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CLOUD FOR BUSINESS

CLOUD FOR BUSINESS

2020: The year business clouds gathered pace

Some 89 per cent of UK business leaders reported the coronavirus pandemic has accelerated their move to the cloud, and without it remote working and business agility would not have been possible

Jonathan Weinberg

In just 12 months since the pandemic hit, use of the cloud for business has soared. According to the *2021 Hybrid Cloud Report* from NTT, 94 per cent of decision-makers across 13 countries saw it as critical to meeting immediate business needs amid COVID-19 uncertainty.

The research found 61 per cent of organisations globally were already using or piloting hybrid cloud, a mixed infrastructure of on-premise, private services and a public cloud.

There's no doubt that, without this technology and the tools to speed up or scale its adoption, the surge in remote working would not have been possible.

Clothing retailer Matalan, for example, was able to take advantage of the cloud for business positives.

Head of logistics Paul Kee explains how it was able to scale its cloud-based warehouse management system (WMS) when its high-street and retail-park doors shut.

"When the pandemic hit and stores closed, Matalan accelerated its ecommerce capability, quickly turning a plan into reality and enabling sales despite significant limitations," he says.

"The upgraded cloud-based WMS enabled Matalan to adapt processes and split the pick face between retail and ecommerce, ultimately giving better control over replenishment and reducing the frequency of running a replenishment process. This had the knock-on effect of reducing 'out of stocks' and improving speed to market on ecommerce orders due to more advantageous cut-off times.

"With ecommerce growing more than 25 per cent per annum, the ability to cater to customer expectations was paramount to ensuring exceptional buying experiences. In large part as a result of Manhattan Associates' cloud-based WMS, Matalan was able to gain improved data availability and stock visibility, empowering better and quicker decision-making, allowing us to offer customers more flexible online delivery options."

Another company owner to reap cloud for business rewards was Tim Peniston-Bird, of customer loyalty agency Orangutan, and training and events company The Holt. He explains how cloud really came into its own when COVID struck, especially when using it to deliver theory lessons remotely to attendees quickly and effectively.

"The pandemic has increased people's comfort with online activity so a larger amount of content will move into the cloud," he predicts. "We are increasingly looking to use virtual environments and a mixture of team tasks and artificial intelligence avatars to boost learning where people can practise approaches in a safe online environment."

And this situation is clearly not uncommon. According to Twilio's *State of Customer Engagement Report*, which surveyed 2,500 enterprise decision-makers globally, 89 per cent of the 300 UK business leaders surveyed reported that COVID-19 had accelerated their move to the cloud.

A key reason was to give customers a greater number of digital routes to engage. Before the pandemic, UK respondents to the research had said less than half (48 per cent) of their organisation's customer engagement was digital. Now that has increased to 62 per cent. Four in ten also suggested revenue would be lost if their customer engagement was not digitalised.

Peniston-Bird experienced this first hand. "During this period, we increasingly integrated much more of the customer experience into cloud systems. For example, in a customer loyalty programme for a housing association, requests to area co-ordinators can be entered, logged and answered within a system, people can book gas safety inspections, volunteer, make suggestions or complete engagement surveys," he says.

However, it has not all been plain sailing. Research by Unit 42, a global cyberthreat research arm of Palo Alto Networks, suggested the rush to cloud computing has allowed security vulnerabilities to proliferate, often because admin privileges were not stringent enough.

This meant any hack could risk sensitive data being leaked and Unit 42 even found new cloud infrastructure was being hijacked to secretly generate cryptocurrency. It claimed at least 23 per cent of organisations globally that maintain cloud infrastructure were affected by so-called cryptojacking.

Alongside security concerns, the resilience of information in the cloud has also been a critical consideration. StorageCraft research found 61 per cent of organisations had increased investment in cloud back-up use and 28 per cent also implemented data recovery plans that relied on the cloud.

For many though, the pandemic has simply sped up use of cloud for business, a growing need they were already in the process of adopting anyway.

Mike Hampson, chief executive at Bishopsgate Financial, who increased its cloud use to service the needs of his 45 colleagues, says: "The pandemic accelerated that journey, especially when organisations pivoted industry-wide to working from home, fully embracing cloud-based collaboration tools.

"Also, with personal interaction severely curtailed, all our clients followed suit, renewing their drive to providing cloud-based digital solutions for their clients."

Sharing a number of lessons he learnt along the way, Hampson adds: "A few things should be incorporated into each organisation's plans. From the outset, adopt a multi-cloud strategy when deploying to ensure resilience. Importantly, focus on the customer journey and experience when developing digital solutions.

"Additionally, all too often, ageing software and hardware platforms are maintained as critical or key components, severely impacting productivity and efficiency. Legacy platforms and systems should be constantly pruned and decommissioned to ensure you don't end up with legacy tech debt." ●

94% of global organisations agree that hybrid cloud is critical to meeting their immediate business needs

61% are currently using, or in the process of piloting, a hybrid cloud solution

85% of leadership teams are the main decision-maker for cloud strategy

NTT 2021

PM Images via GettyImages

CLOUD STRATEGY

Choosing the right cloud solution

As demand grows for scalable applications accessible from anywhere, it's vital to know which cloud set-up will help your organisation achieve its goals

Rosalyn Page

T here's no one-size-fits-all when it comes to having the right enterprise cloud solution. Whether it's on-premises, hybrid cloud or cloud-first, it needs to be guided by the overall IT strategy, organisational readiness and availability of solutions.

Managing the legacy challenge of on-premises set-ups
When mission-critical applications still run on older platforms, it can be a challenge overhauling these systems. Organisations face the task of building in-house skillsets while keeping budgets in check and ensuring there are no breaks in up-time across the organisation.

While the Royal National Theatre (NT) might have gone dark during lockdown, behind the scenes it has been undergoing a transformation, modernising and migrating many of its systems to the cloud for some years now.

Yet the NT has found there isn't always a suitable cloud-based alternative for some of its applications, such as its finance system. "It's still a traditional system that needs to run in a certain way," says Nicholas Triantafyllou, director of IT at the National Theatre.

In years to come, Triantafyllou expects it will be migrated to the cloud. "It's just not economically viable to do it," he says. "Right now we still have some legacy systems running in our server farm in-house and that's the best way of running them."

It illustrates how the starting point

for moving applications to the cloud needs to be a measurable benefit at the end of it. "Understanding what already exists is the other piece of the puzzle," says Simon Ratcliffe, principal consultant at Ensono.

Any decision about making the move to the cloud isn't just because you can. "Having a thorough and detailed understanding of the infrastructure, understanding the needs and aspirations of the application owners, determining a roadmap for the various services and identifying software-as-a-service (SaaS), platform-as-a-service and infrastructure-as-a-service options are all critical if a migration to cloud is to work," says Ratcliffe.

Accepting that not everything will work well in the cloud is perhaps the most difficult decision. "Having some on-premise hardware is not failure; it is pragmatism," he says.

Ratcliffe encounters legacy technology that has evolved over many years and has become a complex mesh of interconnected services that are not fully understood or documented. "When you have answered the two core questions – what do you have and what is the benefit of moving it to the cloud? – then you can begin the process," he says.

Working towards a cohesive hybrid cloud set-up
A hybrid cloud strategy is the most common, with 87 per cent of organisations combining virtual and on-premises, according to the Flexera 2020 State of the Cloud

report. "They can strike their own balance between local and off-site," says Dynatrace regional vice president, UK and Ireland, Abdi Essa.

However, combining both on-premises and cloud applications means managing the interoperability between systems where a glitch in one part impacts another. "The rise of the hybrid multi-cloud model also means apps are now hyperconnected, with dependencies across the IT infrastructure," says Essa.

The NT is running a hybrid set-up with email and business applications all now in the cloud. Its newest streaming service, a much-needed theatrical lifeline to many during lockdown, could not exist without being virtual. Its ticketing platform has evolved to become a SaaS cloud application and its payroll and human resources (HR) systems are next on the migrated list.

With payroll and HR, there was no question these would be migrated to the cloud and not remain in-house. "They are more expensive to run that way and a lot less reliable. I don't need complex teams to look after them and I don't have the same worries about the security of that infrastructure," says Triantafyllou.

In addition to cost and labour savings in having scalable, managed software services, the application

is constantly evolving as needs and technology develops. "And it's a lot more user-friendly this way."

When to take a pure cloud approach
While having a pure cloud set-up might be the end goal for many organisations, they face plenty of challenges in securing remote access, redundancy provision and forward planning. "It's a strategy that's only worth adopting if it's appropriate to the business," says Triantafyllou.

At the NT it's an ongoing project as it looks for solutions to complicated tasks like scheduling shows and managing ticketing at scale. As a 20-year industry veteran, Triantafyllou has seen how enterprise technology has become a

complex, mission-critical function in organisations and transforming this into the cloud requires a comprehensive, well-developed plan.

His advice is to be pragmatic about the best approach to a pure cloud strategy. "If your core business systems have a credible cloud alternative, it's OK, but if your core system is still on-premise and still working, then focus on that, rather than trying to do something in the cloud without doing the research," he says.

Triantafyllou says cloud requires an understanding of business needs, requirements of end-users and what you're being promised by vendors. "And look at it over a three-to-five-year timespan," he says.

While cloud uptake has been spurred on by the pandemic, achieving pure cloud may look different in the future. Some say a paradigm shift is needed to redraw the division between cloud and on-premises. "It's a change in thinking towards technology as a composable system with elements that can be assembled to suit user needs," says Ensono's Ratcliffe.

"We need to decouple the devices from their location and examine things in terms of services and run the service on the most relevant platform," he says. ●

> **It's a change in thinking towards technology as a composable system with elements that can be assembled to suit user needs**

Journey to cloud transformation at scale

The foundations of IT built on cloud fundamentals are constructed on a different set of principles than the way IT was traditionally built; transforming at enterprise scale requires highly specialised expertise

E nterprises have faced a bumpy journey learning about the intricacies of cloud deployment. In spite years of cloud mania, there have been many naysayers around enterprise adoption. Pre-coronavirus the prevailing view was to experiment with cloud adoption, build a hybrid private cloud, with private and public clouds co-existing, and take baby steps as you transform enterprise IT to adopt to a cloud future.

Now that clients increasingly take an "all-in-cloud" and a zero-datacentre approach to cloud migration, gone are the baby steps and the balance between private and public cloud.

The significant dependence on IT to support remote, distributed teams during the coronavirus pandemic, along with business pressure to rapidly become more digital, has driven a huge increase in ambition from companies to majorly shift how they adopt the cloud.

The best cloud transformation programmes require partners which have many years of enterprise transformation experience, coupled with the specific skills of each cloud provider. When this has happened at scale, versus experiments and proofs of concept, the value of agility, flexibility, cost economics, security and

compliance has shown to be hugely powerful and transformative for clients HCL Technologies works with.

"Cloud enables businesses to reach a level of agility and experimentation that they could never have achieved in the past," says Ashish Kumar Gupta, senior corporate vice president and head of Europe, Middle East and Africa for diversified industries at HCL Technologies, whose portfolio of IT products and solutions helps enterprises reimagine their business for the digital age. "We've seen this in the context of startups, which can go live quickly and scale up at a very low cost. The cloud offers those same advantages to enterprises."

HCL Technologies is a global leader in executing large-scale, complex IT transformation projects. Its Mode 1-2-3 growth strategy encompasses next-generation IT infrastructure services, leveraging automation, artificial intelligence, analytics and the cloud to build service-oriented, future-ready IT infrastructure for large enterprises.

As one of the first players in the enterprise space to start working with companies to transform IT using cloud as a lever, HCL has experienced first hand the evolution of this powerful technology. A few years ago, cloud transformation was nearly always a tiptoe approach, as organisations learnt about public cloud environments by only moving small workloads at a time in a very iterative process.

Among the first cohort of major UK cloud transformations, in 2015 and 2016, was global media company News Corp, which needed its IT to become less fixed, more agile and consumption-based as its digital revenues increased. Supported by HCL, the

cloud transformation decreased News Corps operational expenditure from £6 million to £3.4 million a year, while server provisioning time reduced from months down to just days and business became more agile.

In the last few years, approaches to cloud have changed, with growing appetite to transform IT at a much faster pace and for the whole enterprise environment. This also means that rather than choosing one hyperscaler's cloud environment, as organisations often did in the early days, companies are increasingly favouring a multi-cloud approach, not only for commercial lock-in reasons, but to ensure workloads are placed where they perform best. Already, 58 per cent of European enterprise IT decision-makers say they use two or more public cloud vendors in their organizations, according to a survey by Forrester (Adoption Profile: Public Cloud In Europe, Q2 2020, European Public Cloud Innovation Continues, by Paul Miller, May 29, 2020).

"While Amazon, Azure and Google Cloud have scaled at a rapid pace, and accumulated lots of capabilities and functionalities, you have to think about what is fit for purpose for different workloads," says Gupta. "As an independent authority that has deployed across all the leading cloud providers, we have a very clear point of view on that."

"We advise our clients on what workloads should go where. Meanwhile, we recognise that enterprises need a single pane of glass when managing a multi-cloud environment. They want less complexity and more simplicity in the way applications are run. We provide that single pane and single orchestration layer, which allows either mobility between different clouds or the ability to manage across multi clouds. Companies get full transparency and the best of what the hyperscalers have to offer."

More recently, HCL has worked with Cadent Gas, the UK's largest gas distribution network, to provide integrated public cloud hosting, SAP and application maintenance services, including the migration of a significant applications portfolio to the AWS public cloud to support

Cadent's business operations, which distributes gas to 11 million homes and businesses in the UK.

"IT is mission critical to Cadent as a business, therefore it is essential we have the highest levels of IT support. At the same time, we recognise the need to modernise our IT environment to increase our business efficiency and the overall productivity of our mobile workforce," says Tina Sands, then-chief information officer at Cadent. "We believe that in HCL we have chosen a partner that has extensive transformational experience and is committed to delivering real business value through the adoption of the latest technologies."

Through its longevity in supporting numerous cloud transformations over the last decade, HCL has gained enormous experience in delivering cloud at scale for enterprises in ways other IT service providers, including many of the small systems integration partners that hyperscalers recommend, often struggle to execute. Sometimes this means stepping in to rescue transformation programmes. Indeed, when a large consumer goods giant was having troubles with a vendor, HCL was brought in to help.

"We were having a lot of pain with IT speed, and HCL came and rescued us. They solved a challenge for us, otherwise we would have been in big trouble with our existing supplier," according to the head of enterprise computing at the company. "HCL took the transition in a very amicable way from that exiting vendor. It's a very customisable relationship; they act like a partner and really want to solve our problems. We are on a journey and HCL is driving that journey for us, with better infrastructure management and cost control as well as cloud adoption."

For more information please visit
hcltech.com

Five foundations of cloud transformation

The cloud undoubtedly provides a flexible foundation that scales elastically. But delivering this on an enterprise scale across multiple businesses and geographies, and in a secure, compliant and cost-efficient way, needs five key sets of specialist expertise.

1 Managing complex organisational change
Adoption of cloud changes internal IT organisation structures, how IT and business collaborate, how charging is done, how skills change and how innovation is supported. This change is complex and not to be underestimated.

2 Creating a coherent multi-cloud environment
This needs to leverage the unique advantages the various hyperscalers bring to the table, requiring not just deep technical expertise in each hyperscaler, but also a layer of understanding on how these can be stitched into a coherent whole through multi-cloud automation.
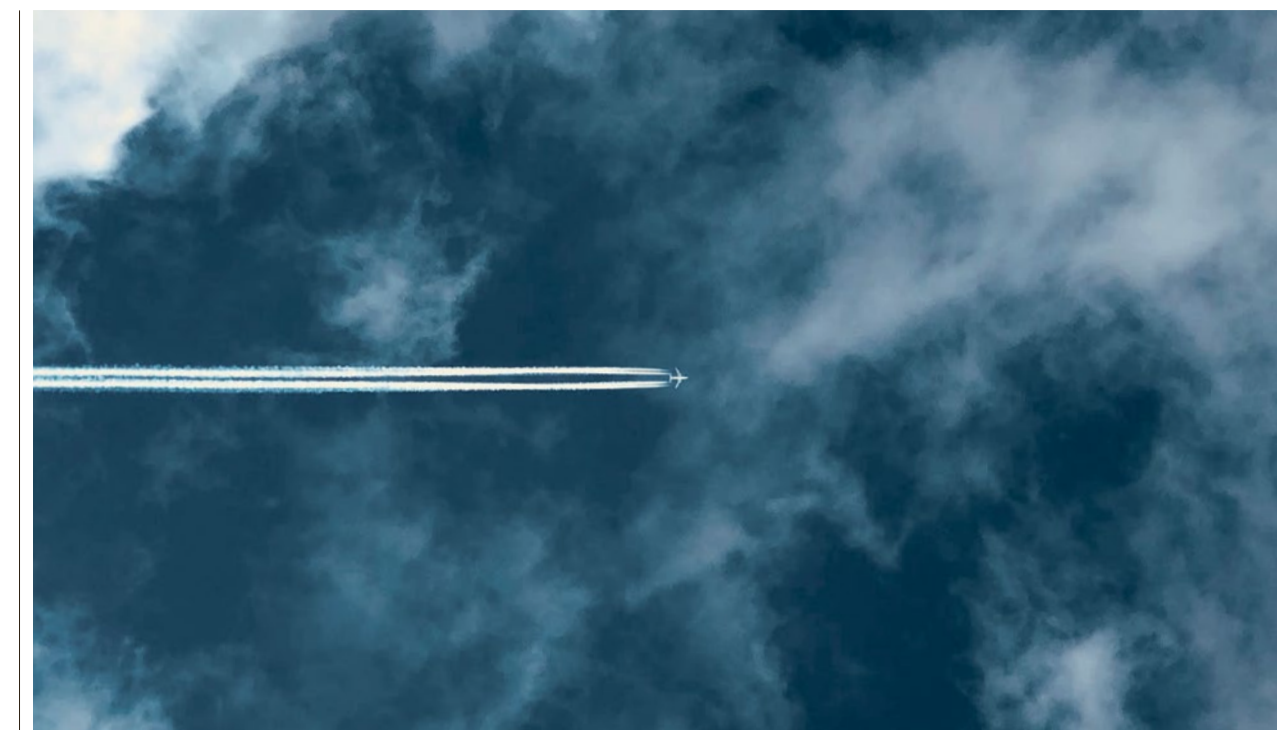
3 Transforming applications and processes that leverage the cloud
This is done in a way that fundamentally transforms how application teams collaborate using a zero-trust and zero-touch approach.

4 Cloud economics
Originally lured by blanket promises of cheaper compute and storage, early adopters were quickly burnt when they racked up bills much higher than they were anticipating. Designing for and managing costs proactively becomes a major competency that enterprises need to learn.

5 Security and resilience
The design of a resilient, always-available service, while being compliant to industry-specific regulations, requires industry compliance maturity coupled with cloud security.

> Cloud enables businesses to reach a level of agility and experimentation that they could never have achieved in the past

HCL

DIGITAL TRANSFORMATION

The dangers of transforming too fast

Coronavirus has doubled or tripled the speed at which businesses around the world are digitally transforming, but a lack of data skills and worker buy-in could trip up efforts before they get started

Marianne Eloise

Never before have businesses, even the most risk averse, had to transform their strategy so rapidly. When the coronavirus pandemic hit in early-2020, businesses had to digitalise fast. With employees shifting to working from home overnight, executives had to find ways to keep their teams working, engaged and productive, while supplying valuable services to their clients, without ever meeting face-to-face.

Businesses that had transformation strategies and plans for adopting digital technology in place had to reassess their approach and those without any digitalisation in place had to get on board doubly fast. This instant adoption of approaches that may have otherwise taken years made old ways of working obsolete.

Accenture's *Technology Vision 2021* report recognises this acceleration and lays out some staggering figures. According to the research, we are seeing unprecedented levels of digital transformation, with leading enterprises compressing a decade of change into just one or two short years. Some 92 per cent of leaders report their organisation is innovating with "an urgency and call to action" and 77 per cent of executives state their technology architecture is becoming "critical to the overall success of their organisation".

Sometimes being forced to evolve is the only way many companies, particularly those set in their ways, were ever going to do so. However, moving too quickly can mean businesses aren't getting the best from their new digital strategies.

The Accenture report explains that digital leaders – the top 10 per cent of companies leading technology innovation – achieve two- to three-fold revenue growth compared to their competitors. They call this chasm the "digital achievement gap". However, it is not enough to transform digitally without recognising and analysing what you're doing and why.

Steven Darrah, chief executive of European Technology Risks, believes that while changing things quickly is exhilarating, it can create unexpected problems in other areas. "When innovating in more traditional sectors, such as insurance or banking, it can take a little while to generate traction, both with service providers and customers," he says, adding that companies need to be aware of customers' reticence to try something new.

It's important to be aware of the disconnect which technology can create too, especially if the transition isn't handled correctly. Service providers may think they are doing a good thing by integrating a new piece of technology, but it can lead to some users feeling unloved and cast aside.

Darrah believes data is the best way to track insights, which can be invaluable when hoping to disrupt a sector. "Data can also tell you when you are going wrong. Even the smallest of changes in the user experience can result in a dramatic dip in sales performance, so analysing the data can keep you on the right track," he says.

Marketing analyst Jo Gordon helps businesses make the best decisions with a data analysis approach of econometrics-marketing mix modelling to measure outcomes. "It is risky to set any new business course without knowing first where you

start and where you think you may land," she says.

Gordon believes data analysis is the clearest way to help business leaders avoid falling flat on the race to evolve. "There is now enough data to analyse and measure the impacts from one company to the next," says Gordon. These differences can be complex, as some effects may be positive for one company, but negative for another.

The boundaries may also shift, whether due to consumer habits adjusting or the impact of long-term lockdowns. "Companies that already had analytics in place are in a much better position to navigate this complexity. They could not better control how they were hit, but they were able to unpick the multiple threads and game-play likely scenarios to minimise uncertainty," she says.

Lua Cooper at digital consultancy Greengage pre-empted these growing pains. "For a long time, we talked about the digital revolution that was coming and the 'future' of work," she says. "We knew we needed to prepare. More often than not, this was a problem to solve tomorrow, for tomorrow's budget and on tomorrow's timeline.

"Last year, digital transformation programmes that were set to roll out across years, were suddenly signed off and speedily rolled out in the days, months and weeks ahead. Working four times as fast, with a fraction of the resources, left room for mistakes to be made."

Cooper references the failure of the NHS Track and Trace database, arguably a notoriously expensive mistake, as emblematic of the drawbacks of transitioning too quickly. "With little
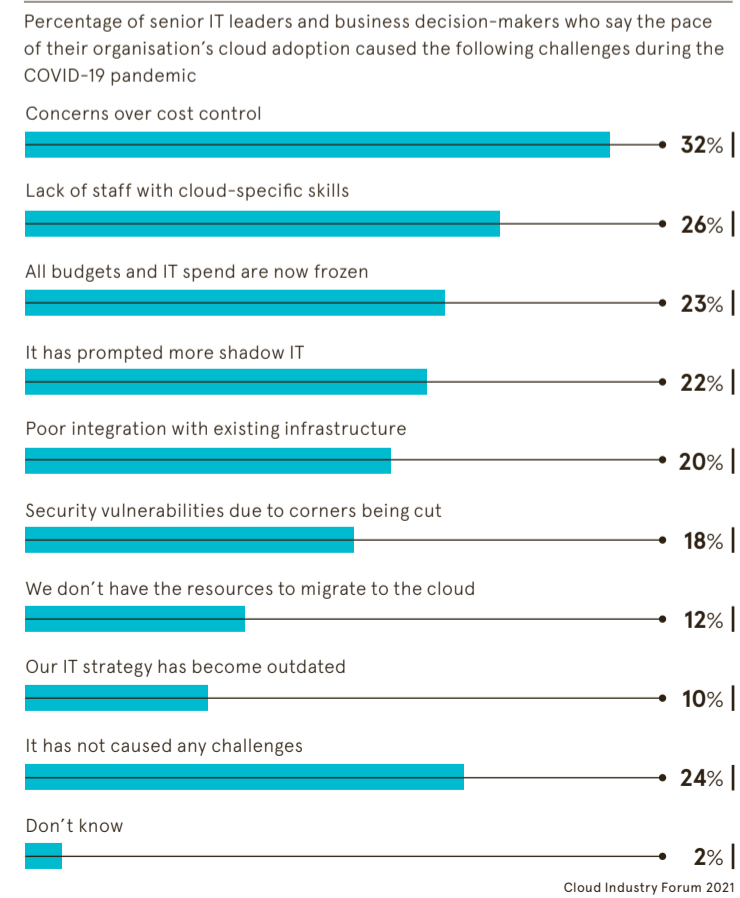
time left for testing, data collection and analysis, the surety of the solutions remain in question, but even more damaging than a bug or two are the rumblings of the lack of staff buy-in and frustration," she says.

The most "expensive misconception" is believing that the term digital transformation relates only to rolling out tech and systems in your company. The reality is far more comprehensive. "It's the complete reimagination of your business in the digital age," says Cooper.

Digital transformation encompasses many key areas: artificial intelligence, new hardware, cloud deployments, remote-working solutions. Data analysis can be an invaluable tool when avoiding pitfalls, but it's important not to forget the humans involved in business, especially at a time when we don't always see them.

"When your teams are not able to handle the changes that come with digital transformation, then you could actually slow down instead of accelerating. You should upskill your teams and, at the same time, update your systems to cope with the changed landscape," say Antonio Marsocci and Sebastian Kraft, managing partner and digital director of Think Positive Agency respectively.

It's also key to prep your clients or find new ones. As your existing clients might be used to finding you on the shelves of their local supermarket or retailer, but now you sell direct to consumers, how do they find you?

Cooper agrees, citing a statistic from the Lloyds Digital Skills Index that notes 52 per cent of the workforce still lack workplace digital skills. This isn't a failure on the part of the individual, but on the employer. Digital moves quickly and employers need to actively train people inside their business to evolve. This has been nearly impossible in a year without face-to-face office-based contact.

"The best tools in the world will gather dust unless they have a team willing to get behind them and work diligently to help optimise them over time. Digital transformation starts with your people; you can implement the tech, but don't forget the people who have to use it," says Cooper.

Digital transformation is both exciting and necessary, but without properly assessing the data and factors, businesses will find they lag behind or encounter damaging pitfalls. The lessons learnt from the last year point to a couple of ways to insure yourself.

One, invest in data analysis to understand the slightest changes to your business, even incremental ones. Two, don't forget the people involved. Even if you move everything to digital processes, your clients, customers and employees are still human beings who need to adapt. Without being taught how to adapt to new ways of working and consuming, they'll fall behind and your business will too. ●

POTENTIAL PITFALLS OF SPEEDY TRANSFORMATION

Percentage of senior IT leaders and business decision-makers who say the pace of their organisation's cloud adoption caused the following challenges during the COVID-19 pandemic

Concerns over cost control	32%
Lack of staff with cloud-specific skills	26%
All budgets and IT spend are now frozen	23%
It has prompted more shadow IT	22%
Poor integration with existing infrastructure	20%
Security vulnerabilities due to corners being cut	18%
We don't have the resources to migrate to the cloud	12%
Our IT strategy has become outdated	10%
It has not caused any challenges	24%
Don't know	2%

Cloud Industry Forum 2021

Why European cloud providers offer superior data security

Can US hyperscalers truly protect the data of their European customers while issues with the CLOUD Act remain unresolved?

It's now three years since the US CLOUD Act was signed into law, but many firms still aren't fully aware of how it affects the security of their data. In simple terms, the CLOUD Act requires US IT service providers to provide data stored or processed outside the United States to US authorities upon request. European firms are also subject to the CLOUD Act if they're a subsidiary of a US cloud or IT service provider, even if headquartered outside of the United States.

Crucially, the CLOUD Act requires US IT service providers to disclose any data in their possession, including customer data.

In other words, if you're currently hosted by a big-three cloud provider and the US government wants to look at your intellectual property or sensitive customer information, that provider will be obliged to hand it over. "That's concerning," says Felix Grundmann, head of cloud product management for IONOS, a leading cloud provider headquartered in Germany.

"For European companies working with US cloud providers, it's unclear if and when data is being retrieved from the servers, what kind of data is being retrieved, to what extent and so on," he explains. "That's because the cloud provider isn't required to notify the European customer that their data was scraped from the platform and handed to a US government agency."

Hosting with a European cloud provider is the easiest way of ensuring your data, and that of your customers, won't be compromised. It also addresses another complication that the CLOUD Act contradicts the

General Data Protection Regulation (GDPR), which protects the data and privacy of EU citizens.

A European business using a US-based cloud provider could wind up caught between both regulations, potentially incurring a hefty fine under the GDPR if data relating to its customers is shared with US agencies.

"The conflict between the CLOUD Act and GDPR leaves room for interpretation and that creates a big problem for the end-customer," says Grundmann. "If a company is hosting its data with a US-based company and its end-customer data is transferred to US agencies, that's in direct conflict with European law.

"There's a lot of discussion going on between the European Union and the US government on how to resolve this issue. But at the moment, it's hard to say in which direction things will go as both sides claim their needs are more important and should therefore take precedence."

His feeling is that there will eventually be concessions on both sides, but until then the uncertainty about which laws companies may be at risk of violating will remain. Thankfully, however, there's an easy way to avoid getting caught up in this transatlantic conflict by using a cloud provider with EU headquarters and datacentres.

Cloud hosting providers Subject to EU law must act in accordance with the GDPR. If they are also exempt from any

association with US companies, there is no danger of being obliged to disclose data under the CLOUD Act. That means their customers have maximum protection from the CLOUD Act and minimum risk of violating the GDPR.

Data encryption would also seem to solve some of the issues associated with the CLOUD Act but, as Grundmann points out, you cannot be certain US authorities wouldn't be able to decode the information somehow. So if you're currently with a hyperscaler headquartered in the United States, can you really say your data is 100 per cent secure?

He believes it's a question European companies can no longer afford to ignore. "Those who aren't with a European cloud provider that has made a point of raising these issues may not be aware of the risks and you don't see US cloud providers saying, 'Here's why your data may not be safe'. But we've been upfront about it because we believe it is important," Grundmann concludes.

For more information on how the CLOUD Act affects your data visit www.ionos.co.uk/cloudact

IONOS

REMOTE WORKING TREND SET TO CONTINUE

Company leader intentions regarding flexible working after COVID-19 (select all that apply)

Let employees work remote some of the time	82%
Let employees work remote all of the time	47%
Flex days	43%
Flex hours	42%
Shortened work weeks (4–10s)	14%
Other	5%
None of the above	6%

Gartner 2020

(vertical credit: Westend61 via Getty Images)

Remote working in the cloud: what's the risk?

Businesses are relying on cloud to maintain operations during the pandemic, but what are the risks and how can they protect themselves from vulnerabilities?

Christine Horton

The cloud has proved a lifeline to many organisations during the coronavirus pandemic. It has enabled a swift transition from office to home working, allowed firms to scale quickly in the switch to digital services and continues to underpin their day-to-day operations. However, one aspect of the cloud continues to cause concern: security.

Forty-one per cent of organisations still believe the office is a safer environment from a cybersecurity perspective, according to research from the Cloud Industry Forum. But what is it about working over the cloud that prompts such concern for organisations? Many of the doubts focus on data loss or a perceived lack of control over their data.

"Many businesses that have held back from adopting the cloud have done so through fear their data could be leaked. This stems from the fact that the cloud is a multi-user environment where multiple resources are shared," says Lisa Ventura, chief executive of the UK Cyber Security Association.

"The basic value proposition of the cloud is it offers near-unlimited storage to everyone. Data is often stored along with other customer's data, leading to potential data breaches via third parties.

'With the use of cloud services such as Google Drive, Microsoft Azure and Dropbox becoming more mainstream, organisations must deal with newer security issues such as the loss of control over sensitive data held."

Some industry experts, however, argue it's not necessarily working over the cloud that heightens the security risk, but because many usually office-based staff are now working from home and therefore outside the security protection their office networks would usually provide.

"The cloud is another evolution in the dissolution of the perimeter. One of the key benefits of cloud is it enables access to critical data from anywhere at any time, but this creates problems for IT as it takes vital data outside their purview," says Ian Pratt, global head of security for personal systems at HP.

Compounding this, the pandemic-driven transition to remote work was hastily enacted by most organisations. Quickly establishing could-based remote working runs the risk of misconfigured software-as-a-service or cloud services.

"Much of the resulting security incidents we have seen are due more to poorly thought-out remote work configurations than cloud usage," says Jim Reavis, chief executive of the Cloud Security Alliance.

There are, however, practical steps companies can take to limit their vulnerability within the new work environment. These include controlling who has access to company data and taking passwords and encryption more seriously.

Cloud encryption is critical for protection, as it allows for data and text to be transformed using encryption algorithms and placed on a storage cloud. Similarly, organisations should implement two-factor or multi-factor authentication, use distinct original passwords and consider passwords with SMS, biometric fingerprint requirements and smartphone access control systems.

But it is just as crucial companies engage their employees in taking cloud and cybersecurity seriously. Technology cannot provide all the answers and employees are the first line of defence against cyberattacks. This is particularly important with phishing attacks currently at an all-time high; across Europe there was a 667 per cent increase in phishing scams in just one month during the pandemic.

"Being aware of what to look for would prevent falling victim to a phishing email," says Ken Roulston, managing director at IT services provider CMI. "While it's not nice from a cultural perspective, you have to operate a zero-trust policy. It's like someone knocking at the front door of your house; you don't always open the door to everyone and you certainly don't let them in unless they are a known and trusted person."

This zero-trust model advocates that no user or system, either inside or outside the cloud, is trusted until they have been verified. Key is deploying a robust cybersecurity awareness training programme that involves the entire organisation.

"When employees are actively involved in protecting company assets, they are more likely to take ownership when it comes to security measures," says Ventura.

However, this is an area still neglected by many organisations, according to a recent study by cybersecurity firm iomart. It found that while almost 20 per cent of firms said they had seen an increase in cyberattacks due to remote working, 70 per cent conceded the business did not currently offer cybersecurity training to all employees.

So, how can organisations approach cybereducation for employees, particularly when in-person training is off the table?

"Although it is more difficult to implement training while employees are working from home, it is not impossible," says Ventura. "Elearning, for example, is particularly useful with a remote workforce. It is scalable and easily deployed to the entire organisation and studies have shown it produces better learning outcomes."

At the same time, the security team will have to play a much more active role, says Amanda Finch, chief executive of the Chartered Institute of Information Security. "Security teams need completely new skills, not only technical abilities, but the 'soft' skills necessary to engage and manage their co-workers, teach them the risks and how to reduce them, and act as a coach or mentor for those who will need a guiding hand to begin with," she says.

With nearly half of companies saying they intend in future to allow employees to work remotely full time, it is crucial they not only deploy technologies to protect them in the cloud, but also develop a culture of awareness and reporting within the workforce to help defend staff from cloud-based threats. ●

> **When employees are actively involved in protecting company assets, they are more likely to take ownership when it comes to security measures**

Race to the cloud puts businesses at risk

Rushing to remote working at the start of the pandemic may have jeopardised companies' cybersecurity, but now is the time to reset for the long term

During the coronavirus pandemic, the notion of cloud has transformed from being a panicked race to adoption, to a more introspective and sustainable consideration for the long term. Consistent across the two approaches, however, is the question of how to make this transition securely and successfully.

Despite the constant media buzz around cloud adoption, it probably isn't as rife as you've been led to believe. As revealed in a recent keynote delivered by AWS chief executive Andy Jassy, only 4 per cent of IT investment is currently being channelled towards cloud migrations, highlighting a discussion which has traditionally been dominated by intent, rather than actual investment.

"As you might expect, the pandemic has changed that narrative quite quickly and severely," says Neil Christie, chief operating officer at cloud solutions provider iomart. "The race to adoption at the beginning of lockdown revolved around remote working and businesses needing to ensure workers could access data that was previously only available to them through the network in the office.

"In a lot of cases, this meant the usual levels of due diligence and consideration had to be abandoned by necessity because of the more immediate need to deliver operational readiness."

For more than 20 years, iomart has followed and guided the evolution of the internet and companies' relationships with all aspects of that loaded term "digital transformation". However, the past 12 months has been unlike any other step-change, with prospective clients realising in the space of less than a year that an accelerated, often under-thought, overhaul isn't the best way to progress.

"Business leaders are now reviewing their decisions and considering the longevity of the choices they've made. Now is the time to reflect and plot the next stages of their cloud journey much more deliberately," Christie adds.

Peeling the onion of cybersecurity

This is where much of iomart's focus has been targeted over the past year, helping clients think more strategically and methodically about where their data lies, who needs to access it, where they should access it from and, vitally, what safeguards are in place for this now-disparate device and user footprint.

"There are a lot of conversations happening about how data in off-site locations can be safeguarded, from both an accessibility and storage standpoint," says Christie.

Chief among these considerations is cybersecurity. Sadly, a global health crisis hasn't been enough to dissuade cybercriminals from attacking vulnerable people and businesses. Rather, it's been a red rag to a bull, to see so many employees forced into uncertain siloed operations.

"The lines have been blurred between personal and business use when it comes to their devices," Christie explains. "It's totally understandable; this is not just working remotely, but trying to work from home while juggling childcare, home schooling and the additional burdens the pandemic has brought.

"This change in behaviour patterns, particularly in a busy home, makes the corporate environment more vulnerable to a security breach. Consultation and guidance around security matters should now take precedence as remote working is going to play a much bigger part in the life of every business."

With each customer, iomart takes an "onion-layer" approach to digital protection. This begins with the organisation's users and devices that are outside the network, before peeling away at more technical elements, such as access to the network, gateway firewalls and the server or cloud environment. Deeper down comes the applications and that's where much of the sensitive data lies.

"Not only do we work through these layers methodically, but we do so in a way that outlines what each protective step means for the business and their employees," Christie continues. "We've conducted a YouGov survey in recent weeks, which has highlighted the risks that can result from seemingly innocuous everyday behaviours in the home.

"Often they're based on basic security hygiene like device sharing within families, using common passwords across multiple systems, the blurring of personal and work devices, the access given to certain applications or social media habits."

Companies aren't just responsible for their own administrative data, they also play host to sensitive information pertaining to employees, partners, suppliers, customers and even customers of customers. While the cloud offers a way to store and safeguard such data, an uninformed leap into its arms is likely to skip vital steps and put this information at risk of attack.

'What does transformation mean to me?'

Slowing down transformation allows for closer auditing of a business's current situation, their ambitions and the best way to get from the former to the latter.

In iomart's case, this auditing then continues almost on a daily basis, analysing the trajectory of a company's digital transformation and the significant elements entailed, such as cybersecurity.

"Historically, these reflections and audits take place every few months to gauge progress, but I think the past year has proved that a lot can happen in such a short space of time. More companies are realising that a potential breach or pitfall at any stage could be catastrophic."

"This penny does seem to be dropping as we enter 2021," says Christie. "Conversations have shifted mindsets. The focus is now on thinking about what change means in the long term."

Taking the long view was integral for the National Lottery Community Fund, which recently completed a strategic transformation with iomart's help. With consideration given to the way staff needed to work, coupled with a focus on security and connectivity, the fund was able to deliver more than £650 million of National Lottery funding during the pandemic in 2020.

Matthew Green, the organisation's technology and data director, says: "In two short years, we enabled the fund to be truly embedded within the communities we serve.

"Comprehensive engagement, careful planning and effective partnering has enabled all our colleagues to communicate, collaborate and share information securely within and beyond our digitally enabled organisation."

Safeguarding digital futures

The notion of software as a service is nothing new and businesses will hopefully now be turning to prospective managed service providers off the back of sustainable consideration rather than impulse and fear.

The security discussion demonstrates this journey perhaps better than any other, as it illustrates the jeopardy thrust upon companies this time last year, the initial panic that ensued and now the opportunity to reset for the long term.

"Remote working isn't going anywhere," Christie concludes, "so it makes sense to ask questions, do due diligence and to make digital transformation a process rather than a race."

In essence, by taking these considered steps and by working through each layer of the onion, companies can safeguard their cloud adoption, cybersecurity and wider digital roadmaps, simultaneously.

> **Cloud protects your data but an uninformed leap into its arms puts you at risk**

iomart

CYBER RISK IN THE UK'S VIRTUAL OFFICES

25% of those surveyed allowed children to use their work device

74% of those surveyed don't use different passwords for everything

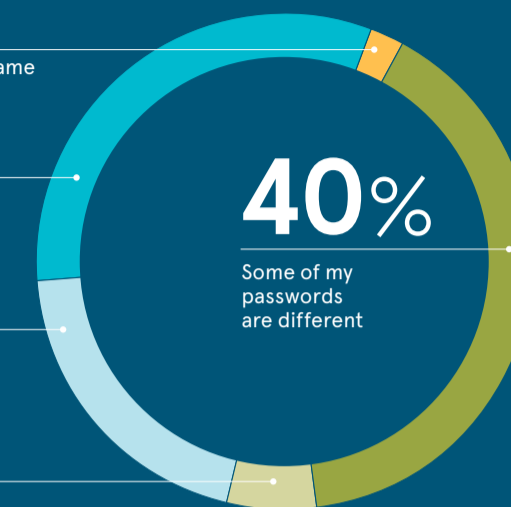**70%** of respondents said they can access social media on their work devices

THINKING ABOUT YOUR PASSWORD USE – WHICH ONE OF THE FOLLOWING STATEMENTS BEST APPLIES TO YOU?
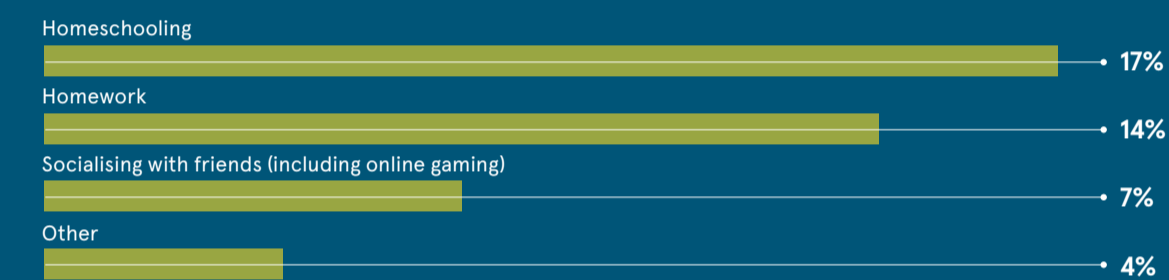
- **2%** My passwords are all the same
- **32%** Most of my passwords are different
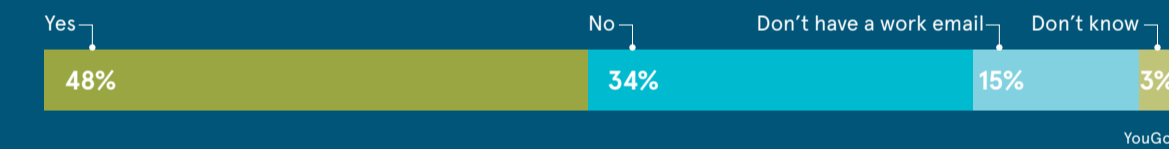- **20%** All my passwords are different
- **6%** Prefer not to say
- **40%** Some of my passwords are different

IF APPLICABLE, FOR WHAT REASONS DO YOUR CHILDREN USE YOUR WORK DEVICE(S)?

Homeschooling	17%
Homework	14%
Socialising with friends (including online gaming)	7%
Other	4%

ARE YOU ABLE TO ACCESS YOUR WORK EMAIL ACCOUNT ON YOUR NON-WORK DEVICES?

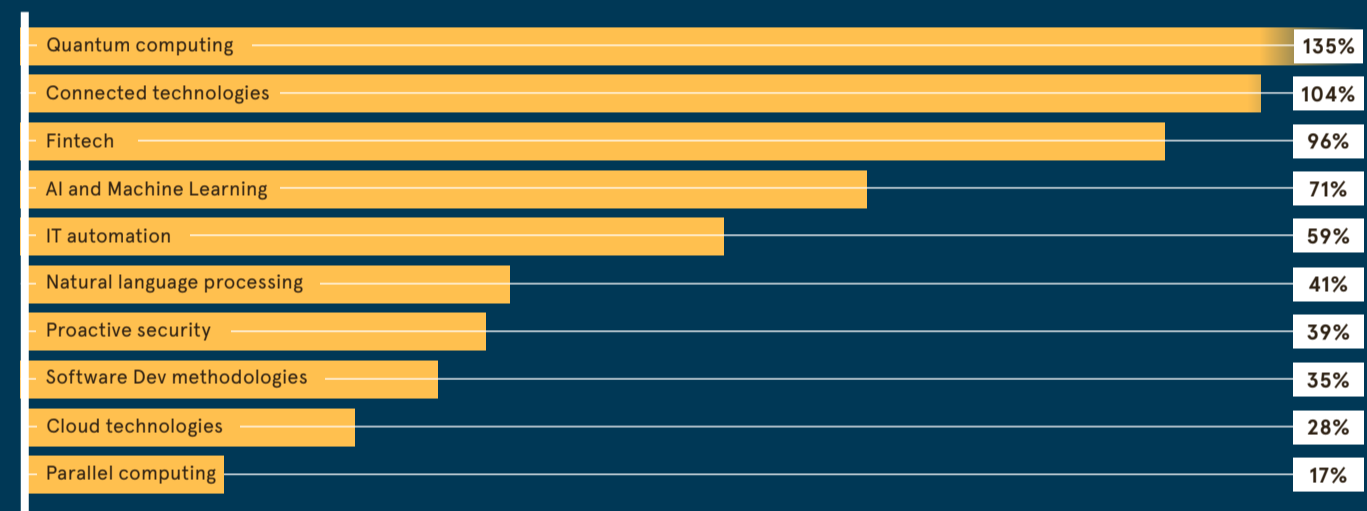| Yes	No	Don't have a work email	Don't know
48%	34%	15%	3%

YouGov

SEARCHING FOR
CLOUD SKILLS

2020 made it clear that few businesses can survive without having a savvy cloud strategy in place. Carrying out a cloud strategy, however, requires a range of specialist tech skills, from artificial intelligence to IT automation, and in many cases demand far outstrips supply

TOP TECH SKILLS IN DEMAND

The fastest-growing tech job skills in North America over the next five years
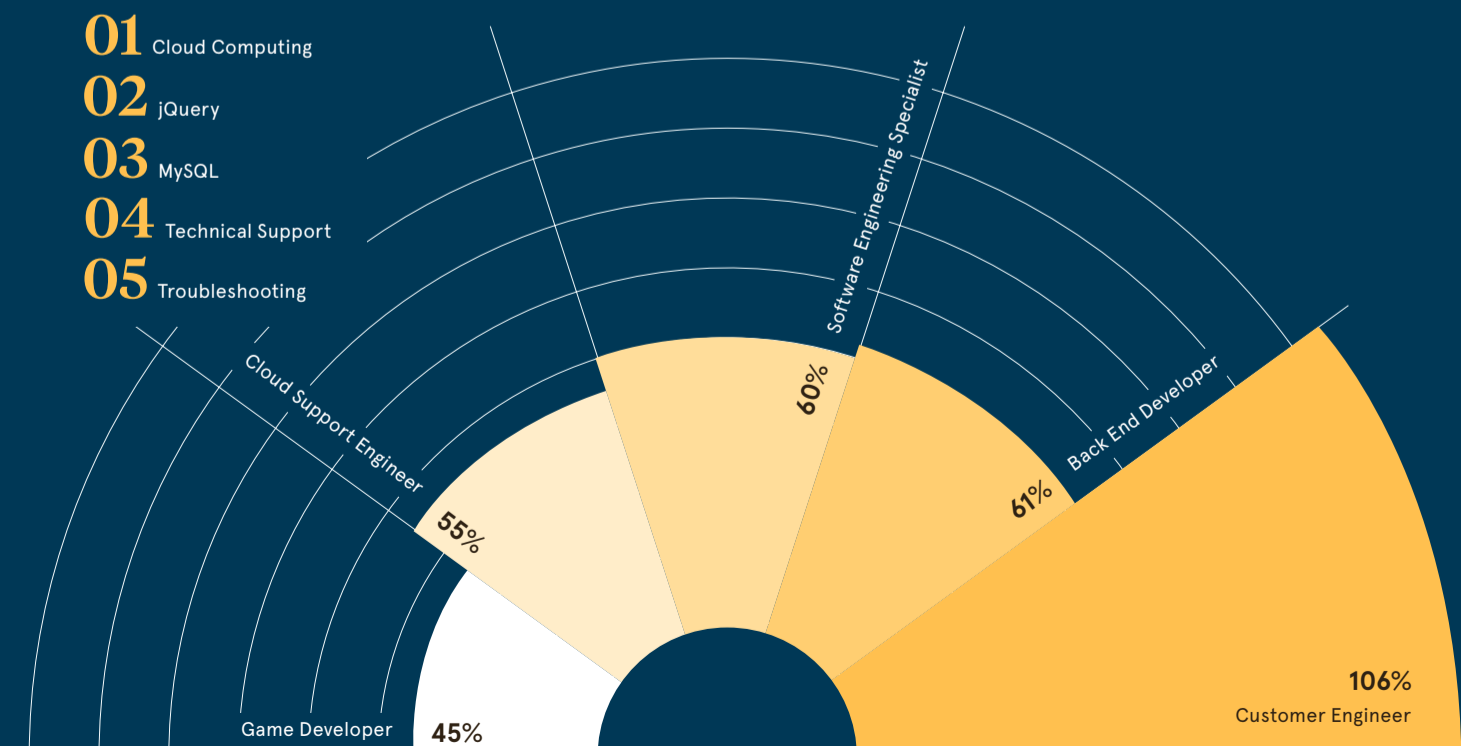
Skill	%
Quantum computing	135%
Connected technologies	104%
Fintech	96%
AI and Machine Learning	71%
IT automation	59%
Natural language processing	41%
Proactive security	39%
Software Dev methodologies	35%
Cloud technologies	28%
Parallel computing	17%

Forbes and Burning Glass 2020

TOP 5 CORE SKILLS TECHNICAL ROLES WILL NEED

01 Cloud Computing
02 jQuery
03 MySQL
04 Technical Support
05 Troubleshooting

CLOUD JOBS ARE MORE IN-DEMAND THAN EVER

The fastest growing jobs under the umbrella of "specialized engineering" on LinkedIn year-on-year

- Software Engineering Specialist 60%
- Cloud Support Engineer 55%
- Back End Developer 61%
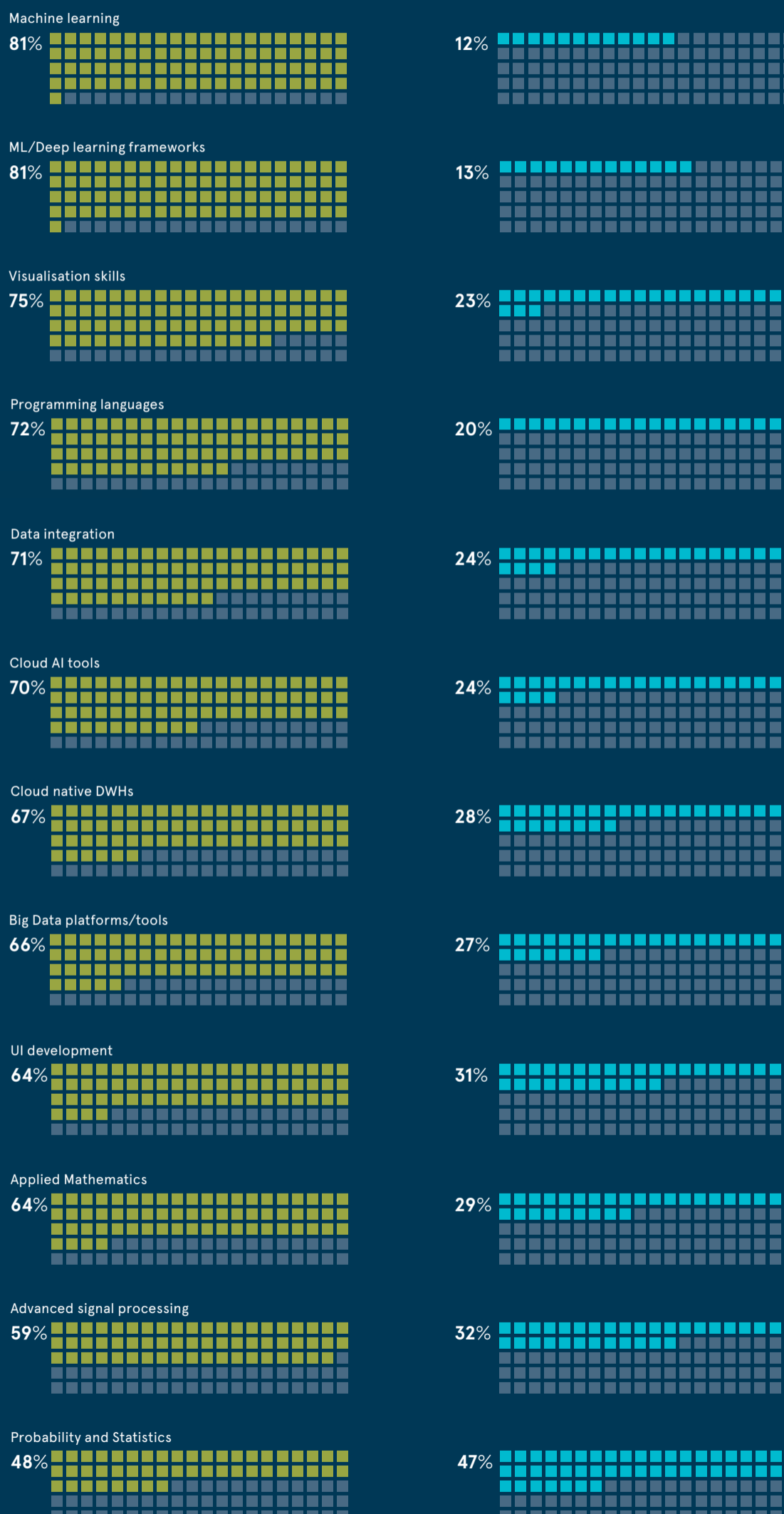- Game Developer 45%
- Customer Engineer 106%

LinkedIn 2021

CLOUD SKILLS CRUCIAL FOR AI DEVELOPMENT

Demand and supply for AI-related skills in large enterprises worldwide

● Demand is high   ● Supply is adequate

Skill	Demand	Supply
Machine learning	81%	12%
ML/Deep learning frameworks	81%	13%
Visualisation skills	75%	23%
Programming languages	72%	20%
Data integration	71%	24%
Cloud AI tools	70%	24%
Cloud native DWHs	67%	28%
Big Data platforms/tools	66%	27%
UI development	64%	31%
Applied Mathematics	64%	29%
Advanced signal processing	59%	32%
Probability and Statistics	48%	47%

Capgemini 2020

PUBLIC SECTOR SKILLS STRUGGLES

Percentage of UK public sector workers who agree with the statement: "my organisation lacks the skills to manage cloud native applications."

● Strongly agree   ● Somewhat agree
⊘ Neither agree nor disagree   ● Somewhat disagree   ● Strongly disagree

- 36%
- 2%
- 42%
- 13%
- 7%
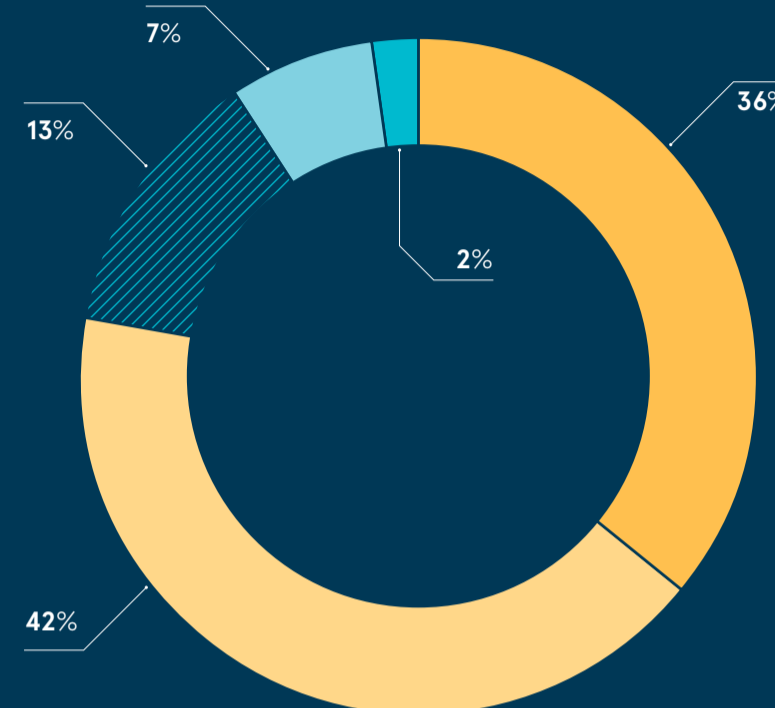
UKCloud 2020

CLOUD CONFUSION REIGNS AT THE EDGE

Global enterprises cite the top challenges they face, or expect to face, when it comes to implementing edge computing

Challenge	%
Implementation complexity	29%
Risk that data will be lost or compromised	26%
Regulatory compliance concerns	24%
Complexity — it is more complex or harder to use than anyone expected	23%
Lack of established migration tools and processes	20%
Risk that remote systems will be compromised	19%
Staff does not have the appropriate skills or training	18%
Understanding what edge computing is	18%
Lack of standards	17%
Technology "learning curve" is too steep	17%

Gartner 2020

HOW MUCH ORGANISATIONS ARE SHELLING OUT FOR CLOUD EXPERTISE

Average salary of cloud computing experts in the US (in 1000 US dollars)

Role	Salary
Senior solutions architect	141
Enterprise architect, IT	140
Cloud solutions architect	128
Solutions architect	126
Information technology architect	123
Senior systems engineer	111
Development operations engineer	100
Software engineer	100
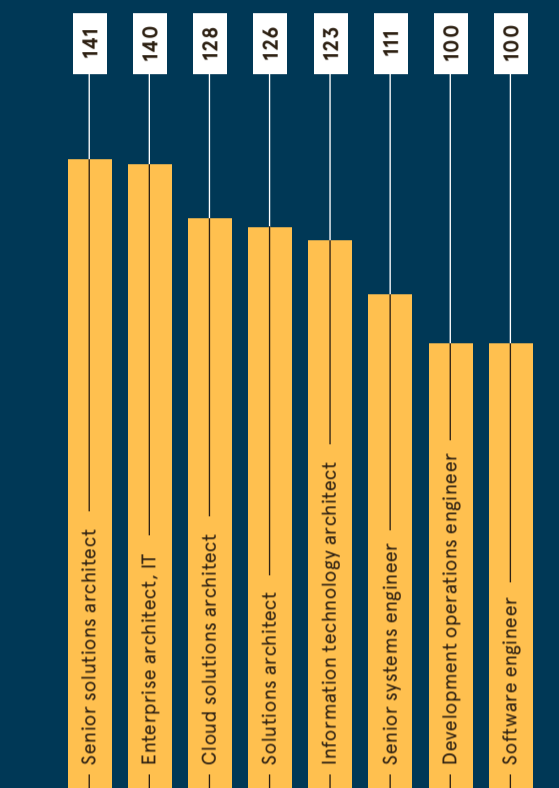
Payscale 2021

SKILLS SHORTAGE TAXES BUSINESSES

Global business leaders cite the most pressing operational challenges they have when it comes to working in a multicloud environment
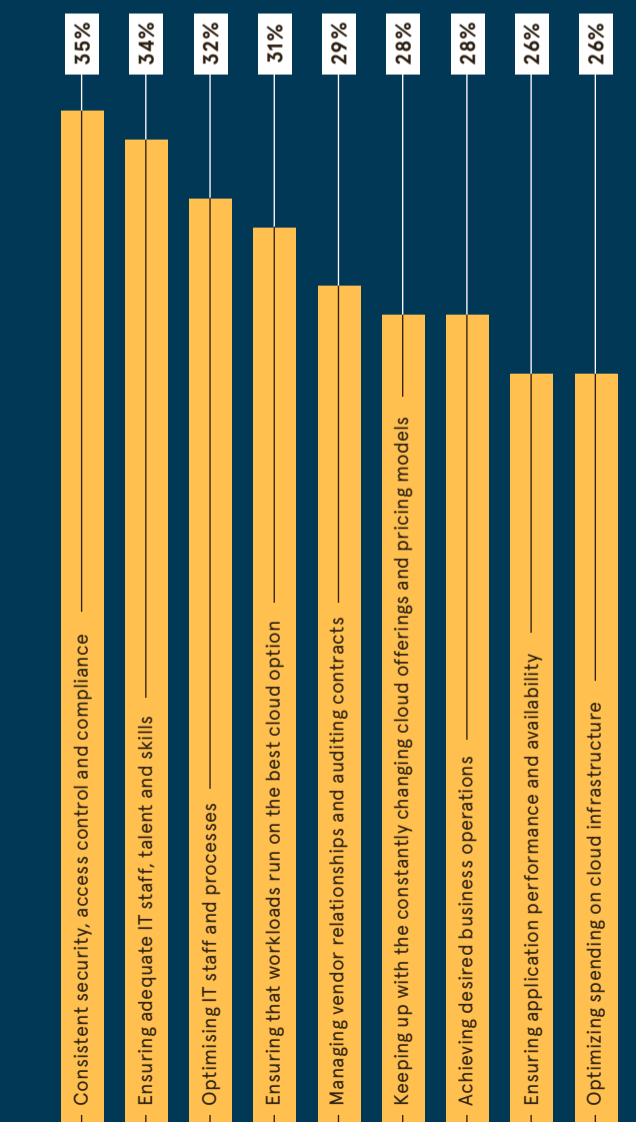
Challenge	%
Consistent security, access control and compliance	35%
Ensuring adequate IT staff, talent and skills	34%
Optimising IT staff and processes	32%
Ensuring that workloads run on the best cloud option	31%
Managing vendor relationships and auditing contracts	29%
Keeping up with the constantly changing cloud offerings and pricing models	28%
Achieving desired business operations	28%
Ensuring application performance and availability	26%
Optimizing spending on cloud infrastructure	26%

IBM 2020

How the cloud is streamlining urban life

A city will tell you when it's about to break down if you just let it, because when it comes to data, a problem shared is a problem solved

Andy Jones

Big city life isn't always business-friendly. Broken escalators cause delays in railway stations, faulty trains mean meetings are cancelled and failing broadband wrecks important contacts. If businesses could see when problems were about to occur, they could work around them. But what if the city itself was able to foresee snarl-ups and stop them in advance?

Cloud software is giving smart cities that capability, enabling administrators to see through walls and predict the future when it comes to daily city life. The same cloud tech can also help a business run transparently and remotely, whether it be a sandwich factory or an accountancy office.

Smart cities, like Nava Raipur in India, are now so advanced they can provide digital 3D modelling of the entire city, enabling forensic analysis of problems before they occur. In Barcelona, escalator failures are avoided because a central data system can spot that a unit is overused or progressively slowing down, or that the water pipe leading to an ornamental fountain is starting to vibrate under increased pressure. With all these pieces of interlinked data stored on the cloud, city administrators can see and assess them instantaneously.

In Mexico, a network of 13,000 cloud-based cameras, installed by Eagle Eye Networks, not only spots crimes unfolding, but helps emergency services navigate traffic congestion as well as issue early-warning messages to citizens.

During the coronavirus pandemic, the same camera system now assists post-lockdown offices. As staff move through a screening area, the cameras take their temperature and notify human resources by email if an individual's temperature is too high. Notifications are delivered along with an image of the person, the temperature detected, as well as the name and location of the camera that detected the high temperature. COVID or the flu stays at the door.

Smart cities' power is in their shared control, says Ravi Gopinath, chief cloud officer at AVEVA, who have provided the software for smart projects in Nava Raipur and Bremen, Germany. Ten years ago, he says, a control room operator would manually monitor utilities, but you would have "islanded systems" that worked opaquely or even against each other.

"You'd have one product which tracked when the next bus is coming or what car park is full, allowing you to plan a journey. But these systems were not interlinked," he says. "What cloud technology does is bring every objective and tool together, from maintenance to sustainability, under one dashboard that is consumable by governor and citizen alike, constantly improving and reinventing itself."

In the future, each citizen will use the city cloud to smooth their passage through daily life, with data from each journey feeding back to the city itself. "You will be able to see if there is a relatively empty bus coming just after this one," says Gopinath. "But, on the reverse, administrators can see how much a bus is used, how late it is and how much fuel it is using."

Cloud software provides a viewable "city in a box" for administrators, a 365-degree picture that allows complete accountability, says Sayaji Shinde, a smart city consultant who has overseen more than twenty smart city projects in the past ten years, including in Da Nang, Vietnam, and Davao City in the Philippines.
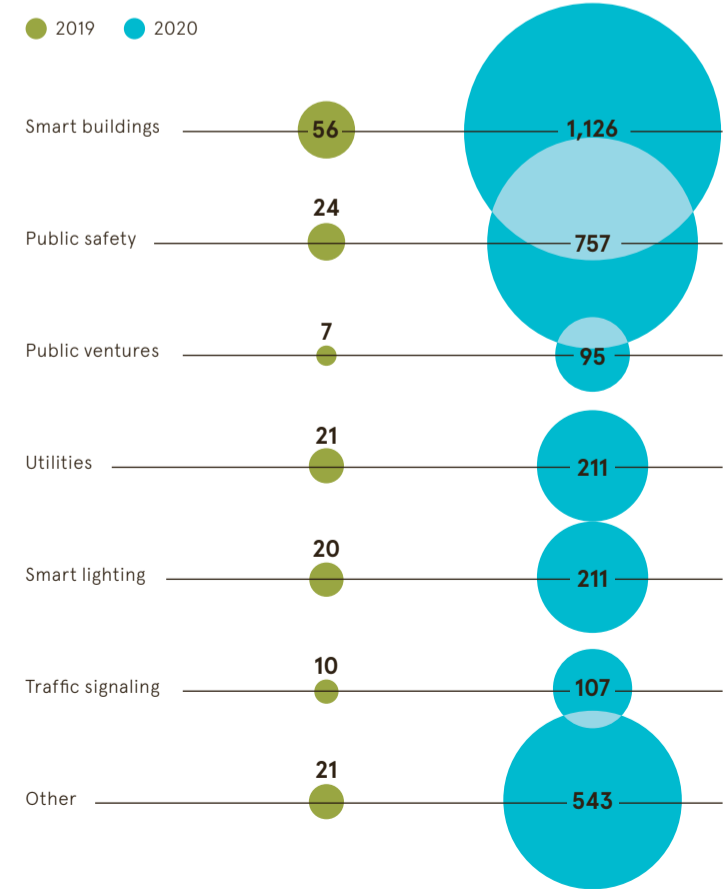
"With the cloud visible by all, officials and administrators can no longer pass the buck or blame budgets because every process, performance and penny is accounted for," he says.

This transparency is demonstrated by the Swedish university

> **With the cloud visible by all, officials and administrators can no longer pass the buck or blame budgets because every process, performance and penny is accounted for**

city of Umeå. The city had set public climate change goals and, in a bid to reduce carbon emissions, had been investing in cycle lanes with some success. When this success plateaued, the cloud software that tracked city emissions showed exactly why.

ClimateView is a cloud-based tool to track local climate change, helping cities that have climate goals, but no idea how to reach them. Every piece of environment and emissions data for participating cities, including Cambridge, Mannheim in Germany, and La Palma in the Canary Islands, is cloud-accessible for all citizens to see impacts and results.

Data from ClimateView revealed Umeå had reached peak mass with cycle lanes and commuters who didn't cycle needed another green alternative. Umeå's planners realised new electric buses would have a greater impact both environmentally and economically than more cycle lanes.

"Previously every piece of climate data and emission indicator was kept on separate spreadsheets and manually inputted," says Erik Eklund, Umeå's environment and energy officer. "To get a complete view you would have to speak to multiple departments. Cloud software changed that."

Publication of Umeå's data prompted collaboration with another Swedish city, Eskilstuna. "Even large local companies like Volvo, ABB and Metso are now able to get involved with our climate goals seamlessly," says Eklund.

Tomer Shalit, creator of ClimateView, says hosting entirely on the cloud allows you to "compare apples with apples" without suffering death by data. "You get clarity of reasoning, develop stringent models for future planning, and waste less money and less resources. Promises cannot be hidden behind," he says.

Archaic mixed technologies are rapidly being brought under one system, says Gopinath of AVEVA. "In yesterday's offices, underlying systems needed their own server and infrastructure, but by using cloud the cost of ownership of the software comes down as well as improving the security, as all updates and security are done centrally. Not only do you get more varied useful data, you control the governance of that data," he concludes. ●

> **What cloud technology does is bring every objective and tool together, from maintenance to sustainability**

WHAT DOES IT TAKE TO POWER A SMART CITY?

The global IT power footprint from edge cloud computing powering smart cities (in megawatts)

● 2019   ● 2020

	2019	2020
Smart buildings	56	1,126
Public safety	24	757
Public ventures	7	95
Utilities	21	211
Smart lighting	20	211
Traffic signaling	10	107
Other	21	543

Statista 2020

'The UK's competitive and vibrant cloud computing industry stands ready, willing and able to support businesses'

A year ago, at the beginning of the coronavirus pandemic, techUK published an article about how the UK cloud computing industry was ready, willing and able to support UK organisations' switch to remote working. We highlighted the scalability the cloud provides, reliable connectivity and that the cloud has been supporting the UK workforce to become more mobile and capable to embrace new ways of working for many years.

Now, as we reflect on the last 12 months, what is clear is, during the pandemic, cloud computing has played a vital role in keeping businesses going, supporting us all to remain digitally connected while we have been, and for now at least remain, physically apart.

Cloud has provided vital support to public and private sector organisations that needed to increase data processing and management capabilities at speed, helping bodies to access real-time data when it was most needed.

Both global organisations and small and medium-sized enterprises supplying cloud services have increased their operations seemingly overnight, providing essential computing resources, infrastructure and data-storage solutions in a safe and secure way to a nation switching to remote working.

In the weeks and months ahead, as the focus for businesses turns to how to rebuild and recover from the pandemic, what is also becoming clear is the important role the cloud will have in supporting UK companies as the economy and society begin to reopen and the crucial post-COVID recovery begins.

The good news is we saw a significant increase in digital transformation by organisations in 2020. Part of the digital transformation seen in the UK has been due to an increase in investment and adoption of cloud-based services and technologies, not just by businesses already using the cloud, but also by smaller companies that had still not started their cloud journey.

Organisations that were still perhaps thinking about digital transformation due to understanding, skills and knowledge, accelerated their plans and invested particularly in cloud to keep their operations going.

What this means now is more UK businesses can access computing services, power and resources that will enable them to be agile and responsive to changes in the market and consumer habits and trends. By investing, adopting and deploying cloud services and technologies last year, organisations will have put in place the digital infrastructure that can support the use of more cutting-edge digital innovations such as intelligent automation, edge computing and artificial intelligence as and when they are ready.

Right now, business leaders who invested in cloud last year will be asking how this can help them move forward, recover quicker and perhaps even reinvent their operations, and, by doing so, leapfrog the competition in months ahead.

Just as we saw at the start of the pandemic, the UK's competitive and vibrant cloud computing industry stands ready, willing and able to support UK businesses in this mission.

However, with organisations' use of cloud computing services expected to develop and mature at pace, it is important that the increased use of cloud is done in a safe and secure way. This is essential, given that just as the use of cloud computing has increased in 2020, so have the cybersecurity risks and the complexity of attacks focused on cloud services.

This is why in the coming weeks techUK will publish a guide to offer information, advice and support to business leaders looking to increase and scale up their use of cloud services, as part of their post-COVID recovery strategy, in a secure and safe way. Please visit our website to get in touch and get involved. ●

Julian David
Chief executive
techUK

TOP TIPS

Six lessons from a year in the cloud

When the coronavirus pandemic forced UK businesses and public services into a series of lockdowns over the past year, digital technologies in the cloud enabled organisations to continue operating. Here, companies with differing levels of experience of using the cloud name their key takeaways

Helen Beckett

1

Do the basics and then improve

At the outset of the pandemic, Gloucestershire Hospitals NHS Foundation Trust decided to accelerate its tentative use of cloud computing. First, a secure, encrypted virtual desktop was launched to support more than 1,000 staff working from home and satisfy strict governance. Shifting clinical applications like e-observations called for a longer conversation.

"We pushed ahead and harvested massive benefits," says Stephen Hardy, associate chief information officer at the trust. Clinicians working from home and consultants in situ could view observations of patients at any hospital to identify deteriorating patients and remotely escalate treatment. The contactless, and safe, aspect of e-observations was added collateral.

Looking back over a gruelling year, the biggest lesson is to exploit the cloud's scalability, to take small steps and to iterate, says Hardy. "With a 'big bang' implementation, the planning takes ages. With the cloud, it's easier to focus on one area and then iterate. You do the basics and then finesse over the year." Lesson two, says Hardy, is not to reinvent every wheel just because you have the cloud. Telephone consultations are practical and adequate in many scenarios.

The trust has started a Silver Linings programme, which identifies innovations that will be kept and enhanced post-COVID-19. "We'll have a lot more of the workforce working remotely; the flexibility means better staff retention. E-methods for clinical services are here to stay. We're moving towards a single portal that a clinician can log on to and see everything we know about a patient," says Hardy.

> ❝
> With a 'big bang' implementation, the planning takes ages. With the cloud, it's easier to focus on one area and then iterate

2

Make support flexible

Independent UK law firm Burges Salmon found the biggest lesson learnt when the firm accelerated a nascent cloud migration was to make support a priority. "Given what people have been through and dealt with in the past 12 months, one stress we can take away is the anxiety of technology not working. We can give our people the comfort of having the tools to do their job," says Eddie Twemlow, Burges Salmon's head of IT and operations.

Twemlow increased the size of the service desk team to ensure staff always had access to support when working from home. "Pre-COVID, there were always colleagues around to offer support. Once at home, this was removed in an instant and staff often worked irregular hours, too, fitting work around home schooling," he says.

To ramp up support fast, staff were relocated into the support team. Receptionists who weren't needed to meet and greet, and personal assistants made the adaptation. The organisation, as well as the technology, had to be flexible. Twemlow says: "It showed we were committed to looking after our staff; some of those people have permanently moved to the Technology team."

The company has a strong collegiate culture and functions such as the AGM and socials were also continued virtually by using collaborative tools provisioned by the cloud. Work capabilities, such as virtual hearings and video conferencing for trial presentation, were rolled out faster too. "Largely, though, the cloud programme held true," says Twemlow.

3

Design digital touchpoints into the day

For a company adept at software and accustomed to running its GPS tracking business from the AWS cloud, the pandemic lesson learnt by RAM Tracking was how to acclimatise culturally. With all staff working remotely and disparately, "we realised more had to be done around creating regular contact, scheduling meetings with management and retaining watercooler conversations," says Scott Chesworth, RAM Tracking operations director.

However seamless and performant the cloud, and sophisticated its dashboards, people can't work in isolation. "Our staff needed regular touchpoints on a daily basis to keep morale strong. We have to retain the human touch in interactions. You can achieve a lot through video conferencing, but a couple of touchpoints need to be designed into the working day to have a chinwag," he says.

4

Take a business-led approach

For Calico, a not-for-profit organisation in the north-west of England that provides housing, women's refuges, and drug and alcohol treatment services, the pandemic provided a massive push to the cloud. "We'd already engaged with BCN Group about delivering a [cloud-based] Microsoft 365 suite in the future. Then COVID happened and we had to up our game," says Anne-Marie Thornley, head of ICT at Calico.

IT had previously taken a backseat at an organisation dedicated to delivering front-line services. "Suddenly we had to change the mindset of individuals and management to provide access to robust and secure collaboration tools," says Thornley. The lesson is to be more business-led. Previously projects had been IT-led. This time the project was led by the executive and wasn't something IT was "doing" to the organisation.

The bonus of this approach is many staff embraced new ways of working, especially those who'd been less confident. "They have a lot more tools in their box to connect and collaborate with customers in new ways," says Thornley.

Deliver products that meet customers' needs

Recognise Bank launched in November in the middle of the pandemic, a bold move driven by the "chronic under-serving of the small and medium-sized enterprise (SME) community". So says Jason Oakley, founder and chief executive of Recognise and former head of commercial banking at Metro Bank. His proposition is relationship-led banking that's digitally enabled. Making the launch possible during the pandemic restrictions was nCino cloud technology.

Recognise Bank was licensed in November, but has already learnt lessons when it comes to delivering on its proposition of trusted adviser. "A pandemic changes the way you onboard clients; we've developed virtual onboarding over Teams or Zoom," says Oakley. Recognise has also changed the way it instructs valuers and lawyers to fast-track loans and streamline esignatures. "It's about convenience and touchless, remote trading, and the cloud caters to that," he says. "It motivates me to harness cloud technology to improve user experience for the SME."

Cloud technology speeds up products that cater to customers' changing needs. And, with the vaccination programme going well, businesses need a route out of the pandemic and that means access to working capital. "They have to rejuvenate and get going," says Oakley.

5

Pitch user experience, not performance

Prior to the pandemic, it had been a struggle to transform the University of Reading from an on-premises IT operation to a cloud-enabled organisation. Significantly, there was a barrier in procurement embracing the capital-expenditure versus operating-expenditure model and the big discounts on software licences available to higher education institutions were holding the university hostage. For IT, the challenge was to establish the necessary governance that would make cloud solutions economically viable.

COVID cut through a three-year hiatus. Frame, a virtual desktop from Nutanix, was deployed to every employee, delivering a secure bundle of collaboration and office tools accessible from their home device. Kevin Mortimer, head of operations at the university, says the big lesson learnt has been to pitch IT differently. "Previously we'd focused on performance and efficiency instead of the user experience people are consuming," he says.

"COVID's been an opportunity to change how the organisation works. Frame makes peoples' lives easier and the cloud has reset our university landscape." ●

6

Modernisation powers agility and innovation

In a business environment where organisations need to adapt and innovate at speed, cloud modernisation is a fundamental enabler to achieving the agility to remain on the front foot

The rapid pace of innovation in recent years, accelerated further by the coronavirus pandemic, has made agility an essential currency for thriving and surviving in the digital age. To eradicate the legacy preventing them from adapting to change at the same pace as natively agile startups, organisations are embracing development and deployment methods.

Modern technologies not only enable agility and cost reductions compared with legacy infrastructure, but also the ability to innovate without barriers and fail fast, which is a crucial facet of gaining competitive advantage. Supported by powerful architectures and development approaches, such as microservices, automation, and continuous integration and continuous delivery, or CICD, it is much easier to experiment and deploy new features.

"Legacy systems lack that agility since they involve, in most cases, one big monolithic application that has been developed over ten or fifteen years," says Rafał Jasiński, senior business analyst at IT service provider PGS Software. "It's big, it's complex and therefore it takes time to build something new and test it. Time to market can take six months or more; with a modernised approach, we can reduce this to as little as three weeks."

While the benefits are clear, the modernisation journey isn't necessarily a smooth one. According to McKinsey research, 70 per cent of digital transformations fail, often because companies are not specialised in cloud migrations and integrations. Those that do succeed typically lean on partners with the expertise in modernising infrastructure.

PGS Software is one such partner, with expertise and services stretching across cloud computing, transformation and data science, including business analysis, user experience and quality assurance. Through its software development services, which are crafted to the needs of each client, PGS Software converts ideas companies have into quality IT solutions.

"We support clients through the whole journey," says Jasiński. "We assist in carefully planning modernisation and migration, rearchitecting solutions and decomposing into microservices or other cloud-native solutions like serverless. Crucially, our teams help clients to build new products and features, all the while allowing them to learn from us as cloud specialists, and therefore become cloud experts themselves through that process."

When AIXBRO, a leading supplier of automotive parts, wanted to improve its online database and search functionality, it turned to PGS Software to build a new prototype in the cloud. An AWS Managed Services deployment enabled AIXBRO to accelerate inventory management by 960 times, from taking up to 80 hours to populate around half a million products, to completing the same tasks in mere minutes and with limitless scalability.

"Not only have we modernised our means of managing our extensive inventory, but PGS Software has also shown us a future-proof solution that will stay with us as we grow and transform," says Stefan Hilbrich, director of ecommerce at AIXBRO. "We now have a frustration-free solution as the basis for multiple new features that'll transform our company even further."

Another PGS Software customer, online business directory Yell, increased its time to market by 840 times thanks to a whole new digital engagement model, underpinned by the cloud. A fintech client, meanwhile, was able to reduce its costs by 30 per cent through a cloud-native development strategy, which accelerated the introduction of new features by 869 per cent.

In the future, companies are going to use more cloud services, especially managed services, as they seek fast, accessible and approachable ways of leveraging the benefits and agility. Crucially, managed services enable companies to quickly experiment with artificial intelligence and machine-learning algorithms, something that would take them much longer to do on their own.

"To run a big data project on-premise, you have to buy very expensive, high-performance computers. You don't know when, or even if, you'll get a return on that," says Jasiński. "Companies are realising they can use cloud services for this. While there is still a cost to the computing power, if you are disappointed with the outcome of the experiment, you can just shut it down, which is crucial to the ability to innovate and improve decision-making."

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> ❝
> Modern technologies not only enable agility and cost reductions compared to legacy infrastructure, but also the ability to innovate without barriers and fail fast

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SUSTAINABILITY

How the cloud can make supply chains greener

Aside from net-zero datacentres, cloud computing can do more to tackle climate change by addressing emissions created along global supply chains

Nick Easen

G reening of the cloud is happening at pace, shifting computing en masse to remote datacentres powered by renewables. However, energy consumption is just one part of the picture. In the lead up to COP26, the United Nations Climate Change Conference, later this year in Glasgow, attention is being directed at the cloud's ability to drive greater sustainability in supply chains.

The focus is on data and lots of it. When it's organised and analysed on the cloud, via a single, uniform platform, organisations can start to reconfigure how they do business in a more environmentally-friendly way. This can be achieved by driving efficiencies, fine-tuning logistics and transport routes, as well as by using natural resources.

"Sustainable supply chains aren't driven by technology, they're enabled by technology," explains Mark Griffiths, global head of climate business at WWF. "Cloud-based technologies enable near real-time visibility, as well as greater accountability."

The World Wide Fund for Nature isn't the only organisation involved. Unilever has teamed up with Google Cloud to fight deforestation and source sustainable commodities, particularly palm oil. The idea is to connect satellite images of forested and deforested areas with data on suppliers, to make sure Unilever is buying products from reputable partners.

The cloud acts as the ultimate ledger for such activity.

"Transparency, data analytics and better decision-making are the cloud's unique selling points when it comes to sustainability," says Vishal Patel, vice president at Ivalua, a procurement software provider.

"Then there's the ability to monitor and track suppliers. Procurement can help drive green initiatives by selecting and rewarding companies for sustainable practices. This is done by validating environmental impact data from suppliers and tracking them against sustainability goals. Cloud-based procurement tools can certainly help identify these opportunities."

Data and supply chain visibility are stumbling blocks

The cloud as a force for green good in the lead up to the biggest climate summit since the Paris Agreement sounds remarkable, but there are challenges. Data and visibility along supply chains is notoriously difficult to achieve if they stretch between Glasgow, Gurugram and Guangzhou, involving many data silos and tiers of suppliers, who now have to adopt cloud solutions. There's a lot of inertia.

"Climate change is a big challenge for organisations, with effects that are far-reaching, but addressing these is a long-term and more iterative process, so investment usually takes longer to prove its worth. It can be difficult for such investments to gain buy-in," says David Basson, UK manufacturing lead at Fujitsu.

Cloud is more likely to be deployed as a supply chain solution because it creates efficiencies, reduces lead times and allows companies to respond, adapt and act faster, saving them money and time. Some of these wins could be future sustainability wins too.

"The cloud helps companies build a common infrastructure. Once supply chain partners adopt this, it gives them the foundation to evolve and adapt to any new challenge; this includes climate change," Dan Martines, managing director at BCG Platinion, points out.

Cloud also provides an agile, just-in-time, elastic environment that is easy to configure for supply chains. It's cheaper to build, with recognised standards and off-the-shelf tools as well as data services. This is likely to drive its adoption when it comes to sustainability.

"Arguably you could deliver the same systems out of the cloud to trace upstream and downstream value chains for sustainability. The challenge is the complexity of doing this," says Grant Caley, chief technology officer (CTO) for UK and Ireland at NetApp.

"For instance, data from operational technologies can be combined with transportation internet of things sensor information and then cleaned with data services in the cloud, before running this against artificial intelligence (AI) models. This is then used as the basis to build cloud-based value-chain applications. The cloud makes all this a lot easier, more cost effective and accessible."

Another driver will be government procurement, as adoption of cloud-based solutions that drive sustainability are being championed by the public sector, which is increasingly

aware of emissions and the race to net zero. The cloud offers transparency and accountability when it comes to the public purse.

"Government requires sustainability and corporate social responsibility (CSR) issues to be addressed as part of procurement. This is happening in local government where up to 5 per cent of an evaluation could be assigned to this. We regularly see the CSR aspect of bids given equal weighting to technical functionality. The result is that it has become a core part of any offer," says Nick Cobley, managing director of cloud at Agilisys.

New cloud-based tools deliver change

The cloud can be leveraged to generate sustainable supply chains in many industries, yet some represent more opportunities than others, such as manufacturing, retail and energy. There are also easy gains within sectors such as greener logistics. This has come to light during COVID lockdowns.

"Retailers have been collaborating with each other and acting more

> ## Sustainable supply chains aren't driven by technology, they're enabled by technology

intelligently over the last mile, cutting their emissions as well as delivery costs and fulfilment processes. Without the flexibility the cloud offers, they would not be able to re-engineer their supply chains quickly enough to take advantage of this kind of opportunity," says Matt Waldbusser, global field CTO at Blue Yonder.

AI and machine learning can also assist in generating more sustainable supply chains, since these technologies can be articulated on the cloud more easily, joining the data dots and providing new levels of insight, such as reducing overstocking or solving complex logistical issues.

"Amazon is a good example. It's not surprising that an organisation with such strong cloud pedigree is connecting customers in-store directly into the supply chain through sensors, AI and the cloud. In the process they can make the entire supply chain more efficient and so more sustainable," Alex Guillen, technology strategist at Insight, explains.

There are also new cloud-based tools that are assisting the sustainability drive. Virtual digital twins are becoming more common. This allows companies to model, simulate and analyse more environmentally-friendly concepts and hypotheses in the virtual world, then apply them in real life.

"You can use a virtual twin to create an entire supply chain. The pharmaceutical and energy industries are now deploying this approach to offer more accurate data across their supply chains and reduce their carbon emissions and waste," says John Kitchingman, managing director, EuroNorth, at Dassault Systèmes.

So what of the future? More cloud-based data will enable supply chains to be reconfigured. The hope is we

> ## We are only limited by our imagination, prioritisation and drive to leverage the cloud in meaningful ways

will transition to a circular economy, moving away from a take, make, dispose linear model. That involves an ecosystem of partners, recalibrating how they interact, which is easier on the cloud.

"This will be a destination for sustainable supply chains, where no net waste occurs in the produce and consume cycle. At the moment it's being pushed in Europe and Japan, but its principles will soon be introduced in the United States," says Dr Raj Agnihotri at IBM's Global Supply Chain Center of Competence.

Certainly, the cloud now offers a window onto the art of the possible.

"We are only limited by our imagination, prioritisation and drive to leverage the cloud in meaningful ways to help address our climate crisis," Aaron Oser, leader of global sourcing at Pillsbury Law, sums up. ●

59%
of supply chain professionals say they are using cloud computing and storage today

22%
say it will be in use 1-2 years from now

Deloitte and MHI 2020

Mobility ensures protection and performance in the cloud

The cloud is increasingly important to an agile, performant disaster recovery plan, but like all cloud strategies it's crucial organisations are able to move applications with ease

C loud has evolved drastically. A decade ago, analyst firms were frequently predicting that practically all organisations would migrate the vast majority of their workloads to the cloud. And while it was initially heading that way, companies soon learnt the cloud might not be the ideal place for everything as there are limitations. Security and compliance aside, it simply doesn't answer every IT challenge.

This realisation has seen early adopters taking applications out of the cloud and the industry as a whole embracing more of a hybrid philosophy, putting specific applications in the places where they are likely to perform the best. To make this work, organisations have increasingly sought an ability to achieve mobility for applications and workloads, allowing them to be quickly moved in a cost-efficient and seamless way.

"There has been a big reality check, with companies learning a lot about where to put certain things," says Gijsbert Janssen van Doorn, director of technical marketing at Zerto. "Still a lot of organisations are moving to cloud, but they're much more careful now. They're thinking about where applications should go and for the right reasons. Then the question is, how do I move applications to a different cloud provider if I need to? Mobility, therefore, should be central to any cloud strategy."

Sitting alongside it must be data protection. The coronavirus pandemic has exposed flaws in many disaster recovery plans. Lockdowns meant some physical locations, including datacentres, were inaccessible and remote working put more pressure on systems and at different times.

During this period, cybercriminals took advantage of the pandemic and we saw an explosion in ransomware attacks. This only added to the impetus to modernise disaster recovery strategies, with the cloud as the foundation. Disaster recovery as a service, in particular, is growing in popularity for organisations desiring not just convenience, but also confidence of continuity should disruption occur.

"Not having to run your own disaster recovery site anymore is very attractive to many organisations," says Janssen van Doorn. "To achieve mobility with traditional disaster recovery, you don't just need a solid datacentre, but also the right orchestration in place and the right service level agreements on the equipment and connections between datacentres.

"With disaster recovery as a service, you can just call up your service provider and they'll take care of it all for you. It provides security and confidence in a service you just consume."

Through a single, scalable platform, Zerto simplifies the protection, recovery and mobility of applications and data across on-premises and cloud environments. The software-only platform uses continuous data protection to converge disaster recovery, back-up and data mobility, and eliminate the risks and complexity of modernisation and cloud adoption.

As applications, and how and where they are deployed, change, companies must ensure their disaster recovery changes too. Whether applications live in an on-premises datacentre or virtual machine, a private, public or hybrid cloud, or a next-generation containerised or Kubernetes environment, which are more dynamic and operate at a very large scale, Zerto's platform enables data to be seamlessly migrated from A to B.

"Zerto delivers a single platform to protect applications and solve different use-cases," says Janssen van Doorn. "Those use-cases include disaster recovery, mobility, back-up and long-term retention across all the different clouds. Zerto doesn't only allow you to efficiently migrate data from VMware to another VMware datacentre, it also allows you to move it into Azure, or maybe migrate your application into AWS.

"Built on a core of continuous data protection, we have a really efficient way of moving data, ensuring applications can be easily mobilised and protected, no matter how they are deployed."

> ## With disaster recovery as a service, you can just call up your service provider and they'll take care of it all for you

For more information please visit
zerto.com/modernize

Zerto

SKILLS

Bridging the cloud skills gap

The move to as-a-service digital technology demands a major transformation in the internal capabilities required to reap the huge potential rewards; organisations that fail to adapt risk missing out

James Lawrence

C loud adoption is now a question of when rather than if for most organisations. However, many risk missing out on the full benefits of as-a-service IT by failing to develop the skills required to exploit the advantages of moving their digital technology off-premise.

Management consultancy McKinsey & Company forecasts businesses can generate up to $1 trillion in added value by 2030 due to the potential of cloud to deliver additional speed, productivity, flexibility, scale and innovation, but only if they put the right measures in place. "Cloud offers tremendous value, but the benefits don't appear magically," says McKinsey.

One key element of this for successful organisations is developing a deep understanding of the fundamental shift from IT as a product, whether hardware or software, which is bought and often adapted, to IT consumed off the peg on a pay-as-you-go basis. This requires a transfer in mindset from pure technology to a greater focus on business outcomes.

"When you start to sell the service of gaining access to something, you change the way of thinking about what that thing is," says Dr Alan Brown, professor of digital economy at the University of Exeter Business School and former chief technology officer at IBM. "You then begin to understand the value you receive from it."

Putting such thinking into practice is Ranjit Gill, UK chief information officer (CIO) of pharmaceutical and healthcare multinational McKesson. He has recently overseen a large-scale implementation of Salesforce's software-as-a-service sales and marketing tools, and is now looking to ensure the business benefits fully from its cloud investments.

"Now we have this technology, how do we really start to drive value from it? It's all about understanding what skillsets we need internally," he says. For him, a key aspect is bringing in and developing talent that is "both IT-literate and also more commercial."

Such commercial thinking is a necessary aspect of extracting maximum value from agile processes, as cloud has hugely accelerated development times and rapid innovation, says Ed Alford, who was enterprise CIO and then vice president of digital transformation at energy giant BP until the end of 2020.

"With cloud, within maybe two weeks, you can spin up a minimal viable product without spending a lot of money," he says. "But then you need to have the conversation: how much does it cost to scale it? And should we scale it? So it's the ability to change the timeline from delivering a finished product to the business to doing it in stages. This involves co-creation with the business, as well as getting the technology environment up and running."
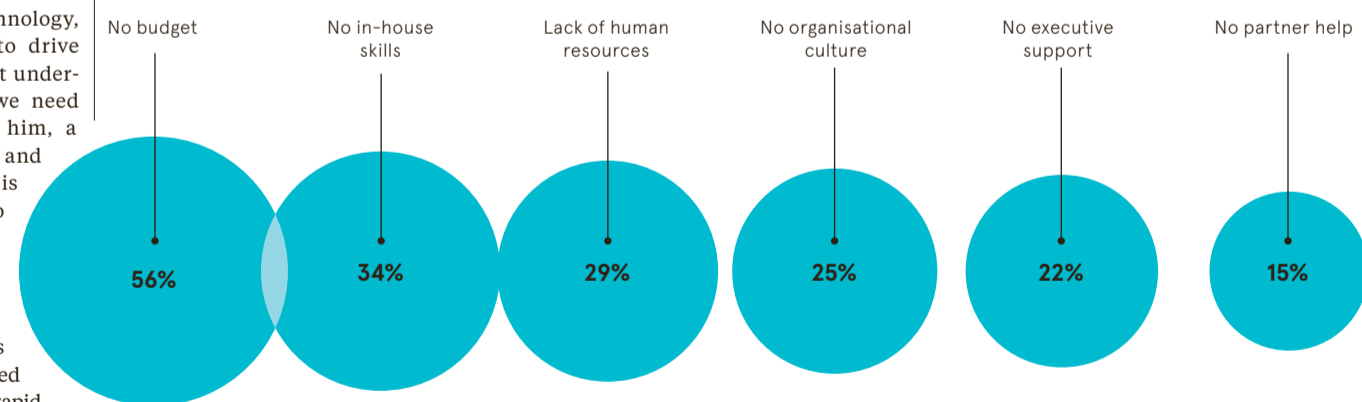
For Gill, this means generating and fostering a deep and close relationship between IT and the rest of the business, and IT should never stand alone. "When you do a programme in an agile way, there's no such thing as an IT project. If you have that, you're going to fail," he says.

Meanwhile, there is value in ensuring the partnership between IT and users runs deep in other ways, says Charlie Forte, CIO at the UK Ministry of Defence. He believes there are crucial lessons to be learnt from the way consumer IT uses cloud, particularly around the benefits of focusing on end-users and their needs.

"Cloud and the journey to cloud sit in the technology shift towards the consumerisation and the commoditisation of our underlying toolsets," he says. "The technology we use in our personal lives is dominated by themes of personalisation and flexibility, and if something in that world doesn't have the best of those characteristics, you won't use it. It's why Zoom has been so successful: because it's so easy to use."

In a similar way, Forte argues, cloud-hosted tech is forcing organisations to rethink their approach to technology. "Cloud is helping us to focus on those really important themes and that becomes an important part of what we need to make our business successful," he says.

A further big shift for organisations is how cloud changes the way IT is paid for. It involves a fundamental transformation from on-premise projects funded by capital expenditure, which require annual budgeting and big-ticket sign-off from financial decision-makers, to ongoing programmes that can quickly be turned on or off and scaled at pace, and are paid for from operating expenses.

This, again, requires different skillsets and a new approach to budgeting and finance, says Alford. One of the main issues, he says, is due to the flexibility and accessibility of cloud services. It's now easy for almost anyone in an organisation to switch on pay-as-you-go cloud services, leading to the risk of IT costs spiralling out of control. "The last thing we wanted was everybody using the BP credit card to spin up more disks any time they wanted," says Alford.

To avoid that, BP had to learn fast. Alford established a "cloud service line", which took responsibility for orchestrating demand and matching it to the service received from the cloud provider. "It could kill instances that were running, but people weren't using," he says.

"We even put apps on the developers' phones that allowed them to easily snooze their environments at lunchtime and at 5 o'clock at night." The result was that BP didn't have to pay for any of the hours when its cloud services were unused.

Although cloud puts a bigger than ever focus on business outcomes, CIOs like Alford and Gill also warn that organisations should not lose sight of the importance of developing in-house technical skills, rather than simply expecting those aspects to be transferred fully to the cloud vendors.

"If you want to work and operate in the cloud, you still need to have a core internal capability," says Alford. "Having your own engineers, albeit that you don't need hundreds of them, will save your bacon a lot of the time, and you'll save yourself a lot of money as these people generate value in terms of safety, reliable operations and security."

However, many of those capabilities are unlikely to exist within the organisation in the first place, he adds. For BP, it was a case of taking its in-house on-premise team and reskilling them to have the right technological understanding to get the best out of its two cloud providers, Amazon and Microsoft.

Meanwhile, finding CIOs and other digital leaders with skillsets that span both technology and the "softer" business skills demanded by cloud, is challenging, says Graeme McNaull, associate director of IT recruitment firm Harvey Nash. "More than ever, CIOs need to be able understand the tech jargon and relate that back to the business leaders who are not technically-minded," he says. "But we're frequently getting feedback from our clients that someone wasn't able to articulate exactly what they were trying to do."

However, he points out, it's impossible to have long-standing cloud skills. "You can't find someone with 15 years' cloud experience, as it's still very, very new," he says. "But there's a need for IT leaders with a vision of how everything fits together; these days, they need to understand the business as much as the CEO." ●

> **There's a need for IT leaders with a vision of how everything fits together; these days, they need to understand the business as much as the CEO**

> **With cloud, within maybe two weeks, you can spin up a minimal viable product without spending a lot of money**

LACK OF CLOUD SKILLS HOLDING ORGANISATIONS BACK

Senior IT leaders and business decision-makers' responses to the question "what is preventing your organisation from becoming digitised more quickly?"

No budget	No in-house skills	Lack of human resources	No organisational culture	No executive support	No partner help
56%	34%	29%	25%	22%	15%

Cloud Industry Forum 2021

Bridge between two worlds

Thanks to rapid advances in technology, enterprises finally have a robust bridge to support their desire for a hybrid model that provides the best of on-premise and cloud

E nterprises have been on a rocky journey to the cloud over the last decade. Having first been faced with the decision of building private or moving to the public cloud, highly regulated organisations such as banks and healthcare companies had to settle for keeping it private, while leaning on the public cloud for only select use-cases, such as when building new digital apps. By doing so, they missed out on the significant operational and cultural efficiencies enjoyed by startups that could be born in the cloud.

Recognising the barriers faced by enterprises dealing with transactional and sensitive data, the cloud providers have responded with investments to overcome compliance concerns and the challenges associated with migrating data safely from on-premise to the cloud. Mainframes and databases created in the 1950s were dependent on large on-premise deployments, so how do you move that kind of environment to the cloud?

"We're hearing from lots of enterprises that it's not about recovery anymore; it's about uptime and business continuity," says Allen Terleto, field chief technology officer at Redis Labs, home to the leading in-memory database Redis and Redis Enterprise, which gives organisations the scale, reliability and flexibility to power use-cases such as personalisation, machine learning, search, ecommerce and the internet of things.

"Organisations need to be able to withstand the failure of an entire region or even two. The cloud providers have finally made a pathway where you can safely deploy, possibly as a managed service, on a public cloud, with the assurances from all their investments in security, infrastructure and operational efficiencies."
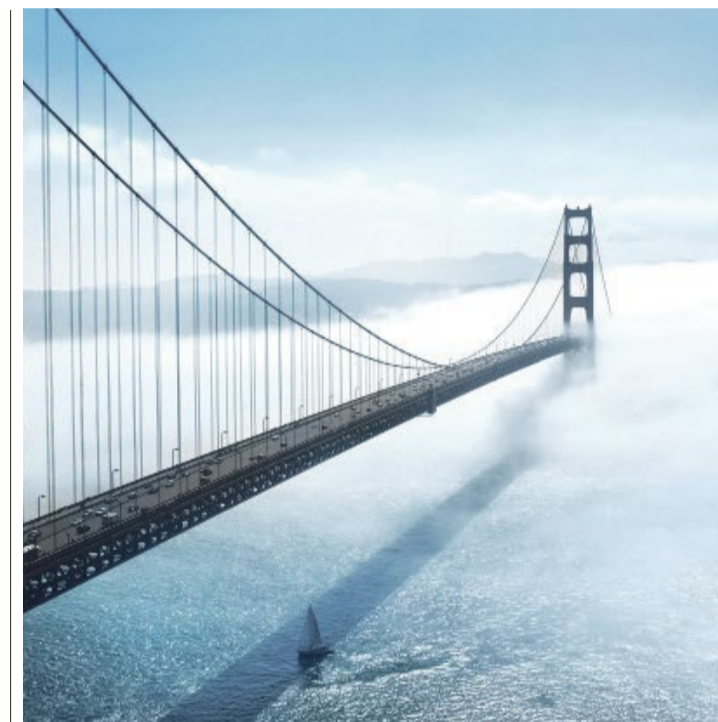
That pathway of data migration, cultural change and deploying on the public cloud is still, however, not obvious to enterprises. To get them to take the leap, cloud providers are introducing ways to go back on-premise and create a hybrid solution. Hybrid cloud has quickly grown into the model of choice for enterprises, which can continue to meet their regulatory requirements, but also have a bridge to deploy new applications or migrate existing ones as a microservice still connected to on-premise.

Redis Enterprise acts as that bridge, allowing enterprises to actively deploy on-premise and in the cloud with conflict-free resolution, which has traditionally been one of the most difficult challenges to solve.

Companies can seamlessly migrate data from their legacy database and keep it continuously integrated so bilaterally it stays in sync. Moving it into Redis Enterprise's technology, which includes active-active geo-distributed topology, means it can be deployed cloud natively as a managed service. This fulfils the entire data path for enterprises, from on-premise to the cloud and back, in a seamless, risk-free way.

"It's a game-changer and completely unique in the industry," says Terleto. "With these capabilities, there is no holding back enterprises from embracing the cloud, and we're going to see massive adoption as they make the leap to managed services, consumption cloud models and transacting through cloud marketplaces. Redis Enterprise can meet them where they are, as a first-party service on Microsoft Azure, a third-party, first-class service with Google Cloud or through our marketplace partnership with AWS."

This leap is necessary because the coronavirus pandemic has brought forward the realisation of a digital-led economy, underpinned by the cloud. Out of sheer necessity, businesses have substantially advanced their digital transformations during the pandemic, with digital offerings leapfrogging seven years of progress in just a matter of months, according to McKinsey research. High availability powered by the cloud is crucial to success in the digital age.

"Organisations persevering through the pandemic have commonly attributed their success to prior investments into digital channels and processes, which allowed them to quickly pivot their operational model when it mattered most to their customers," says Terleto. "Having the right cloud-native technology and an agile culture in place was a key differentiator. As we turn the corner on COVID-19, these same chief information officers will only increase their investments further to prepare for the post-pandemic digital economy and next generation of modern applications."

> **This leap is necessary because the coronavirus pandemic has brought forward the realisation of a digital-led economy, underpinned by the cloud**

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