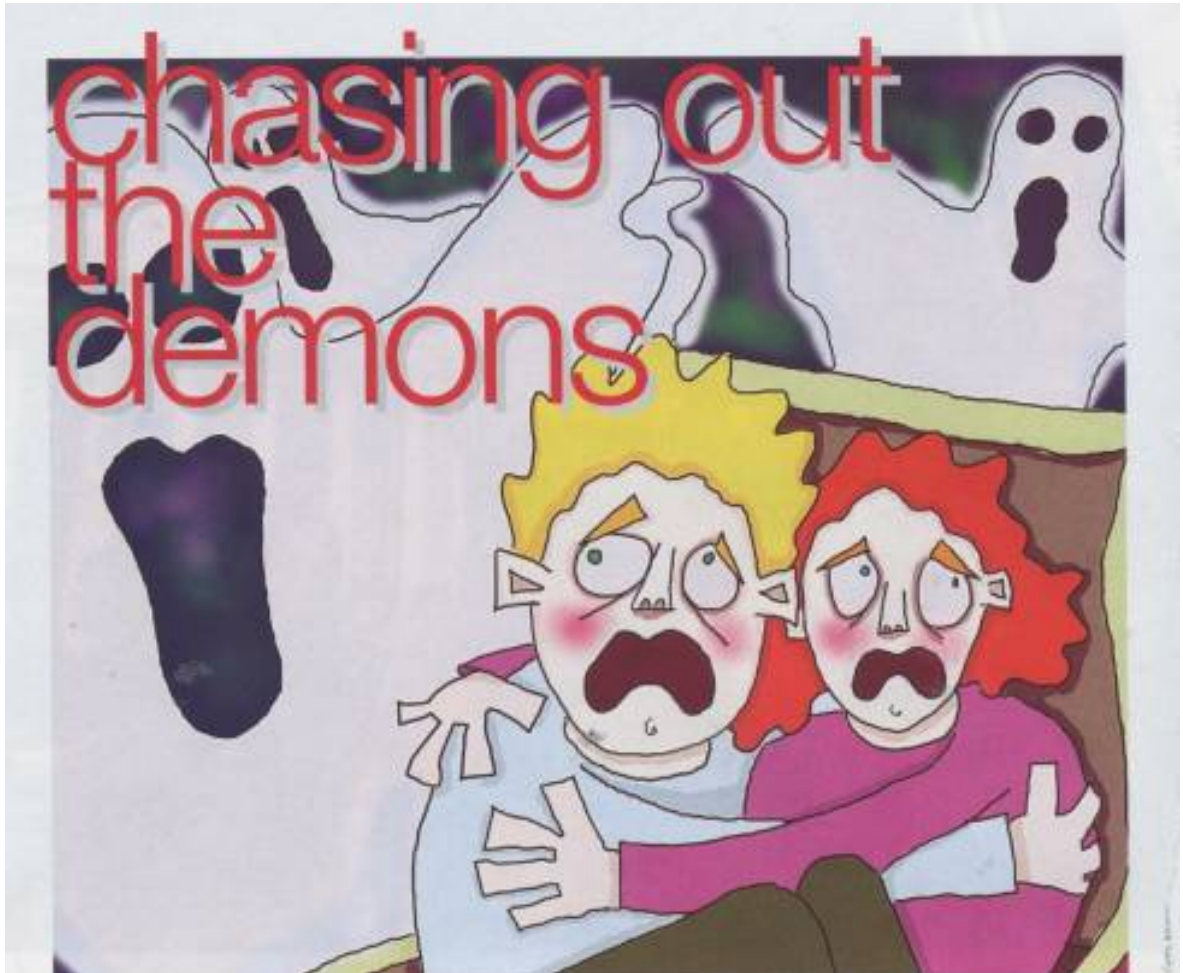




VoIP QoS



Will the ghosts in the machine of VoIP undermine the technology before it has had the chance to challenge the circuit switched monolith? Andrew Terry thinks not...

It's your worst nightmare. You're alone in the office, it's intensely still and there is an ominous silence in the air. The atmosphere turns cold and the hairs on the back of your neck start to bristle. But there's no dark and shady character lurking in the background with an axe, just the foreboding that comes from knowing yet another call made on your IP network has been abruptly severed.

This is much more than a bad dream for most businesses, as it can cost hundreds of thousands of pounds in reduced productivity, damaged reputations and lost customers. As a result, the majority of IT departments have restricted the use of IP-based networks to carrying data, and continued to rely on traditional phone connections for their voice requirements. This explains

why there is still a distinct lack of truly converged and affordable networking technology in the workplace, despite the wide-ranging availability of solutions. It also clarifies why many companies are spending a great deal more money than they need to in supporting two diverse systems that could, under the correct circumstances, be replaced by one central communications infrastructure.

Historically, the quality issues surrounding Voice over IP existed because of the way individual pieces (or cells) of data were transmitted over the Internet, or across VPNs. All but the most expensive leased line-based Voice over IP solutions tended to use pure DSL-based broadband technology – which works well for data but cannot deliver the voice quality associated with land-



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line connections. The reason for this is simple: all Internet protocols split voice and data transmissions into cells of data before sending them over the Internet to be reassembled at their final destination. However, DSL technology sends these data cells over different routes, which means they can arrive at their destination in any order, and have to be reorganised before the receiving device (IP phone, networked PC, etc.) can process them.

Although this usually only takes a few nanoseconds, it is sufficient to create delays and 'pregnant pauses' in conversations – which doesn't produce the best medium for conducting business. However, the problem is compounded because most broadband connections have to fight for their space with other Internet users. If you imagine the Internet as a motorway, with rush hours and quieter periods of usage, you start to see the problem quite clearly. During peak times when more cars are on the road, average speeds can drastically decrease, while journey times increase proportionately. You still have the same three or four wide lanes, but when they're full of traffic, you're going nowhere fast.

Fighting for bandwidth

On the Internet, this means voice and data cells are delivered at an even slower rate, as they have to fight for bandwidth during peak times. If the bandwidth is not available for an individual cell, it has to be re-sent by the originating device. This slows down the performance of data networks, and causes huge problems for voice transmissions as entire sections of the conversation can be delayed or even lost in the ether – creating patchy conversations. Remember the stand-up comedian, whose act revolved around a microphone that cut in and out at random intervals? Well that's what many conversations using IP connections sounded like.

It's therefore unsurprising that phone companies have remained smugly confident about the circuit-switched technology that still sits at the heart of all traditional phone networks and, which despite its age

and relative inflexibility, is still successfully seeing off the challenge from most Voice over IP technology. This is because circuit-switched technology seemed to offer everything that Voice over IP could not. It used a connection that was routed via dedicated physical cables (and more recently, wireless links) that could only be accessed by the parties involved in each call.

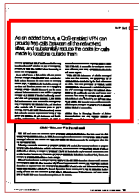
A more logical order

But now things have started to change. What if there was a way to use broadband to deliver IP cells in a more logical order – to reserve an exclusive Internet or VPN connection so that companies did not have to compete with each other for bandwidth, and to offer guaranteed quality of service (QoS) levels? Could Voice over IP then conquer its demons and find the holy grail of crystal clear conversations?

The answer is a resounding 'yes'.

By deploying an IP-based network that uses an ATM broadband connection, companies can access the full potential offered by Voice over IP and move towards a converged network environment. This is because ATM-based WAN connections transmit the cells of data so that they arrive at the destination device in the same sequence that they left the transmitting device. The ATM cells, therefore, do not need to be reordered at their destination, reaching the recipients' ears without any delay. In addition, quality of service standards and service level agreements can be guaranteed in an ATM environment, which provides businesses with the reassurance required to migrate to an IP-based solution.

By utilising an ATM connection, voice communications can be deployed in an IP environment – just like a leased or ISDN phone line. This means that each business has access to its own one-to-one connection and the entire network can run with a greater degree of efficiency than was previously possible. With this architecture in place, secure, reliable and affordable Voice over IP deployments are within reach of a whole range of companies that were discouraged by the high cost of leased lines and the unreliability of broadband. ►



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based IP solutions. In fact, it's quite possible for many broadband-based IP solutions to pay for themselves, particularly when they replace legacy frame-relay or leased line infrastructures.

As an added bonus, a QoS-enabled VPN can provide free calls between all the networked sites, and substantially reduce the costs for calls made to locations outside them. In addition, it can centralise a range of services and functions across each of a company's disparate offices – allowing everyone to use the same voicemail infrastructure and to have access to a central reception at a fraction of the cost traditionally associated with such consolidated solutions. It also means that businesses can move towards the exciting possibility of high-quality, real time video calls, and introduce other products with IP addresses (such as CCTV cameras, alarms and public address systems) across their networks to create unprecedented levels of integration and efficiency, as well as dynamic and flexible working environments. For example, as each IP

connection can deliver leased line voice quality at a fraction of the cost, it is possible for employees to work more effectively from home – and even provide remote call centre support.

Today, with the emergence of reliable converged voice and data networks, the possibilities for IP deployments are only limited by the kinds of hardware on offer. This new generation of Internet based communications lets companies exploit the full potential of IP technology, and helps the hardware manufacturers to confidently promote and install their solutions. This means the shadowy days of unstable Internet-based voice networking are definitely drawing to a close, and separate voice and data networks will shortly be consigned for good to the IT graveyard with no hope of a resurrection. ■

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