

# The Straw that Broke the Network's Back



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Twenty years ago, to start and run a business, you could invest in a desk, a phone line, a filing cabinet and some basic stationery, and business could feasibly commence. Networking meant handing out business cards and the idea of having a face-to-face conversation via a computer lay in the realm of sci-fi. Twenty years on, the stuff of fiction is now a reality. The Internet allows us to access information at any time and from most places on earth. You can conduct every office function imaginable from a device the size of a pack of cards; you can have that face-to-face meeting with someone 10,000 miles from you. The world is suddenly a very small place.

The network, the infrastructure on which these, and other, miraculous feats of communication rely, is so much a part of our day-to-day environment that it's almost impossible to remember life without it. The network is now a business-critical infrastructure and nearly every type of industry relies heavily on its reliability, whether to make money, enable processes, transmit information or optimise costs. However, today's network, this myriad of arteries and veins that pump and direct the life force of enterprise, is increasingly unable to support the demands made on it. It's a case of when, not if, it will collapse.

### The rise and rise of technology

To best understand the current crisis, it's worth reviewing how networks have evolved over the past decades. Internetworking had its roots laid in the early nineties but there was still considerable debate between multi-protocol environments as to which protocol would dominate. The surge of demand to inter-connect LANs and WANs – to be able to share resources – drove the demand, and around 1998 IP, the Internet Protocol, won the race. IP networks became mainstream and their adoption was exponential. They replaced and consolidated many other data networks, and went from being a business differentiator to a business staple. The majority of traffic was corporate-based and consisted mainly of access to back-end systems and corporate email.

Whilst the Y2K challenge attracted massive IT investment, the majority of expenditure was on back-end systems and mainframes. The network – deemed to be fairly young and only recently deployed – attracted little attention, and even less investment. When the bottom fell out of the dotcom market in 2001, the IT industry was

brought to its knees, and there was a desperate attempt to consolidate the unstructured IT investments that had been made and to clean up the mess of now extinct dotcom companies. The shock waves permeated beyond the IT industry into other sectors, for reasons ranging from total over-capacity to misjudged technology investments, and suddenly the brakes were on IT spending. The next three years were spent stabilising environments and driving operational efficiencies and the network was left without investment. That said, as traffic composition remained predominantly corporate and relatively unchanged, networks seemed to be performing well and as they were designed to.

Over the following years the Internet grew exponentially – beyond everybody's wildest dreams – but it was in 2005 that another network-life changing event occurred. IP telephony started to gain acceptance in the market and quickly became heralded as 'the next big thing'. It had considerable business benefits; it allowed the consolidation of data and voice networks, dramatically cheaper voice minutes and operational expense savings – accolades which didn't exactly impede its rapid adoption.

By the end of 2007 an explosion of development had been witnessed. IP telephony was now mainstream, and galloping behind it came unified communications and collaboration, web-based computing, Web 2.0, mobility, data centre consolidation, Green IT and virtualisation, among others. The network now found itself thoroughly overworked and largely overlooked. The majority of funding was pumped into these exciting new technologies, and whilst there was some investment in growing the network coverage, this was very much unstructured and predominantly confined to extending a ten year old architecture.

## The move to wireless

Technology is a self-perpetuating beast and whilst the network may currently be plodding on stoically, there are new technologies coming down the line that might be ground-breaking and network-breaking. Wireless is one such technology; the 'rivers of connectivity' associated with the wired Ethernet do not afford the level of pervasive connectivity and availability that the modern end-user now demands. There has been an evolving progression through the wireless standards from 802.11a through to the latest 802.11n standard. The latter has a Wi-Fi specification that can now seriously challenge wired connectivity. The earlier standards were designed primarily with data in mind and weren't structured for 'real time' connectivity. The 802.11a, for example, worked at 54 Mb/second, whilst the recent 802.11n connects at 300 Mb/second and has sufficient bandwidth and latency to effectively carry data, voice and video. The way is now paved for a new era in connectivity, so much so that industry analysts estimate that by 2011, 70% of new client to network connections will be wireless and by 2013, wireless will be the preferred form of connectivity. But to support applications in the future, there is a pressing need for people to re-architect their wireless network. In order, for example, to maintain sufficient coverage, one needs access points, and because wireless uses radio frequencies not wires, the network needs re-architecting to accommodate this. Such re-architecture can be seen as an investment in the future; the truly pervasive connectivity that wireless now offers can be described as the next quantum in productivity potential.

In the same way as the world-wide adoption of the cellular phone revolutionised human interaction, wireless promises to revolutionise business and human interaction. The Yankee stadium in New York, which recently incorporated wireless into its network, is a good example of the exciting possibilities that such connectivity affords. As you enter the stadium your cellular phone connects to the wireless network; you can check stats on your phone, get directions to your seat, talk to friends in other seats, play back sections of the game and even locate the nearest exit, toilet or food stand. In fact, this level of connectivity opens up a whole

new world of business opportunities and a brand new advertising medium – the ability to target and access consumers, regardless of where or when, is the stuff of marketing dreams.

## Voice over wireless

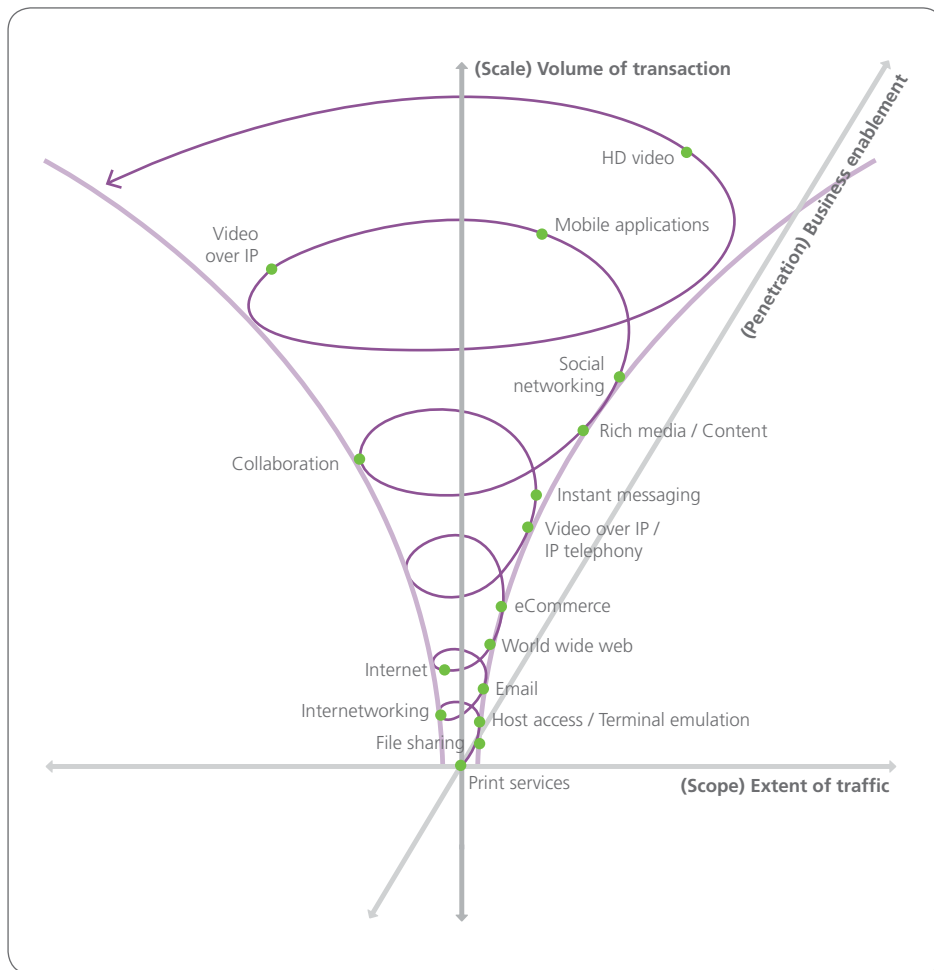
Internet Protocol (IP) telephony, or voice over IP (VoIP) is gaining popularity as a means to implement business communication anywhere, anytime. These technologies allow telephone calls to be made over the Internet as opposed to the ordinary public switched telephone system (PSTN). One of the primary motivations for implementing such a system is dramatically lower calling costs. The marriage of wireless LAN and IP telephony is voice over wireless LAN (VoWLAN) and, thanks to the improvements in wireless standards, the expectations of an increasingly mobile and IT savvy workforce, and the push for converged communications, this has become one of the major new applications for the wireless network. Users are able to enjoy real time voice communication whilst in the wireless space without incurring cellular costs or falling prey to the coverage unreliability associated with traditional cellular phones. Whilst the monetary savings are a significant driver for this technology, the productivity boon of such anywhere connectivity could prove invaluable. Being able to locate and communicate with an employee regardless of their location within the wireless space has obvious benefits to nearly every type of organisation. A hospital scenario, however, is an obvious example of where instant accessibility could have life changing repercussions. In this context VoWLAN would negate the need for lag-prone paging devices and would provide a viable alternative to cell phones, which can interfere with medical equipment.

## HD video

One of the most exciting new technologies on the market today has to be HD video and, in particular, TelePresence. This is a next generation video conferencing solution that uses high speed networking and high definition video technology. Being able to conduct a fully interactive, real time conversation with a life size, natural looking, HD quality image is more than reminiscent of the 'Beam me up, Scotty' teleporting technology so revered in Star Trek. Trekkies aside, this technology has exciting and far reaching implications for a number of enterprises and a number of reasons. Companies looking to cut down their travel spend, especially in this uncertain era of spiralling fuel costs, now have a viable alternative to face-to-face conferencing. Similarly, Green IT initiatives would benefit massively from a fading carbon footprint. The increased productivity and mental alertness of an employee, who is neither travel weary nor jet lagged, is another persuasive advantage, not to mention the increased job satisfaction of said employee's ability to balance their work and life more harmoniously, to spend more time at home and less in a hotel room. HD video, and IP TV in general, may well have the same sort of impact on business and communication that broadcast television had on radio, and will cause a significant shift in traditional business models. However, such technology is currently incredibly bandwidth-intensive and incurs fairly high operating costs. Real time traffic needs specific network treatment and service guarantees to operate satisfactorily. That said, the way has been paved, and there's no doubt that video over IP is going to go mainstream, sooner rather than later.

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**Network trajectory diagram**



**What's your network trajectory?**

In light of the pressures your network already faces and the demands that new technologies will bring, it makes sense to understand the exact path your network is on. This becomes even more critical when you consider that many of today's business models would come to a grinding halt if the network failed. The network trajectory diagram shows how the demands made on the network grow over time. The network has spiralled from supporting initial functions such as file and print services to more business-penetrative and network-dependant applications. The majority of today's networks have extended their reach in terms of volumes of traffic, functional scope and wide penetration of business areas. While this expansion is a sign of networking success, initial designs and architecture certainly did not take this

wide-ranging use into account and many organisations today are lumbered with a network that simply can't cope.

One of the implications of this risky situation is a slowdown or halting of operations. Work styles and business processes have been completely transformed by the availability of pervasive connectivity. We run businesses in a world where anytime, anywhere connection to information and transactional systems is often taken for granted or even a prerequisite for the smooth functioning of operations. Looking forward, this dependency is only likely to increase as new technologies become ever better at delivering location independence and real-time, almost-as-good-as physically present user interaction. Given this reliability on the networking fabric, understanding the network trajectory becomes critical.

**Where to start?**

In order to figure out how close your network is to breaking point, it's important to first assess whether the current state of your network adequately supports your business needs right now. It's often a very difficult question to answer. In many cases there's been no prior need to maintain detailed information on a network's 'current state', because the major new traffic changes have only occurred in the last few years. The following actions, however, will enable you to accurately assess your current network state and give you the insight and foresight to build a comprehensive network road map for the future.

1. Conduct a baseline network assessment to give you a 'state the nation' view of your network.
2. Assess your current network performance. This will tell you how close to breaking point your current network infrastructure is.
3. Review your mobility requirements going forward and assess whether your current wireless network will meet them. Do you know if your wireless is set up to scale to handle the additional demands of mobile users and new communication services?
4. Map your current architecture and articulate a vision for a network that supports the delivery of converged communications and a communication-enabled business model.

By implementing a measured and structured approach to both optimising your network's current performance and preparing your network for the future, you will be setting yourself up for the next inevitable era of communication. Don't wait to see which straw will break the network's back because, for your business, that could prove to be the short straw.

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