Uncorking digitisation

How acquiring Naked Wines has shaped and aided Majestic Wine’s digital transformation plans
Prepare for no-deal Brexit, says ICO
The UK Information Commissioner’s Office (ICO) has urged businesses to prepare for a no-deal Brexit to ensure there is no interruption in data flows from Europe. While the UK government intends to seek an adequacy decision for the country, which would recognise the UK’s data protection regime as essentially equivalent to those in the EU, this will not be in place before Brexit, the ICO has warned.

HMCTS suffers major IT issues
HM Courts and Tribunals Service has experienced problems with its IT systems, supplied by Microsoft and Atos, including secure email and networking. The issues affected devices trying to connect to the main Ministry of Justice network, which is used by the department as well as all its agencies. The Secret Barrister took to Twitter to say: “Imagine the headlines if it were the NHS. But it’s only justice, so no one cares.”

Home Office vetoes privacy campaigner from senior post
The Home Office has refused academic and privacy campaigner Eric King security clearance for a senior role at intelligence services watchdog the Investigatory Powers Commissioner’s Office (IPCO). King said the Home Office refused him security clearance for the job because of his “previous work and associations”, despite high-level support from IPCO.

Santander announces latest branch closures
Santander is closing 140 branches in the UK, with 1,270 employees set to be either redeployed or laid off entirely, as app-based banking continues to have an impact. The closures will leave Santander with 614 branches in the UK. The bank said Santander customers were increasingly using mobile and online channels and it was important for the network to change to reflect this.

Scottish Police Authority awards £21m mobile services deal to EE
Mobile network operator EE will oversee a three-year, £21m transformation of the Scottish Police Authority’s mobile services. BT-backed EE will become the network supplier and main contractor to Police Scotland, while Samsung will supply smartphone devices, Motorola Solutions will supply its Pronto Digital Notebook software, and BlackBerry will take charge of mobile device management.
DCMS puts digital ID policy team on no-deal Brexit work

The Department for Digital, Culture, Media and Sport’s (DCMS) digital identity policy team has shifted focus to prepare for a no-deal Brexit. A DCMS spokesperson said the department continued “to lead work on digital ID” but was “prioritising resources”.

Facebook objections to court concerns about ‘optics’, not facts

Facebook is challenging an Irish High Court judgment, which found the data of EU citizens was at risk of interception by US intelligence services because it was more concerned about its appearance than its contents.

M&A in action: Majestic Wine pairs with Naked Wines for cloud-led digitisation

Dunnhumby analyses its data challenges

Editor's comment

Buyer’s guide to deep learning

How technology can help fashion retail’s eco ambition

How to cut your way through the jungle of cloud options

Downtime

NHS England launches public roll-out of NHS App

NHS England has begun the public roll-out of the NHS App, which aims to provide a digital front door to NHS services. This follows an invite-only beta stage, which began in September 2018 with around 3,000 patients.

BigCommerce migrates 60,000 traders to Google Cloud Platform

E-commerce platform provider BigCommerce has swapped out IBM and Amazon Web Services for Google Cloud Platform. The provider claims to have spent the past three months moving the 60,000 merchants across.

London cyber innovation centre expands global ties

Plexal, home to London cyber security innovation centre Lorca, has announced partnerships with the Global Cyber Alliance, the City of New York’s chief technology officer in the mayor’s office and the New York Economic Development Corporation.

HPE opens Geneva IoT innovation lab to capitalise on edge data

HPE says it has expanded its internet of things (IoT) expertise by opening an IoT innovation lab in Geneva. The lab is the company’s third such facility.
Why CIOs need to reshape desktop IT to prepare for Windows 7 end of support

With less than a year to go before Microsoft Windows 7 reaches its end of life, organisations’ IT departments have more than just the operating system upgrade to consider, writes Cliff Saran

Almost half of UK and US organisations surveyed by market research firm Censuswide are still using Microsoft’s Windows 7 operating system (OS).

The survey of 160 UK and 160 US organisations, carried out on behalf of software-defined delivery specialist Kollective, looked at the potential costs and security threats of staying on Windows 7 beyond Microsoft’s support deadline of 14 January 2020.

After that date, Microsoft will no longer issue operating system patches unless organisations purchase custom support contracts. In the largest enterprises, with 10,000 or more terminals, the fee for such a service to Microsoft could exceed $1.4m a year, according to Kollective.

One-fifth oblivious to deadline

The research found that nearly one-fifth (17%) of IT departments were oblivious to the support deadline, while 6% were aware of support ending but had yet to start planning their migration away from Windows 7.

The survey also found that 16% of IT professionals admitted to be still running Windows XP and Windows Vista on some of their machines, despite support for those operating systems having ended more than three years ago.

The National Cyber Security Centre (NCSC) warned of the risk of not upgrading in a blog post: “Windows XP went out of support in 2014. It wasn’t long after that before exploitation of the final version of the platform became fairly widespread. Malware can spread much more easily on obsolete platforms because, without security updates, known vulnerabilities will remain unpatched. So it is crucial to move away from them as quickly as possible.”

Windows 10 drives hardware upgrades

Gartner’s latest market share data for PC shipments suggests the support deadline is driving enterprises to upgrade ageing desktop and laptop PCs. In 2018, PC shipments totalled 259.4 million units, 1.3% down on 2017. The decline was due to lower consumer sales, but enterprise PC shipments were stronger.
“The market stabilisation in 2018 was attributed to consistent business PC growth driven by Windows 10 upgrades,” said Mikako Kitagawa, a senior principal analyst at Gartner.

Gartner analyst Ranjit Atwal told Computer Weekly that since 2016, PC sales have been lifted by businesses getting ready for Windows 10. This first began in the US, then picked up across Western Europe in 2018. “Windows 7 support expiring at the start of 2020 should provide an incentive for businesses and even governments to upgrade to Windows 10,” said Atwal.

In the past, especially with the end of support for Windows XP, Microsoft extended the support deadline. But Atwal warned that it is unlikely to extend the Windows 7 support deadline “due to its investments in Office 365 and Windows 10”. He expected Microsoft to use Windows 10 as a way to sell more of its software.

**DIVERSITY IN DESKTOP IT**

The enterprise is no longer solely Windows-based. Business users connect to corporate networks from iOS, Android and MacOS devices, and the user interface for many enterprise applications is delivered through browser-based software-as-a-service (SaaS) products or as native apps.

While it is feasible to use Windows 7 end of support as a catalyst to rethink the delivery of desktop IT, Atwal said many enterprises lack options in terms of migrating or even supporting additional platforms, because of third-party software providers’ inability to support non-Windows platforms. “Many IT departments are dependent on third-party applications,” he said. “Often these are not being rewritten for other operating system platforms.”
For Atwal, Windows 10 ticks all the boxes across the enterprise IT environment, which means there is no financial reason to move away. One of the biggest benefits, but also potentially the most disruptive for enterprise IT, is the fact that Microsoft takes charge of updating the Windows 10 OS environment, in effect becoming the outsource provider for keeping the OS fully patched.

In the past, application compatibility has been the biggest challenge facing IT departments when rolling out a new Windows operating system. Microsoft wrote in a document published in September 2018: “Whereas compatibility was previously a concern for organisations upgrading to a new version of Windows, Windows 10 is compatible with most hardware and software capable of running on Windows 7 or later.”

**SERVICE UPDATES**

Microsoft has introduced the concept of service channels that enable IT departments to decide how quickly updates are deployed, claiming these channels allow customers to designate how frequently their individual devices are updated.

“An organisation may have test devices that the IT department can update with new features as soon as possible, and then specialised devices that require a longer feature update cycle to ensure continuity,” the company said.

Users on the Windows Insider Programme get the latest updates immediately, but most users are likely to be on the Semi-Annual Channel, getting Windows 10 updates in March and October.

Microsoft also provides a Long-Term Servicing Channel, where new features are released every two to three years. It recommends this channel for use only on specialist devices, such as medical equipment, that typically do not run Office, but IT departments that are not in a position to entrust desktop Windows updating to Microsoft could choose this channel over semi-annual updates.

The issue of Windows updates breaking the operating system was highlighted during the roll-out of the October 2018 Windows 10 update. Microsoft had to suspend the release following a spate of reports of users’ files disappearing.

“**Once firms are on Windows 10, they will need to continuously update their systems**”

Dan Vetras, Kollective

Whichever route IT departments choose, once the organisation is on Windows 10, it will be Microsoft, not the internal IT department, that ultimately controls updates. “Once firms are on Windows 10, they will need to continuously update their systems as part of Microsoft’s new ‘Windows as a service’ model,” said Kollective CEO Dan Vetras. “This means distributing increasingly frequent updates across their systems – which many IT departments will find impossible because of outdated infrastructure.”

According to Kollective, a potential issue for IT is that if all the updates happen in March and October, the corporate network could be overloaded as updates go to every Windows device.
M&A in action: Majestic Wine pairs with Naked Wines for cloud-led digitisation

Caroline Donnelly finds out how the acquisition of online-only wine retailer Naked Wines in 2015 has shaped the digital transformation plans of its parent company Majestic Wine, allowing it to keep pace with modern challenges.

As the UK retail market braces itself for another year of uncertainty and struggle, a number of bricks and mortar retailers are turning to technology to help streamline their operations and build out their online shopping capabilities.

And store-based specialist wine retailer Majestic Wine is no different, having moved to acquire its online-only rival Naked Wines in 2015 for £70m – not only to increase its market share locally and overseas, but to help fast-track its own digital transformation plans as well.

Naked Wines operates on a subscription-like model, whereby customers pay £20 a month into their account, which is used to fund the making of wines by independent producers.

The end products are then made available to Naked Wines subscribers to buy on an exclusive basis for around 25 to 50% less than an equivalent supermarket offering.

At the time of the Majestic acquisition, Naked Wines was less than 10 years old, but had already established itself as a high-growth business, with annual sales in excess of £80m. It was also growing at a rate of 40% year-over-year, with a break-even forecast of March 2016.

Fast forward to 2018, and the Majestic Wine Group’s year in review document suggests Naked Wines has become the organisation’s second most profitable brand of the four that make it up, posting earnings before tax of £8.7m against sales of £156.1m.

High-growth acquisition target
Earnings aside, the organisation had a number of other elements that marked it out as a compelling acquisition target. These include its customer relationship management (CRM) system, which Majestic hailed as instrumental in helping the firm create a growing and loyal, recurring revenue-generating subscriber base, and a cloud-savvy team of techies.

“Naked Wines was built with technology embedded in the company from the start,” Majestic Wine IT development manager Rob Kay tells Computer Weekly.
Its in-house teams created the technology stacks that underpinned its websites, its call centres and other support services, and – from day one – they all ran in the cloud, relying initially on Amazon Web Services’ (AWS) compute and storage services to power them.

This model had paved the way for the Norwich-based firm to expand its business interests to the US and Australia, which would have been practically and financially harder to do if it relied on on-premise servers and storage systems to run its business, says Kay.

By comparison, its parent company had a more restrictive, traditional and mainframe-reliant IT setup. “For a lot of retailers, technology has never been high on the list of [investment priorities], at least not until very recently, and Majestic Wines is quite similar in that respect,” says Kay.

He joined Majestic three months after the acquisition, in September 2015, when the onus was on getting the firm to modernise its technology strategy, so that it would be more in keeping with the Naked Wines way of doing things. Primarily, that meant helping the firm make better use of its customer data, while bringing together their divergent IT systems.

“We’ve been slowly migrating everything about the Majestic business, which started with building a data warehouse because they had no concept of what that was,” says Kay.

“Over the past three years, we’ve also migrated them onto [the Naked Wines] e-commerce platform,” he adds. This is another offering the firm created in-house that makes liberal use of AWS technologies to keep it up and running.
Chief among them is AWS Elastic Beanstalk, a service used to ease the deployment of web apps by making the underlying compute, storage and load-balancing resources easier to orchestrate, and the Amazon Relational Database Service (RDS).

“In short, what this means is we now have all of the customer data and order data in one place, in the cloud,” says Kay, adding that the migration has brought business agility benefits to Majestic. “We were hamstrung by technology in Majestic three years ago because we were unable to move quickly, but we’re not anymore.”

**Faster response times**
Since moving Majestic over to the cloud-based e-commerce platform, the company can respond more quickly to changes in customer wine-buying habits, and no longer has to rely on over-provisioning its infrastructure during peak trading periods.

“The busiest time of the year for us is the week before Christmas, but during the first week of January, no one really wants wine, and we now have the capability to spend less on our infrastructure in January than we did in December,” he says.

At the time of writing, the company still has “some datacentres” in operation, and it is in the throes of migrating a number of its legacy applications to the cloud – primarily for security management reasons.

“That is one of the greater concerns – that things sat in a datacentre can’t be centrally managed. Our preference is to use the services Amazon provides so we don’t have to worry about those things,” he says.

**Migrate to innovate**
At present, there is still some distance left for Majestic Wine to run on its migration journey, but much of the “heavy lifting” has been completed, according to Kay.

“We haven’t quite gone from the mainframe yet, but that’s our migration process and we’ve done the core of it so far,” he says. “One way of looking at it is like a tree: we’ve chopped off the really big roots, but there are some smaller ones clinging on.”

With the “core” taken care of, the company is better positioned to experiment with emerging technologies and use its data to enhance and improve the wine-buying experience for both its in-store and online customers. By recommending wines, for example, based on previous purchases or what other customers have bought, it will be easier for customers to find wines in-store they might like.

“Historically, if you’ve walked into a Majestic shop, you’ve seen displays that say, ‘Here are all the French wines’, and that is great if you are a top wine buff. But, generally, people go by flavours and know they like crisp and fruity wines, for example,” says Kay. “So it is about using technology to guide them to that and to help find the wines they like online, but also to provide a crossover into our stores.”
**Generating recommendations**

On the Naked Wines side, the use of technology has involved introducing elements of machine learning to help generate recommendations for customers who need guidance on what wines to buy.

“We see huge potential [to do more] here and accelerate our ability to use the data we have and fit that into a model that says, ‘We know you’re really going to like these wines’, or, if the customer comes to the site and already knows they want six bottles of a certain wine, but asks for our help in what else to select to fill a case of 12 bottles,” says Kay.

The firm is also trialling the use of **machine learning tools** in its customer contact centres, where the bulk of the queries fired the company’s way are email-based.

“We’re trialling some stuff to see how well we can infer meaning from customer emails and make sure they get to the right people. It is by no means simple, but we can see some potential here for sure,” says Kay.

At the same time, Majestic is looking at the tweaks it needs to make to its existing platforms and services to ensure it can continue to keep pace with whatever challenges the retail market throws up next.

“We’ve done a lot of work to get Majestic off the really old stuff, and we’re continuing to modernise [our IT estate] by heading down the serverless and **microservices** route,” says Kay. “We’ll have even fewer servers to manage and less storage to worry about, which is definitely where we will be going. That will be an ongoing process, and I’m not sure it will ever stop.”
Dunnhumby analyses its data challenges

David Jack, CTPO at analytics pioneer Dunnhumby, tells Angelica Mari how he is working to scale up the company’s platforms and migrate to the cloud

This will be a busy year for UK customer data specialist Dunnhumby as the company seeks to launch a range of new products to fend off competition, while driving a large cloud computing implementation.

The firm has a broad technology agenda, covering everything from C-level consulting to a large range of products that include applied data science tools and fully automated real-time data science platforms that handle billions of bid requests a day for retailers, consumer goods companies and firms from other sectors.

To modernise the foundations supporting its product portfolio, there are some large IT programmes under way at Dunnhumby, such as the ongoing decommissioning of datacentres and big-ticket traditional hardware that will see the firm’s analyst platforms being provisioned entirely in the cloud.

Dunnhumby faces fierce competition in the analytics space, so it also plans to bring a lot of products it has been working on to light this year. Chief technology and product officer (CTPO) David Jack joined the firm in May 2018, with a remit covering all these fronts and more – such as venture capital investment and skills partnerships with universities.

David Jack, Dunnhumby: “We have accumulated over 1,000 years of corporate memory”
“My first areas of attention over the last six or seven months have been about the platforms that we build our products on and use to interface to our client systems,” says Jack. “I have also been accelerating the building of the scale of these platforms and driving down the economic cost of operating them.

“That means we can exploit more science, innovate and execute faster, bring more value to our clients. And that’s really exciting.”

Another key area of focus for Jack is to evolve Dunnhumby’s concept of global code lines, whereby computational models are rewritten in the latest technologies and then made available to customers across multiple markets.

“This spring, we will demonstrate a new look and feel and a new sense of what we mean when we say we are a customer data science platform,” he says. “The idea is that different product propositions feel connected and, as clients adopt one product, they will start seeing the journey to more products in our inventory.”

**THE RIGHT TO WIN**

According to Jack, Dunnhumby has “the right to win” when it comes to competition – partly because of its history of nearly three decades serving some of the most demanding retailers in the world, including its parent, **Tesco**.

“We have accumulated over 1,000 years of corporate memory about how to apply data insights and data modelling to bringing value to retailers over our nearly 30-year history,” he says. “Very few competitors can point to that level of intellectual capital.”

Dunnhumby has been evolving in its cloud adoption and will move forward with a large migration of its analytics product sets this year. Jack says the project consists of taking products as they are, putting wrappers around them and migrating them into the cloud, as well as some new products that are **cloud-native**.

“The cloud migration is driven by the economic advantage, but there is also the point that in data and computational science, cloud provisioning is not just a case of sounding sexy – it is phenomenally helpful to run science models at huge scale.”

**CLOUD PROVISIONING IS NOT JUST A CASE OF SOUNDING SEXY – IT IS PHENOMENALLY HELPFUL TO RUN SCIENCE MODELS AT HUGE SCALE**

*David Jack, Dunnhumby*
reduced cost,” he says. “It would be almost unthinkable in a traditional infrastructure, processing thousands and thousands of instances of insight at any given time, then collapsing that infrastructure when it is no longer needed.”

**THREE BUCKETS OF CLOUD DATA**

When it comes to the cloud data that the company migrates, there are three buckets. The first is data brought in from clients, which is ingested, conformed, mapped to a common data model, then made available to Dunnhumby’s data lake.

The second bucket is providing a data analytics platform that is used as though all the data conforms and powers the insight tools that come with it. The third bucket is when all products are natively hosted in a cloud environment.

“Considering those three blocks, the first is lifting and shifting our data, [running] ingestion processes and putting them into the cloud,” says Jack. “Through a large majority of clients that we intend migrating, we are already there – that’s what we’ve been running in the past year.

“On the second piece, the related analyst tools and platforms, we run that entirely in parallel – and that’s a huge way through as well. The third piece, which is lifting our current product set and putting it into the cloud, and new products being developed for cloud delivery, that’s at a much earlier stage.”

When it comes to suppliers, one of the products that Dunnhumby acquired in North America recently is currently hosted in Microsoft Azure, and the company’s data platform is hosted in the Google Cloud Platform.

Another big partner is Oracle, as the firm has big Exadata setups in its traditional datacentres that power many client production systems. On the business system platforms front, the company is 75% through deploying Oracle Fusion across its global estate.

With so much on his plate, Jack’s top challenge is winning the hearts and minds of the organisation. The added complexity is that he needs to keep a demanding 1,200-strong technical team interested in the job while not having the answers to everything.

“That is challenging, especially when it gets hard and we’ve got to maintain our current business growing at the rate we’re growing and changing as much as we’re changing,” he says. “That’s the thing that keeps me awake at night. To work around that, one of the things I set about doing was to strengthen my technical leadership by injecting additional experience and skills and having some of my amazing people focus on a smaller number of things.”

Jack concludes: “Focusing on the real prize, which is the fast delivery of that 1,000 years of cumulative knowledge to our existing client base and our new clients, and not get lost in every single challenge along the way, is the way that we will win.”
Windows 10 migration brings trepidation

It doesn’t seem long ago that IT departments were battling with the challenge of upgrading PCs from Windows XP to Windows 7, as Microsoft finally pulled the plug for support on the legacy operating system.

Now it is the turn of Windows 7, which has become almost a de facto PC standard for end-user computing. This is mainly down to the absolute flop that was Windows 8. The idea of trying to push a touchscreen-optimised user interface without a Start menu button into enterprise IT probably seems ludicrous now, but that is exactly what Microsoft tried to do with Windows 8. Businesses stuck with what they knew: Windows 7. And now, as those still on Windows 7 count down the days until support ends on 14 January 2020, many see Windows 10 as the only route forward.

Yes, it does have a Start menu, but it is certainly not simply a more modern Windows 7. The radical change Microsoft introduced with Windows 10 is that the supplier manages the operating system updates – not corporate IT. Microsoft promises there will no longer be big-bang, high-risk roll-outs of new Windows operating systems. Instead, users will receive fresh features on an ongoing basis, twice a year. Why would this not be a good idea?

Yes, there are plenty of reasons. Which IT administrator would entrust Microsoft with the reliability of the updates that affect an entire PC estate, potentially spanning thousands of machines? We’re all used to this approach on Google’s Android and Apple’s iOS operating systems, but one only has to look on the App Store to read of horror stories of apps that used to work until Google or Apple updated their respective software.

Windows is worse, because Windows claims backwards compatibility. This means enterprise software providers do not have to rush out a new version of their applications to support the latest Windows operating system if their software will run on an older version in so-called “compatibility mode”. But as anyone who has undertaken application compatibility testing will appreciate, just because something should be compatible in theory, does not mean it works when deployed.

Even something as ubiquitous as Google Chrome has been known to fail. What hope is there for bespoke software or third-party applications? Microsoft may well handle the updates of Windows 10, but IT teams and third-party developers will still need to ensure software is compatible with those rolling updates.

Cliff Saran, managing editor
The technology industry is in the midst of an artificial intelligence (AI) renaissance. Initial work in this field fell something short of its longer-term potential because of limitations in the technology platforms of the day, somewhere around the 1980s.

As such, the first age of AI was ignominiously relegated to movies where it powered talking cars, humanoid cyborgs and a selection of other fancifully imagined products.

The current reawakening of AI has been facilitated by advances in hardware, from processing to memory to data storage, but also by our ability to develop complex algorithmic structures capable of running on these new super-powered backbones.

As IT departments start working to apply AI enablement to enterprise software stacks, it is worth taking a step back and examining what is actually happening inside the synaptic connections that make our AI “brains” so smart.

By knowing more about the software structures being architected, developers can, in theory, more intelligently apply AI advancements to the applications being engineered for tomorrow.

**Google TensorFlow**

Key among the “tools” many AI developers will be learning now is TensorFlow. Built and open sourced by Google, TensorFlow is a symbolic mathematical library used to build AI intelligence in the Python programming language. For example, TensorFlow can be used to build a “classifier” – a visual image-scanning component that can recognise a handwritten numerical digit in less than 40 lines of code.
Describing the principles behind deep learning, Rajat Monga, engineering director for TensorFlow at the Google Brain division, says: “Deep learning is a branch of machine learning loosely inspired by how the brain itself works. We’re focused on making it easier for humans to use the devices around them and we think that making TensorFlow an open source tool helps and speeds that effort up.”

TensorFlow is used heavily in Google’s speech recognition systems, the latest Google Photos product and, crucially, in the core search function. It is also used to provide the latest AI functionality extensions inside Gmail – many users may have noticed an increasing number of auto-complete options in Gmail, a development known as Smart Compose.

**PERCEPTUAL BREAKTHROUGHS**

The toolsets and libraries being developed in this area are focused on what is often called “perceptual understanding”. This is the branch of AI model coding devoted to letting a computer-based image scanner pointed at a roadway directions sign know that it is looking at a signboard and not just letters on a wall. So applied context is key to this element of AI.

Scale is also key to many of these types of AI and machine learning libraries, so they need to be able to run on multiple CPUs, multiple GPUs and even multiple operating systems concurrently. TensorFlow is good at this and is a common attribute to much of the code discussed here.

“Most strong deep learning teams today use one of the more popular frameworks – technologies like TensorFlow, Keras, PyTorch, MXNet or Caffe,” says Idan Bassuk, head of AI at Aidoc, a Tel Aviv-based specialist firm using AI to detect acute cases in radiology. “These frameworks enable software engineers to build and train their algorithms and create the ‘brains’ inside AI.”

In addition to those mentioned, there are several categories of tools that enable deep learning engineers to actually “do” their work faster and more effectively. Examples include tools for automating DevOps-related tasks around deep learning (such as MissingLink.ai), tools for accelerating algorithm training (such as Uber’s Horovod and Run.ai), and others, says Bassuk.

Microsoft’s work in this space comes in the shape of the Microsoft Cognitive Toolkit (formerly known as CNTK). This library works to enhance the modularisation and maintenance of separating computation networks.

The toolkit can be used to build reinforcement learning functions for AI to grow cumulatively better over time. It can also be used to develop generative adversarial networks (GANs), a class of AI algorithms found in unsupervised machine learning.
IBM has a very visible hand in this space with its Watson brand. Despite the firm’s recent acquisition of Red Hat, the IBM approach is rather more proprietary than some. The firm offers developers access to a collection of representational state transfer application programming interfaces (Rest APIs) and software development kits (SDKs) that use Watson cognitive computing to solve complex problems.

Facebook is also in the big brand group for AI and machine learning. The social networking company is very keen to work on AI functions and is known for its PyTorch deep learning framework, which was open sourced at the start of 2018. PyTorch runs on Python and so is regarded as a competitor to TensorFlow. Facebook also open sourced its Horizon reinforcement learning products last year. The developer team behind the Horizon

## A selection of artificial intelligence and deep learning tools

- **Caffe**: An open source framework for deep learning that supports various software architectures that were designed with image segmentation and image classification in mind.
- **DeepLearning4J**: An open source, distributed deep learning library for the Java virtual machine (JVM). The company claims it is well suited for training distributed deep learning networks and can process huge amounts of data without losing its pace.
- **IBM Watson**: Billed by IBM as “deep learning for business”.
- **Keras**: An open source neural network library written in Python.
- **Microsoft Cognitive Toolkit**: A deep learning framework developed by Microsoft Research. Microsoft Cognitive Toolkit describes neural networks as a series of computational steps via a directed graph.
- **MLflow**: A tool from Databricks to support machine learning experiments.
- **MXNet**: An Apache scalable training and inference framework with a concise API for machine learning.
- **PyBrain**: An open source, modular, machine learning library.
- **Scikit-Learn**: An open source machine learning framework for Python that is useful for data mining, data analysis and data visualisation.
- **TensorFlow**: An open source library for high-performance computation. It combines several machine learning and deep learning techniques to support applications such as face and handwriting recognition.
- **Theano**: A Python library for defining, optimising, manipulating and evaluating mathematical expressions using a computer algebra system.
- **Torch**: An open source framework for scientific computing that supports machine learning algorithms.
platform say: “Machine learning systems typically generate predictions, but then require engineers to transform these predictions into a policy (a strategy to take actions). Reinforcement learning, on the other hand, creates systems that make decisions, take actions and then adapt based on the feedback they receive.”

Any overview of neural nodes in the AI brain would be remiss without mentioning a number of other key libraries and toolsets. Caffe is an open source framework for deep learning that can be used to build what are known as convolutional neural networks, typically used for image classification. Caffe goes down well with some developers because of its support for various types of software architecture.

DeepLearning4J is another useful tool for the AI developer toolbox. It is an open source distributed deep learning library for the Java Virtual Machine. For Python developers, there is Scikit, a machine learning framework used for tasks such as data mining, data analysis and data visualisation.

There is also Theano, a Python library for defining and managing mathematical expressions, which enables developers to perform numerical operations involving multidimensional arrays for large computationally intensive calculations.

In the real world (but still the AI world), firms are using a variety of toolsets, libraries and code methodologies in their developer function to attempt to build the machine intelligence they seek.

According to a Databricks CIO survey, 87% of organisations invest in an average of seven different machine learning tools – and this of course adds to the organisational complexity that comes with using this data.

Databricks has attempted to address part of this challenge by producing and open sourcing a project called MLflow. The goal with MLflow is to help manage machine learning experiments and put them into what effectively becomes a lifecycle. The company also strives to make it easier to share project set-ups and get those models into production.

Databricks insists that if we want AI to be easier to adopt and evolve over time, we need more standardised approaches to managing the tools, data, libraries and workflows in one place. MLflow was released in alpha status in June 2018.

As these tools develop, some common themes are surfacing. Flexibility in these software functions often comes at the cost of either performance or ability to scale, or both. If a toolset is tightly coupled to one language or deployment format, it is typically harder to reshape it bigger, wider, faster or fatter.

Over time, there is likely to be some consolidation of platforms or some wider community-driven migration to the most efficient, most powerful, most open, most intelligent and most “trainable” toolsets.
Representatives from Arcadia, Burberry, Marks & Spencer and Primark were called to Parliament as witnesses last November to detail the steps they are taking to reduce the environmental and social impact of the clothes and footwear they sell.

They were followed by Nick Beighton and Carol Kane, CEOs of Asos and Boohoo respectively, and Paul Smith, head of product quality and supply at Missguided, which also faced an Environmental Audit Committee inquiry into fashion sustainability.

Led by committee chair and MP Mary Creagh, the inquiry put the retailers’ supply chain transparency under the spotlight, while questioning the impact of cheap clothing on society and the environment.

It was an in-depth debate, covering the Modern Slavery Act, as well as treatment and pay conditions of third-party factory staff, but some retailer responses highlighted how technology helps, or might help, their sustainability practices.

The three online retailers described how they use their social media accounts to educate shoppers on the best ways to re-use or recycle fashion items.

Paul Lister, head of the ethical trade and environmental sustainability team at Primark, revealed his business is set to launch a clothing returns scheme this year. Leanne Wood, chief people, strategy and corporate affairs officer at Burberry, called
for government support to boost investment in “innovation for recycling technology”.

**Blockchain and big technology**

Anusha Couttigane, principal analyst for fashion, Europe, Middle East and Africa (Emea), at Kantar Consulting, says technologies such as radio frequency identification tags (RFID) and blockchain “empower brands to monitor their operations better and build in the storyline of traceability”, while reassuring consumers.

In mainstream fashion, H&M Group is working with Singaporean blockchain company VeChain to secure product data traceability for certain products sold by its Arket brand. Shoppers download the VeChain app and scan a near-field communication (NFC) chip on Arket products, enabling them to see where and how items were made.

“The fact that brands and retailers are looking to adopt technology with consumers in mind shows that commitment to sustainability is being driven from the top-down from a strategic level, but also from the bottom-up in terms of the consumers engaging with policies,” says Couttigane.

Kantar Group research shows shoppers are increasingly driven by company values beyond brand name and product, suggesting it is a prudent path for brands to follow.

Some 57% of British consumers feel better when buying environmentally friendly brands, and 47% feel better when buying a socially conscious brand, according to Kantar Worldpanel data from September. Last year’s Kantar Futures (now part of Kantar Consulting) Global Monitor showed 47% of 16- to 25-year-olds have made it a top priority to live a more environmentally conscious lifestyle.

**Taking away consumer uncertainty online**

A trend in recent years is for retailers to invest in technology to help consumers make better and more informed purchasing decisions, particularly when buying online. Whether it’s personalisation software, fit technology, 360-degree view imagery, or increased product information or video content, there are multiple options available.

True Fit, which is increasing its global presence thanks to partnerships with the likes of Clarks, Levi’s and Next, says it can help make e-commerce more efficient for retailers thanks to its product recommendation engine based on extensive fashion data.
Co-founder Romney Evans says working with his business can also help brands reduce “the sea of cardboard” moving to and from consumers’ homes caused by size and style sampling, which contributes to rising return rates in fashion retail.

“One customer might buy three items in a year and one might buy 300 items in a year - we don’t want to start mandating how much an individual should buy,” says Evans. “But we do need to make sure that the process is more efficient. What we don’t want is for the user who buys three items a year to ship back 12 items, and the one who buys 300 items to have to ship back and forth 1,200 items – we want to take waste out of the process and that is where there is ground to be made up by retailers.

“The key to improving the process for the environment is by delighting consumers and helping them get their selection right first time, reducing the unnecessary by-product from size and style sampling,” he adds.

True Fit worked with Walmart-owned outdoor fashion retailer Moosejaw to create a digital script so that if a shopper added two different sizes of the same style to the shopping cart, a screen advising how they could narrow sizing selection would appear on screen.

Moosejaw shoppers in this situation were encouraged to create True Fit profiles on the spot, and from there they reportedly gained the confidence about which size was best to buy based on the data-led recommendations it suggested.

“Most consumers don’t want to buy multiple sizes – it’s tedious for them like it is for brands – but they do it because what’s even more tedious is not getting it right the first time,” says Evans.
Asos, one of the companies called before November’s inquiry, announced the introduction of fitting guidance technology to help consumers make their decisions at the point of purchase.

A DIFFERENT TYPE OF SUSTAINABILITY CHALLENGE
All retailers have different needs, of course. Burberry made national headlines in 2018 when it stated in its annual report that it had burned £28.6m worth of unsold bags, clothes and perfume.

This move, which historically may have been seen as a move to protect brand image by avoiding the need for increased markdowns, can actually have the opposite effect in today’s socially conscious era.

Luca Tonello, director at Dedagroup Stealth, which specialises in providing the back-end technology and systems for high-end fashion brands, says the luxury fashion sector must gain transparency of their supply chains.

“Transparency means establishing an end-to-end view of where products sit in the supply chain, from the manufacturing facility to the shop floor, owned warehouse, or third-party distribution centre - and anywhere in between,” he says.

“Transparency in the supply chain means that luxury fashion retailers will be able to act on issues in real time and ensure smooth running operations. However, increasingly important, transparency means sustainability success - and that will be a quick-fire way to build a respected brand in 2019.”

2020 VISION
Kantar’s Couttigane argues it’s perhaps more relevant for fashion brands in all markets to be thinking one year on from that, especially with so many organisations working towards a “2020 vision” of sustainability. H&M wants to only use cotton fabric free of pesticides by 2020, while Zara is aiming for 10% of clothing to come from recycled or organic fabrics by then.

“On the grand spectrum of major industries, I think fashion is ahead of the game when it comes to sustainability,” she says.

“There are a lot of brands which have made independent moves, which haven’t been legally mandated or strategically necessary, but they have made the commitment anyway because it speaks to the value of their consumers.”

With the government seemingly putting greater focus on business’s sustainability efforts, as highlighted by November’s Parliamentary inquiry, there could be more laws on the horizon. But because of its use of technology, general company culture, or as a result of consumer pressure, fashion in general is well positioned to adhere, says Couttigane.
There is no getting away from the fact that cloud can be complex, as enterprises have to make sense of the varying propositions of myriad providers, and the veritable jungle of options and services they have to offer.

Finding a cloud provider whose services are a good fit for your company and its requirements can be quite simple if done correctly, but there are plenty of variables that can stand in the way.

It is worth remembering that cheapest does not always equate to the best in the business world, as any seasoned professional will tell you, and loss of service can easily result in loss of customers and revenue in the worst-case scenario.

There seem to be some very specific cloud suppliers frequently mentioned by management, but they do not seem to understand the options, costs and flexibility that come at a premium.

The reality is many cloud service providers appeal to specific markets and do one (or several) things and do them well, rather than dozens of things in an average way. These markets are businesses with different business drivers, capabilities and outcomes.

To put it into context, developers have different requirements to web designers. Developers want to be able to stand up a host instance quickly, with minimal intervention.

Therefore, a development house may look at how good and complete the available application programming interface (API) is, and how easy it is to automate and stand up a virtual machine in it that may only need to last a few hours for development and testing, rather than longer-term use in a production environment.
Being able to call the API means the build of a virtual machine can be automated and may last minutes, hours or days, which recently gave rise to the concept of per-second billing.

Those environments with rich environmental APIs that automate often have increased flexibility, but can come at a monetary cost. The cost versus flexibility debate is a critical one for businesses to get involved with.

Compare and contrast this to a web developer who just needs a cloud-based hosting environment for SMEs and micro-businesses. For several dollars a month, a web developer can have a robust test and development environment.

A lot of small developers want a simple service. Indeed, some of the top-tier suppliers offer an overly complex set of options, and in business, time is money. Excess options do not always make happy customers, who adhere to the mantra: “Do what is needed and get out.”

It may lack the bells and whistles, and perhaps even the high availability that comes with some providers, but when the bill is paid for on a monthly basis, the upfront costs may not be that much cheaper per virtual machine but the specifications tend to be better.

For example, provider A might offer 1GB memory and one CPU core for £5, while supplier B, which is not as “API driven”, may also have an offering priced at £5, but which comes with 2GB memory and two CPU cores.

**Business requirements**

It all comes down to what is required to satisfy the business requirements. For instance, load balancing, backups, per-second billing and APIs all come with costs. Smaller businesses usually do not require the more advanced capabilities that the bigger, web-scale businesses, or startups, often do.

Furthermore, the underlying functionality can be further whittled down to the realms of serverless computing, where the cost discussion starts getting extremely complicated, not least in developing the application itself.

In summary, there really is no one-size-fits-all type of cloud supplier for every situation, so before committing to using a specific one, businesses should consider the following:

- What do we want to achieve for the business? Do we just want hosting for our websites or do we need capabilities that will make our services more dynamic and reactive?
- Do we have any existing in-house expertise with specific suppliers that may fit the bill and provide us with the functionality and capabilities required?

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**A LOT OF SMALL DEVELOPERS WANT A SIMPLE SERVICE, YET SOME TOP-TIER CLOUD SUPPLIERS OFFER AN OVERLY COMPLEX SET OF OPTIONS. EXCESS OPTIONS DO NOT ALWAYS MAKE FOR HAPPY CUSTOMERS**
What functionality is key to a successful outcome (management capability, automatic backups, service-level agreements, disaster recovery, etc).

Do we use (or intend to use) automation or scaling? Nine times out of 10, the answer is no, despite what some cloud administrators may say.

Does the provider need to offer team-based infrastructure, role-based capabilities, management and auditing?

The simpler the interface and fewer the options, the easier the management can be. This, however, depends on business requirements. Complexity is the enemy of simplicity and uptime.

For most, the answer usually comes down to billing period (months versus seconds or minutes) and resiliency (high availability and redundancy versus single instance servers with no disaster recovery infrastructure).

For small test and development servers without the complexity, small suppliers often win out in terms of just getting things done.

Ultimately, what it really comes down to is doing quality research and ensuring the chosen company provides the functionality needed, without adding in a load of billable extras that can cause confusion and make things more complicated than they need to be.
Of Dyson men
There’s no getting around the fact James Dyson has revolutionised pub bogs up and down the country with his hand dryers. Rumours they store up and shoot out poo particles everywhere aside, the Airblade is a modern signifier of an establishment that looks after those of its belching, farting, urinating and sometimes even defecating patrons who might wish to dry their hands fast.

And who can forget his vacuum cleaner? A noughties icon that once doubled as a broomstick on which you could transcend class barriers; its creator vouchsafing us incrementally improved versions over the years while the famously stoic Henry ate its dust.

But what will billionaire Brexiter Dyson be known for by the next generation? Could he, perhaps, engineer some new kind of amphibious craft, capable of safely transporting rats from sinking ships; complete with tiny, automatic, retracting ladders? No, that’s unfair.

His company is actually off to Singapore to make cars, but chief executive Jim Rowan worries some cynics are bound take that the wrong way: “Because [Dyson’s] roots are in Britain and its founder has been a vocal supporter of Brexit, the decision to move its headquarters to Singapore is likely to make political waves.”

Don’t be paranoid, Jim! All the best for Singapore, which – did you know – recently signed a free trade agreement with the EU??!

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