Call waiting

Is VoIP the latest telecommunications gold rush or just another over hyped technology?

Several Cisco Systems executives, sitting in a line on the front row, gave one another worried looks. A conference to showcase the US-based networking giant's vision for voice over Internet Protocol (VoIP) was not going to plan.

Dozens of journalists and analysts from across Europe had been invited to Cisco's sprawling estate of glass-fronted offices close to London's Heathrow Airport at the end of January 2002. The executives knew this was an opportunity to win over a skeptical audience. VoIP's technical problems were solved, the visitors would be told, and the slow-burning sector was poised for explosive growth. But many left the conference unconvinced.

Cisco's problems began with the choice of reference site. It quickly became clear that John Gladman, the straight-talking head of communications and IT at Surrey County Council, one of the UK's biggest local-government authorities, was not going to toe the party line. He stressed that he was a public servant answerable to elected members of the council – he was certainly not there to act as a salesman for Cisco equipment. And as he launched into a presentation about the council's new VoIP network, he remarked: "The key thing is: when I kick the tires, does it actually work?"

Unfortunately for Cisco (and service provider Cable & Wireless), it didn't work – or at least not all the time. Two floors of the council's offices in the town of Guildford had lost their phone service after the new equipment over-heated. A cooling system had to be installed to solve the problem.

As the presentation continued, the atmosphere in the conference room grew tense. Gladman drew up a slide revealing Surrey's choice of reference site: the New Zealand Social Policy Ministry's VoIP network, one of the biggest IP-based phone systems in the world. A member of the audience interrupted Gladman and asked him if he knew about the controversy surrounding the New Zealand network. He shook his head.

The questioner was referring to a case that has dogged the technical reputation of Cisco for 18 months and threatens to disrupt the VoIP market – unfairly on both counts, according to Cisco.

The system in question – an IP-based voice, video and data network connecting 8,000 IP phones in more than 200 offices – was built for the Wellington government in October 2000 at a cost of $2.8 million (€3.2m). Government documents released under the country's Official Information Act revealed how a special hotline had failed under the strain from callers trying to report possible cases of child abuse.

A ministry official acknowledged that missed calls were potential "life or death situations" for the children concerned. Calls to the ministry's Department of Work and Income also went astray and many offices suffered a complete loss of service. One senior civil servant wrote in a letter to a local newspaper: "Staff now have a perception that we've been sold another pup."

Cisco's VoIP sales people have spent the intervening period explaining to prospective customers how the network failures were related neither to its equipment nor even to VoIP technology itself. An internal Cisco document circulated to sales staff claims the problem resided at a call center that was served by a conventional private branch exchange (PBX), and had nothing to do with the new VoIP system. "This story is 18 months old and never seems to die," one frustrated Cisco salesman told *Infoconomist*. He suspects that misinformation about the case may be part of a smear campaign orchestrated by Cisco's rivals.

Whatever the facts about the New Zealand case, one thing is certain: mud sticks. Even VoIP advocates concede the technology has an image problem.
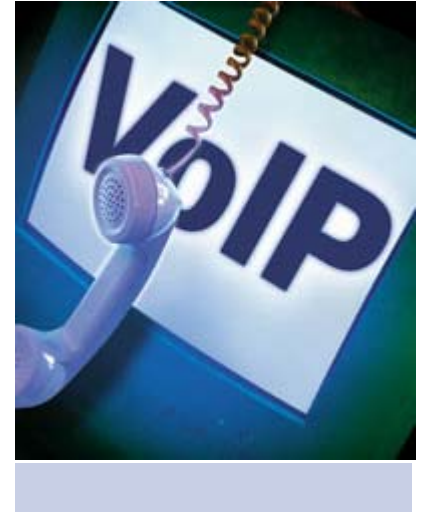
When it was first developed in the mid-1990s, VoIP and its main application, IP telephony, held out the promise of free office-to-office calls, low-cost domestic and international voice calls and value-added voice and data applications. Consumers loved it. Internet cafes across the world rolled out IP telephony services – usually a small investment – and cable operators such as UPC and Liberty Media said they planned to upgrade their networks to carry IP calls to the home.

But businesses were skeptical. They needed 100% uptime and would not tolerate quality problems. And they would have to spend more, adding VoIP servers and gateways to existing systems.

As the first equipment reached the corporate market, the backlash set in. Reports emerged of technical problems caused by network congestion and packet loss – such as echo, delay and lost dialogue. The industry learnt an important lesson: packet-based errors can be overlooked in the data world, but not in the voice world.

The technology's adoption was further hindered because the operators themselves were unwilling to share the financial risks with potential customers. Most operators refused to make quality-of-service commitments in the form of VoIP service-level agreements. Doubts were repeatedly voiced about the technology's scalability, interoperability and security features.

The equipment, too, was invariably expensive, often priced at a premium of 50% over conventional networking switches. And even though one of the key attractions of VoIP is the flexible way in which voice packets can be managed, some of the early systems lacked the basic features found in standard PBXs, such as call forwarding and caller ID.

However, none of these issues deterred the VCs. They looked beyond the initial scepticism and saw a telecoms market about to reinvent itself – with the winners and losers still undetermined. Hundreds of millions of euros were invested in young companies seeking to solve the technology's various problems and add powerful new VoIP applications. VoIP service providers also benefited from the backing of the investment community.

Now, early in 2002 and some five years after VoIP first began to interest the business sector, the investment is showing signs of paying off. Cisco's small problems aside, the technical issues have largely been resolved and equipment costs have fallen sharply, say optimists. It is, they say, time for telecom's next big revolution.

Grounds for optimism?
UBS Warburg, the US investment bank, believes that VoIP's time has come. "This should be the year that enterprise IP telephony experiences rapid growth," it proclaimed in a report identifying the 10 key technology trends of 2002.

It is a view shared by industry consultant InfoTech, which found in a recent survey that 90% of enterprises planned to conduct VoIP trials in 2002. Indeed, Paul Di Leo, Cisco's director of new technologies for EMEA, says: "The real driver for voice over IP is the enterprise."

Chris Rawson, Lloyd's of London: "Penetration rates of VoIP are low because most enterprises cannot find a clear business case for it."

But is such optimism completely warranted? Even VoIP advocate Chris Rawson, head of IT at Lloyd's of London, the insurance market, is not entirely convinced. He ordered one of Europe's biggest VoIP enterprise networks towards the end of 2001, after persuading the Lloyd's executive committee to take a punt on the new technology. It was a big risk, as Rawson points out: "The telephone is the lifeblood of this business."

The Lloyd's case, like that of the New Zealand Ministry of Social Policy and Surrey County Council, is significant because it will likely be one of Cisco's key reference sites.

Lloyd's did not rip out its existing PBX system and replace it with a new €2.3m VoIP system because it craved new technology. The decision was made on more pragmatic grounds. Some departments from another Lloyd's office were due to relocate at the beginning of 2002, while its telecoms service contract with BT was due to run out around the same time. "It seemed like the perfect opportunity to review our phone systems," he says.

This is an important issue, both for VoIP market entrants and VCs thinking of investing in VoIP start-ups. Is there is a clear business case for VoIP – the kind of business case that will help generate strong growth for a group of well-placed suppliers and integrators? Or will it instead gain ground over a much longer period of time, as enterprises gradually upgrade their legacy networks?

Rawson may be an early adopter, but he favors the latter scenario. He has this warning for suppliers: "Penetration rates are low because it is difficult for most organizations to justify the business case [of replacing PBX systems with VoIP networks]."

Still, vendors say that even the replacement business is a sizeable market. In 2001, some $3.5 billion (€4bn) was spent on new phone systems, according to analysts. "That is still a big piece of pie for us to go after," says Cisco's Di Leo.

It is also unclear whether most organizations are ready to invest in the full functionality of VoIP networks – at least initially. Products that vendors may struggle to sell to a 'return-on investment' conscious CIO could include videophones, text-to-voice and voice-to-text email and voicemail, use of the PC as a phone, and web access on the phone display.

There are many other VoIP applications that seem attractive but that arguably will be regarded as non-essential and even a little fanciful by CIOs. These could include voice-call databases, searching for text within a call, and the ability to take calls on a handheld computer while away from the office.

Lloyd's, for its part, has invested in a fairly simple system. Rawson says that new applications may be installed in the future. But before he buys, there will have to be a clear business case, he says.

The technical and business problems beyond the enterprise are far greater than within the enterprise, suggesting take up will be gradual. VoIP traffic based on a local area network, for example, has the advantage that bandwidth and quality of services are under local control. That is not necessarily the case with wide area traffic, whether or not it involves the public Internet. And quality problems will clearly suppress demand.

Wide area caution
Many wide area service providers are rolling out services very cautiously. UK-based BIS, which provides telecoms and Internet services to the shipping community, is a case in point. Subscribers to its phone service dial eight if they wish the call to be delivered at least part of the way over an IP network, and dial nine if they want it to be delivered over the conventional phone network.

Glenn Maule, the company's chief operating officer, says this enables BIS to demonstrate to users that the quality of service is as good with IP as with analogue calls. It also means that customers can easily back out of the VoIP service if they are unhappy.

BIS is one of dozens of new VoIP service providers. Low barriers to entry have encouraged Internet service providers (ISPs) and start-up telecoms resellers to flood the market. These companies use existing data networks for their services.

Once, a telecoms service provider needed to make huge investments in circuit-switched network infrastructure in order to compete. Today, however, a telecoms company can be up and running with VoIP gateway equipment that typically costs less than one-tenth of its circuit-switched equivalent. "This very low cost of entry is creating a highly fragmented market, with new start-up companies entering the market every day," Ovum analyst Annelise Berendt wrote in a 2001 research note. Pricing and business models, however, will be a major issue. IP packets today are mostly unmetered, or are so cheap to send that there is little scope for clear profit margins.

Because of this, some service providers may raise tariffs or – more controversially – begin charging for internal office-to-office calls delivered over a virtual private network. Indeed, Maule says that BIS is already studying such options. "No call is entirely free [to the service provider], of course. We would like to cross that bridge in about two years' time, but if there is going to be a charge it would be a minimal amount." However, the danger is that fierce competition among VoIP service providers may delay or even rule out such a move.

The major telecoms network operators cannot decide whether VoIP and IP telephony is a threat or an opportunity. IP-based voice calls would seem, on the face of it, to erode much of their traditional sources of revenue. But the reality is less clear-cut.

The main reason for using VoIP will be cheaper calls – but the cost of land-based domestic calls is already falling fast, and telecoms suppliers already have a long-term strategy to move towards premium value added services.

The international voice services market – where demand for IP telephony could be strong – is worth about $70 billion (€80.5bn). That sounds enormous, but most large carriers in Europe and the US generate only about 5% of their sales from such traffic.

Many incumbents are enthusiastically exploring the possibility of providing IP-based phone services on an outsourced basis. But just as simply many wish VoIP would go away. Take Deutsche Telekom, which is suspected of having prevented T-Online, its Internet service provider (ISP) subsidiary, from offering IP telephony because it feared such a service would hurt its own sales.

David Isenberg, former AT&T engineer and author of influential 1997 essay "The Rise of the Stupid Network", believes the impact of VoIP on telecoms providers will be far-reaching.

"They will slip to the bottom of the value chain, indeed they will not survive in any form that we recognise them in today," he says. "The network-infrastructure companies of the future will look very different than telcos – it will be like the difference between a stable and an automotive repair station."

But that is for the future. In the meantime, there is a rush to sell equipment, software and services. Cisco, with a 50% share of the equipment market, already has a strong lead. Most smaller technology companies and service providers will have to strike partnerships and OEM agreements with the networking giant, or risk being left out in the cold.

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