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# From virtualisation to private cloud

## Small steps to big results

Andrew Buss, Freeform Dynamics Ltd, July 2012

*Lots of people are talking about private cloud as the next natural step from virtualisation. While some companies have managed to implement private cloud, for many it can seem to be a giant leap. By implementing a number of smaller, individual optimisations that collectively come together to deliver a big improvement, IT can up the quality of service delivery and enhance business value with a cloud-like infrastructure.*

### Key Points

#### **Virtualisation is seen by many as a key foundation stone for private cloud**

When 118 respondents to a recent online survey were asked whether they thought that virtualisation skills provide a firm foundation for moving to private cloud, just over half agreed. Around a quarter were neutral about this, while fewer than 10 per cent disagreed.

#### **But private cloud is not universally seen as the automatic next step from virtualisation**

When asked whether they thought that private cloud was the natural next step from virtualisation, just under 40 per cent agreed, though those with greater experience were more inclined to acknowledge the progression.

#### **Implementing a full private cloud can be complex and costly**

Few organisations are at the level where their IT department can justify rolling out a full private cloud solution. However, many of the aspects of private cloud can bring recognisable benefits to the way IT is run and provides services to the business. Many companies could benefit from cherry-picking the most relevant parts of private cloud to make their infrastructure more dynamic and 'cloud-like'.

#### **Getting to grips with management will be the key to cloud-like environments**

All too often, applications, systems or platforms are implemented on a project basis and then managed using a bunch of separate tools that come as default with each solution. In addition, IT operations teams are often physically distinct, leading to a fragmented management environment. Being able to get on top of automated workload management and distribution will require structural change to get the teams working together as well as investment in integrated management tool sets.

#### **Charge back and billing are low-down on the private cloud priority list**

While many voices in the industry opine that billing and self-service are key elements of private cloud, the evidence suggests that it is low down on the real priority list. If a billing culture is already in place, it may help to accelerate the move to a more private cloud-like environment, but it is clearly not a pre-requisite for moving this way.

### CONCLUSION

Standing back and looking at all the evidence, it is best to think of the journey to private cloud as a series of small steps towards a bigger picture rather than an all-out transformation.

*The study upon which this report is based was independently designed, interpreted and reported by Freeform Dynamics. Feedback was gathered via an online survey hosted on The Register IT news site and attracted 118 respondents (mainly IT professionals). The study was sponsored by Microsoft.*



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## Introduction

There is a lot of talk by IT vendors and the mainstream IT media about how private cloud naturally follows on from virtualisation. But moving straight to private cloud is a massive leap, akin to climbing Everest in a single bound. In reality, the small minority that do manage to get to the peak do it in stages, and with hard work and training.

The rest of us though are happier to get fitter and faster by strapping on a good set of gear and tackling smaller hills and mountains closer to home. In the same vein, smaller optimisations can come together to deliver a big improvement in how IT can deliver services and enhance business value.

So what's really going on in the world of virtualisation and private cloud? Is private cloud becoming the accepted approach, or is there another way? What are some of the challenges, and do they outweigh the collective benefits? Is there a natural equilibrium point where the IT infrastructure is 'cloud-like' enough, without going the whole way? The answers to these questions provide important context for the adoption of virtualisation, a more dynamic and unified infrastructure, and ultimately private cloud.

## Study overview

In order to gain a better understanding of these matters, in May 2012, we surveyed 118 online respondents, mainly IT professionals (see Appendix for more details). In addition to requesting responses to very specific questions about private cloud adoption, how virtualisation is progressing, the challenges they face and the benefits they've seen, we also gave respondents the opportunity to tell us in plain text what's going on in their world.

As with all online surveys, the resulting sample was skewed towards those with experience of or an interest in the topic, in this case virtualisation and private cloud, as a result of the 'self-selection' principle. Readers therefore need to be careful not to take the data we are presenting out of context, and in particular be aware that levels of activity or interest in our sample will be higher than in the general population. On the plus side, however, we have the luxury of working with input from a significant number of early adopters, which is great for generating insights into real world practicalities.

## Understanding private cloud

Before we begin, it's helpful to step back and look in a bit more depth at what we mean when we talk about private cloud. Because of all the different models to which the word 'cloud' has been applied, confusion can result if terminology is not clearly defined. During the study, we therefore presented respondents with the following definition of private cloud:

***The basic idea of private cloud is to pool a bunch of servers and other resources (storage and networking) to create a general-purpose platform upon which a variety of workload types can be run simultaneously. An important attribute of private cloud is the rapid allocation/de-allocation of resources to/from workloads enabling a more dynamic management approach.***

We took a fairly broad and inclusive approach to the definition of private cloud, and deliberately excluded certain contentious and not very widely adopted features that are often associated with cloud, from the definition. In particular, these are features such as end-user self-service and billing/chargeback capabilities. To get more information on why this is, you can refer to our previously published report 'Private cloud in context'<sup>[1]</sup>, which goes into this area in some depth.

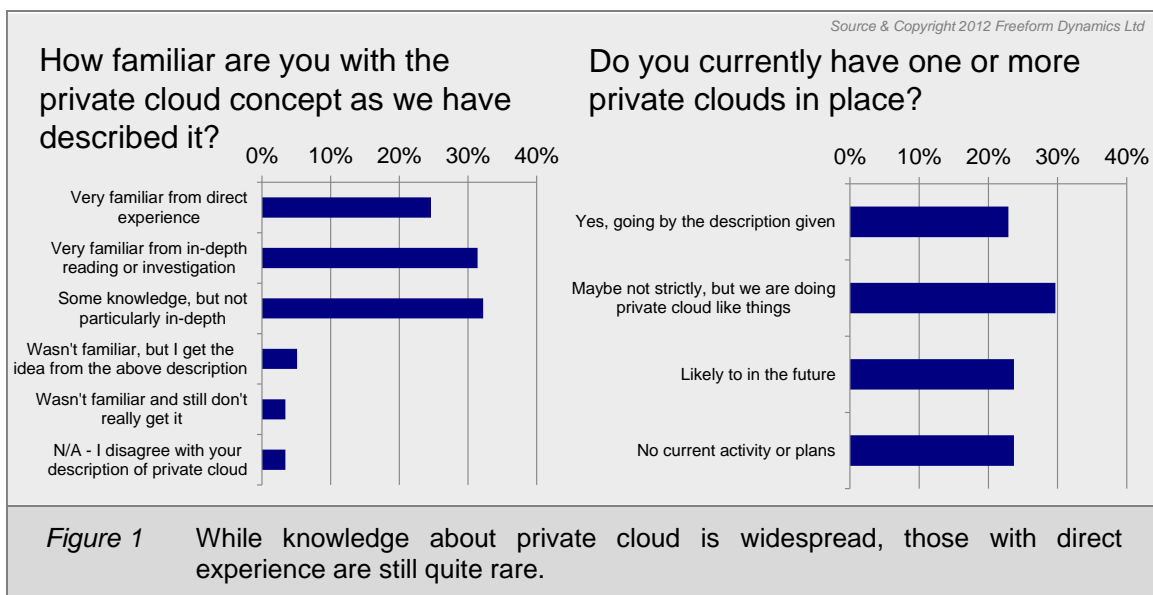
Coming back to the current survey, the good news is that the vast majority of participants understood the definition, even if only a minority had direct hands-on experience. Equally as good is very few disagreed with it. However, there were a couple of respondents that took exception to the use of the term 'private cloud' in general, such as this one:

*“Private cloud’ is just a marketing term used to describe full virtualisation of one’s infrastructure to me. If someone starts throwing ‘private cloud’ around as if it’s a distinct product then I assume I am talking to an idiot.”*

These types of strong objections to private cloud, although rare in this study, are still commonly raised across the IT community in general, and are the result of continuing scepticism as to whether there is anything new or substantial being discussed. The important thing to take away is whatever one may think of the term ‘cloud’ or ‘private cloud’, it is really all about using the concept of dynamic infrastructure and workload management so IT can deliver better services and respond more effectively to changes in the business environment.

### There is a lot of ‘private cloud-like’ activity going on

With the definition of private cloud in hand, we asked the respondents about their activities in this area. Rather than straightjacketing them into a binary ‘Yes/No’ answer looking at whether they implement private cloud or not according to the definition given, we also provided options to indicate whether they are further down the journey to private cloud than virtualisation, but not yet at the level of sophistication demanded by the definition (Figure 1).



As per our earlier warning, the skew of the online sample means this situation is unlikely to be reflected in real world scenarios (the level of activity is undoubtedly over-stated). It's extremely useful, however, to have captured views from participants at all levels of experience.

### Where does private cloud fit?

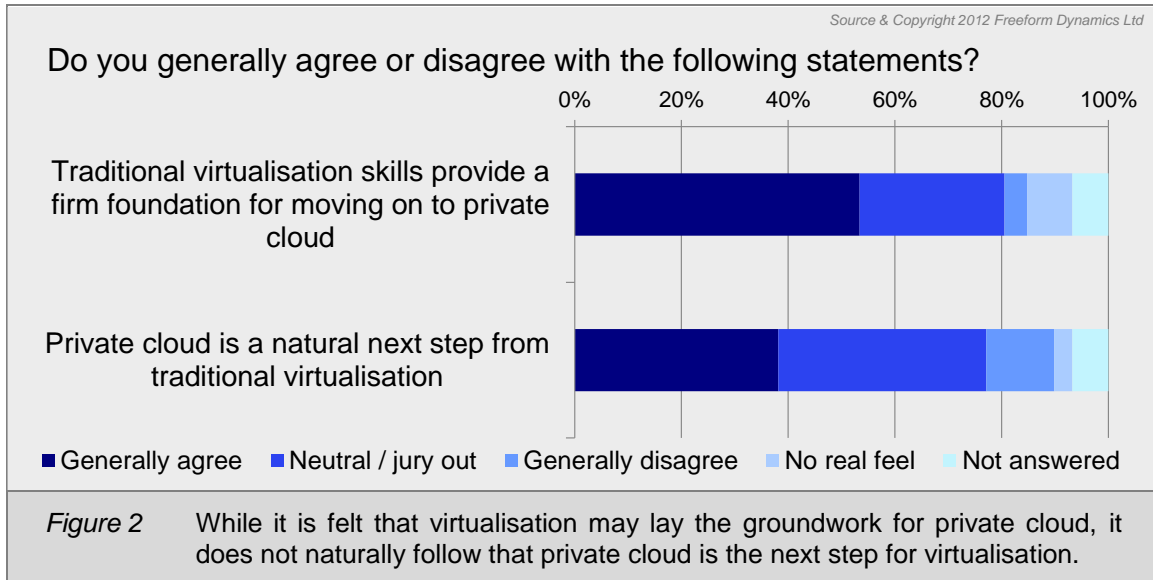
If you repeat something often enough, it becomes accepted as the truth. This is frequently the case when it comes to marketing messages extolling the virtues of private cloud. Almost every major IT vendor has a position on private cloud, and more often than not it's portrayed as the logical end point of virtualisation projects.

But time and again, our research<sup>[2]</sup> shows that while virtualisation has become widely adopted, and in an increasing number of cases consolidation projects have essentially been completed, private cloud adoption is lagging a long way behind.

To get insight into why this might be, and indeed where private cloud fits into the broader scheme of things, we posed a number of questions to the respondents regarding private cloud and how it relates to broader activities and objectives.

## Relationship between private cloud and other activities and investments

The first question we looked at was whether skills acquired while implementing basic server virtualisation provide a useful advantage when considering the progression to private cloud, and the prevailing view was that they do. Over half of our respondents felt that virtualisation skills can help to provide a good foundation for private cloud adoption (Figure 2).



The notion of skills reuse as highlighted by the first bar on the above chart is quite understandable in that virtualisation enables workload provisioning and distribution to be largely independent of the physical servers and infrastructure in the datacentre or server room. This frees up resources to be allocated or deallocated as needed, which is one of the tenets of private cloud.

When it comes to private cloud building on top of virtualisation, however, there are a lot of additional requirements around management and service monitoring that are often not in place already, resulting in additional cost and complexity. It is therefore not surprising that a smaller proportion of respondents view private cloud as a natural/automatic next step from a traditional virtualisation initiative. We can see this from the second bar on the chart shown in Figure 2 above.

We should also be careful about regarding private cloud as an 'end' rather than a means to an end.

### Better service delivery is the ultimate goal, not private cloud

The reality is that moving to adopt private cloud according to the strict definition is not something that all IT shops need to, or even should, do. Much of the benefit of private cloud can be realised by adopting some of its attributes, with a view to creating a 'cloud-like' infrastructure which yields much of the benefits but at a reduced level of cost and complexity. This is reflected in the free text comments we received from respondents:

*"Our organisation is quite heavily virtualised, but we don't have a requirement for rapid provisioning or deprovisioning of servers or scaling of workloads as we don't have any big spikes. To me private cloud is a 'nice to have' feature (for its infrastructure management capabilities) rather than a necessity and isn't worth the cost."*

*"I don't believe Private Cloud is the foregone 'next step' after virtualisation. In some areas - consulting businesses, IT-savvy shops - it makes a lot of sense. But it introduces a LOT more headaches and a LOT more complexity".*

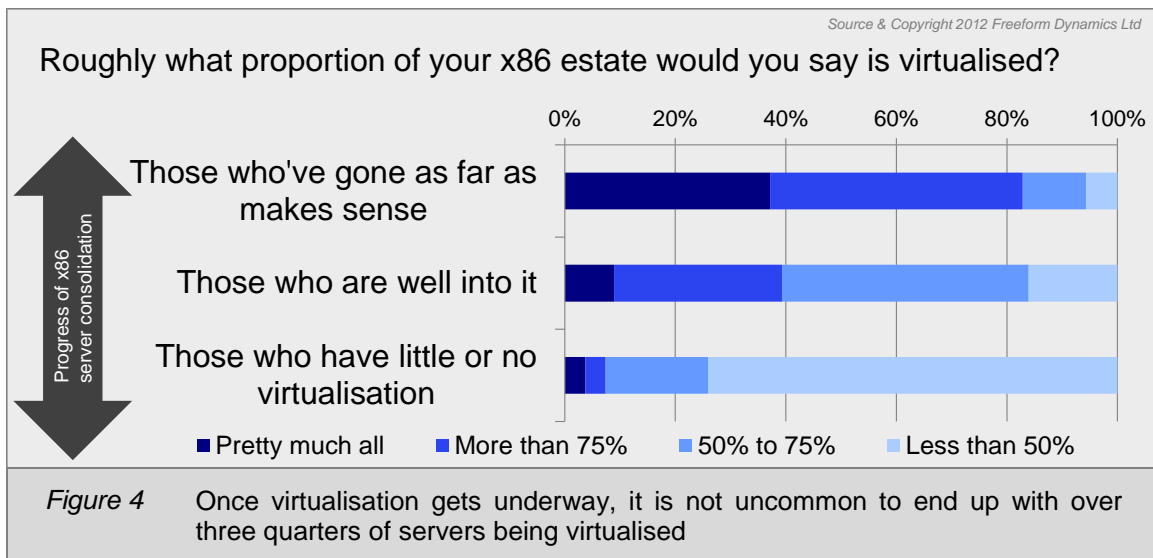
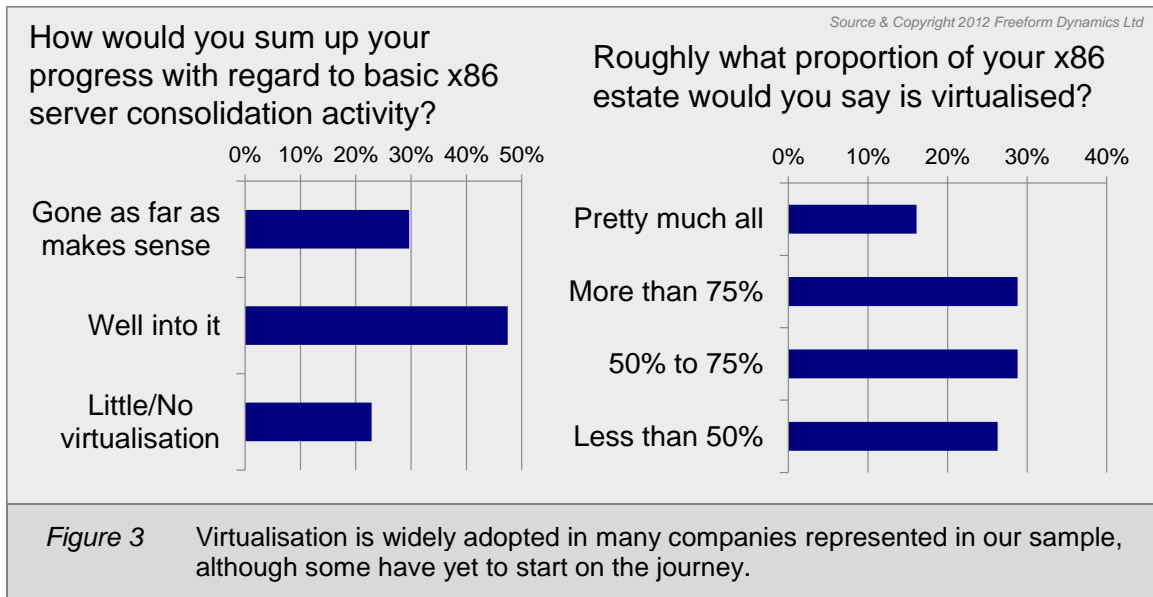
*"You can easily run a virtual environment that serves a number of custom needs. The way I see private cloud operating is that while it simplifies IT management - it pigeonholes applications and development, and is a massive shift in mindset*

for that part of your business. Seems like infrastructure is dragging the business on this one..."

With that, let's take a look at the continuum between server virtualisation and private cloud.

## The progress of virtualisation

Even though our sample base in this survey is arguably a little ahead of the curve, other research tells us that virtualisation has become reasonably widely adopted, particularly in larger organisations<sup>[2]</sup>. Examining progress more precisely, we see respondents at different stages of implementation, with the natural end point resulting in three quarters or more of their server estate being virtualised (Figures 3 and 4).

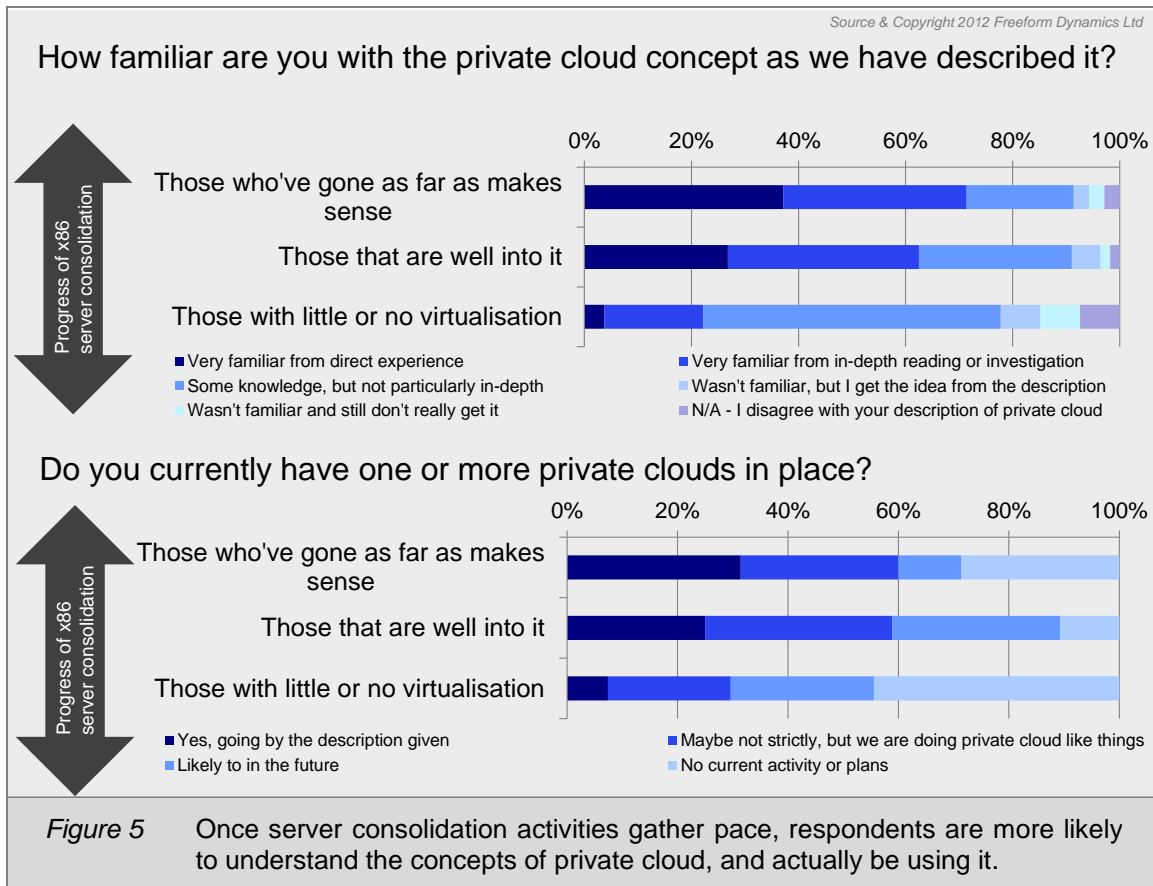


As a word of caution, apart from the skew towards organisations with more experience, it's also worth noting that our sample contains quite a few 'tech savvy' SMB respondents with fewer servers and less complexity. While we haven't broken this out here, as you can imagine, these smaller organisations tend to be able to push things further in relative terms, i.e. virtualise a higher percentage of their overall server estate.

## Experience of virtualisation and views on private cloud

At this stage, it is worth circling back to the question of virtualisation progressing to private cloud and whether the respondents' views change based on their actual experience.

The first thing that jumps out when we do this is that experience of virtualisation opens minds and creates interest and activity with respect to private cloud (Figure 5).



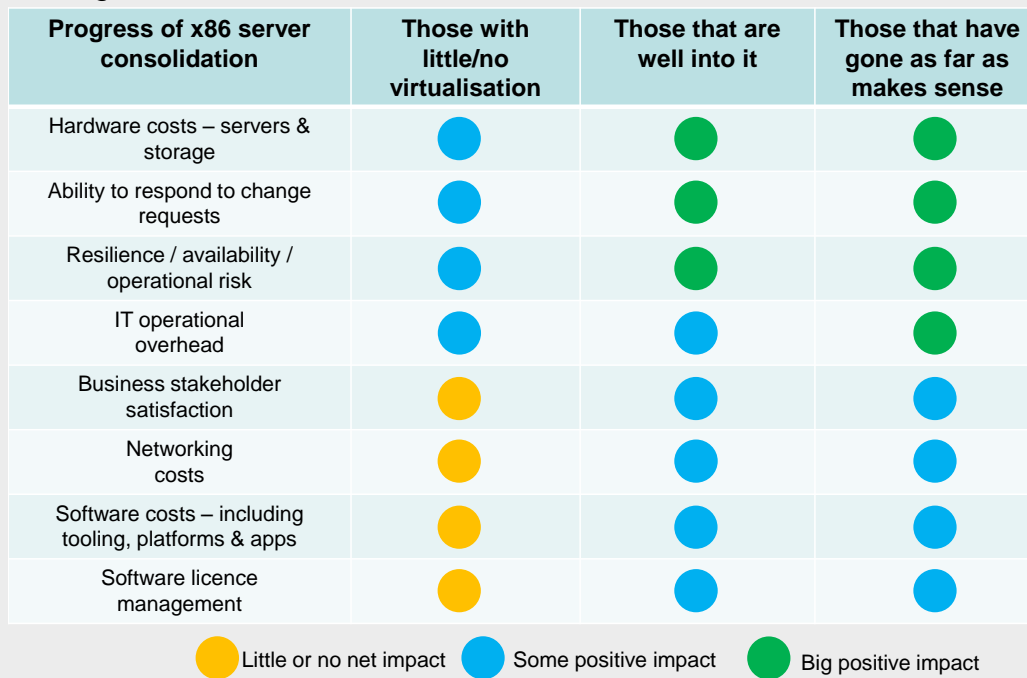
So much for the high level view. Now let's walk through the typical progression in more detail, starting with the benefits and challenges of virtualisation, some of the stepping stones between virtualisation and private cloud, and the way in which perceptions on key considerations tend to evolve along the journey.

## Virtualisation offers benefits on many levels

What we've seen so far is that many companies are progressing with virtualisation, and that a number in this sample have even moved to private cloud implementation already. However, a good proportion say that they have progressed beyond mere virtualisation and are doing 'cloud-like' things. But just what is it that they are doing that is helping them to progress without the expense and complexity of a full private cloud?

The first thing to look at is the benefits or drawbacks that have been seen through the adoption of virtualisation, particularly by those more advanced in this area. The good news here is that we hardly saw any negative feedback, with the vast majority seeing good gains here (Figure 6).

How much has your x86 server virtualisation activity had an impact in the following areas?



**Figure 6** Almost no companies saw a drawback to implementing virtualisation, with many seeing big gains across more areas the broader use they made of it.

Some of the motivations for moving to virtualisation are all about achieving short term gains, as we can see here:

*“Without server virtualisation we simply would not be able to operate with the limited numbers in the IT team that we have. We have been virtualised since 2006 and in that time the company had a major cost cutting operation where we would not have survived without being able to reduce our numbers.”*

But as virtualisation becomes more entrenched and tools and processes improve, then IT can change the way it operates:

*“The reduction in time spent sizing physical servers is immense. All servers can now access a single pool of storage and effectively memory & processor. If a server is incorrectly sized or requires more capacity at a later date, you simply change the resources allocated to it. What may have been a 2 day job now is barely a consideration”*

## The challenges of virtualisation

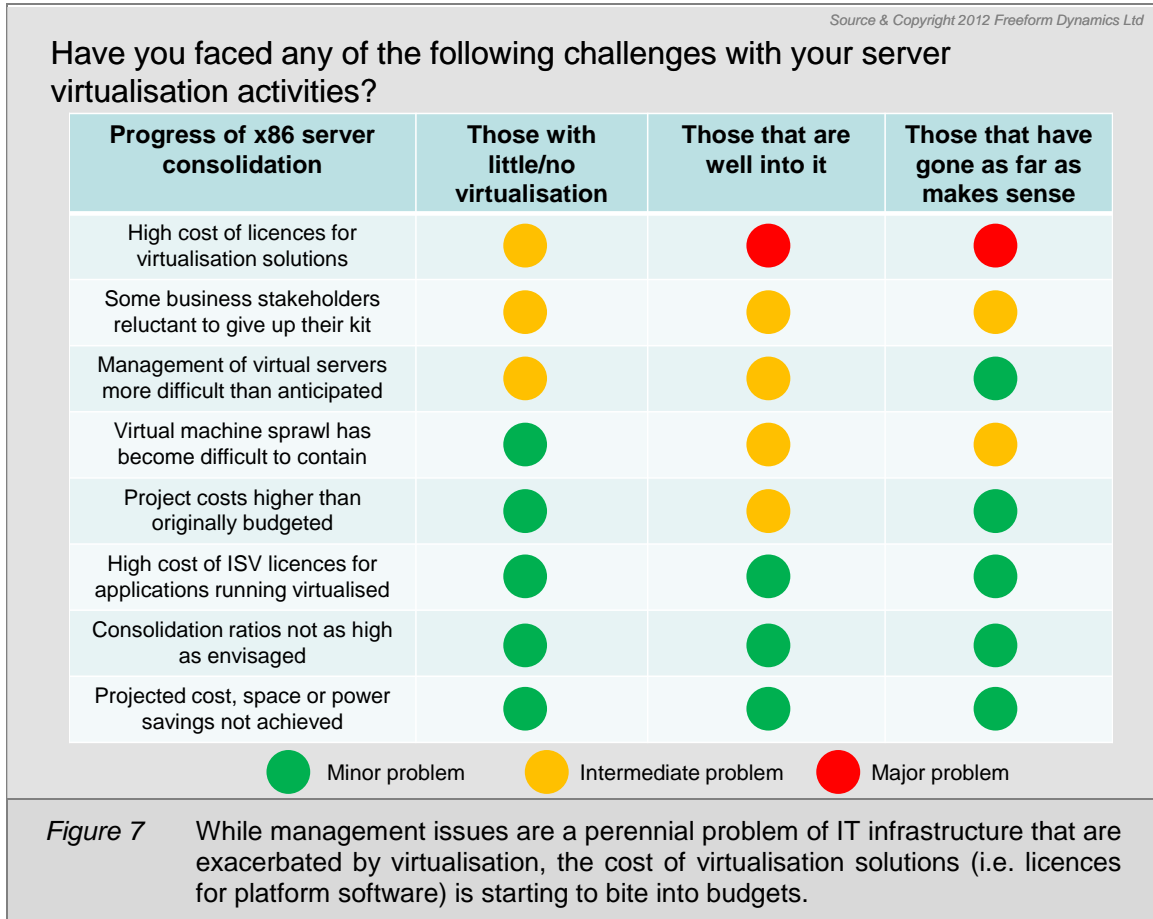
Despite the significant benefits that virtualisation is bringing to the IT environment, it is not all plain sailing. Virtualisation can work well on its own when there are certain pain points – such as a lack of space, power or manpower - that need addressing. Judicious use here can bring very real and valuable returns.

But as virtualisation becomes more accepted and used, it does tend to cause issues that if not addressed have the potential to slow down further virtualisation activities and bring increased costs and overhead into IT operations.



IT departments more often than not suffer from perennial problems with fragmented infrastructure management<sup>[3]</sup> which are exposed and exacerbated by the introduction of virtualisation.

However, it is a particular concern that there is a perception that the virtualisation platform itself – which was touted as being a magic bullet to cut the capital cost of hardware acquisition - is now becoming a significant challenge for further server virtualisation activities, making a return to physical hardware attractive to some (Figure 7).



Not all of the challenges associated with virtualisation are technical in nature. Part of the problem is the changing way in which IT and the business interact, as this respondent has found:

*“We're more responsive to requirements from business for new servers - this has led to a mentality in the business though that 'ah it's only a virtual server, we won't have to pay for it'. It's been a struggle to get financing to ensure capacity is available when needed.”*

## Investments that bring ‘cloud-like’ benefits

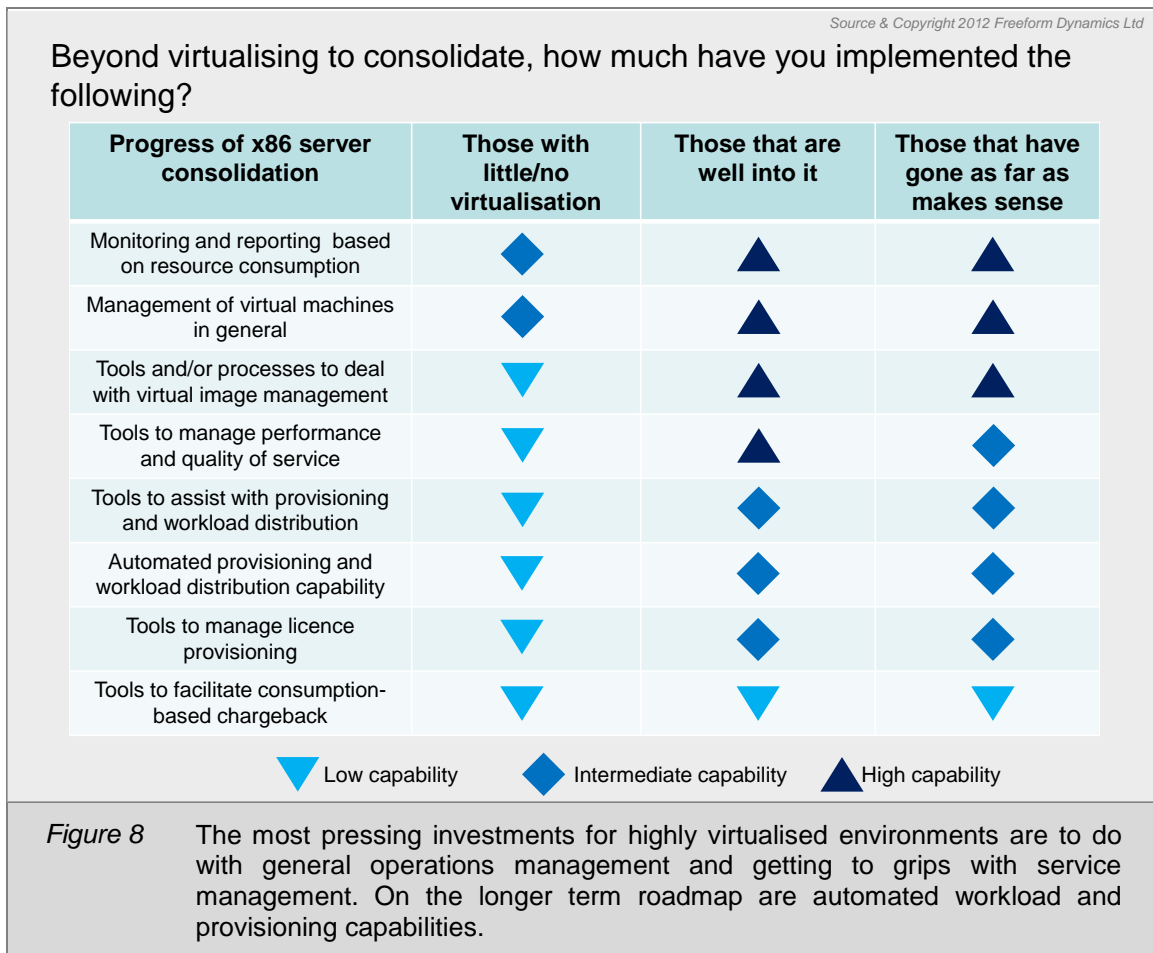
Although we’ve seen that some of the challenges around moving to virtualisation are out of the hands of IT, when it comes to IT management it is a different story. We too often hear that IT operations staff are overstretched as the business is continually asking for new services and that IT has to juggle too many conflicting priorities. Yet few companies also recognise that their typically fragmented operations teams and management tools help to contribute to these difficulties as a root cause<sup>[4]</sup>.



When it comes to private cloud, we can recognise two main trends. The first is to generally virtualise and pool the physical resources so that workloads - applications and services - can share the underlying assets. The second is to manage the workloads effectively, so that the required performance or service levels are delivered, while ideally making efficient use of the underlying hardware.

Many companies start off trying to create a virtual pool through virtualisation, but due to a lack of capability to manage this effectively, progress is usually limited: without a change in approach, this virtual environment will suffer from the same problems that physical systems do in day to day operations.

As virtualisation becomes more established and important, the management challenges are exacerbated, which in turn creates a need to invest time and budget to standardise automated workload provisioning and distribution in order to maintain service levels (Figure 8).



### Billing and chargeback are low down on the priority list

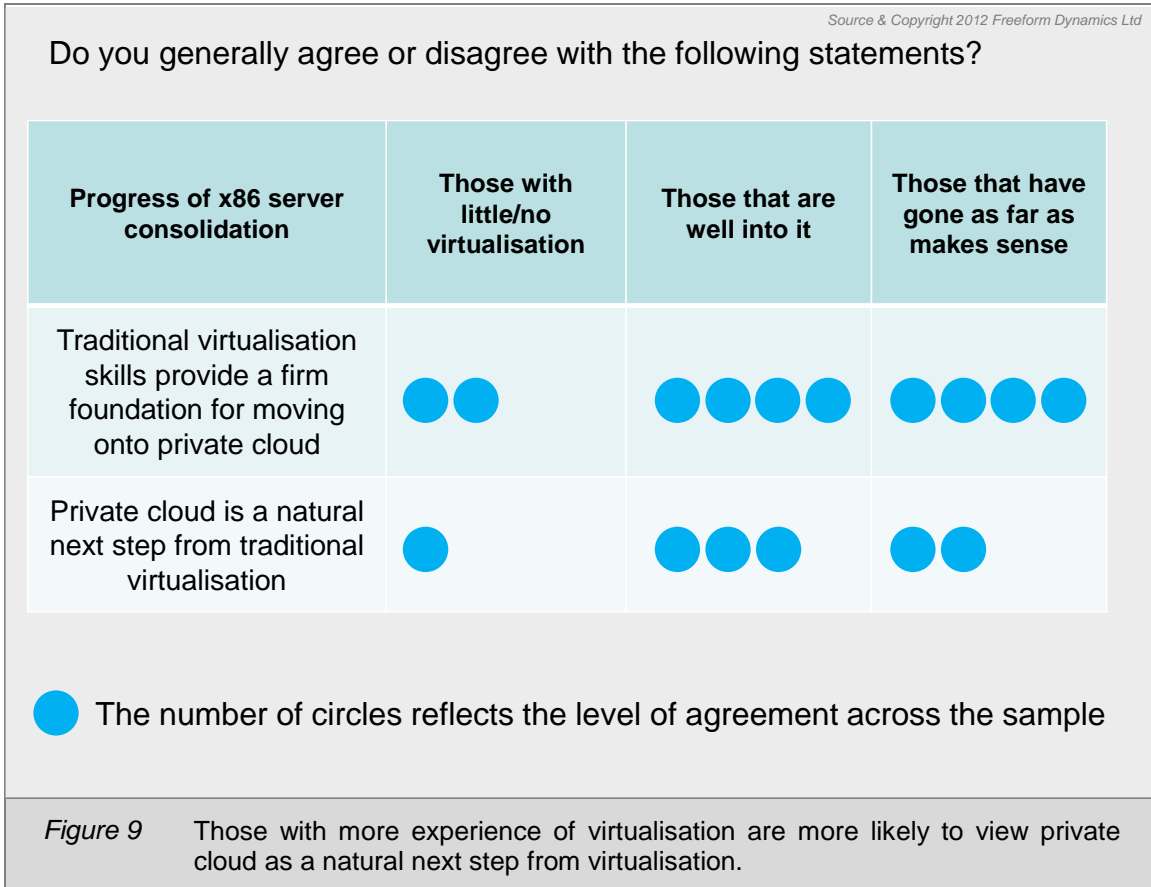
On a specific point, it is commonly claimed that self-service and billing are essential elements of private cloud. However, what comes through clearly here, in line with our previous research, is that chargeback accounting is not a high priority, even for those that have adopted private cloud or highly virtualised environments.

This whole area is a highly emotive one. Whether you think that self-service and charge-back accounting are good ideas for IT or not, the reality is that very few companies have a basic handle on them, let alone the motivation to take them on board. Many projects aimed at implementing these capabilities have led to IT being burned in the past.

## Experience makes private cloud seem a lot more natural

We have seen here that those companies that are well advanced in their consolidation initiatives have both direct experience and a good understanding of private cloud, as well as having made more investments in optimising and managing their environment and reaping the rewards along the way.

Therefore it is not surprising that when we look at the opinion of those with more experience of virtualisation they tend to hold a much firmer view that private cloud is a natural progression from virtualisation (Figure 9).



This change of opinion with increasing experience of virtualisation is not unexpected. After all, those companies that become more expert in an area are generally more capable and confident of seeing their route to the next level, in this case a more service centric and dynamic IT environment.

## Discussion

Virtualisation is increasingly on the agenda for modern IT organisations. However, it is also clear that there is no consensus that this will naturally lead to implementations of private cloud, although significant numbers of respondents, and particularly those that are already more highly virtualised, tend to think this way.

The reality is that doing private cloud is quite hard, and not all organisations will be able to justify doing a full implementation at the current time. However, there are many demonstrable benefits to be had by going down the route towards private cloud, but not going the whole journey to the destination with all the cost and complexity that comes with it.

The foundation for a cloud-like environment is virtualisation, and this requires getting to grips with investing in management to make sure that virtualisation does not get a life of its own and runs away from IT. Further concerns are dealing with the cost issues around the virtualisation platform as well as tackling the internal politics of project finance and shared infrastructure.

Then there is the question of balancing short term efficiency gains such as server consolidation against longer term benefits such as pooled resources and automated workload management. Sometimes it makes sense to halt consolidation and focus on getting the cloud-like environment into place before all the budget is eaten up with consolidation, and what's left at the end is an efficient and consolidated virtual mess rather than a physical one.

The short term focus in moving beyond 'virtualise to consolidate' activity will be to build on the virtual machine management and monitoring of resource utilisation by implementing effective virtual machine image management as well as service quality or performance monitoring.

In the longer term, once the environment is stable, the focus can more naturally shift towards a more dynamic infrastructure with assisted workload provisioning and distribution, with an eye to achieving as much automation as possible within the confines of your budget and business constraints.

## References and further reading

**1. Private Cloud in Context**

<http://www.freeformdynamics.com/fullarticle.asp?aid=1526>

**2. Cloud Computing Checkpoint**

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

**3. IT Services and Systems Management**

<http://www.freeformdynamics.com/fullarticle.asp?aid=1245>

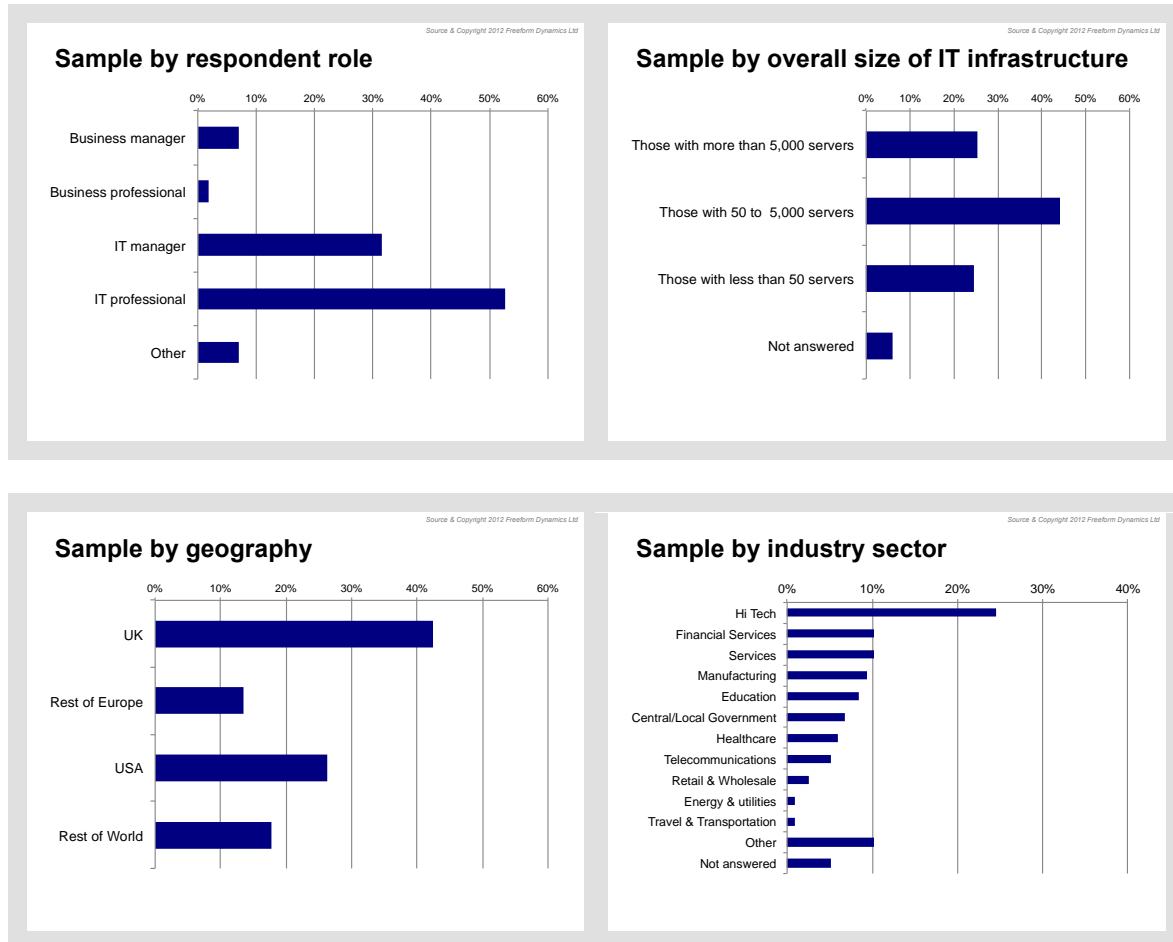
**4. Readers tell us why implementing change is so hard**

<http://www.freeformdynamics.com/fullarticle.asp?aid=1512>

## Appendix: Study Sample

Feedback was gathered via an online questionnaire published on The Register news and information site ([www.theregister.com](http://www.theregister.com)). The respondents, totalling 118, were mainly IT professionals representing a good cross section of job functions and working in a range of different industry sectors.

The sample distribution was as follows:



### A note on methodology

The web survey approach used in this study is subject to the 'self-selection' principle, which basically means that people with a greater knowledge of or interest in the topic are more likely to have responded.

Such self-selection does not undermine the analysis we have presented here as we have focused on the relative emphasis of different perceptions and types of activity. Indeed, in fast moving areas it is often useful to investigate the views and behaviour of those that are ahead of the curve. It does, however, mean that it would be inappropriate to regard any of the statistics we have used as a representation of the absolute level of need or activity across the business community as a whole.

The study was completed in May 2012, and we would like to take this opportunity to thank all of those who took the time to participate. Your help is very much appreciated.

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