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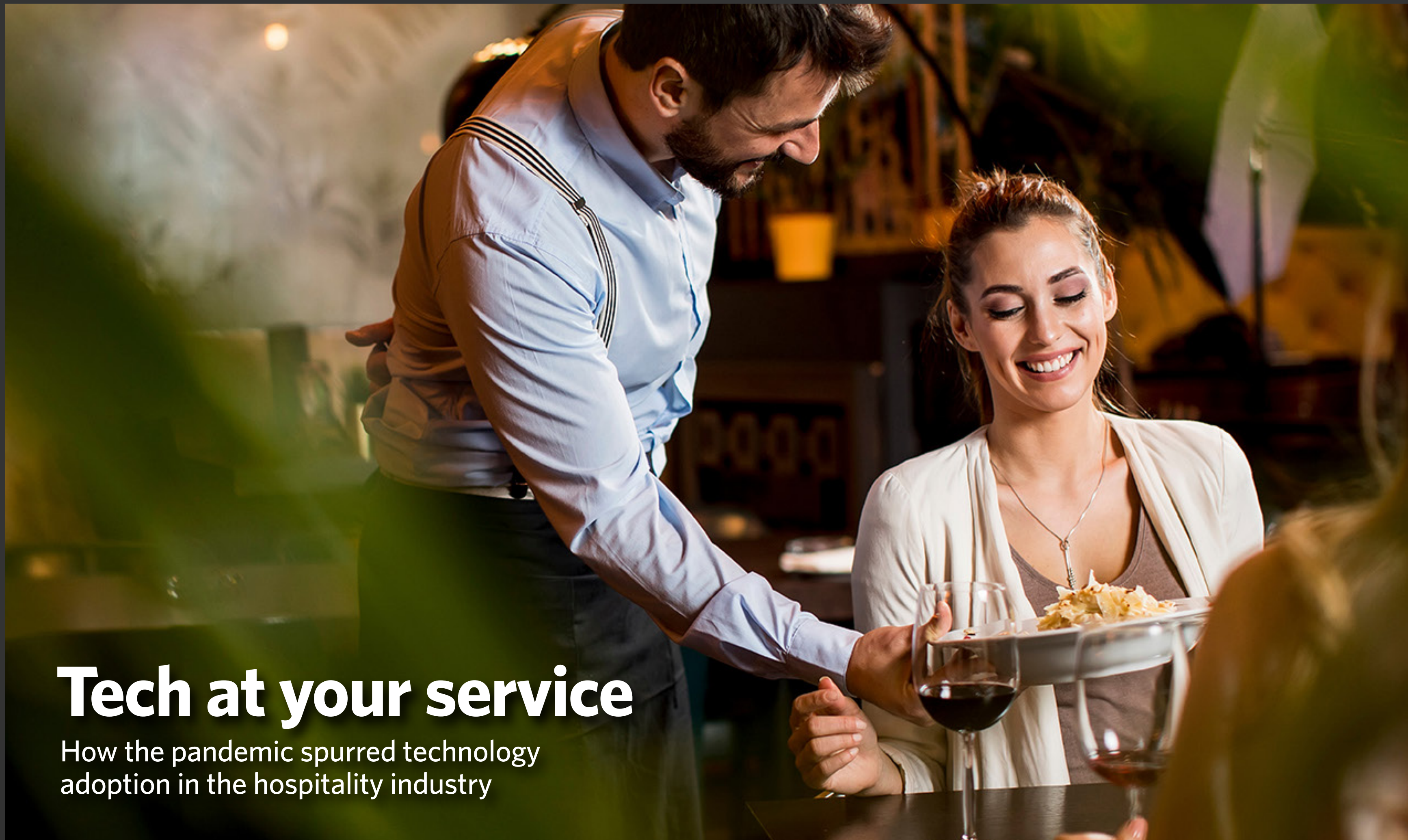

Tech at your service

How the pandemic spurred technology adoption in the hospitality industry

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New minister asked to pause Fujitsu government contracts

Labour MP Kate Osborne has demanded that Dean Russell, recently installed as Parliamentary under secretary of state for business, energy and industrial strategy, should pause and review all government contracts with Fujitsu. Fujitsu has so far escaped financial penalties, whereas the government has been forced to set aside £1bn to cover the costs of compensating victims of the Post Office scandal.

Government speeds up NHS Digital and NHS England merger

The Department of Health and Social Care (DHSC) has expedited the merger of NHS England and NHS Digital to create a more streamlined support body. The move, which will see NHS Digital's role as a separate arm's-length body of the DHSC cease to exist as staff and assets are transferred to NHS England, was due to happen at the end of March 2023, but will now take place in early January.

Public sector cloud provider hit with winding up order

Public sector-focused cloud provider UKCloud has been placed into liquidation, more than a year after its accounts revealed the firm was in need of a £30m funding injection to continue trading. Winding-up orders for UKCloud and its parent company, Virtual Infrastructure Group, were issued on 25 October, and Gareth Jonathan Allen has been appointed official receiver by the court to oversee the liquidation of both parties.

ICO warns against biometrics used for 'emotional analysis'

The Information Commissioner's Office (ICO) is warning organisations against using biometric technologies to conduct emotion analysis, which it has described as "immature" and "pseudo-scientific". Emotion analysis technologies are often powered by artificial intelligence algorithms and rely on a wide range of personal and biometric data to perform their purported functions.

MATT CARDY/GETTY

Sainsbury's outsources for cloud-first benefits

Sainsbury's has signed an outsourcing agreement with Tata Consultancy Services to support the retailer's move to a cloud-first IT strategy. The extension of a relationship between Sainsbury's and the Indian IT services supplier will see the retailer's IT infrastructure move to a hybrid cloud stack. Sainsbury's CIO Phil Jordan said this means it will be able to develop software for new potential revenue streams and react quickly to opportunities.

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Reported Horizon errors should have been 'show-stopper'

Problems reported with the Post Office's Horizon IT system before its roll-out should have been regarded as a "show-stopper", according to a senior executive involved in the roll-out of the controversial system.

One in five tech workers subject to workplace surveillance

One in five tech workers are subject to workplace surveillance software used to monitor their activity across in-office, hybrid and remote settings, which has become a feature of the UK's post-pandemic economy, a Prospect Union survey has found.

Microsoft Cloud shows signs of growth, but less than expected

Microsoft has reported revenue for its first quarter of 2023 of $50.1bn, up 11% compared with the same quarter last year. However, net income was $17.6bn, a 14% decrease. The firm said it had experienced "strong overall demand" for its cloud offerings.

SAP Q3 2022: Revenue up 15%, Ukraine war makes impact

SAP has announced third-quarter 2022 financial results showing a 15% increase in revenue to €7.841bn year on year, with cloud revenue up by 38% to €3.288bn, which is 42% of the total.

Meta tightens purse strings as it spends on Reality Labs

Meta CEO Mark Zuckerberg has admitted the firm faces "near-term challenges on revenue", meaning it will drive up efficiency during 2023. For the three months ending 30 September, Meta reported a 4% drop in revenue.

GMCA, Cisco collaborate for inclusive, digital region

Greater Manchester Combined Authority (GMCA) has announced a partnership with Cisco, looking to enable the transformation of public services with social value initiatives to support digital inclusion and address the digital divide across the region. ■

HSBC chooses Oracle's Cloud@Customer service

HSBC has chosen to use Oracle's Cloud@Customer service to upgrade and migrate some of its database systems. The bank will use Oracle's managed infrastructure offering, part of the Oracle Cloud Infrastructure, in its own datacentres.

JOHN GOMEZ/ADOBE

- Lawyers raise concerns over hacked cryptophone data.
- Cuba ransomware cartel spoofs Ukraine armed forces.
- UK needs stronger innovation clusters outside South East.
- Santander calls for cooperation to tackle APP fraud.

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Google Cloud Platform in 2022: What's in it for the enterprise?

Google Cloud has seen its market share and revenue soar in recent quarters as enterprises flock to its platform, but profitability continues to elude the company. Caroline Donnelly reports

The evolution of the Google Cloud into a compelling option for enterprise IT buyers is an ongoing, multi-year process that has so far involved senior management changes, the rejigging of business units and several product rebrands.

On the back of all this chopping and changing, the Google Cloud Platform – and how it differs from what its major competitors have to offer – has become far more tangible and defined. And the firm is reaping the rewards in market share and revenue growth.

"Google has done well, increasing its worldwide market share from less than 6% five years ago to 10% today," said John Dinsdale, chief analyst and research director at market watcher Synergy Research Group. "Over that same period, the market size has grown five-fold, so Google has been able to grow its share of a market that is itself growing extremely rapidly."

Even so, as Dinsdale concedes, Google Cloud remains a "distant third" in the public cloud market rankings behind Microsoft Azure and Amazon Web Services (AWS). Undeterred, it has sought to differentiate itself from Microsoft and Amazon by talking up its technology credentials – specifically its portfolio of artificial intelligence (AI), machine learning and data analytics services – rather than pitching itself as just another purveyor of cheap commodity cloud compute and storage services.

The firm's commitment to ensuring that its cloud services are built on open source principles is another feature that it emphasises as a point of competitive difference. This has also fed into the marketing of the Google Cloud Platform as an enabler for enterprises to adopt a multicloud strategy.

On that point, it remains difficult to say with any degree of certainty how many Google Cloud users are "all-in" on its platform, rather than using it to supplement the cloud deployments they already have in place with the likes of Amazon and Microsoft, said Sid Nag, vice-president of cloud services and technologies at market watcher Gartner Research.

"The market share numbers speak for themselves," he said, citing Gartner's most recent *Worldwide public cloud services market share* data from June 2022.

Its data has Google pegged as the fourth-biggest public cloud provider globally, behind Chinese firm Alibaba. AWS leads the market with a 38.9% share and whole-year revenue of $35.4bn for 2021, while Google's share stands at just over 7%, with the firm making $6.4bn in revenue last year. "Does Google have customers that use them as the primary?" said Nag. "Of course they do, but the question is what percentage of customers are using Google as a primary provider, rather than the secondary. Or tertiary in a multicloud construct. That's really the issue."

Recent years have seen the firm's sustainability credentials also lauded as a reason to "go Google" by customers, including fashion house Stella McCartney and consumer goods giant Unilever, which are using the platform to make their supply chains greener.

The Google Cloud Next user conference in October 2022 saw car marker Ford also speak at length about how it is using the firm's technologies to improve the efficiency of its manufacturing processes and to enhance customers' driving experience.

Telco giant [Vodafone signed a six-year deal with Google Cloud] in May 2021 to extend an earlier collaboration between the two firms that was focused on boosting its data-processing capabilities.

During Google Cloud Next, details emerged about how the next phase of this partnership will see Vodafone embark on a multi-year effort to [migrate all of its on-premise SAP workloads to the Google Cloud Platform].

Also announced at the show was the news that online furniture retailer Wayfair had completed an "all-in" move to Google Cloud, which saw it [move all the workloads and applications in its data-centres to the platform] over the course of 16 months.

Fashion house Stella McCartney is using the Google Cloud Platform to make its supply chain greener

AGCREATIVELAB/ADOBE

Building its customer acquisition strategy on the pillars of AI, open source and sustainability is why Google Cloud's most recent financial results confirm that its revenue grew by 35% year on year to $6.3bn during Q2 2022. But the company is yet to turn a profit. In fact, its Q2 results revealed that its losses have widened year on year from $591m in 2021 to $858m in 2022.

Sticking point

According to Nag, this might be a sticking point for enterprise IT buyers who are still weighing up whether to add Google to their roster of IT suppliers. "Google Cloud continues to grow as a business within Alphabet, but the biggest challenge is they haven't shown operating profitability for a very long time," he said. "Google Cloud launched in 2008, and now it's 2022 – and they haven't shown an operating profit in all that time.

"The company keeps saying it's focused on growth. That's fine, but obviously, as you get considered by enterprise buyers, financial viability is important. The company may claim financial viability is not an issue, because it is part of a parent company, Alphabet, which is highly profitable and highly viable."

The Google Cloud Platform's connection to Alphabet is a positive one in terms of giving it the breathing space it needs to pursue a growth strategy as its losses widen.

And during the conference call to discuss its Q2 results, Alphabet chief financial officer Ruth Porat shed some light on why turning a profit continues to elude Google Cloud because of how heavily it is investing in its platform. "Customers are transforming their businesses, utilising Google Cloud Platform's secure infrastructure with data analytics and AI capabilities, uncovering real-time insights and leveraging the collaborative tools of Workspace [formerly known as G-Suite]," said Porat. "They are in the early days of this transformation, and we continue to invest in our products, our go-to-market capabilities and cloud regions."

> "Google Cloud launched in 2008, and now it's 2022 – and they haven't shown an operating profit in all that time"
> Sid Nag, Gartner Research

Indeed, Google Cloud Next saw the firm set out plans to open its first datacentre regions in Austria, Greece, Norway, South Africa and Sweden, having already publicly committed earlier this year to building out its datacentre presence in Malaysia, Mexico, New Zealand and Thailand in response to the growing demand for its services. This means Google Cloud now has a total of 48 regions that are either live or under development.

There is also a persistent question about whether Google Cloud's close ties to its parent company remains a sticking point for some enterprises, because Alphabet's highest-profile offerings are consumer-grade products such as YouTube, Google Maps and its flagship search offering.

Google and OVHcloud are embarking on a technology tie-up.

Synergy Research's Dinsdale said: "While Google is a very strong brand that plays well all around the globe, historically this was more of a strength in consumer rather than enterprise markets. In many senses, Google's history was supplying free services on a best-efforts basis. That might be fine for people who are doing searches or trying to find their way from A to B, but for enterprise customers, best efforts is nowhere near good enough."

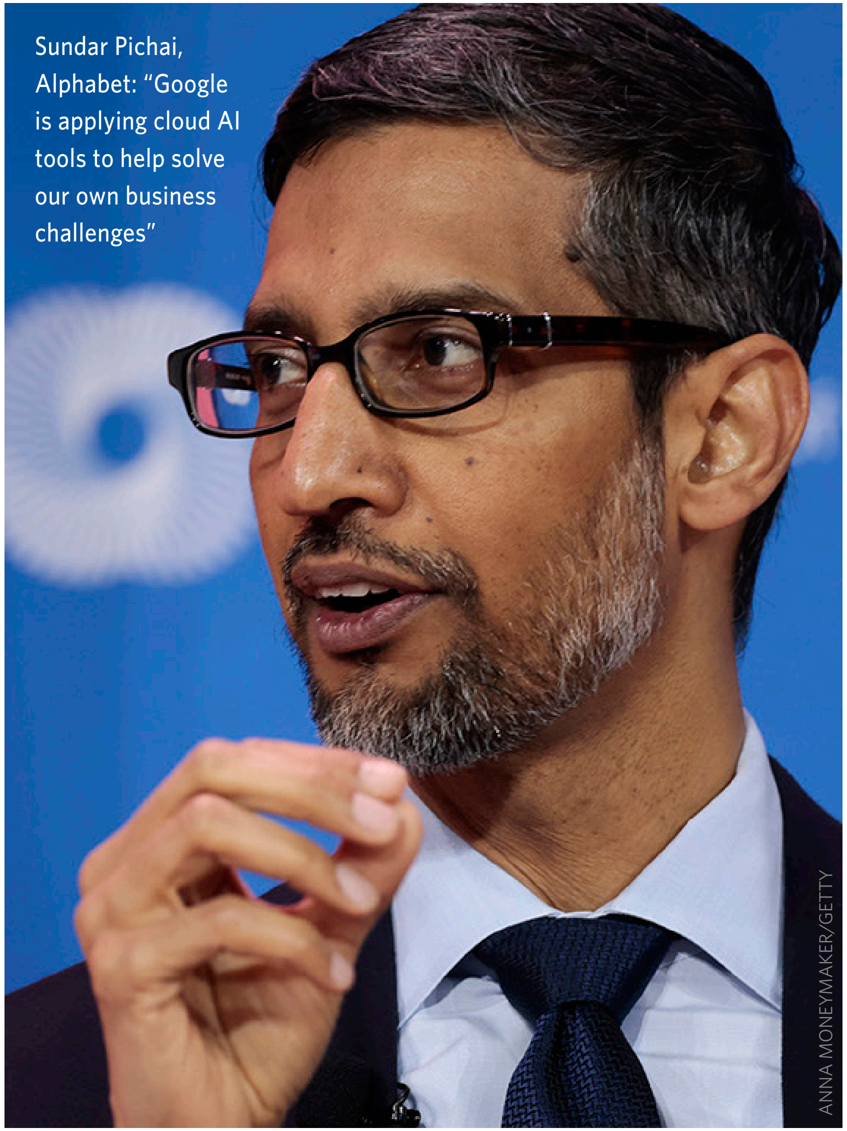
Also, Google entered the cloud market only two years after its arch-rival AWS pitched up, but its early offerings were not, said Dinsdale, "as focused and aggressive as they should have been".

He added: "By then, Amazon was already well established and it has continued to benefit from its early mover status, keeping the pedal to the metal by aggressively expanding its range of cloud services, constantly growing its worldwide datacentre footprint and growing its sales and support capabilities."

The origin stories of both AWS and Google Cloud share a degree of commonality, given that both were effectively spun out or built using knowledge gleaned internally from operating a consumer platform. In AWS's case, that's the Amazon retail business.

"Given the nature of cloud services and Google's existing tech foundation, this was a market that should have been a natural target and in which it could have been a leader," said Dinsdale. "Instead, it missed the boat and has been playing catchup."

But while Google's reputation as a purveyor of consumer-grade cloud services may have initially held it back in the enterprise, the CEO of parent company Alphabet, Sundar Pichai, used the opening keynote of Google Cloud Next to outline how its consumer business helps strengthen its enterprise offerings.



Sundar Pichai, Alphabet: "Google is applying cloud AI tools to help solve our own business challenges"

"We developed our global network, including 22 subsea cables, to bolster our infrastructure and improve the performance of our products like YouTube," he said. "Now it's available to our customers as well. We developed BigQuery to help our search customers. And now every company has access to the most powerful analytics. And because we invested for years in threat analysis to protect everyone who uses Google, we can help provide that same protection to countries and companies with Google Cloud."

Landing well with IT buyers

And it is this part of the Google Cloud proposition for enterprises that Nag feels is landing well with IT buyers. "Google has never had a problem with technology, right?" he said. "They've always been at the forefront of cutting-edge technology and they do a good job of cross-pollinating that across the different properties and assets, be it YouTube or Search or Maps or whatever, and into their cloud offerings. That's always been covered."

This view is shared by Simon Dawson, a member of the C2C Google Cloud Customer Community and head of engineering at Atom Bank. "Google has developed a strong brand and reputation for running public cloud services that are consumed by millions of users worldwide," he said. "Enterprises can see the reach and scale of services such as Search, YouTube and Maps, and be confident that Google Cloud's underlying infrastructure that powers these services can be leveraged for their business needs.

"Google's public cloud proposition provides global reach, scalability, advanced security and resilience out of the box. These strengths, coupled with their investment in service offerings, particularly in AI and machine learning, can provide a competitive advantage for enterprises looking to scale their business."

The Google Cloud Next keynote also saw Pichai talk about how Google has "long been an AI-first company" and how this has contributed to it making strides in "challenging areas" such as translation, computer vision and natural language processing.

"These advances are powering helpful product innovations, from enabling people to search using video and text simultaneously, to summarising long documents and highlighting what matters," he said. "Google is also applying cloud AI tools to help solve our own business challenges. Google's products are used by people around the world who speak thousands of different dialects and languages. It's really important we can provide translations, so everyone can access them."

Project Starlight

Pichai also gave an example of some technology in the pipeline from Google Cloud which is geared towards making online meetings a more personable experience using 3D modelling technology. It is being developed under the name of Project Starlight.

"It creates a 3D model of a person, making it feel like you're sitting with someone in the same room – not at the other end of a video call," he said, adding that the technology has been put through thousands of hours of testing internally at Google. "Users noted the powerful ability to make eye contact and how much more engaged and connected they felt," said Pichai.

As confirmed at Google Cloud Next, the technology is now being tested with a series of third-party Google partners, including

Salesforce and T-Mobile. "Starting this year, we will begin installing Starlight prototypes in select partner offices for daily testing," said Pichai. "It's a really exciting next step and we are looking forward to improving this technology together."

Post-pandemic, initiatives like Project Starlight are sure to be of interest to enterprises that are grappling with how to make a go of operating a hybrid working setup, but another notable announcement the firm made at Google Cloud Next was around the sovereign cloud strategy it is pursuing.

> **"Google Cloud haven't really demonstrated a multicloud narrative for enterprises"**
> Sid Nag, Gartner Research

In September 2021, the firm outlined its commitment to providing private and public sector organisations across Europe with access to off-premise services designed to meet their security, privacy and digital sovereignty requirements. It would achieve this by partnering with local cloud providers in several European countries, including T-Systems in Germany, S3NS in France, Minsait in Spain and Telecom Italia in Italy, to bring the services to market.

According to Nag, the strategy it is employing to deliver its sovereign cloud services is a blueprint it should follow to add more meat to the bones of its multicloud proposition for enterprises.

"Google Cloud talk about multicloud and have always taken the approach of being a multicloud provider in a very open manner, but they haven't really done anything to demonstrate a multicloud narrative for enterprises," he said. "They haven't formulated strategic partnerships with other players in that space in the way that, for example, Oracle and Microsoft have. On the multicloud front, they should definitely formulate some partnerships to demonstrate their commitment to that."

The firm has a multicloud-enabling platform called Anthos, which it claims can help enterprises containerise their applications so they can run in the Amazon and Microsoft public cloud, as well as in on-premise datacentre environments, with minimal modifications. Nag said: "Anthos is a piece of software that supports multicloud and containerisation, but in essence, they are still pushing their own technology via the multicloud narrative in many ways and it is also unclear how much traction they are getting with Anthos because they don't really publish that data."

Channel strategy

Another challenge for the firm is in building out its channel strategy, which Nag described as "lagging behind" and "evolving", but which will, in time, provide another route into the enterprise.

Synergy Research Group's Dinsdale backed this view, saying: "It took too long for Google to get really serious about sales, support, channels and marketing for enterprise markets. Google has come a long way in the last five years and it is pushing all the right buttons. The challenge remains that Amazon and Microsoft are also pushing those same buttons." ■

Subpostmasters federation failed its members when they needed it most

A dereliction of duty saw the National Federation of Subpostmasters ignore its members when IT problems hit and allowed the Post Office to destroy their lives, writes Karl Flinders

The National Federation of Subpostmasters (NFSP) failed its members in their hour of need by ignoring clear warnings that the Post Office's Horizon IT system had problems early in its operational life, according to victims of the scandal.

At the ongoing public inquiry, the NFSP acknowledged it could have prevented hundreds of ruined lives and saved thousands of businesses from struggle and failure, if it had done the very thing it was set up to do over 100 years before Horizon's arrival.

A trade union until 2014 before taking its current private business form, the organisation was set up in 1897 by a group of 90 subpostmasters to improve the conditions for all subpostmasters in the UK. But when its members needed it most, it failed them.

The NFSP is currently a participant in the statutory public inquiry into the Post Office Horizon scandal – a scandal that saw an abuse of subpostmasters as a result of the Post Office blaming and punishing them for unexplained shortfalls in their accounts, which were actually caused by the computer system from Fujitsu which subpostmasters were made to use in their branches.

Horizon was introduced to Post Office branches in 1999/2000 to automate accounting processes. Soon after it went live, subpostmasters started experiencing accounting shortfalls that they could not explain. Thousands of subpostmasters were blamed for these shortfalls, which were later proved to have been caused by computer errors – but not before lives had been ruined.

Between 2000 and 2015, about 770 were convicted of financial crimes such as theft and false accounting, based on data from the Horizon system. Many were sent to prison and thousands more were ruined financially and had their lives turned upside down. More than 80 former subpostmasters so far have had criminal convictions overturned, with many more expected to follow.

Back in 2009, when Computer Weekly first told the stories of seven subpostmasters who had suffered the life-changing effects of being wrongly blamed for losses, a recurring theme was that the NFSP did not help them.

There were many opportunities for the NFSP to make a stand on behalf of its members, but it chose to ignore them. For example, in

2009, when asked by Computer Weekly for comment during its investigation into subpostmaster claims of IT problems in 2009 and faced with the prospect that the Horizon problems could soon be brought to the public's attention, the NFSP sat on the fence and declined to comment.

Much later, despite more evidence to the contrary, the NFSP continued to defend the Post Office's position, rather than challenge it on behalf of its members. During a Business, Innovation and Skills Select Committee meeting in 2015, Alan Bates, a member of the Justice for Subpostmasters Alliance (JFSA) pressure group, which was set up to campaign for the subpostmasters affected, criticised former NFSP general secretary George Thomson for siding with the Post Office over the Horizon problems. Thomson refuted this, saying: "I will kick the Post Office up the backside when it does something wrong, but on Horizon it has done nothing wrong,"

Now the NFSP will have to justify its inaction to the public inquiry. In opening statements in phase two of the seven-phase statutory inquiry, lawyer Catriona Watt, representing the NFSP, said the executives of the federation had trusted the Post Office and Fujitsu when they said that it could not be Horizon errors causing unexplained losses. By implication, this means it didn't listen to its members or trust their views.

"NFSP sincerely regrets that its belief in the Post Office, the government, Fujitsu and the justice system was so misplaced," said Watt. She added: "Without the knowledge that, it turns out, Post Office and Fujitsu had, the NFSP was limited in what it could do and it is, of course, with hindsight, with all of the information that

Hundreds of subpostmasters were prosecuted for financial irregularities that were later found to have been caused by the Post Office's Horizon IT system

FEFERONI/ADOBE

is now available to it, that the NFSP and others can look and say 'well, why did we not know this?'"

But from early in Horizon's life, a common theme from subpostmasters' horror stories is a lack of help from the NFSP. In fact, the federation went out of its way to avoid the subject. It is not credible to blame a lack of warnings of the Horizon problems as its reason for doing so.

Former subpostmaster Lee Castleton was declared bankrupt after he refused to pay the Post Office £27,000 – money it said he owed because his branch accounts showed unexplained deficits over a 12-week period in 2004. The Post Office spent about £300,000 on legal costs to defeat Castleton in court. He believed the shortfall was caused by computer errors.

Suffering losses

Castleton never believed he was the only one having trouble balancing the Horizon system and during the time when he was suffering losses, he had been calling other subpostmasters to see if they were also having problems.

In 2004, he contacted the NFSP for help. "I thought I was a member, but when I got in contact for help, they said, 'You are not a member, but if you send a year's membership fee in one go, we will look into it'," he told Computer Weekly.

He sent the money, but it was promptly returned. "I was told I couldn't join because of the issue I was having," he said. Colin Baker was then the general secretary of the NFSP.

Castleton said subpostmaster Mark Baker, who was on the NFSP executive council at the time, asked directors of the federation to help him, but this was rejected. From the beginning of Castleton's problems, he believed Horizon was to blame and raised the issue with the NFSP. "I mentioned Horizon from day one," he said.

Mark Baker confirmed to Computer Weekly that he tried to get help for Castleton through the NFSP executive council, but "they weren't having any of it". He said he was told Castleton could not join the union because he was bringing problems and saying too much about Horizon. "In essence, they were saying to Lee, 'Horizon is not responsible for your problems, you are not joining the union.' Baker said he tried again when George Thomson took over as general secretary, but still couldn't get help for Castleton.

Frightened the executives

He even initiated a motion to the executive council to allow Castleton to join and give him financial support to help him fight his case. "I spoke on the motion and asked my colleagues to support my motion," he said. "George Thomson was on his feet and poured cold water over the idea and frightened the executives to death, saying this will cost a fortune and the Post Office will fight us all the way. I did not even get a seconder to my motion."

Another former senior executive officer at the NFSP, Michael Rudkin, said that in 2003 he became aware that subpostmasters were having problems with Horizon. "People were ringing me up complaining. As a branch secretary, I had to escalate these complaints to an executive officer, but invariably they wouldn't do anything because they didn't understand it and were encouraged [by the NFSP] not to pursue it. In regional meetings, we would raise the issue, but it was always swept under the carpet."

› *Victims demand that the perpetrators of Post Office scandal face public inquiry.*

In 2008, there was a £44,000 shortfall at Rudkin's branch in Ibstock, Leicestershire, and he was suspended. He was reinstated three months later, but he said there were problems in balancing the accounts and in 2009, after experiencing unexplained account shortfalls, his wife Susan, who worked at the branch, was prosecuted for theft.

Susan Rudkin was convicted, received a 12-month suspended prison sentence and was ordered to carry out 300 hours of unpaid work and placed on an electronically monitored curfew for six months. She has since had this wrongful conviction overturned.

Because of the NFSP's inaction, subpostmasters were left to campaign against the Post Office themselves, often during periods when they were trying to save their businesses being destroyed by unexplained losses.

For example, Alan Bates, the former subpostmaster who led the 555 subpostmasters who successfully sued the Post Office in the High Court group litigation order (GLO), wrote to NFSP general secretary Colin Baker in 2003.

"I am writing to you with regard to Craig-y-don Post Office further to my previous letters," he wrote. "The Post Office have now closed the office and I have to tell you I am very, very disappointed with the lack of response to my plea for help and assistance from the National Federation of Subpostmasters. The post office ceased trading on 5 November 2003, and in the weeks prior to

MASSIMO USAI/ADOBE

that, I made numerous telephone calls to your office, but to no avail, nobody ever responded. The file I sent you in mid-September about my case highlighted how the issue not only affected me, but also every subpostmaster who runs a post office. The Horizon system is flawed and Post Office Ltd are trying to hold subpostmasters liable for system losses, without allowing full access to the system to check the data they have input."

"As the federation were not able to stand up to the Post Office and support its member is this issue, it subsequently allowed the Post Office to just take away our investment, livelihood and life savings in one fell swoop. I have no doubt that Post Office are involved in a major cover-up of the inadequacies of the Horizon system, and I will continue, even as a voice alone, to raise the profile of this issue and to have it investigated at the highest level."

NFSP response

Colin Baker responded to Bates in January 2004: "In relation to errors that members considered were due to Horizon problems, the Executive Council set up a joint Federation/Post Office group who visit the Horizon helpline site to discuss and resolve issues. It is my understanding that the Post Office can trace the nature of any error, including telephone calls relating to the same, when the Horizon system is in question and, therefore, should be able to produce evidence that all is, in fact, correct from their side.

"We are not in a position to provide information regarding other subpostmasters' dealings with the Post Office. We are aware that there are some disputes around the time that offices migrated from the manual system to the Horizon system, but we are now of the view that Horizon works well and that there are no real problems in post offices which are operated by the Horizon system."

Mary McCrory Philip bought a Post Office branch in Fife in 2001 with her mother, Mary Logie Philip, who was the subpostmistress. Her mother was suspended in 2006 after being blamed for an unexplained loss. She had paid tens of thousands of pounds out of their own money to cover shortfalls over the years and died before the truth about Horizon was revealed. McCrory Philip said her mother contacted the NFSP but they talked to her like she was guilty of something: "They were just as bad as the Post Office."

Judge criticised NFSP

During the High Court group litigation *Bates and others versus the Post Office* in 2018/19, when 555 subpostmasters sued the Post Office and proved Horizon errors cause unexplained losses, the managing judge criticised the NFSP. Judge Peter Fraser said: "It is obvious in my judgment that the NFSP is not remotely independent of the Post Office, nor does it appear to put its members' interests above its own separate commercial interests."

In her closing statement to the public inquiry, Watt said: "The NFSP wants to make it clear that, while it has supported many members over the years in disputes with the Post Office, and noting some of what was said by counsel, where there were any NFSP members who did not receive the help that they considered necessary, that will always be a matter of regret for the NFSP."

NFSP CEO Calum Greenhow said in a statement to Computer Weekly: "The NFSP will address in more detail the points made in the opening statement at subsequent phases of the inquiry." ■

Capital One banks on assuring software developer wellbeing to build agile future

Cliff Saran talks to Capital One CTO Brad Miller about the bank's focus on its software development team

Brad Miller lives in New Jersey and, due to the pandemic, has the flexibility to work both out of his home and from Capital One bank's New York office. Miller has been chief technology officer (CTO) of Capital One for two years, where he is responsible for the bank's enterprise products and platforms technology organisation.

With more and more of business relying on software, Miller believes the role of an IT leader is to ensure software development teams can work in an agile way and are not held back by avoidable effort. He says: "Look for bottlenecks in your systems."

For Miller, it is very easy to identify these bottlenecks. They can be revealed as a massive backlog of work to do, or when the net promoter score of a business service starts to fall.

But he adds: "There are not as many instances of true agile development as people think."

For Miller, the reason true agile development is hard to achieve has nothing to do with the ability of software development teams to work in an agile way. But, in Miller's experience, within a publicly listed company, the cadence of software-enabled product

Brad Miller, Capital One: "There are not as many instances of true agile development as people think."

releases is set by the delivery commitments made to shareholders and the financial markets.

"Certain capabilities that you're forecasting in your financials or to enable investors to understand [the direction the company is taking] means that you've kind of shifted yourself away from extreme agile," he says. "You're working back from a date."

While the market expects a "big bang" product release, the developers are working iteratively to build out the new functionality by a specific deadline, he says.

> **"Software developers love really hard problems. They love work on the most modern stacks and they love innovative work"**
> Brad Miller, Capital One

Miller says Capital One uses scrum methodologies to enable teams of developers to make small product releases that are iterative, so it can deploy innovation on a sprint-to-sprint basis.

Software is seen by many business leaders as the catalyst that enables them to accelerate business strategies and develop digitally enabled innovations. But Miller says the main challenges IT leaders face is how to hire great talent. And although every new tech trend is followed by a demand for new skills, leading to skills shortages, Miller says: "We have such a large appetite to develop new business capabilities that we are constantly hiring. But Capital One has done a really great job at being very specific about the skills we need. Whether it's front-end development, or iOS/Android mobile developers, I've been very impressed with our recruiters' ability to go after the right talent."

Miller says this has adapted as the business shifts to requiring people with skills in newer areas, such as data-focused skills. "We're really focused on getting the right talent in with the right set of skillsets in order to deliver [technical] capabilities to our customers right now," he says.

Talent strategy

To ensure that Capital One is able to continue to innovate with software, Miller says it is imperative to maintain a focus on developing software that is core to the bank's business goals. "Nowadays, retaining staff through training is a critical part of our talent strategy," he says.

Along with developing strong internal skills, Miller says he will, where necessary, buy in technology or work with a tech partner to fill in the skills gaps in the organisation.

Looking at how to keep developers motivated, Miller says: "Software developers love really hard problems. They love work on the most modern stacks and they love work that is innovative."

These motivations can be drawn upon when businesses are battling to modernise older systems to prevent technology from going stale. Automation and the right tooling are crucial. Miller says developers spend a huge amount of time managing code deployment pipelines. Capital One has centralised the code delivery type pipeline as a managed service by the IT department.

One of the benefits of the software development and engineering process is scrum teams, says Miller: "These teams are very focused on a service that they're bringing to market and the team rallies around that service and the supporting services."

According to Miller, such a work environment creates cohesion among team members. "It's a very socialistic way of building software where developers and product managers and designers and testers are working together, whether virtually or physically, with the same goal of creating, developing and operating great services for customers," he says. The team thrives irrespective of whether team members are working in an office or virtually, he adds.

Risk of burnout

With modern business requiring constant software innovation, there is a great risk that software developers will become overworked and experience burnout. Miller says the pandemic showed how people could work isolated at home and connect to each other via technology. "I wouldn't say it's as great as being able to be physically in front of someone or hug somebody, but I couldn't imagine life without it in these past few years," he says.

"In this era of non-physical togetherness, we've actually flexed our muscles on thinking about the other people as real people and what they may be going through and we're embedding more social interaction, even though it's over Zoom."

Undoubtedly, the Covid-19 pandemic has forced business leaders to reassess the way employees work, where they are most productive and how to manage teams where some people are not all in the same office. The hybrid mode of work has also altered the pre-pandemic way that people interact in a work environment.

Miller says the so-called "water cooler moment" is an aspect of office work that cannot easily be replicated over an online conference. "These positive collisions happen on the work floor and nothing replaces walking by someone at the water cooler or, to date myself, it was at the printer or the printer room," he says.

Flexibility at work

Capital One believes in flexibility at work, he says, which means offering a hybrid mode where Mondays and Fridays are optional days for people to come into the office. "Tuesday through Thursday are options for people to come together."

But one area that is often overlooked in hybrid working is how people can be mentored. Miller's LinkedIn profile shows a career spanning senior roles at Mastercard, building cloud operations at Citi Bank and general manager at Amazon's e-commerce platform. He also spent four years as a security strategist at Microsoft.

Discussing his experiences of being mentored and mentoring, Miller says: "I grew up in an environment where I was going to the office every day, sitting beside some of the smartest engineers at Microsoft and Amazon, learning from them and asking questions." He says he benefited from the mentoring that takes place in such environments, adding: "We've yet to develop new mechanisms to do mentoring in a hybrid way." ■

Listen to the full podcast interview here

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TechTarget

Security slip-ups are no laughing matter

If causing a cyber security breach is a resignation matter, then to be able to waltz back into the same job days later is unacceptable – and yet this is exactly what our erstwhile, and now current, home secretary Suella Braverman did. On 19 October – the day before former prime minister Liz Truss quit – Braverman resigned from her post as home secretary after breaching the ministerial code by sending official, restricted documents from her personal email account to a fellow MP. In a pointed resignation letter to Truss, Braverman wrote: "I have made a mistake; I accept responsibility; I resign."

Yet just six days later, with Truss consigned to history and Rishi Sunak elevated to PM, Braverman was reappointed to the same post. In doing so, Sunak and Braverman made a joke out of the security profession that the government claims to value so much. They make it harder for security professionals to justify doing their jobs well, and make it more likely that they will receive pushback from their organisations when they have to make a tough call: "The home secretary used her personal email account to send official documents – so why shouldn't I use mine?"

Cyber security professionals do one of the most demanding jobs in IT, and are often overlooked by their organisational leadership and belittled by those they protect. Security practitioners often complain they are seen as "that person who says no to everything". In a recent study by Trellix, frustrations over a lack of support and recognition were cited by almost one-third of those planning to leave the security profession.

Sunak and Braverman made a joke out of the security profession

Perhaps more worryingly, Sunak and Braverman have also risked making it harder for the UK's intelligence agencies to perform their duties. GCHQ and its National Cyber Security Centre operation report to the foreign secretary, not the home secretary, but MI5, which carries its own cyber security brief, does report to Braverman. Although protecting critical systems from cyber threats, both foreign and domestic, is a far cry from a carelessly sent email, any security professional will tell you that the most apparently benign of security slip-ups will let in a nation-state threat as easily as it will a financially motivated ransomware gang.

Those in charge of national cyber security must be held to a higher standard. At the very least, Sunak and Braverman owe an apology to the thousands of cyber security professionals who keep organisations across the UK safe from an unrelenting barrage of daily threats. ■

Alex Scroxton, security editor

Read the latest Computer Weekly blogs.

The tech helping firms to manage their finances

With a worsening economic climate, software has an important role in helping finance departments control budgets, writes Madeline Bennett

AXEL/ADOBE

The latest *Deloitte UK CFO survey*, for the third quarter of 2022, demonstrates just how badly external economic factors are impacting businesses. Some 91% of chief financial officers (CFOs) expect operating margins to decline over the next 12 months, and cost reduction and cash control are now their top priorities.

Faced with these challenges, finance departments need to shift away from dealing with basic accountancy tasks, and instead become more strategic, identifying ways to add value to the business to ensure survival through the economic crisis.

One of the best ways to achieve this is with technology that helps CFOs not only predict, forecast and plan, but also apply automation to reduce manual finance tasks.

Visibility across the business

Through its enterprise performance management (EPM) and analytics technology, Oracle offers capabilities around planning, budgeting, forecasting and reporting, as well as risk management and automation. With EPM, Oracle says firms can also bring in third-party data from other parts of the organisation so that planning can be done holistically, and everyone is using a consistent data structure to achieve visibility across the business as a whole.

According to Oracle finance transformation leader Nick Jackson, this enables businesses to bring in scenario planning rapidly. "With the pace of change we are seeing at the moment, everything is changing all the time," he says. "Assumptions that were made six months ago have got thrown up into the air. How can you quickly rerun your planning scenarios, understand what the implications of different decisions are, and deploy that?"

Oracle's offering in this area is bolstered by Fusion Analytics, which enables firms to interrogate finance, HR and supply chain data, using analytics to predict, understand trends, identify exceptions, and deploy machine learning. Companies can learn about user behaviour, pre-empt decisions, offer advice, and start automating more of the data management that is currently managed by staff within a finance function.

To cater for global organisations such as Nestlé, Oracle offers Analytics Cloud, which enables global companies to funnel vast amounts of data into the financial planning and analysis (FPA) function. "They can then provide recommendations to decision-makers, such as: here's what we think is likely to be a sensible way forward and also here are the implications of that in terms of risk, in terms of scenarios that might apply to the decision," says Jackson.

> "Assumptions that were made six months ago have got thrown up into the air. How can you quickly rerun your planning scenarios?"
>
> Nick Jackson, Oracle

According to Jackson, these latest financial planning tools are vital for businesses wanting to react to fast-changing market conditions. "We are growing much too quickly not to leverage automation, but it hasn't been leveraged in a lot of the ways that I had hoped to at this point," he says.

SAP is another enterprise resource planning (ERP) provider offering a range of finance analytics and automation technology that can be added to its core ERP system. These include predictive analytics to identify the optimal processes to automate, embedded artificial intelligence (AI) and machine learning (ML) to provide intelligence in the application, and financial planning with embedded forecasting, all tightly integrated with ERP.

These different technologies can be applied to automate operational processes, for example invoice receipt reconciliation, mapping incoming payments to open accounts receivable items, and intelligent automation to analyse business results as well as to predict, simulate and create scenarios, including anomaly detection.

SAP provides out-of-the-box embedded AI/ML scenarios, for example predictive liquidity forecast, and offers AI/ML tools that can be integrated with applications such as SAP S/4 Hana. A modelling framework is available to generate specific scenarios without the need for programming.

For CFOs, one of the core benefits of such planning tools is reducing the time spent on basic finance tasks. According to Michel Haesendonckx, global solution owner for financial planning and analytics at SAP, its customers have seen a shift in allocation of employee time from 80% preparation-20% analysis to 20%-80%, respectively.

"This is a clear shift from operational activities to added value activities for the organisation," he says. "Automated forecasting has improved accuracy by 7% and process automation reduces errors and improves employee satisfaction. It allows for faster cycles, for example predictive modelling allows for many more 'what if' scenarios and simulation, bringing greater scalability.

"Trust in ML applications through the addition of insights into how they work also gives organisations the ability to act with confidence. This enables them to save time, allowing them to focus on value-added tasks as well as cost savings."

Cookie company bakes in visibility to help manage fluctuating costs

For cookie company Crumbl, getting visibility into the business was proving difficult. The firm has 600 franchise locations across almost every US state, and is opening seven to 10 new stores each week. Crumbl has doubled its size year on year, and is on track to continue doing so. But this rapid expansion was making it difficult to get an accurate view of the firm, leading to a decision to upgrade from QuickBooks Online to NetSuite ERP to manage its financial reporting and planning.

The NetSuite technology is helping Crumbl deal with the fluctuating costs and supply chain challenges affecting so many businesses at present. While Crumbl has been able to maintain costs for staple ingredients, for rotational products that are needed more irregularly, this is trickier to manage.

Michael Card, vice-president of finance at Crumbl, says: "It is unreasonable for us to stockpile gummy sharks for Shark Week. But in those instances where we have to supply almost a just-in-time approach to certain aspects of our supply chain, we have been able to leverage some of the tech we've been developing through NetSuite, through efforts on our procurement side, to ensure we have all the product we need at a reasonable price."

Card was impressed with some of the new automation features on show at NetSuite's SuiteWorld event in Las Vegas in September. He could see Crumbl taking advantage of automations on the banking and reconciliation side to improve business processes in finance. NetSuite AP (accounts payable) automation embeds banking services into the ERP system, with automated payment services provided by HSBC.

HSBC says businesses are looking for integrated and accessible systems. The embedded banking software with NetSuite enables firms to manage payments and automate reconciliations at the point of need, without switching screens or multiple logins.

Card agrees that firms want integrated systems rather than standalone products. "I have a fear of being SaaS-ed to death," he says. "Wherever I can, I avoid having to have so many systems that I'm integrating to NetSuite, as opposed to NetSuite offering a built-in capability or with a native-to-NetSuite-type solution."

Anaplan's business-planning software can sit on top of any data repository, whether Excel or a supplier such as Oracle or SAP, and is intended to help companies model and solve some of their most pressing financial planning and budgeting problems.

One company using these tools is building materials supplier Onduline. During the Covid pandemic and a subsequent slowdown in business from its trading in Russia, the company has been able to connect supply chain planning with revenue and forecast planning. This enabled it to identify which plant to select if it needed to close one, or which materials to move from one area to another based on demand.

The role of AI

On the AI side, Anaplan offers Optimizer, an algorithm-driven optimisation engine that aids complex business decisions by analysing billions of possibilities. AI and ML remove any emotional bias of the planner, according to Nadine Pichelot, vice-president of finance EMEA (CFO) at Anaplan.

"I remember that in the financial crisis of 2000, at the company I worked at, sales was very optimistic," she says. "In finance, we were doing mathematical calculations and we were always right. It's very good to have a modelling tool that brings you what the reality could be, to be compared with the human forecast. That's what Anaplan enables."

> **"AI tools with large enough datasets can analyse historical transactions to forecast future outcomes and give users intelligent recommendations"**
> Rob Harvey, Sidetrade

Other tools are available that apply AI to a specific aspect of the finance function. Sidetrade, an AI-powered order-to-cash platform, is designed to help firms manage and unlock cashflow.

Managing accounts receivable in large organisations can entail finance teams dealing with huge volumes of customer invoices. Doing this manually or using spreadsheets for order-to-cash tasks can cause headaches for businesses around overdue invoices.

Rob Harvey, chief product officer at Sidetrade, says: "By implementing an AI business solution in the order-to-cash space, CFOs can not only streamline manual tasks and reduce human error, but they can also leverage powerful insights from the AI and strategically plan for what is ahead.

"AI tools with large enough datasets can analyse historical transactions to forecast future outcomes and give users intelligent recommendations on the next best action moving forward."

In an environment dominated by supply chain challenges, fluctuating costs and a bleak economic outlook, the key job of the CFO is to optimise resources in this new world of constraint.

CFOs need tools that enable them to go fast and shift quickly. For those companies not already using analytics and automation to enhance business processes in the finance function, the smart move would be to invest in this technology soon to deal better with the current and any upcoming financial turmoil. ■

DIGITISATION

How the pandemic accelerated tech adoption in hospitality

The pandemic led to technology adoption across several sectors, with hospitality being no exception. Glynn Davis reports

TARIKVISION/ADOBE

Hospitality businesses have historically been largely run as single channel, restaurant-based operations, but the accelerated adoption of digital by customers during Covid-19 has pushed the sector into developing a multi-channel model akin to that found in the retail industry.

Joel Robinson, digital and technology director at Azzurri Group – which operates the Zizzi, Ask Italian and Coco di Mama chains – says: "There are parallels with retail, which is probably 10 years ahead of hospitality. Digital was massively accelerated by Covid-19, with the landscape having changed staggeringly."

For Azzurri Group, this meant a move from having fewer than 10 channels across its brands to now having around 20. This has included the digitisation of existing channels such as in-store and take-away involving the adding of Order & Pay at table and kiosks; new channels including partnering with the key delivery players Just Eat, Deliveroo and Uber Eats; the creation of virtual brands that are run from existing kitchens; click and collect; and the introduction of product ranges into the retail channel including Coco di Mama baguettes in convenience stores and Zizzi pasta in Sainsbury's and Tesco.

The strategy of Robinson is to take a different approach for each channel and brand based on deciding what is the best customer experience to deliver and then working backwards to build the technology.

"Sometimes you can optimise for IT [taking an all-in-one solution], but that's not the best thing to do. As a tech product it makes life easy for you, but it's not the right thing to do for the customer," he says.

Instead, the company has taken the best-of-breed route with the creation of two tech stacks – one for casual dining and the other for its quick service restaurant (QSR) brands. It works with various players such as AND Digital, for its Order & Pay at Table solution; Orderswift, for click and collect for Ask Italian and Zizzi; and a new partnership with Vita Mojo, for click and collect and planning out the introduction of kiosks for Coca di Mama.

Kim Teo, co-founder of Mr Yum, is also an advocate of the best-of-breed approach as she says all-in-one solutions will invariably be only 80% as good. The problem for many hospitality companies is that "lots of choices made during Covid-19 were hasty" and undertaken out of necessity to keep businesses trading. Technology providers came knocking with online solutions and suggested solutions such as doing cheap delivery, with the result that companies tried all sorts of things, helped by the fact they had the resources to do it as their restaurants were closed.

Nick Liddle, commercial director at Vita Mojo, agrees that companies made mistakes during Covid-19, with short-term decisions being made. "People cobbled things together and created a Frankenstein-like mess that requires lots of manual work. It can be as simple as dealing with a menu across channels. One operator had two people just working on menus with six lots of changes required whenever the menu was altered," says Liddle.

> **"Brands now looking to grow are looking at their tech stack, and this is because what they have built is disjointed"**
> Kim Teo, Mr Yum

This is prompting progressive operators to make the necessary changes, according to Teo, who says: "Those brands now looking to grow are looking at their tech stack, and this is because what they have built is disjointed with lots of manual downloading and uploading of data between the various systems."

The complexity is obvious, with Teo highlighting the myriad of data now coming into hospitality businesses from the likes of social media feeds, web channels, customer reviews, point of sale (PoS), QR code ordering, customer relationship management (CRM) systems, and so on.

With this amount of data flowing around between the different applications, the choice between best-of-breed and all-in-one solutions often comes down to the integration issues involved in knitting the different applications together.

For Mr Yum, there is a recognition that its technology partners have to dedicate resources to the task, which incentivises them to engage. It commits around 20% of its teams' time to dealing with integrations.

Before Covid-19, Teo says the industry was held back by electronic point of sale (EPoS) partners, but this has been changing in recent years: "Three years ago, it was hamstrung by PoS providers. If they did not want to do any integration work, then the tech provider had to do a lot of it. If you do not automate the data flows [through integrated systems], then it is a manual effort. EPoS were more closed networks, but Covid has accelerated things [to change]."

Application programming interfaces (APIs) have helped dramatically with the integration headache – they lie at the heart of Shopify, for instance, where specialist applications can be purchased and integrated into hospitality firms' tech infrastructure via APIs.

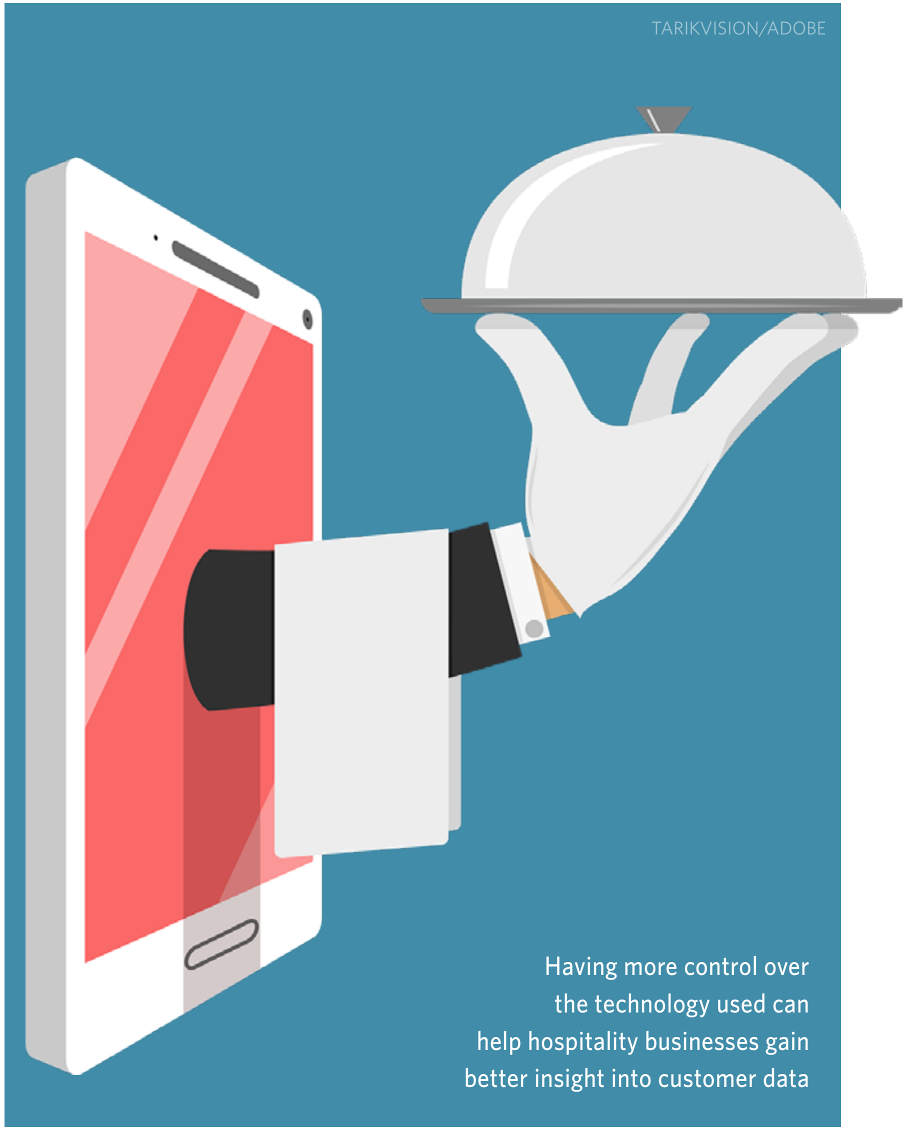
Stacking up

The disjoined nature of systems is recognised by JP Then, founder of Crosstown Doughnuts and delivery platform Slerp, who says many hospitality companies are looking to avoid this fate by selecting the right technology to deliver an integrated infrastructure.

"It should all be part of the same tech stack with everything integrated," he says, adding that there has been a fundamental change to the stack. Whereas the EPoS has traditionally been the "motherboard" of hospitality businesses, it is the ability to order online that is now the motherboard as restaurant operators' focus shifts away from on-premise being the primary pillar of their operations.

This is based on the continued growth of sales through the various digital channels. Vita Mojo's Liddle says that established operators have to accept that things will not be returning to the pre-pandemic normal, with delivery and online sales returning to the old volumes.

He says companies now have to decide what are the right channels for their business and who they should work with that



TARIKVISION/ADOBE

Having more control over the technology used can help hospitality businesses gain better insight into customer data

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best represents their brand. "Those businesses that will be successful recognise that it's a big project with multiple stakeholders across the various teams. It needs buy-in at C-suite level," says Liddle.

Vita Mojo has built a full operating system for restaurants around ordering across the channels and is working with the likes of Leon, Tossed and Nando's. For Leon, it provides the infrastructure for its click and collect, kiosks and app that are integrated into a third-party PoS system.

Kiosks in particular have been a highly successful digital channel. Liddle says that he is surprised that more restaurant operators are not adding kiosks into their mix based on the high level of adoption of the devices by consumers, as well as the economic benefits they provide by enabling a reduction in staffing levels or a redeployment of personnel. However, he expects this to change with more IT investment among the mid-range brands as they come under increased financial pressure to reduce costs and drive more covers.

Part of the problem that is slowing things down, according to Teo, is the age of the decision-makers in many businesses. "The guests and the servers will love it, but the decision-makers are not always young and it can take some time convincing them that these solutions enable great service in hospitality," she says.

This was not the case at Azzurri Group, as Robinson says that the company was anticipating the need for greater adoption of digital capabilities during the run up to Covid-19. This included bringing in Robinson to a newly created role three years ago.

He offers a word of warning about where technology investment should be directed within hospitality companies. "What's often overlooked is investment in the network infrastructure to handle the level of digitisation. It's our biggest investment because we now have many orders coming via the internet," says Robinson. "It's all well and good having a great relationship with your customers, but if there's not a stable infrastructure behind it and you lose connectivity, you're set up to fail. There are far too many cheap and cheerful systems out there from the days when an internet connection was just a nice thing to have."

Interestingly, the size of the business does not determine the success of IT implementations and the development of a multichannel model within the hospitality sector, with JP Then saying that some of the best performing customers of Slerp are of varying sizes.

"It's a mix – from the savvy SMEs that have got a community [of customers] behind them, to larger enterprises that typically move more slowly. For larger organisations, it's more about change management than IT project management involving legacy systems and training up people," he says.

The next frontier for hospitality businesses is to harness the customer data that is now flowing increasingly rapidly across a growing number of channels to create a single customer view – and possibly feed this into a loyalty programme. But this is a tough task and something that retailers have been grappling with for many years and most have failed to yet solve the problem. There's clearly still time for the hospitality industry to catch up with its retail neighbour. ■

STORAGE

AIOps storage: Potential huge benefits, but lots of lock-in

Applying AI to storage can help to predict bottlenecks and diagnose issues, but suppliers' products are largely limited to their own hardware, writes Stephen Pritchard

SONULKASTER/ADOBE

The growing complexity and diversity of IT is a challenge for chief information officers (CIOs) and their teams. The demands of the datacentre, cloud infrastructure, containerisation, and security and compliance all put more pressure on IT management and operations.

At the same time, it's difficult to recruit and retain experienced staff. This has prompted IT departments and suppliers to look at ways to automate information services and infrastructure management, including for data storage.

One answer is to use machine learning (ML) and artificial intelligence (AI) to take up some of the workload. AIOps – or AI for IT operations – is one tool promoted by the industry to deal with complexity, optimise systems and maximise uptime. It also plays an increasingly important role in storage management.

Improvements in processing

AIOps has developed rapidly in recent years because of improvements in ML and AI processing – including in the cloud – but also because IT systems are increasingly able to be monitored in real time. But although everyone wants more visibility in their IT operations, the vast volumes of log data generated by modern hardware, on-premise and in the cloud, could overwhelm IT teams.

AIOps makes use of that data through analytics engines to predict peak workloads, bottlenecks, capacity limits and failures, and to flag the need for maintenance and upgrades.

For storage, AIOps promises to help firms with resource allocation, to make best use of available capacity and, potentially, move data between storage tiers and/or to the cloud.

HOME

AIOps promises to do this more quickly and perhaps with more accuracy than human system admins. It also allows organisations to scale up their digital operations without hiring more staff. It can be integrated with service management, dealing with users' tickets and datacentre infrastructure management (DCIM).

"The way I describe AIOps is an overarching technology that sits above the operational domain expert systems and can correlate data and feed that back as actions to the operational teams," says Roy Illsley, chief analyst at Omdia. "That can be manual actions or it can be automated actions."

What is storage AIOps?

In IT management, AIOps sets out to make use of data generated by servers, networking equipment and storage arrays – but it aims to be more than a simple monitoring tool. By using AI, organisations can gain insights into system health, but also see how systems can be optimised.

This, according to GigaOm analyst Enrico Signoretti, is equivalent to putting "storage in autopilot mode".

As suppliers added sensors to their systems, they could provide more up-to-date status information. They then tied this to predictive analytics and, later, automation.

"They use machine learning, and they feed their machine learning algorithms with all this information," says Signoretti. "Now they have automation that makes better suggestions for what is happening in the system and what you should do when something is happening. All of this improves the usability of the system."

Storage AIOps monitors standard measurements, such as utilisation, input/output (I/O) activity and latency. By adding a degree of ML or AI, systems go beyond simply serving up raw data, and can flag unexpected events to a human analyst, as well as predict when a component might fail or when a system needs more capacity. Omdia's Illsley describes this as "domain expertise".

Suppliers in other sectors, such as networking, also have their own AIOps capabilities.

Storage AIOps monitors standard measurements, such as utilisation, input/output activity and latency

Combining storage with data

The real power of AIOps for storage comes when combined with data from other parts of the IT system. This allows firms to spot a wider range of problems, such as a network issue being traced back to a malfunctioning database.

With storage, AI offers the prospect of spotting bottlenecks before they become issues, such as when data is moved to a lower-performance storage tier to make better use of capacity. The AI system then alerts IT managers and suggests changes, or even makes configuration changes by itself.

AIOps can also allocate workloads, including storage volumes, across different types of infrastructure. This comes into its own for firms that run hybrid architectures, where AIOps can manage the transition from on-premise to cloud, or between cloud tiers.

However, to work, such systems need to integrate with cloud suppliers' management application programming interfaces (APIs) and have an understanding of their pricing models.

AIOps promises improved system usability, reliability and efficiency. This comes principally from reduced maintenance downtime and reduced failures, and also from better allocation of compute and storage resources. This is especially useful for organisations that have a large number of separate systems, virtual machines (VMs), or that are starting to move towards containerisation for production.

Storage AIOps suppliers' cloud capabilities are still limited, and need to develop cloud and hybrid capabilities

Complex systems

AIOps becomes more useful as systems become more complex. Replacing dozens of servers with hundreds of VMs already places a heavy load on IT admins.

Moving to potentially thousands of containers might not be possible at all without automation. The greatest benefits of AIOps, however, come from integration across the whole of a firm's IT estate. This – for now, at least – is beyond the reach of most storage suppliers' AI tools, which only work with their own products.

The issue is whether they can talk to competitors' systems, to compute and networking tools, or cloud management systems. As Omdia's Illsley puts it, AIOps suppliers need to be the "neutral Switzerland". Storage suppliers will need to convince their competitors, and most or all of their customers, that they will work equally well with other suppliers' tools. Alternatively, CIOs can look at hardware-independent monitoring tools, such as Splunk, Datadog or ServiceNow.

As GigaOm's Signoretti points out, storage AIOps suppliers' cloud capabilities are still limited, and need to develop cloud and hybrid capabilities. He expects these to grow, to allow firms to federate storage across suppliers, and according to policy. "We are heading to that type of scenario, but it will take some time," he says.

Suppliers with AIOps capabilities

Dell CloudIQ: Currently covers all Dell EMC storage and PowerEdge servers, as well as the firm's hyper-converged systems and networking hardware.

HPE InfoSight: Supports ProLiant and Apollo servers, Alletra, Primera and Nimble storage, and HCI.

IBM Storage Insights Pro: Covers a wide range of systems including IBM's own Flash storage, as well as Spectrum Scale and Cloud Object Storage. It also supports some from Dell EMC, Hitachi Vantara, NetApp and Pure Storage.

Infinidat InfiniVerse: Supports InfiniBox and InfiniBox SSA.

NetApp Active IQ: Covers OnTap, E-Series and StorageGRID storage, as well as integration with NetApp Cloud Manager.

Pure Storage Pure1: Pure1 manages all Pure arrays (FlashArray, FlashBlade and Portworx) storage. Pure1 Meta provides a full-stack analytics capability. ■


JOSEPH OKPAKO/GETTY

Leaking out loud

The plus symbol. *The division sign*. *Equals*. Just three of the password character ideas Ed Sheeran has suggested through his album titles to promote good cyber hygiene. Yet when it comes to the beloved elfin hitmaker's cloud storage, one man found Sheeran's security acumen to be lacking.

That hacker has now been jailed, after accessing and selling copies of musicians such as Sheeran's unreleased songs. London's Police Intellectual Property Crime Unit said he was a "highly skilled individual who unfortunately saw potential in using his abilities unlawfully".

The prosecution described a man with "complete disregard" for his victims' creativity, hard work and lost earnings. "He selfishly stole their music to make money for himself," they went on, by which point Sheeran might've been forgiven for checking they were still talking about the hacker. ■

"Cyber crime knows no borders, and this individual executed a complex scheme to steal unreleased music in order to line his own pockets … We have sent a clear message that we have the ability and tools to stop this type of criminal activity and protect victims"

Manhattan district attorney Alvin Bragg Jr

Read more on the Downtime blog.