ComputerWeekly

17-23 MAY 2022

Planet-friendly power

Digitally transforming UK's energy networks using open source to support move to renewables

RH2010/ADOBE

TechTarget | ComputerWeekly.com

Post Office scandal victims tell their stories in Scotland

Post Office scandal victims have been telling their stories to a public inquiry in Glasgow, with differences in English and Scottish law raising further serious questions. Inquiry chair Wynn Williams, a former judge, heard from 10 former and current subpostmasters in Scotland who have suffered after being blamed for unexplained accounting shortfalls, which were caused by computer errors.

Data Reform Bill intentions announced in Queen's Speech

The Queen's Speech confirmed the government's intention to bring forward a Data Reform Bill, but some in the tech sector are concerned about the impact of the UK's potential divergence from European data protection standards. Delivered by Prince Charles on 10 May, the Queen's Speech made clear the government's plan to reform the UK's data protection regime.

Further delays to umbrella market regulation expected

The government's commitment to rolling out statutory protection for umbrella company contractors is being called into question after the omission of any mention of the plan in the Queen's Speech. In the lead-up to the address, contracting market stakeholders had hoped it would include an Employment Bill and signal a timeline for umbrella market regulation to be rolled out, but this was not mentioned in the speech.

UK digital markets regulator to be given statutory powers

The UK government is to give the Digital Markets Unit (DMU) statutory powers to enforce a "pro-competition" regime, with the aim of rebalancing the relationship tech giants have with consumers and businesses. The government's proposals will allow the DMU to designate firms with "strategic market status" and enforce binding codes of conduct.

KIRICHAIE/ADOBE

Fashion tech investment grew 66% during Covid

Fashion-related tech investment increased by 66% during the pandemic, according to research by The Business of Fashion and McKinsey. The report found the value of the top 50 investments in fashion-related technology across the past year, either by fashion retailers or firms that sell products and services to fashion-related companies, has increased by 66% to $16.2bn since 2019, indicating an increase of capital put into tech in the fashion sector.

Catch up with the latest IT news online.

CyberUK 22: Data sharing service to protect public from scams

The National Cyber Security Centre handed the UK's internet service providers a new weapon in the fight against online scams through a new threat data sharing partnership, launched at its flagship CyberUK 2022 conference in Wales.

Analysts confirm return of REvil ransomware gang

The REvil/Sodinokibi ransomware is once again undergoing active development, and its original operators are likely responsible, according to analysis conducted by the Secureworks Counter Threat Unit.

Amazon Web Services embarks on green power-focused deals

Amazon Web Services has signed a deal with green energy storage firm AES, as the public cloud giant works towards powering its global operations with renewable energy by 2025. The firms have signed two renewable energy power purchase agreements.

SAP CEO majors on sustainability and supply chain resilience

In his keynote at the Sapphire 2022 conference, SAP CEO Christian Klein talked up supply chain resilience, sustainability and business process transformation, claiming the firm is uniquely positioned to drive digital transformation.

DWP partners with AI-powered career and job services

The Department for Work and Pensions (DWP) has been trialling tech to connect job seekers with local roles. The government has partnered with three firms that specialise in job-matching artificial intelligence.

Qualcomm reveals next generation of core Snapdragon platform

At its annual 5G Summit, hosted for the first time by new CEO Cristiano Amon, chip giant Qualcomm showcased how the company is attempting to address next-gen networks through the evolution of the connected intelligent edge. ■

Wales splashes £9.5m on cyber innovation hub

The Welsh government, alongside the Cardiff Capital Region investment body and a consortium of industry partners, is to spend a total of £9.5m on a cyber security innovation hub – to become operational towards the end of 2022 – which it is hoped will help the Welsh cyber sector become a global leader.

TONY BAGGETT/ADOBE

- *Nationwide stops thousands more attempted frauds.*
- *Three UK to switch off 3G network in two years' time.*
- *Pure to offer on-prem object storage as data source.*
- *Retailers see embedded finance as revenue builder.*

Catch up with the latest IT news online.

What will a quantum datacentre look like?

IBM has set out plans for hybrid supercomputing, employing quantum and classical computing. This impacts both hardware installation and software, writes Cliff Saran

IBM has updated its quantum computing roadmap to reflect how quantum processors, central processing units (CPUs) and graphics processing units (GPUs) will be woven into a compute fabric that is capable of solving computationally complex problems.

"We think we have found what it takes to scale quantum computers into what we're calling quantum-centric supercomputers," said Jay Gambetta, IBM fellow and vice-president of quantum computing at IBM.

Building on its existing roadmap, IBM has unveiled a 133-qubit Heron processor, slated for 2023, that has redesigned gates and tunable couplers to improve speed and reliability. "We are also preparing for the ability to control multiple Heron processors with the same control hardware, enabling quantum computing with classical communication between each processor," said Gambetta. "Heron will allow for classical parallelisation between quantum chips."

IBM has also been working on a chip-to-chip coupler, to run two-qubit gates between qubits on different chips. Gambetta said the company planned to release a minimum viable product in 2024 demonstrating this technology – a 408-qubit processor, built on the Heron technology, called Crossbill, which is made from three chips joined by this modular coupler.

"Our goal is that users feel as if they're using just one, bigger processor," he added.

Gambetta said that in 2024, IBM also plans to introduce longer-range quantum communication between chips and create clusters of quantum processors using a long-range coupler for connecting qubit chips through a cryogenic cable about a metre long.

"We will be releasing a demonstration of this architecture by linking together at least three 462-qubit processors, each called Flamingo, into a 1386-qubit system," he said. "We expect that this long-range coupler will be slower and lower-fidelity than our on-chip gates, since it involves a physical cable. Our software needs to be aware of this architecture consideration for our users to best take advantage of this system."

Kookaburra will be the next quantum processor. Due in 2025, IBM said Kookaburra will be a 1386-qubit multichip processor with quantum communication link support for quantum parallelisation. As a demonstration, IBM plans to connect three

Kookaburra chips into a 4158-qubit system connected by quantum communication, said Gambetta.

IBM has also been working on the software side of quantum computing in a bid to deliver quantum advantage sooner by taking a hybrid approach. In effect, a problem is broken down into a series of smaller quantum and classical programs. An orchestration layer is then used to stitch the data streams together into an overall workflow. IBM dubs this approach Quantum Serverless.

"Quantum Serverless centres around enabling flexible quantum-classical resource combinations without requiring developers to be hardware and infrastructure experts, allocating just the compute resources they need when they need it," said Gambetta. "In 2023, we plan to integrate Quantum Serverless into our core software stack to enable core functionality, such as circuit knitting."

Scalability challenge

Discussing the challenges of connecting quantum computer systems, Katie Pizzolato, director of IBM quantum strategy and applications research, said: "The scalability challenge is that there is a limit on how many qubits you can put on a device and how you link devices together to enable a 4158-qubit system."

She said 300 to 400-qubit systems can be linked together using the short coupling technology IBM is developing. The long coupling needs to be fast enough to ensure the performance of applications is not severely restricted by the slower connectivity between clusters of 300 to 400-qubit systems. "The idea is to put as much of the hardware as possible in the same fridge which can hold 1,000 qubits," said Pizzolato.

IBM's Quantum System Two, unveiled in November 2021, was the first example of how a system could be built to scale up using a modular design. Given the one-metre constraint on the connectivity between qubit systems, clusters of systems could be arranged in a cylindrical fashion, where each cylinder comprises a fridge with a number of interconnected 300 to 400-qubit systems.

"By 2025, we will have effectively removed the main boundaries in the way of scaling quantum processors up with modular quantum hardware and the accompanying control electronics and cryogenic infrastructure," said Pizzolato. "Pushing modularity in both our software and our hardware will be key to achieving scale well ahead of our competitors."

Hybrid datacentre

Just as when blade servers changed the construction, energy and cooling requirements of datacentres, IBM said it was already thinking about what a future hybrid datacentre for classical and quantum computing would look like.

"Our experience tells us that the requirements of a quantum datacentre are very similar to those of classical datacentres, with addressable solutions to accommodate cryogenic equipment," said Pizzolato.

"Key aspects of datacentre design – such as electrical and cooling water requirements, footprint needs, and the standardisation of infrastructure and system elements – are an integral part of our thought process. We have been able to leverage our deep experience in system and datacentre design to move quickly to design our quantum centres." ■

› *IBM adds LG Electronics to Quantum Network to explore offerings for AI and IoT.*

'Spy cops' public inquiry delves into extent of police relationship with MI5

There was 'no filter' on the information that undercover police officers collected on activists in the 1970s, despite senior managers and officials questioning the appropriateness of the activities. Sebastian Klovig Skelton reports

There was "no legal justification" for the information gathering and sharing practices of undercover police officers during the 1970s, which became more extensive and intrusive as the decade went on, a public inquiry into the police infiltration of more than 1,000 political groups has heard.

Evidence submitted to the inquiry also shows there was a close and prolific working relationship between Special Branch and the British security service MI5, which routinely shared information and coordinated surveillance efforts on primarily left-wing activists. Previously undisclosed documents show that senior managers at Special Branch also had an awareness at the time that what they were doing was difficult to justify, even as they were forming a "data entry team" to computerise more than 20,000 records.

Established in 2015 to investigate the practices of undercover policing units – including the Special Demonstration Squad (SDS), which was created in 1968 to infiltrate British protest groups as part of the Met Police's Special Branch – the Under Cover Policing Inquiry (UCPI) began its third phase on 9 May 2022.

The inquiry is looking at whether the intelligence-gathering practices of undercover officers were justified, and is expected to reveal details of how data protection issues were neglected at a time when laws were being introduced to govern the use of personal information.

Whereas the previous phase of the inquiry heard evidence from undercover officers and non-state witnesses (victims of police spying) about the SDS's operational activity, the third phase will look more closely at its supervisory chain of command, from its formation up until December 1983.

'Indiscriminate' and 'intrusive' data gathering

In his opening statement on behalf of Socialist Workers' Party member Lindsey German, James Scobie QC said that although the SDS was originally created to deal with the potential public order threat of a single demonstration in 1968, "it quickly became an intelligence trawl of left-wing political groups, growing ever more indiscriminate and ever more intrusive".

Scobie said that as time went on, the SDS's "focus shifted away from anything that could genuinely be described as police work", instead becoming a "political and economic police, with echoes of the Stasi", throughout the 1970s.

He noted, for example, that despite the clearly dwindling threat of "public disorder" by the mid-1970s – which was even apparent to Special Branch commanders – the extent of data collection "increased exponentially, from 200 information reports in 1969, to almost 10,000 by November 1971, with thousands being produced on an annual basis thereafter".

At the same time, said Scobie, SDS intelligence was increasingly being supplied to new "customers", including those "with little or no involvement in public order issues". This included other Special Branch departments and MI5, as well as the Home Office and other unnamed government departments, he said.

"By the end of the 1970s, the SDS management were having regular face-to-face meetings with MI5, including over games of sport, which are redacted for some reason," he said. "They were also having monthly meetings over lunch, with the Home Office – although the name and specific role of the Home Office representative in question appear to have been forgotten.

"Other unnamed government bodies were not liaised with directly. It was considered more appropriate to keep them at 'arm's length'. By April 1980, SDS and MI5 were meeting for 'drinks' every fortnight. By August 1980, meetings were described as 'routine'," added Scobie.

On the previous day of phase three of the inquiry, counsel to the inquiry David Barr QC said in his opening statement that

EXPRESS/STRINGER/GETTY

Police restrain protestors demonstrating against a National Front meeting in Red Lion Square in London, 1973

the information collected by the SDS and disseminated to MI5 included material about industrial disputes between private companies and their employees, which fuelled employment blacklists, and "extensive reporting" on children involved in activism.

"Many of the reports produced by the SDS, including those sent to the security service, were reports about individuals, including identifying information, and information about their membership of various left-wing organisations," said Barr.

The reporting on children's activism, he said, was also done at the direct behest of MI5, which urged the SDS in a December 1975 letter not to make direct enquiries with schools on its behalf, but to find sources "which you can use without risk of embarrassment".

Thousands of records computerised

Barr also noted the scale of information gathering, citing a newly disclosed Special Branch report which shows that 5,268 files were opened, mainly on individuals, and more than 1.1 million entries were made in its files in 1979 alone. The document also shows that, by the end of December 1979, 20,000-plus SDS records had been "computerised".

"A substantial increase in civil staff and the formation of a data entry team ensured significant progress in the computerisation of those selected Special Branch records concerned with terrorism and public disorder. I am aware of its political sensitivity," said the report, which was signed by a Deputy Assistant Commissioner Bryan.

"Training courses were arranged for record keepers and searchers to enable the system to go 'live' on 10 December. Almost immediately, the retrieval facilities enabled new lines of enquiry to be pursued," it added.

Barr said that information supplied to the security service by Special Branch was also passed on to employers, which included various government departments, the Atomic Energy Authority, the Bank of England, the British Airports Authority, British Airways, the Post Office and the BBC.

MI5 – which justified this practice on the basis that it "has a duty to establish whether or not he [the employee] has access to classified information...and to offer an assessment of the risk which the continuation of any such access might entail" – recognised at the time that this could "have serious consequences for the person concerned", including being purged from the civil service or held back in their career.

Barr noted an "awareness of the political sensitivity" associated with the SDS's practices was also present among senior managers and high-ranking Home Office officials at the time, including two successive permanent under-secretaries of state, Sir Robert Armstrong and Sir Brian Cubbon.

Should all this information have been recorded?

Citing a Home Office letter dated 2 April 1979, Barr said HM Chief Inspector of Constabulary was of the view that "the security service sought more information from Special Branches than they really needed".

Despite the concerns raised by officials in these previously undisclosed documents, it is still unclear whether any of those involved acted on their concerns.

› 'Spy cops' victims share ongoing data protection concerns.

Police clash with anti-fascist demonstrators during a National Front march in London, 1977

GARY WEAVER/KEYSTONE/HULTON ARCHIVE/GETTY IMAGES

Barr said the questions that UCPI chair Sir John Mitting must ask "are not so very different from those being asked in the Home Office in 1980. Should all of this information have been recorded? Should it have been kept for so long?"

However, Oliver Sanders QC, the designated lawyer for the undercover officers, contended in his opening statement that "many of those involved in the processing and consumption of SDS intelligence", including MI5 staff, did not necessarily know about the existence of the unit or the origins of the information they received. "The unconscious consumption of so much SDS intelligence...means evidence as to its use and value will be difficult to trace, particularly in surviving documentary records," he said. "It is submitted that further MPS [Metropolitan Police Service] and MI5 evidence as to the above is vital to an understanding of key inquiry issues as to the targeting and authorisation of the SDS, the dissemination of its intelligence, its interactions with MI5 and the justification for its operation."

The inquiry will hear from managers of the SDS over the next two weeks, who will answer questions about their authorisation and supervision of undercover operations from 1968 to 1983.

The next set of hearings on the activity of undercover officers from 1983 to 1992 will be held in spring 2024. ■

Digitised power networks the key for phasing out fossil fuels, says LF Energy

With countries worldwide under pressure to decarbonise their economies, Shuli Goodman, founder of open source championing LF Energy, talks to Caroline Donnelly about digitising power networks to be ready for renewables

The UK's over-reliance on overseas sources of oil and gas has been brought into sharp focus in recent months, as energy prices have risen sharply due to a mix of factors.

These include, but are not limited to, the ongoing geo-political unrest caused by Russia's invasion of Ukraine, the UK's extrication from the European Union, and the post-lockdown period prompting a bounce-back in industrial energy usage.

In response, the government has committed to taking action that will, in time, result in more home-grown generated energy being made available to UK consumers and businesses, and, in turn, reduce the amount of influence that global energy security issues have on how much they pay for power. These actions are outlined in the government's *British energy security strategy* policy paper, published in April 2022, which includes a pledge to build out the UK's wind and solar power generation capabilities, while accelerating the pace at which oil and gas are phased out of use.

In line with this, the UK will also move to ensure that, by 2050, up to a quarter of the power consumed in the country comes from

Renewable energy production must be accelerated, says LF Energy's Shuli Goodman

nuclear sources. It will also invest in measures that make the use of low-carbon hydrogen fuel cells for energy storage and transportation far more common, says the paper.

The policy paper further states that the UK's energy transition will require a revamp of the transmission networks used to carry power from where it is generated to where it will be used and stored. These networks are, as the report acknowledges, "complex systems" where "transformation" in the past has been slow to progress – particularly in bringing new capacity online.

> "It is a very problematic challenge that we have as humans to change out the engines of our economies"
>
> Shuli Goodman, LF Energy

Also, the policy paper emphasises the need to build networks with "hyper-flexibility" capabilities so that renewable energy supplies are more evenly matched to demand to prevent wastage.

This is because the generation of wind and solar energy is notoriously intermittent, so energy networks need to be built to ensure energy remains abundant and plentiful when the wind does not blow and the sun does not shine – especially as electricity demand is likely to double by 2050, according to government forecasts.

Much of the work the UK government is planning to do at network level appears to be geared towards increasing capacity by overhauling planning permission protocols.

However, an open source community – with ties to the Linux Foundation – is also exploring ways to revamp the world's energy networks, with a focus on virtualisation and software-defined elements to ease society through the transition from relying on fossil fuels to renewable sources.

Known as LF Energy, the initiative started just over five years ago when its founder and executive director, Shuli Goodman, approached the Linux Foundation in search of "someplace neutral and collaborative" where people could come together to build the energy systems and networks of the future.

"It is a very problematic challenge that we have as humans to change out the engines of our economies and shift them from fossil fuels to a different model that relies on renewable, intermittent energy," Goodman tells Computer Weekly.

'Now or never'

As stated in the Intergovernmental Panel on Climate Change's (IPCC) April 2022 review of climate science, the world is at a "now or never" point when it comes to limiting the effects of global warming by curbing greenhouse gas (GHG) emissions.

The move to renewables will play a vital role in bringing GHG levels down and reducing the risk of global temperatures rising by more than 1.5°C this century. But achieving that will mean taking steps to ensure carbon emissions peak by 2025 and then fall swiftly, the IPCC warns. "Without immediate and deep emissions

reductions across all sectors, limiting global warming to 1.5° is beyond reach," it says. "Limiting global warming will require major transitions in the energy sector, involving a substantial reduction in fossil fuel use, widespread electrification, improved energy efficiency, and use of alternative fuels, such as hydrogen."

On this point, Goodman is in total agreement, saying that a large-scale transformation of the way power systems operate is needed to help the world's economies hit their net-zero carbon goals. "Power systems lead," she says. "If you look at the amount of decarbonisation [that needs to happen], change needs to start with power systems, then transportation and then the built environment. If we begin working very intensely on power systems, we can transition to electric mobility and remove fossil fuels from our transportation systems, and then really go about transforming our housing and built environments, so they are using radically efficient resources for lighting, heating, cooling and cooking."

Digital transformation

And with the effects of climate change and global warming already being keenly felt across the globe, it is imperative that the digital transformation of the world's power systems proceeds at pace, says Goodman. "If we don't figure this out, there will be no economy," she says. "If you're a multibillion-dollar or trillion-dollar company, and a third of the world's population – hundreds of millions of people – are moving around because they're [climate change] refugees, that's not good for business."

In terms of what digital transformation means in the context of power systems, Goodman says: "Key to this is going to be: how do we produce, move and consume electrons? That's where the digital part comes in because you can't network electrons, like we do bits and bytes over airwaves, because electrons need a physical surface to move across. So what we have [at the moment] are systems that are quite brittle and designed so we can basically throw electrons across the line and into the house so that we can turn the lights on or so that businesses can consume massive amounts of energy to drive industrial processes."

> **"If we don't figure this out, there will be no economy"**
> Shuli Goodman, LF Energy

Energy systems typically exist in an "all-on" or "all-off" state, but the transition to renewables will require networks to be more dynamic and better co-ordinated so they can manage supply and demand in rapidly changing systems, says Goodman. "A lot of the work we are doing right now is to ensure that data is able to move and be available to an increasing number of systems that will use data – devices and tools that will enable all of us to manage our energy profiles," she says.

LF Energy is leaning on its community of open source collaborators to seek out ways to bolster the amount of flexibility in power networks so they are better equipped to cope with intermittent, renewable sources of energy. This work will require energy networks to become more digitised and less analogue, says

Datacentre operators could do far more to make their operations more sustainable.

A large-scale transformation of the way power systems operate is needed to help the world's economies hit their net-zero carbon goals, says LF Energy's Shuli Goodman

WANCHAI/ADOBE

Goodman. "Digital has never been more important, and essential, when considering the future of power networks," she adds.

Also, power networks and systems will need to become far more data-driven, she says. "What we can do is network the metadata about electrons, which gives us increasing dimensions of flexibility to be able to manage intermittent energy.

"For the most part, the plugs that are in our homes and built environments are analogue, so I think we have to really think much more closely about what it would be like to be able to have a paired wire that not only carries electrons, but also carries data about those electrons."

LF Energy's work has also seen it draw inspiration from how other utility-related industries, such as telecommunications, have sought to digitally transform the infrastructure underpinning their operations. "Telecommunications is probably the most logical [comparison]," says Goodman, "because if you look at the internet, if you look at telecommunications, if you look at cloud, if you look at energy, you can see that power systems will inherit the work that was done there – because we're looking to create a distributed energy system using distributed computing."

Digging into this subject a little more, Goodman points to the work that AT&T has done around network function virtualisation

(NFV), which saw the telecommunications giant set out plans in 2014 to have 75% of its global network classified as being software-defined and controlled by 2020.

For AT&T, this process has allowed it to replace its costly, proprietary network hardware infrastructure with off-the-shelf open source kit and server virtualisation technologies that can host the virtual machines needed to run necessary network functions.

> "I THOUGHT WHAT WE WERE FOCUSING ON WAS A NO-BRAINER, BUT IT TURNED OUT TO BE VERY, VERY COMPLICATED"
>
> SHULI GOODMAN, LF ENERGY

AT&T says this setup makes it easier for it to respond in real time to fluctuations in demand for network capacity, and enables it to roll out new services to customers sooner. Similar to LF Energy, AT&T has sought the support of the open source community to help it reach its goals, and is known to be a participant in the Linux Foundation and Open Infrastructure Foundation in the past.

It remains to be seen whether energy systems will be able to reach the same level of virtualisation as AT&T has with its network, but Goodman says she is "quite certain at least 50% of the problem LF Energy is trying to solve will be digital".

Reflecting on the early days of LF Energy, Goodman admits that getting other people to see the value in digitally transforming power systems was not always an easy task. "I thought what we were focusing on was a no-brainer, but it turned out to be very, very complicated, because there's a lot of vested interest and a lot of economic value that is captured in the old energy system," she says. "There is a lot of technical debt, so it's not fast moving. Inertia is the dominant paradigm of the current power system."

Expanding on this point, Goodman says that during the first few years of LF Energy's existence, it became clear that the organisation was "considerably ahead of the market" in terms of what it was seeking to do. French power transmission system operator RTE Energy saw the value instantly in what LF Energy was setting out to achieve, says Goodman.

The company joined forces with LF Energy after a "relatively small group of its engineers" realised that without urgent intervention, there was no way power systems could transform quickly enough to accommodate the shift to renewables, she says.

SOFTWARE IN THE FIELD

Fast forward to today, and Goodman says the organisation has "software in the field" in California, the Netherlands and the UK, where it is helping to co-ordinate demand to deliver flexibility to the grid. These in-the-field deployments include its green energy hub, OpenGEH, which is designed for use by utility companies that want to keep tabs on electricity production and consumption levels, so they can pinpoint when would be the best time to bring more renewable energy onto the grid.

"This is being used in Denmark, Estonia, the Netherlands and Germany," says Goodman, and is an example of how digitisation is helping to accelerate the transition of these countries away from fossil fuels.

Another product that is also being keenly used in the field by utility providers in France is known as OperatorFabric. This is designed to help organisations aggregate notifications from multiple applications within their systems on a single screen, so these alerts can be acted upon.

"These are the beginning of LF Energy using open source software, open specifications and open hardware design as a suite of tools to help the world go faster, together," says Goodman.

Domino effect

As well as a growing list of real-world deployments for LF Energy technologies, the organisation has experienced a "domino effect" of organisations wanting to join its community of contributors and users, including household-name big-box retailers, manufacturing giants and tech firms.

The reason for that, says Goodman, is because these firms are starting to realise that how they manage their energy needs will hugely influence how they are able to meet their sustainability goals and pledges.

"Every company on this planet is going to have to, in one way or another, become an energy company," she says, "in that every company needs to have somebody whose job it is to think about 'how does my company consume, provide and participate in the creation and usage of electrons?'"

Every company in the world will find itself under increasing pressure to decarbonise its operations to minimise the impact of global warming, which will require all of these firms to shift their economic priorities, says Goodman, particularly as rising energy costs mean that power is becoming an increasingly big overhead for companies. Therefore, they will need someone in place to ensure they are operating in a more energy-efficient way, while also ensuring their environmental responsibilities are met.

> **"We need to accelerate the production of renewable energy and storage, and radically shift our priorities with regard to energy efficiency"**
> Shuli Goodman, LF Energy

"The cost of energy is skyrocketing," says Goodman. "We need to accelerate the production of renewable energy and storage, and – even more importantly – we have to radically shift our priorities with regard to energy efficiency. We have to think from lower-wattage devices and appliances to higher-efficiency windows, doors and insulation. This is the century of the electron. We need to treat it with respect." ■

ComputerWeekly

Computer Weekly,
10 Exchange Square,
9th Floor (West),
London EC2A 2BR

Telephone: 020 7186 1400

Editor in chief: Bryan Glick
bglick@techtarget.com

Managing editor (technology): Cliff Saran
csaran@techtarget.com

Investigations editor: Bill Goodwin
wgoodwin@techtarget.com

EMEA content editor: Karl Flinders
kflinders@techtarget.com

Senior editor, UK: Caroline Donnelly
cdonnelly@techtarget.com

Security editor: Alex Scroxton
ascroxton@techtarget.com

Networking editor: Joe O'Halloran
johalloran@techtarget.com

Management editor: Lis Evenstad
levenstad@techtarget.com

Storage editor: Antony Adshead
aadshead@techtarget.com

Business applications editor: Brian McKenna
bmckenna@techtarget.com

Business editor: Clare McDonald
cmcdonald@techtarget.com

Senior reporter: Sebastian Klovig Skelton
sklovigskelton@techtarget.com

Production editor: Claire Cormack
ccormack@techtarget.com

Senior sub-editor: Bob Wells
rwells@techtarget.com

Senior sub-editor: Jaime Lee Daniels
jdaniels@techtarget.com

Senior sub-editor: Ryan Priest
rpriest@techtarget.com

Vice-president of sales, EMEA: Jat Hayer
07557 433681 | jhayer@techtarget.com

IT strategies need to be data-centric

Data, as the cliché goes, is the new oil. If a business loses its applications, it may cause some serious headaches in the IT department, but ultimately, it should be able to recover. Lose the data though, and that's like losing the crown jewels.

But far too much emphasis seems to be put on applications over data. "IT started with constrained computer systems; data was a secondary asset," says Clive Benford, head of the corporate analytics programme at Jaguar Land Rover. Software is procured or specified as a functional asset. It is rather like, to continue the oil analogy, the drill on an oil rig. But if there's no oil to be found, it's a moot point whether the drill has been optimally specified.

However, the emphasis on applications is changing. Work is under way to build a "data-centric manifesto" – an information architecture that puts the emphasis on data rather than applications. All the value from using analytics occurs, says Benford, when people do things beyond the functional specifications of the original systems.

JUST AS WHEN DRILLING FOR OIL, THE MOST IMPORTANT ASSET IS THE DATA

The Data-centric Manifesto is one of the groups lobbying to change IT's perspective on applications and data. Consider how multiple apps attach to a mobile phone's calendar. They don't "own" the calendar, but they know of it and can schedule events and set reminders. While the data landscape of an enterprise is more complex than a calendar, the Data-centric Manifesto says it is possible to establish a shared model of the essential concepts that underpin all the applications of a large firm. Such an IT architecture is not application-driven. There is no killer app. Just as when drilling for oil, the most important asset is the data. The data identifies target areas to drill for oil, or, in the context of a business, it highlights potential efficiency gains, waste, supply chain optimisations and improvements to customer or employee experience.

This requires both a top-down and bottom-up approach to embed how people at all levels of the organisation think about the role of data in their job, and how data is shared, securely and responsibly. Speaking at Gartner's data and analytics summit in London, Peter Blomgren who leads AstraZeneca's R&D data office, says the company changed culturally from being closed by default to open by default for qualified users. If data is truly the new oil, then IT leaders must move beyond an application-centric IT strategy to one that is wholly data-centric, with a governance framework architected for the secure sharing of information assets. ■

Cliff Saran, managing editor (technology)

TechTarget

Read the latest Computer Weekly blogs.

BUYER'S GUIDE TO COMMUNICATIONS AS A SERVICE | PART 3 OF 3

Rethinking business comms

With post-pandemic ways of working forcing organisations to rethink their communications setup, Cliff Saran looks at the growth in cloud-based services to support hybrid working

Throughout the Covid-19 pandemic, employees proved they could work effectively and productively from home – and many are planning to continue doing so despite a widespread return to offices.

According to a recent study by CCS Insight, although pandemic restrictions are easing in many regions, employees are determined that remote working will continue to play a vital role. This will have a profound effect on the way IT departments reconfigure telephony, unified communications (UC) services and Wi-Fi networks to support post-pandemic working methods.

The survey of 660 employees in European and US organisations reports that 90% of those who are able to work remotely want to retain the option to do so, with just over a quarter (27%) wanting to work remotely all the time. The appetite for full-time remote working varies slightly by region, at 38% in Germany, 36% in the US and 33% in the UK.

A much higher proportion of respondents, at 62%, favour a hybrid model, whereby they would work from home three days per week.

The need to make hybrid work

Analysts at Gartner forecast that the number of people working remotely will have doubled to over two-thirds of digital workers by 2023, shifting buyer requirements towards work-from-anywhere capabilities.

The nature of remote and hybrid working means people are continuing to hold meetings online, even with the easing of pandemic restrictions and offices reopening. According to CCS

HOME

Insight, this continued reliance on virtual meetings is triggering disruption across the employee productivity technology market.

Its survey found that use of the two leading platforms – Microsoft Teams and Zoom – jumped by over 50% in 2021, with the products being used by 47% and 41% of employees respectively. This is having a dramatic impact on the use of traditional voice technologies in organisations, with phone calls down 20% compared with pre-pandemic levels.

This is not just about using video conferencing, says CCS Insight principal analyst Angela Ashenden. The lines between the different forms of work-related communications are blurring, with "a shift from voice to telephony apps", she adds.

CCS Insight's research found that almost a quarter of employees expect their use of desk phones to further decrease over the next 12 months, with voice-only and video calls on meeting apps expected to grow strongly.

Popular apps combine enterprise messaging, telephony and video conferencing as cloud-based UC services with relatively straightforward subscription plans. In fact, the unified communications as a service (UCaaS) market has reached a point of maturity where the services available are superior to on-premise comms systems.

Gartner's *Magic Quadrant for UCaaS* report, published in October 2021, identifies Cisco, Microsoft, Zoom, 8x8 and RingCentral as market leaders. According to the report, for Gartner clients that subscribe to Microsoft 365, messaging is almost always awarded to Microsoft. In the most challenging telephony environments, however, such as hospitals, manufacturing, field services and retail, its clients select providers with the most extensive capabilities and a longer track record, such as RingCentral, Cisco and 8x8.

THE UCAAS MARKET HAS REACHED A POINT OF MATURITY WHERE THE SERVICES AVAILABLE ARE SUPERIOR TO ON-PREMISE COMMS SYSTEMS

However, while senior IT leaders understand infrastructure spending and will err towards economies of scale to reduce communications costs, CCS Insight's Ashenden says employees prefer to use the tools they are accustomed to, which means they may organise and host conference calls on their favourite video conferencing app, even though the organisation may have a company-wide contract with another provider.

MARKET LEADERS IN UCAAS

Microsoft: With 80 million monthly telephony users, Microsoft Teams has experienced the largest UCaaS adoption rate. Gartner's *Magic Quadrant for UCaaS* highlights Microsoft's expansion of Calling Plans from 11 to 28 countries, along with its introduction of Operator Connect and Voice-Enabled Channels, which Gartner says offers lightweight call centre-like capabilities. Teams also offers location-based routing and live captions for calls. There are 1,000+ apps available in the Teams App store.

Zoom: Regarding enhancements to Zoom, Gartner says the company has introduced Power Pack, a desktop experience for reception console users, and an enhanced dashboard for real-time and historic call queue analytics. It is now offering a hardware-as-a-service option for IP phones in 18 countries, and Zoom United, a bundled phone, meeting and chat offering for less complexity and commercial effectiveness. It also offers the Phone Appliance, which allows a Zoom app experience for desk

Implications of deploying UCaaS on Wi-Fi

A knock-on effect of the switch to online meetings is the added strain on office networking, which may not be up to the job, especially when users connect via Wi-Fi on their laptop or mobile device. Analyst firm CCS Insight found that 37% of the people it surveyed were concerned about network speeds.

One of the challenges in configuring a Wi-Fi network for the office is that every device "hears differently", says Dan Jones, wireless engineer at Natilik and host of the Wireless Pubcast. "If something's working really well on a laptop, that doesn't mean it's going to work really well on a tablet or a phone or whatever."

He says the main issue is that Wi-Fi chipsets used in devices differ significantly and their firmware runs algorithms that optimise Wi-Fi communications differently. Apple's approach is well-documented, according to Jones, but other manufacturers seem to be less open about how their chipsets optimise Wi-Fi. This means that, unlike with PCs and Android devices, a Wi-Fi engineer can understand the trade-off of optimising a Wi-Fi network for macOS-based hardware over one that favours iOS devices.

Wi-Fi tends to be optimised for the widest coverage area, but this is inefficient in an office environment, where a laptop only needs enough Wi-Fi range to connect to the nearest access point (AP), otherwise it continually jumps between APs, leading to intermittent connectivity. Thus, lower-powered Wi-Fi connectivity using APs positioned close to users means each laptop connects to the nearest AP, leading to a more stable Wi-Fi connection.

Another challenge for network specialists is that Wi-Fi is a shared medium, which means it suffers latency issues, particularly when used for real-time applications such as video conferencing. A cell tower in a mobile network works differently – it understands how many devices are connected and the type of data they want to send. It can schedule who gets to talk when and what bits of the radio spectrum they can use.

Jones says such scheduling will become available for Wi-Fi thanks to orthogonal frequency division multiple access (OFDMA), providing concurrent AP communications in Wi-Fi 6 as more devices are 6GHz-enabled.

phones. In July 2021, Zoom placed a $14.9bn bid to acquire contact centre-as-a-service (CCaaS) provider Five9. But the two companies failed to reach an agreement and the acquisition was abandoned in September 2021.

Cisco: Gartner notes that Cisco has expanded the telephony feature set in its Webex service to support large organisations. Telephony is now available in 85 countries in 21 languages and Cisco now offers an e-commerce site for web-based purchasing. Like many of the products featured in the Gartner report, Webex uses AI-based noise removal, which offers hybrid workers a better conferencing experience.

RingCentral: While it is known for its telephony service, RingCentral has been expanding into the online video conferencing market. Gartner points out that the company has formed strategic partnerships with Verizon and Vodafone, made e-commerce investments for direct sales, and put "a massive investment in RingCentral Video meetings", adding virtual backgrounds and closed captioning. Other changes listed in the Gartner report include redesigned mobile and desktop clients to keep pace with rival offerings, along with expanded developer support via RingCentral Engage application programming interfaces (APIs).

Deeper comms integration

UCaaS is often discussed alongside communications platforms as a service (CPaaS), where services are more tailored to organisations wishing to develop functionality that fits closely with internal enterprise systems. CPaaS is generally seen as a way to help organisations develop and improve their end-to-end customer experience.

Survey shows 98% of CPaaS users are "very" or "extremely" effective at getting their customers the information they need, compared with just 37% of organisations that don't use a CPaaS

A study from Forrester, commissioned by Vonage, reported in October 2021 that seven in 10 firms feel they are able to provide information to customers when, where and how they want it. The online survey of 1,037 global customer and digital experience decision-makers and influencers found that 98% of CPaaS users are "very" or "extremely" effective at getting their customers the information they need, compared with just 37% of organisations that don't use a comms platform as a service.

According to Gartner, a capability that has seen increasing market demand is the integration of universal communications capabilities with business applications that make workflows more efficient. For instance, 8x8, one of the leaders in Gartner's *Magic Quadrant for UCaaS*, develops software for the entire UCaaS and CCaaS stack.

ELLAGRIN/ADOBE

There is clearly plenty of choice when it comes to selecting a unified communications service. The majority of products provide off-the-shelf video conferencing, telephony and messaging. Businesses looking to streamline workflows may need to consider how these systems integrate with their customer experience platform, customer relationship management (CRM) and other enterprise systems.

What is clear from conversations with industry experts is that these systems need to be able to support hybrid working patterns and hence office wireless networks require a big rethink. ■

Storage requirements for AI, ML and analytics in 2022

Stephen Pritchard looks at what is needed for artificial intelligence and machine learning, and the pros and cons of block, file and object storage to store and access large amounts of often unstructured data

ALEKSANDR/ADOBE

Artificial intelligence (AI) and machine learning (ML) promise to transform whole areas of the economy and society, if they are not already doing so. From driverless cars to customer service bots, artificial intelligence and machine learning-based systems are driving the next wave of business automation.

They are also massive consumers of data. After a decade or so of relatively steady growth, the data used by AI and ML models has grown exponentially as scientists and engineers strive to improve the accuracy of their systems. This puts new and sometimes extreme demands on IT systems, including storage.

AI, ML and analytics require large volumes of data, mostly in unstructured formats. "All these environments are leveraging vast amounts of unstructured data," says Patrick Smith, field chief technology officer (CTO) for Europe, the Middle East and Africa (EMEA) at supplier Pure Storage. "It is a world of unstructured data, not blocks or databases."

Training AI and ML models in particular uses larger datasets for more accurate predictions. As Vibin Vijay, an AI and ML specialist at OCF, points out, a basic proof-of-concept model on a single server might expect to be 80% accurate.

With training on a cluster of servers, this will move to 98% or even 99.99% accuracy. But this puts its own demands on IT infrastructure. Almost all developers work on the basis that more data is better, especially in the training phase. "This results in massive collections – at least petabytes – of data that the organisation is forced to manage," says Scott Baker, chief marketing officer (CMO) at IBM Storage.

Storage systems can become a bottleneck. The latest advanced analytics applications make heavy use of CPUs and especially GPU clusters, connected via technology such as Nvidia InfiniBand. Developers are even looking at connecting storage directly to GPUs.

"In AI and ML workloads, the learning phase typically employs powerful GPUs that are expensive and in high demand," says Brad King, co-founder and field CTO at supplier Scality. "They can chew through massive volumes of data and can often wait idly for more data due to storage limitations. Data volumes are generally large. Large is a relative term, of course, but in general, for extracting usable insights from data, the more pertinent data available, the better the insights."

> "In general, the more pertinent data available, the better the insights"
> Brad King, Scality

The challenge is to provide high-performance storage at scale and within budget. As OCF's Vijay points out, designers might want all storage on high-performance tier 0 flash, but this is rarely, if ever, practical. And because of the way AI and ML work, especially in the training phases, it might not be needed.

Instead, organisations are deploying tiered storage, moving data up and down through the tiers all the way from flash to the cloud and even tape. "You're looking for the right data, in the right place, at the right cost," says Vijay.

Firms also need to think about data retention. Data scientists cannot predict which information is needed for future models, and analytics improve with access to historical data. Cost-effective, long-term data archiving remains important.

What kinds of storage are best?

There is no single option that meets all the storage needs for AI, ML and analytics. The conventional idea that analytics is a high-throughput, high-input/output (I/O) workload best suited to block storage has to be balanced against data volumes, data types, the speed of decision-making and, of course, budgets. An AI training environment makes different demands to a web-based recommendation engine working in real time.

"Block storage has traditionally been well suited for high-throughput and high-I/O workloads, where low latency is important," says Tom Christensen, global technology adviser at Hitachi Vantara. "However, with the advent of modern data analytics workloads, including AI, ML and even data lakes, traditional block-based platforms have been found lacking in the ability to meet the scale-out demand that the computational side of these platforms create. As such, a file and object-based approach must be adopted to support these modern workloads."

Block-access storage

Block-based systems retain the edge in raw performance, and support data centralisation and advanced features. According to

IBM's Scott Baker, block storage arrays support application programming interfaces (APIs) that AI and ML developers can use to improve repeated operations or even offload storage-specific processing for the array. It would be wrong to rule out block storage completely, especially where the need is for high input/output operations per second (IOPS) and low latency.

Against this, there is the need to build specific storage area networks for block storage – usually Fibre Channel – and the overheads that come with block storage relying on an off-array (host-based) file system. As Baker points out, this becomes even more difficult if an AI system uses more than one operating system.

File and object

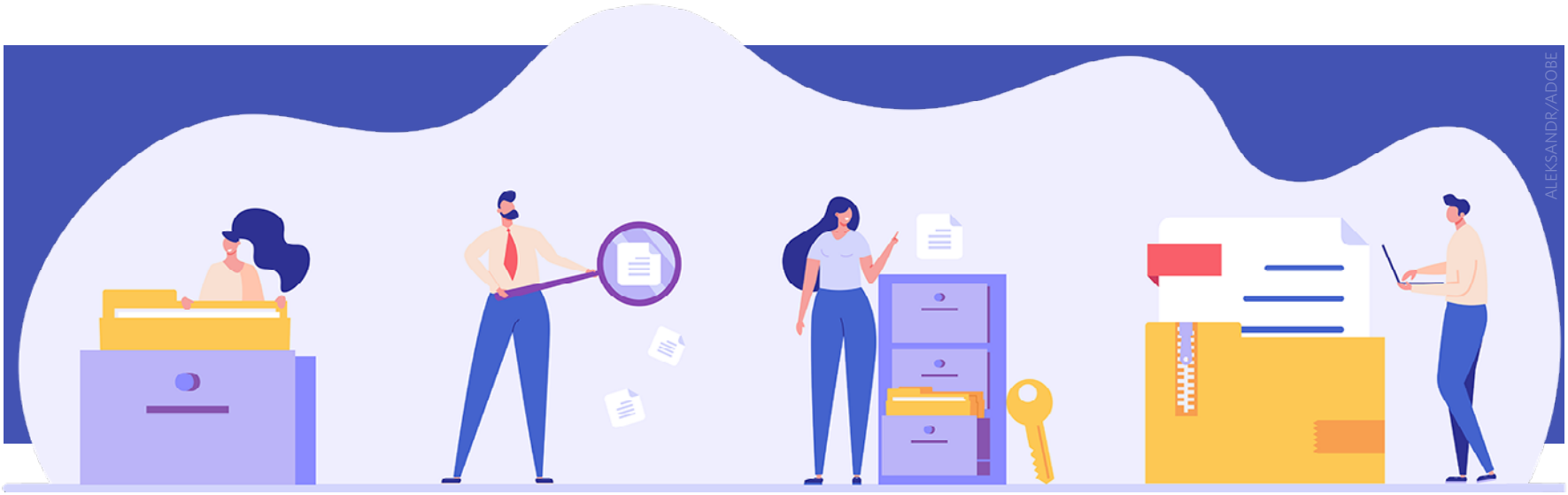
As a result, system architects favour file or object-based storage for AI and ML. Object storage is built with large, petabyte capacity in mind, and is built to scale. It is also designed to support applications such as the internet of things (IoT).

Erasure coding provides data protection, and the advanced metadata support in object systems can benefit AI and ML applications.

Against this, object storage lags behind block systems for performance, although the gap is closing with newer, high-performance object technologies. And application support varies, with not all AI, ML or analytics tools supporting AWS's S3 interface, the de facto standard for object.

Cloud storage

Cloud storage is largely object-based, but offers other advantages for AI and ML projects. Chief among these are flexibility and low up-front costs.



ALEKSANDR/ADOBE

The principal disadvantages of cloud storage are latency, and potential data egress costs. Cloud storage is a good choice for cloud-based AI and ML systems, but it is harder to justify where data needs to be extracted and loaded onto local servers for processing, because this increases cost. But the cloud is economical for long-term data archiving.

What do storage suppliers recommend?

Unsurprisingly, suppliers do not recommend a single solution for AI, ML or analytics – the number of applications is too broad. Instead, they recommend looking at the business requirements behind the project, as well as looking to the future.

"Understanding what outcomes or business purpose you need should always be your first thought when choosing how to manage and store your data," says Paul Brook, director of data analytics and AI for EMEA at Dell. "Sometimes the same data may be needed on different occasions and for different purposes."

Brook points to convergence between block and file storage in single appliances, and systems that can bridge the gap between file and object storage through a single file system. This will help AI and ML developers by providing more common storage architecture.

> "Understanding what outcomes or business purpose you need should always be your first thought when choosing how to manage and store your data"
>
> Paul Brook, Dell

HPE, for example, recommends on-premise, cloud and hybrid options for AI, and sees convergence between AI and high-performance computing. NetApp promotes its cloud-connected, all-flash storage system ONTAP for AI.

At Cloudian, CTO Gary Ogasawara expects to see convergence between the high-performance batch processing of the data warehouse and streaming data processing architectures. This will push users toward object solutions.

"Block and file storage have architectural limitations that make scaling beyond a certain point cost-prohibitive," says Ogasawara. "Object storage provides limitless, highly cost-effective scalability. Object storage's advanced metadata capabilities are another key advantage in supporting AI/ML workloads."

It is also vital to plan for storage at the outset, because without adequate storage, project performance will suffer.

"To successfully implement advanced AI and ML workloads, a proper storage strategy is as important as the advanced computation platform you choose," says Hitachi Vantara's Christensen. "Underpowering a complex distributed, and very expensive, computation platform will net lower performing results, diminishing the quality of your outcome, ultimately reducing the time to value." ■

Has Wi-Fi 6 stalled before it even got started?

Wi-Fi 6 and 6E were supposed to meet the need for wireless connectivity, but some say that uptake has stalled. Maxwell Cooter investigates

MICROONE/ADOBE

The Wi-Fi market is looking rather confused at the moment. The general feeling was that Wi-Fi 6, a standard that was ratified in 2018, would be widely adopted by now.

The new technologies were aimed at fulfilling the need for faster wireless connectivity, essential to meet the demand for more broadband-intensive applications and help meet the needs of employees working in a hybrid workplace, with the resulting demands this has placed on people working from home.

Wi-Fi 6 and 6E were supposed to meet that need, but it hasn't been plain sailing. In fact, there is a suggestion that uptake of the technology has stalled and that, in some cases, users are waiting for Wi-Fi 7 to be ratified to jump straight into the newer technology – and this is despite the fact this standard is still some way from entering the enterprise marketplace.

Wi-Fi 6 is a standard

What is most remarkable of all is that this is taking place against a backdrop in which wireless connections are more crucial than ever, and that Wi-Fi 6 is a standard that was agreed some years ago.

However, according to Tiago Rodrigues, CEO of the Wireless Broadband Alliance (WBA), the claims that the technology is not being adopted are wide of the mark. "We are very positive about Wi-Fi6 and 6E – there is plenty of momentum behind them," he says.

Rodrigues points to a survey by Comcast that shows the increased take-up of Wi-Fi devices and, in particular, the 59%

of customers who have improved their Wi-Fi implementations. "While not all of that will be Wi-Fi 6, I am starting to see a pickup for 6 in enterprise, particularly in places like convention centres, hotels and stadiums," he says.

Rodrigues adds that Wi-Fi 6E is certainly beginning to emerge as a viable technology, with some manufacturers beginning to roll out products.

Supply constraints

However, this is the area that the Dell'Oro Group has highlighted as a major concern and a stumbling block for the roll-out of Wi-Fi 6. As CEO Tam Dell'Oro points out, the component supply issue is across the board of every network equipment manufacturer and across most, if not all, products.

"Senior executives at the manufacturers estimate supply constraints will limit shipments through the second half of 2022," she says.

Part of the problem is the fluctuating labour issue as fabrication facilities struggle with rising levels of absences – something that is not going to change quickly.

"Economists from world premier organisations predict that qualified labour won't return to pre-pandemic levels until the end of 2023," says Dell'Oro. "The point is that while advanced economies have access to good medical care, developing economies don't – and much of the manufacturing is performed in developing economies. It is also the case that the pandemic has affected port staff, with fewer people offloading ships."

> "Economists from world premier organisations predict that qualified labour won't return to pre-pandemic levels until the end of 2023"
> Tam Dell'Oro, The Dell'Oro Group

But this is only part of the story. The pandemic has affected the roll-out of Wi-Fi 6 in other ways, too. The rise of the hybrid enterprise and the work-from-home movement has meant that organisations have had to completely redesign their corporate systems to support a new generation of remote workers.

On the face of it, this should mean even greater demand for an upgraded wireless technology, but as Dell'Oro explains, it's not necessarily that simple.

"Enterprises realised that they had to change their network architecture to support a more distributed workforce," she says, adding that "this translates into more security as work from home connects to corporate files".

Niche products

Such has been the demand, however, that to get popular products to market quickly, executives at several network equipment manufacturers have said they will redesign equipment with components that are more available. The natural consequence of this, says Dell'Oro, is that "not-popular and niche products

are likely to be more susceptible to supply constraints", which means newer technologies will be left behind as suppliers look to work with what they already have available.

But the WBA's Rodrigues is sceptical about this. "I know the Dell'Oro report suggests there is a supply challenge, but I don't have any evidence that this will affect the take-up of Wi-Fi 6 or 6E," he says, pointing to a trial currently taking place with Turk Telekom and various commercial enterprises running small-scale 6E projects.

Accelerated roll-out

Rodrigues says the freeing up of spectrum has accelerated the roll-out of 6E and he expects to see momentum build up. However, there are some problems to overcome. He admits take-up has been slower in Europe than in the US, with many governments reluctant to give up spectrum that is currently being used. "In Europe, we have only opened half of the band to Wi-Fi," says Rodrigues, adding that there are two issues in the continent.

"There are many different bodies in Europe that use that spectrum – some utilities and some railway companies, for example," he says. "And then there's the issue that Europe is a very mobile-centric region – more than the US is. There is a strong mobile industry that has also been pushing to use that spectrum."

Rodrigues says there is a delicate balancing act to ensure existing users are not left behind, but there are still opportunities for wireless providers to make full use of the spectrum.

"We've been trying to work with regulators to make sure Europe hasn't fallen behind on Wi-Fi," he adds.

MICROONE/ADOBE

However, Dell'Oro points out that even in the US, things are not straightforward. "The spectrum is still be deployed in areas such as smart streetlights with cameras and sensors, the management of electric grids and long-distance phone systems," she says.

Dell'Oro says the latter is particularly difficult because the process of deploying 6E and complying with government regulations is not yet smooth. "For example, Wi-Fi 6E signal transmission outdoors requires management by an automated frequency control system," she adds.

Spectrum issues to be resolved

Rodrigues is aware there are still issues to be resolved on spectrum, but says everything is moving in the right direction.

"The Wireless Broadband Alliance thinks it is OK to share the spectrum – there are smart technologies to help," he says, adding that attention needs to be paid to dense, urban areas and technologies need to be deployed to manage these challenges.

But the world is changing and there is a growing need to address the requirement for faster wireless broadband, says Rodrigues. The underlying issue is the way in which advanced data services are having an effect on the way people work.

"Broadband and advanced services – augmented reality and virtual reality – have had an impact on our life already," he says. "And the Covid pandemic has also reinforced how important Wi-Fi is for all of us."

Integrators will wait

But while Rodrigues talks of the advances that have been made, Dell'Oro says her belief that there had been a slowdown in 6E take-up is based on conversations at the tail-end of last year. "During the past quarter, I interviewed systems integrators who told me that their enterprise customers were not asking for 6E, they were asking for Wi-Fi 6," she says.

> **"Systems integrators [recently] told me that their enterprise customers were not asking for 6E, they were asking for Wi-Fi 6"**
>
> Tam Dell'Oro, The Dell'Oro Group

"Perhaps this should not be surprising as it is very early days for Wi-Fi 6E and most manufacturers haven't launched enterprise-class Wi-Fi 6E access points. However, there has been a huge amount of press coverage over the past couple of years and users certainly should have been aware that 6E was coming."

On top of that, says Dell'Oro, there is the issue that Wi-Fi 6E access points have far more parts than Wi-Fi 6 or Wi-Fi 5 – components such as radios and processors. Given the previously mentioned supply constraints, Dell'Oro believes businesses will be wary about going down that route, particularly when, as she points out, consumer-class Wi-Fi 7 products are already being shipped.

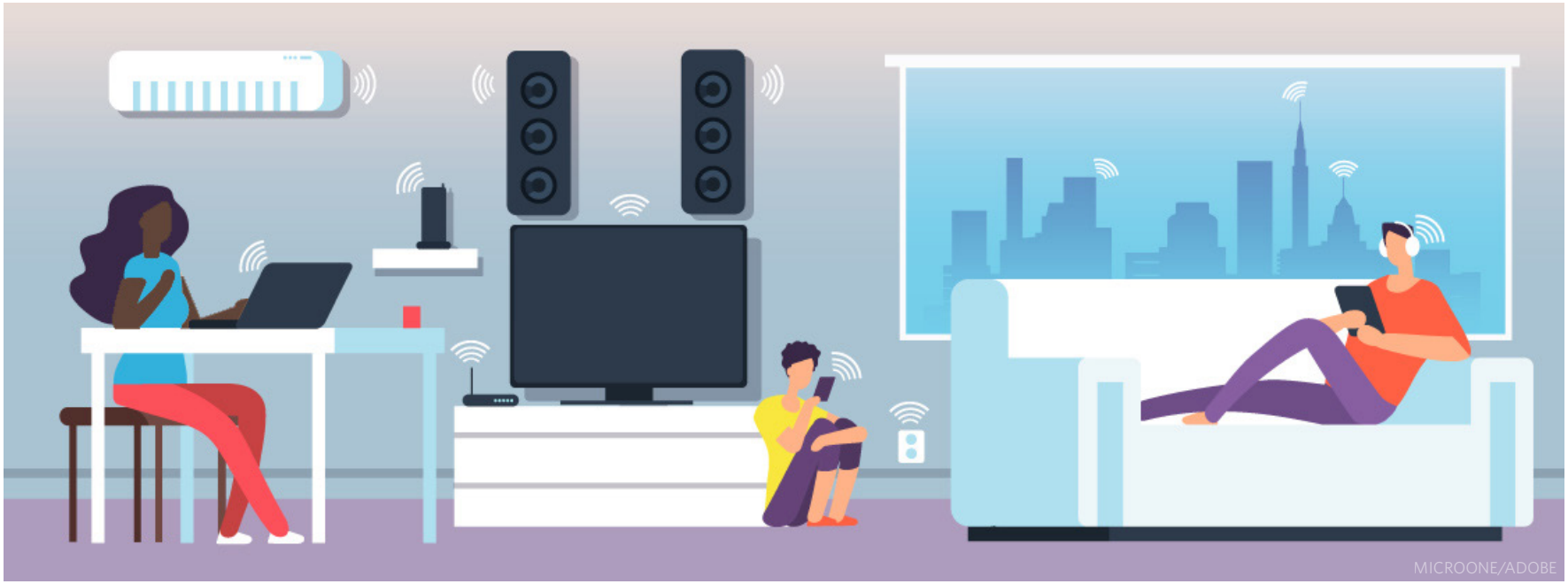
"I am hearing from industry participants that enterprise-class Wi-Fi 7 access points are likely to ship by the fourth quarter of next year," she adds.

But this is not a situation that Rodrigues recognises. "I have my doubts that many people will hold on for Wi-Fi 7," he says. "Maybe there will be someone who is very techy and will hold on for 7 products to appear, but most people will buy what is now available."

There is little doubt that there is a need for faster technologies, and while some businesses can wait, there will be a need for more robust connectivity sooner rather than later, so Rodrigues' thinking is probably correct. But that is not to gloss over the supply difficulties that Dell'Oro has spoken about – and that is before we talk about the situation in Europe, as various bodies scrap over spectrum availability.

As Dell'Oro points out, even in the US it is not always straightforward to find spectrum available, and that situation is much trickier in Europe.

There is still plenty to sort out, but – at first sight – there are still plenty of opportunities for Wi-Fi 6 in the near future. ■



MICROONE/ADOBE

ROKAS/ADOBE

The end of an EA

Electronic Arts has confirmed that its partnership with football's governing body, Fifa, will officially come to an end after the release of *Fifa 2023* later this year.

The battle has now begun between the two organisations over who needed the other more to make their video game titles so successful, with Fifa already claiming anything without its name attached to it will lack the authenticity gamers crave. We'd suggest the firm that still conjures images of Sepp Blatter's horrible, supercilious face failed to make any difference to the prestige of *France Football* magazine's Ballon d'Or awards, and that EA Sports will only benefit from cleaning its hands of the evil crooks who believe they have some sort of magical Disney-esque ownership of the sport. The Fifa World Cup Qatar 2022™ should be good, though. ■

"I can assure you that the only authentic, real game that has the Fifa name will be the best one available for gamers and football fans. The constant is the Fifa name, and it will remain forever, and remain The Best"

Gianni Infantino, Fifa president

›Read more on the Downtime blog.