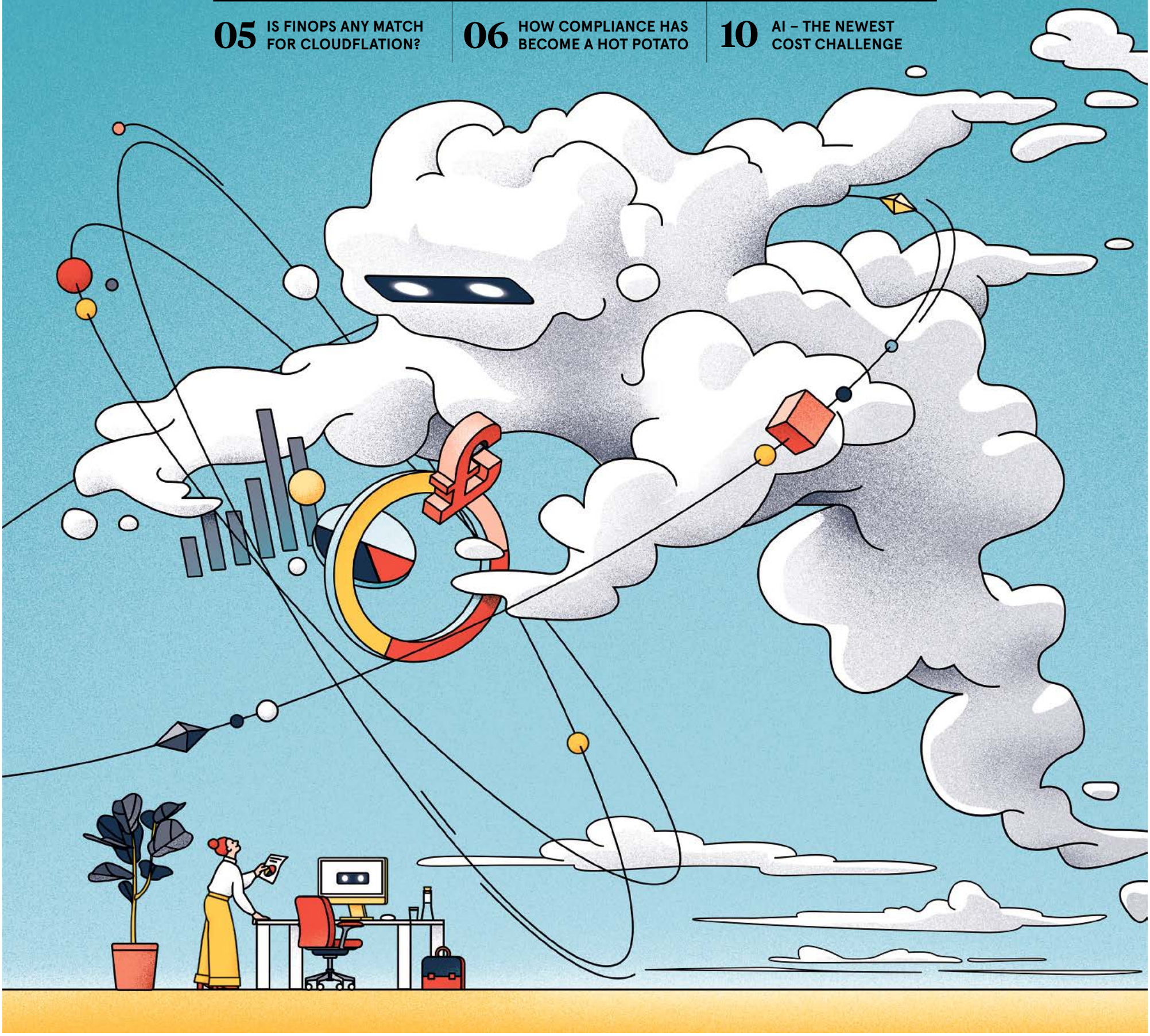
CLOUD FOR BUSINESS



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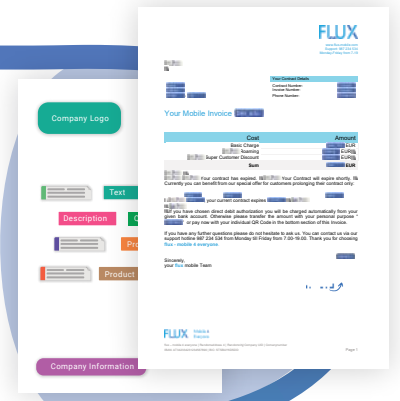
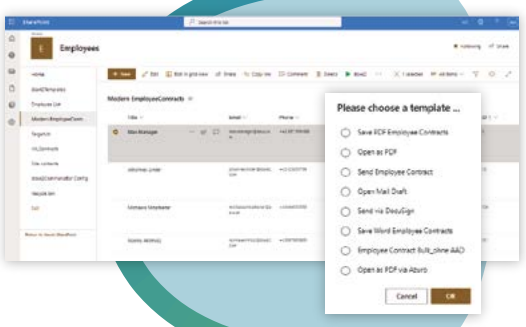


DATA INTEGRATION



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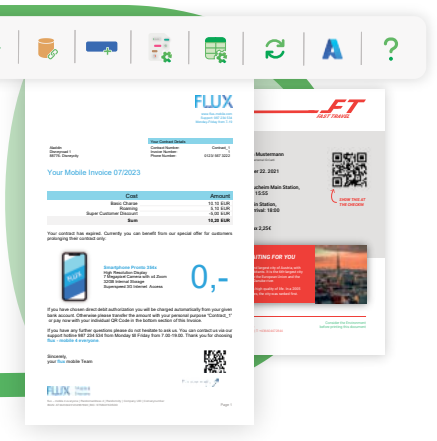

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GEOPOLITICS

The cloud forms a cold front in Sino-American trade war

The Biden administration is attempting to hamstring China's burgeoning artificial intelligence sector by restricting its access to US cloud services and infrastructure

Sophia Akram

As developments in artificial intelligence gather pace, the superpowers are acutely aware of the risks posed by any AI advance achieved by their rivals, particularly in the military arena. As a result, the US and China have been engaged in a tit-for-tat battle to restrict each other's development potential.

Washington has added advanced computing chips to its export control list. Beijing has banned some companies from buying products from the US's largest memory chipmaker, Micron Technology, and announced export restrictions on metals that are used in advanced chip manufacturing.

The Biden administration is reportedly planning to oblige US cloud service providers to seek government permission before they can serve any Chinese company using AI processors, particularly in cases where their platforms would be used in the training of an AI model. Such a move would be a significant escalation in the technological trade war between the superpowers and a step towards the politicisation of cloud provision.

Cloud computing "was political from the beginning – and it will be political at the end", declares Trey Herr, director of cyber statecraft initiative under the Atlantic Council's Digital Forensic Research Lab.

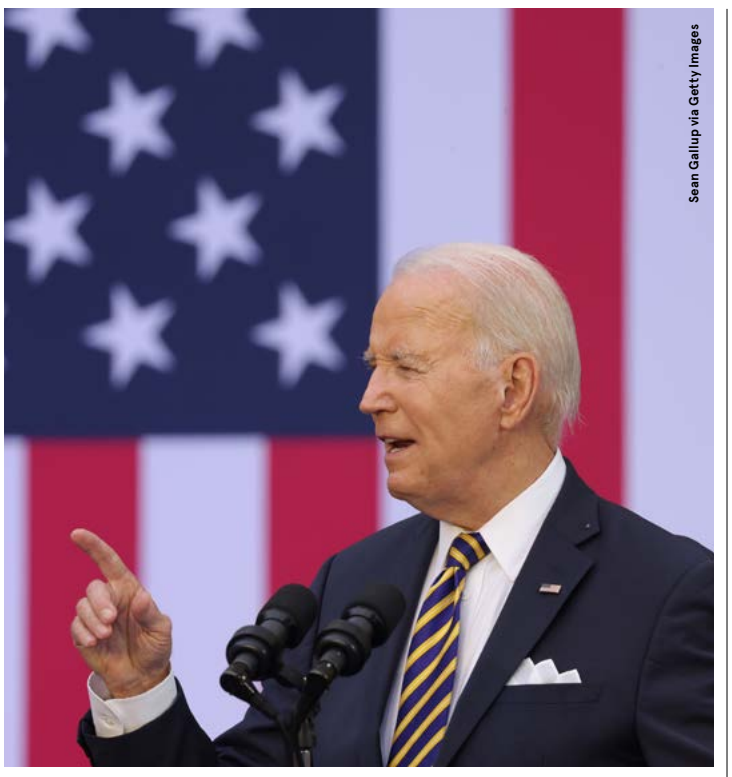
"It requires a tremendous amount of physical infrastructure, which has to sit somewhere. So there are the local politics of the jurisdiction it lives in," he adds, noting that any discussion of cloud security soon becomes politicised.

Caught in the middle are the US cloud providers doing business with Chinese clients. Of those, Microsoft Azure and Amazon Web Services (AWS) are the big players most likely to be worst affected.

"It certainly has an impact on earnings. I think everyone is doing business in the Chinese market," Herr says.

The new AI-related restrictions will oblige providers to alter the services they have made available to their Chinese clients. Work to mitigate losing that segment of the market has already started.

"This a growing market, not a long-existing one," notes Gordon McKenna, CTO of public cloud at Ensono. In that sense, cloud providers aren't losing as much as they might gain, as the need for machine learning data ramps up and firms know that they must adopt AI or risk getting left behind.


Sean Gallup via Getty Images

Dr Fabio Goncalves de Oliveira is a lecturer in entrepreneurship and innovation at Henley Business School and a certified instructor of AI and cloud computing. He notes that Chinese regulations for multinational companies to provide cloud and telecoms services in China dictate there must be at least 50% local ownership of capital.

Microsoft Azure is represented in China by Shanghai Blue Cloud Technology, for instance, and AWS is represented by Beijing Sinnet Technology Co (Sinnet). It still needs to be determined whether any new rules would affect these ventures. Moreover, the Western stake in Chinese public and private clouds is relatively small. Research by the International Data Corporation shows that Alibaba has 34% of the market (the biggest share), followed by Huawei, Tencent and China Telecom. AWS, by contrast, has a market share of 9%.

"For cloud AI developers based in China, this could be a problem if the current Chinese cloud providers do not keep up with the pace of development of AI models," says Goncalves de Oliveira.

But this outcome seems unlikely. As Goncalves de Oliveira points out: "The Chinese regulations for using data, including data about citizens, benefit AI development, while EU and Western regulations constrain the advances of new AI developers and the use of data to train AI models."

In some ways, the White House's plans are unsurprising, given that US companies and investors have been busy weaning themselves off Chinese data and devices, while embargoes have been imposed on Chinese businesses ranging from Huawei to TikTok.

There is concern among cloud providers' US clients about security, particularly the fear that they might be sharing data centres with Chinese companies. This is not a place that either providers or their clients want to be in, according to McKenna.

"I think Microsoft and AWS have better understood these requirements from their clients and have architected solutions to meet these compliances," he reports.

AWS, for example, has moved beyond the traditional public and private cloud platforms. Clients in highly regulated sectors can keep their data in GovCloud platforms, which are designed to meet the security and compliance needs of government organisations.

The rules in question may also apply only to public clouds, says Goncalves de Oliviera, who adds that multinational firms operating in China usually adopt a hybrid approach. If they have "a private cloud and an authorised network carrier, these companies might still gain access to restricted services".

That said, given the complexities of regulating such a rapidly advancing market, we are seeing only the beginning of governance in this area.

"Sources in Chinese and American big tech have stated that it is impossible for the US government to prevent the spread of cloud AI technologies in both directions," Goncalves de Oliviera observes. "Chinese AI developers can access pre-trained Western models elsewhere, through their presence in American, British and other Western universities and their participation in Western corporations."

The open-source, pre-trained machine learning and deep learning models offered by Californian firm H2O.ai are free, for instance.

The cloud will continue to serve as an extension of geopolitical wrangling and trade wars. Service providers will be able to pre-empt many future restrictions. Those with larger stakes should have little to worry about – in the short term, at least.

$27bn
China's expected AI market revenue by 2026

8.9%
China's expected share of total global AI investments by 2026

International Data Corporation, 2022

GROWTH

Companies find their FinOps wanting in the struggle against rampant cloudflation

Businesses need strategies to mitigate their soaring costs more than ever. Are they up to the task of optimising expenditure and minimising waste?

Daniel Thomas


Cobalt88/via iStock

The cost of everything is going up – and cloud computing is no exception. Last year, Google announced price hikes of up to 50% on core services. Amazon Web Services (AWS) put the average price for on-demand computing capacity up by 23% in the year to February, according to data from research firm Liftr Insights.

This so-called cloudflation has come at a bad time for British businesses, which are already struggling to meet rising wage, input and borrowing costs. It has also underlined the importance of a good FinOps strategy to optimise cloud usage and reduce waste.

The principle behind FinOps is that, by getting a clearer picture of their usage and encouraging all departments to take responsibility for improving efficiency, firms can mitigate those cost pressures.

Yet there are concerns about the efficacy of FinOps strategies in this period of high inflation. There are genuine questions about the difference its practices can make when prices are rising so quickly. So what can companies do to ensure that FinOps does the job it's meant to do?

A big part of the problem is that the market is dominated by a handful of big players, while clients are typically nervous about moving to smaller, less prominent cloud vendors. As such, the dominant providers are following "well-established playbooks" on pricing, says Richard Palmer, senior managing director at FTI Consulting.

"Their strategies include bundling services and features and imposing periodic price increases," he explains. "And, as organisations' data footprints grow and they tap into the extended capabilities in their cloud platforms, their costs will rise – with or without price increases."

It's no secret that many companies struggle to use the cloud efficiently or in a disciplined way, leaving some locked into a highly priced service or one that's no longer suitable for their purposes. This can cause costs to spiral, which is when a sound FinOps strategy should come into play. Yet getting things right in this area is no easy feat.

One challenge is that a successful FinOps policy necessitates a cross-functional approach, meaning that a company needs to get every department on board with the change. But too many firms take a top-down approach or leave the job of cost control to the finance department. So says Nick Durkin, field CTO at Harness, a platform that streamlines software delivery.

"Finance teams don't have the expertise or resources to continuously monitor cloud spending, so changes in resource allocation have the potential to cost thousands in unmanageable expenditure before anyone realises what is happening," he says.

Instead, organisations must involve the DevOps and engineering teams as soon as possible, ensuring that they can gain a "real-time view of cloud costs from the offset".

FinOps strategies must also get to grips with the complexities of cloud billing, which is key to obtaining a proper view of your usage costs. Companies often use several services from a single provider, each of which has different units to determine pricing.

Many firms will also be paying for cloud services wrapped inside software-as-a-service fees for other corporate tools such as customer relationship management systems, which can make it harder to delineate specific underlying cloud costs.

While it's easy to be cynical about the impact of FinOps strategies, experts agree that not having one in place risks making a bad situation much worse in this climate.

Jon Chan, another senior manager at FTI Consulting, adds that prices are unlikely to rise so dramatically as to make FinOps practices ineffective. Instead, he and other experts agree that firms should focus on updating their strategies for a high-inflation environment.

DoiT, a partner of AWS and Google Cloud, provides cloud technology and consulting services in almost 70 countries. The firm helps clients to optimise their cloud use through processes such as deep inspection, trend analysis and automation. Chief product officer John Purcell says that, while nearly all companies have adopted the cloud, many have yet to streamline their infrastructure and commercial agreements in a way that optimises their spending. Doing so is vital not only in a period of high inflation, but all year round, because price increases occur in repeated cycles, he says.

"In any growing business, we expect cloud costs to increase as it serves more customers. This is one of the most obvious elements of elastic infrastructure," Purcell adds. "As always, though, the key is to understand why [costs are] increasing and to ensure that the rate of increase is proportional to overall business growth."

He says that reaching optimisation involves understanding what your business is paying for, what is driving the cost, whether you're spending the "right amount at the right time" and whether you're minimising waste.

Matt Barker is global head of cloud-native services at Venafi, a cybersecurity firm in the machine identity space. He thinks that companies will make FinOps savings on their cloud expenditure by going back to basics such as accurate provisioning, "rightsizing instances" and something as simple as turning the cloud off when it isn't in use.

"I'm also seeing opportunities to save money by migrating to cheaper environments," Barker says. "For example, companies could explore new cloud vendors when moving into a new territory as a test, instead of expanding their existing footprint with a major provider."

Durkin believes that successful FinOps is all about ongoing monitoring. For him, the most important principle is to build cost management into everyday processes.

"All levels of the business need to understand what their costs are and how their decisions affect cloud costs," he stresses. "This will reduce the chances of unexpected cloud spend later down the line."

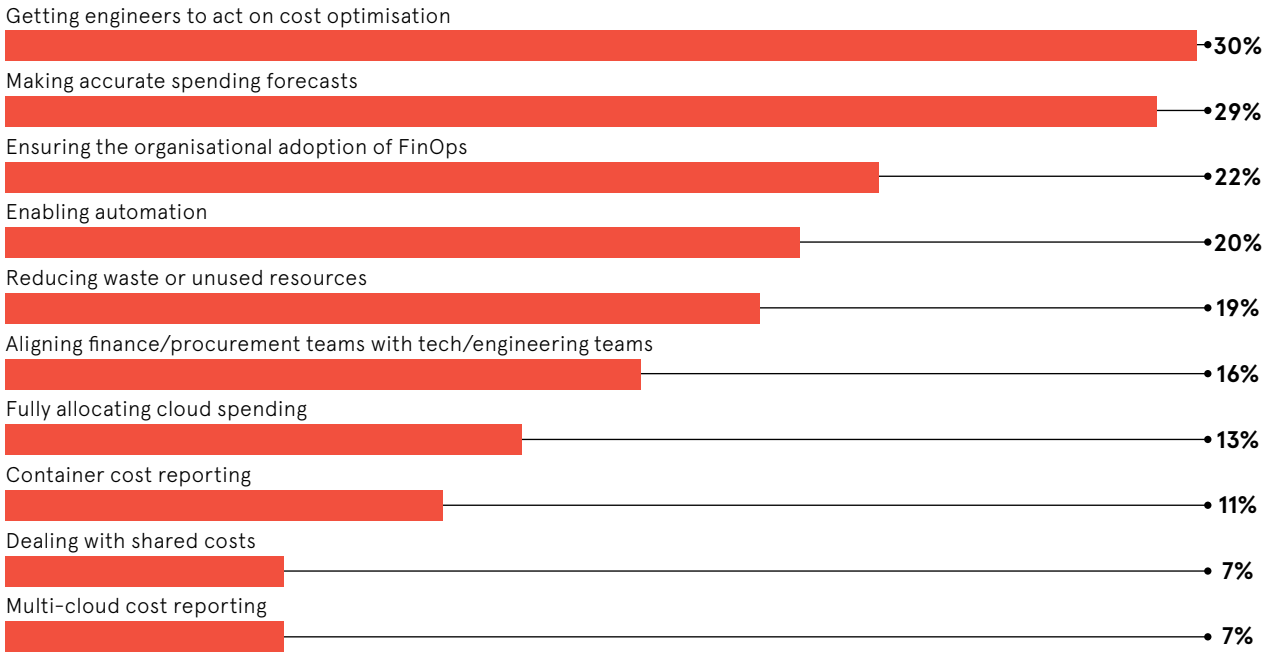
Palmer would advise companies to split their FinOps strategies into supply- and demand-side categories. On the supply side – how firms approach vendors – they should unbundle services and spread expenditure across several providers. On the demand side – how firms use services – numerous levers can be pulled to reduce overall computing and storage needs. These include data minimisation, end-user licence optimisation and storage tiering.

"A detailed strategy", he says, "can help organisations to contain their costs even amid price inflation."

MANY FINOPS TEAMS ARE STRUGGLING TO FORECAST CLOUD EXPENDITURE AND REDUCE WASTE

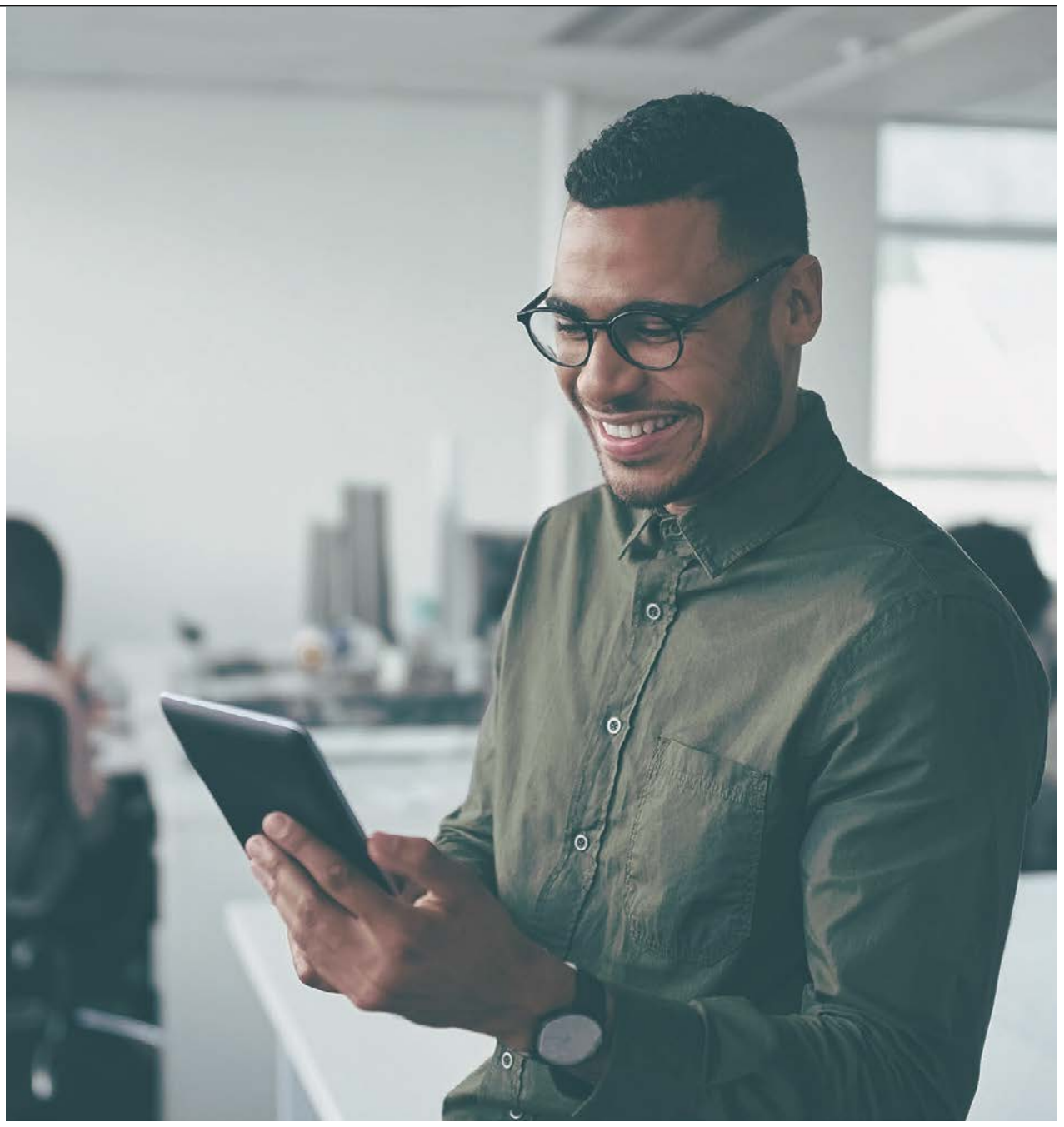
Percentage of FinOps professionals citing the following as challenges in cloud financial management

FinOps Foundation, 2022



Driving value and innovation from your cloud strategy

As organisations seek to maximise the value of cloud and spearhead innovations, especially in AI, they need to reassess their approach to the cloud



Cloud computing was once a disruptive technology. Today, it's a pervasive reality as the pandemic and remote working acted as a stimulus for its wholesale adoption. Right now, it's used for everything from managing client data and AI, to supply chains. But concerns over cost mean organisations are looking to maximise the value of cloud services, minimise its risk and innovate, all at the same time.

Cloud computing is appealing – agile, elastic and scalable in nature, it's at the core of many IT initiatives to modernise, digitalise services, utilise new tools and be competitive. Leveraging the cloud strategically is vital. Yet it's important for organisations to find a balance between utilising the cloud's full potential, while safeguarding against cloud risks – data breaches, security and privacy issues.

"Over time, the cloud has proven its worth. The big question now is – how do you calibrate this value in full and how do you continue to capture maximum value over time? This is where the big debate is," explains Ade Omotomilola, head of cloud and data and analytics at Trustmarque, provider of cloud solutions and one of the most highly accredited IT services providers in the UK.

He explains: "What's changed is the question of what's possible through cloud adoption. The horizon has opened up. The possibilities for innovation are super abundant, particularly in artificial intelligence. It means organisations now need to structure themselves differently than in the past to take advantage of exponential advances in technology. Cloud adoption is part of that process."

Every organisation has a unique cloud roadmap

Every organisation is on a different stage of its cloud journey and each has its own unique roadmap for adoption and migration that reflects its needs. The configuration of a business in the cloud environment can determine how successful it will be at getting products to market quicker than competitors, improving margins, realising financial gains or dealing with more customers.

"During the pandemic there was a rush to put workloads in the cloud. Now organisations are realising that their cloud journey has to be more of a transformational journey. Their operating model needs to evolve. Businesses will not maximise the value of cloud computing unless they use it efficiently and effectively, and where workloads are optimised for this environment," states Neel Dev, practice director for cloud services at Trustmarque, which is one of the only UK-specific firms to have all six Microsoft cloud partner designations. This is invaluable when completing projects with the NHS, government departments and businesses, including those in financial services.

"Assessing where an organisation is on the ladder for cloud adoption is vital. We call it the cloud runway. It's a methodology that allows us to calibrate and then maximise the cloud for a business – best practices and frameworks really do matter in this area."

Extract value and provide guardrails: Managed Services for cloud management

For instance, some organisations fail to put the right level of security and safeguarding in place in their rush to gain insight from data they've leveraged through the cloud. Trustmarque has observed this in UK healthcare settings for instance.

With the emergence of generative AI, which collates even more data to produce new content, this issue will become prominent. Understanding and delivering on compliance can often be an afterthought. When data is increasingly leveraged for competitive gain, this cannot be the case.

"Organisations need to mitigate against the risk of cloud migration. We've now got this covered with the right tools and frameworks in place so teams can concentrate on adding value with cloud, such as unlocking the potential of data or utilising new information sources, whether it's from social media, patient records or customer purchases," details Dev from Trustmarque, which is on track to become an Azure Expert Managed Service Provider.

"By deploying AI or machine learning on cloud data they can almost predict the future. It's an evolution from reactive data analytics to a proactive approach. Instead of understanding what happened yesterday, you can increasingly calculate what'll happen tomorrow. It's a powerful proposition. But you need guardrails in place to achieve this."

It's why cloud-managed services are also increasingly popular for organisations. The growing complexity of IT systems and the need for businesses to focus on strategic, digitally driven projects that directly fuel the bottom line, is increasingly creating opportunities for specialists to manage cloud security, migration, integration, cost and performance.

> **Organisations now need to structure themselves differently than in the past to take advantage of exponential advances in technology**

"This is the reason why cloud management platforms are coming to the fore. Organisations are looking to administer their cloud services effectively, respond to security incidents, optimise systems, as well as better understand their cloud estate. That's why we've developed a cloud optimisation managed service based on an in-house platform. This tool, called Prism for Azure, is a constituent part of our cloud management platform," states Omotomilola from York-based Trustmarque, which employs 500 people and now owns cloud optimisation firm, Livingstone.

"One of the things that often stops cloud adoption in its tracks is the fear around costs and losing control of costs. The ability to monitor these and allocate or pull resources is vital. This is where a cloud management platform bringing together optimisation, insights and service management becomes an incredibly powerful tool."

The future is bright

In terms of the future of cloud, there will be more specialisation. Service providers will look to address the needs of each market. Extensive knowledge, deep engagement and expertise will be vital.

"Those that provide intellectual property around cloud services which are specific to each sector will add value. This is what we're focused on, especially as organisations seek more innovation in the cloud. They can only do this if they partner with consultancies that are at the forefront of this technology, especially as AI continues to evolve at pace," says Omotomilola from Trustmarque, which has nearly 40 years' experience and offices across the UK.

"The future also lies in the consolidation of products, tools, technologies and services within the large cloud service provider space, such as Microsoft with Azure, its cloud platform, but also with Purview, its data protection and governance solution, and Fabric, which unifies data and insights."

Delivering cloud service at scale and at cost will be increasingly important. This is where self-service will become a key requirement, whether it's to do with AI deployments or data-analytical tools. An increasing number of products are now available in the cloud. Today they aren't being fully utilised, this will also change.

"The future's bright. Data-driven decision-making is the future. We need to make this happen," concludes Dev.

INSIGHT

‘Achieving the best outcomes for the planet requires shared responsibility for sustainability’

At a time when our commitment to mitigating the impact of climate change has never been more urgent, a sustainable approach to technology must be at the heart of any digital transformation strategy. Cloud computing has huge potential to help businesses engage with this challenge, but achieving the best outcomes for the planet requires both providers and users of cloud services to share responsibility for sustainability.

Cloud is a key driver of the UK’s digital economy, giving businesses of all kinds access to computing resources that are scalable on demand. Applications, platforms, data storage and infrastructure can all be delivered as a service, allowing for the more flexible and efficient use of resources and, potentially, a reduction in energy consumption and carbon dioxide emissions compared with legacy infrastructure.

That makes cloud an appealing option for organisations, with a recent Gartner CEO survey reporting that 70% of business leaders focusing on sustainability will look to public cloud services to achieve such outcomes.

The good news is that providers recognise the demand for sustainable cloud services and many have announced investments relating to the use of renewable energy, hardware recycling and water consumption in their data centres.

For example, AWS aims to achieve 100% renewable energy usage by 2025, while Microsoft Azure has set a goal of 100% renewable energy, as well as being zero-waste and water-positive by 2030. Oracle already powers all of its European data centres with renewable energy. Google aims to run all of its data centres on carbon-free energy by 2030.

Recycling firms such as Sims Lifecycle Services offer sustainability calculators that enable clients to quantify the environmental benefits of hardware reuse and recycling. Meanwhile, NetApp provides data centre operators with advanced analytics to help them make better decisions about data storage and management, resulting in improved efficiency and sustainability.

All of these use cases show how the cloud industry is trying to mitigate its impact. But a move to cloud will not automatically guarantee the best possible environmental benefits, while computing as a service does not equate to sustainability as a service. Just as cloud providers should continue to invest in resource efficiency and in reducing the carbon footprint of their services, cloud customers also have a responsibility to take an active role in using cloud services sustainably. To achieve the best outcomes for the planet, user behaviour is also key.

This means fostering a culture of sustainability and adapting FinOps practices to track carbon metrics; revising your data strategy to minimise the storage of unused data in the cloud; and harnessing green software principles to develop and use more energy-efficient applications.

As an industry, we should take a holistic view of cloud sustainability, considering what we can do as individuals, as organisations and as a community to use and operate cloud services as efficiently as possible. By making sustainability the core of a business’ cloud strategy, leaders can empower teams to identify waste, cut carbon emissions and energy consumption and mitigate their environmental impact. This approach will be crucial as demand for cloud services grows further as a result of emerging technologies such as AI.

Ultimately, as consumer demand and pressure from governments and investors prompt businesses across the economy to seek more climate-friendly technologies, cloud computing can play a key role in delivering sustainable digital services. This calls for a shared-responsibility model under which users, providers and governments cooperate to adopt best practices, unlock innovation and empower organisations to achieve their net-zero goals. TechUK and its members are committed to this vision. ●

Sue Daley
Director, tech and innovation, TechUK

COMPLIANCE

Out of sight, but not out of mind

As organisations shift ever more data and processes away from their premises, the question of who’s accountable for what in the cloud is becoming increasingly complex

Nick Easen

The days of carefree cloud usage are over. As service providers’ offerings have evolved, so has the level of complexity. Given the expanding smorgasbord of services offering ever more functionality, keeping a handle on all things cloud is no easy task for business users. More cloud means more obligations, from cybersecurity to regulatory compliance.

It’s why hyperscalers and other providers have had to wade in. For instance, Amazon Web Services and Microsoft have developed shared-responsibility models, while Google has adopted what it calls a shared-fate model. It’s also why many providers have started offering managed services to help clients account for all their various cloud activities.

Businesses cannot rely solely on their providers for all aspects of responsibility. It has to be a collective effort

The idea behind the former type of model is straightforward enough: if a business runs servers on its premises, it’s fully liable for complying with data protection laws and other regulations. If it moves material on to the cloud, such duties increasingly become shared between it and its provider. Under the shared-fate model, the provider and the client work together towards an outcome greater than shared profits, building on mutual trust and effort, so that both parties benefit.

Sander Nieuwenhuis is a governance, risk and compliance advisory lead at Nordcloud, a consultancy specialising in cloud computing. He observes that, “because of these models, it needs to be clearly defined who is actually accountable for, say, cybersecurity. Businesses must understand the consequences of the choices they make about these services at a technical level. In the case of security, we usually apply formal frameworks laying out who’s responsible for what. This works well for classic cloud services.”

Nieuwenhuis believes that shared models will oblige businesses to scan for knowledge and accountability gaps and, where any are pinpointed, fill these promptly.

“Shared responsibility as a concept is well known by our customers working with public clouds, yet the actual impact of that shared responsibility is often not recognised,” he stresses.

Good governance models are one thing, but understanding cause and effect when it comes to business decisions about the cloud is another. For instance, it’s easy to start a new cloud application, which is likely to require lots of processing power. But this may have a huge environmental impact that may not have been considered. There can be a disconnect.

Matt Watts, chief technology evangelist at data management specialist

NetApp, notes that vendors have started providing "tools to show the true emissions arising from companies' cloud workloads. Now that these are maturing, it means that both parties can play their part in dealing with cloud growth and climate change. No longer can anyone assume that this is somehow someone else's issue."

Starting a new generative AI application in the cloud also has consequences for a business, presenting tricky questions about data processing, transparency, bias and intellectual property rights. But the overriding message is clear: customers of cloud services cannot outsource all obligations to their provider. They must take accept an increasingly predetermined degree of accountability.

"When businesses hold more power because of their use of generative AI, say, it seems reasonable that they should also accept more responsibility," argues Elle Todd, a partner specialising in data protection regulation at law firm Reed Smith.

Another layer of complexity results from the fact that cloud service providers are delivering ever more applications – it's rarely about data storage alone. Calibration is important here. If you can't measure it, you can't manage it, which in turn makes the assignment of liability harder. But there are data-led tools available, including accountability matrices and dashboards, that can help in this effort.

"Providers have an increasing responsibility as they expand their services," says Shane Maher, MD at Intelliworx, a specialist in cloud and managed IT services. "They need to ensure the security, reliability and scalability of their infrastructure to meet the demands of businesses."

But he adds that clients must also "step up and be more responsible. They need to understand and then mitigate the risks associated with using cloud services, including cybersecurity, carbon emissions and AI usage. Businesses cannot rely solely on their providers for all aspects of responsibility. It has to be a collective effort."

Education is also key. Using cloud services responsibly is perhaps not quite there as an enterprise-wide skill, but awareness of the issues is increasing. Cloud obligations are being enshrined in law in the EU with the adoption of the European Cloud Initiative and the Digital Operational Resilience Act, both of which have implications for the UK. Regulation will certainly make organisations focus more closely on their liabilities in this area.

If businesses do get their checklist of obligations in order, they will be better placed to deploy state-of-the-art services as a point of competitive differentiation. When accountabilities are crystal clear, far more can be achieved, notes Perry Krug, head of developer experience at Couchbase, a cloud database platform developer.

"With a greater understanding of cloud models and a commitment to the fine print, enterprises can look to use new types of architecture, such as super-clouds," he says. "These combine three computing models – infrastructure as a service, platform as a service and software as a service – into one solution."

Some people believe that the cloud is much like any other utility, such as water, electricity or the road network: the provider maintains the infrastructure to ensure reliability of service, but consumers are liable for how they use it. But, in the case of cloud services, the difference is that the infrastructure providers are also the same organisations selling the products that largely determine how consumers will use that infrastructure. When it comes to the cloud, questions of liability may be slightly more nuanced than they first appear, even if shared models succeed in providing some clarity.

31%

of IT professionals say that maintaining regulatory compliance is a primary challenge for hybrid cloud architectures

ISC2, CyberEdge, 2023

30%

of business respondents cite legal and regulatory compliance as one of the greatest barriers to wider cloud adoption in their organisations

Fortinet, 2023

How multinationals can simplify with cloud telephony

The global adoption of unified communications platforms has accelerated dramatically during and since the pandemic. Now multinationals can also manage their phone calls in a similarly global way

For years, multinational businesses have grappled with disparate and complex telephony deployments. Needing to work with local network operators in every geographic market has meant a raft of different contracts, technologies and support systems. Wires have had to be run through buildings, with legacy handsets plugged into thousands of individual desks. It has been an immense burden to manage these multiple deployments and vendor relationships, with huge impacts on personnel time and budgets.

In recent years, the Covid pandemic has accelerated businesses' move towards more versatile cloud-based – rather than on-premises – telephony. Nevertheless, most of these cloud telephony services remain country-specific, provided by the local regulated operators that are licensed to serve only their own markets.

"Cloud telephony has rapidly become a $20bn industry, because in today's hybrid working environment it enables your work phone number to move with you. You can make and receive calls whether you're at home, in the office, at the airport, or even on the golf course," explains Steve Flavell, co-CEO of multinational cloud telephony provider LoopUp.

"The problem for many multinationals is that they are still buying and managing services from a patchwork of local operators, who are unable to provide broader global coverage. It generates complexity and cost via multiple disparate contracts, management portals, support arrangements and pricing tariffs."

During the pandemic and post-pandemic period, unified communications platforms – which include messaging, collaboration and meeting tools – have rocketed to prominence, going from being a tool someone might use occasionally to a standard way of communicating and collaborating on a global basis.

"Microsoft Teams has become the dominant unified communications platform among multinational businesses," Flavell says. "Unlike telephony, it's managed on a consistent global basis. Telephony is still critically important – albeit perhaps secondary to unified communications – so why not manage telephony on a similarly global basis?"

The global management of telephony is now possible, and it can all be integrated with broader Microsoft Teams deployments. Indeed, multinationals are already doing so today by reinventing their telephony, consolidating with one vendor and one management portal, instead of a patchwork of disparate vendors and inconsistent tools.

Many of these companies are now working with LoopUp, a cloud telephony provider which is licensed and certified on Microsoft's Operator Connect programme in more than 50 countries, with new countries being added almost every month. LoopUp handles all the connectivity with its 20 underlying carrier partners. That removes all the management and technological complexities for businesses.

"We select the highest quality routing carrier for any given call, and we have multiple carrier redundancy should any individual one be experiencing network problems," explains Flavell. "Our multinational customers, therefore, can benefit from premium quality calls and radically simplified procurement and management: one vendor, one contract, one global management portal and one support team, all integrated with their broader Microsoft Teams setup."

In practice, this kind of service allows users to pick up any Teams-enabled device, and make or receive a regular phone call to or from another number. Similarly, people can use a Teams-enabled device to receive calls from anyone, anywhere, where callers have simply dialled the person's standard phone number. No legacy phones or networks are needed.

Among the many companies worldwide using the LoopUp system is a strategic communications consultancy with around 7,000 staff in 30 countries. With LoopUp, the company consolidated more than 20 telecoms vendors down to one. In doing so, it has dramatically simplified processes and saved time and money, all while improving call quality and reliability, and allowing connectivity for its staff anywhere.

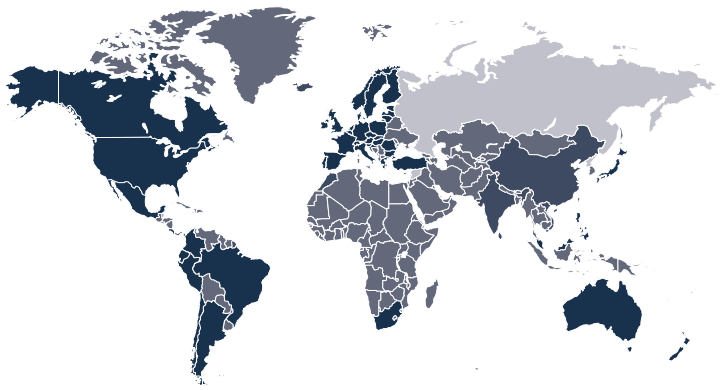
Looking ahead, the rapid evolution of cloud-based technology will provide businesses with ever simpler and more effective phone calls. Multinational businesses that choose a single service provider with global coverage, integrated into Teams, can gain valuable simplicity and efficiency, alongside high-quality, reliable calls and streamlined management.

To find out more about global cloud telephony, visit loopup.com

loopup

TOP RANKED FOR COVERAGE

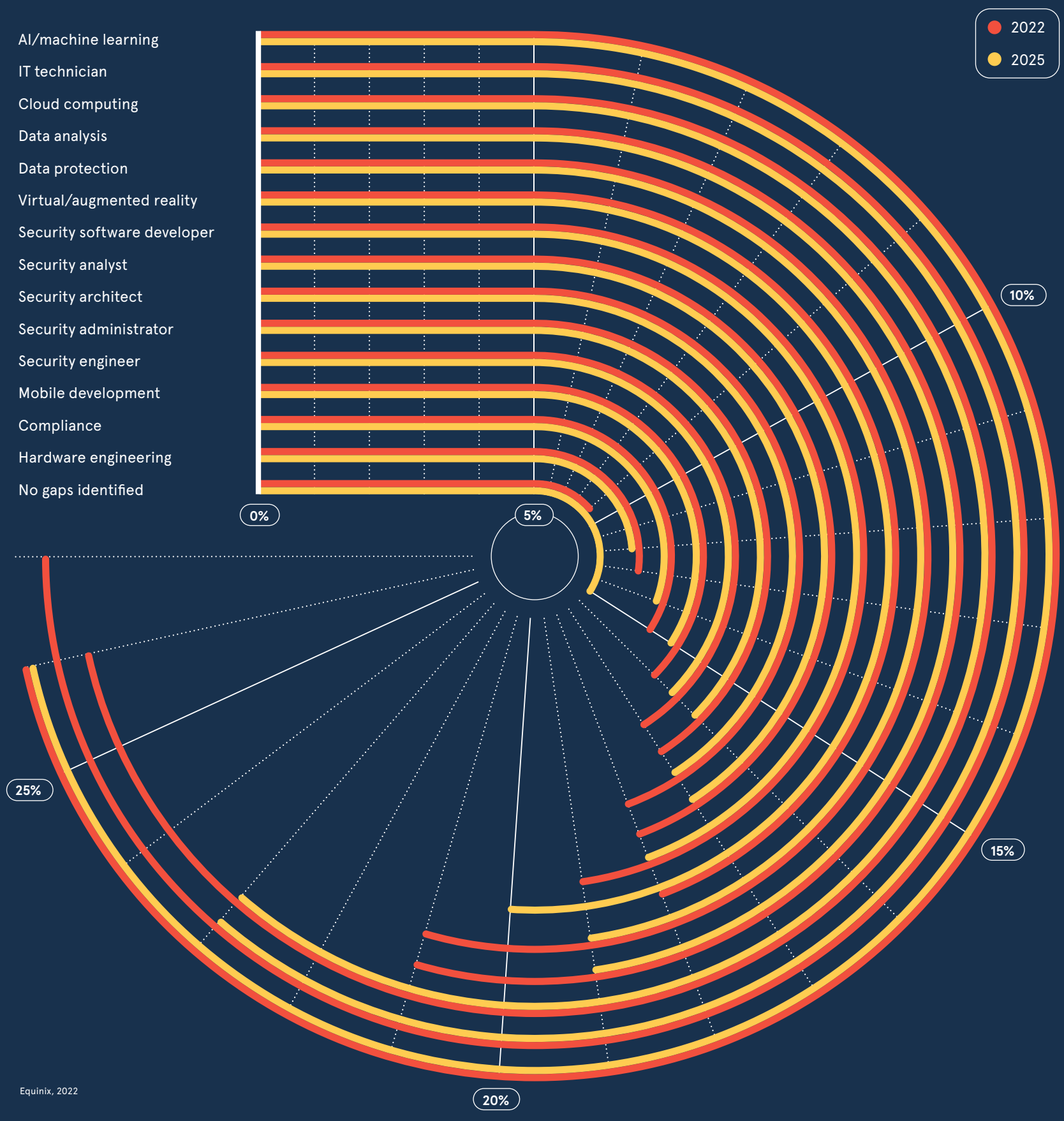
Global coverage of LoopUp's telecommunications services, by coverage type



> **Multinationals are consolidating with one vendor and one management portal, instead of a patchwork of geographic vendors**

GAUGING THE DIGITAL SKILLS GAP

Share of business leaders citing the following as areas where their firms lacked skills in 2022 and where they're likely to lack skills in 2025



Equinix, 2022

CLO DEV

A LACK OF SEC

Share of tech leaders

- Security
- Networking
- Data
- Fundamental clo
- Automation
- AI/machine learn
- Governance
- Infrastructure
- Migration
- DevOps
- Architecture

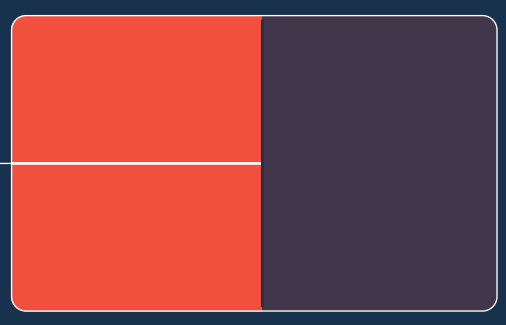
WHAT DO EMPL

Share of leaders citin

- Technical accura
- Cost-effectivene
- Customised solut
- Measurability
- Ease of modulari
- Certifications
- Fun and engaging

52%

of tech professionals believe that the digital skills gap has widened over the past year



Revolent, 2023

MOST FIRMS INTEND TO INCREASE THEIR INVESTMENTS IN CLOUD SKILLS

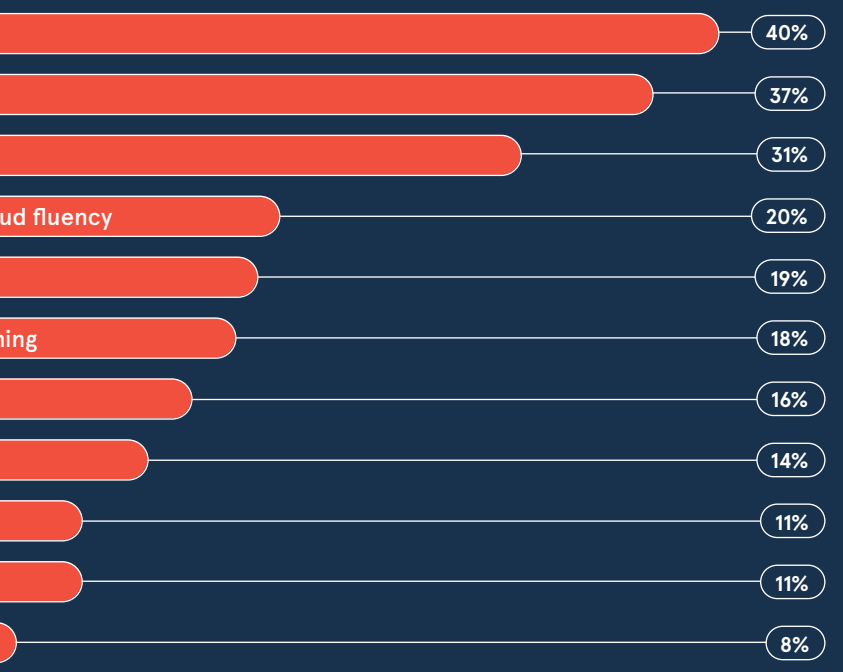
Percentage of firms giving the following responses when asked whether they were changing their cloud sk

OUD SKILLS VELOPMENT

Although most organisations have moved at least some of their workloads to the cloud, more than a quarter are finding it difficult to recruit, retain and train all the people they require to keep their cloud workloads functional and secure. IT and tech-specific skills are in high demand, but leaders are also grappling with ensuring basic cloud literacy and data security among the wider workforce. Employers are increasingly turning to cloud skills development programmes and most are planning further training interventions, despite the ongoing economic uncertainty. So what are they looking for in an effective development programme?

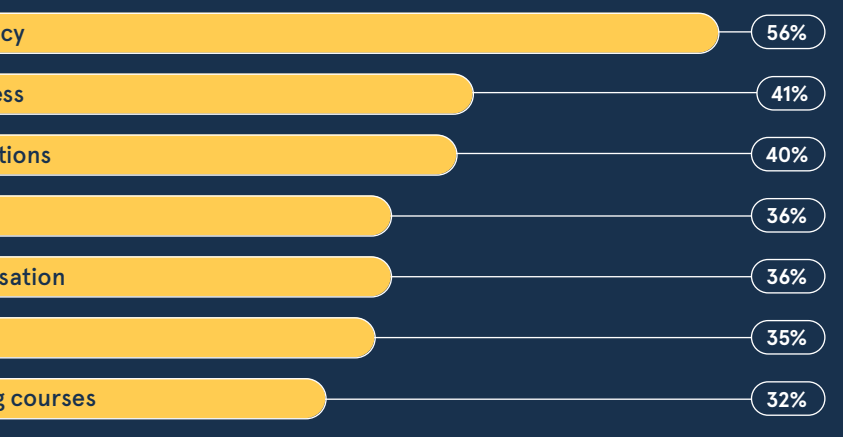
CURITY SKILLS IS THE MAIN CONCERN AMONG TECH CHIEFS

s and technologists citing the following areas as where cloud skills gaps exist



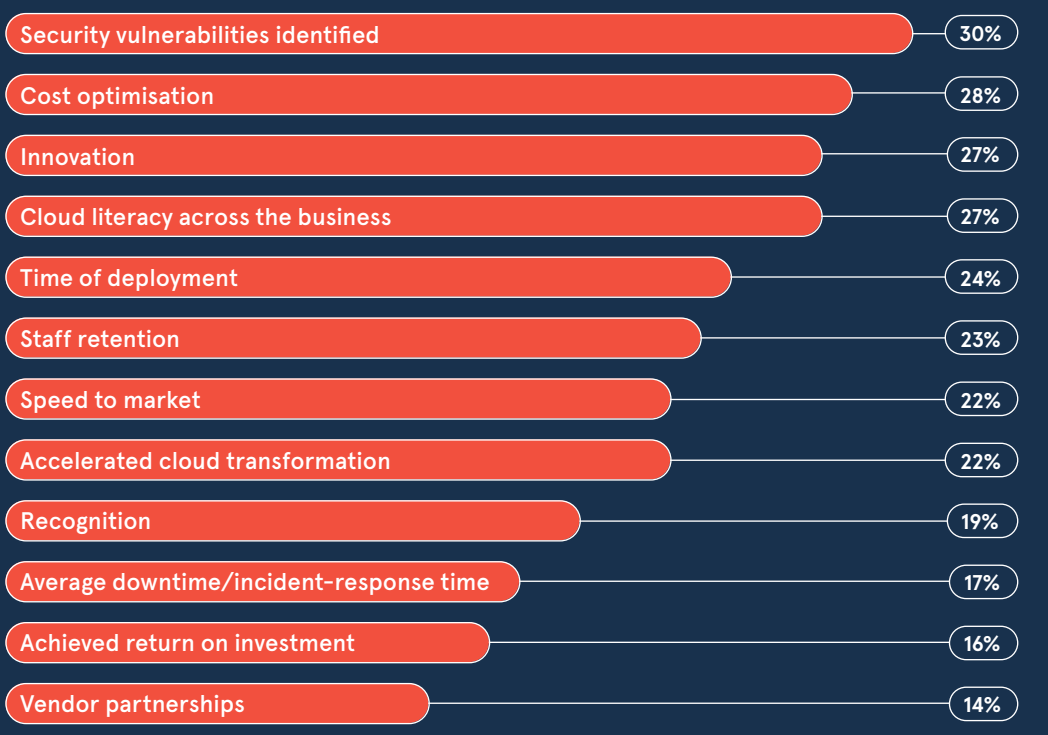
LOYERS WANT FROM A TRAINING PARTNER?

g the following as qualities they seek when choosing a cloud skill development vendor



HOW DO EMPLOYERS MEASURE SUCCESSFUL SKILL DEVELOPMENT?

Share of leaders citing the following as metrics they use to measure the success of cloud training



WHAT DO PEOPLE WANT FROM THEIR TRAINING?

Share of employees citing the following as reasons for being interested in developing their cloud skills

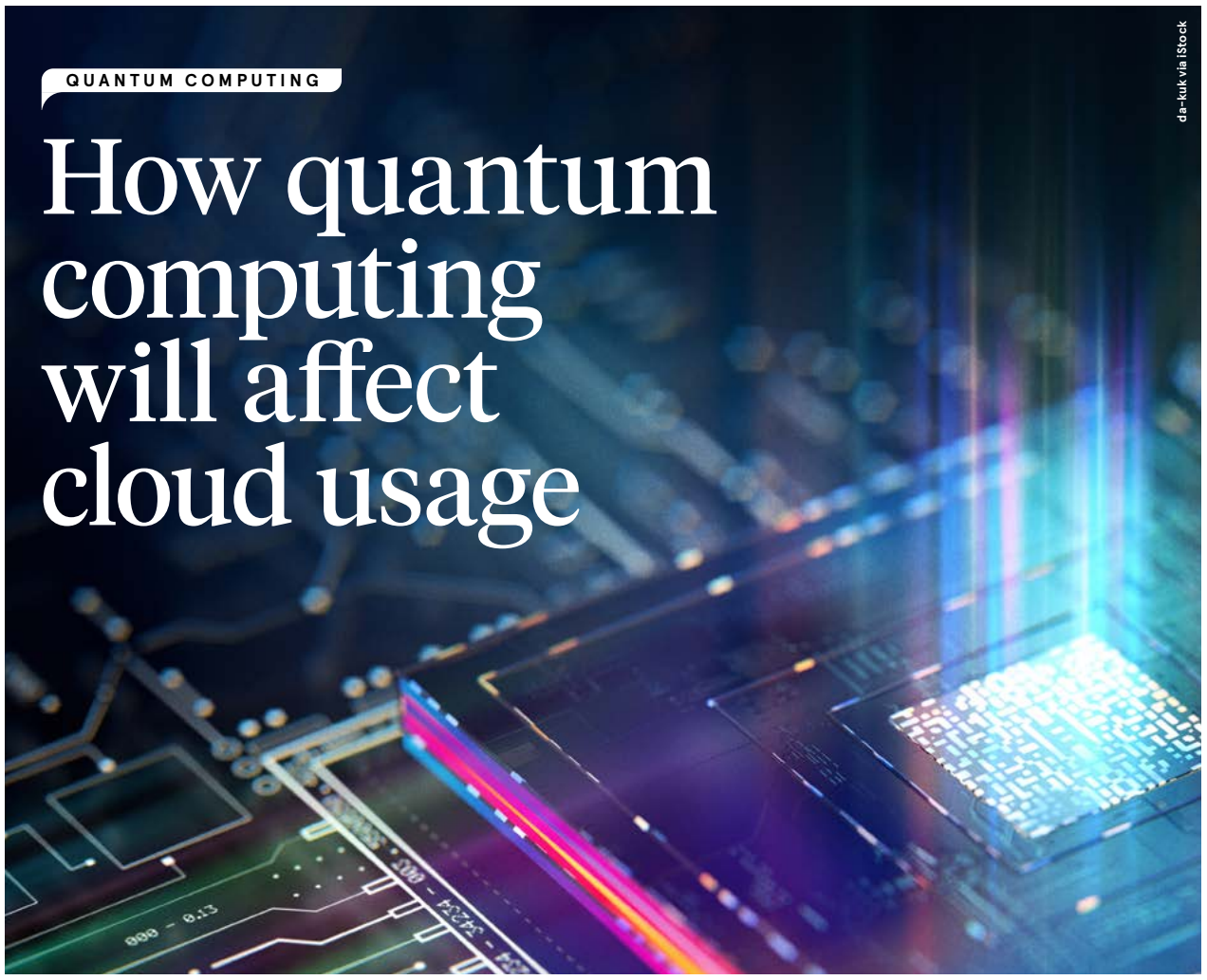
Pluralsight, 2022

ill development budgets year on year

Decrease No change Increase

74%

Pluralsight, 2023



da-kuk via iStock

QUANTUM COMPUTING

How quantum computing will affect cloud usage

Quantum computers promise colossal increases in processing power at far lower levels of energy consumption than their conventional equivalents. Could they ever render cloud services obsolete?

Ouida Taaffe

The cloud is big business – and it still has plenty of growth potential. The global market for public cloud services this year will be worth about $597bn (£462bn), according to an estimate by Gartner in April. The research giant expects the total to leap to $725bn in 2024 and believes that this rate of expansion is sustainable at least over the next few years. It has forecast that three-quarters of organisations "will adopt a digital transformation model predicated on cloud as the fundamental underlying platform" by 2026.

But what if the massive processing power of the cloud providers' servers could be easily outstripped by that offered by an alternative technology? Quantum computing can reportedly perform some functions in microseconds that, as things stand, would take several millennia for a conventional computer to wrestle down. Does this so-called quantum advantage mean that demand for classical computing could decline dramatically?

"Computing has become increasingly homogeneous over the past two decades," notes Richard Hopkins, a distinguished engineer specialising in hybrid cloud solutions at IBM and a former senior quantum ambassador at the company. "We are going to see more speciation, because we need it. In essence, there are lots of very powerful PCs underneath the cloud. We can't afford to try solving large-scale optimisation problems using conventional computers such as these, because we'd be consuming huge amounts of power."

Bloomberg has estimated that the cloud could be using 8% of all electricity generated in the world by the end of this decade. One of the main reasons for this, according to the Institute of Electrical and Electronics Engineers, is that nearly all of the possible efficiencies have been wrung out of classical computing.

Hopkins says that IBM expects quantum computing to be solving complex problems, without consuming anywhere near the same amount of energy, before 2030.

Quantum computing still has some significant development hurdles to surmount. For instance, the computers need to be cooled to -273°C – absolute zero – and have other demanding operational requirements. Despite this, some quantum capability is already available. What's more, it's accessible via the cloud.

"We've launched Amazon Braket, a fully managed service giving customers access to different types of quantum hardware," says Simone Severini, director of quantum technologies at Amazon Web Services and professor of physics of information at University College London. He reveals that the service is still limited in scope, but "the idea is to allow experimentation and to help speed up scientific research and software development for quantum computing".

Hopkins says that quantum computing "won't enter the mainstream for some years, but at IBM we have 24 quantum computing systems in our cloud. System Two, which can run quantum processing units alongside classical CPUs, is set to be released later this year."

But what is such hardware able to do? Hopkins explains that quantum computing applies to problems beyond the capability of the algorithms that can be run on classical computers. "For example, in credit card processing, we used a quantum algorithm alongside a classical one and were able to reduce the number of false positives and negatives beyond the state of the art."

Severini says that "some of the Amazon Braket hardware is universal – that is, it tackles any computing problem – and some of it is specific to particular problems".

He stresses that quantum computing should not be seen as a panacea. There are some problems that are extremely hard for today's conventional systems to solve that will also be extremely hard for quantum computers, such as challenges in combinatorial optimisation. This is the term applied to tasks such as solving the so-called travelling salesman problem, which involves calculating the best route for a salesman to visit all the cities on his schedule once and then return home. As the number of destinations increases, working out the most efficient itinerary gets very computationally intense. Combinatorial optimisation has numerous commercial applications, such as finding the best way to cut up sheets of raw material in a factory so that waste is minimised.

"We need to set the right expectations about quantum computing," Severini says. "It will be able to solve only certain types of problems more efficiently. Uploading data to quantum computers can be very time-consuming and the notion of quantum storage is still unclear. It's potentially useful when the input is small and the number of computing steps required is very large."

He does not expect quantum computing to become primarily a business service. In his view, the hardware "will be used specifically as a research instrument and have the most impact on areas relating to quantum physics itself".

Research, though, could cover areas such as molecule interaction simulation, pricing optimisation and supply chain optimisation, all of which have commercial potential.

There are security concerns about the possible misuse of quantum computing. One example of 'small input, many steps' is working out the prime numbers that have been used in a cryptography key. With a 400-digit key, a classical computer running a million factorisations per second could, over the lifetime of the universe, try out 10^{24} possibilities. To be sure of cracking the key, it would need to examine 10^{200} potential combinations. A quantum computer, by contrast, could feasibly break the long-standing RSA cryptography standard on which much of today's online security systems still rely.

The authorities are taking this risk seriously. For instance, the US National Institute of Standards and Technology announced the first four quantum-resistant cryptographic algorithms in 2022 after a six-year competition.

Investors are also seeking solutions. Kamil Mieczakowski, a partner at venture capital firm Notion Capital, reports that it has invested in Arqit, "a company that helps enterprises to become 'quantum ready' with its quantum-proof encryption technology".

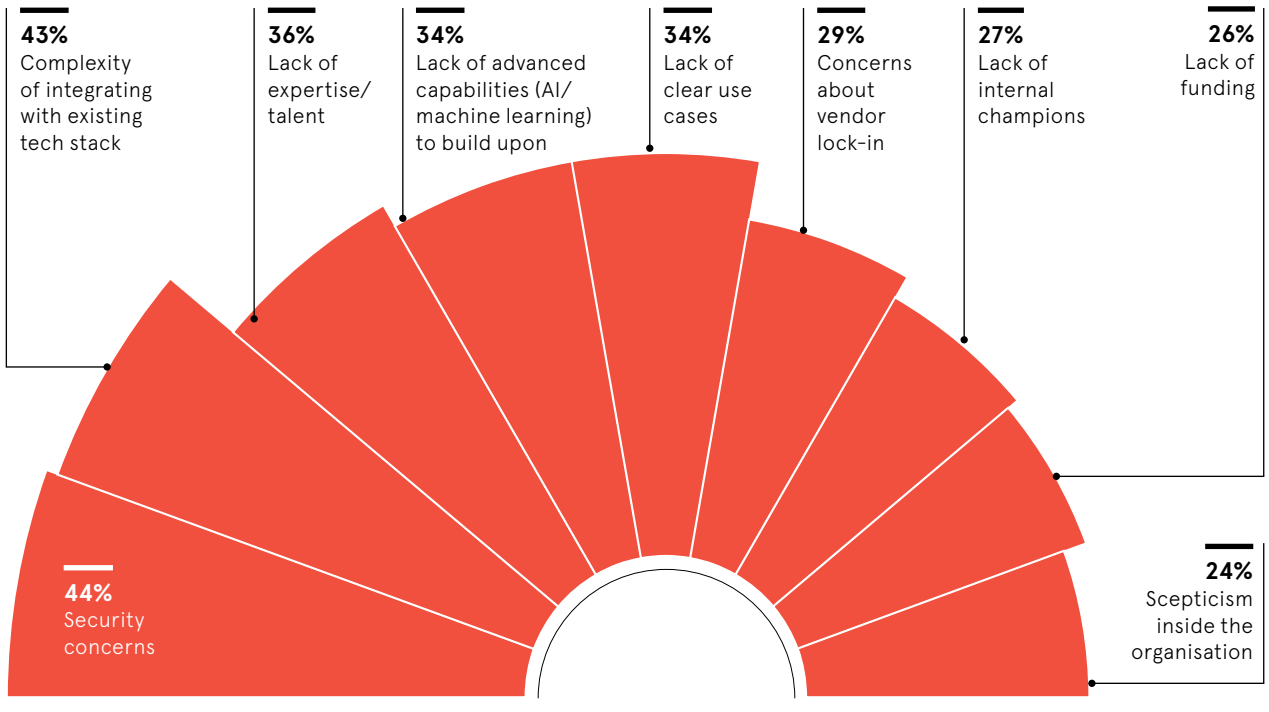
Mieczakowski says that it's still early days for quantum computing and adds that, once it does become more widely available, it's likely to be "overkill" for most purposes. Classical cloud computing will still be the main workhorse. He observes that "it's very expensive to build and run quantum computers. They are inherently fragile too. The cloud will be the cheapest way to access quantum computing capability."

Quantum computers will, in effect, become a part of the cloud as it continues to grow and add new tech that can process data more quickly and energy-efficiently. But quantum computing is unlikely to usurp the cloud as the "fundamental underlying platform" on which tomorrow's businesses will be built.

FOR MANY ORGANISATIONS, QUANTUM COMPUTING IS STILL A LONG WAY OFF

Share of businesses worldwide citing the following as barriers they face in adopting quantum computing

Zapata Computing, 2023



Modernisation 2.0: what got you here won't get you there

Transformation beyond simple projects might feel like conquering Everest but businesses need a sense of urgency

Data modernisation and digital transformation projects are no easy tasks for businesses to undertake. Little wonder, then, that it's often treated as the last thing businesses want to do. Done badly, they can be disruptive and unruly, with significant ramifications for an organisation's way of working.

"Modernisation, in the past, has sometimes been seen as a plumbing project," says Thilo Rockmann, CEO of LzLabs. "Everyone's got an 'if it isn't broke, don't fix it' mindset. And that's a real issue because often these applications aren't technically broken at the point they need modernising."

Another problem is that initial projects often tackle small, simple areas of a business, with leaders presuming that biting off less of the problem will make it easier. But if one area is modernised and updated and the rest of the business isn't, it can cause issues of incompatibility and broken dependencies among a complex set of applications and systems.

There's often a sense of having renovated one area of a property, only to find doing so has uncovered a small mountain of issues with the rest of the building. "There's a huge learning curve in there. People have often hit that brick wall headfirst without a hammer, unfortunately, because digital transformation is just as much a people process as it is a technology process," says Rockmann.

Why thorough modernisation is important

Although it may seem like a headache, modernising legacy technology is a vital requirement for businesses. Experienced developers are becoming more scarce, younger employees are unlikely to be familiar with older applications and the talent pipeline is not replenishing institutional knowledge within organisations. That's clearly problematic if organisations are relying on old-fashioned systems that underpin their core business.

"You have a small percentage of people who can deal with these old languages, and then a percentage of those that can deal with the old technologies, and then a percentage of those who have institutional knowledge of the applications," says Rockmann, "so you've got fractions times fractions times fractions, and it gets to be a scarily small number of people at the end." It's a ticking time bomb that could explode at any minute. If anything were to go wrong with a long-established application, the fix may not be particularly complex but it might rely on a very specific bit of knowledge. If there's no one remaining at the company able to make that repair, it could leave a business in a sticky situation.

> We believe in an iterative, incremental and interoperable approach. We don't believe that there is a one-size-fits-all solution

Modernisation helps keep IT and business systems up to date, meaning that they can be agile and flexible to business needs – not just whoever has the long-term memory of when it was first installed. Naturally, a need to keep systems up to date means that modernisation is never a one-and-done project, explains Rockmann. "This is not a one-time exercise but a continuous and recurring process," he says. "It's a process that can be approached in a variety of ways."

Moving beyond simple solutions

Rockmann points out that prior history has recommended following the principle of the seven Rs (see the seven Rs panel) when considering how to modernise applications. The majority of companies on the cusp of transformations expect to replatform or replace, though other approaches such as rehosting and refactoring are gaining in popularity.

However, leaders can fall into the trap of simplifying a modernisation project by picking one approach. Leaders shouldn't feel like they have to commit to just one of the seven Rs, as even approaches like replatforming and refactoring won't solve all the issues. For example, refactoring one element of an organisation's IT infrastructure will likely identify the need to take different actions elsewhere. In some cases, replacing one of the Rs with two of them sequentially can unlock value quickly and reduce risk – often taking problem issues out of the critical path. "The seven Rs aren't a bad approach, but they're not elegant when one approach is applied to an entire portfolio," says Rockmann.

In part, that's because the seven Rs are designed to solve simple problems – and as any business leader knows, that's not the reality of any organisation today. Technologies to assist transformations have also evolved beyond these simple approaches. "Modernisation 1.0 is doing the easy stuff, without the dependencies," says Rockmann. "And because they're learning, they've actually found some of that quite hard still. Now, they look internally and see the Gordian knot, and this is the 'Oh no' moment. That simplistic, single approach won't work."

LzLabs's experience of helping companies enact digital transformations successfully shows that there are no simple big bang fixes. "We believe in an iterative, incremental and interoperable approach," says Rockmann. "We don't believe that there is a one-size-fits-all solution. Not even ours alone."

Business leaders need to indeed look at their systems holistically and find a bespoke solution. They also need to come to terms with the fact that almost any modernisation project will also raise further issues beyond those first identified. Being cognisant of that – and comfortable that it's an ongoing, multi-step approach, rather than a quick project that races to completion – is crucial to tackling the Everest of a full modernisation project.

The trick is not to try and tackle the full climb in one go, leaving leaders overwhelmed and organisations stuck at base camp. A step-by-step approach broken down into small stages is the key to reaching the cloudy summit and making worthwhile change within the organisation quickly, with low risk. Keeping front of mind one thing is vital, explains the LzLabs CEO. "Modernisation is doable," says Rockmann. "But you need to think in a different way."

For more information please visit lzlabs.com

LzLabs®

The seven Rs

The basic approaches to application modernisation

Replatform: Recompiling an application on a new platform or operating system.

Rearchitect: Changing how the systems work, often splitting them up into smaller, modular forms.

Rebuild: Starting from scratch and building again – this can be costly and risky but leads to a clean, modern deliverable.

Rehost: Shifting from one environment to another, most commonly associated with moving wholesale to the cloud, with no changes to language or source required.

Refactor: Changing code within a system without changing functionality to adapt to new advances. This is often achieved by transcoding from older languages with automation.

Replace: Swapping out existing systems for a fresh set of applications, bought especially for the project. Most commonly off-the-shelf packages for non-differential applications.

Retire: Giving up the ghost – or the old way of working – and potentially (but not always) replacing it with alternatives which may take different forms.

shomos uddin via Getty Images

STRATEGY

Default setting: the rise of cloud-first strategy

Several organisations have come to view the cloud as their standard choice for data storage and workflow hosting, but they still need to make case-by-case cost and suitability assessments

Christine Horton

From the mid-noughties onwards and especially since the Covid crisis, enterprises of all sizes have been flocking to the cloud, entrusting an ever-increasing proportion of their data and workloads to third parties. In April, for instance, consumer goods giant Unilever moved all of its 400-plus household brands to Microsoft's Azure platform, completing one of the largest cloud migrations ever seen.

In November 2022, DIY group Kingfisher – the owner of B&Q and Screwfix in the UK – announced a five-year £80m deal with Google Cloud to move on-premises services, including its ecommerce platform and test environments, to the cloud. It plans to scale up from offering 300,000 products on the B&Q website to more than 4 million.

Such massive and wholesale migrations indicate a significant change in how organisations view the cloud. A growing number of companies, particularly larger ones, are coming to treat it as their default option when it comes to data storage and workload hosting.

It's not only businesses that are looking to the cloud as their standard solution. The UK government recently updated its tech procurement guidance to state that public sector bodies should consider public cloud services first and seek out an alternative only when these aren't a feasible option. This approach is mandatory in Whitehall and strongly recommended to the wider public sector.

Roy Shelton, CEO of IT support and services company Connectus Business Solutions, expects the cloud-as-default approach to be the number-one deployed strategy by the end of 2025.

"The economic challenges we're facing will fuel greater adoption of cloud-first solutions, as companies seek to minimise their capital investments, reduce internal costs and outsource more non-core activities," he predicts.

While big corporations have tended to be the most prominent adopters of the cloud-first approach, smaller firms and startups have been leading the way, as they are less likely to be encumbered by unwieldy tech stacks and legacy processes. In fact, there is an entire generation of cloud-native companies, whose business models and operational processes have been designed with the cloud in mind.

> **The economic challenges we're facing will fuel greater adoption of cloud-first solutions, as companies seek to minimise their capital investments**

Among the younger businesses that have made the switch is insurance company Inigo, which was established in 2020 and became a cloud-first concern in nine months.

Inigo's chief operations and technology officer, Erdal Atakan, reports that one of the main benefits of the cloud-by-default approach is that it offers "new capabilities without requiring large infrastructure and security teams, reducing the need for physical space and equipment maintenance. It also makes it easier for you to flex and scale your operations up (and down) as and when required."

Canterbury Christ Church University is another organisation that's come to view the cloud as its standard choice for hosting new services and applications. The university's platform and systems manager, Dave Hailwood, reports that this change of approach has proved advantageous in several ways.

"It enables us to be quicker at reacting to technological developments and adopting new features," he says. "We can test something quickly and create a proof of concept without committing to a large investment in new hardware. If testing is successful, we can scale the new feature out to production. If not, we can simply turn it off."

> **Firms should ask themselves: 'Will this deliver a return if we put it in the cloud?' If the answer is 'no', it's time to re-evaluate**

Hailwood adds that applying a cloud-first approach and making better use of software as a service in this way shifts more of the responsibility for infrastructure maintenance to those better placed to do it.

"We can leave the vendor to think about low-level hardware management while we concentrate on delivering a good service to our staff and students," he says.

Despite much of the marketing hype talking up the 'simplicity' of public cloud services, it is worth remembering that managing a migration can be a complex process that may be beyond the capabilities of some smaller organisations' in-house tech departments.

Even the 68-strong IT team at Canterbury Christ Church University encountered unexpected problems during the Covid crisis while enabling remote access to campus PCs across the board with Microsoft Azure Virtual Desktop. It ended up having to enlist a third-party migration specialist called Nerdio to make the process more manageable and cost-effective.

Cost is obviously a huge consideration for any firm thinking about adopting a cloud-first policy. A survey of enterprises published by the Uptime Institute in March found that 42% of respondents had spent more on cloud services in 2022 than they had expected to. Nearly a third (33%) reported that they had moved applications back from the cloud to an on-premises data centre or co-location facility.

Andrew Bithell is account team lead at CTS, one of Google's largest dedicated cloud partners in Europe. He notes that, "with the cost-of-living crisis still hot on everyone's radars, companies need to evaluate the best strategies for making smart choices about their legacy systems and optimising these to get the best return on their investments. While it's hard to forget how expensive IT systems are, businesses are evolving constantly and adopting digital innovations apace. But not everything needs to be in the cloud. Firms should ask themselves: 'Will this deliver a return if we put it in the cloud?' If the answer is 'no', it's time to re-evaluate."

Bithell adds that cloud computing gives users the scope to "modernise and ensure that they're using open-source licensing and cloud-native technologies. But finding maximum value means modernising, utilising the available technology and transforming existing archi-

tecture into something that's more cloud-like and cost-effective."

Organisations should therefore not expect an instant reduction in their IT costs simply because they have adopted a cloud-first policy. They must reimagine and refactor their architecture, according to Bithell, who stresses that the cloud "is always going to be expensive" if they're not able to adapt.

A report published by Gartner in April predicted that three-quarters of firms will have adopted "a digital transformation model predicated on the cloud as the fundamental underlying platform" by 2026. Despite this, significant barriers to going all-in on the cloud remain.

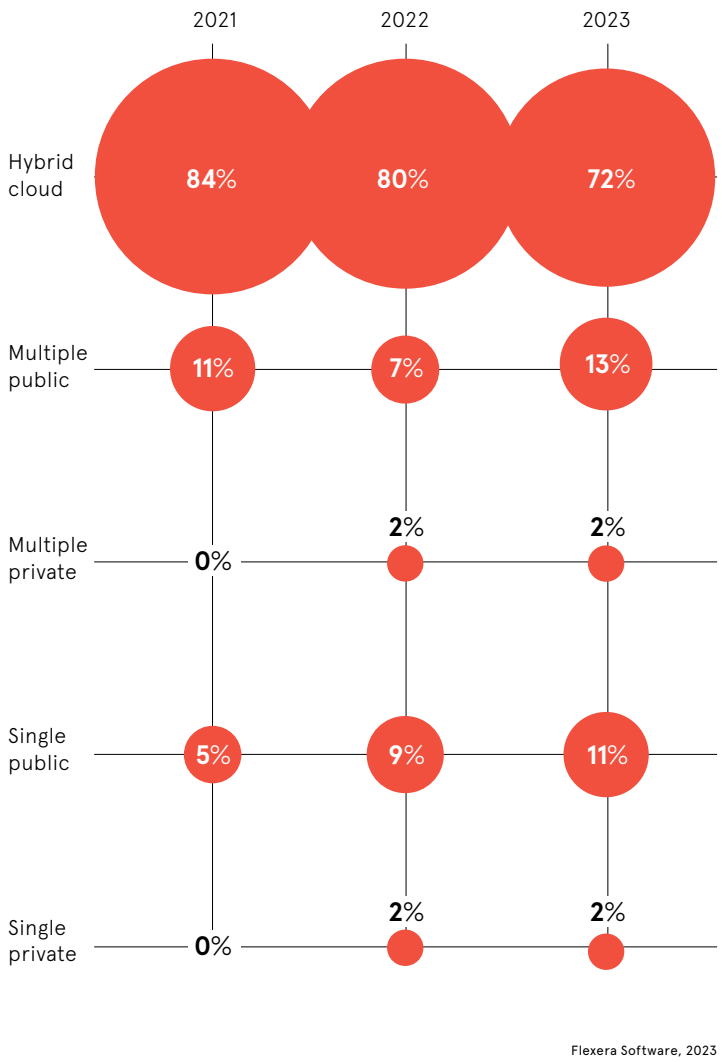
Todd Moore, senior vice-president of encryption products at Thales Cloud Protection & Licensing, explains: "There will always be the need for on-premise or hybrid workloads based on latency, performance and security. And requirements such as digital sovereignty may always force the need for some on-premise elements."

He stresses that a cloud-first approach is not the same as an all-cloud policy. Under the former, there'll always be a balance between the various options based on your technical and operational needs.

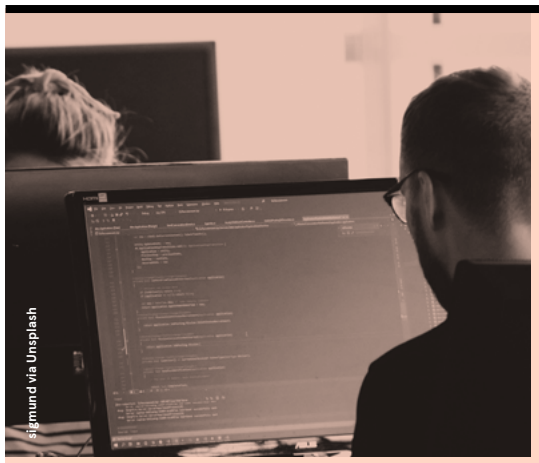
Ultimately, organisations adopting a cloud-first strategy must, just like any other enterprise, focus on extracting full value from each investment in cloud tech, keeping a keen eye on the returns while minimising the risks of incurring unexpected costs.

HOW CLOUD STRATEGY HAS EVOLVED IN RECENT YEARS

Percentages of firms applying the following enterprise cloud strategies in 2021-23



Flexera Software, 2023



sigmund via Unsplash

The pros and cons of pay-as-you-go cloud

With the rise of generative AI and the growing importance of data management, cloud usage and the costs thereof are only likely to increase. It's little wonder that pay-as-you-go cloud (PAYG) services are becoming more popular.

Choosing PAYG makes sense in certain scenarios. Ideal candidates for this payment model are applications that need to be scaled up in certain periods and down in others because of seasonal fluctuations in demand. But it all comes down to the application. Backups, for instance, will vary by size and frequency on a case-by-case basis.

"PAYG will not stop the ingress, egress and API charges on data. This is one of the biggest areas where unexpected costs for businesses can arise."

So says Andy Ramgobin, chief technology offcer at consultancy MergeIT. He observes that the rise of public cloud services and the acceleration in cloud-native adoption has stemmed from technologies such as Kubernetes, containers, serverless computing and software-defined wide-area networks. A public cloud will offer its own native version of Kubernetes, managed by the vendor, and also have a container service.

"These are not cheap services to consume," Ramgobin stresses, adding that serverless computing is "exceptionally powerful – so powerful that you sometimes forget you're consuming it. The premise of PAYG is that you pay only for infrastructure when you need it, but you'll be using event-driven code for everything if you aren't careful. PAYG could suit some businesses but definitely won't suit others. This requires careful planning rather than hoping that PAYG will solve all cost-control issues. It won't, although it could help."

Ramgobin says that firms seeking to fine-tune resources to requirements will have to pay either for native performance-monitoring tools in the cloud or for a cloud engineer to track costs, which is likely to be the more expensive option.

"PAYG is not like the many one-size-fits-all commercial models in existence. A business must adequately plan from both a technical and a commercial perspective and build a 12-month forecast as close to what is likely as possible," he advises. "If you then build in a 30% cost contingency, you shouldn't find yourself struggling with huge unexpected bills. That said, nothing would mitigate this risk completely."

Ultimately, there's no way to avoid unexpected costs completely, whether you're on premises or in the cloud, according to Ramgobin.

"The best you can do", he says, "is follow best practice, be prudent, plan well ahead and try to control the uncontrollable."

Tackle your cloud fears before you're left behind

Security and cost concerns mean some organisations have yet to get off the starting blocks when it comes to cloud migration. But the right support can help them overcome their fears

If cloud migration was a race, some organisations would already have crossed the finish line, others would be struggling around the halfway point, and finally, right at the back, would be the non-starters. Instead of trying to keep up with the competition, they're paralysed by fears of spiralling costs and security breaches. And with every second that passes they're falling further behind.

This uncomfortable truth is borne out by the latest cloud forecast from Gartner. It predicts that worldwide end-user spending on public cloud services will reach nearly $600bn in 2023, up from $491bn in 2022. What's more, 75% of organisations will have adopted a digital transformation model with cloud as the underlying platform by 2026. So how can the non-starters overcome their migration fears before it's too late?

Firstly, they need to separate fact from fiction, particularly when it comes to the cost of migration and the security of their data. Concerns that workloads will be less secure on the cloud than on-premise are still common according to Stephen Croke, head of business development at CirrusHQ, an Amazon Web Services (AWS) Advanced Consulting and Solution Provider partner. But in fact workloads are likely to be just as secure in the cloud, if not more so.

"We've had situations where a customer does not have, for example, a recognised international information security standard for their architecture, like ISO 27001. And yet they will be worried about moving to a cloud provider such as AWS, when doing so would allow them to inherit almost 150 different security standards and global compliance certifications."

Firms that are stuck on the starting blocks also place too much emphasis on the cost of migration rather than the long-term cost savings it can unlock. "There is no customer in the world with a fully populated on-premises data centre, run with on-premises hardware, that is not going to save money when they move to the cloud, just purely in terms of the usage-optimisation benefits," says Croke.

But to realise these pay-as-you-go cost benefits, you first need a clear idea of what you're running on-premises. "If you haven't kept track of what you've got running, or you lift and shift your environments over to the cloud and leave them there, it will probably cost you more because of the way cloud is priced," says James Lucas, founder and CEO of CirrusHQ. "But that's because you won't be taking advantage of the ability to turn off resources when you're not using them."

A clear picture

Organisations that want to save money by migrating to the cloud therefore need to develop a clear picture of their current workloads. But the daunting nature of this task means migration projects sometimes stall before they even get going.

"Customers often want to make a move on cloud migration, but they don't know what the first step is because they don't always know what they've already got," says Croke. "Do they have a thousand applications? Do they have four hundred? The IT manager can typically tell you, 'I've got 40 servers and 400 virtual machines'. But what are these all actually doing? The sheer scale of even thinking about it can lead to decision paralysis."

A cloud migration partner can help organisations to overcome this paralysis, accurately assess their on-premise resources, and build a detailed cost projection for running workloads in the cloud. A migration-readiness assessment, for example, can reveal current cloud-readiness strengths and weaknesses and help to establish a plan for closing any gaps. And typically these services are funded by the cloud vendors at no cost to the customer.

> **Customers often want to make a move on cloud migration, but they don't know what the first step is because they don't always know what they've already got**

Croke describes it as "a traffic light system to say you're miles away on tooling for service management, for example, or your IT team knows how to run VMware but don't have a clue about a cloud vendor like AWS, so you need to build in a training plan for them."

Discovery work can also help technical teams to identify how applications might change once they're migrated to the cloud. "It gives them a technical overview of all of the jumbled parts they have today and how to straighten them out," Croke explains. "That one's going here, that one's going there, this one's getting deprecated, that one's getting moved to software-as-a-service, etc."

When it comes to actually migrating and modernising workloads, tools like AWS Migration Hub can help organisations to track progress and identify and troubleshoot issues. But also it's vitally important they have the right partner on board to support their migration – preferably one with specialist knowledge of their needs or sector.

The right partner

CirrusHQ has extensive experience in helping educational and public sector organisations migrate to AWS. As well as being an AWS Education Competency accredited partner, the company has also attained AWS' Well-Architected Framework certification. "Cloud vendors set exceptionally high bars for partners to get those certifications," Lucas explains. "So don't pick someone that just started this year and claims to know what they're doing. They don't. You cannot be up to speed that quickly on everything that's going on."

An experienced partner will also know where there are potholes that could trip up the migration process, says Croke. For example, an organisation may previously have given away specific rights around licence mobility – i.e. the right to deploy software to cloud service providers – for a discount.

If they want to migrate to a provider other than the one that sold them the licences, they may be forced to pay for the privilege. However, a partner with a strong relationship with the desired alternative provider can help organisations to overcome this issue at little or no cost.

Specialist partners can also tap into sources of funding that the organisation may not know of, such as the One Government Value Agreement (OGVA) between AWS and the UK government. This treats participating public sector organisations as a single client, meaning they can access cost savings for cloud deployments similar to those available to large commercial customers.

An accredited partner will also know how to navigate the myriad of cloud pricing options on offer and secure the best discounts. "There are tens of thousands of different pricing points, so again, you need someone who understands all that and finds the quick way through to 'these are the options you have available,'" says Lucas.

White Rose Education, which supplies teaching materials used by the majority of primary schools in England, knows just how essential the right partner is for a successful migration. It worked with CirrusHQ to transform its traditional architecture into three separate bespoke applications that could be scaled as required. This resulted in a 70% cost saving against their old environment, as well as increased performance.

"They're now outstripping their competitors, winning awards, taking on bigger customers," says Croke. "It's transformed their whole model and they're leaving competitors in their wake."

For more information please visit cirrushq.com

CirrusHQ

ARTIFICIAL INTELLIGENCE

The clouded costs of generative AI

The potential of this branch of artificial intelligence is huge, but so are its resource demands. Any firm's success in using it will hinge on the efficiency of its cloud management

Nick Easen

Not a day goes by without another business use case for generative AI popping up in the media. But very little of the growing body of coverage mentions the fact that this revolutionary new technology requires vast volumes of data and a hefty amount of computing power to process all that material.

When an emerging technology has so much potential, such practical concerns do tend to be overlooked amid all the hype. As a result, few organisations will have looked in detail at what cloud capacity they might require to do the heavy lifting and what that could cost them. Moreover, cloud and data centre providers could soon find it hard to scale up their resources quickly enough to meet all the demands of advanced AI.

To work properly, generative AI needs to be fed huge volumes of data. As these systems continue to evolve, their consumption of data will increase exponentially. Training microchips, for instance, requires a tremendous amount of computing power. The advanced chips capable of running the large language models (LLMs) that generative AI is based on can require months of dedicated training time. Even where businesses use pre-trained models, fine-tuning these will still call for considerable computational clout. The demand for such processing power could easily outpace the supply.

Séamus Dunne is managing director for the UK and Ireland at Digital Realty, a data centre operator. He points out that "no one knows how much demand there's going to be. But, if generative AI ends up being anything like the cloud when that first hit the scene, you can bet that there's going to be a huge demand for it. Capacity, or the lack of it, will make or break this technology."

Dunne adds that, while cloud costs will undoubtedly increase, "it's important to understand that generative AI is a new frontier. There aren't many legacy AI companies, so competition in this field will be fierce. Startups will emerge daily, all of which will be working on exciting new applications. We will reach a point where costs stabilise, but that will take time."

A lot of money is flowing into both AI and cloud computing. Global spending on public cloud services is set to increase by 22% to nearly $600bn (£458bn) this year, according to Gartner, which cites generative AI as a crucial factor fuelling that growth. Bloomberg Intelligence has predicted that the market for generative AI will be worth $1.3tn within 10 years.


Maksim Tkachenko via iStock

> **If not managed effectively, rapid scaling up to accommodate generative AI applications can lead to cost overruns**

There are other reasons why generative AI is pushing up corporate IT expenditure. The technology requires high-grade central processing units and other microchips. These sell at a premium in any case, but supply shortages are putting upward pressure on prices.

In the short term, many firms may need to reconsider their generative AI aspirations once the cloud costs and capacity limitations become clear to them. They may need to become more selective about which workloads they run in the cloud, with a focus on truly disruptive applications and those offering significant profit margins and clear returns on investment.

Expect tailored cost-optimisation methods to gain prominence. These will help companies to strike the appropriate balance between performance and cost. Dr Chris Royles, field chief technology officer for EMEA at Cloudera, notes that there are systems available to help them make the most efficient choices in this respect.

"Decisions on whether an AI workload will be better suited to cloud-native deployment in a shared public cloud or an on-premise environment must be driven by good data. Workload analytics enable organisations to observe the performance of a workload before making a call one way or the other," he says.

The cloud and generative AI landscape is also developing apace, especially as businesses and investors continue to show willing to spend heavily on the technology. The hyperscalers – Amazon, Google and Microsoft – are likely to offer cost-efficient off-the-shelf models and cloud infrastructure to accommodate a growing AI ecosystem.

Rahul Pradhan is vice-president for product and strategy at Couchbase, a US firm specialising in database-as-a-service software. He predicts that the hyperscalers will "partner heavily with independent software vendors and emerging AI companies to provide a one-stop shop for AI infrastructure. This strategy will help organisations to cut costs by doubling down on the vendor, although this could come at the cost of vendor lock-in."

Not all generative AI systems are created equal, of course, and some are significantly more efficient than others. A business will often find that the largest LLMs, which contain the greatest number of parameters, aren't the most appropriate. Instead, smaller LLMs can be used, which can enable faster fine-tuning with the firm's proprietary data. This could deliver meaningful insights faster and at a lower cost, requiring fewer cloud resources.

"If not managed effectively, rapid scaling up to accommodate generative AI applications can lead to cost overruns, while being too conservative or slow may hinder model performance," Pradhan notes. "It's a fine balance."

There are also companies trying to make generative AI more efficient. Players such as d-Matrix and Deci are reorganising the neural architecture and redefining how memory is used in chips. The aim is to help firms use less cloud power to achieve the same AI outputs.

If businesses want to optimise their investments in generative AI, it's clear that they'll need to get smarter about how they manage their cloud resources. Those that can do more with less stand to gain a crucial edge over their rivals.

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