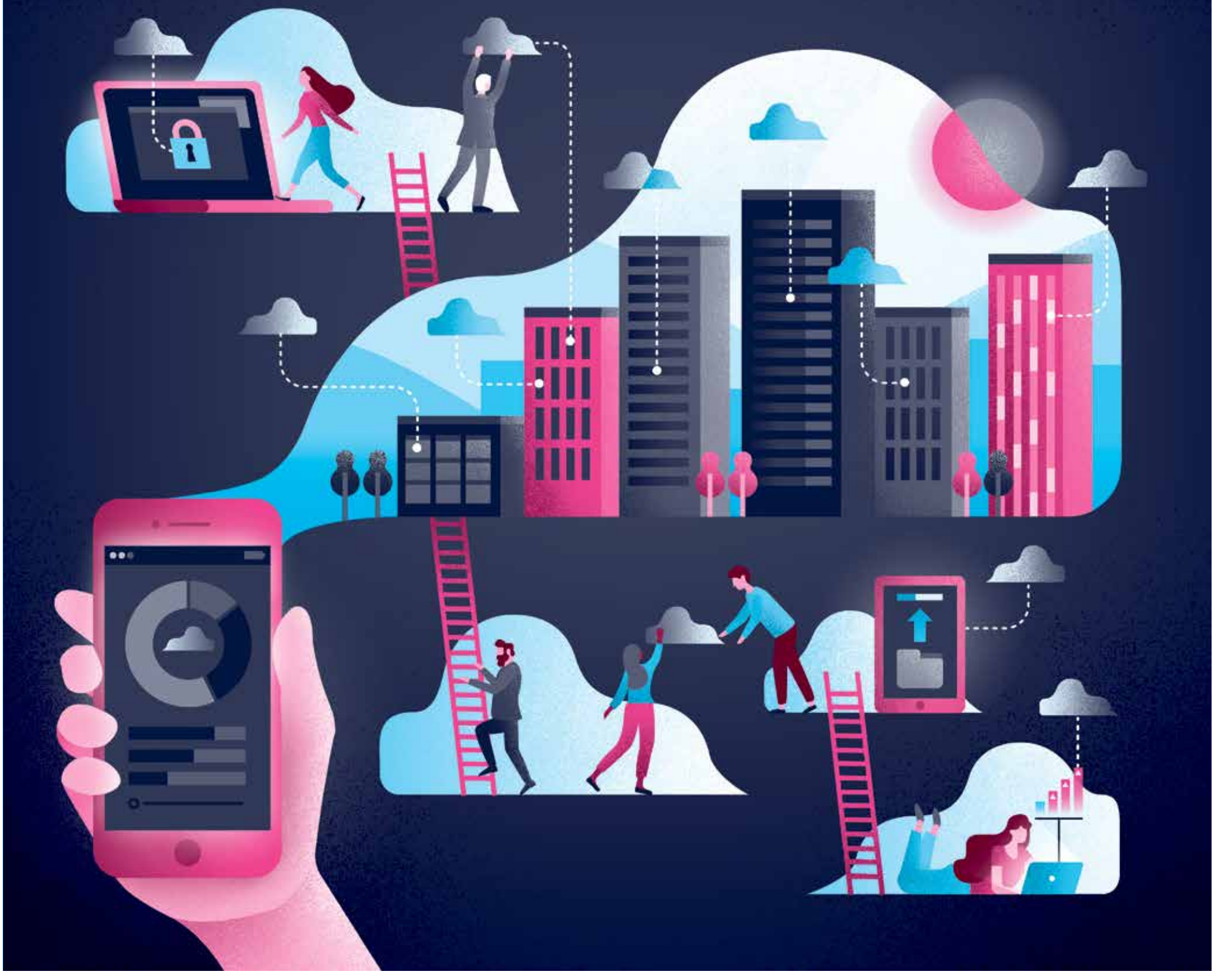
CLOUD FOR BUSINESS



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CONTRIBUTORS

ADRIAN BRIDGWATER
Specialist author on software engineering and application development, he is a regular contributor to *Forbes* and *Computer Weekly*.

BEN ROSSI
Editorial director at Vitesse Media, and formerly editor of *Information Age* and *Computer News Middle East*, he writes for national newspapers and business publications.

MARK SAMUELS
Former editor of *CIO Connect* and features editor of *Computing*, he specialises in IT leadership issues.

EMMA WOOLLACOTT
Specialist technology writer, she covers legal and regulatory issues, and has contributed to *Forbes* and the *New Statesman*

raconteur reports

Publishing manager
John Harvey

Production editor
Benjamin Chiou

Managing editor
Peter Archer

Head of production
Justyna O'Connell

Digital content executive
Fran Cassidy

Design
Grant Chapman
Sara Gelfgren
Kellie Jerrard
Harry Lewis-Irlam
Celina Lucey

Head of design
Tim Whitlock

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Looking forward to the silver lining

Cloud formations are changing and opening up new opportunities for organisations that stand to profit from exciting future developments in the industry

MARK SAMUELS

Imagine a world where anyone in your organisation can source computing capacity automatically and use this resource to run technology-led projects that will help disrupt your business for the better.

That's the vision for the development of cloud computing during the next decade. Movement towards this cloud-first vision of business is already being established. The cloud industry has matured rapidly during the past decade and the technology is now embedded across enterprises, regardless of size and sector.

Take the approach of Alex von Schirmeister, chief digital, technology and innovation officer at retail specialist RS Components, who says his firm is becoming increasingly confident when it comes to the cloud. "Our data no longer needs to be sitting on our own infrastructure and data no longer needs to sit in one physical premise – those days are over," he says.

Yet the game is far from won. Gregor Petri, research vice president at analyst Gartner, says there is a popular belief the cloud is already a business-as-normal activity. However, this view is a misconception and only a small amount of enterprises run significant workloads on the cloud, he says. "There's still a long way to go," says Mr Petri.

The transition to the cloud during the next decade will not simply be a process of lifting and shifting existing on-premise applications. While some legacy apps will have to be transformed to run on the cloud, others will not. Instead, the future cloud is best thought of as a platform for the implementation of innovative technologies and services.

"These new, disruptive technologies, which are too expensive to run today, will make up the majority of things that are running on the cloud in the future," says Mr Petri. These technologies include application programming interfaces, internet of things, artificial intelligence, serverless computing and new interactive services, such as virtual reality and blockchain.

Enterprises will run these innovations on the cloud, agrees Alex Hilton, chief executive of the Cloud Industry Forum (CIF). "Cloud is the generator for the next wave of technologies, the enabler for all the exciting developments," he says. CIF research suggests just 12 per cent of IT budgets will be spent on legacy technology by 2022 as cloud usage increases


Vek Labs/Unsplash

Such easy access to computing power creates exciting possibilities for the future. Enterprises will use the cloud as a scalable foundation for the creation of new business models, says Kevin Curran, professor of cybersecurity at Ulster University and senior member of the Institute of Electrical and Electronics Engineers.

"This massive cloud computing power with instant response will make intelligence on demand available for everyone, everywhere. New business models, where devices are boosted by inexhaustible cloud-based resources, will begin to emerge," he says.

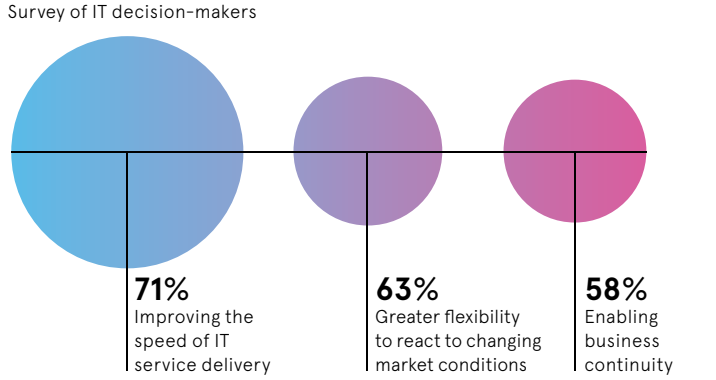
The focus on disruption during the next decade has clear implications for the cloud industry. Ten years, of course, is a long time horizon and, in terms of technology, the potential for change is enormous. As yet unheralded providers will bubble up and challenge established cloud industry players.

But independent analyst Clive Longbottom believes most enterprises will continue to use large, hyperscale cloud providers instead of smaller specialists. The major players, such as Amazon Web Services, Microsoft, Google and IBM, wield significant power and this will not wane, he says.

Cloud industry behemoths will use their power to focus on innovation and acquisition in the coming years. He says they will create a portfolio of additional functionalities, such as search and database technologies, that will support the creation of disruptive, cloud-based services.

Top business objectives driving cloud investments

Survey of IT decision-makers



IDG 2018

"The answer is not a private or a public cloud or even a mix of the two, but a dynamic and mixed cloud of, more often than not, a private cloud mixed with a range of public cloud services, including infrastructure, platform and software-as-a-service," says Mr Longbottom.

An assessment of the broad mix of provision is familiar to Richard Gifford, chief information officer (CIO) at logistics giant Wincanton. He is running a modernisation strategy that involves application consolidation and a new cloud-based transport management system. This initiative is a multi-million-pound project with board-level sponsorship.

"It's about digitally enabling our IT infrastructure," says Mr Gifford. "The aim is to create a cloud-first strategy. This approach will give Wincanton the scalability it needs as business demands change."

This type of cloud-first use-case demonstrates the increasing maturity of the cloud. Its continued development will rely on firms being able to make the most of the products and services the cloud industry generates. A dynamic, mixed cloud might be the objective, but many CIOs still discover that moving data between providers is an intractable challenge.

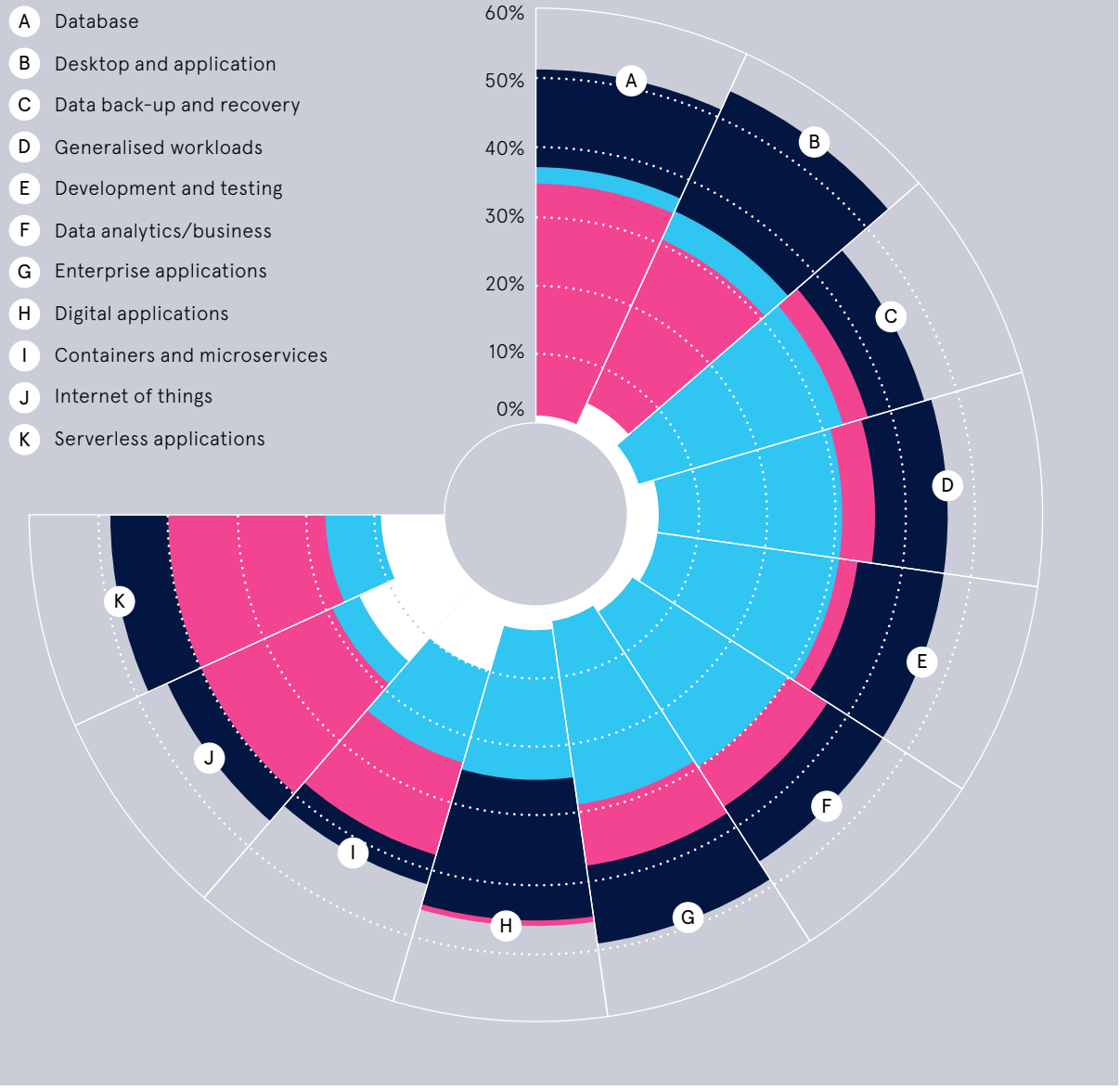
While vendor lock-in remains a concern, Stephan Fabel, director of product at IT firm Canonical, says the cloud industry and business leaders are showing a new commitment to openness and open-source tools. He says the adoption of "LEGO-like building blocks", through specialist tools such as Kubernetes and OpenStack, will help bring order to the cloud.

Barry Libenson, global CIO at financial data company Experian, believes technology leaders are already beginning to create standardised cloud strategies that recognise the importance of openness. It's an approach he's implemented at his own firm and Mr Libenson believes many cloud providers are embracing openness, too.

"I think the good news is the industry is sort of moving in that direction as well," he says. "While some of the cloud providers would love for you to use their native services because of the lock-in it potentially creates, I would say the industry is largely focused on flexibility and a recognition that portability is highly desirable."

Multi-cloud infrastructure leads the next phase of IT

As complex IT environments increasingly prevent businesses from transforming and innovating at the pace they want, multi-cloud environments managed through a single interface are providing the simplicity and agility to succeed in the digital age



Technology has become a crucial function in accelerating business transformation initiatives and supporting services in the digital age. But people don't start companies to be masters of IT; they just expect it to be able to support their mission and objectives.

They know they need IT because it enables them to deliver services faster and cheaper, but it's rare for a chief executive to have a particular bias for an IT infrastructure. Businesses simply want their services to be delivered reliably, securely and with a good response time to keep customers happy.

It became increasingly apparent that traditional on-premise infrastructure was failing to keep up with those business expectations because it was too complex, not only to install and expand, but also to operate. Put simply, in a world of smartphones and big data, datacentres could no long deliver services at the rate the business needed.

Brian Cox
Director of product marketing
Nutanix

"Businesses have traditionally adopted very complex infrastructure with servers on one side, storage on another and a connection fabric in between," says Brian Cox, director of product marketing at Nutanix. "Typically all these pieces come from different vendors that don't test their gear together before they launch it all, so integration gets pushed back on to customers. The customers end up being the IT mastermind of all the complexity which is not really fulfilling the mission of the business."

The rise of cloud computing has offered businesses the opportunity to limit or eliminate entirely the need to deal with that complexity. Two cloud models have emerged: public and private. With the public cloud, computing services are delivered remotely over the internet and sold per usage by third-party providers. Private cloud differs in that the services are built for and used entirely by one enterprise which can control access.

Public cloud is popular because it takes all the complexities of IT infrastructure away from the business at a cost that scales as it grows. However, the trade-off is users lose control over important aspects such as performance, downtime and security. They may also not be able to guarantee compliance if they're in a regulated industry because they don't always know where their data is and they may violate data sovereignty laws.

"I was at a trade show last year," says Mr Cox, "and an IT leader from a German healthcare firm said to me, 'I love the public cloud, but I can't use it'. He loved the simplicity, but he wouldn't know where his data is located, which would breach German privacy and data sovereignty laws. He wasn't comfortable with the lack of control he'd have in terms of maintaining uptime and he couldn't guarantee his CEO the infrastructure would always be available.

> **Our goal is to simplify every layer of software and hardware infrastructure**

"For those reasons, this company was speaking to us at Nutanix because we can give them the simplicity of a cloud-like experience while also ensuring they're maintaining data sovereignty and privacy, complying with regulations, and have in place the infrastructure to always keep everything up and running. There's room for both public and private cloud."

The model, pioneered by Nutanix, that enables all of these elements is driven by a multi-cloud strategy, where enterprises are able to deploy both public and private cloud platforms for different applications and resources, and a single software stack enables portability across them all. Analyst firm IDC predicts that by 2020 four in ten European enterprises will have established mechanisms to operate multi-cloud environments.

A multi-cloud strategy enables IT leaders to deploy applications and workloads in the environment that best suits their individual requirements for flexibility, simplicity and compliance. Meanwhile, intelligent tools such as Nutanix Beam will compare the costs in real-time between deploying on the public cloud or privately.

Nutanix is dedicated to building a single enterprise operating system and a common interface that gives businesses complete visibility across their environment, and the ability very easily to move workloads and applications to the most appropriate place.

"Our goal is to simplify every layer of software and hardware infrastructure," says Mr Cox. "We've gone beyond hyper-converging compute, storage and virtualisation, and now provide simplification of the network, management of the underlying databases that run the applications, and allow customers to move between private and public clouds.

"We have tools, which through a drag-and-drop orchestration, will not only deliver set-up of an app either in a public or private cloud setting, but will also show the cost of putting it in one place or the other. That means you're not doing this through guesswork anymore; you can get certainty about what cloud it makes most sense to deploy."

As IT increasingly heads in the direction towards multi-cloud environments, it's set to become even more orchestration driven. The trend will continue towards simplification, with growing levels of drag-and-drop orchestration, enabled by automation technologies such as artificial intelligence becoming more and more common.

The ability to do this in a way that is consistent across both public and private-cloud environments holds the key to the future of IT infrastructure. The vendors that provide enterprises with not only the ability to pick and choose where workloads and applications go, but also the real-time insights to do it in an intelligent way, will thrive.

"We want to get it to that kind of level where policies you set around cost, data sovereignty and everything else dictate whether your application is delivered through public or private cloud," says Mr Cox. "That way you know you're always getting the right fit for your infrastructure needs to run the app. That's what I think will emerge over the next couple of years and that's what Nutanix is investing in."

For more information please visit nutanix.com

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Hiroshi Watanabe/Getty Images

Cloud is now a worldwide opportunity

Software development is starting up in countries previously unassociated with information technology, providing an opportunity for economic growth in emerging markets

ADRIAN BRIDGWATER

The breadth, power and scope of cloud-computing networks have changed the way we think about information technology and the next generation of software currently being built. Given what is effectively no upper limit on the extent of IT resources available, any data job for an application or database can theoretically be increased, or decreased, by an order of magnitude in a short time.

The expression web-scale may have come out of the marketing rhetoric that cloud industry vendors are so fond of, but it does have a meaning. We now understand web-scale to mean the opportunity for a cloud application to be as wide as the web itself where needed.

This same globally connected all-inclusiveness factor also has an impact on the people that use cloud computing. Leaving local data governance and compliance issues aside, cloud networks don't particularly care where users are in the world. Although there is still a question of latency for highly intensive applications, a cloud user could be sitting in Fiji and logging into a server located in Glasgow, and some of them probably are.

The location agnosticism element in cloud has created a whole new playing field for emerging markets and developing nations. Globally distributed teams of software developers have started to form in countries with little or no track record in information technology. A new First World opportunity for economic growth has been created in territories that we traditionally think of as non-technical and non-creative.

Enterprise applications company IFS actually established its operations in the Sri Lankan capital of Colombo some 21 years ago back in 1997, roughly a decade before the notion of what we now think of as cloud computing was coined. With the spectre of the Indian outsourcing market on its doorstep, IFS is differentiated by virtue of having established a software programmer and developer team in the country.

With headquarters in Sweden, IFS has ultimately started placing some of its programmers overseas outside Sri Lanka, in cases where individuals and teams have become domain experts in a particular subset of IFS's enterprise resource planning and field service management technology.

"It's all about getting the best people to do the best work, whoever they are and wherever they are," says Christian Pedersen, chief product officer at IFS. "The geographic barriers that previously drove tech companies to put software development in one place are eroding. When operating at scale, you need to attract and retain talent in multiple locations, which for companies like us means building a globally distributed set of teams working in harmony."

Mr Pedersen claims that the journey to working as a globally distributed software business with co-located development is the only way to really know whether or not your programming processes are efficient or not.

But there are levels, caveats and exceptions to this cloud computing First World opportunity. General manager and senior regional director for Western Europe and sub-Saharan Africa at cloud software and hyper-converged infrastructure solutions company Andrew Brinded argues the point. He explains that when it comes to emerging markets, cloud computing is something of a double-edged sword enabling big business and small companies alike to expand rapidly into new areas without having to invest in local infrastructure or staff.

"That approach, however, adds little to local economies apart from a handful of, often, low-paid jobs. But emerging market entrepreneurs are fighting back and now looking for ways where they can take advantage of the cloud, to develop applications and business models of their own," says Mr Brinded.

> **The location agnosticism element in cloud has created a whole new playing field for emerging markets and developing nations**

What markets like Sri Lanka, and of course India and China, now trying to shake off is the outsourcing-only image of the past. Workers in this function perform relatively basic repeatable roles such as call centre agent support. Now that artificial intelligence-enriched automation software is helping us build so-called chatbots capable of interacting with humans at an increasingly sophisticated level, these markets realise they need to start being more creative.

"There is part of a natural cycle here; there has been an ebb and flow between centralised processing, as in a cloud datacentre, and processing that happens near to consumers on their computers. Initially, calculators were central processors – think Babbage – then through miniaturisation we started giving calculators to individuals to carry in their pockets – think Casio," says Richard Slater, principal consultant and DevOps/SRE (site reliability engineering) leader at London-based cloud applications consultancy Amido.

Mr Slater argues that we have seen a similar cycle in the world of work, albeit in a much slower cycle. We have moved from individual traders to centralised shops and the Walmart effect where shops are centralised in out-of-town centres.

"I suspect we are seeing the same effect here on working patterns; there is going to be a push to more remote working for a while before it contracts in again to enable the next level of innovation, one where technology will still be decentralised, but the task of writing machine-learning algorithms will need to be much more lab based," he says.

Quite how cyclical the whole process proves to be is yet to be seen. However, one thing is clear: cloud computing is creating big new virtual workspaces for people to work in wherever they are in the world. ◆

Commercial feature

Co-creation is crucial for cloud success

Leading technology providers are working together to help businesses navigate the complex and necessary journey to digital transformation

Organisations are facing an unprecedented level of disruption to their core business models. The World Bank predicts that if digital technology continues to disrupt traditional industries at the current rate, 30 per cent of total global business revenue, more than $60 trillion, will be redistributed by 2025 to brand new players.

Despite the scale of this challenge and the hyper-intense competition it presents, there are huge opportunities within reach for those who refuse to stand still. Looking beyond "business as usual being a recipe for failure", the most forward-thinking organisations are responding to and embracing disruption, not only to drive new revenue streams, but to surpass competitors, many of whom are playing by entirely new rules.

In light of this, businesses are searching for transformational ways to innovate and respond to change faster, and to deliver more seamless services that engage and delight customers. Cloud has emerged as the crucial tool for achieving these goals.

"The cloud has underpinned the strategies of most, perhaps all, of the most disruptive new entrants," says Mark Phillips, head of hybrid IT, Europe, Middle East, India and Africa, at Fujitsu. "It is so much more adaptable, responsive and connected than any alternative, and more economically flexible too. Enterprises are favouring the cloud over on-premises and hosted workloads due to its resilience, security, agility and scalability, and to reduce costs – but now even more so, to move at pace and innovate faster."

Hyperscale clouds such as Amazon Web Services (AWS) are enabling organisations to build new services that transform the user experience and increase customer engagement. With the cloud, any business can now access enterprise-class services and capabilities, as well as advanced development tools, enabling innovation at great speed.

As awareness of the cost advantages and service benefits of cloud computing grows, cloud providers will continue to enhance and develop new services at an even faster rate. Over two thirds of organisations say changes in their cloud environment happen every few days or less, according to Fujitsu's *State of Orchestration Market Report 2018-19*.

However, simply buying the latest technologies available doesn't guarantee successful digital transformation; the necessary steps must be carefully planned and executed. Fujitsu divides digital transformation for its customers into a number of distinct steps, corresponding to their digital maturity level. This enables them to identify where they are, from establishing the necessary connected enterprise to building artificial intelligence into services and processes, and then map the moves that will take them forward.

While it is expected that over time most, if not all, established businesses will be on the cloud, some will also have applications that need to remain on-premises for regulatory reasons. As such, their resulting architecture is likely to be a blend of cloud and the best of what they already had, creating a hybrid IT environment.

"Cloud is now the computing paradigm of choice and will only continue to grow, with customers choosing a hybrid IT architecture as a key enabler for their transformation," says Mr Phillips. "The majority of enterprises are now opting for a 'right workload for right cloud service' approach, which delivers agility, as well as cost and service advantages, while also allowing the cloud's broad functionality and breadth of services to be leveraged.

"Fujitsu combines, integrates and orchestrates cloud services together with any existing or on-premises IT, to deliver outcomes the business is looking to drive or, in some cases, may not have even considered themselves."

In the fast-moving digital landscape, organisations seeing success are working with a number of connected technology providers that can deliver the broad scale of objectives they want to achieve. The most successful transformations are enabled through co-creation, powered by an ecosystem of partners working together with customers to add their business context to their overall solution.

Delivering results quickly can only be achieved through this process. If it is truly transformational then no internal team knows what it is or how to do it. Nor can innovation be totally outsourced or sub-contracted. Co-creation brings together the necessary technology and application expertise in a single team to make rapid progress.

In Fujitsu's study, organisations referenced security (95 per cent) and compliance (79 per cent) as some of the most challenging aspects of managing their cloud estate. To utilise the full power of cloud, customers must also manage their data in a way that ensures connectivity and regulatory requirements are consistently met. They need to know not only the technical aspects of delivering security, but also who to ask about threats that haven't yet been identified. Only providers with intelligence-led, dedicated managed security capabilities can do this.

"Transforming – or changing and evolving in terms of digital maturity – is very complex, especially when you consider the requirement to achieve this without disruption to the live services crucial to business and customers," says Mr Phillips. "This can only be done if IT providers work together with their customer and partners, to construct the optimal plan, with a personalised cloud environment at its heart."

Fujitsu's Co-creating Program helps customers to accelerate digital transformation and develop suitable architectures. The program connects organisations with Fujitsu specialists and its ecosystem of partners, and enables them to leverage Fujitsu's Human-Centric Experience Design methodology. This takes place within Fujitsu's Digital Transformation Centres and Centres of Excellence, which focus on breakthrough technologies such as artificial intelligence, blockchain and quantum computing.

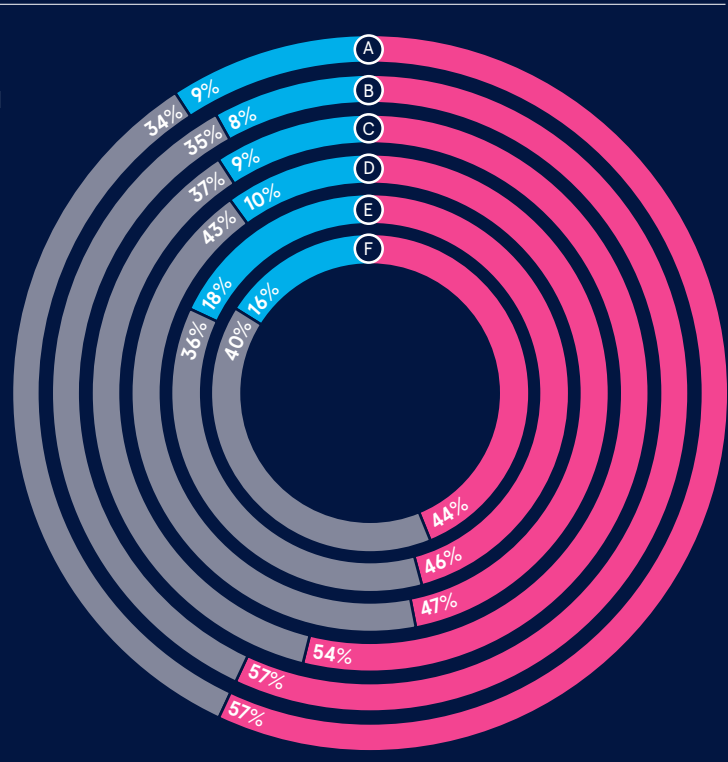
Fujitsu's orchestration report found that most organisations now have many cloud services deployed, with 84 per cent saying they find integrating these "challenging" or "very challenging". This highlights the importance of

> **The most successful transformations are enabled through co-creation, powered by an ecosystem of partners working together with customers**

CLOUD INSIGHTS

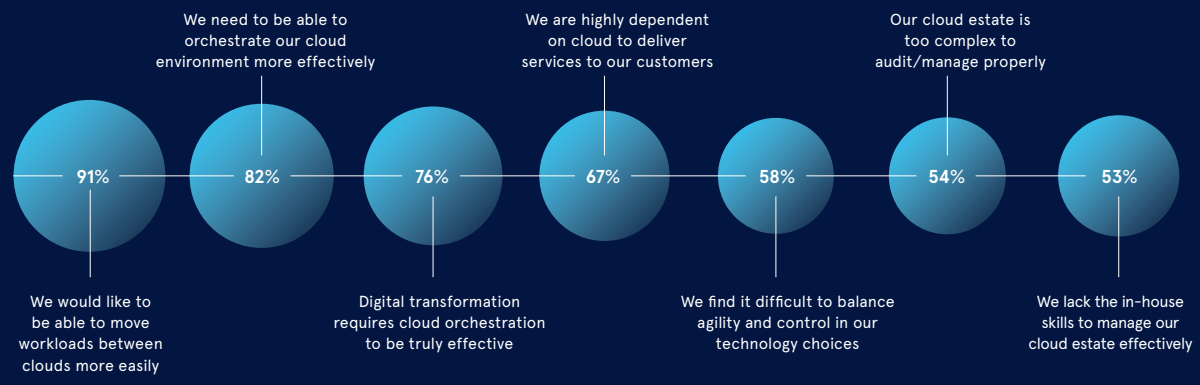
Fujitsu's *State of Orchestration* research surveyed hundreds of IT leaders with cloud and infrastructure responsibilities. The report highlights their challenges and perspectives on managing and optimising cloud

Compared to 12 months ago, have the following become more or less challenging in enabling you to deliver a seamless digital experience to your customers?



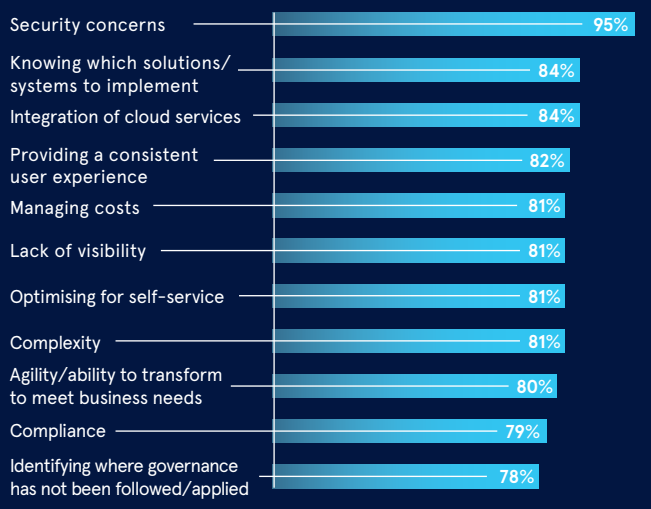
The importance of orchestration

Percentage of respondents that agree with the following statements

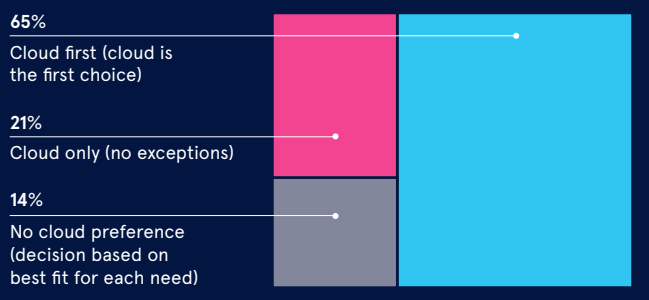


How challenging do you find the following aspects of managing your cloud estate?

Percentage of respondents that find the following challenging/very challenging

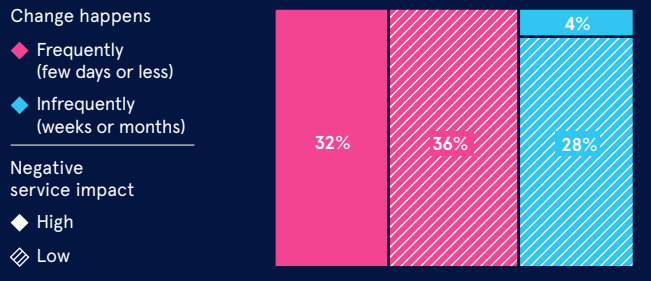


How would you describe your cloud strategy?



How does your organisation deal with changes in cloud services you have running?

Includes platform behaviour, updates and software changes



Fujitsu: *State of Orchestration Market Report 2018-19*
www.stateoforchestration.com

IT simplification, which crucially, can only be achieved through co-creation. Fujitsu's strategic collaboration with AWS enables customers to get the most out of extremely powerful cloud capabilities, while ensuring everything is connected and well orchestrated to drive greater value from existing processes.

To accelerate innovation, large organisations must also look beyond the re-hosting element of cloud. A cloud such as AWS provides even greater value when organisations want to re-platform and modernise their applications or re-architect them in a cloud-native state. When implemented successfully, this can present significant opportunities for growth and a transformed customer experience.

"With our co-creation approach, we have a series of initiatives called Cloud-Native Accelerators, where a dedicated services team and partners help customers to understand how a cloud-native approach might work for their business and how to leverage the latest cutting-edge technologies. All of this is with the aim of responding to digital disruption and accelerating innovation," says Mr Phillips.

"Cloud is the new normal and the unique ways in which it can power innovative commercial solutions will drive the differentiated business models of the future. This approach is already having a massively disruptive influence and unlocking huge potential for positive change, as demonstrated by the fact that 52 per cent of businesses believe they will not exist in their current form in five years' time."

For further information please visit www.fujitsu.com

FUJITSU

Q&A

Fujitsu and AWS enable hyperscale heroics

Brad Mallard, chief technology officer for cloud services in Europe, Middle East, India and Africa at Fujitsu, describes how its strategic collaboration with Amazon Web Services (AWS) enables businesses to modernise and transform

Why are businesses needing to transform the way they approach their IT?

We see a need for radical change in the way IT is delivered for any business to be able to adapt and embrace the technology they need to operate in an always-on, fast-moving environment. Businesses need to transform to compete. In many industries, margins also continue to tighten, so organisations must optimise their cost base and supply chains. Cloud-delivered technologies offer the opportunity to remove complexity, increase efficiencies and reduce the cost of IT delivery.

How important is collaboration between vendors such as AWS and Fujitsu in ensuring cloud drives positive outcomes across the business?

Long gone are the days when any single IT department, team or organisation could keep up with the rate of change in technology. To overcome these challenges and ride the wave of opportunity, you have to embrace partnerships and collaborate with experts. We work with providers such as AWS not only to deliver support to customers, but to shape and execute their growth and ability to exploit opportunities. Vendors such as AWS provide the technological building blocks of a digital business, but you also need to have the expertise to be able to blend those together to create an immersive user experience, or obtain and deliver data instantly, wherever people or devices are in the world. For this reason, enterprises are finding the collaboration between AWS and Fujitsu extremely valuable to them.

How exactly do you work with AWS to support customers?

Fujitsu and AWS have a strategic relationship, offering customers expertise in services to help them intelligently transform and optimise their IT. We have jointly invested in a world-class team of engineers from both organisations to develop best-practice approaches to embracing AWS in the enterprise. Our relationship really excels in large-scale enterprises with complex transformations. The benefits we drive through service optimisation have reduced costs for customers by up to 70 per cent. At the other end of the spectrum, we can also take new service development timeframes from months to days. With some customers, we're releasing software updates numerous times a day.

> **Fujitsu and AWS have a strategic relationship, offering customers expertise in services to help them intelligently transform and optimise their IT**

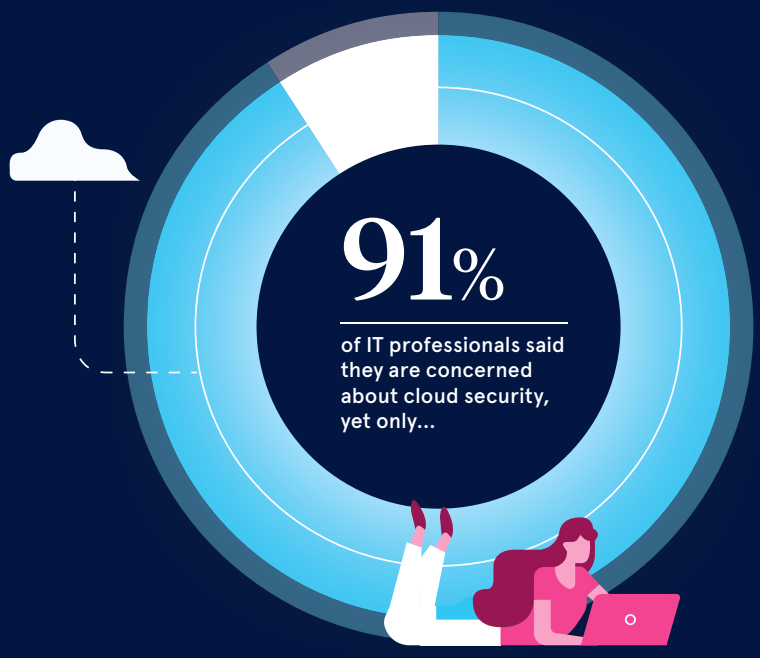
What role will co-creation like this play in helping businesses to accelerate digital transformation?

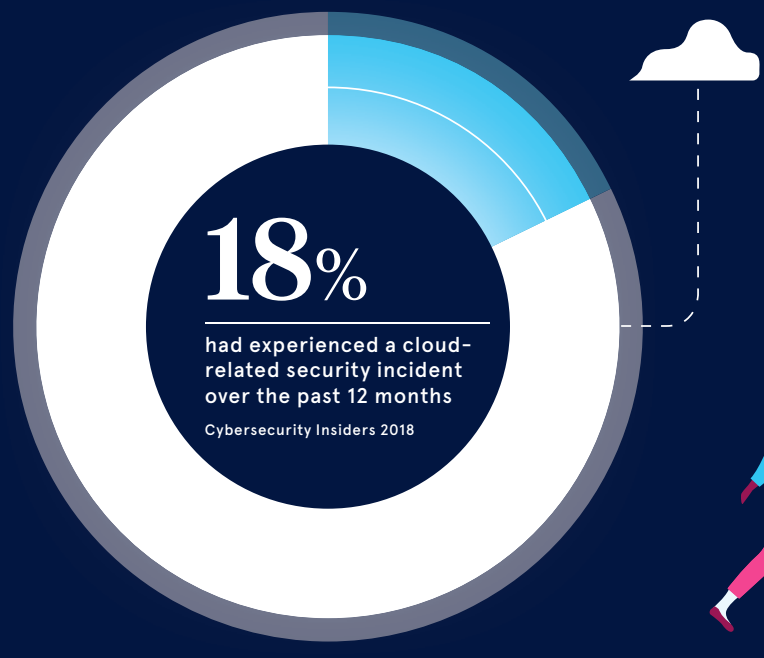
Beating your competition to market means you need to be able to apply technology instantly. Fujitsu has an ecosystem of trusted partners that accelerate success in removing risk and executing effectively. Our strategic relationships, of which AWS is one of the most important to us, enable us to jointly apply experience at scale and provide the support that helps customers to accelerate their business at an unprecedented pace. Together, AWS and Fujitsu are providing modern ways of developing, integrating and optimising not just applications, but also infrastructure, to free up more spend for driving accelerated digital transformation at scale. Fujitsu's Cloud Service for AWS offers customers a well-architected framework and automated set of tools to accelerate the operational delivery of the service. Fujitsu has worked with AWS to prove our services leverage and accelerate adoption of the best of AWS. This has meant we have the right people and the processes to ensure new AWS features are available when our customers want them.

What are your top tips for those looking for help with their digital transformation?

The one-size-fits-all approach is no more. To drive differentiated experiences and the most efficient processes, you need to understand how people, technology and machines interact. Delivering effective outcomes requires a thorough knowledge of all business constraints, which can only be obtained through customers, technology providers and other trusted partners working together, side by side. For those customers wanting to get started with AWS, you need to ensure you have expertise with real-life experience, that you consider regulatory constraints, which can reduce some of the services you may be able to adopt, and that you optimise your cloud transformation plan to maximise the cost and agility of IT to the business. Sometimes development and project execution efficiency is more beneficial than infrastructure-focused cost reduction, particularly when measured by the business and not the IT department.

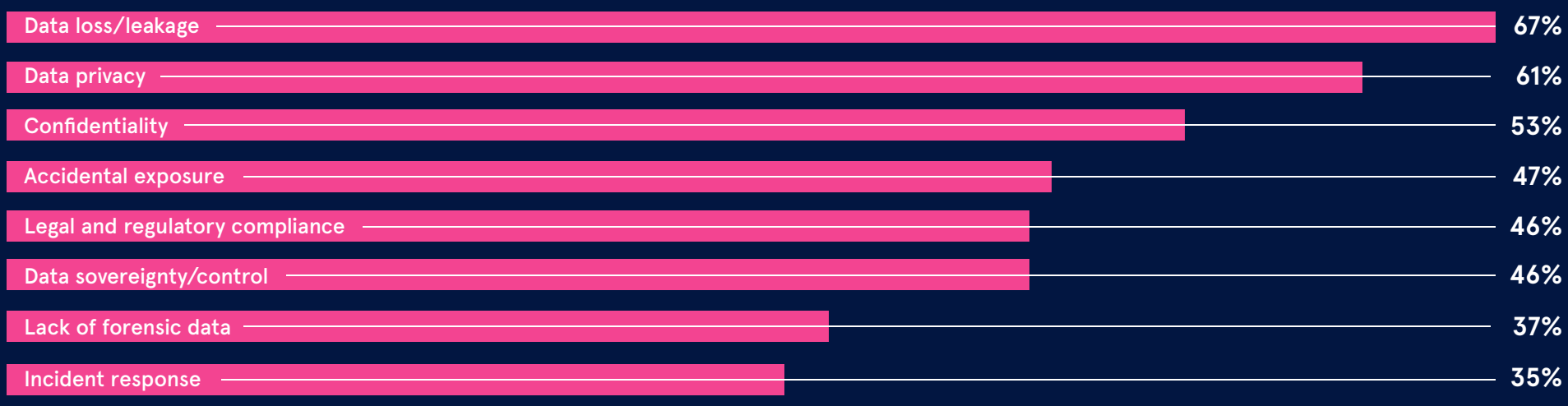
CLOUD SECURITY





Biggest cloud security concerns

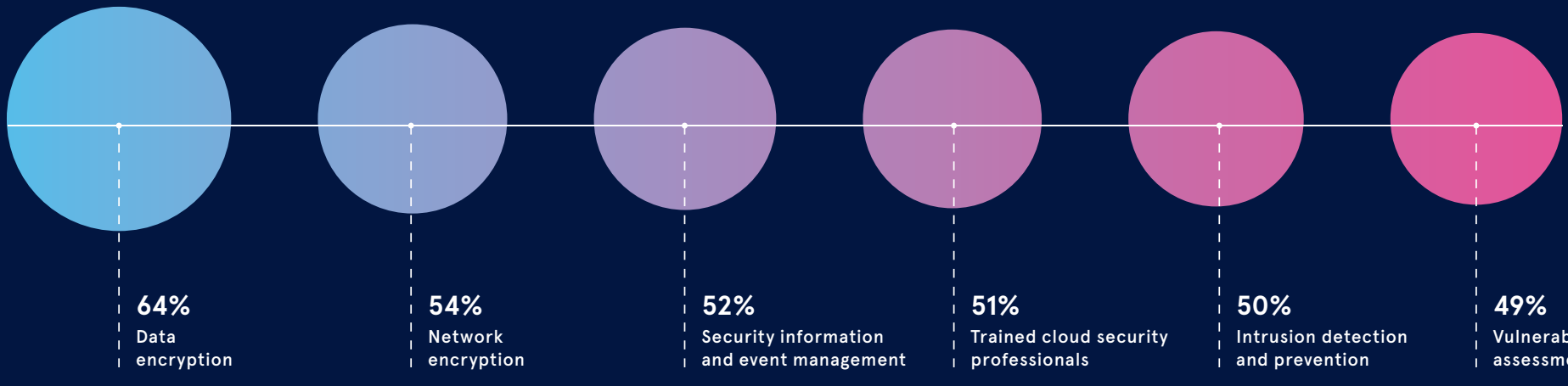
Percentage of IT professionals who said the following are a concern



Cybersecurity Insiders 2018

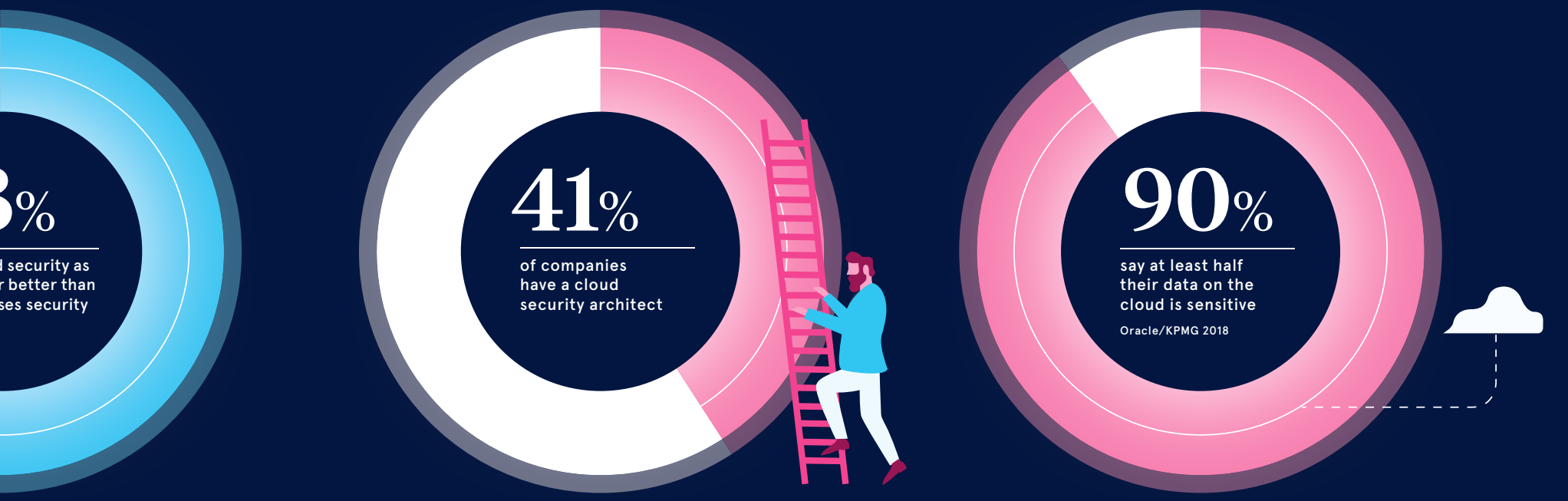
Most effective cloud security technologies and controls

Percentage of IT professionals who believe the following are effective at protecting data in the cloud



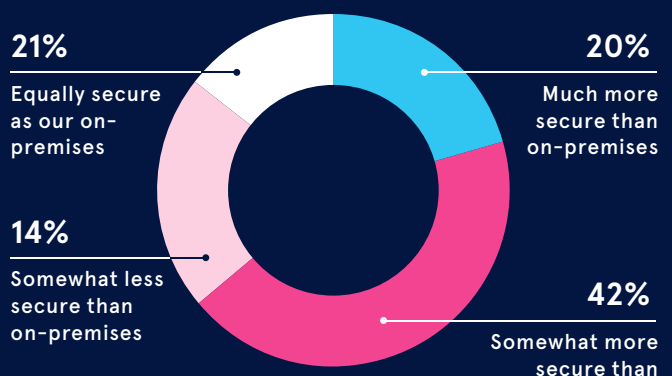
Oracle/KPMG 2018

As cloud adoption continues to grow and workloads increasingly move away from on-premises environments, security remains the biggest cloud worry for IT professionals



Public or on-premises cloud?

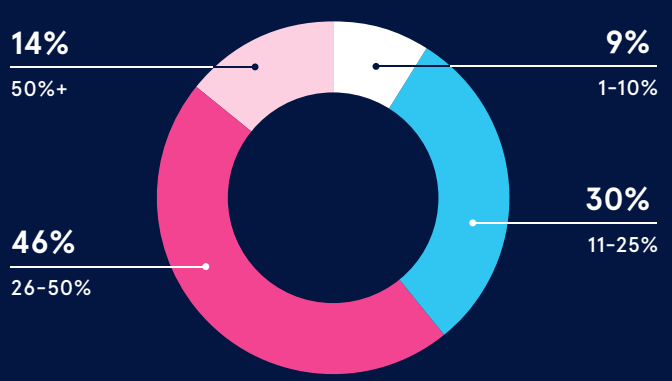
How cyber-professionals view the security of public cloud and on-premises environments



Oracle/KPMG 2018

Where enterprise data resides

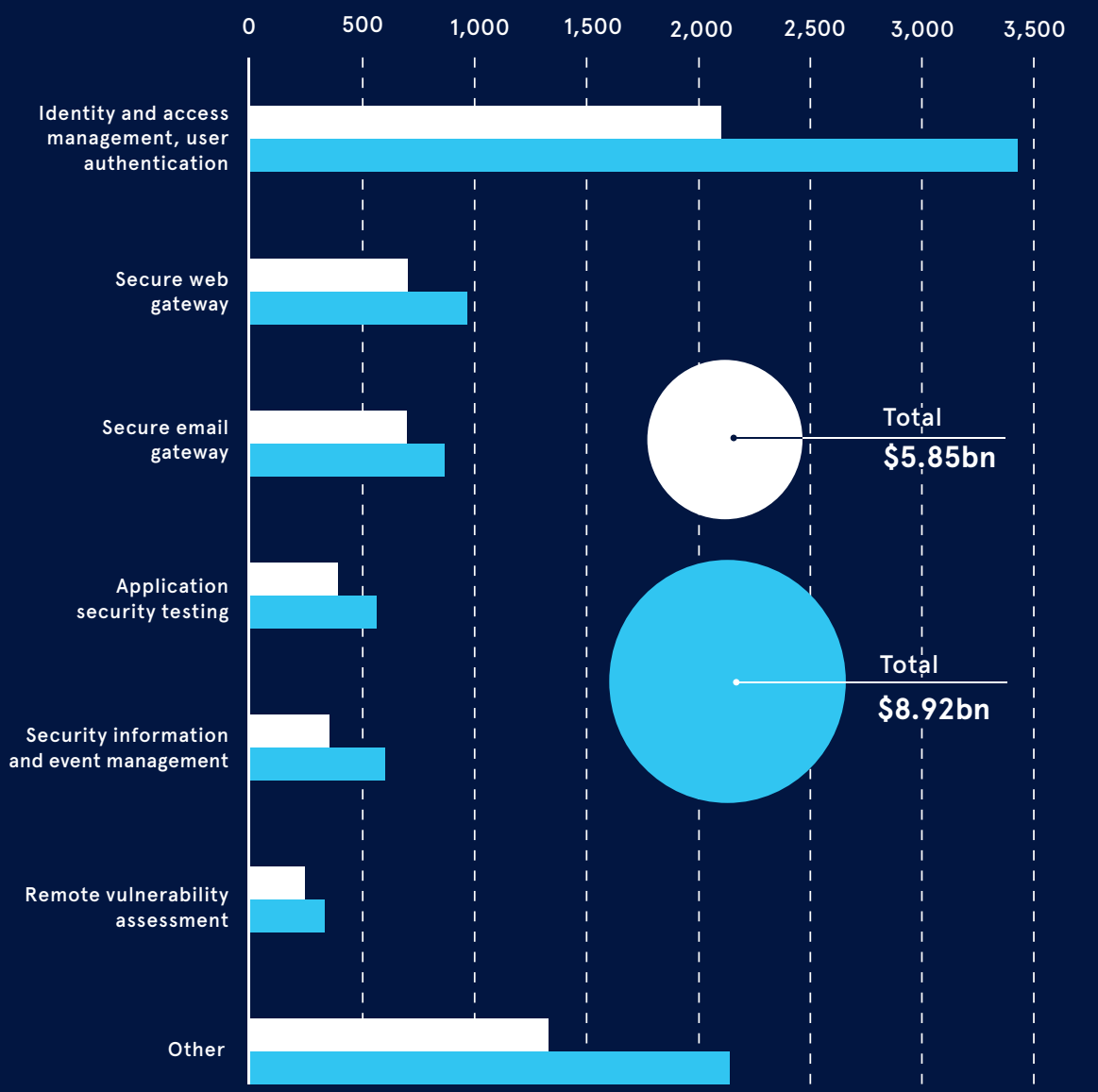
Percentage of company data residing in the public cloud



Oracle/KPMG 2018

Cloud-based security services market

Revenue forecasts by segment ($m)



Gartner 2017

Commercial feature

The divide is over: welcome to the age of choice

Cloud computing entered the market with great force over a decade ago and, although there has been significant adoption, there exists a cloud divide, says **James Petter**, vice president, Europe, the Middle East and Africa, at Pure Storage

The public cloud is not purpose built for enterprise requirements and enterprise-grade storage is not as user friendly as the cloud.

Now, thanks to a strong demand from customers, at Pure Storage we have bridged this divide by introducing a pioneering solution that enables the next generation of hybrid applications to run seamlessly across clouds. In November, we announced Pure Storage Cloud Data Services, a suite of new cloud offerings that run natively on the Amazon Web Services (AWS) cloud.

Cloud Data Services will empower our customers, enabling them to invest in a single-storage architecture that unifies application deployments on-premises and in the public cloud to transform data flexibly into value anywhere and everywhere.

The combination of enterprise application mobility and emerging technologies, including artificial intelligence, machine-learning and deep analytics, has exponentially boosted the strategic importance of digital infrastructure.

Five years ago, our customers talked about the desire to adopt a cloud-first strategy, but the limited capabilities meant that some workloads required them to sit on-premises. There was no nuance to the conversation; it was either on-premises or public cloud. Additionally, there was no credible integrating technology available at the time that allowed clients to use both seamlessly.

We want customers to have the flexibility to utilise both options and now we can offer that bridge, unifying the cloud. Simply put, Pure Storage Cloud Data Services enables customers to deliver on their cloud vision in three unique ways.

Build

First, it helps them to build clouds. Organisations can create private clouds on-premises, or in hosted environments, to deliver storage-as-a-service with the performance, availability and ease of use that customers expect.

Run

Not only can customers run applications on-premises or hosted environments, but they can also run seamlessly on Pure in the public cloud. A shared storage platform enables applications to be built once and run anywhere in the hybrid cloud model.

Protect

Finally, it delivers data protection everywhere and this is a crucial point. Customers have the flexibility to choose the best back-up, recovery and retention options for their specific needs by replacing legacy tape and disk with high-performance flash and cost-effective cloud storage.

Pure Storage Cloud Data Services connects on-premises with the public cloud, enabling customers to create hybrid applications anywhere and move them to the other solution without friction and at speed. In effect, our capabilities serve up a multi-cloud for our clients; it could be private, storage-as-a-service or edge computing and so on. Their business needs dictate where they want to create new applications and this new functionality means they can evolve at speed.

At Pure, we understand it is critical for organisations to have real-time access to data and applications. Customers have come to expect an environment where they can take advantage of data anywhere and anytime, wherever it lives. Our vision is to create a data-centric architecture that enables fast, shared access. The launch of Pure Storage Cloud Data Services is a huge step towards enabling that for enterprises.

For more information please visit www.purestorage.com/uk/

PURESTORAGE®

Pure Storage Cloud Data Services: introducing a new set of capabilities

Cloud Block Store for AWS
Industrial-strength block storage that runs natively in the Amazon Web Services (AWS) cloud. Cloud Block Store, designed to enable mission-critical applications to run seamlessly in the cloud, enables hybrid mobility and adds new storage services to web-scale applications.

CloudSnap for AWS
Cloud-based data protection, built right into Pure FlashArray. CloudSnap enables FlashArray snapshots to be sent quickly to AWS S3 storage, which enables cost-effective protection in the cloud along with flexible recovery both on-premises or in the cloud.

StorReduce
Cloud-native deduplication technology, designed to enable fast, simple, cost-effective cloud back-up to AWS S3 storage, in conjunction with on-premises flash for fast recovery.

OPINION COLUMN

‘If you’re not exploiting cloud services, you can bet your competitors are’

Precisely what is meant by the cloud often depends on who you’re speaking to and what they’re trying to sell. Whether public or private, senior leaders must keep in mind the ultimate goal: to optimise or innovate business IT applications through the strategic use of cloud infrastructure and services. Poorly thought out strategies can quickly leave a business blimp like, lagging behind Concorde competitors. In an age of cloud ascendance, ignorance is no longer an option.

In my experience, senior leadership has been so drenched in a torrent of cloud marketing spiel that they often have an inflated sense of the powers cloud possesses and an underappreciation of pitfalls to avoid. Add to the mix a legacy mindset and a firm might soon find itself staring into the void.

Many businesses believe it’s simply a matter of lift and shift: plonking legacy applications in virtual machines, moving them from on-premise facilities into the public or private cloud, optimising them, then driving efficiencies by only paying for resources on demand. While undoubtedly true for some applications, significant efficiencies can be often gained simply by right-sizing workloads on existing on-premise infrastructure.

By not considering the long-term implications of the public cloud service delivery model, firms that initially experience savings may quickly see their costs spiral out of control. For many applications, private cloud, with its flexible licensing arrangements, is more cost efficient, especially when coupled with its automation and capacity planning capabilities.

And as it affords full ownership and control, businesses that rely on applications carrying out highly regulated activities should keep them in a private cloud to speed up compliance processes.

To unlock the true benefits of cloud services – there are more than 150 available on Amazon Web Services (AWS) – businesses must enact a developer-like approach to their applications and avoid the temptation of the virtual machine life raft, which can be daunting.

Starting from scratch and reimagining the way applications are run not only vastly improves efficiencies compared with lifting and shifting, but also allows for experimenting and innovation. The latest artificial intelligence services, such as Google Tensorflow or AWS Lex, turn the public cloud into a laboratory for building interesting applications that transcend competition. Don’t be fooled: if you’re not exploiting cloud services in this manner, you can bet your competitors are.

A common misnomer is that public cloud is inherently more insecure than its private variant, resulting in many organisations keeping their sensitive data on-premise or in a private cloud by default. In reality, security outcomes depend on the diligence of end-users. Too many incorrectly assume it’s the responsibility of service providers to secure applications and they end up vulnerable to threats.

But equally, many are unaware that a granular approach to application reconstruction can leverage microservices to create sophisticated architectures more secure than a trusty in-out firewall. Being unaware of these possibilities and keeping workloads on-premise as a result could actually leave a firm more exposed.

To succeed in a cloud world, these decisions must be made continually on an app-by-app basis, which essentially comes down to how much an organisation is prepared to change its approach to IT. An app-centric approach to enterprise IT moves away from the traditional periodical release and review of IT apps and infrastructure to one of continuous delivery and optimisation. Gone is the two-year life cycle and a business-first, IT-second mindset. IT and business are two sides of the same coin.

James Orme
Junior editor
The Stack

DATACENTRES

Saving energy and slashing CO_2 emissions

As big data gets ever bigger, so do datacentres, gobbling up more energy and spewing out harmful greenhouse gases. Here are five innovative projects slashing their environmental impact

EMMA WOOLLACOTT


Microsoft

01 Project Natick, Scotland

Earlier this year, Microsoft lowered a huge white cylinder into the water off the Orkney Islands in a project designed to create a datacentre using as little energy as possible.

The 40-foot-long prototype is designed to operate for up to five years without maintenance and is naturally cooled by the chilly northern seas. A heat-exchange process, more usually used for cooling submarines, pipes seawater directly through the radiators on the back of each server rack and back out into the ocean.

It's powered by renewable energy from the European Marine Energy Centre's tidal turbines and wave energy converters. Tidal currents in the area, says Microsoft, travel up to 9mph at peak intensity and 10-foot waves are a regular sight.

The datacentre is loaded with 12 racks containing a total of 864 servers and associated cooling-system infrastructure. Assembled and tested by a submarine-building firm in France, it was shipped on a flatbed truck to Scotland where it was attached to a ballast-filled triangular base and sunk beneath the waves.

If Project Natick works out as planned, Microsoft hopes to be able to create environmentally sustainable, pre-packaged datacentre units that can be ordered in a range of sizes, rapidly deployed and left to operate "lights out" on the seabed for years.

02 Verne Global, Iceland

When it comes to disposing of waste heat, it helps if it's a bit chilly outside. And with the temperature in Iceland hovering around 0C for most of the year, Verne Global has a head start.

Its 44-acre campus is located at the United States Naval Air Station, a secure former NATO base close to the town of Keflavik. There's no need for any expensive and dirty cooling systems as it's cooled entirely by the outside air, which enters through a controllable louvre system. The temperature is so low that most of the louvres are frequently left closed.

Other features include adaptive temperature controls, cold/hot aisle containment, smart lighting and the ability to optimise data hall resiliency.

The datacentre is run on 100 per cent green energy, thanks to local geothermal and hydro-electric sources that were originally developed for aluminium smelting. According to the company, the site only uses 10 per cent of the available electricity at any time, so it's unlikely to ever need to turn to non-renewable sources.

The Keflavik datacentre is the largest in Iceland, and the company's clients include car manufacturers BMW and Volkswagen, as well as various power-hungry bitcoin mining outfits. According to the company, simply by moving ten of its high-performance computing clusters from Munich to Verne Global, BMW cut its annual carbon emissions by 3,570 metric tonnes, the equivalent of burning 1.46 million litres of petrol.


Verne Global

03 Citigroup, Germany

Citigroup's Frankfurt datacentre is green literally as well as metaphorically: it has a living roof and living wall. It was the first datacentre in the world to be given Leadership in Energy and Environmental Design platinum certification.

The site is optimised for natural air cooling, with Citigroup estimating cooling costs nothing for 65 per cent of the year. According to the company, it uses only 30 per cent of the power that a conventional datacentre would require and just 40 per cent of the heating energy.

Overall, it's estimated to be cutting CO_2 emissions by 11,750 tonnes a year compared with a more conventional facility. It also saves water, through the use of innovative reverse osmosis water treatment in the cooling plant, which saves up to 50 million litres a year.

Even the construction of the building was carried out with the environment in mind; more than a quarter of the building materials were recycled and 40 per cent were locally sourced.


Christian Richters–VIEW/Alamy

Citigroup's Stephen Ellis, head of technology infrastructure in Europe, the Middle East and Africa, says: "The energy-efficient design of the datacentre, coupled with extensive use of new, energy-efficient virtualised technology, housed in innovative modular cabinets, has optimised energy use and reduced the data cabling needs."

04 DigiPlex, Sweden

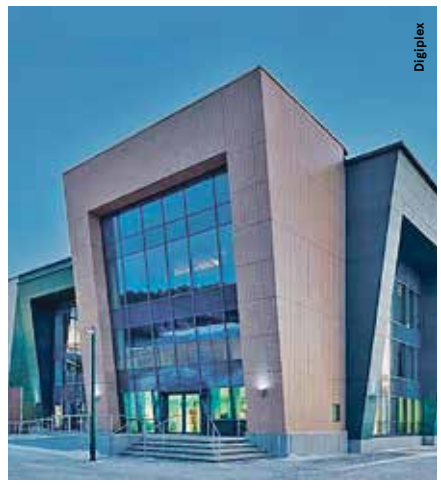
DigiPlex this year teamed up with energy firm Stockholm Exergi to use the excess heat from its datacentre to help warm local homes.

Stockholm Exergi operates a district heating network that supplies nearly 90 per cent of homes in Stockholm via a network of underground pipes that carry hot water and DigiPlex's contribution amounts to enough heat to warm the equivalent of 10,000 homes.

"It represents a key step towards our vision of using datacentre heat to contribute to a more sustainable society," says Anders Egelrud, chief executive of Stockholm Exergi. "As part of our drive to make Stockholm fossil-fuel free, our objective is that 10 per cent of Stockholm's heating needs shall be provided by recovered datacentre waste heat."

Since 2004, DigiPlex has run entirely on renewable energy, such as hydro and wind power. Its Copenhagen datacentre in Denmark uses an air-to-air evaporative cooling system, which capitalises on the cool, moist atmospheric conditions of the region. The cooling system is controlled by an algorithm that optimises its performance based on the amount of electrical power consumed by the data servers.

The company has also recently signed a letter of intent with Norway's largest district heating supplier, Fortum Oslo Varme, to heat around 5,000 apartments in Oslo in a similar way. The system is expected to be in operation next autumn.


Digiplex

05 Green Mountain, Norway

Buried 250 metres under a mountain on the Norwegian island of Rennesøy, Green Mountain's DC1-Stavanger is a former NATO ammunition bunker and is probably the best protected datacentre in the world as it was built to withstand a nuclear bomb.

To keep the site cool, gravity draws in water from an adjacent deep-water fjord; the water has a temperature of 8C all year round. Circulating pumps supply a titanium heat exchanger in the cooling station.

The company says the unique system uses less than 3kW of power to gain more than 1,000kW of cooling.

DC1-Stavanger uses 100 per cent renewable power combined with the lowest power prices in Europe, making it one of the greenest datacentres in the world, with a carbon footprint of close to zero, the company says.

"Our location is centrally located less than 300 metres from the National Grid and no fewer than two renewable hydro power plants," says chief security officer Svein Atle Hagaseth. "There are few places that have that proximity to available green power."


Green Mountain

The datacentre is completely airtight, which means there's no need for fire extinguishing gases; the company has made the entire space flame retardant by lowering oxygen content to 15 per cent, below the amount needed to start a fire. ◆

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Listen to the sound coming from the cloud

The opportunity to use the cloud to crowdsource knowledge could be an important factor in the technology's next phase of growth

ADRIAN BRIDGWATER

As we enter what is widely billed as another generational shift in computing, we are adopting the cloud-computing model of networked datacentre IT to drive the way all our software applications work. From this wider, deeper, thicker and altogether more algorithmically intelligent backbone, we can build crowdsourced knowledge bases that far outstrip any previous notions of learning and intelligence, however encyclopaedic they may have been.

Crowdsourcing in the cloud era, or cloudsourcing, gives us the chance to connect mass information streams that come together in new ways. How we now start to apply the sound of the crowd in the cloud to our operational business models is crucial.

Applications designed to exploit crowd knowledge in the cloud are many and multifarious. Take soil erosion issues for want of a seemingly random but extremely relevant example.

If walkers, trekkers and other outdoor types are suitably targeted and engaged, their collective presence can represent great environment value. Where cliff edges are crumbling away, local authorities can post signs encouraging walkers to snap pictures with their smartphones and upload them to a website.

That website isn't just a page on the internet; it's just how it renders graphically. It is actually a cloud database sitting on a server in a datacentre that can be programmed with image analytics software to track where the landscape is changing. In this scenario, the crowd and the cloud are helping to protect your weekend walks and picnics.

The cloud-based collective hive-mind concept has an extremely logical application in business too. Major software vendors are now working to create what we could call templates for business decision-making. The knowledge distilled into these architectural reference models represents a new type of playbook for other customers to use and apply to their own business models.

One customer doesn't actually get to physically see the customer details or individual data values that other users will have fed into these templates, all that is appropriately anonymised and obfuscated in the interests of governance and compliance. The theory is that one clothing manufacturer or retailing specialist, for example, should be able to learn from the cloud-based crowdsourced data flows that another manufacturer or retailer has experienced.

Where it becomes even more interesting is when clothing retailers start to apply operational model efficiencies learnt from oil rig operators, cake bakers, holiday companies and so on. There are many levels to business and cross-pollination through the

cloud-crowd technique can be equally multi-tiered.

Financial trading firms are embracing this cross-pollination by employing crowd-sourced talent in their investment strategies. "A crowd of insights and ideas gives investments an advantage," says Jared Broad, founder and chief executive of QuantConnect. "Through our cloud-coding environment, we see an evolving and growing trend of the asset management industry leveraging quantitative multi-factor models to generate higher returns."

Independent technology analyst Theo Priestley agrees that the ability to learn from crowdsourced data across multiple sectors is an unparalleled opportunity for businesses to finally break out of their industry-based silos.

"There's no reason why a utilities company cannot combine cloud-based datasets from medical records to understand energy demands from home-care patients recovering from injury for example," says Mr Priestley. "What's more, the costs of such a collaboration on crowd-sourcing in the cloud can be spread across all organisations taking part. There's no downside here."

The same theory extends to analysing cloud computing usage itself. We can globally crowd-source cloud-data workload trends for different types of applications. When we collate and analyse those patterns, we can create predictive models that enable us to manage cloud resources more effectively and at better price points.

> **Crowdsourcing in the cloud era, or cloudsourcing, gives us the chance to connect mass information streams that come together in new ways**

"Companies using cloud computing are faced with the challenge of guessing what level of datacentre resources to allocate to their new connected apps. Many firms will tend to 'super-size' how much cloud they sign up for to mitigate risk. Stopping to examine a crowd-sourced library of similar apps can help them to better size their cloud consumption at the point of initial deployment" says Ayman Gabarin, senior vice president for Europe, the Middle East and Africa at public cloud optimisation analytics company Densify.

Mr Gabarin says typical application resource requirements evolve over time, so cementing cloud resource intake is far from ideal. Making apps aware of changing requirements and self-optimise by using machine-learning to right size themselves continuously and predictively makes them run better, and reduces waste of cloud resources.

These moves to encourage collective, collaborative and co-operative attitudes across cloud-computing frameworks are still largely new territory for the business world. Indeed, as much as it is widely discussed in technology circles, cloud computing itself is still comparatively new territory for many businesses. ◆

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Commercial feature

Data management: multiple clouds, one strategy

As more organisations adopt a hybrid cloud model, they need to ensure that they can manage their data across multiple locations

Cloud strategies are revolutionising the way in which organisations become agile in creating new digital services. While greater agility enables organisations to beat the competition and become first to market, the need for customer loyalty and higher-quality customer service creates sustainability with increased consumer confidence and trust. These strategies lie at the heart of any organisation's success in the digital age.

There is, however, an additional key driver required to create a data-driven business. This involves leveraging data to develop greater value, while at the same time mitigating risk associated with irresponsible data use. Creating value through the effective use of data improves customer service and service quality through personalisation, while responsible data compliance increases customer confidence, driving data consent.

For organisations to become data driven, they require technological change. This means placing significant investments around new digital services, adoption of cloud and effective management of data. Perhaps the greatest challenge for organisations is that stakeholders of these innovations sit in both the line-of-business and IT departments. Collaboration is key to support the pace of change as well as enabling IT to create the operational rigour and discipline needed to deliver service quality.

> **It's essential that the IT department and the line-of-business teams work closely together**

The challenges presented by this collaboration are varied and complex. They include new services being created in the cloud led by DevOps, the exponential increase in data volumes linked to digital interactions with customers owned by the chief data officer and data location challenges linked to data sovereignty regulations policed by IT.

Other challenges arise from digital compliance, which requires a change of approach by the data privacy officer, as well as increased investment in resilience and business continuity driven by the threat of ransomware and data loss with IT owning this responsibility. The opportunities for collaboration are vast. However, the risks are increased by departments operating in stovepipes.

"It's essential, therefore, that the IT department and the line-of-business teams work closely together," says Jason Tooley, regional vice president Northern Europe at Veritas, a leader in the data management market. "Only by doing so can they reap the rewards of an agile, secure cloud and data management strategy that will become the foundation of the organisation's digital transformation."

Customers are driving the adoption of cloud especially for new digital workloads, creating large amounts of unstructured digital data, which reside on public cloud service provider platforms. Customers are realising the operational capabilities and service availability in the cloud, as well as the management of data, is their responsibility rather than that of their cloud service provider. In case of a data breach, it is the organisation that will be fined and suffer the associated reputational brand damage rather than the cloud service provider. "In private cloud transformations, supporting workloads that can't be moved to a public cloud service provider, the focus is on the same cloud characteristics of performance, scale-out, elasticity and economic benefit," says Mr Tooley. "In private cloud environments with greater IT control, customers can utilise the same operational capabilities that they have used in successfully managing service and data. They can apply these capabilities to current workloads and new workloads in a consistent way."

Customers are now openly talking about data management encompassing protection and recovery, governance, resilience and business continuity as key tenants of their ability to maintain service and become a data-driven business. This forms part of their wider multi-cloud strategy.

"Managing data from the point of view of risk on the one hand and value on the other is a fine balance," says Mr Tooley. "It's essential that capabilities allow for increased democratisation to empower the line-of-business stakeholders who are looking for pace and autonomy. But it's equally critical that IT brings its expertise and experience to dealing with the challenges faced in supporting the 'run the business' requirements. The need to support on-premise mission-critical services, virtual applications and new digital workloads in a consistent, reliable way remains the primary goal for both IT and the business."

For more information please visit veritas.com

VERITAS

Misconceptions and challenges of data management in the public cloud

83%

of organisations mistakenly believe their cloud service providers (CSPs) take care of data protection

69%

incorrectly assign full responsibility for data privacy and compliance to CSPs

54%

wrongly believe it is the CSPs' responsibility to transfer data between on-premises and cloud securely

58%

mistakenly believe application performance is the CSPs' responsibility

Creating partnerships supporting the cloud and data management requirements

It's clear customers are looking for solutions that address their business challenges instead of solely purchasing technology. This has caused many traditional IT suppliers to become providers of managed services or to create solutions from multiple suppliers in the delivery of an integrated offering. Customers expect suppliers to partner and build complementary solutions to address the business needs.

"At Veritas, by developing partnerships with cloud service or cloud technology suppliers, such as AWS, Microsoft Azure, IBM Cloud, Fujitsu and Nutanix, our complementary data management capabilities are providing solutions that are crucial to customers and the challenges that they face," says Jason Tooley. "They only care about what partnerships and certifications offer in practice, not in theory.

"We're seeing existing partners building go-to-market strategies that address the joint-data management and cloud strategies. This could be partners such as Computacenter, Softcat and SCC that actively want to support customers' multi-cloud strategies. Our long-term partners are now focused on delivering integrated solutions based on our wider portfolio."

Cloud strategies continue to evolve based on use-cases that enable customers to develop value. As examples, there are priorities placed on solving the challenge of long-term retention of data as a tape alternative. Cloud offers an opportunity to meet this requirement with cost and regulatory benefits.

Business continuity in the cloud or between clouds is becoming an imperative for customers as they recognise the need to integrate these requirements into datacentre consolidation programmes, while retaining workload portability, which is a significant problem for chief information officers. The partnership business model is critical to create solutions with delivery capabilities to address these requirements.

"There's a growing importance for partnerships to be based on what is known as 'joint-cloud credibility'," says Mr Tooley. "The combination of Veritas and a major global cloud service provider must satisfy both the requirement for complementary technology certification and joint research and development.

"Supporting the business challenges mandates data management and cloud being the highest priorities for customers because of the impact on customer loyalty, service quality and first-to-market agility. Becoming a data-driven business will differentiate an organisation from the crowd in a very visible fashion in the digital age."

Netflix's cloud-based recommendation engine is powered by user data and saves the company more than $1 billion annually

Freestocks.org/Unsplash

Turning cloud data into business value

With most organisations failing to approach cloud data as a key business resource, artificial intelligence (AI) could hold the key to insights that can drive transformation

BEN ROSSI

Organisations are increasingly adopting cloud-based applications to reduce costs and give them the scalability and agility to transform in an increasingly fast-evolving business landscape. Through doing so they are generating a large amount of data that could provide actionable insights, but few are implementing analytics strategically.

The most innovative companies in the world, including Facebook, Amazon, Netflix and Google, are not only underpinned by the cloud, but recognise that their whole business model is based upon data. Indeed, Netflix said in 2016 that its cloud-based recommendation engine, powered by user data, is worth more than $1 billion annually.

Closer to home, Ocado has disrupted the saturated supermarket industry by placing cloud data and automation at the core of its proposition, and even productised much of its technology stack for sale to other retailers. Meanwhile, Heathrow Airport has adopted cloud and business intelligence services from Microsoft to optimise movement of the 200,000 people who pass through its terminals each day.

"The explosion in big data has been powered by the availability of unprecedented levels of computing power, alongside the democratising force of public cloud making this power available to a wide range of organisations," says Craig Lodzinski, chief technologist for developing technologies at Softcat. "With quantum computing on the horizon, the ability to process huge amounts of data in a short period of time presents possibilities that have previously been impossible."

In a study by data analytics firm SAS, 72 per cent of organisations said data analytics helps them generate valuable insight and six in ten said their analytics resources make them more innovative. While these findings sound positive, by delving deeper it becomes clear they're not getting the most from their analytics investments.

In the same piece of research, only four in ten companies could say analytics is core to their business strategy and a third reported it was only used for tactical projects. Despite acknowledged value among professionals, with two in three saying they can measure value from deploying analytics, there is still a way to go before businesses are using analytics strategically across the whole organisation.

"There is a strong desire to boost competitive insight and efficiency using analytics, but it is not being fed into core business strategies: a missed opportunity," says Laurie Miles, director of analytics at SAS UK and Ireland. "With AI now top of mind for many, it's more important than ever to have a powerful, streamlined analytics capability."

Moving from recognising the value of data analytics to approaching it as a key business resource requires responsibility and ownership at the very top of a company. According to Deloitte, this is only the case in half of organisations. Insights from data programmes are often only seen by individual functions and viewed as an IT project. The real value lies in cross-functional collaboration and identifying end-to-end insights.

> **Emulating the success of companies that have placed cloud data at the centre of their business model will increasingly mean utilising AI to embrace the real value of digital transformation**

A common mistake is approaching data analytics as a project with a beginning and an end, rather than a journey to break up into iterative, actionable elements. Frequently muted as the best approach is "failing fast", where value is delivered incrementally and agile teams can swiftly change the methods adopted to reach the defined objectives should the programme be underperforming at any stage along the way.

"It's important for businesses to keep in mind the key challenges they'd like to address with analytics and build outcome-based solutions to directly address this," says Andy Gauld, partner at Deloitte. "Businesses all too often go into projects without first pinpointing what they are looking to achieve and how to measure success."

Automation technologies such as AI and machine-learning are now central to the next phase in advancing the value of data analytics from cloud-based applications. By sifting through masses of data, AI-based systems are having a huge impact on extracting commercial benefit from information and helping to generate offers and services that are more likely to be bought or consumed by an organisation's customers.

Through the application of pragmatic AI that brings together historical and real-time cloud data, user journeys can be streamlined, sales opportunities triggered automatically and customer satisfaction enhanced. AI makes data available for use in decisions made on behalf of customers across all their preferred channels of interaction.

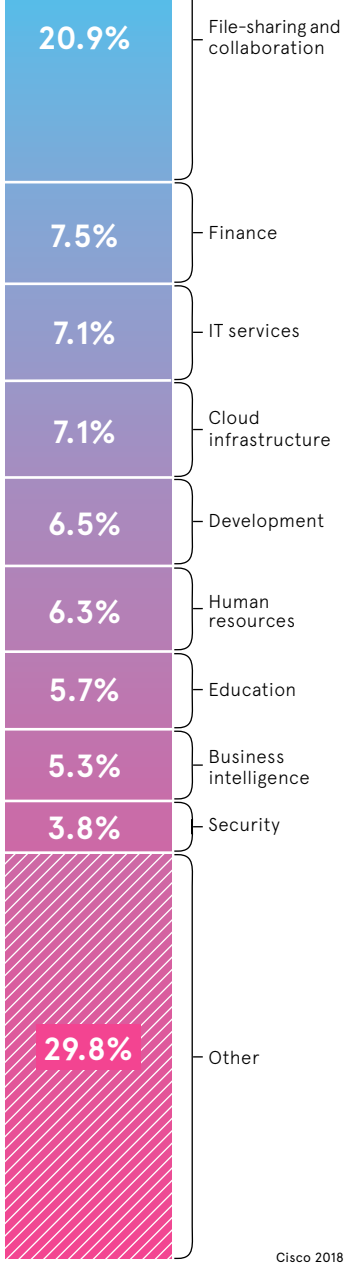
"Analytics and AI will underpin pretty much any decision that needs to be made using large datasets as the input to those decisions, for both customer interactions and employee support," says John Everhard, chief technology officer for Europe at software firm Pegasystems. "The combination of the machine guiding decisions and people adding the human touch will evolve into a seamless partnership that provides the best products and services to customers, based on their needs, attitudes and experiences."

Thibaut Ceyrolle, vice president, Europe, the Middle East and Africa, at Snowflake Computing, adds: "Organisations that capitalise on machine-learning will also be better positioned to extrapolate the variety of data sources available and glue it together to serve as an interconnected data network. As this technology advances, it will foster more collaboration and partnerships."

While the majority of organisations now recognise that the vast data generated by their cloud-based applications can provide enormous value to them, realising that value and placing it at the heart of their business requires a major cultural shift. Emulating the success of companies that have placed cloud data at the centre of their business model will increasingly mean utilising AI to embrace the real value of digital transformation. ◆

Cloud usage by category

Percentage of cloud services in use in 2018



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