



The Internet telephone: Voice over Internet Protocol (VoIP)

Phone calls on-line

In an ironic twist, basic telephony has come full circle to challenge telecommunications incumbents, all through a new and promising technology—VoIP. The acronym stands for ‘Voice over Internet Protocol’ and uses the same technology as the Internet. VoIP has the potential to enable cheaper long distance and international telephone voice calls than the normal public switched telephone network (PSTN), but not without some upfront costs and technicalities.

A subscriber to VoIP service receives a handset that resembles and works like a normal telephone, but the service uses Internet Protocol (IP) technology over the data cable so as to provide more flexible phone calls. The calls may be cheaper than traditional services, whether made to other network subscribers or to the public network. VoIP may offer call waiting, conference calls and user billing plans. A cheaper alternative is the use of computer microphones and speakers with www.skype.com software.¹

However, users face the upfront costs of obtaining a handset as well as the ongoing Internet service subscription charges. There is also an issue of service quality and reliability. Muffled sound levels or feedback issues have plagued some early systems.

VoIP does not necessarily need broadband capacity, but VoIP won't work if the Internet connection is down. Note that VoIP for telephony is quite a separate activity from downloading entertainment programs or using other multimedia capabilities on computers. The possibility of having mobile VoIP through wireless is discussed here. This should not be confused with common mobile phone use.

Following a demonstration project in regional Victoria, the introduction of VoIP in Australia is proceeding. Regional carrier, Neighbourhood Cable, installed a cable system providing VoIP services in Ballarat, Geelong and Mildura, providing subscribers with access to a range of new services of pay TV, Internet access and VoIP. Nationally, Telstra and Optus have now decided to provide VoIP services in 2005 to home customers, building on commercial services.

A number of smaller companies have provided such services and handsets already.² Handsets may cost around \$249 with a \$16 monthly subscription, in addition to connection fees anywhere in the world. Note that the service fees and initial setup connection costs may be significant and vary among providers.

Technology issues

Each VoIP telephone has an Internet Protocol address that fully identifies the handset no matter where in the world it is located, thus offering the ability of a single ID number. The handset can be used anywhere as long as IP access is available. There are also service variations available, such as using normal telephones at each end with calls routed via Internet or broadband service providers.

While a standard telephone call uses up to 64kbps of data, VoIP technology compresses signals down to 8kbps. Silence suppression further reduces the required bandwidth by only allowing the transmission of data packets while someone is actually speaking. The end result is the need for much less bandwidth, although there are reports of variable voice quality if the upstream and downstream bandwidths vary.³

Corporate VoIP installations now provide always-available access to private local area networks with intelligent service features. These allow multimedia support, so that the concept of video telephones can also become a reality. Such setups may replace links to proprietary switchboard systems. VoIP-over-mobile networks may be a further new development, to allow Internet access to be integrated into wireless handsets, provided that spectrum is cheap.

Technical and legal issues

In the case of emergency calls, PSTN telephone services have a dedicated emergency priority system where a call to 000 should provide precedence should the exchange be congested. While VoIP's access to 000 is comparable with that of PSTN services, the nature of the VoIP service means that the location of the caller may not always be certain. Network operators are working to address this issue.

Current telecommunication performance standards originally developed for PSTN telephone services may not adequately serve VoIP technology. To address issues such as voice call quality e.g. echoes, for VoIP services, the standards are under review. Locally, the Australian Communications Authority is actively looking at the implications of four billion IP numbering addresses.

Also being reviewed are matters relating to security, privacy, law enforcement and access for people with a disability. However, according to a recent Network Insight analysis, there may not be overwhelming legal change required to accommodate VoIP services.⁴ Thus VoIP may be applications-driven rather than cost-driven.

The challenges facing VoIP also include matters of interconnection, identity, interception, customer credit and privacy. Interoperability based on a common standard seems to be eluding manufacturers so far.

Wi-Fi and wireless broadband

Promising wireless technologies that offer broadband (high bandwidth capacity) services over local regions may well assist VoIP. Wireless Internet provides access to the Internet without a telephone line or cable, using radio frequency bands. This requires the presence of local wireless 'hotspots' or subscription to a wireless Internet service provider.

Hotspots use Wi-Fi technology, enabling Internet access, within a 100 metre or so range. A computer wireless card costs around \$200 to buy. There will also be an account for the wireless access with a service provider, unless free services like www.public.net.au or www.wafreenet.org are utilised.

Wireless broadband Internet Service Providers (ISPs) such as Unwired or iBurst operate their own ISP networks using proprietary technologies. Such companies provide a special modem and antenna to connect personal computers from anywhere within their network coverage areas. Installation and service prices vary with plan choice. Note that regional and remote areas are not well served.

Broadband uptake

The *Economist* has warned of impending brand wars as VoIP gains increasing market share from traditional phone networks. VoIP is independent of distance and time costs, and breaks the nexus between broadband access and telephony service. However, incumbent PSTN operators will not stand by, especially as many provide broadband access.⁵

Some developing nations have acted to ban VoIP in their countries in favour of the existing PSTNs, given the 'digital divide' facing many such nations. This action may overlook the multimedia capabilities on offer, possible cost and price savings, and opportunities. The established carriers can use the same VoIP technology if they so choose and offer a range of services at various price and quality levels.

Analyst Paul Budde claims that VoIP here seriously threatens telecommunications carriers or pay TV providers, unless they act to impede broadband deployment, since VoIP competitors can provide voice as well as data over a single broadband connection. By international standards, Australia's broadband rollout has been tardy, costly and somewhat compromised by pay television policy.

As at June 2004, there were just over a million broadband (>200 kbps) services connected across Australia, according to the ACCC. This represented growth of 26 per cent over the previous quarter. Digital subscriber line broadband was the service with the highest growth rate.⁶ The nation ranked 22nd in the broadband users listing produced by the OECD. Just over half of Australian households have Internet access,

with less in regional and remote areas, according to the ABS. Close to two-thirds of households have access to a computer, but there are variances due to age and location across the nation.⁷

Australian broadband development has been a national issue, with extensive reviews of broadband policy undertaken over the past few years, including the [Broadband Advisory Group](#) process, the [Regional Telecommunications Inquiry](#), the [Framework for the Future](#), the [House of Representatives' Inquiry into Wireless Broadband Technologies](#), and the [Higher Education Bandwidth Advisory Committee](#) study.

Two recent Senate inquiries have focussed on broadband issues. The inquiry into [the Australian telecommunications network](#) supported the upgrading of infrastructure to improve broadband connectivity, along with more proactive regulation. The inquiry into [competition in broadband services](#) urged structural change to the telecommunications industry to remove Telstra's media interests, while setting a ten-year national target for service provision. Again, analyst Paul Budde notes that one year's Telstra profit alone—about \$5 billion—could provide broadband service to nearly all of regional Australia.⁸

The Government's response to the independent Regional Telecommunications Inquiry included funding of \$142.8 million over four years for a number of programs to address the bandwidth needs of regional, rural and remote areas. The Australian Government has also worked cooperatively with all state and territory governments to develop the [Australian National Broadband Strategy](#). Time will tell as to how this sits with growth in VoIP markets.

1. Google appears set to launch a similar service linking its search engine to providing lines for voice queries.
2. Packages are offered by electronic stores, Broadband Phone, Freshtel, Eftel, Engin, Swiftel and other providers.
3. David Neiger, 'Accessing voice via Internet', *Engineers Australia*, November 2004, p. 46.
4. Mark Armstrong, 'Notes on VoIP Regulatory Options', *Network Insight*, Sydney, November 2004.
5. 'The phone call is dead; long live the phone call', *The Economist*, 2 December 2004.
6. ACCC, Media Release MR189/04, 31 August 2004.
7. ABS Media Release 148/2004, 22 September 2004.
8. Paul Budde, 'Editorial', *Paul Budde's Information Superhighways*, Vol. 11, No. 8, September 2004, p. 167.

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