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PAPER

Bare metal matters: Why hardware still counts in the age of cloud abstraction

IT leaders weigh in on cloud strategy, migration, and what they want out of their cloud solutions

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Introduction

Today's organisations are, on the whole, well aware of the benefits of the cloud, with the majority having migrated at least some workloads to this environment. However, as data and applications have moved to the cloud, hardware and architecture considerations have taken a back seat, with many leaving this to the care of cloud providers. The nature of cloud computing means workloads become increasingly abstracted and customers bear less responsibility for the day-to-day management of the supporting infrastructure.

However, just because the applications and data are de-coupled from the physical infrastructure that host them, it doesn't mean hardware no longer matters. If organisations are to get the most out of their cloud-based workflows, utilising the right cloud architecture and taking advantage of the latest hardware innovations is key.

This white paper draws on exclusive subject expert interviews to explore what organisations are doing today to ensure they are placing workloads in the most suitable environments, from edge to cloud. It examines organisations' current hybrid and multi-cloud strategies and reveals whether they are delivering in key areas, such as performance, reliability, and security. We also reveal what organisations want out of their cloud solutions, and how hardware fits into this.

Key learnings

- Clear strategy and objectives are needed to ensure costs are minimised and performance is optimised when deploying a cloud solution.

- Reducing IT workloads through automation and support is an important initiative.

- The ability to scale up or down based on demand and maintain flexibility are central considerations.

- Lifting and shifting to the cloud should be avoided.

- The future of work will be predominantly hybrid and cloud-first.

The interviewees

- **Dom Russell**, Head of Infrastructure at Victoria Plum.

- **Michel André**, CIO at Banking Circle.

- **Paul Greaves**, Head of Automation and Orchestration for IT infrastructure at Virgin Media O2.

Suitability and strategy

The new era of digital transformation demands rapid development across all industries. A growing number are choosing to migrate to the cloud, but progress is often hampered by lack of strategy or failing to consider which cloud solution best suits an organisation.

For Dom Russell, Head of Infrastructure at Victoria Plum, adopting cloud services that meet your business objectives is critical.

"It's critical to ensure that any technology you're embracing is fit for purpose. For some businesses, it's easy to be tempted to opt for a new application, system or solution, without analysing whether it really fits their requirements.

"Now that cloud is much more accessible to more businesses, understanding your requirements and the overall business strategy are key considerations when deciding if the cloud solutions fits and satisfies your needs."

This extends to the architecture that underpins your cloud environments too. Those business outcomes you're after – the efficiency gains, latency reductions, and security improvements are all dependent on the hardware on which your cloud is built. Increasing abstraction means you no longer need to dedicate large resources to managing hardware. It doesn't mean hardware no longer matters.

For many, the sudden shift to remote working has placed greater demands on IT. While some organisations were already starting their cloud-first journeys, others decided it was the time to take on more cloud capabilities to support homeworking and innovation.

"Prior to the pandemic, we operated with two data centres which were physically located at two of our sites, each providing backup and recovery options for the other. The pandemic presented the business with an opportunity to embrace the concept of hybrid working and the possibility to reduce our physical data centre requirements. We analysed what the business wanted to strategically achieve, and the cloud model was an ideal solution in satisfying some of our requirements," says Russell.

Michel André, CIO at Banking Circle, says the COVID-19 pandemic did not impact their transformation. As a growing business, the fact that they had already migrated to the cloud allowed for rapid scalability during this time.

"The pandemic has not shifted our cloud strategy – we had already setup a virtual desktop infrastructure. We actually started a cloud migration around three years ago, migrating our client-facing front end and APIs. Then we gradually moved our core banking system to the cloud. We want to utilise the capabilities and infrastructure of the cloud to scale with the business and support geographic expansion.

"We have seen tenfold performance improvements in some of our key workflows following our migration. We've been able to extend our opening hours to our clients just down to that."

These kinds of performance improvements are due to employing the right cloud architecture, with the sort of scalable, leading-edge hardware that cloud providers are able to leverage. Trying to support the same computing capabilities on-prem would mean eye-watering capital expenditure as part of a regular update cadence. Not to mention the operational expenditure required to maintain and manage such a technology estate.

> *"The ability to rapidly scale as we grow is a major factor. Being in the cloud allows us to take that journey, allowing flexibility for building and putting client solutions in the face of clients, because we can provision and test things faster."*
> *– Michel André, CIO, Banking Circle.*

Paul Greaves, Head of Automation and Orchestration for IT infrastructure at Virgin Media O2, explains that strategically moving to the cloud by planning the journey and what you want to achieve is critical.

"You need to plan it out and take your time to make sure you don't underestimate and overcommit, otherwise costs will be blown out of the water. You've got to make sure you can build fast and you can scale up and down based on demand. Don't just buy the size and keep it static – static is not the cloud.

"Because we grew so fast and demand grew so rapidly, we were struggling to keep up with the service levels. We began discussions around how we can reduce our footprint and our data centres. We started to look at increasing our footprint in the cloud environment. Consumption of cloud services for us is a big win, keeping us agile, allowing innovation, and it means we don't worry about the infrastructure as much as we have done previously."

Michel André shares this view, emphasising that without strategies organisations are prone to 'lifting and shifting' – a common shortcoming in cloud migration journeys.

Lift and shift is where organisations move an application and its corresponding data from one environment to another with minimal redesign.

"Organisations need to be contextual and see where they're coming from. If you want to have flexibility and scalability, a cloud strategy is important.

"I think a lot of companies move to the cloud in a kind of lift and shift mode. They take the old and try and move it in a shoebox into the cloud. We have rebuilt APIs as cloud native with cloud-first components to reap the full benefits of moving to the cloud. You need to be cognisant of where and if you should lift and shift, and where you should start from scratch and build anew."

Previous *Computing* research reveals that only 45 per cent of organisations surveyed say they have a defined digital strategy, while just 19 per cent say they have a clear post-migration cloud vision. Yet around 70 per cent agree that "success in the cloud requires having a clear post-migration vision."

Outlining your desired business outcomes, the purpose in migrating, and how you will measure the success of the solution is critical. Because transformational change encompasses people, process, and technology, the strategy and vision should be shared between decision-makers, IT staff, and across all levels of the organisation.

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The need to digitise is putting increased focus on infrastructure, prompting business and IT professionals alike to ask whether their technology estate is up to the task. Here are four steps to consider on your enterprise's journey in this new era.

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The importance of hardware

As data, applications, and data environments move to the cloud, customer IT personnel are increasingly removed from the daily administration of the hardware that underpins them. Often, cloud providers will manage the infrastructure, but hardware still matters when it comes to performance, reliability, and cost. Utilising the right architecture is an important element in ensuring cloud solutions suit your organisation and its strategy. This is particularly true of high-performance compute workloads or anything requiring real-time data. Latency, bandwidth, and instructions per clock cycle become crucial.

Russell explains that for Victoria Plum, an organisation using both on-premises and cloud solutions, hardware is still important.

"Hardware will continue to be a consideration for us as a business. When we evaluate our existing physical hardware, a decision needs to be based on the benefits of running that infrastructure on on-prem hardware or whether moving to a cloud environment would be more efficient. This is a decision which needs to fit the criteria and needs of the business."

Abstracting cloud computing as you move from IaaS, to PaaS, to SaaS, removes the burden on customers to manage the infrastructure that supports them on a day-to-day basis. But organisations must again choose the right architecture to suit their needs, says André. Additionally, they must ensure they are placing workloads in the appropriate environments, from edge to cloud.

Previous *Computing* research finds that 80 per cent of organisations recognise the need to upgrade their hardware to ensure flexibility independent of geography, OS, and network.

"Implicitly you still manage hardware resources which is physical somewhere. It's still a consideration when buying cloud resources – what do we need? How do we scale? How do we provision the right way? To some extent, in the end hardware is there," says André.

Optimising workloads

Increasingly, organisations are turning to the cloud for web-facing applications, databases, and collaboration tools. Often non-core operations are migrated first because it is a simpler, less risky process. Abstracting cloud management also optimises workloads, with many seeing the benefits of freeing up IT resources.

Russell says they've noticed a sizeable difference in IT management's capacity to tackle wider business objectives.

"Having the physical infrastructure managed by an external provider reduces the administrative workload within my team. Freeing up resources allows us to focus more on strategic projects rather than undertaking the day-to-day management tasks of keeping the systems running and data secure."

"The benefits for the team's workload are hugely important to consider when you're looking at the value you're getting from cloud services. It's the smaller tasks which may not be overly time consuming, but when there is a considerable amount of them to undertake, this can be a significant time burden."
– Dom Russell.

For Russell and André, removing the burden from the IT team has been supported by automation. "As a business, strategic automation is a big opportunity whether it's automating website services or our internal processes. Using AI to recognise and spot anomalies in traffic patterns and usage improves both resource and time efficiencies. AI carries out these tasks more accurately and efficiently than humans, and allows your workforces' time and effort to be focussed more effectively," says Russell.
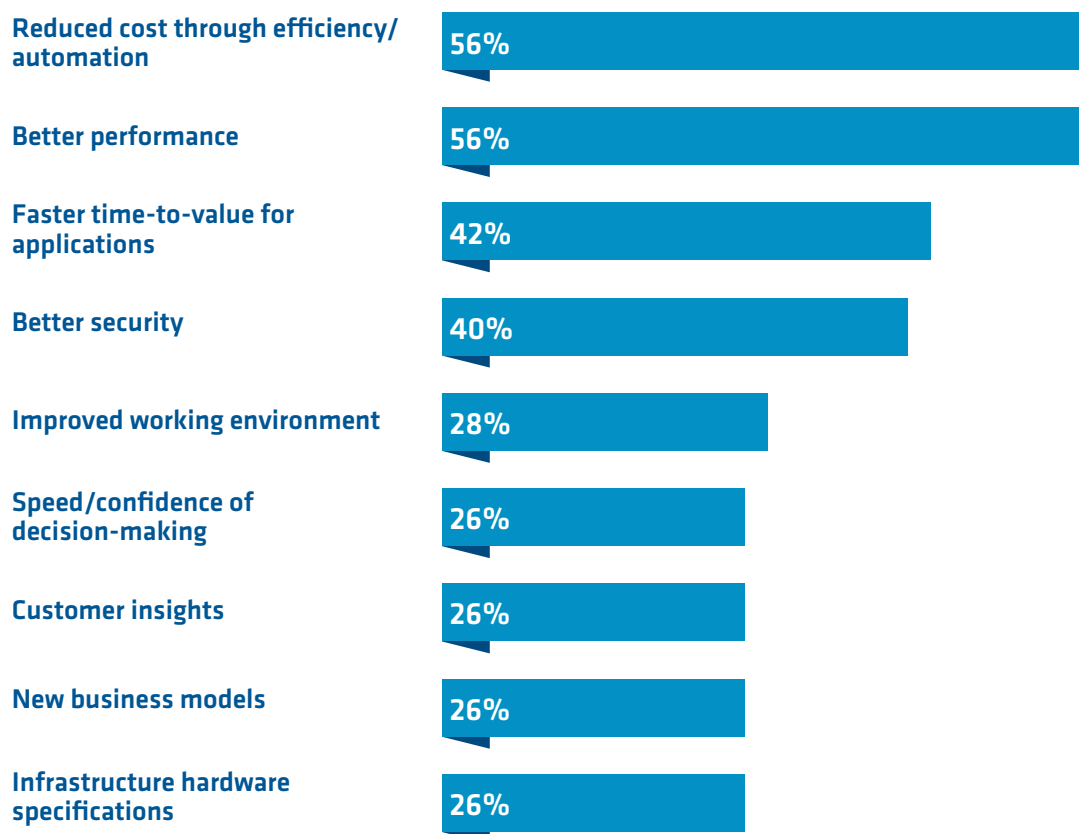
For IT leaders, powerful hardware, whether it is deployed across the cloud or at the edge, underpins AI and data analytic improvements and offers important insights. Using scalable hardware can accelerate AI initiatives, increasing performance, optimising tasks, and streamlining development. Customer and user insights are a competitive advantage as organisations recognise the need to keep pace with their expectations.

"Some of our key components to do transaction monitoring and AML screening built using AI and machine learning models. That has driven down the number of false positives we get when scanning transactions. Less manual work is now needed on monitoring transactions. This is a very tangible business outcome of cloud transformation, a capability that simply took too much time, by taking care of the manual burden we had in the traditional rules-based system we had before," says André.

Reducing IT burden alongside adopting cloud environments further permits agile development. Being able to build faster and better and deploying in a timely fashion is important to Greaves. "My requirement for the business is to reduce the amount of time it takes to deploy, standardise, and test. That's the big thing about cloud in my opinion. You don't worry about the hardware and the infrastructure; you worry about what you deploy on it. If you're deploying and consuming a service from a cloud point of view, then your overhead of maintaining that disappears."

Previous *Computing* research demonstrates that, for survey respondents, cost through efficiency or automation, better performance, faster time-to-value for applications, and better security are ranked as the most important factors for enabling a cloud strategy to deliver competitive advantage.

Fig. 1 : Which of the following have an important role to play in enabling your organisation's cloud strategy to provide competitive advantage?

Reduced cost through efficiency/
automation
56%

Better performance
56%

Faster time-to-value for
applications
42%

Better security
40%

Improved working environment
28%

Speed/confidence of
decision-making
26%

Customer insights
26%

New business models
26%

Infrastructure hardware
specifications
26%

Costs and rewards

We've heard that costs are a major consideration for organisations on their migration journey. Predicting the costs involved can be challenging as subscription plans offering pay-as-you-go features combined with fluctuating workloads have an impact. Often, cloud costs can creep up over time or it can be difficult to establish exactly how much of a ROI you are getting. However, on the whole, moving to the cloud reduces the need to invest in hardware in the long-term, therefore a post-migration cloud strategy that encompasses the potential incurred costs is key.

Russell says the added support and analytics available from cloud providers is linked to reducing costs. He again emphasises the value in having management responsibilities removed.

"We operate with a relatively lean IT workforce, so it's difficult, for example, to justify having a dedicated security specialist within the team. Being able to utilise security expertise from a cloud solution gives us a great deal of opportunity in terms of the available analytics and opportunity for protection.

"As hardware and architecture that applications in the cloud run on change and improve, the hardware and running costs are likely to come down.
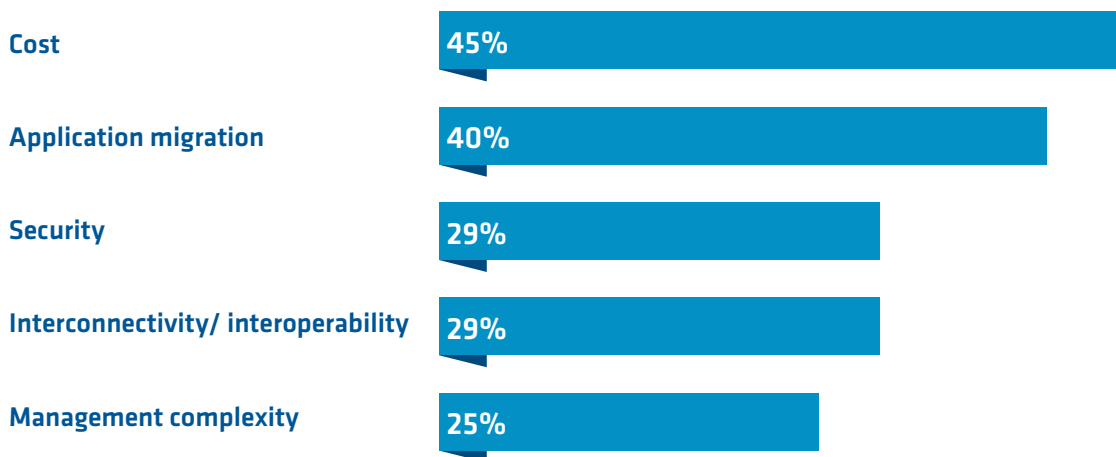
"It can be difficult to see cloud ROI in relation to your workforce as their time being freed up to focus on other activity can't always be measured easily. However, I think it's obvious economics that the creation of additional of resources for the team is invaluable."

For Greaves, one of the values in adopting cloud environments is the security benefits.

"There's a risk of costs spiralling out of your control if you don't maintain it or lock it down. You pay for it in whatever shape or form, but in reality, the value you get in return outweighs the cost of maintaining. Considering the amount of security everyone has to abide by these days and the number of attacks, your worries drop. It's a win-win. It transpired for us that the cost of running on-premises was higher than running a fully managed service consumed in the cloud."

Previous *Computing* research show that the main past and ongoing cloud challenges for organisation across the board are costs, application migration, and security.

Fig. 2 : The main cloud challenges at organisations

Cost	45%
Application migration	40%
Security	29%
Interconnectivity/ interoperability	29%
Management complexity	25%

It's natural for organisations to have security worries when considering cloud migration – data is critical in every business. IT leaders must ensure their organisation is protected from breaches and is abiding by strict regulations. Cloud providers offer tools to improve security and can provide expertise and resources that would otherwise be unavailable to some.

"The most important element is security. When you're dealing with business-critical data, it's imperative to work with a trustworthy partner which will enable you to operate within data regulations."– Dom Russell.

"Over the years, cyberattacks on public clouds and services have led to massive outages – this is a potential threat and risk to all organisations. And security is our foundation. We are a trust business that processes payments and transactions." – Michel André

> *"Security was a big challenge. Maintaining databases that deal with critical information means everything must be encrypted in transit, it must be locked from the outside world."*
> *– Paul Greaves.*

Hardware has a key role to play here too. Cyber attacks increasingly play on zero-day vulnerabilities baked into cloud and endpoint hardware, and other below-the-OS technology. Cloud customers should ensure their providers carry out due diligence when it comes to the security credentials of the hardware they employ. Capable hardware should not only avoid offering side-doors into infrastructure, it should also offer hardware-native security features, such as encryption, to further limit vulnerabilities.

Conclusion

The IT leaders *Computing* **have spoken to have revealed that a good cloud strategy starts with business priorities, rather than technology, but cloud hardware plays an integral role in the delivery of those priorities.**

For a cloud migration to deliver, understanding the appropriate hardware, costs, and support that the process demands are key. Many organisations are opting to take the hybrid approach – keeping some data or applications on-premises. This strategy allows flexibility and agility, which all organisations are striving for. Overall, most organisations are well on the way to adopting the cloud. With remote working becoming the norm and the competitive advantage from innovating, efficient cloud management along with a robust strategy is essential. Crucially, the right cloud solution and approach is entirely dependent on an organisation's needs now and in the future.

> *"Although cloud is very much an 'of the moment' buzzword, it is actually an important toolset. At Victoria Plum, we don't have a specific cloud strategy, however we focus more on where a solution would suit our needs and requirements."*
> *– Dom Russell*

Increasingly, organisations are automating processes to reduce errors and offload responsibilities from time-poor IT personnel. Removing the burden of day-to-day infrastructure management is a huge benefit for small and large organisations alike. By using a cloud provider, hardware innovations will become available. We've heard that resources have been freed up to allow IT teams to return their focus to wider business objectives, and utilising cloud infrastructure has led to tenfold performance improvements in workflows.

> *"One of the main issues seen during the pandemic is the shortage of chipsets and not being able to get your hands on them. I think this is potentially moving a lot of organisations across to cloud." – Paul Greaves*

The main challenges comprise costs and security, but organisations recognise that well laid out plans and the expertise of cloud providers can alleviate such concerns. Decisions made in the planning phases of digital transformation will influence expenditure down the line. So, IT leaders must seek out tailored solutions to support their specific journey in a way that will avoid costs creeping. Similarly, choosing a solution that meets the required regulations will minimise risks.

Cloud abstraction can tempt IT leaders to neglect the architecture that underpins their cloud services. However, beneath every computing workload, from edge to cloud, is hardware. Whether or not that environment fulfils its business objectives is dependent on that hardware being performant, secure and cost effective. Your cloud hardware, both self-managed and third-party, must rise to the technology demands imposed by an increasingly distributed workforce and customer base, otherwise employee productivity and business innovation are compromised.

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