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# Cloud Connectivity Carefully does it

Andrew Buss, Freeform Dynamics Ltd, June 2011

*We keep hearing that network connectivity is a problem when considering moving to Cloud services. We've heard the doubts and listened to the success stories. So where are we when it comes to Cloud and connectivity?*

## Key Points

### **Connectivity is not widely perceived to be a major barrier to the adoption of Cloud services**

There is an optimism surrounding the ability of the existing connectivity infrastructure (internal network and external comms services) to support Cloud computing. However, few have actually adopted Cloud to any significant extent, so the opinion is based more on intuition than experience.

### **But experience of Cloud highlights that in reality connectivity can be a significant challenge**

The broad optimism around the suitability of connectivity to support Cloud adoption is not borne out by those who already make use of this new delivery model. As Cloud services become more central to both IT and the business, the prevailing sentiment emerging is that connectivity becomes more challenging the more extensively Cloud services are worked into the equation.

### **Supporting remote working is not the same as supporting Cloud**

Implementing solutions for remote working, another communication intensive activity, is relatively straightforward, and assuring acceptable overall service performance and availability typically requires little incremental investment. Moving to Cloud, on the other hand, brings new issues to the table and places new demands on the connectivity infrastructure, often requiring higher levels of reliability and support that can only be dealt with through proper planning and investment.

### **Connectivity has to be as reliable as that for in-house services, not necessarily more so**

Failures in internal IT systems still happen on a regular basis. When moving applications to the Cloud, there is sometimes a tendency to assume that these applications then need to be more reliable. Not all apps need five 9s availability, and reliability comes at a cost. Understanding the nature of the apps and the impact of failures can help in choosing the appropriate service levels and costs for the comms infrastructure.

### **As applications migrate externally, comms provider selection needs particular due diligence**

As applications increasingly migrate to the Cloud, and many of the interactions that previously happened over the LAN become reliant on the external WAN infrastructure, the due diligence conducted on comms service providers becomes critical. With Cloud, any issues with connectivity have the potential for widespread and noticeable disruption to business operation and/or user productivity. This is not just about users being able to access a SaaS application, for example, but also ensuring that critical points of integration between in-house and hosted apps function reliably. The net is that the Quality of Service offered by comms services providers must be regarded as business critical in a Cloud environment.

*The study upon which this report is based was independently designed and executed by Freeform Dynamics and executed in collaboration with The Register news site. Feedback was gathered via an online survey of 161 predominantly IT professionals from the UK, USA, and other geographies. The study was sponsored by Microsoft.*

The Microsoft logo, consisting of the word 'Microsoft' in its characteristic bold, black, sans-serif font.

## Introduction

One of the most frequent concerns raised when looking at the risk of adopting Cloud services and SaaS - along with security and privacy<sup>1</sup> - is that the underlying communications infrastructure (internal network together with external comms services) is not quite up to the job. If true, this has the potential to put the brakes on the uptake of Cloud, as the fundamental promise of Cloud or SaaS is to abstract the application or workload to run as a service that is accessed via a wide area communications network or even the public Internet.

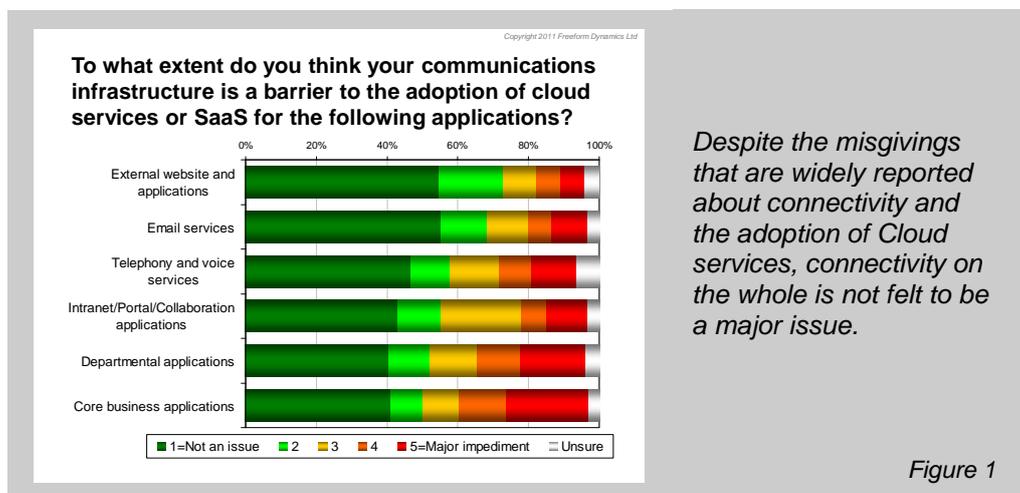
Many Cloud services are wholly dependent upon network connectivity in order to work effectively. If there are any issues with the network, it translates to potentially serious issues with application availability, functionality, performance and/or responsiveness.

The aim of this report is to investigate whether the point of view - that the network is a problem for Cloud adoption - is well founded or is more myth than reality. It is based on a study that was designed to investigate how the communications infrastructure is felt to be able to support communication intensive activities such as remote working and Cloud services of various types.

## The majority are positive about Cloud connectivity

To begin with, let's first look at the overall impression of the suitability of the communications infrastructure to support Cloud. We'll then look more deeply at the underlying currents that shape experiences with cloud solutions in practice.

At this high level, the picture that emerges is generally positive. Many of the respondents looked favourably on the ability of their existing communications infrastructure to cope with Cloud services. Three quarters of respondents said they have a lot of confidence that their network is ready for "Cloud friendly" workloads such as website hosting and email, while around half felt that their network could effectively support even challenging application types such as core business and departmental applications in the Cloud (Figure 1).



On the surface, this appears to be good news because many feel that their existing communications services can cope well with the changes to the computing environment that Cloud brings. So is that it? Is connectivity really not that much of an issue? Or is there something more at work here?

By digging a little deeper, we can look at whether this rosy view is shared by those that have tackled more comms-centric problems in practice.

A good place to start with this is by examining the area of remote working, as we might expect experience gained here to help when considering Cloud related comms requirements.

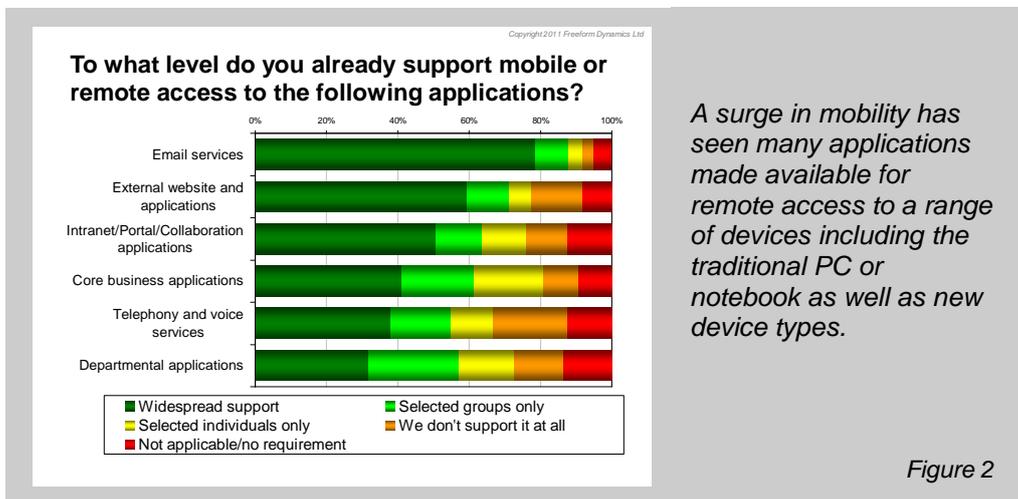
This is an important area as a lot of companies have experience supporting remote working; it is fairly mature as well as making advanced use of telecommunications services. It is also related in that ease of catering for remote working is often one of the drivers for moving to Cloud applications - mobile and remote access are generally an integral part of SaaS offerings, for example.

## Remote working is widely supported

One of the main trends in the client side of IT over the past few years has been the emergence of highly mobile devices. This includes ever smaller and more capable notebook PCs, smart phones and - more recently – tablets. This has been coupled with an increase in the diversity of connectivity through broadband, WiFi and 3G. In turn this has driven the support for enabling application access from remote places or while on the move, which we term “remote working” in this report.

At this point, it is worth pointing out the nature of the study we are reporting here, which used an online survey to capture responses to the questionnaire. This is very likely to have led to a degree of ‘self-selection’ in the respondents. The sample is therefore potentially skewed towards those with an interest in or knowledge of remote working or Cloud computing in general, leading to a likely under-representation of those who have less of a specific interest in the topic. It is therefore not possible to make statements about absolute levels of adoption or penetration, but it does allow us to gain insights into what is happening in relative terms.

It is clear from the responses received that enabling remote working is now generally the rule, rather than the exception. Certain applications naturally lend themselves to remote or mobile access, so it’s no surprise that email, website applications and collaboration applications are the most widely supported (Figure 2).



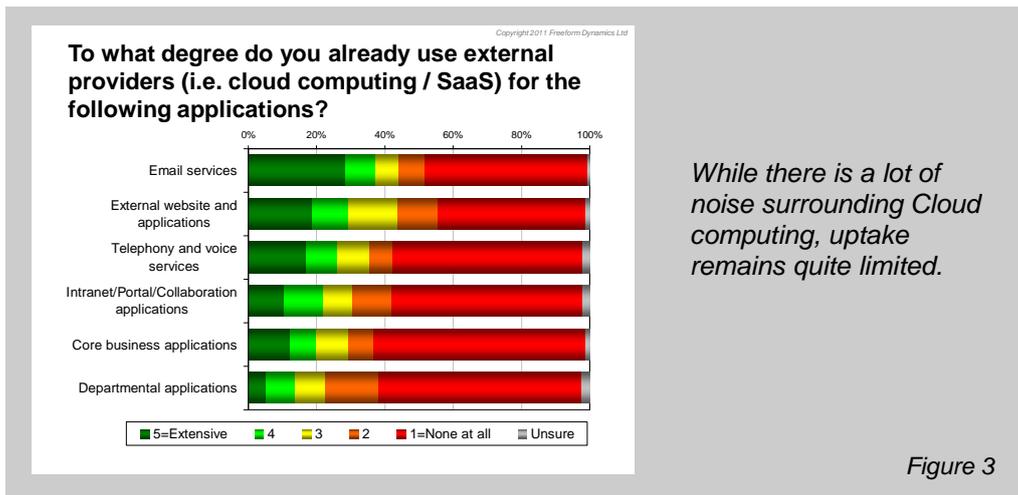
Even business and departmental applications are pretty well supported for remote working, although the focus tends to be more on enabling select groups or individuals rather than rolling out company wide access. This makes sense, given the more targeted user bases that these applications tend to have.

It is worth noting at this point that the level of support for the remote accessibility of applications follows roughly the same pattern to the ease with which the respondents felt their communications infrastructure could cope with moving the applications to the cloud (as previously seen in Figure 1). It is likely that those applications that the respondents have made most accessible are also those that they feel most confident that the network can support in the Cloud due to that experience.

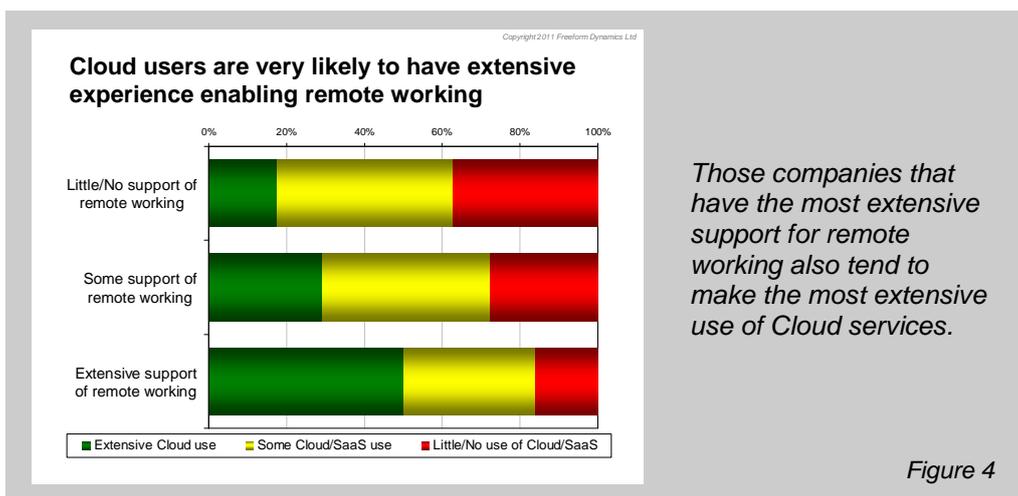
## Cloud adoption is nowhere near as advanced

We’ve seen that mobile access is generally quite well supported across many application types, but what does the picture look like for the adoption of Cloud services? Recent surveys<sup>1,2,3</sup> have highlighted the slow uptake of Cloud offerings generally, so our expectation going into this survey was that most respondents would be talking not from the experience of use, but more from inference or gut feeling.

Our assumption of limited penetration was accurate. Even in this self-selecting sample, fewer than half of respondents make use of Cloud services across each application area, including email services, the most extensively adopted Cloud application (Figure 3).



We discussed earlier the potential relationship between experience with remote working and comfort with Cloud. This is something we investigated during our analysis. If we create indices for how extensively mobile access is supported and for how much use is made of Cloud services across all the application types, and plot them against each other, the trend here is clear - the more support there is for remote working, the more likely it is that the use of Cloud services will figure in the mix (Figure 4).



With the strong correlation that we see, the next step is to drill down a bit deeper and see if the expectations of the communications network are broadly similar for both remote working and Cloud support, or if any special requirements exist that would-be Cloud adopters need to take into consideration.

## Ready for remote working is not the same as ready for Cloud

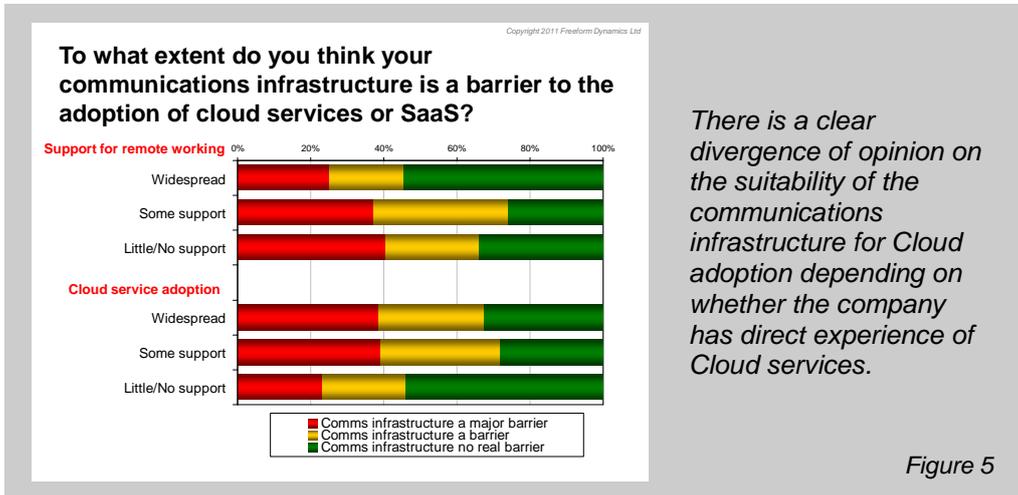
In brief, what we've seen so far is the general consensus that the communications infrastructure is not, on the whole, considered as being a major barrier to the adoption of Cloud services. We've also seen that support for remote working is fairly widespread, while the adoption of Cloud services is still at a relatively low level.

The result is that the positive outlook on the ability of the network to support Cloud use that emerged from Figure 1 is based not on objective experience, but more on subjective opinion. What does the picture look like when we home in on those with extensive experience of Cloud services?

We would expect some variation in opinion regarding connectivity when it comes to Cloud support compared to remote working because there are significant differences between the two. Remote working generally enables users to connect to internal systems from the outside in. The realities of mobile working, however, with unstable and intermittent connectivity being the norm, mean that

applications are often architected, and user expectations set, to be tolerant of occasional disconnects. Cloud is a different matter as services are often aimed at office workers that expect and often need continuous access, while the services themselves expect and need a continuous connection. In addition, Cloud services may need to integrate directly and synchronously with internal applications in order to function effectively, and vice versa.

Given this, it should not be surprising that connectivity is regarded as more of a challenge by cloud-savvy respondents (Figure 5).

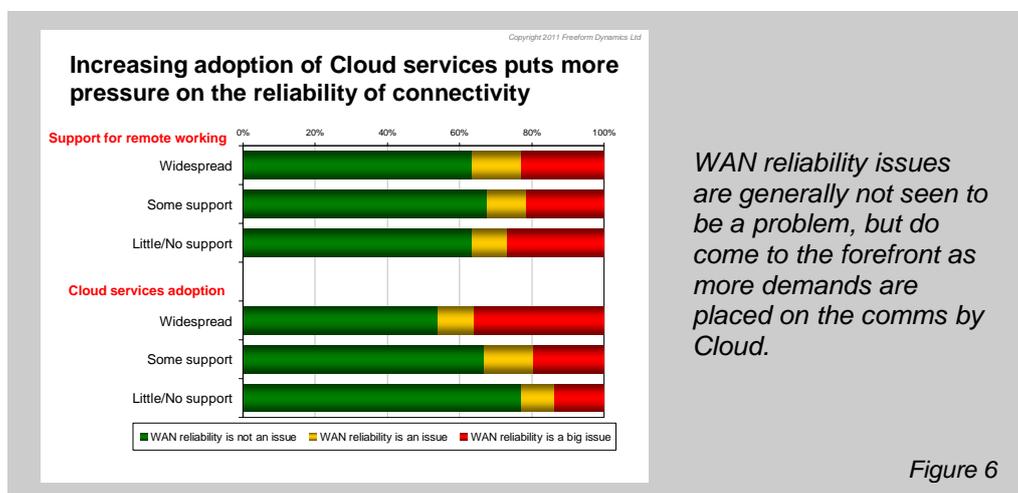


Pulling all this together, we can form a view of how perception and reality are playing out in the marketplace. Those with little or no support for remote working do not have all that much confidence in the network to support Cloud adoption, whether this is due to inexperience and uncertainty, or an actual lack of capability in the infrastructure. As the support for remote working grows, so too does the confidence in the ability of the network to handle Cloud adoption. However, this confidence is often misplaced as Cloud puts a different set of demands on the communications infrastructure that may not be met without additional work and/or investment.

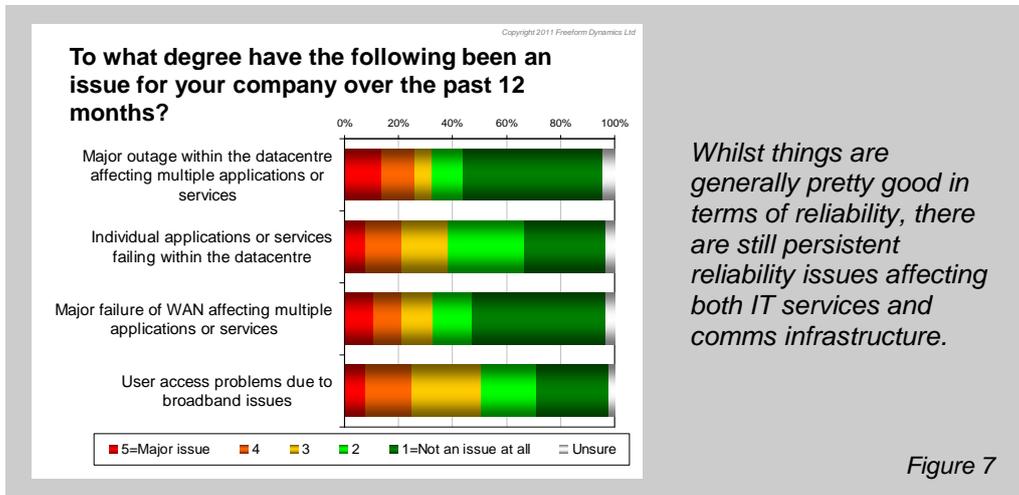
## Cloud puts more demand on WAN reliability

As one of the respondents to our survey put it: *“With Cloud there are too many points of failure between my company and my data ... and without my data the company will be losing money”*. This is clearly a very real concern, but just how much of an issue is it in reality?

While WAN reliability is not an issue for the majority, it clearly is for some. The more that is asked of the WAN with increasing use of Cloud, the more likely it is that any shortcomings in quality will be exposed (Figure 6).



But it's important to keep this in perspective. Looking at the reliability requirements of Cloud in isolation is one thing, but internal IT is not without its challenges. Applications have different requirements and expectations when it comes to reliability. What is clear is that in general things run pretty well most of the time. However, about a quarter of respondents reported issues affecting internal applications as well as the comms services (Figure 7).



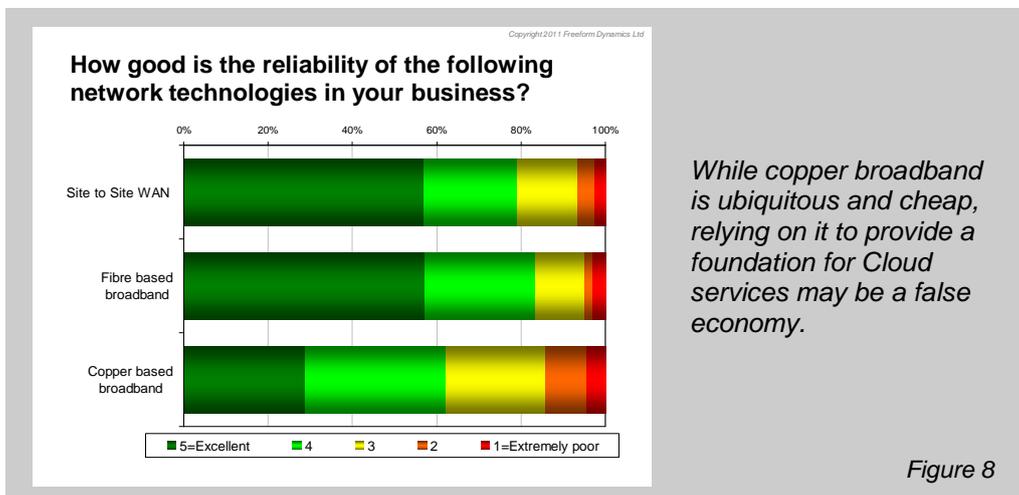
The takeaway from this is not to take the Quality of Service of the WAN for granted, but not to look for perfection either. Reliability of anything to do with IT and communications is often subject to the law of diminishing returns – you can get to ‘good enough’ at a reasonable cost, but getting to ‘excellent’ can be both expensive and unnecessary. The trick is to know where the most likely points of weakness are and the areas on which to focus in terms of improvement.

## Comms services in more detail

Drilling down on the specifics of the comms infrastructure, on the whole, performance issues such as upload and download throughput and predictability did not vary all that much. But two considerations did stand out.

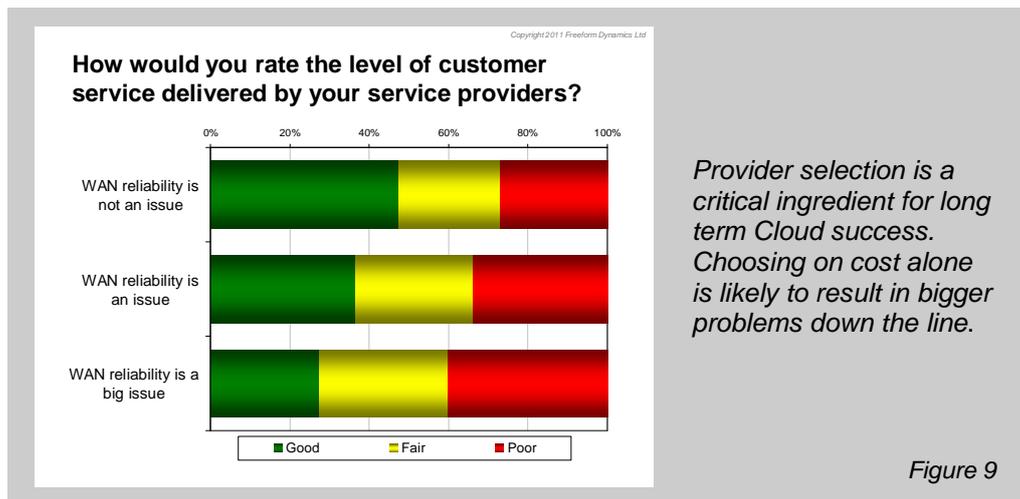
The first of these concerns the appropriate choice of technology for Cloud comms. A best effort copper broadband connection may be a good solution for syncing files and email to branch offices, for example, as these are largely asynchronous in nature, but may well present issues if attempting to run line-of-business sales, CRM or ERP applications in the Cloud.

From the responses we received, it's clear to see that site-to-site WAN connections and Fibre based broadband have a distinct advantage over copper based broadband when it comes to reliability. If comms service quality is an issue with Cloud, then adopting these can help to improve the situation, albeit at a cost (Figure 8).



If these technologies are so good, surely everyone should be using them? As with most IT decisions, it comes down to balancing priorities. The increased reliability does cost significantly more to implement and run. Early in a Cloud project it may not make sense to invest in them, but as more reliance is put on Cloud services this may need to be reconsidered.

Another factor to address is the culture of the comms provider, and in particular how it handles customer support. We would expect that as applications become more dependent upon the service provider that customer service will be an increasingly important element in a successful implementation. This indeed is what we see as respondents with the fewest issues with WAN reliability also have the most helpful service providers (Figure 9).



## Discussion

Although the whole area around Cloud computing for the last few years has been dominated by a lot of hype and sensationalism, we are starting to see a more sustained and considered phase of Cloud adoption<sup>4</sup>. The outcome of this is that adoption will grow from the small base of experienced users that we see today to become a more mainstream proposition with many companies adopting Cloud services. A good proportion of these companies will be new to Cloud and the way that this impacts on traditional IT infrastructure, operations and management.

The truth is that Cloud has a significant impact on how we need to think about both architecture and connectivity, and how it relates to effective application or service delivery. If applications require constant connectivity to function, the network becomes a critical enabler. If they can tolerate interruptions in connectivity and continue then the network becomes less of an issue.

We wouldn't dream of implementing line-of-business applications on desktop PCs or consumer operating systems. Instead, the hardware and supporting software is assessed for performance, reliability and serviceability at the right cost point rather than using the cheapest hardware and hoping for the best.

Yet this 'hope for the best' viewpoint is evident in the optimism that many companies demonstrate towards how ready they feel they are to support Cloud adoption on top of their existing communications architecture and services. Experience shows that in reality explicit attention needs to be paid to appraising current comms infrastructure capability. Necessary improvements and associated investments then need to be factored into any proposals involving Cloud services to ensure appropriate levels of reliability and support.

This will elevate the role of the service provider to that of a critical IT partner if they are not already so, making supplier selection a core part of the solution. When it comes to selection, due diligence on their advertised capabilities, as well as their ability to deliver and long term sustainability and commitment will ultimately determine whether Cloud services are able to live up to the potential.

Putting in place service level agreements and then monitoring and enforcing will be a top priority. For larger enterprises betting certain parts of their business on Cloud, appropriate penalties and sanctions may be required to focus the provider on consistently delivering the agreed service. Current penalties, such as a period of free service that are common today, are unlikely to be suitable if the business depends on the service to be running and accessible to generate revenue and profits. Using multiple or redundant service providers may help, but may add to the cost and complexity of adopting Cloud.

In conclusion, Cloud services are starting to be looked at seriously by many companies and have much to offer to organisations of all sizes. But success will involve far more than just subscribing to a service and expecting everything to work perfectly. The communications infrastructure is a critical risk to the success of Cloud services, and needs to be accounted for as part of the programme plan.

## References and Further Reading

### 1. Trust and Security in the Cloud

*The myths and realities of hosted applications*

<http://www.freeformdynamics.com/fullarticle.asp?aid=1307>

### 2. x86 Server virtualisation check point

*How dynamic should your data centre be?*

<http://www.freeformdynamics.com/fullarticle.asp?aid=1241>

### 3. Evolution of hosted server computing

*The emerging 'Cloud' alternative*

<http://www.freeformdynamics.com/fullarticle.asp?aid=1104>

### 4. Cloud Computing Checkpoint

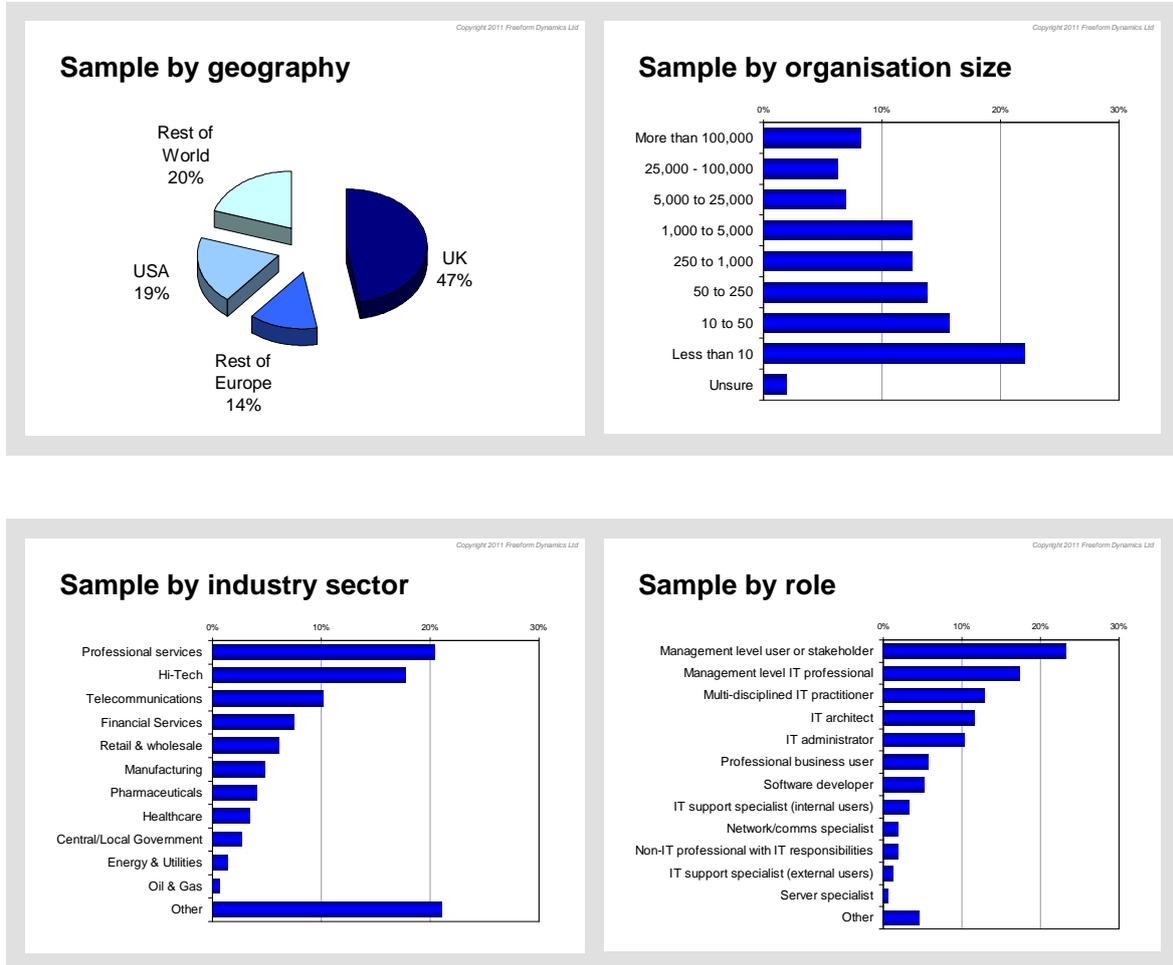
*First signs of more general mainstream acceptance?*

<http://www.freeformdynamics.com/fullarticle.asp?aid=1344>

## Appendix A: Study Sample

The study upon which this report is based was independently designed and executed by Freeform Dynamics and executed in collaboration with The Register news site. Feedback was gathered via an online survey of 161 predominantly IT professionals from the UK, USA, and other geographies.

The sample distribution was as follows:



### A note on methodology

The online survey methodology used to capture data in this study almost certainly led to a skew in the sample due to the principle of 'self-selection'. Put simply, this means that those with more of an interest in or knowledge of cloud computing are more likely to have participated. Conversely, those who know less or care less about cloud are likely to be underrepresented. It is therefore not possible to make statements regarding absolute levels of market penetration and activity from the data.

However, the insights presented in this report, which are all based on relative observations, are not affected by this limitation.

## About Freeform Dynamics



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