



# Network Performance Frustration Research Report

Is your network running at the speed of life?



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The Network Performance Frustration research was conducted from April through to June 2008 to investigate the challenges that poor network performance presents to organisations, their employees and their IT departments. The research was commissioned by Dimension Data, sponsored by Blue Coat and conducted by Datamonitor.

This Research Report is a summary of the key findings of the research and is available for download from [www.dimensiondata.com/speedoflife](http://www.dimensiondata.com/speedoflife).

### About Dimension Data

Dimension Data (LSE:DDT), a specialist IT services and solutions provider, helps clients plan, build, support and manage their network and IT infrastructures. Dimension Data applies its expertise in networking, security, operating environments, storage and contact center technologies and its unique skills in consulting, integration and managed services to create customised client services. [www.dimensiondata.com](http://www.dimensiondata.com)



### About Blue Coat Systems

Blue Coat Systems, Inc., founded in 1996, (NASDAQ: BCSI) is a publicly-held company based in Sunnyvale, California. Blue Coat secures Web communications and accelerates business applications across the distributed enterprise. Blue Coat's family of appliances and client-based solutions – deployed in branch offices, Internet gateways, end points, and data centers – provide intelligent points of policy-based control enabling IT organizations to optimise security and accelerate performance for all users and applications. Blue Coat has installed more than 40,000 appliances at over 8,000 customers worldwide.



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# Introduction

This report focuses on the results of the first research undertaken by Dimension Data into Network Performance Frustration.

Online interviews were conducted with 957 IT users, and 267 IT Decision Makers responsible for managing IT networks, across Europe, Australia, Central and Latin America, Far East, Middle East and Africa and North America. The objectives of this research were fourfold; to establish the levels to which users experience network performance related issues, the effect that these performance issues have on users' productivity at work, the degree to which IT decision makers understand performance issues and the level of maturity that IT decision makers have in addressing network performance. Having discussed these issues in depth, the report looks to briefly discuss some of the potential solutions to Network Performance Frustration and examine, in light of the findings, the potential impact that such solutions could have on IT users, IT Decision Makers and, in turn, the organisations that employ them.

The demographics of this research are displayed in Appendix A.



# Today's IT users

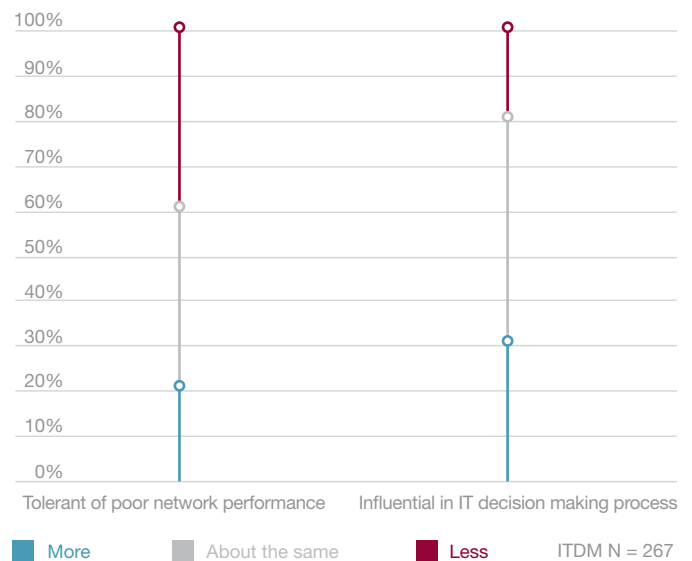
In order to fully understand the nature of performance frustration, it is important to get a clear picture of the IT users who use the technology. There are many links in the performance chain, but it is logical that performance is defined by the end-user experience. It is the end-users' experience of network and application performance which will impact directly on their ability to deliver their optimal performance for the enterprise they work for. Consequently, before analysing the specific nature of their performance frustrations, it is crucial to examine the usage and behaviour patterns of the IT user - what technologies they are using, and how and where they are accessing it. These variables can have a significant impact on network performance, and in many cases the IT user's usage patterns could be contributing to performance disruptions. Understand the user, and you will go a long way into understanding where performance is now, and where it could be in the future, not least because of the increasing leverage that the IT user has in the workplace. Most IT Decision Makers (ITDMs) believe that users are less tolerant of poor network performance and more influential in the IT decision than they used to be and actually have more power to influence change in their corporate network environments, as shown in Figure 1.

The consumerisation and socialisation of IT are two key drivers of change in IT today. IT departments are now dealing with a generation of IT natives, who learn technology at home and not the workplace. This IT literacy manifests itself in consumers adopting, and using, new technologies at an unprecedented rate, and frequently via their corporate networks. In fact, leading industry analysts suggest that more than 50% of network traffic is not business related, and that most enterprises have very little visibility of this. The research performed for this report certainly gives credence to this statistic. Of the nearly 1,000 IT users asked how often they connected to a network that is not their company's, over 50% of respondents answered that they connect daily.

While 12% of respondents only use IT connections at work, nearly two thirds also use alternative connections outside of work. In order to further investigate what exactly the IT user is accessing whilst at work, they were asked what external Internet resources they used at work, and whether they were for personal or work use. The results are displayed in Figure 3.

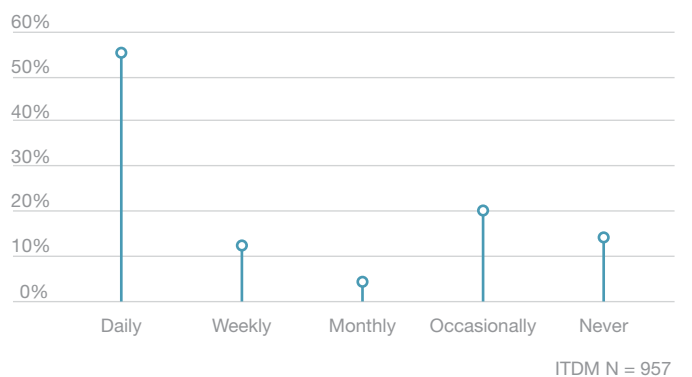
**Figure 1: ITDMs perceive users to have increasing power and to be less tolerant**

*Do you believe users are less or more tolerant of poorer network performance than in the past? Less or more influential in IT decision making process than in the past? (Respondents%)*



**Figure 2: The majority of IT Users connect daily to a network that is not their employers'**

*How often do you connect to a network that is not your company's? (Respondents%)*



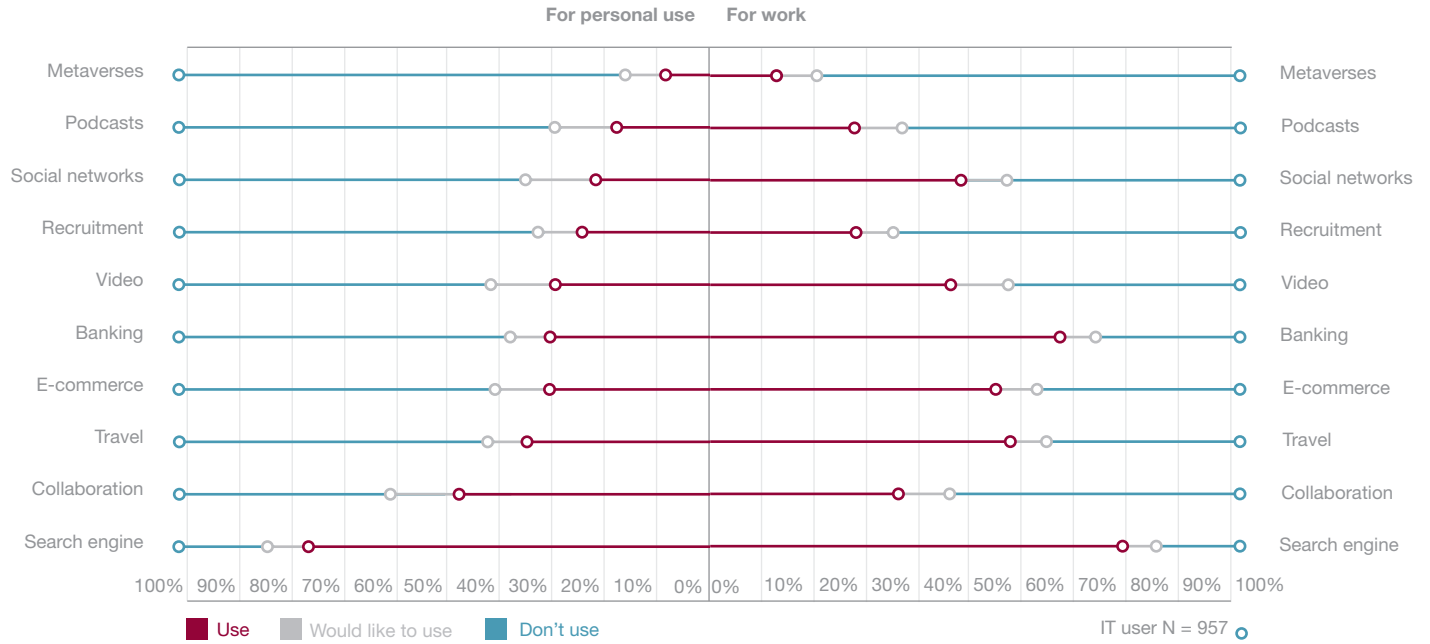
“The consumerisation and socialisation of IT are two key drivers of change in IT today.”





**Figure 3: End-users increasingly use Internet resources for both work and personal reasons**

*Do you use any of these external Internet resources at work? Select all that apply...*



# What impact could these usage patterns have on the network?

## Is your network secure?

Network congestion as a result of worms, viruses and denial-of-service attacks can cause the poor performance of key enterprise applications and needs to be addressed to safeguard and optimise the network. Security threats are frequently the results of unsolicited and rogue traffic on the corporate network that could have severe security and compliance repercussions. A granular view of network traffic will not only facilitate performance management, but also allow for flexible, effective and business-enabling security policies.

The results clearly show that IT users use a range of technologies at work, but not necessarily for work. The research shows that Search is by far the most adopted technology, with 80% of the respondents asserting that they use it for personal use but whilst at work. Social networking is being used by almost half the IT users, while one fifth says they use it for work purposes. Social networks such as Facebook, LinkedIn, YouTube, My Space etc. are a common service to a growing percentage of workers, and as Figure 4 highlights, these services are being accessed from the workplace. These are graphic intensive sites that consume large amounts of bandwidth. Recent studies have revealed that YouTube, the popular video sharing site, can account for up to 10% of all network traffic, and that video streaming formats account for as much as 46% of all Internet traffic. Such widespread usage patterns imply that many organisations must be suffering from the unsolicited use of their internal network resources.

The growth in Instant Messenger (IM) users is reflective of e-mail 10 years ago; there are more than 700 million IM users between MSN, Yahoo and AOL. These services not only support IM sessions, but a wide suite of collaboration services, including video conferencing, peer-to-peer (P2P) voice – similar to SKYPE –, file transfers, multi-way IM conferencing and many more, all applications that can sap the bandwidth resource of companies. Users, and the nature of the applications they use in the workplace, generate a significant amount of ‘rogue traffic’ – traffic that can have an adverse impact on company applications. SKYPE is a good example of this; to guarantee acceptable voice quality, SKYPE always sets the Type of Service (ToS) field to the highest value in order to gain the highest priority for its traffic in a network. This means that the SKYPE traffic of a corporate user talking to a friend will always be guaranteed better treatment than data sessions to a company ERP system.

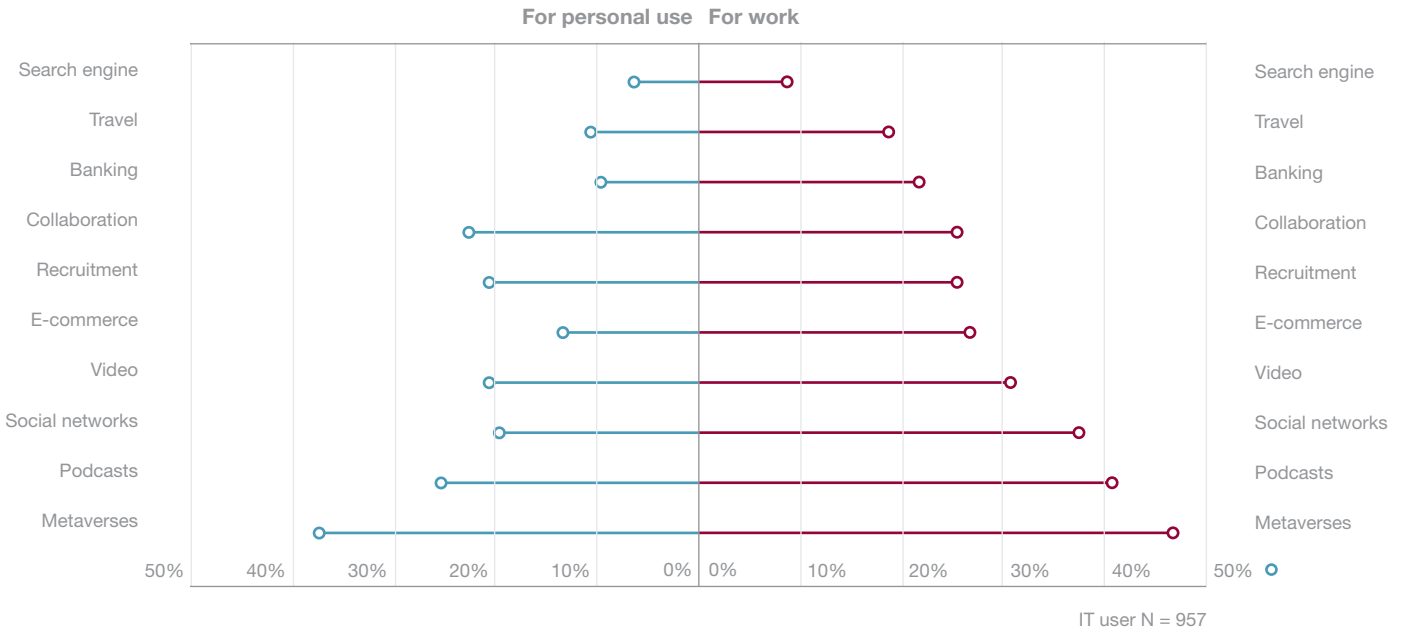
Looking at the web application and services that are being significantly utilised for work purposes, there is evidence of a growing trend in companies in-sourcing certain services that would previously have been outsourced or dealt with outside of the corporate network. Travel, recruitment and banking are examples of these, and employees are being increasingly required to leverage these services and employ Internet services as part of the corporate enterprise application suite. Web-based computing introduces a whole new set of protocols to the network. Browsers use HTML and/or XML and introduce large amounts of varying protocol traffic and changing traffic patterns. The ping-pong, or ‘chatty’ nature of how objects are downloaded can result in significant latency problems, which in turn can render poor performance and user experience. Distributed applications, in general, require 5-10 times as much bandwidth as standalone applications due to the increased traffic, and there is still the potential of latency challenges to resolve in order to provide the user with an acceptable experience.

There is little doubt that the problems associated with Internet applications are set to increase as the adoption of these technologies becomes even more embedded in the IT users usage patterns. Figure 4 shows that the adoption rate increase of these network intensive technologies would be particularly high if all those who wanted to use it, did. Interestingly, the technologies that are most sought after by IT users are the very same ones that are likely to cause the most performance problems.

“Social networking is being used by almost half the IT users, while one fifth says they use it for work purposes.”

**Figure 4: The resources that IT users would most like access to are those that potentially cause the most performance challenges**

Do you use any of these external Internet resources at work? Select all that apply... "Would like to use (but do not use currently)" responses - Desire Quotient\*



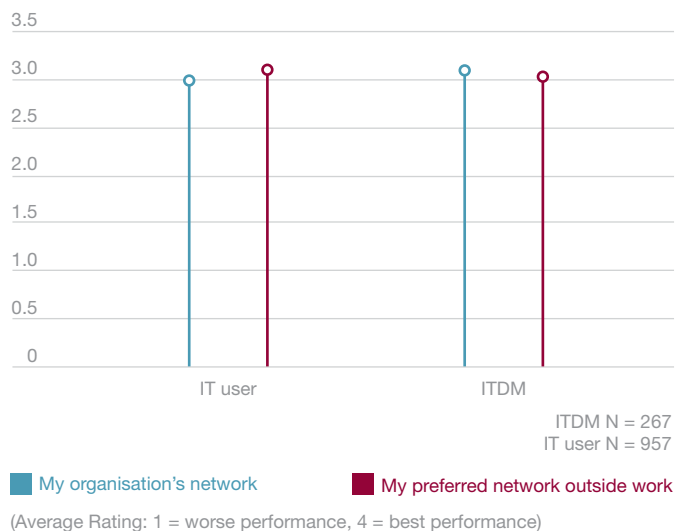
\* The percentage of increase in usage if those users who want to use it, start using it.

# Comparing networks' performance

Whilst the IT users' desire to expand their Internet application usage is evident, the perceived performance levels of external networks provide clear motivation. Both the IT users and the ITDMs were asked how they would rate the network performance within their organisation and the external network performance outside of their organisation. The results can be seen in Figure 5.

**Figure 5: Both IT Users and ITDMs perceive little difference in performance of internal and external networks**

*How would you rate network performance (speed, likelihood of crashing, etc.) within your organisation and the network outside of your organisation? (Average rating)*



“Enterprises now have to compete with the end-users perceptions and expectations towards these external networks.”

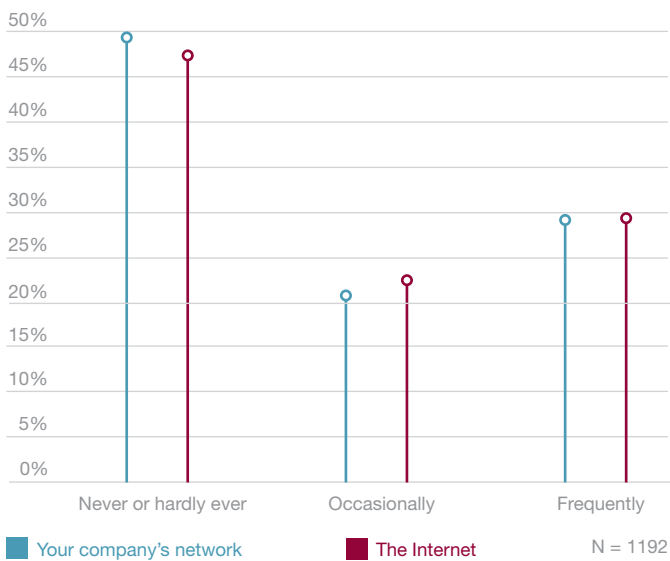
The responses in Figure 5 unequivocally show that IT users believe that enterprise networks perform roughly on par with their preferred external networks, whilst ITDMs give a slight edge to the corporate network. Strong investment by the various Service Providers has resulted in increasingly good performance perceptions. Enterprises now have to compete with the end-users perceptions and expectations towards these external networks. In most cases corporate networks would have, historically, outperformed external networks, perhaps resulting in a lower level of Internet use than the end-user would otherwise have employed. However, as consumer networks continue to invest and improve on their already favourable position, enterprise networks will have to keep pace.

Having established that both IT users and ITDMs perceive external networks to either match — or nearly match — the corporate network, further investigation into the actual performance of these networks, from both a management and end-user perspective, is necessary. ○

# What are the performance frustrations?

**Figure 6: More than half of IT Users experience their computers running slowly or crashing occasionally or frequently when connected to the network**

*On average, how often does your computer crash or run slowly when you are connected to ... (Respondents%)*

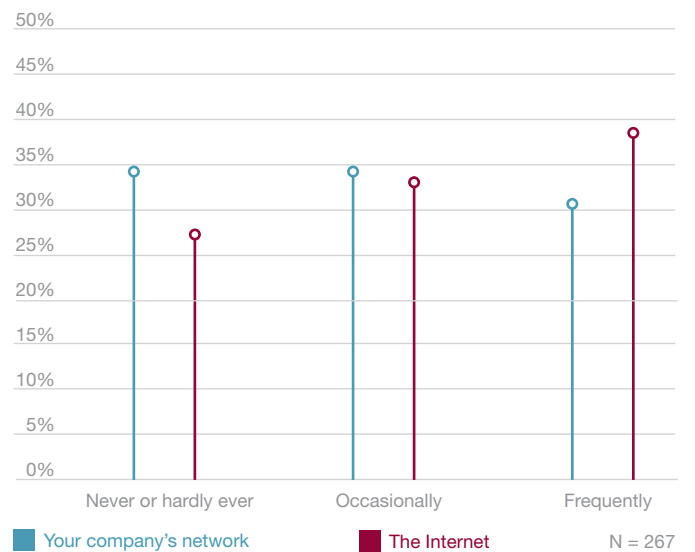


Both the IT users and the ITDMs were asked how often, in their opinion, their computers crash, or run slowly when connected to the company's network and the Internet, respectively. The findings in Figure 6 show that, on average, most users report slightly better performance when connected to their company's network. Somewhat more concerning is the evidence that one in three of the respondents frequently report that their computer crashes or runs slowly when connected to both the Internet and the corporate network. The data previously discussed shows that the vast majority of users are accessing the Internet at work on a daily basis. Of these people, over 30% will be frequently suffering severe performance problems. Similarly, 30% of users working on their corporate network will also incur serious performance issues, very probably as a direct result of the corporate network's exposure a variety of potential performance inhibitors, as outlined previously in the report.

ITDMs typically trust the corporate network more than users, as the graph above demonstrates. Over 35% of this group reported frequent computer crashes or impaired performance when connected to the Internet, and just over 30% reported the same issues when connected to the company network. This is a surprisingly high percentage when one considers that outsourced IT support particularly, would offer a Service Level Agreement (SLA) with previously agreed levels of service.

**Figure 7: ITDMs perceive their own networks' performance to be slightly better than the Internet**

*On average, how often does your computer crash or run slowly when you are connected to ... (Respondents%)*



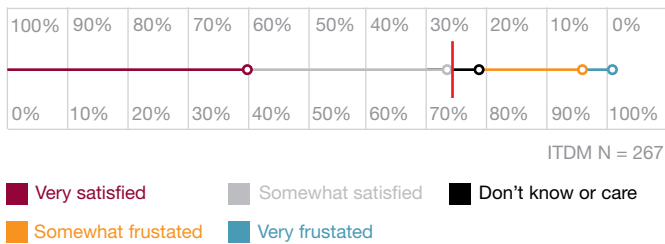
Interestingly, given the relatively high percentage (almost a third) of users suffering from frequent performance problems, most ITDMs think that their corporate network performance is optimal. When asked, overall, how frustrated or satisfied they were with their organisation's network performance overall, over two thirds of ITDMs reported that they were happy with the performance of the company network. However, 20% claim that they are somewhat to very frustrated with their network's performance.





**Figure 8: Over two-thirds of ITDMs say they are satisfied with their company's network performance**

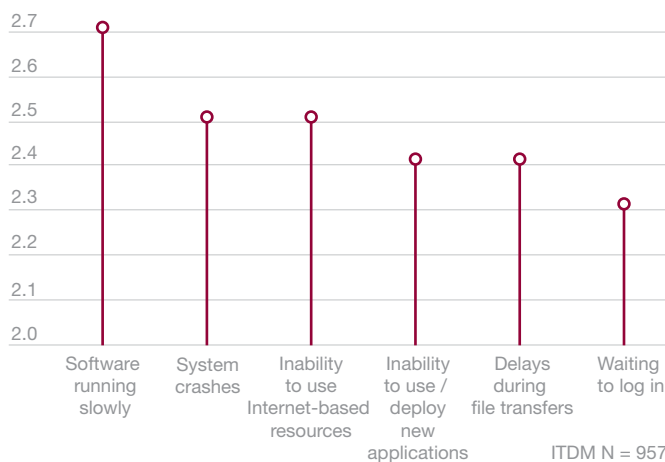
Overall, how frustrated or satisfied are you with your organisation's network performance? (Respondents%)



Flipping the percentages in Figure 8 on their heads, one can see that less than 40% of ITDMs are very satisfied with their network performance, a figure which would obviously be considerably higher if network performance could be improved. Similarly most end-users also think that their network performance is satisfactory, and of the frustrated users, most were somewhat, rather than very, frustrated, and perhaps not frustrated enough to complain about network performance. There is also no evident disparity between the ITDMs' perception of end-user frustrations, and the actual levels of frustration reported by the end-users.

**Figure 9: Users rank slow-running software, system crashes and inability to use Internet resources as most frustrating**

What irritates you the most about your company's network? (Average rating)



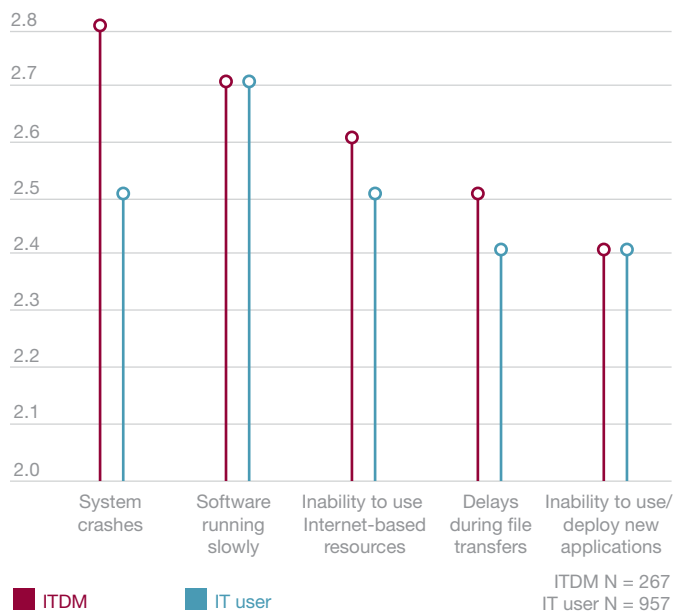
(Please rate the following factors from 1 to 4 where 1 = least irritating and 4 = most irritating)

But what exactly are the areas of greatest frustration for IT users? The IT users were asked to rank on a scale of 1 to 4 what irritated them the most about their company's network.

The results in Figure 9 show that slow-running software was the users' primary complaint, whilst system crashes and the inability to use Internet-based resources also trended higher. Software relies heavily on the underlying network to deliver its functionality and a poorly performing network would contribute significantly to slow software.

**Figure 10: ITDMs say system crashes are their worst irritation**

What do you think your users find the most irritating about your organisation's network? (Average rating)

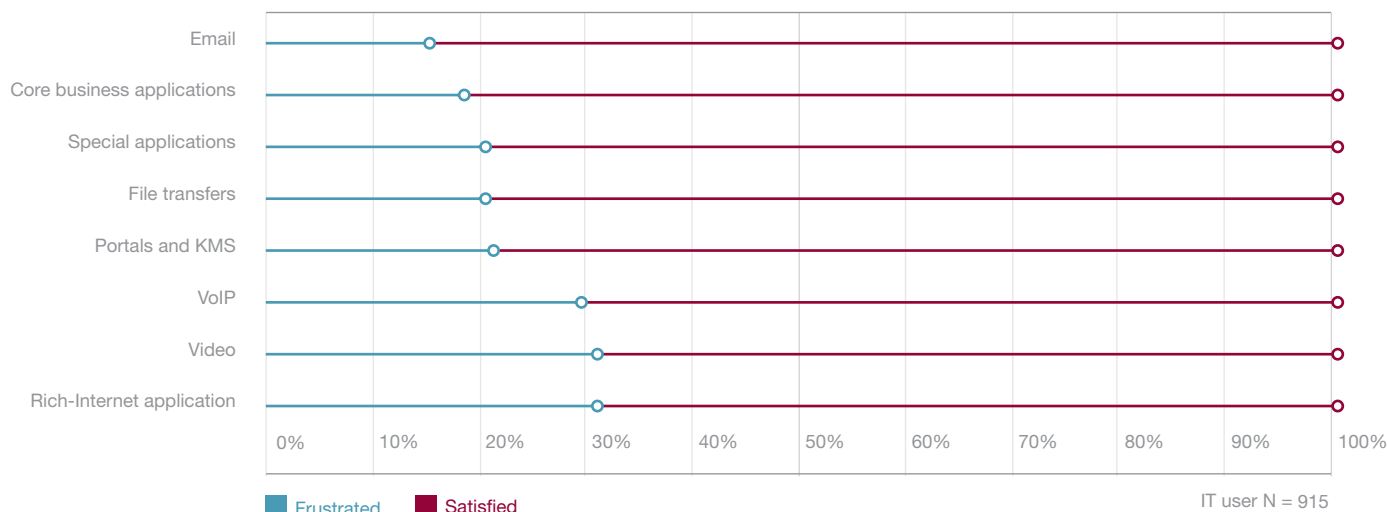


(Please rate the following factors from 1 to 4 where 1 = least irritating and 4 = most irritating)

Conversely, ITDMs find system crashes more frustrating than slow-running software, most probably because they have a larger impact on an ITDMs workload. ITDMs, on average, are only modestly frustrated overall, although slightly more so than IT users. With the intention of isolating more specific areas of performance frustration, the IT users were asked how frustrated or satisfied they are with the performance of the applications that they use on their company's network. Figure 11 displays the results.

**Figure 11: IT Users are most frustrated with VoIP, Video and Rich-Internet Applications**

*How frustrated or satisfied are you with the performance of the applications that you use on your company's network? (Respondents%)*



Based on the survey responses, it is apparent that the applications that cause end-users the most frustration are VoIP, Video and Rich-Internet Applications. VoIP and Video are bandwidth intensive technologies that are particularly sensitive to poorly performing networks. They also have an extremely low user-tolerance threshold, most obviously because their success relies on real time availability. As these technologies are used more and more

for business purposes, their performance needs to be considered. As previously discussed, many Internet applications are prone to sap corporate bandwidth and, by consequence, are likely to have a noticeable effect on this type of technology. Rich-Internet Application frustrations could be a result of legacy or hybrid IP/ legacy networks being unequipped to optimise the newer Internet based applications and protocols. ○

# The impact on productivity

The research results so far seem to indicate that many IT users and ITDMs are not overtly frustrated with network performance. However, further analysis into the levels of performance that both groups deem acceptable, should go a long way in highlighting whether their performance expectations are low, or indeed whether their networks are allowing them to work at optimal efficacy.

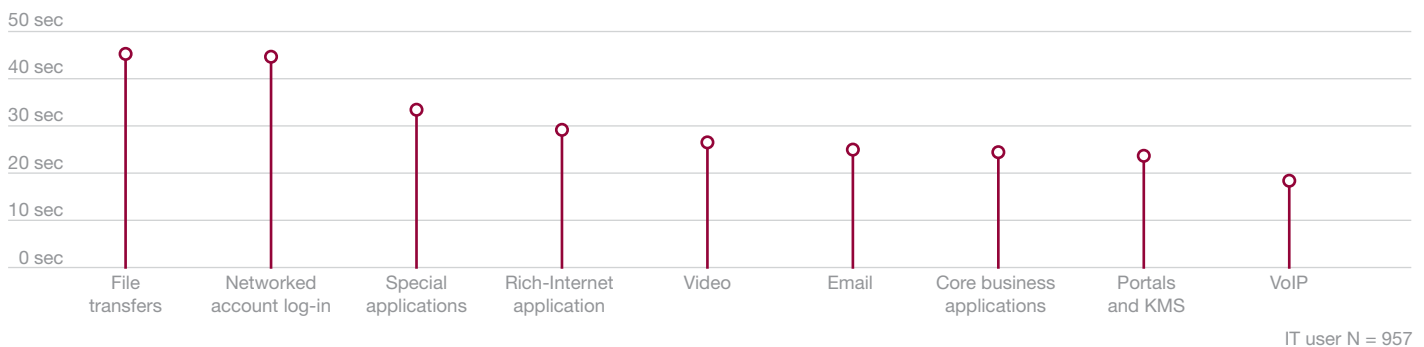
The IT users were asked how much of a delay – in seconds – they experienced during each session, or action, across a range of applications running on the network. The biggest performance

bottlenecks are file transfers and log-ins, both of which have an average delay of over 40 seconds. Whilst the shortest delay was with VoIP, with almost 20 seconds, the effect of voice latency in a conversation can render the application unusable; if there were delays of this length on a fixed, landline phone, users would be quick to end the call. Clearly performance issues of this nature could result in end-users avoiding using the technology, and therefore the company's original investment in it would be largely negated.

Figure 13 shows the total minutes lost per month calculated from the varying usage of these applications indicated by IT Users.

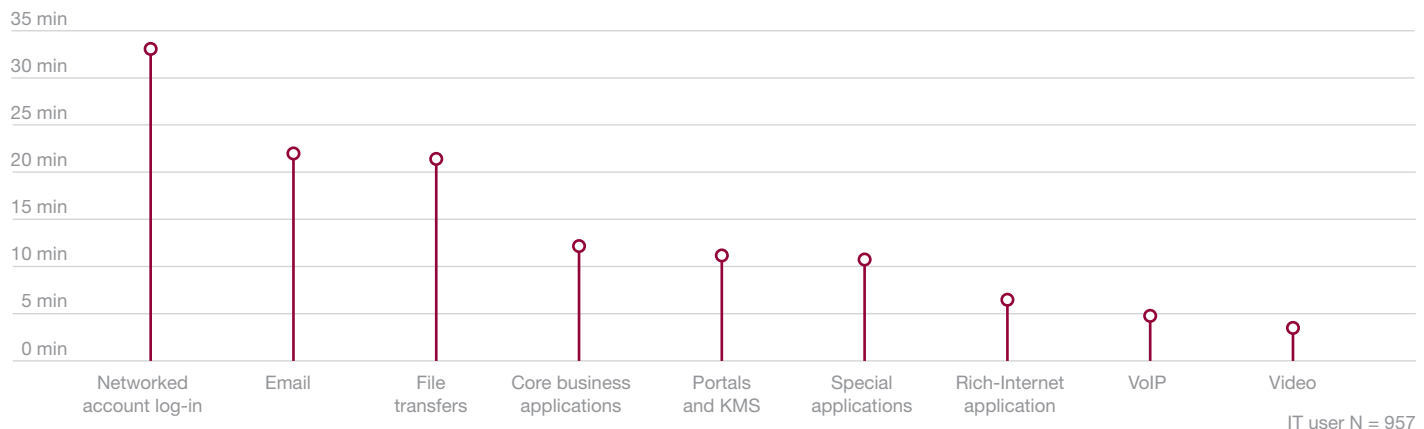
**Figure 12: IT Users experience delays across all types of applications and services delivered on the network**

*On average, how much of a delay do you experience during each session/action (in seconds)?*



**Figure 13: The delays experienced by users add up to at least two hours over the course of a month for the average user**

*On average, how much of a delay do you experience during each session / action (in minutes)?*



The results are startling; an average user typically wastes at least two hours per month on network-induced delays, adding up to between two to three days per year. This figure is even more worrying when multiplied across the enterprise. What would two or three days extra work per employee, per year, mean to an organisation of 1000 employees? It's also important to take into account the frequency with which certain applications are utilised.

Email delays, for example, might not be as noticeably lengthy as many other applications, but its heavy usage means it has a disproportionately higher impact. Consequently, performance must be looked at in the context of the entire organisation, and not just the individual end-user's performance perception. Likewise, with the usage of video, Rich Internet Applications and VoIP set to increase, delays in these areas will become ever more problematic. [o](#)



# The shifting perceptions of productivity

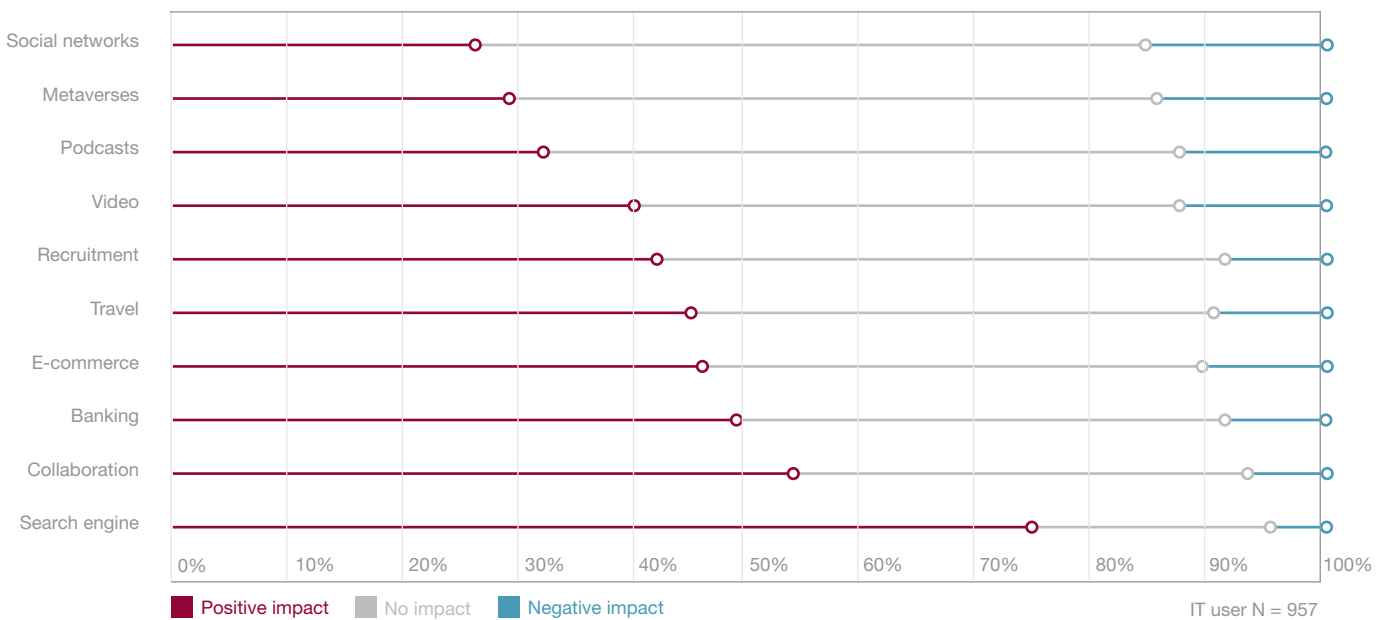
The issue of productivity should also be explored as an evolving concept. As evident in the Figure 4 (see page 8), IT users are pushing to incorporate a range of applications into their working environment. Collaboration, social networking and Video, a set of fairly bandwidth-hungry applications, are most in demand, and in all instances, a larger proportion of respondents would like to use the applications for work rather than personal use. A boost in productivity is most likely the primary motivation for these IT users, as the Figure 14 suggests.

The responses indicate that there are a number of these applications which employees feel would contribute to, rather than detract from, their productivity. Heavily adopted technologies, such as search engines, are considered very productive, and the positive response to banking, travel and e-commerce resources nods to the trend, discussed earlier in this document, of bringing previously outsourced services under employee control. Over 50% of the

IT users believe collaboration technologies would also increase productivity. In some cases, it could be shown that some personal use technologies might negate the need to spend unnecessary time away from the office, and therefore have an indirectly positive influence. Over 40% of respondents believe that video technologies can have a positive effect on productivity. Considering that an estimated 275 million business travellers per year traverse the world's air routes, train lines and road networks, it's clear that Video could prevent the outlay of expensive resources in the form of lost time, travel costs, reduced efficiency, environmental impact and physical and personal sacrifice on the part of employees, whose work-life balance is disrupted. However, this technology needs to perform optimally in order for its employment to rival the benefits of face-to-face communication. When the ITDMs were asked what they felt the impact of these technologies had on their organisations' productivity during work time, the results in Figure 15 show a degree of hesitancy.

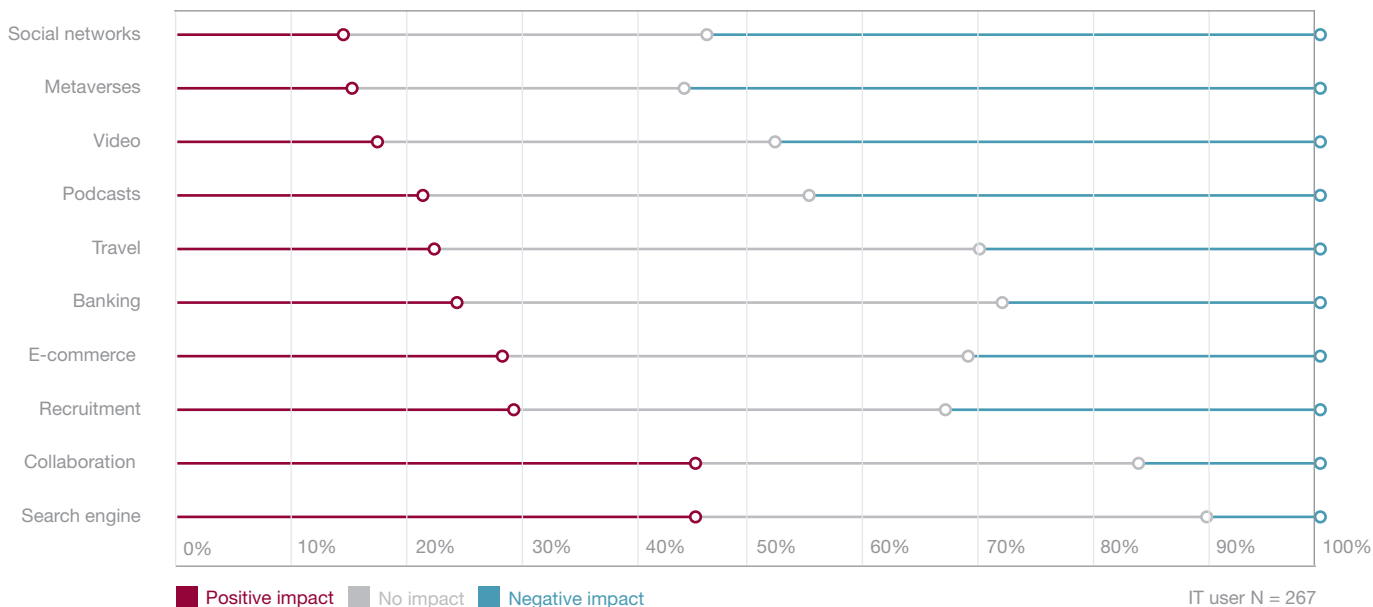
**Figure 14: IT Users feel that their productivity could be enhanced, directly or indirectly, through access to a wide range of technologies**

*In your opinion, what is the impact of following technologies on your productivity during work time? (Respondents%)*



**Figure 15: ITDMs see less positive gains from technologies traditionally defined as “personal use”**

*In your opinion, what is the impact of following technologies on your organisation’s productivity during work time? (Respondents%)*



Around half of the ITDMs surveyed felt that technologies like social networks, metaverses, video and podcasts would have a negative effect on productivity. Understandably, this negativity could be a result of perceived bandwidth constraints, or is, perhaps, an indication of which applications cause the most problems for an

unprepared network. With evident conflicts of opinion between IT users and ITDMs, the solution could be the implementation of company policies that strike a balance between the positive and negative implications. ○



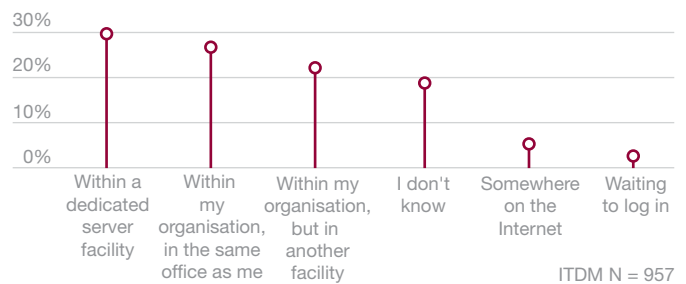
# The eroding boundaries between Internet and enterprise

What is overwhelmingly obvious is that the historic delineation between the enterprise and the Internet is becoming increasingly blurred. This phenomenon is being accelerated by new software models and new Internet services being incorporated into the enterprise. While the latter has been discussed previously, the former is worthy of further investigation. Software as a service (SaaS) is an emerging trend and involves a company accessing enterprise applications over the Internet, allowing a company to leverage a hosted application run by the service provider. There are considerable efficiency and cost benefits to employing SaaS, but new protocols, traffic flows and rich content can have an adverse effect on a network. Furthermore, these applications require special consideration as they are delivered over networks that are not owned by the organisation and end-to-end performance management is challenging.

but one that must be taken into consideration when planning for present, and future, productivity.

**Figure 17: Most IT Users say they can identify their company's network locations**

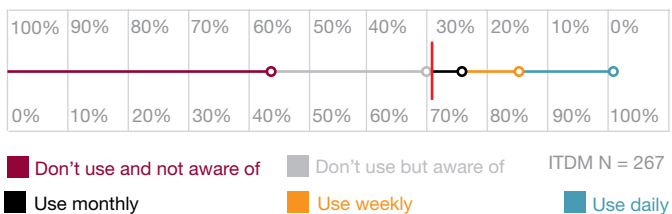
*Are you aware of where your files, email servers or applications run from?*



“There are considerable efficiency and cost benefits to employing SaaS, but new protocols, traffic flows and rich content can have an adverse effect on a network.”

**Figure 16: Although SaaS is used by only a small proportion of IT Users, when used, it is accessed often**

*Do you use Internet based applications that are paid for on a subscription basis or are free to use? (Slots%)*



As Figure 16 illustrates, 70% of the IT users surveyed do not presently use SaaS, but then again the majority of them are unaware of its existence. Of the 30% who do use SaaS, more than half of them use it frequently, which indicated that when adopted, the benefits of SaaS are leveraged. Again, this is new paradigm,

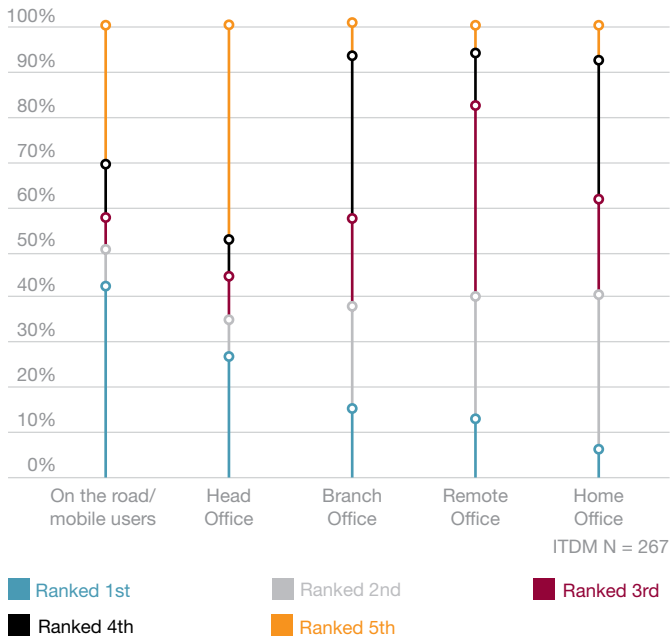
Whilst many users remain unaware of SaaS, most users are aware of their company's network locations, as shown in Figure 17. Only about 18% of users did not know where their basic computing functions are run from, while another 5% knew that it was vaguely 'somewhere on the Internet'. This is another indicator that network performance is more on the user conscience than it should be; ideally network performance should be good enough that the location of applications and functionality are undetectable to the user.

Mobility and wireless is another fast-evolving trend, which promises a myriad of benefits for employee — and business — accessibility, efficiency and productivity. Leading industry analysts predict that by 2011, 70% of all new client to network connections will be wireless and that by 2013, wireless will be the preferred form of connectivity. Despite this growing market, mobile users are frequently the most affected by network performance frustrations.



**Figure 18: Mobile users are often the most affected by network performance frustrations**

Please rank the following types of user by location and the degree to which they may experience network performance problems?  
(Respondents%)



“As mobility and ‘anywhere access’ continues to grow... organisations need to ensure users can count on fast and reliable access to applications regardless of how and where they connect from.”

Figure 18 shows that ITDMs clearly consider mobile users to be the most affected by network issues. However, the strong showing of fifth place rankings also suggests that mobile workers may not yet constitute a higher number of workers. As mobility and ‘anywhere access’ continues to grow...organisations need to ensure users can count on fast and reliable access to applications regardless of how and where they connect from. ○

# ITDM Response to Network Performance

Having taken an in-depth look at the IT end-users' network usage patterns and the potential for further performance frustration, it is important to examine the role of the ITDM and the management of the corporate network in more detail. The question begs: how equipped are IT departments and ITDMs to resolve and manage the performance frustrations that – on average – 30% of their end-users suffer from?

The research results suggest that IT departments, in general, lack a strong grasp on network performance. The ITDMs surveyed were asked how they would rate their organisation's capability to manage network performance in a number of areas. The results are shown in Figure 19.

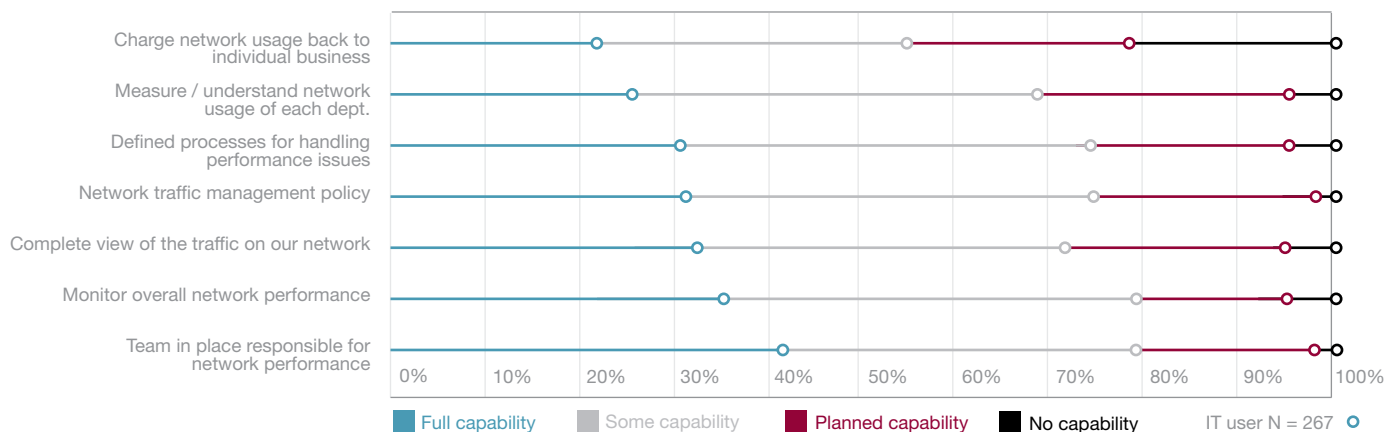
Whilst most IT departments have a team in place responsible for monitoring network performance, it's clear that the departments are lacking in either defined processes for handling network performance or a granular view of network traffic. Just under half of the ITDMs admitted to having little or no capability for charging network usage back to individual businesses, whilst almost 30% have only either 'planned' or 'no capability' to measure or understand the network usage of various departments.

With less than 35% of IT departments having full capability for handling performance issues, the impact on end-users, and the speed with which their performance problems are resolved, is concerning. Both the ITDMs and the IT users who were experiencing network problems were asked how effectively their organisation's IT support were able to help them/their users. Figure 20 displays the responses.

What is immediately clear is that the IT users and ITDMs perceive the tempo of problem resolution differently; IT departments believe that end-users' network problems are being resolved more quickly than they actually are. The majority of ITDMs assert that when their users get in touch with the IT department, their problems are resolved instantly. However, the majority of end-users – over 50% – believe that after contacting their IT department, their network problems will be resolved eventually. The impact on productivity now penetrates beyond the individual technology or application and becomes a network management problem. If employee X has wasted valuable time with an application suffering performance problems and then has to wait a considerable amount of time to have the problem resolved, the actual cost of lost productivity could be substantial. The implication here is that many organisations do not have any one person or team responsible for performance and therefore support problems are not being resolved efficiently.

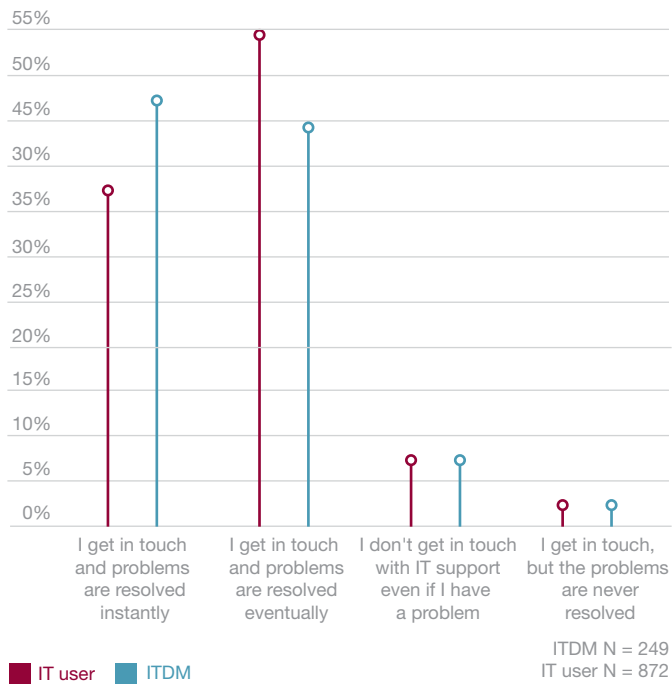
**Figure 19: IT departments mostly lack defined processes for handling network performance and a granular view of network traffic**

*How would you rate your organisation's overall capability to manage network performance in each of the following areas? (Respondents%)*



**Figure 20: ITDMs perceive that performance problems are being more quickly resolved than users perceive them to be**

*If you/your users experience a network problem is your organisation's IT support able to help you? (Respondents%)*  
 Respondents experiencing network problems only



Despite the results implying that IT departments do not, currently, have a strong grasp on network performance, and despite the fact that over 50% of end-users' network problems are, currently, resolved 'eventually', 50% of the ITDMs surveyed believe their networks are already future proofed, as shown in Figure 21.

**Figure 21: Half of ITDMs believe their network is in good shape for the future**

*In your opinion, how confident are you regarding your network's readiness for future increases in network traffic and changing traffic patterns? (Respondents%)*

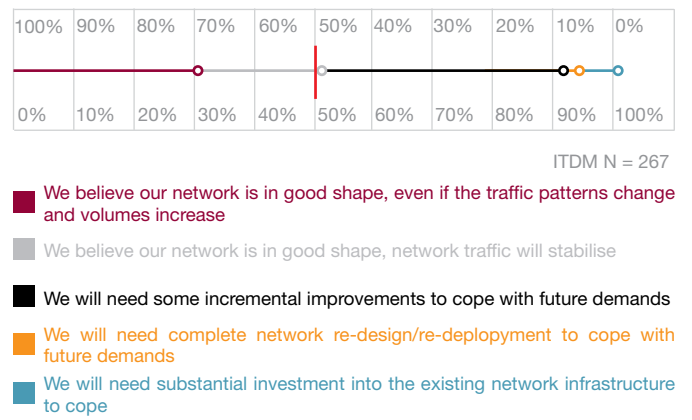


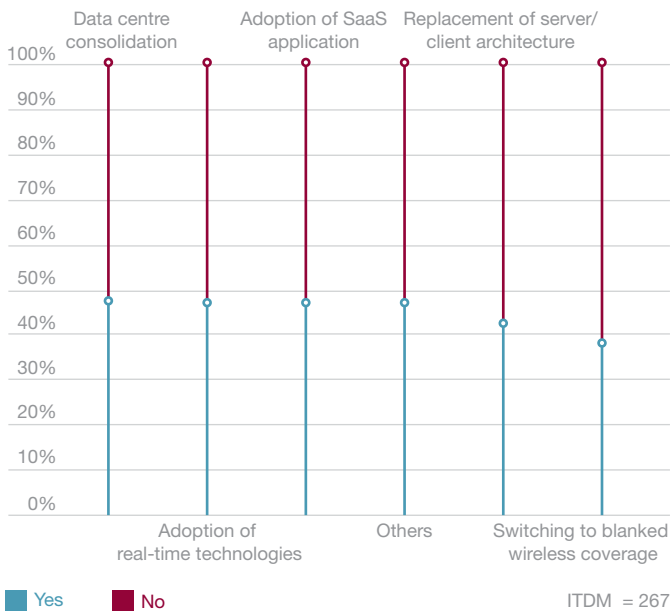
Figure 21 illustrates that only a small portion of IT departments are bracing for a network overhaul and substantial investment. Around 40% believe that they will need some incremental improvements to cope with future demands. Given the existing adoption, and the IT users' desired future adoption rate of newer, bandwidth hungry technologies, such optimism might be naïve. ○

# What are the performance pitfalls?

In order to further investigate ITDMs awareness of the IT initiatives that might disrupt network performance, they were asked which, if any, of a variety of actions, resulted in worsening network performance. The results are shown in Figure 22.

**Figure 22: No single technology change stands out as being more disruptive to network performance**

*Which, if any, of the following actions has resulted in your organisation experiencing a worsening in network performance? (Respondents%)*



The results indicate that perhaps ITDMs do not appreciate the full effect of these technologies on network performance. The absence of a clear spike suggests that ITDMs may lack a degree of network visibility, an assumption borne out by the results in Figure 19 (see page 19), where less than 40% of IT departments had a constant, complete view of network traffic or the full capability to monitor overall network performance.

## Key market trends and their implications on performance

**Consolidation:** Data centre consolidation and server and storage consolidation and centralisation are having a major impact on how applications are delivered to end users. The majority of applications were not designed to be delivered over WANs and this is impacting performance. If traffic pattern changes and the application performance impacts are not considered, user performance will most likely be degraded by a consolidation project.

**Web Applications:** Many client and server applications are migrating to web-enabled applications, with more enterprise applications – SAP, Oracle, Siebel – being accessed via browsers. In general, web-based applications require between five and ten times as much bandwidth as client-server models due to the increased traffic – and there may also be latency challenges to resolve to provide acceptable end-user experience. SaaS applications will have similar impacts on network performance.

**Convergence:** Networks now carry voice, video and data traffic whilst most were on designed for data. Voice and video traffic are more demanding and need better performing networks to be seamlessly usable. Network performance characteristics such as latency and jitter are important to manage.

**Globalisation and mobility:** Companies that outsource or multisource parts of their operations to Service Providers all over the world can incur WAN performance problems. Today’s workforces are increasingly mobile and need high speed access to applications irrespective of how they connect.

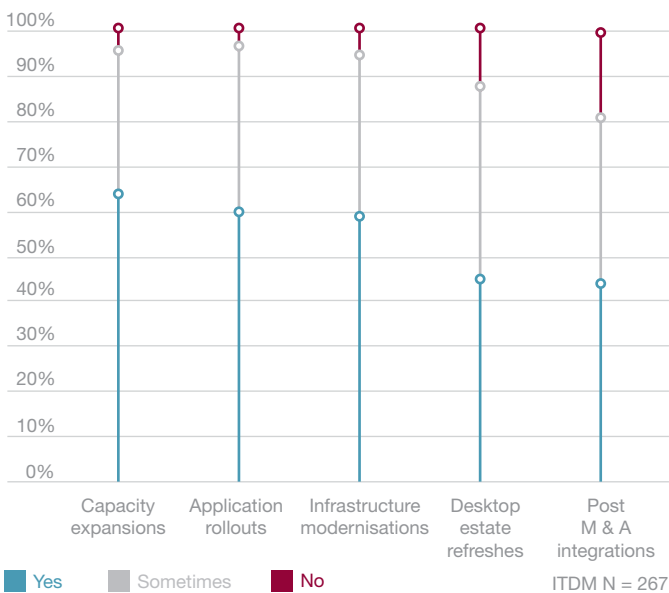
**Rogue and unsolicited traffic:** There is generally a lot more user recreational traffic on corporate networks than organisations realise. Malicious traffic from exposed security vulnerabilities pose a big threat to corporate applications but also introduce large quantities of unwanted traffic on corporate WANs. ○

# Is performance planned for?

In order to ascertain to what degree performance disruptions are taken into account prior to new IT initiatives, the ITDMs were asked whether they formally considered network implications during the planning and implementation stages of various initiatives. The results are shown in Figure 23.

**Figure 23: Network implications are only sometimes considered in implementing new initiatives**

*Do you formally consider network implications during the planning and implementation stages of the following initiatives? (Respondents%)*

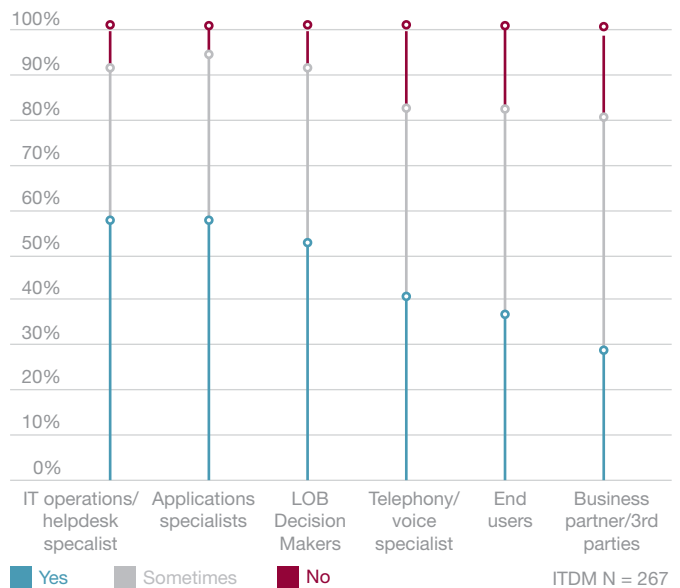


The ITDM responses show that network implications are considered when implementing business initiatives, but not universally. Fewer than half of ITDMs consider network implications in the wake of mergers and acquisitions or desktop estate refreshes.

Do IT departments involve stakeholders in networking project planning and deployment? The ITDM responses (shown in Figure 24) suggest that key specialists and stakeholders are not always included.

**Figure 24: Key stakeholders in the network are not consistently included in planning and deployment**

*Are the following stakeholders included in networking project planning and deployment? (Respondents%)*



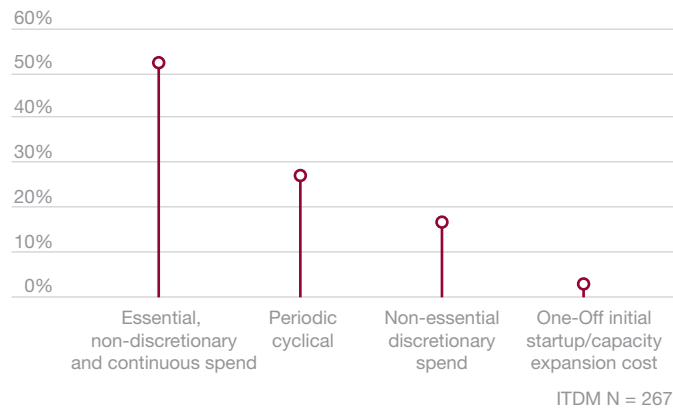
Interestingly, whilst ITDMs may consider end-users influential (see Figure 1, page 5) in technology changes, they are not always included or consulted in network planning and deployment, despite the fact that these projects could impact on their performance. Similarly, a surprisingly low number – just slightly more than half – of IT departments routinely include IT and application specialists in network projects; nearly 10% never include IT specialists. Despite the fact that telephony and voice technologies can suffer severely from performance issues, they ranked in the bottom three. Given that many IT departments have only a partial visibility of performance problem areas as well as limited awareness of the impact of disruptive technologies, their reticence to involve key stakeholders and specialists is concerning. ○

# Network budget and investment

The ITDMs were asked how their organisations rated network infrastructure, from a budgetary and investment point of view. The results are displayed in Figure 25.

**Figure 25: Although just over half of ITDMs view network infrastructure an essential, non-discretionary expense, some see it as non-essential**

*From a budgetary and investment point of view, how does your organisation consider network infrastructure? (Respondents%)*



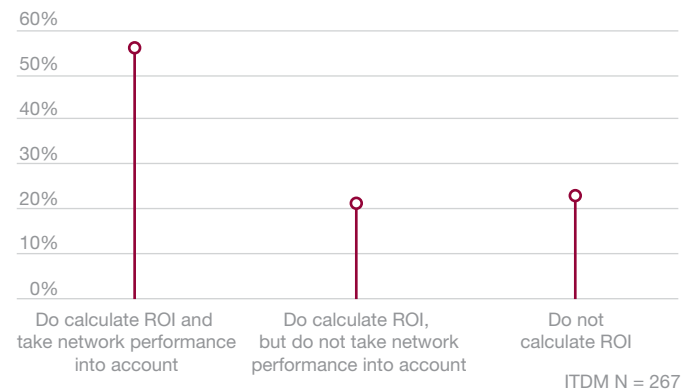
Just slightly more than half of the organisations surveyed view network infrastructure as a continuous and essential expense and, alarmingly, almost one in five see it as a non essential expense. The data showed that the industry verticals which rely heavily on their network as a business critical continuum tend to rate it essential spend – for example, 62% of the financial services organisations acknowledged it as such. Interestingly, the percentage of organisations that rated network spend as essential and non discretionary correlates with the percentage of organisations who felt their network was future proofed, implying that a confidence in network performance might well be directly related to network investment.

Sector	Essential, non-discretionary and continuous spend
Financial services, insurance and banking	62%
Public sector (including Government)	55%
Technology	55%
Manufacturing	44%
Retail, wholesale and consumer goods	42%

In spite of this correlation, a critical finding of this research is that network performance is not always linked to Return on Investment (RoI), as Figure 26 shows.

**Figure 26: Network RoI is linked to performance in just over half of organisations**

*Do you carry out (ROI) calculations on network investment? Do you attempt to measure cost of (poor) network performance? (Respondents%)*



This graph shows that roughly three quarters of IT departments calculate RoI on network investment, while only slightly more than half also consider network performance. A shocking 23% do not calculate RoI, and thus can have no clear understanding of the monetary impact that network performance can have. ○

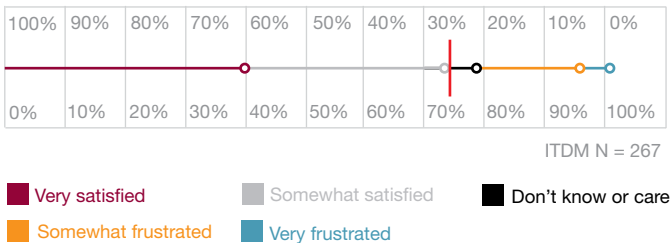


# What's possible?

The research highlighted a number of dichotomies between the levels of ITDM and user frustration and the actual time that the end-user is wasting when unable to work effectively. Figure 8 (see page 11) and Figure 27 indicate that around 75% of ITDMs and IT users are, on the whole, satisfied with the performance of the corporate network, even though a third of both IT users and ITDMs report frequently slow running computers and system crashes. The contradictory nature of these results suggests a level of acceptance, or a low expectation of performance, that is both unnecessary and avoidable.

**Figure 27: When asked directly, IT users seem satisfied with network performance overall**

Overall, how frustrated or satisfied are you with your organisation's network performance? (Respondents%)



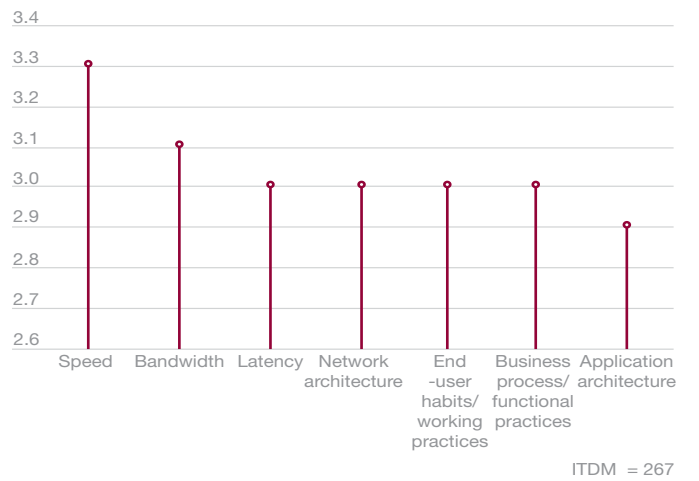
ITDMs are aware that, above all, speed is the crucial factor in performance perception, as shown in Figure 28.

ITDMs are aware that, above all, speed is the crucial factor in performance perception. In their most simple definition, performance optimisation technologies and techniques applied to IT infrastructure will speed up the delivery of applications to end-users. The technologies fall under the broad categories of

WAN optimisation and application acceleration and delivery. WAN optimisation features compression, data reduction and caching, traffic management and load balancing techniques which improve link and bandwidth utilisation. Acceleration techniques improve the performance of applications by addressing the shortcomings of protocols and adapting the way data is delivered. Performance optimisation technologies can also optimise the way in which large files are transmitted and delivered across the network, assist the network in processing bottlenecks and even manage rogue network traffic to ensure that business critical applications are given priority over recreational traffic.

**Figure 28: ITDMs identify speed as the crucial factor in performance perception**

Can you rate the importance of the following parameters on the perceived network performance? (Average rating)



“It’s clear that performance optimisation technologies can afford considerable time savings across a number of areas, from file downloads to logins and remote access, which are typically causing IT users to suffer delays.”



In terms of actual performance improvements, these technologies can afford dramatic improvements (often over 100x) in network traffic flow and download speed – time savings which could improve invaluable to an organisation. Enterprises can also expect, on average, a 30% improvement in bandwidth utilisation where optimisation technologies have been deployed – this translates into 30% more data being delivered on the same link size and is far more cost effective than purchasing additional – often unnecessary – bandwidth.

It's clear that performance optimisation technologies can afford considerable time savings across a number of areas, from file downloads to logins and remote access, which are typically causing IT users to suffer delays. (See Figure 13, page 13). All of the performance frustrations that have been highlighted in this report could be dramatically reduced with the correct employment of these techniques. What seems clear is that ITDMs and IT users alike are settling with a level of sub optimal network performance that they feel to be satisfactory; the

challenge exists to enable these groups to raise their network performance expectations.

The costs of poor performance can be severe and widespread; unutilised applications will result in a wasted project and wasted funds as well as preventing the productivity benefit to the end-user that it was intended to bring. Performance should be defined by the end-users ability to be as productive as possible in their role, to ensure that the technology investments made are realised. Figure 26 (see page 25) indicated that many IT departments do not link RoI with network performance, and a significant number do not calculate RoI at all. It will be hard for these departments to appreciate exactly what poor performance will be costing their organisations. However, typical payback periods for optimisation projects can be as low as seven months, and even less, depending on how effectively the solution has been designed and how extensively it is deployed. The average RoI lies between 200-300%, which translates into a ratio of two to three dollars delivered in net returns for every dollar spent. ◦



# Conclusion

## The IT user

The vast majority of IT users are connecting to external networks on a daily basis, while a large percentage are using external Internet resources at work, for both personal and work use. Simply put, the fact that IT users are at work, but not necessarily working, will cost the organisation in terms of that employee's productivity. Similarly, the organisation will incur the costs that such usage patterns' have on network performance and, consequently, on other employees' ability to work optimally. However, the research shows that many of these applications may well have a viable place in the workplace, and do not necessarily always have a negative impact on productivity. In this consumer led technologic age, it is inevitable that more and more of these, previously perceived, personal applications can, and will, be incorporated in to the business environment. ITDMs, although aware of these trends, could look at using these behaviour patterns to the benefit of the business, taking more of a control, rather than cut off, approach. It comes down to having a better visibility and understanding of the nature of network traffic; how the network is being used, and how the way it is used affects the network.

have a low tolerance threshold for performance problems, like VoIP, mean that the impact of performance issues penetrates beyond the individual time delays. From the results of this research, one can assume that the average user believes that they waste up to two hours per month in delays. This adds up to two or three days per year and when multiplied across an enterprise of, say, 1,000 employees, could be costing a company tens of thousands – if not more – per year. While it's possible to make costing calculations in terms of unrealised employee time, the sunken costs of wasted application and network investment are harder to quantify, but no less important.

## The ITDM and the enterprise

Whilst the research indicates that ITDMs are, on the whole, aware of most end-user performance frustrations and perceived network problems as a serious issue, they don't necessarily have the management capabilities to be able to effectively manage, or pre-empt, these problem areas and do not seem to have a clear definition of what acceptable levels of performance are.

“It comes down to having a better visibility and understanding of the nature of network traffic; how the network is being used, and how the way it is used affects the network.”

There is a definite perception by IT users, and to an extent ITDMs, that the corporate and external networks enjoy a near a parity in terms of performance. However, one would expect that the corporate LAN network, which can carry 100Mb/per second would consistently out perform a third party, Service Provider hosted network. Perhaps what is at question here is not the increased investment in, and consequent performance levels of, the external networks, but rather to what extent the corporate network is under performing that users see little difference between the two.

Performance problems and delays run across a range of services as shown in Figures 12 and 13; obviously the heavy usage of certain technologies, for example email, and technologies that

Figure 20 shows, somewhat alarmingly, that the majority of IT users feel that their network problems are only resolved eventually, and not, as ITDMs believe, instantly. This discrepancy could indicate that IT departments are lacking the necessary visibility of where problems are occurring on the network, and are thus unable to either prevent or resolve these problems as effectively as they would like. This hypothesis is given further credence in the research when looking at Figure 19; whilst most IT departments have a team in place for monitoring network performance, they are not taking an end-to-end approach to network management. The departments are specifically lacking inter-departmental billing capabilities, a granular view of network traffic and defined processes to handle network performance. Deficiencies in these areas will make it very hard to quickly diagnose, identify and



resolve network performance issues, as well as render accurate RoI calculations near impossible. In fact, nearly half of the ITDMs surveyed neither take network performance into account when calculating RoI, nor attempt to calculate RoI at all (see Figure 26). Without the ability to look at RoI, a company leaves itself open to losses and costs which can not be quantified. As we've seen, the RoI and business case for performance improving technology and solutions is compelling — and easy to prove.

A contributing factor in a reactive, rather than pre-emptive, IT approach is undoubtedly the fact that network implications are far from being a default consideration when implementing new IT projects. Even in scenarios which involve the total integration of IT networks, systems and procedures — such as mergers and acquisitions — fewer than half of the ITDMs consider network implications. In this example, particularly, a lack of visibility could result in either unnecessary over investment or, conversely, not enough investment, which can have unwelcome cost and performance implications respectively. As strategic projects such

a data centre consolidation and virtualisation projects gain more favour, not having a firm handle on performance management will prove hazardous. Similarly, IT departments could well be making a rod for their own backs when not consulting key specialists and stakeholders prior to network project planning and deployment. Again, an end-to-end approach — one which understands the implications or potential points of performance degradation through every stage of any procedure — could pay for itself in terms of nonperforming technology, lost productivity and unnecessary future expenditure.

Far from being future proofed, as most ITDMs believe, the survey provides considerable evidence that the network is barely 'present proofed'. With the adoption of network intensive technologies only set to increase, and performance dependant trends such as VoIP and wireless becoming key business drivers, networks that are not invested in as a business continuum will, inevitably, continue to prevent an organisation's key assets and resources from performing optimally. ◦



# Appendix A:

## Demographics of the Research Respondents

### Respondents by sector

Region	Country	IT Users	ITDMs
Australia	Australia	100	40
<b>Australia Total</b>		<b>100</b>	<b>40</b>
CALA	Argentina	33	-
	Brazil	48	-
	Mexico	24	-
<b>CALA Total</b>		<b>105</b>	<b>-</b>
Europe	France	41	-
	Germany	40	-
	Italy	30	-
	Netherlands	20	-
	Spain	30	-
	UK	99	50
<b>Europe Total</b>		<b>260</b>	<b>50</b>
Far East	China	40	17
	Hong Kong	6	7
	Japan	40	17
	Singapore	20	12
	Taiwan	14	-
<b>Far East Total</b>		<b>120</b>	<b>53</b>
MEA	Egypt	33	5
	SA	109	30
	Saudi Arabia	33	10
	UAE	55	29
<b>MEA Total</b>		<b>230</b>	<b>74</b>
North America	Canada	20	-
	US	122	50
<b>North America Total</b>		<b>142</b>	<b>50</b>
<b>Grand Total</b>		<b>957</b>	<b>267</b>

### IT Users

- Australia, 10%
- CALA, 11%
- Far East, 13%
- North America, 15%
- MEA, 24%
- Europe, 27%



IT user = 957

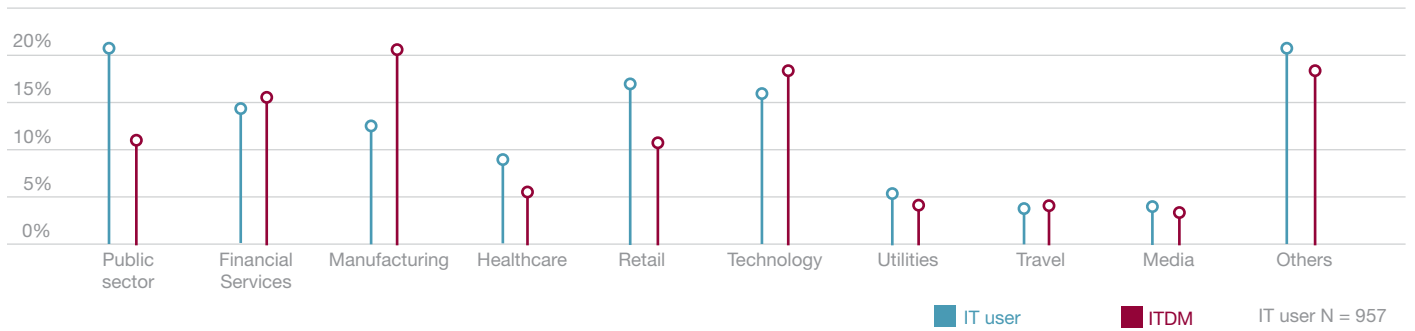
### IT Decision Maker (ITDMs)

- Australia, 15%
- US, 19%
- UK, 19%
- Far East, 20%
- MEA, 27%



ITDM N = 267

### Respondents by sector



# Glossary

For the purposes of this report the following definitions were used:

<b>CALA:</b>	Caribbean and Latin American
<b>Core business applications:</b>	e.g. Accounting, Timesheet, Customer contact databases
<b>ITDM:</b>	IT Decision Makers
<b>MEA:</b>	Middle East Africa
<b>Metaverse:</b>	A virtual environment in which humans interact both with each other and software agents, in a three-dimensional space that uses the metaphor of the real world. Linden Lab's Second Life is perhaps the best known example of a metaverse.
<b>Podcasts:</b>	Digital audio recording made available for downloading to a personal audio player
<b>Portals and Knowledge Management Systems:</b>	e.g. Intranet resources, dashboards, portals
<b>Rich-Internet application:</b>	e.g. Streaming video / audio, web conference, on-line applications
<b>Social network:</b>	An internet resource that creates or reflects the personal or professional set of relationships between individuals through offering the ability to engage (share messages, media, and other information) with each other.
<b>Specialist applications:</b>	e.g. Imaging systems, CAD, Manufacturing management, Analytical applications voice over IP, Internet or Web-phone - e.g. Skype
<b>Video:</b>	Any video content available for downloading or network streaming. Video (e.g, video-call, video conferencing, telepresence)





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