds of 512 kbps in each direction to

enable Video over IP communication for mainstream users and for Deaf people as a voice equivalent service.

**Q.2.5.** What service standards should apply to basic phone services delivered by the universal service provider?

A number of the key USO concepts, outlined in Attachment C to the Issues Paper, are considered individually in part answer to Q.2.5. Listings are omitted wherever there were no comments.

**Any-to-any connectivity** is fundamental to the ability of a person to communicate effectively with another person. It is very important that the concept of any-to-any connectivity be preserved under the USO. People with disabilities do not all communicate by voice. Deaf people prefer to communicate in their first language, AUSLAN (Australian Sign Language) and thus need Video over IP or video calling over mobile networks. As they are unable to use voice communications, they may also use text communications (currently analogue TTYs), but wish to use Text over IP as a real-time communication service. This also applies to people with hearing or speech impairments.

**Priority Assistance.** This is a vital safeguard for many people with disabilities and needs to be retained. In the future, priority assistance needs to be available for mobile and broadband services as well as the fixed line network as more and more people unsubscribe from a fixed line service. While priority assistance is currently a license condition on Telstra, it should become part of the USO.

#### **RECOMMENDATION 5.**

Priority Assistance be available for all communication services, independent of access technology. This includes mobile, wireless and broadband as well as the current fixed line voice networks.

**Payphones** remain essential services, especially for people with disabilities and those on low income.

**STS.** The STS is defined as **communications** for the purpose of voice telephony or its equivalent for people with disabilities. It follows that Text over IP and Video over IP should now be part of the STS. This is discussed elsewhere in this paper.

**TIO.** The TIO needs to continue to investigate complaints and their role should be expanded to cover emerging technologies.

**Q.2.7.** What aspects of the current universal service arrangements for basic phone services work well and should be maintained?

All aspects of the current USO arrangements need to be preserved but may need to be restructured with regard to an expansion into mobile, wireless and broadband technologies.

**Q.2.8.** What aspects should be changed?

- (i) A Communications Allowance should be established for people with disabilities in order for people who are employed, undertaking vocational training or voluntary work to be able to access communications equitably. The concept of the Communications Allowance is based on that of the Mobility Allowance for people with disabilities who cannot use public transport without substantial assistance. This is currently set at a maximum rate of \$104 per fortnight.

A Communications Allowance would provide the mechanism for eligible people with disabilities to obtain equitable access to communications modes to meet their needs. This may be Video over IP for Deaf people, for example. Blind people could subscribe to a mobile phone plan that included a more expensive handset using the Symbian operating system to enable them to purchase screen reading software so that they can use all menu functions including SMS with speech output. These are only two examples of how a Communications Allowance would make a difference in the provision of equitable communications for people with disabilities. The Allowance needs to be set at a level to accommodate the costs that need to be met.

The price caps provided for in the USO structure (that are not currently used) and the license conditions on Telstra together address the issues of affordability. The Communications Allowance retains the concern for affordability but uses a different delivery mechanism.

**RECOMMENDATION 6.**

That a Communications Allowance be implemented to allow for equitable access to communications by people with disabilities.

- (ii) Practical considerations need to be reviewed for operation of an equitable Disability Equipment Program providing suitable hardware and software for fixed, mobile and Internet-based communications. An independent Disability Equipment Program should be established in conjunction with the Communications Allowance. The Disability Equipment Program would be a central clearinghouse for specialised hardware and software so that people with disabilities can obtain expert advice, the products as well as technical support when needed. This should be independent of any particular network or service provider for reasons of equitable access to services.

**RECOMMENDATION 7.**

That an independent Disability Equipment Program be established in conjunction with the Communications Allowance to offer people with disabilities expert advice, products and technical support.

**Q.2.9.** What would be the ideal approach to providing universal service for basic phone services?

The ideal approach is outlined under question 2.3 above.

**Q.2.10.** Is the level of service standards that applies to Telstra USO services (as set out in the Standard Marketing Plan [SMP]) reasonable? Is it too flexible and lenient on Telstra? Or is it overly prescriptive in an environment where consumers are choosing other feature and functionality as more valuable to them in the new telecommunications environment?

The level of service standards that apply to the Telstra USO services are reasonable. Consideration could be given to reducing the length of time allowed for installation of new services, once an approved request has been received. However, the seeming lack of consequences when SMP criteria are not met, is not reasonable.

It is also important that standard transmission speeds be increased to meet the communications needs of all Australians including people with disabilities.

**Q.2.11.** Does the concept of a SMP provide an effective regulatory mechanism? What alternatives exist?

A SMP only provides an effective regulatory mechanism to the extent that it is followed, that adherence to the SMP is monitored and that there is a penalty for any breaches.

**Q.2.13** Does the very high take up of mobile services mean that service standards can be altered?

The high uptake of mobile services means that it is imperative that service standards be applied more widely. The escalating number of complaints to the TIO attests to the urgency of these changes for the protection of consumers.

A Choice magazine investigation into complaints about mobile phones found that repair times were long and customer service lacking. It reported that: "the Australian Competition and Consumer Commission receives more complaints about telcos than (for) any other industry, with a substantial number relating to mobiles. Complaints about mobiles to the TIO jumped by 29%, to over 52,000 – a staggering 1000 complaints per week on average. And that followed an 88% increase in the previous year."<sup>5</sup>

Clearly, service standards need to be applied to mobile phone services.

### ***Chapter 3: Payphones in a changing telecommunications environment***

**Q.3.1.** With the widespread uptake of mobile phones, in what circumstances should there be a requirement to provide a public payphone?

Payphones are an important means of communication in rural, remote and regional areas, as well as for people of low income in all areas (particularly in low socio-economic areas), and for people with disabilities who are over-represented in low socio-economic

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<sup>5</sup> Choice magazine, accessed online (6.10.07) at:  
<http://www.choice.com.au/viewArticle.aspx?id=105544&caId=100517&tid=100008&p=1&title=Mobile+phone+repairs>

groups and those living in an institution, nursing or group home with limited/no private phone access.

The SMP sets out the criteria for the installation of Telstra-operated payphones. The criteria are all predicated on the size of the community. There is no consideration of likely places of residence for people with disabilities. Many of these locations would be considered unprofitable by a private payphone operator. It is essential that a SMP would enable a payphone to be installed in places where requested by people with disabilities.

**RECOMMENDATION 8.**

That accessible payphones should be provided on application in areas where there are numbers of people with disabilities, e.g. in institutions and group homes.

**Q.3.2.** What aspects of the current payphone arrangements work well and should be maintained?

Many aspects of the current payphone arrangements work well. Payphone complaints are small but payphone numbers are similarly small. However, it is essential that rural, remote and regional coverage be continued especially in remote Indigenous communities.

It is essential that both Telstra and TriTel comply with the accessibility criteria specified in the Communications Alliance Payphone Guideline (G630: 2006 Accessibility of Payphones). This should be used as the basis for service standards to be applied to all current and future payphone providers.

**Q.3.3.** From a community perspective, what should be changed?

From a community perspective, extra consideration should be given to the provision of payphones in areas of low socio-economic status. In addition upgrading of payphones to include a video calling facility should be added. Payphones should be encouraged to become "PayTerminals" for all forms of communication.

**Q.3.5.** What would be the best approach to providing universal access to payphones?

The current practices should be continued, with the USO used to subsidise the installation and maintenance of non-profitable installations in areas of low mobile service coverage. The USO should be used to provide incentives for upgrading to new technologies.

**RECOMMENDATION 9.**

That the continuing importance of payphones be recognised, that they become multimedia and that the USO continue to be used to subsidise their installation and maintenance.

## ***Chapter 5: Delivery of services under the universal service regime***

**Q.5.21.** How can consumers be made more aware of the respective roles of organisations involved in oversight and compliance of the universal service regime?

Consumers have a very low level of knowledge about the USO, or any other regulatory conditions protecting their communications rights. Informing consumers about any 'new' USO should be an outcome of this Review. ACMA can play an important role here.

Other useful vehicles for informing consumers include media advertisements (print/radio/television) and information or human interest articles in a range of magazines. People with disabilities can also be reached through disability advocacy organisations, general consumer organisations, disability service organisations, and health channels.

### **RECOMMENDATION 10.**

That there be a requirement to disseminate information about the USO to consumers.

## **Recommendations**

### **RECOMMENDATION 1.**

That the function of the USO continue as a legal requirement so that people with disabilities have equitable access to communications technologies, based on the Articles in the United Nations Convention on the Rights of Persons with a Disability.

### **RECOMMENDATION 2.**

That the USO deliver **communications** which are accessible, affordable and available to all people in Australia including people with disabilities no matter where they work or reside.

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Priority Assistance be available for all communication services, independent of access technology. This includes mobile, wireless and broadband as well as the current fixed line voice networks.

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## Conclusion

Rapid technological changes have taken place in communications over the past decade. Similarly, there has been a markedly increased uptake of mobile services, accompanied by the emergence of IP-based communications services. All these changes mean that the the USO needs to be updated and expanded. TEDICORE believes that there is willingness from industry, consumers and the regulators to engage in a productive dialogue to bring about the changes needed to deliver high quality, accessible communication services to all Australians, and in particular to people with disabilities.

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## **Text - over - IP (ToIP) — Industry Issues**

Text-over-IP (or ToIP) is a new means of communicating using text in real-time reliably over the Internet.

### **Background**

The TTY is the device that is used today by people who want to communicate using real-time text. It is a terminal with a small display, a keyboard and a modem so it can be connected to a standard PSTN line.

Most TTY users are Deaf or hearing impaired or speech impaired. They use TTYs as it is difficult or impossible for them to use the standard telephone to communicate. Other users include organisations who wish TTY users to communicate with them, and friends and relatives of TTY users.

TTYs were designed to work in the PSTN world. They use modems to transfer the encoded text in a character-by-character mode. The text is encoded using the 5-bit Baudot code – the one used by the old telegraph and Telex machines.

TTY signals can be carried over the Internet as 'audio signals' provided that there is no 'speech compression' and very little packet loss as these can cause severe signal distortion and erroneous or missing text.

TTYs do not work effectively over the mobile networks in Australia today.

A TTY terminal is rather unique as it allows a simple form of 'multimedia' service provision on the PSTN. It can support text in one direction and speech in the other if required. This is called Voice Carry-over (VCO) and Hearing Carry-over (HCO). For VCO, a person with a hearing impairment who can speak, will speak to the caller but receive text back. In the case of a person with a speech impairment, he/she will use HCO to listen to the caller but will type text back.

### **Social importance of real time text conversation**

Real time voice communication access is taken for granted by people.

TTY users use text to replace the voice telephony portion of communication. TTY conversations are real time.

With Text over IP, users know when there are pauses, and when someone is typing fast – which is part

of the communication in itself. Because the text is sent and received character by character, it means that conversation is spontaneous and each party can interrupt the other or change course at any time with the full knowledge of the other party at the time it happens. This is different from many IM interactions where one party has moved on to another topic, while waiting for a response from the other party.

## What is ToIP?

ToIP is defined as a mainstream real-time text service that operates over the Internet. It can operate at any speed and has built-in added reliability features. It is built on the same principles as the latest VoIP technology.

ToIP uses the internationally recognised T.140 real-time text presentation layer protocol. T.140 includes some simple real-time editing capabilities.

ToIP can be used on many different types of accesses to IP networks. It can be used over narrowband accesses (as it uses less than 2 kbit/s @ 30 characters/sec) and broadband accesses. A typical terminal on a fixed line access would be a home computer that supported multimedia communications - Voice and Video and real-time Text over IP. The multimedia application software could be pre-loaded into the computer or ToIP or multimedia software could be downloaded into a computer. (*Some open-source software is already available – see SIPcon1 on SourceForge.*)

ToIP can also be used over mobile networks using mobile terminals that have a moderate to large screen and a good keyboard. The mobile terminals may have the ToIP or multimedia software already installed or software could be downloaded from the Internet.

Text-over-IP has been designed as a replacement for TTYs when using the IP-based networks. It has less service restrictions compared with TTYs, is designed to be used as a mainstream service and can be used on standard computers or mobile terminals. Proper alerting systems for incoming calls need to be included as well as user interfaces, both hardware and software, that meet the needs of Deaf people, and people with hearing or speech impairments. This can best be achieved with input from end-users in the development stages.

(See Text over IP description on Wikipedia - [http://en.wikipedia.org/wiki/Text\\_over\\_IP](http://en.wikipedia.org/wiki/Text_over_IP))

## Emergence of ToIP as an industry standard

- Text-over-IP (ToIP) is gaining the attention of mainstream users and NGN network implementers. It has been defined by the IETF and has been specified for inclusion in the IP Multimedia Sub-system (IMS)<sup>6</sup> that is being used to implement many Next Generation Networks (NGNs).
- ToIP is real-time text that is suitable for conversations. It is sent after buffering of characters for less than half a second.
- ToIP has been defined to complement VoIP, Video-over-IP and Instant Messaging communications.
- Support of ToIP is being considered in multimedia Emergency Public Service Answering Points (PSAPs) in Europe and USA. IETF working group ECRIT defines its use for Emergency Services.

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<sup>6</sup> ToIP is defined as part of IMS in 3GPP TS 26.114 v2.0.0 "IMS, Multimedia Telephony, Media handling and interaction".

- ToIP provides a very different user experience to that of Instant Messaging (IM) which has sentence-based or paragraph-based transmission.
- ToIP can also increase the accessibility of deaf, hearing impaired and speech impaired users to mainstream communications.
- ToIP can meet regulatory requirements to provide 'equivalent service' to the telephone service for people who have hearing or speech impairments with very little impact on networks.

## Features of ToIP

- ToIP is designed around the ITU-T **T.140** real-time text presentation layer protocol (defined for H.32x multimedia services).
  - ToIP is sometimes referred to as 'T.140-over-IP'.
  - T.140 allows real-time editing of text e.g. by using 'backspace' and retyping.
  - T.140 is based on the ISO10646 character set that is used by most IP text specifications and uses the **UTF-8** format.
- ToIP transport uses the same Real-time Transport Protocol (**RTP**) as VoIP and Video-over-IP.
  - The text is encoded according to IETF **RFC4103** “RTP Payload for Text Conversation”. It is a 'Standards Track' document.
- RFC4103 supports an optional, standard form of redundant transmission to effectively provide a very low end-to-end packet loss across IP transmission links that have rather high packet loss.
- RFC4103 can buffer text for a short time (0.3 – 0.5 seconds) before transferring it to improve efficiency.
- Very fast typing (30 characters/sec) results in a **2 kbit/s** traffic load (including overheads for RFC4103, RTP, UDP and IP).
- Control of ToIP sessions can be achieved using the standard SIP/SDP protocols. The only changes required are to SDP and they have already been included in the latest version of SDP.
  1. The features of SDP that ToIP uses are defined in 3GPP TS 26.114 v2.0.0 A5.1 where text is identified by the inclusion of '**m=text**'.
  2. Also see “**Framework for ToIP using SIP/SDP**” (approved draft-ietf-sipping-toip-07.txt) and IETF **RFC 4504** “SIP Telephony Device Requirements and Configuration”.

# ToIP Q&A from a user's perspective

- **How do I use ToIP ?**

ToIP can be used by a user with a ToIP-capable terminal to call any other user with a ToIP-capable terminal. ToIP-capable means that the terminal has ToIP or multimedia application software that supports the ToIP protocols.

Call establishment is exactly the same as a VoIP call.

A ToIP-User would start a ToIP or multimedia application. To make a ToIP call, the ToIP-User would enter the telephone number or the VoIP address in the address field of the application, indicate that he/she wants to make a 'text' call and then click on a 'Call' button.

When the called ToIP-User answers the call e.g. by clicking on an 'Answer Call' button and then typing text like 'Hello'. The text will appear in a window in a display format that suits the needs of each ToIP-User. Text can be sent at any time by either user and all of the text conversation will appear within 1 second on the other user's screen.

To close down a ToIP call, either ToIP-User can click on the 'Hang up' button.

## 1 What can I use ToIP for?

ToIP can be used to transfer conversational text information reliably over IP networks in real-time. It can be used:

1. in conjunction with voice and video in a multimedia application or on its own using a dedicated ToIP application,
2. by people of any age who want a fast and really interactive means of conversing,
3. in noisy environments where it may be hard to hear,
4. in environments where other people are nearby but where communications privacy is required,
5. to transfer information e.g. numbers, addresses etc, where exactness is necessary,
6. by people with hearing or speech impairments to communicate with able-bodied and hearing or speech impaired people.

## 2 What ToIP customer equipment is available on the market ?

ToIP or multimedia application software can use existing terminals like PCs, notebooks and mobile terminals with reasonable screen and keyboard capabilities.

The application software can be either provided when people buy the terminal with the ToIP service included OR it could be downloaded on request over the Internet.

Terminals that have software that supports ToIP include:

- Omnitor Allan eC Total Conversation PC software with video, real-time text and voice,
- Aupix videophone with video, real-time text and voice,
- RNID Talk-By-Text software with real-time text,
- Trace/Omnitor SIPCon1 open-source PC software with video, real-time text and voice,
- Asterisk open source IP multimedia exchange,
- AnnieS ToIP software for 2.5G GSM mobile terminals e.g. Blackberry.

Most of these have been successfully tested at an ETSI Interop in April 2007.

Some ToIP-TTY Gateways have also been developed e.g. by Omnitor and AnnieS.

### **3 If ToIP is the IP equivalent of TTY-over-PSTN, how do I connect my TTY to IP ?**

There has been discussion about making a TTY-to-ToIP Adapter box that would allow existing TTYs to be used on an IP network. That is, much like a VoIP Analog Terminal Adapter or ATA. However, a cost benefit analysis needs to be done and no Adapter has been developed at this time.

The current recommendation is that people use their existing TTYs on the PSTN and use ToIP on any Internet access or any suitable mobile terminal.

### **4 Can my existing TTY be used with ToIP ?**

For a TTY-User on the PSTN to communicate with a ToIP-User on IP requires the use of a *TTY-ToIP Gateway* device to be included in a network that is accessible by all TTY and ToIP Users.

Calls from ToIP-Users to TTY-Users can be automatically routed via the Gateway. The use of a PSTN called number plus the indication (“*m=text*”) in the SIP/SDP protocol that this is a text call will identify the need to route the call to the TTY-ToIP Gateway.

Calls from TTY-Users to ToIP-Users do not have any indication that they are 'text' calls. They will require a means of identifying that the call should be routed via the Gateway device. The ACIF/Communications Alliance Any-to-Any Text Connectivity Options Working Group report to DCITA in August 2004 provides some guidance. (See <http://www.acif.org.au/Activities/tata> ) Once connected to the Gateway device, the TTY-User can then enter either PSTN (number-based) addresses or Internet-type addresses e.g. sip:name@domain.

A Gateway is needed while there are many TTY users still in the community.

### **5 What advantages/benefits will I get over and above my existing TTY on PSTN ?**

TTYs can operate at a maximum of 6 characters per second in a half duplex manner. ToIP can operate at any speed in a full duplex manner.

TTYs are specialised terminals. TTY-Users must communicate with other TTY-Users that also have TTYs. TTYs have created a virtual 'closed user group' due to the uniqueness of the TTY. ToIP software can be added to mainstream computers and mobile terminals for little or no cost making ToIP more accessible for all users.

ToIP can be used in conjunction with Video-over-IP and well as VoIP.

Mainstream users will also be able to add ToIP for little or no cost to their existing fixed or mobile terminals so that they can communicate effectively with ToIP-Users.

ToIP is consistent with NGN developments and can be used over fixed or mobile accesses.

## **Difference between ToIP and IM and email**

The *email service* has been used for many years on the Internet. It sends multiple paragraphs as a single message. It can include other files as attachments. It is not real-time.

*Instant Messaging (IM)* is a text service that sends sentences or paragraphs quite quickly. However, as there can be a considerable delay between the first character of a sentence or paragraph being typed and that character actually being sent, it is not real-time.

*ToIP* provides a real-time, character-by-character text conversation. It is closely aligned with the conversational nature of VoIP. It is real-time as defined by ITU-T F.700 and F.703.

The user experience of ToIP is very different from the IM user experience.

Clearly, there is a place for all three text services in the multimedia world. Each can be used where it is most appropriate.

## **Reasons for supporting ToIP**

ToIP is a mainstream real-time text service that has been defined for use by the 3GPP IMS which is the basis for most NGN implementations.

ToIP complements Voice-over-IP and Video-over-IP – and uses very similar protocols and addressing. It can be introduced as a new service with very little impact on NGN networks.

ToIP can provide one form of “equivalent service” as defined by the Standard Telephone Service (STS) with little impact on networks. It also enables users to have a more cost-effective service than the current TTY service over the PSTN with the potential for call charges to be based on data transmitted rather than PSTN call charging.

The low cost of adding ToIP application (or a multimedia application) client software to user terminals means that it will remove a barrier to communication that the cost of TTYs creates. It also has the potential to reduce the need for TTY Relay services as more users will be more easily be able to communicate directly using ToIP.

With the rapid growth of multimedia communications, plans are already under way to expand the means to access emergency services. ToIP is one of the services that are being planned to be included in Europe and North America.

## **Conclusions**

The inclusion of support for ToIP in NGNs as specified by the IMS can be achieved at little additional cost and will provide the opportunity for network operators to provide a new service that they can offer all customers.

It is consistent with the Voice and Video over IP solutions that are being introduced via the IMS. It is also consistent with developments in access to emergency services.

It provides a real-time text alternative to TTY-over-PSTN that is consistent with rapid network developments. It eliminates the need to “do something special” for some people with hearing and speech impairments in order to meet legislative requirements.

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