

# CIO Trends #10: Benelux



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- How can CIOs in Europe turn innovation into a competitive advantage?
- Whisper it... but could a cyber attack be good for your career?

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### In this e-guide:

**If CIOs ever needed a reminder of the predatory cyber criminals that circle their organisations, Travelex's woes is a big one.**

**The foreign exchange company is still trying to recover from a ransomware attack weeks after its systems were first taken offline. It faced a \$6m demand from a cyber mafia group to decrypt its internal files after discovering its networks had been attacked by Sodinokibi malware – causing disruption in about 70 countries.**

**The company is now beginning to restore its systems, but recovering from the damage done will be a monumental challenge for the business.**

**Also find out how close autonomous ships are to regularly docking in Dutch ports. Read more about it in this e-guide.**

**Karl Flinders, EMEA content editor**

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## Travelex to begin restoring foreign exchange services two weeks after 'Sodinokibi' attack

Bill Goodwin, Investigations Editor

Travelex said today that it was to begin restoring its IT systems, which provide electronic foreign exchange services to banks and its own branch network, nearly two weeks after the company was [hit by cyber gangsters](#).

The company faced a [\\$6m demand from a cyber mafia group](#) to decrypt its internal files after discovering its networks had been attacked by [Sodinokibi malware](#) - also known as REvil - which disrupted the company's operations in nearly 70 countries.

The attack has left more than a dozen banks in the UK, including the Royal Bank of Scotland, NatWest, First Direct, Barclays and Lloyds, which rely on Travelex to provide services, unable to provide foreign exchange services.

[Banks in Australia](#), including NAB, the Commonwealth Bank and Westpac, have also been hit by the attack.

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Travelex said today that it had restored some of its internal order processing and was starting to restore customer-facing systems, beginning with in-store computer systems used to process electronic orders.

“We are now at the point where we are able to start restoring functionality in our partner and customer services, and will be giving our partners additional detail on what that will look like during the course of this week,” said Travelex CEO Tony D’Souza.

The company declined to say whether it had paid a ransom to the cyber criminals that disabled its global networks - a move that would allow it to recover encrypted files on computers in Travelex stores and offices worldwide.

It is unclear whether Travelex has back-ups of the encrypted files, which include the names of clients and bank account and transaction details, according to people familiar with Travelex.

### Hackers threaten Travelex on dark web

Last week, Computer Weekly reported that the [Sodinokibi crime syndicate had threatened to sell Travelex customers' credit card details](#) and personal data on the [dark web](#).

It emerged today that the criminals behind Sodinokibi have released internal documents from another hacked company – US Computer Services firm, Artech – which was hit by a similar ransomware attack in late December 2019.

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The hackers have posted a message on an underground hacking forum, threatening to disclose further hacked information from Artech, which claims to be the largest IT staffing company owned by women in the US, unless the company agrees to pay an undisclosed ransom.

[Irina Nesterovsky](#), head of research for Israeli security company and specialist in darknet threat intelligence, [Kela](#), which identified the post, said it marked a significant change of tactic for the crime group, which first appeared in April 2019.

“This is the first time that the group behind Sodinokibi published alleged proof of their attack,” she said. “While not mentioning explicitly Travelex – this is definitely a nod towards them and any other company that would be attacked by the operators of the ransomware, and refuses to pay.”

Travelex said it [had found no evidence that its customer](#) data had been stolen.

### Travelex staff ordered to return laptops

Travelex has instructed employees to hand over their laptop computers to IT specialists for analysis, according to people familiar with the attack.

The company is categorising laptops as red, amber or green, depending on the risk they pose to the organisation and the damage caused by the malware.

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"IT teams will contact you as soon as they are able to rebuild your device," said instructions sent to Travelex staff.

Those with unaffected computers have been told to keep their machines switched on and connected to the internet, so the computers can receive continuous updates and be monitored for suspicious activity.

### Problems persist with payroll

The incident has disrupted employees' ability to access the company's [Workday HR system](#), which is hosted in an independent cloud service.

People familiar with the situation told Computer Weekly that staff were only able to access basic functions HR functions.

Some staff have been told they will receive estimated salaries, as the company has not been able to update payroll systems with details of their overtime during the crisis.

"This has impacted many staff who worked extra hours and holidays over Christmas and the New Year and haven't been paid for it," one member of staff said.

Staff who received too much have been asked to pay back Travelex once its IT systems are back up and running.

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## Staff implement manual workarounds

Computers and point-of-sale machines in Travelex's retail outlets are still out of action, forcing staff to use cash books to keep track of transactions.

Customers are being told they can only buy foreign exchange with cash as the company is unable to process card payments.

Employees have been asked to use their own mobile phones to communicate with the company, and have set up WhatsApp groups to receive updates from managers.

"Staff are pulling together. We all realise we've only got each other to rely on to get through this," one person told Computer Weekly.

"Older staff have found the transition to pen, paper and calculator easier, but younger employees have taken time to adjust. The younger ones are starting to find their feet and getting more confident, but many cannot grasp the concept of doing a manual balance at the end of the day," they said.

## Travelex plans recovery roadmap

Travelex said in a statement today that it would continue to communicate with partners about the resumption of services and provide a roadmap setting out the next steps in its recovery.

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It said the company had been able to honour “most” online orders for collection in store and, where it could not, it has proactively reached out to people affected to make alternative arrangements, through its 24/7 customer support desks.

But one person familiar with the attack said communications had been chaotic.

“We’re receiving updates on procedures and the latest story to give to our customers every couple of days, and every time they change their minds on what we are supposed to do. They seem to be making it up as they go along,” the person said.

### Travelex warns staff not to comment on attack

Travelex has sent its employees pre-prepared speaking notes to repeat to customers when asked questions.

The company has also warned staff to say “no comment” to journalists. Travelex has instructed employees to take the name of any reporter asking questions, along with their contact details and organisation, and pass the information on to line managers.

Managers have also instructed employees to report any unusual calls or suspicious visits by people to Travelex counters.

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## Warning to Travelex

Kela's Nesterovsky said the decision by hackers to not to disclose Travelex internal company information, unlike that of Artech, might imply that Travelex has negotiated with the cyber crime group.

"The fact that no documents from Travelex were published yet could hint to the fact that the company has gotten in contact with them. Another option is that the data stolen from Travelex is more sensitive in nature, and they would not share it in public like that," she said.

Analysis by Computer Weekly of Artech files released by Sodinokibi hackers appears to show that hackers had widespread access to the company's internal networks, including administration credentials which could have provided administrator-level access.

The Information Commissioner's Office (ICO) said Travelex had not reported an information breach.

"We are in contact with Travelex and giving advice on potential personal data issues following the recent ransomware attack. The company has not reported a data breach," said an ICO spokesperson.

"If an organisation decides that a breach doesn't need to be reported they should keep their own record of it, and be able to explain why it wasn't reported if necessary," said the spokesperson. "Organisations must notify the ICO within

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72 hours of becoming aware of a personal data breach unless it does not pose a risk to people's rights and freedoms."

A spokesperson for the Financial Conduct Authority, which regulates Travelex, said: "We are aware of the issue and in contact with the firm to ensure affected customers are treated fairly."

### Ransom demands

Computer Weekly reported that [Travelex had been attacked by ransomware](#) in a report on 3 January and identified the [origin of the attack as Sodinokibi](#) on 6 January.

[Sodinokibi](#) subsequently [told security web site Bleeping Computer](#) that the group had accessed 5GB of information from Travelex and had threatened to publish sensitive information, including credit card details and social security numbers, unless Travelex paid a \$3m ransom.

The group went on to [tell the BBC that it was demanding a \\$6m ransom](#), and would release sensitive customer data by 16 January unless Travelex paid-up.

Update: 14 January 2020

A spokesperson for Artech confirmed to Computer Weekly that the company's computer systems had been hit by a malware attack on the morning of 8 January.

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"As a precaution, we immediately shut down all of our systems in order to fully investigate the attack and ascertain whether any sensitive or personal data was compromised. While we will continue to conduct further forensic examination, at this stage we believe that no sensitive or personal data has been compromised," the spokesman said.

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*Additional research by Matt Fowler.*

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## EU court opinion finds EU-US data transfers lawful but raises questions over Privacy Shield

Bill Goodwin, Investigations Editor

The [European Court of Justice](#) (ECJ) has backed lawyer and privacy activist [Max Schrems](#) and [Facebook](#) in a legal opinion which found that the contractual agreements widely used by companies to [share data between the European Union \(EU\) and the US](#) are lawful.

Advocate general Henrik Saugmandsgaard Øe said the agreements, known as [standard contractual clauses](#) (SCCs), were valid under EU law as mechanisms for ensuring the privacy rights of EU citizens are protected when their data is transferred overseas.

But he raised questions over the lawfulness of the EU-US [Privacy Shield](#) agreement on data protection in the light of evidence that the [US runs bulk surveillance programmes](#) which breach European privacy laws and fail to give European citizens adequate rights of redress if their data is wrongly intercepted.

The case originates in 2013, when Schrems complained to the Data Protection Commission Ireland that Facebook was providing "mass access" to data on its

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European customers to the US intelligence agencies, in breach of European privacy law.

Speaking today, Schrems said he was generally pleased with the court's statement. "The opinion is largely in line with our legal opinion and is an important sign of protecting the privacy of users," he said.

In a 97-page legal opinion, Saugmandsgaard Øe found that US bulk surveillance programmes did not mean that standard contractual clauses, which are used by more than 100,000 companies to share data with the US, were unlawful.

But he said there was an obligation by national data protection supervisors – in this case Irish data protection commissioner Helen Dixon – to investigate complaints about breaches in European data and to take action if the transfers fail to meet EU law.

"Where appropriate, [the supervisor] must suspend the transfer if it concludes that the standard contractual clauses are not being complied with and that appropriate protection of the data transferred cannot be ensured by other means," wrote Øe.

### Questions over Privacy Shield validity

The Advocate General found that although the European Court of Justice did not need to make a decision on Privacy Shield, there were questions

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over whether Privacy Shield gave adequate privacy rights to EU citizens when their data is shared with the US.

He said that Dixon should be given the chance to re-examine her files in the case. If she considered that Privacy Shield was an obstacle to her powers to suspend Facebook's transfer of data to the US, it would be open to her to bring the matter before the national courts to refer back to the ECJ.

"Prudence dictates that the court should await the completion of these procedural steps before it examines the impact which the Privacy Shield decision has on the way in which a supervisory authority deals with a request to suspend a transfer to the US," he said.

Saugmandsgaard Øe said the validity of the Privacy Shield decision depends on whether the US ensures an "essentially equivalent" level of protection to EU data to that guaranteed by the [General Data Protection Regulation](#) (GDPR), the European Charter of Fundamental Human Rights, and the European Convention on Human Rights.

But according to the Advocate General's opinion, it is not certain that US bulk surveillance programmes – authorised by section 702 of the Foreign Intelligence Security Act and Executive Order 12333 – provide adequate levels of privacy for EU citizens under EU law.

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"I have doubts about the validity of the finding that the US guarantees, in the context of their intelligence services...and adequate level of protection," he said.

### A relief for European businesses

The case is expected to be heard by the European Court of Justice next year. In the majority of cases, the ECJ follows the opinion of the Advocate General, though some people involved in the case believe the court may reach a different finding.

Lisa Peets, the lawyer at Covington and Burling representing the Business Software Alliance, which was joined to the case, said the Advocate General's decision to affirm the validity of SCCs was "tremendously important for companies across the economy, which rely on the SCCs for many of their day-to-day operations".

Richard Cumbley, partner at Linklaters, said: "The Advocate General's decision will prompt a huge sigh of relief amongst European businesses that deal with affiliates or suppliers in the US."

He said the decision meant that businesses could use standard contractual clauses as a mechanism to share data with Europe following Brexit.

"They will therefore be an important tool for UK businesses to receive data from the EU post-Brexit, and make an adequacy finding a desirable rather than critical aspect of the forthcoming trade negotiations."

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Graham Doyle, head of communications for the Irish Data Protection Commission, said that opinion raised important issues. They include that EU law applies when a person's data is processed by public authorities outside the EU, that US laws and practices lead to interference with the rights of individuals that are incompatible with US law, and that those problems are not cured by Privacy Shield.

"The opinion illustrates the levels of complexity associated with the kinds of issues that arise when EU data protection laws interact with the laws of third countries," he said.

Antony Walker, deputy CEO of trade group [TechUK](#), said Saugmandsgaard Øe's opinion was particularly important for small businesses preparing for Brexit, but he said there was still uncertainty over Privacy Shield.

"The Advocate General questioned the validity of Privacy Shield on the right to respect for private life and the right to an effective remedy. There will be a lot of focus on how these questions are addressed by the final CJEU [Court of Justice of the European Union] ruling," he said.

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## Autonomous ships on Dutch horizon

Karina Meerman

The Port of Rotterdam is moving closer to its plan to enable autonomous ships to call into port, and is currently replacing thousands of sensors to be compatible with the IBM Watson Platform it purchased in 2018.

The [internet of things \(IoT\) strategy of the Port of Rotterdam](#) is driven by two main challenges: transition from using fossil fuels and digitisation of processes and information.

The ultimate goal is autonomous ships. Think huge fuel-efficient vessels with a skeleton crew and an artificial brain, that sail the seas sustainably and navigate ports with great accuracy, thanks to rapid data exchange with terminals, agents and customs authorities.

Shipping companies and container terminals are making great strides towards that goal, says [Jeroen Ramakers](#), IT Architect at the Port of Rotterdam Authority: "Our customers are automating everything that can be [automated]."

"Today, when visiting the large container terminals, such as Rotterdam World Gateway, you hardly see any people walking the grounds. Our customers are way ahead of us in the digitisation of their operations."

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The first autonomous ships will still have crews on board for navigation. In later phases, the captain can perhaps steer his ship from shore and the vessel will navigate the seas autonomously.

But before any of this can become reality, all relevant data needs to flow seamlessly between all parties involved. Data such as water and weather conditions, terminal capacity and logistics.

In 2018, the Port of Rotterdam Authority purchased IBM's IoT Platform Watson. Working with networking giant Cisco and IT services company Axians, the port started to collect a variety of weather and water data including water level, currents, saline levels, wind and visibility.

Saline levels are relevant because a higher percentage of salt in the water means a greater buoyancy, and this affects a vessel's fuel consumption. "We replaced these five sensor types so they worked with Watson," said Ramakers. "It was the hardest task we gave our supplier. Once that was done, we could start changing other sensors, too."

Previously, sensor data was read, translated into information, analysed and turned into forecasts. "Now we can very accurately calculate conditions 24 hours in advance," said Ramakers. "Our aim is to create one generic platform that collects all data: that means replacing thousands and thousands of existing sensors in quaysides, roads and boulders. All that data needs to come together in one platform that will be able to communicate with autonomous ships.

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A port of Rotterdam spokesperson said that data has already led to a surprising cost saving. "When we constructed quaysides, we built them to withstand the forces of ever larger ships," they said.

"However, our sensors have measured these ships are actually not taxing the quaysides as much as we had calculated. Now can now start constructing more cost-efficient quaysides that require less material and match the required functionality."

The drive to automating shipping is a global challenge, and the Port of Rotterdam is of the international network organisation, known as Port Call Optimization. It meets regularly to discuss and agree upon standards for data exchange. "We have to work together – nobody can do this on their own," said Ramakers.

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## ▶ How can CIOs in Europe turn innovation into a competitive advantage?

Mark Samuels,

CEOs want their CIOs to transform their businesses with the use of digital systems and services. But if European CIOs want to help their companies steal a competitive lead through tech into the next decade, then they will have to take a pioneering approach to innovation that draws on a wide pool of internal and external expertise.

Almost half (44%) of global organisations are undergoing some kind of major digital change that will fundamentally affect their organisation, according to this year's annual IT leadership [research from recruiter Harvey Nash and consultant KPMG](#), which polled just under 4,000 CIOs and technology executives across 84 countries.

The research suggests that radical transformation results from growing expectations by the board and CEO of faster revenue growth, more value-generating innovation and changing business models, all enabled in part by stronger internal and external partnerships.

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[Albert Ellis, chief executive at Harvey Nash](#), said European CIOs who want to encourage innovation must get people to think creatively, and CIOs who want to drive transformation must ensure that innovation is ingrained within their company's DNA.

"What works is getting people into a structured environment, such as an innovation think tank, and rewarding the process of good ideas or behaviours," he said. "If you put the right infrastructure in place, you do get innovation. But if you do find an individual that comes up with good ideas, then you do need to reward that success in some way – and that means all the people who have been involved in the creation process."

One IT leader who is taking a structured approach to creativity is [Michael Cole, chief technology officer \(CTO\) for the PGA European Tour](#), who is actively hunting for innovations that his team can use to build the intelligent golf course of the future.

### Innovation contest

The PGA European Tour, which is responsible for managing and operating men's professional golf in Europe, is currently running an innovation contest alongside technology partner Tata Communications to help identify more opportunities for digital transformation.

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The innovation contest, which is down to its final stages, is supporting startups as they search for innovations in connectivity and data. The finalists are focusing on how to transform the game through multilingual content for global audiences, second-screen viewing using augmented reality, and enhanced real-time engagement with TV audiences.

“Golf is technically complicated, but with that complexity comes opportunity,” said Cole. “I think that’s why we will set ourselves apart from other similar competitions, because we are unique in sports and we have unrivalled opportunities. But we are also building on a platform of world-class tournaments, with leading industry-leading expertise.”

[Kristian Hjort-Madsen, who joined the executive board at Danish banking and insurance firm Alm Brand](#) in October 2018, agrees that European CIOs need to think differently if they want to push digital transformation. As CIO and chief innovation officer and on the board, Hjort-Madsen thinks his role is novel when it comes to IT leadership.

“I think it’s unusual to have someone responsible for innovation and digital on the executive board,” said Hjort-Madsen, who spoke at a [recent TBM Council event in London](#). “A lot of the stuff I’ve been doing is about bringing IT and business together. As digital leaders, we’ve been talking about this sort of stuff for ever – this is my third agile transformation. But at Alm Brand, we’re doing it a bit differently.”

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The organisation's collaborative approach draws on agile methodologies and cloud technologies to encourage people in all lines of business to think about how to develop creative solutions to its customers' challenges. Hjort-Madsen said CIOs who push hard at the beginning of a transformation strategy are likely to deliver better results in the long term.

"If you're really aggressive when you start working in a new way and you're very disciplined around things like lean and scrum, and you have the business working in that way, it becomes so powerful," he said. "Be honest with the board about how aggressive you want to be, how big the cultural change will need to be and how many people you will need to bring in."

"The big issue for us is how to enable our people to work collaboratively. We have aggressive targets, but we need a lot of great ideas on how to get there. That's why incremental changes are important. Listen to your customers, show your solutions and pivot on those in a much more dynamic way."

### Agile approach

Like Hjort-Madsen, [Nik Puri, senior vice-president for international IT at delivery firm FedEx Express](#), said an agile approach can help businesses think more creatively about digital transformation. His business is using the specialist management tool Appito to assess and communicate the cost of IT services for planning, budgeting and forecasting purposes.

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"I need visibility across 200 countries – you want to know how much is being spent," said Puri, who also spoke at the TBM Council event and is based at FedEx Express' European headquarters in Amsterdam. He said Appito provides insight into the operational value of technology systems and services.

"It's allowed me to have a discussion with the CFO where I can say which department is spending the most on IT," he said. "We wanted to make sure we had a baseline. Then we looked at application optimisation – because we knew we could deliver value."

Puri said the data from Appito allows him to have quick, productive conversations about the value of IT across different regions and areas of the business. Executives can then think much more carefully about IT spending. He added that they can optimise their portfolio of supplier partners, even potentially in some of the most pioneering areas of digital-led transformation.

"We always step back and ask what the headline would be 10 years from now – do we have the means to deliver those capabilities?" he said. "In most cases, we don't have that capability. But as it's so far out, people are willing to work with you and you can create a cross-functional team to think about technological changes. And then, once you know the architecture and capabilities that are required, you can go to the business and say, 'forget 10, let's do it in three years'."

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## Whisper it... but could a cyber attack be good for your career?

Sooraj Shah,

Over the past decade, much has been made about the cyber security blame game, with the same question being asked: who should be accountable for a [data breach or cyber incident](#)? The answer, of course, is that it's never black or white. But in the aftermath of many major incidents, chief information security officers (CISOs) and chief information officers (CIOs) are let go, and sometimes the CEO follows them out of the door.

In the case of one of the world's biggest credit score agencies, [Equifax](#), all three stepped down from their respective roles after a [catastrophic breach](#) that affected 147 million people in the US, 14 million UK citizens and 100,000 Canadians.

According to David Rimmer, the former CISO of Europe at Equifax, who was at the company [during the breach](#), such decisions are not necessarily made for the right reasons.

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“Often moves like that are made to satisfy shareholders and the press, rather than what’s best for the company – providing continuity in leadership is really important during a breach response,” he says.

Mark Walmsley, the CISO of law firm [Freshfields Bruckhaus Deringer](#), agrees, and adds that the act of firing someone can be a knee-jerk reaction of being in a crisis.

“Bringing in someone new as a way of deferring attention can be a big risk because you’re [replacing] someone who inherently understands your business and has all of the relationships within the business [with] someone who doesn’t have any of that experience,” he says.

“The market says it’s a great idea, but the reality is that you’ve got a crisis, you probably haven’t fixed the problem yet, and then you’re bringing in someone who doesn’t know anything about anything – it’s very clearly not a great idea.”

### A breach waiting to happen

Nearly all the CISOs Computer Weekly spoke to at the recent [Cyber Security Connect UK](#) conference in Monaco referred to the now cliché phrase “not if, but when”. They believe their organisations should understand that a cyber incident of some sort will happen at some point in time, but there’s no way of knowing when.

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As a result, Nathan Hayes, who acts as both CIO and CISO for law firm [Osborne Clarke](#), suggests there will be cases where it may be the right call to axe someone from the role.

"If there's been catastrophic failings, then there's not a lot you can do about it – somebody has to take responsibility. However, if you know all the reasonable arrangements are in place, then to axe someone would not necessarily be in the best interests of the company," he says.

Ameet Jugnauth, head of IT and risk at [Lloyds Banking Group](#), adds that it should be considered by those making hiring and firing decisions that CISOs or CIOs cannot predict every possible scenario.

"Should every CISO's job be impacted [by a breach]? If you knew you were sitting there with vulnerabilities and did nothing about it, that's very different to patching as much as you could, realising risk and managing it – that's as much accountability as you can have," he says.

Johan Pieterse, director of enterprise IT and group security officer at the [Racing Post](#), puts this into perspective.

"If you have 10 guys walking through the door of an office with AK-47s, should I have a strategy for that? I'm not going to spend money to have three layers of security for the *Racing Post* for that. However, if they get into your systems –

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physical, virtual or cloud – and I haven't patched my systems or done anything, that's completely different," he states.

It should come as no surprise that CISOs are essentially pleading with their organisations to understand the inherent risk of using IT in 2020. After all, a Nominet survey of more than 400 CISOs in the US and UK, conducted by Osterman Research, found that many of them (6.8% in the US and 10% in the UK) believe they would be [fired in the event of a breach](#).

### A tainted CV or an invaluable experience?

While there is much talk about the immediate impact of a cyber incident, what about thereafter? Would the CIOs and CISOs who've been axed manage to get similar or even better jobs, or are their CVs tainted because of their association with a cyber incident? Would any cyber security or IT staff who leave of their own accord also find themselves in a similar situation?

According to Joe Hansard, cyber security recruitment consultant at [La Fosse Associates](#), it wouldn't necessarily hamper their future employment prospects. "It would be how they reacted to the breach that they would be judged on," he suggests.

Although, if they were removed shortly after the incident – as was the case at Equifax – it may be difficult to prove they're the right person for the job, or to

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prove to future employers that they did put all of the right protocols in place to avoid such an incident.

If they were allowed to continue in the role, at least for a short period of time, there is a greater chance that the incident could enhance their CV.

"I work within the contract market, and, if anything, being at an organisation during a breach adds value to a CV, not the opposite. They are able to get a first-hand account of the breach to understand what led to the breach and the [incident response plan](#) that followed," says Hansard.

"This experience is invaluable – being at the helm in the midst of a breach, working around the clock and the war stories gained from this can offer real value to future employers," he adds.

Pieterse believes his experience of dealing with a breach without being directly accountable for it – as he was not the CISO when it happened – is invaluable.

"The good thing about it is that I have had the experience of dealing with the ICO [Information Commissioner's Office], remediation and implementing policy solutions [such as ISO 27001](#)," he says.

In fact, Freshfields' Walmsley believes experience of a breach or hack could make an applicant a better candidate for a job.

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“A lot of people we hire come from professional services where their job is about breach management on the professional services and managed services side. That means our incident response team internally have all worked at the big providers, so they spend all day saying ‘we’ve got an incident – this is how we respond’. It’s already part of their DNA,” he says.

All of these comments chime with an Optiv Security study which found that 58% of CISOs believe that experiencing a data breach would make them more attractive to future employers.

### The real deal

The reason that the experience is so valuable, according to Osborne Clarke’s Hayes, is that most teams will [undergo constant tests](#) to see how they react to a cyber attack, but there is nothing quite like actually going through it.

“Somebody with that experience would be of benefit as they would have gone through a real event rather than a training programme with a pseudo environment,” he states.

For those in more junior cyber security roles, being involved in a large-scale hack or breach would be extremely difficult, and Pieterse suggests they should therefore use the same advice as CISOs – that they’re doing everything in their position to avoid such an incident from happening.

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“As long as you’re finishing the work, doing it correctly and you’ve made people aware around you what the risks are and what the team is doing about it, then it is always considered good experience. It gets negative when you don’t do the research, don’t do the **bread and butter** kind of things such as patching, or don’t communicate effectively,” he says.

In other words, as long as you’re doing what is required of your role – whether it’s as an engineer, CIO or CISO – and you’ve matched the **risk appetite** of the company with your actions, then even if the company were to suffer a data breach or cyber incident, your role shouldn’t be under any threat, nor should your career prospects.

The issue is that many organisations, CEOs and investors don’t actually understand the risk appetite and put too much pressure on the IT and security teams. As a result, even if someone is not to blame for a cyber incident, they are let go, and on the outside it looks as if they were to blame and that they did something unforgivably wrong.

In one such case, a former CIO told Computer Weekly they had left their role of their own accord, and that it had nothing to do with the data breach in question. Hopefully, they can share their version of the story and what they’ve learnt as a result when they’re searching for their next job.

Those in cyber security roles or in the midst of a cyber security incident should take encouragement from the likes of **Dido Harding**, the former TalkTalk boss

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who is now chairman of NHS Improvement, and former [Target](#) CIO Beth Jacob, who is now senior vice-president, strategic advisor and leadership coach at SPS Commerce.

Much like data breaches, it's not a matter of if you'll find a new role, it's a matter of when.

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## Processors re-imagined: Will cloud and AI lead mean all change in the datacentre?

Daniel Robinson,

Intel has long dominated the datacentre, with its x86 server chips accounting for upwards of 90% of the market for the past decade or longer. But the datacentre is now undergoing changes, as enterprise workloads start to incorporate [big data analytics](#) and [machine learning](#), while cloud-native deployment models such as containers and serverless computing are on the rise.

“Cloud provides opportunities for any new processor system to make headway, as the total platform can be a mix of so many things,” says independent analyst Clive Longbottom.

“Historic platforms had to be pretty much uniform (hence x86) but virtualisation and containerisation have made this less of an issue. Plus, the acceptance of things like [GPUs](#) [graphics processing units], [FPGAs](#) [field programmable gate arrays] and [ASICs](#) [application-specific integrated circuits] has meant that workloads can be targeted at defined areas of a platform as and when needed,” he adds.

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Intel is well aware of the changing nature of workloads, as demonstrated by some of the [features introduced with the Cascade Lake Xeon server processors](#) earlier this year. These include the [Vector Neural Network Instructions \(VNNI\)](#), extensions to the existing AVX-512 vector processing instructions, which are intended to accelerate calculations involved in [deep learning](#) processes.

Cascade Lake also added support for Intel's [Optane DC Persistent Memory](#), which can be fitted into [DIMM slots](#) to expand the overall memory capacity of a server without filling it with expensive DRAM. This could prove useful for [in-memory database](#) processing and as datasets used in analytics grow ever larger.

Next up on Intel's roadmap is Cooper Lake. This was supposed to have been released this year, but is now due in 2020. This will be followed by Ice Lake, which is set to be Intel's first server chip family manufactured using a 10nm (nanometre) process. Ice Lake features a redesigned core with wider and deeper instruction pipelines, and will also implement more instructions targeting artificial intelligence (AI) and machine learning.

Coming in 2021 is a major overhaul called Sapphire Rapids, set to be used in the Aurora A21 exascale supercomputer Intel is building. This will also feature Intel's Ponte Vecchio Xe GPU accelerator. In fact, Intel says what it calls an XPU framework approach is key to future workloads, combining central processing units (CPUs), GPUs, FPGAs and other accelerators.

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## AMD's EPYC return

Meanwhile, AMD has been playing the comeback kid with its [Epyc processors](#). The second generation, codenamed Rome, launched in August, with up to 64 CPU cores and eight memory channels per socket. The cores themselves have enhancements such as wider floating point units, an improved branch predictor and better instruction pre-fetching, all of which leads to a claimed 29% improvement in instructions per clock over the first Epyc chips.

Looking to the future, AMD expects to deliver a third generation of Epyc in 2020, codenamed Milan, which will offer further tweaks to the CPU cores. This will be followed in 2021 by a fourth generation codenamed Genoa. Little is currently known about this, but it may be manufactured using a 5nm process and support DDR5 memory.

With the successful introduction of a second-generation Epyc, AMD seems to have gained the confidence of partners and customers, such that major suppliers such as Dell EMC, HPE and Lenovo have already launched systems supporting it. The fact that AMD's chips offer comparable performance to Intel's Xeon, but at a lower price, has also helped.

ARM does not manufacture its own chips, instead leaving that to its licensee partners, and the ARM ecosystem has had a number of false starts in the server market – Calxeda, Qualcomm, Broadcom and even AMD have all brought ARM-based server chips to market before dropping out for one reason or another.

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The current crop of hopefuls comprises Marvell with the ThunderX line it inherited via its acquisition of Cavium; Fujitsu with the A64FX chip that it is using to build supercomputers; and Ampere Computing, founded by former Intel president Renée James, with the eMAG range of processors.

ARM itself has drawn up an ambitious roadmap for future core designs aimed at the datacentre under the Neoverse project. The first of these, Ares, was unveiled in February 2019 and is designed to scale up to 128 cores. This will be followed in 2020 by Zeus with enhancements to make it 30% faster than Ares. Further out, Poseidon is expected to be optimised for a 5nm production process.

The problem that ARM licensees have often faced is the ecosystem to support ARM-based server systems is much less mature than that for x86 servers. This is despite support for ARM, including key software stacks such as [Red Hat Enterprise Linux](#) and [Ubuntu Server](#), as well as most of the big software projects.

“ARM should have done better than it has. It makes a great low-power edge chip or discrete workload server – but ARM does not seem to have managed to get the partners together to make this a real play,” says Longbottom.

Perhaps tellingly, most of the current crop of ARM server chips is found either in [supercomputers](#) or being deployed into hyperscale environments, where the lower power consumption of ARM chips is a key advantage. Fujitsu's A64FX

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chip powers Japan's Fugaku supercomputer, while Marvell's ThunderX2 is also in supercomputers and deployed (for internal use only) in Microsoft's Azure datacentres. Ampere's chips are used to power some server instances by bare metal cloud provider Packet.

## Power to the people

IBM has been treading its own path with its Power systems, [targeting demanding enterprise workloads](#) and focusing on Linux and other open source tools. The current Power9 processors are designed to offer more bangs-per-buck than Intel's chips, with up to 24 cores capable of four or eight threads each, and theoretically capable of being paired with up to 8TB of memory.

Power9 was also the first chip to support PCIe 4.0, enabling high-speed connections to accelerators. In addition, it sports BlueLink ports running Nvidia's NVLink 2.0 protocol, allowing GPU accelerators to be connected at a higher speed than even PCIe 4.0.

On the roadmap, Power10 is slated for 2020 and may double the number of cores to 48, as well as introducing PCIe 5.0 I/O.

The Power architecture has previously not been considered a real challenger to Intel and x86 in the mainstream, but IBM's recent acquisition of Red Hat may change that.

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“Power is still a great architecture, with hardware virtualisation built in, great workload balancing and so on,” says Longbottom. “It has a part to play – provided IBM plays it properly, and RedHat gives it a great way to play it.”

IBM is pushing a hybrid and multicloud vision based on technologies such as Linux and [Kubernetes](#). Under this vision, Red Hat Enterprise Linux becomes the default operating system for Power systems, and IBM has wasted no time in repackaging many of its key software products, such as DB2 and WebSphere, to run on Red Hat's OpenShift container platform.

The latter brings us back to the march of cloud-native approaches to developing applications, which emphasise open source tools such as Linux, [Docker-style containers](#) and Kubernetes. None of these technologies is tied to any single processor architecture, and so it makes the choice of server architecture less important – or so you might think.

Meanwhile, [serverless computing](#) has also been garnering attention. This takes abstraction to a new level, enabling (in theory) the customer to simply run their code without having to worry about the provisioning and management of the underlying infrastructure used to run that code. Serverless computing is generally cloud-hosted, such as [AWS Lambda](#), although there are on-premise platforms.

In reality, while new-build applications and services are cloud-native, there are still a great many legacy workloads in everyday operation in enterprises, and

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these may be tied to a particular platform, typically x86 servers. Organisations may look to eventually refactor or replace these with cloud-native versions, but for the present most organisations are likely to be sticking with x86 servers on-premise for this reason.

Overall, Intel is likely to continue to dominate the server market for the near future at least. AMD is likely to grab some share of this, if Epyc can continue to beat Intel on price/performance.

Beyond x86, ARM is making inroads into supercomputing and hyperscale, but whether ARM servers will be seen in any numbers in the enterprise is questionable. Power is more tricky to gauge, but there are plenty of Red Hat enterprise customers that may be tempted by IBM's claims that Power systems can handle demanding workloads at a lower overall cost than using x86 servers.

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