computing research

# Mind the gap

## Bringing the public cloud into the data centre [rather than the other way around]

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RESEARCH PAPER

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# Executive summary

Digital transformation is all about re-aligning business practices and modernising IT to better compete or, even just survive, in our fast-paced digital world. A world where competitive advantage comes from the ability to deliver what customers want and do so, not just faster than the competition, but when, where and how customers want to consume it.

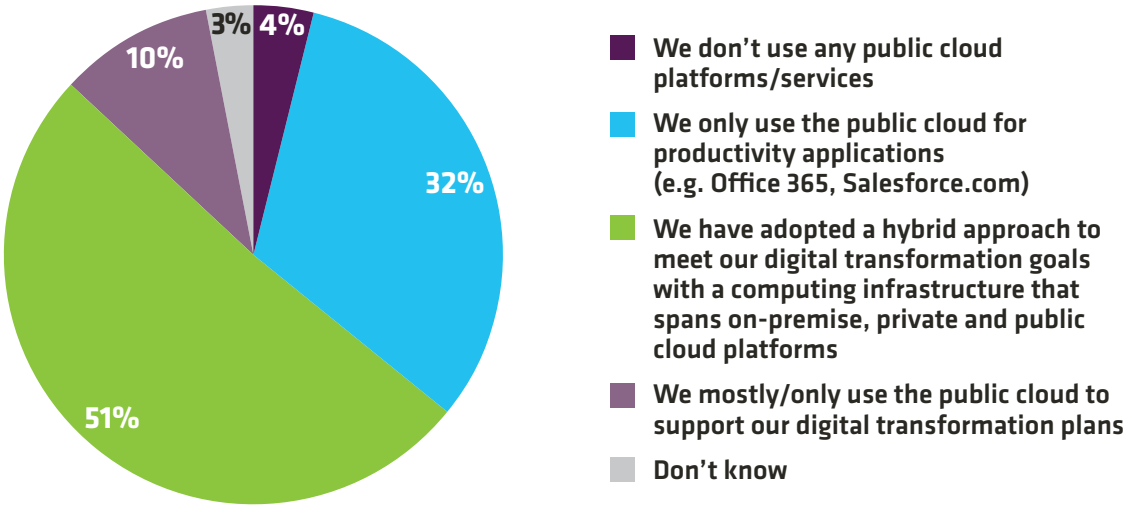
For many the public cloud is an integral part of that process, combining infinite scalability with pay-as-you-consume economics plus on demand access to the latest digital technologies. The public cloud is, however, a completely different environment to the on-premise data centre which, for most organisations, remains at the centre of their IT operation. Moreover, the differences make it essential for companies building a hybrid infrastructure to look for ways of bridging the gap between the two if they are to deliver on digital transformation.

In this research paper we look at the causes of the technology gap between the on-premise data centre and public cloud infrastructure, the problems it can cause and how they can be addressed.

While it's fair to say that digital transformation is something of a moving target there is, at least, consensus on the need for close alignment of business processes to IT and the importance of fast, flexible and agile digital technologies as key enablers. Moreover, companies wanting to stay ahead of the transformation game are increasingly turning to the public cloud to deliver the technological part of this equation, as reflected in a recent online survey of *Computing* subscribers into how the public cloud fits into their digital transformation plans.

Conducted across a broad spectrum of medium to large enterprises only a tiny number of companies polled (4%) said they were not using public cloud platforms or services at all, as shown in Fig. 1.

## Fig. 1 : Most digital transformation plans involve the public cloud, how is it used in your organisation?

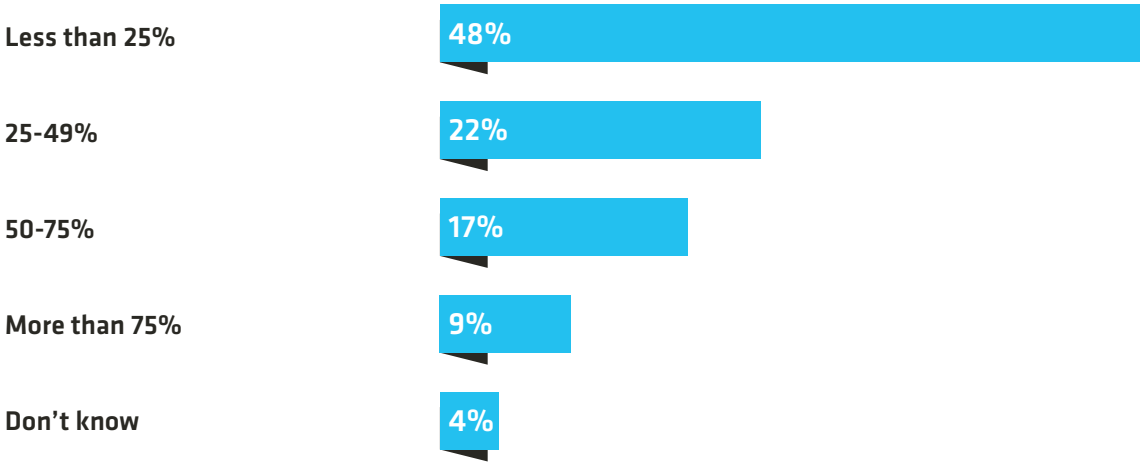


## Mind the gap

Just under a third (32%) restricted public cloud use to productivity applications such as Office 365 and Salesforce.com but for the majority (61%), the public cloud was an integral component of their digital transformation plans. Moreover, at one extreme, 10 percent had gone all out to free themselves from using on-premise infrastructure and mostly/only used public cloud platforms. The more popular approach, however – taken by a fraction over half (51%) of the respondents – was to build a hybrid infrastructure spanning on-premise, private and public cloud platforms.

Plans, of course, are easy to conjure up, putting them into practice is another matter entirely. As such, the survey sought also to find out just how far companies looking to build a hybrid infrastructure had gone towards embracing the public cloud in practice, the results of which can be seen below in Fig. 2.

### Fig. 2 : How much of your IT infrastructure is in the public cloud?




A far from easy question to answer, the approximations given by respondents still indicate remarkably swift adoption of the public cloud. Indeed, a surprising quarter (26%) of companies polled said that over half their infrastructure was now provided by public cloud platforms, a result made all the more remarkable given widespread concerns over security and compliance. Concerns which led initially to much slower uptake of public cloud services by the enterprise compared to small businesses and consumers.

Those concerns haven't gone away, but it seems that they no longer dominate the thinking of enterprise leaders, particularly those focused on finding the most expedient route to digital transformation.

# The cloud is a different country

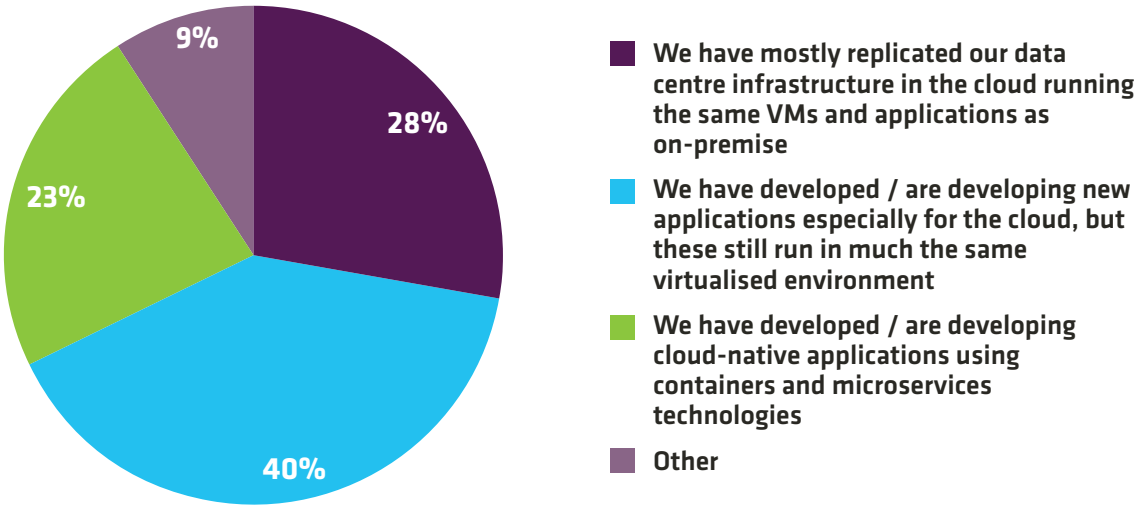
So, like it or loathe it, the public cloud is fast becoming an equal partner, routinely employed to host business-critical applications alongside the on-premise data centre in enterprises across the board. There is, however, a huge gap between the two environments that needs to be bridged and not just in terms of the technologies involved, but how they are provisioned, organised and managed which need to be addressed if the enterprise is to extract maximum benefit from the hybrid approach.

Part of the problem here is the speed at which the public cloud is evolving, with the big-name vendors making the latest cutting-edge technologies available in a highly digestible and affordable format at a breath-taking pace, in turn, leading to a sea change in the way the cloud is being used.

Wind back just a few years and you would find early adopters doing little more than replicate their on-premise infrastructure in the cloud and using it to host much the same virtual machines and applications as in the data centre. On the plus side this removes the need to source and manage on-premise hardware, but it does little to take advantage of the flexibility and agility benefits of the cloud, especially cloud-native technologies, such as microservices and containers, which are being pushed out at an incredible rate.

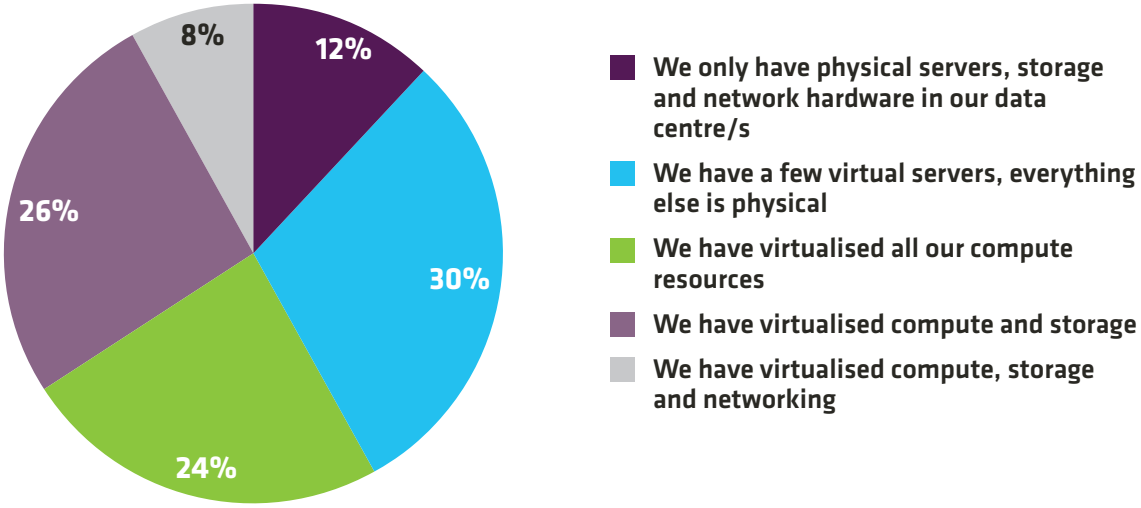
As a result, companies merely replicating their on-premise data centre in the cloud are now very much in the minority (28% in the *Computing* survey) with most organisations now developing applications expressly for the cloud and a surprising 23 percent already making use of the latest cloud-native technologies rather than stick with traditional applications and VMs (Fig. 3).

## Fig. 3 : How are you using the public cloud?



Compare that with what's happening in the on-premise data centre to expedite digital transformation and you find a completely different scenario, with much slower adoption of even the most basic of technologies. Such as virtualisation, for example, now very much taken for granted in the cloud and not just when it comes to compute resources but storage and networking as well. The same is widely assumed to also apply in the enterprise data centre, but the figures from the *Computing* survey paint a different picture altogether (Fig 4.) with patchy levels of virtualisation even at the most basic level.

### Fig. 4 : Successful digital transformation requires a high scalable, agile and responsive data centre infrastructure where resources are fully virtualised and easily accessible. How does yours measure up?

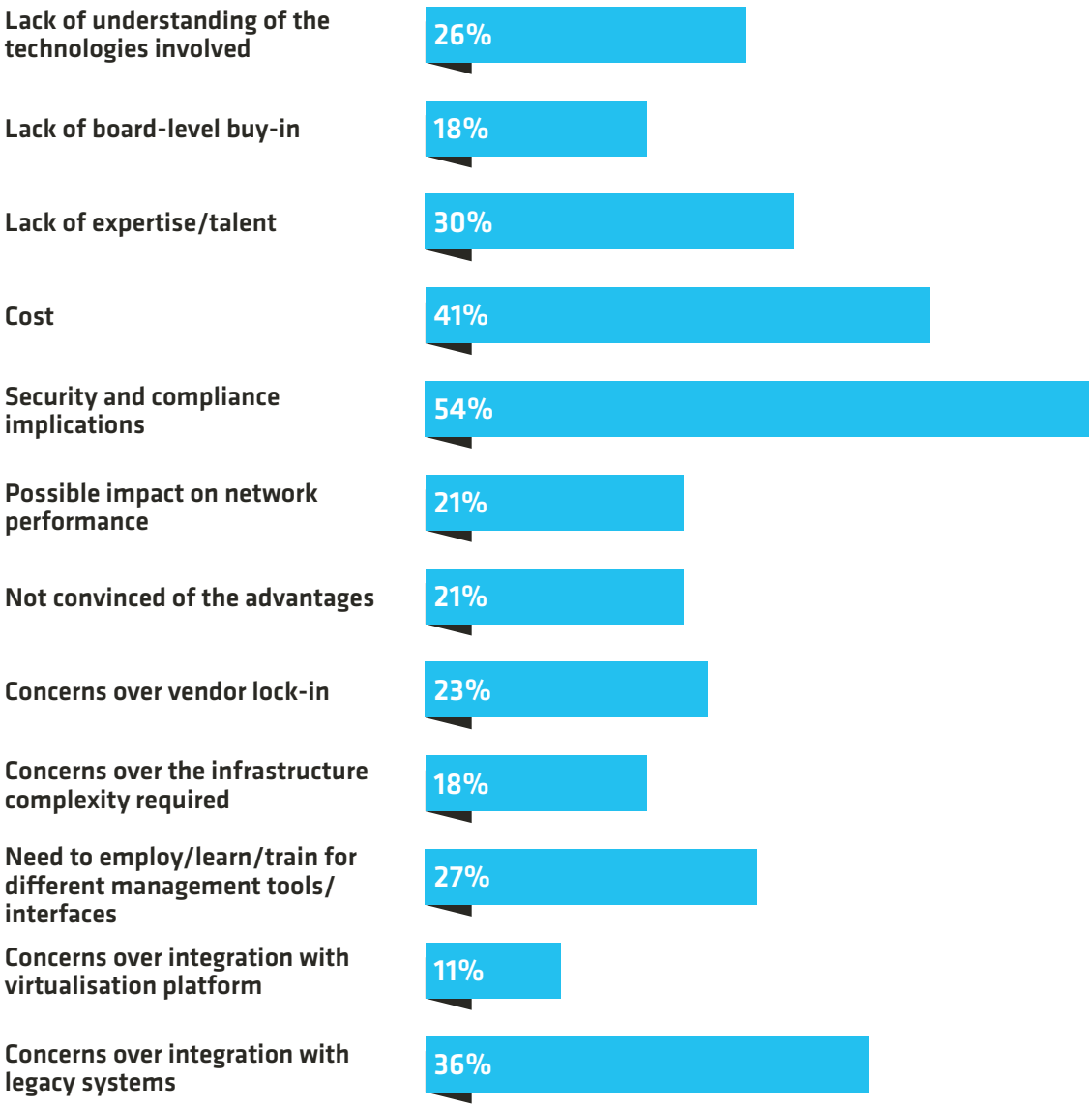



Far from having fully virtualised environments, almost 12 percent of respondents claimed still to be using only physical servers, storage and network hardware in their data centres, with almost a third more (30%) having partial server virtualisation and nothing else. On the plus side, about a quarter (24%) had completed virtualisation of their compute resources and a similar number (26%) had both virtual servers and storage. However, just 8 percent had what might pass for software-defined data centres with full virtualisation of compute, storage and network resources to the level taken for granted in the public cloud.

# Going native

As part of their transformation plans companies are also developing cloud-native applications to run in their data centres. However, this is happening at a much slower pace than in the public cloud, not least because, as already highlighted, many are still struggling with basic virtualisation projects. Support for cloud-native platforms also calls for considerable capital investment – not needed if using the cloud – plus a whole new layer of management tools and expertise. Added to which there are variety of other factors contributing to slow uptake of cloud-native technologies in the data centre, as summarised in Fig. 5.

## Fig. 5 : Which of the following are causing you to hesitate over the development and deployment of cloud-native applications using containers and microservices?




Asked specifically why they might be hesitating over the adoption of cloud-native technologies, security and cost (inevitably) came top of the list. Almost a third (30%) however, identified lack of expertise/talent and a similar number (27%) the need to employ/train support staff to work with new tools and interfaces needed to manage cloud-native applications.

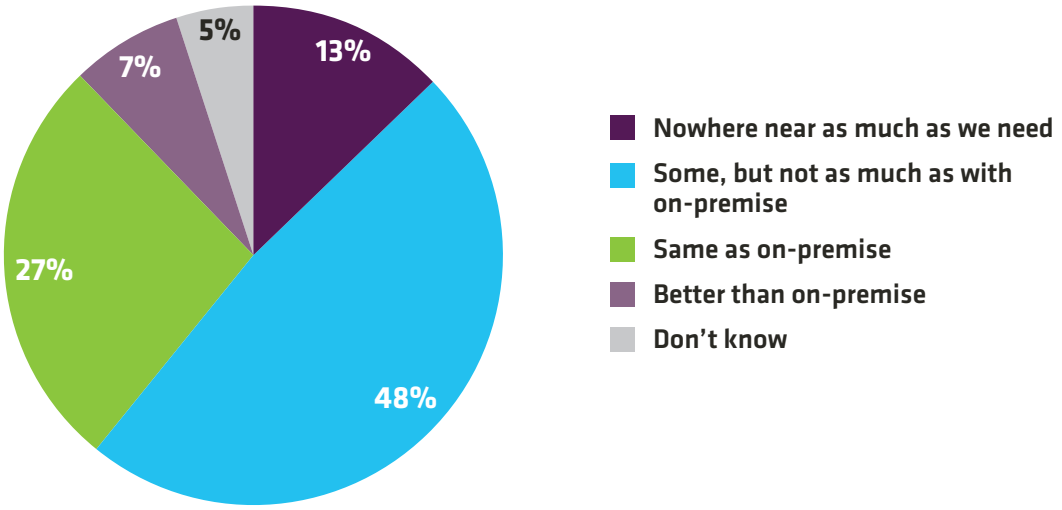
Integration with existing virtualisation platforms and legacy systems also loomed large in the thinking along with possible vendor lock-in and a general lack of understanding of the technologies themselves.

# The worst of both worlds

What is clear from the survey is the huge technological gap that has arisen between the infrastructure found in the on-premise data centre and what's available in the public cloud. Simply put, the enterprise data centre is no longer the cutting-edge technological temple it once was. That mantel has been assumed by the public cloud, which is evolving at breakneck speed and largely leaving the data centre floundering in its wake.

When it comes to monitoring and managing application workloads in these environments, however, the roles are reversed with IT teams, in general, having much greater visibility of what's going on in their data centres than they do public cloud platforms (Fig. 6).

## Fig. 6 : How much management visibility do you have of your public cloud infrastructure and the applications it hosts?

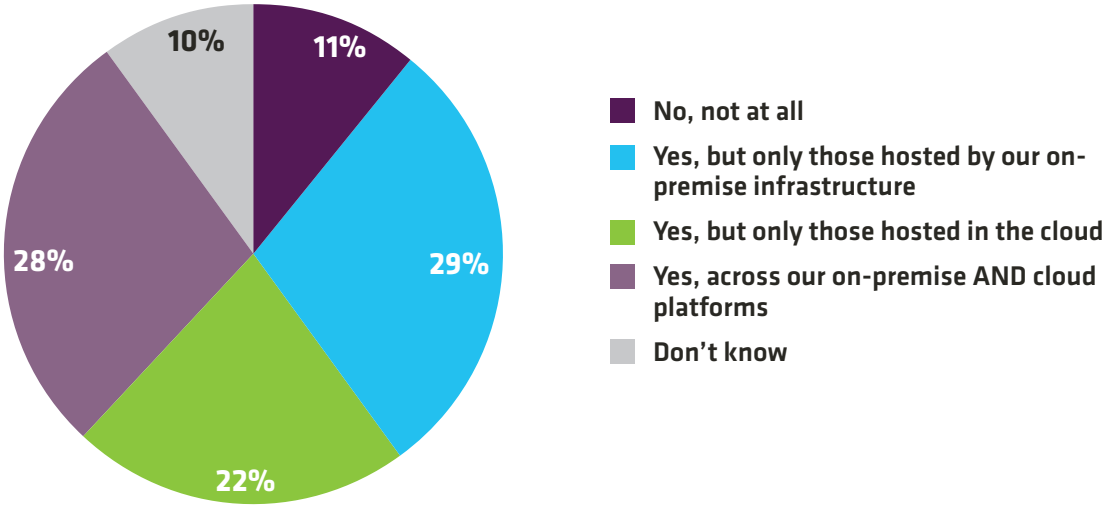



The figures here show over 60 percent of companies polled with less visibility of public cloud workloads compared to those hosted on-premise. Moreover, while around about a quarter (27%) claimed to have equal visibility across the two camps, that figure may well be flattered by a lack of management tools in the data centres concerned.

Only a very small minority (7%) said they had a better view of what was going on in the cloud – a figure that, again, may be skewed by poor on-premise management tools. Either way, companies building a hybrid infrastructure need to think carefully about how it will be managed and direct their investments towards platforms, virtualisation environments and tools able to deliver the required level of management visibility regardless of where workloads are hosted.

Likewise, a great deal of careful planning and investment is required to achieve the holy grail of the hybrid network – the ability to dynamically balance workloads across platforms to cope with peaks and troughs in demand. A shown in Fig. 7, this is currently a rare ability. Most of those taking part had some load balancing capabilities but less than a third (28%) said they could balance workloads across a mix of on-premise and public cloud platforms.

### Fig. 7 : Are you able to balance business critical workloads to, for example, handle fluctuations in application demand?

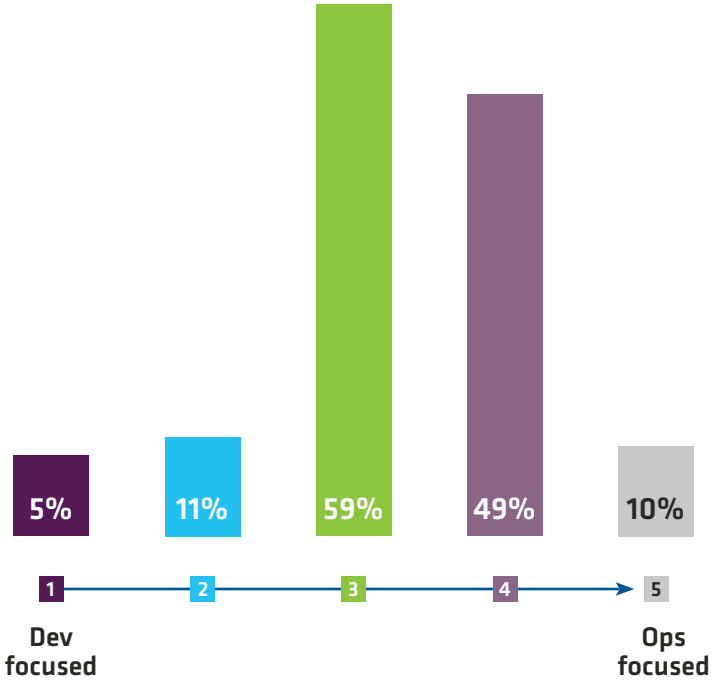



# Moving forward

It's not all bad news. Enterprises looking to hybrid IT as a means of delivering digital transformation may be staring into a technological abyss between their on-premise and public cloud investments, but that doesn't mean they aren't aware of the issue. Neither are sitting on their hands and doing nothing about it. More importantly, they appear to be avoiding the trap of being led by the technology, an approach often taken in the past and fraught with dangers.

In the case of digital transformation companies could, for example, be bamboozled by tech 'evangelists' into developing cloud-native applications regardless of the readiness of their infrastructure to support and manage them. That, however, doesn't appear to be happening. Indeed, when asked specifically about this, respondents to the *Computing* survey said that DevOps teams were, in general, inclined to greater consideration to the deployment, integration and management of new applications than the speed and ease with which they could be developed and brought online (Fig. 8 – *see next page*).

## Fig. 8 : DevOps requires organisations to consider both development and operational issues when planning and deploying applications. How is the DevOps equation balanced in your organisation?




Equally, the IT industry is becoming aware of the need to put on-premise infrastructure on an equal footing with the public cloud as an important first step to bridging the technology gap between the two. Vendors, for example, can be widely seen re-engineering their products to remove barriers to on-premise virtualisation and empower IT teams to create the same kind of software-defined data centres as those behind the big name public cloud platforms. At the same time steps are also being taken to extend the management visibility available on-premise out to infrastructure hosted in the public cloud, with increasing effort also being put into allowing workloads to be balanced across the on-premise to cloud divide.

These developments aren't happening overnight, but they are trickling down into real products and services, putting the onus onto the enterprise to mind the gap, seek out those products and services and employ them to build the kind of hybrid infrastructure needed for successful digital transformation.

# Conclusion

As reflected in the *Computing* survey on which this research paper is based, initial reluctance on the part of enterprise IT to embrace the public cloud is being put aside with companies, across the board, looking to build hybrid infrastructures as means of fulfilling their digital transformation ambitions. Unfortunately, a growing technology gap is also to be found between the on-premise data centre and the public cloud which needs to be addressed if the two are to co-exist with any degree of harmony.

Greater virtualisation of on-premise infrastructure is fast becoming imperative as a first step to bridging this gap, as is the need to extend management visibility out of the data centre and into the cloud. Attention also needs to be paid to enabling workloads to be balanced seamlessly across the on-premise to cloud divide and make hybrid infrastructure more of cohesive whole than a mere collection of parts.

IT vendors are working to make all this possible. Enterprise IT teams, meanwhile, need to understand the need for those developments, seek them out and use them to 'mind the gap' in their organisations.

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