

# CIO Trends #7: Middle East

IT leadership best practices for CIOs, CTOs and CDOs



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## In this e-guide:

**The Middle East is changing fast and as a result the region is on a digital mission. Taking the example of Silicon Valley in the US, Saudi Arabia wants to build a bustling tech hub on its shores. Read here how the country has sent a delegation to the US to see how it's done.**

**One area where the Middle East already appears to be a pioneer rather than a follower is smart city development. Read about smart city initiatives in the Gulf Cooperation Council countries in this e-guide.**

**Also find out how a rare fault caused Visa's global payment system to go offline, in an in-depth analysis of Visa's outage in June 2018.**

**Karl Flinders, EMEA content editor**

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## ■ Saudi-con Valley? Kingdom's bid for global tech leadership

Alicia Buller, guest contributor

In April this year, Saudi Arabia's [crown prince Mohammed Bin Salman visited Silicon Valley](#) in the US to meet with tech giants such as Apple and Amazon as part of efforts to fast-forward the kingdom's technology capabilities.

An understanding of what these companies want from a tech hub is vital if Saudi Arabia is to achieve its lofty tech ambitions.

As part of [Saudi Arabia's drive to modernise its economy by 2030](#), the kingdom's push into technology has so far included a \$3.5bn deal with Uber in 2016, the creation of a massive tech fund with Japan's SoftBank Group and the announcement of a \$500bn business and tech city, dubbed Neom.

"Saudi Arabia has made significant gains in modernising and adopting progressive technology policies that other Arab countries have been reluctant to consider," according to [Wes Schwalje, COO of Dubai-based research firm Tahseen Consulting](#).

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“Through the Public Investment Fund, its open approach to regulating emerging technologies, and evolving entrepreneurship ecosystem, Saudi Arabia is emerging as a very serious contender to Dubai,” he said.

With a population of over 32 million, Saudi Arabia offers the largest ICT market in the Gulf and has long been attractive to outside players. Major US IT suppliers such as Cisco and Microsoft have been operating in the kingdom for decades.

“Saudi Arabia has been and remains a priority focus for us,” said [David Meads, vice-president, Middle East and Africa at Cisco](#). “The kingdom is marked by a large, young and tech-savvy consumer base and a growing number of local, regional and global enterprises. Saudi leadership truly understands the power of digitisation,” he added.

### Leadership in connectivity and information technology

Meads said he is seeing “unprecedented” commitment on the part of the public sector to achieving leadership in connectivity and information technology.

“Key initiatives have been implemented across healthcare, education, smart cities, cyber security and skills development, and we see great potential for this promising market,” said Meads.

But learnings from the US's Silicon Valley are vital, as more needs to be done to get to the next stage. [John-David Lovelock, chief forecaster at Gartner](#), warned

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that the kingdom will have to “strongly focus” on attracting talent to the country if it is to achieve its ambition of becoming a global tech leader.

“Saudi Arabia will have to create access to skilled IT labour and also create the ability to support that skilled labour,” he said. “The Crown Prince needs to create the jobs and then make them accessible.”

He added the nation's focus on attracting tech talent has to be “multi-pronged”, with a focus on both domestic training and importing international talent. “It's not possible to train up the domestic workforce as quickly as you need them, but you cannot also build an entirely imported workforce,” he said. “You have to have some skin in the game.”

Lovelock refers to California's Silicon Valley, which is home to a vibrant and cosmopolitan mix of local and global talent. “At a certain point, you have to cultivate indigenous talents who are not transient.”

He suggested it will take the kingdom four years to nurture indigenous junior tech talent, but developing local IT “visionaries” could take decades.

## The Silicon Valley of the Middle East

Overall, Lovelock said the idea of Saudi Arabia becoming the Silicon Valley of the Middle East is possible. “There is growth in the technology industry globally and there aren't yet enough local tech hubs,” he said.

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“Saudi Arabia has the benefit of a lack of binding regulation and lack of legacy infrastructure, but it also means they don't have a mature level of IT support and experience. Saudi Arabia still needs to provide the right infrastructure – but I wouldn't bet against the country building it, just as Dubai has done.”

However, [Andreas Krieg, assistant professor at King's College London's department of defence studies](#), warned Saudi Arabia's ambitious goals appear to be out of sync with the “reality” of the job market in the kingdom.

“Saudi Arabia is currently lagging behind its neighbours in terms of ease-to-business, ease-to-invest as well as economic mobility,” he said.

Bin Salman's tough approach to revolutionising the country has spooked some foreign investors, which could make it more difficult for the kingdom to obtain the support it needs to grow its tech sector..

“The market in Saudi Arabia is so far, despite the various announcements by the new leadership, quite closed and does not provide the incentives for foreign investors to help build an indigenous industry outside the hydrocarbon sector,” said Krieg.

“Looking at global push-and-pull factors in the tech sector, currently tech companies have no incentive to relocate to the Gulf – if they do, they would rather go the UAE or Qatar where the infrastructure for such companies is a lot better.”

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He said the global tech sector thrives on “innovation, liberalism and freedom of thought” – all preconditions that are currently not met in Saudi Arabia.

“If Saudi Arabia is to become a truly global tech leader, the nation must become a liberal society that is not in fear to think outside the box, a business climate of openness and trust, where business is conducted according to the rule of law,” he said.

Krieg said Saudi Arabia could eventually create a more liberal environment but that it will take a long time. “The rest of world is already transforming at a faster pace. The competition for the kingdom is fierce, and Bin Salman has gigantic hurdles to overcome while other tech hubs are already flourishing.”

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## ■ Gulf Cooperation Council smart city initiatives garner momentum

Edward Banda, guest contributor

The Middle East is pouring investment into smart cities to enhance government efficiency and citizen services in conjunction with digital transformation initiatives such as [Dubai Smart City](#) and UAE Vision 2021, Saudi Vision 2030, Oman Vision 2020 and New Kuwait Vision 2035.

Analyst Gartner said citizen engagement has become critical to the success of smart cities because city-wide initiatives are no longer just about optimised traffic patterns, parking management, efficient lighting and improvements to public works.

“The way forward today is a community-driven, bottom-up approach where citizens are an integral part of designing and developing smart cities, and not a top-down policy with city leaders focusing on technology platforms alone,” said [Bettina Tratz-Ryan, research vice-president at Gartner](#).

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To keep pace with the changing needs of citizens and the development of new business, cities are now striving to become not just smart, but also innovative in enhancing human experiences.

[Carlo Ratti, professor of the practice, Massachusetts Institute of Technology \(MIT\)](#), said there is an increasing drive by businesses and the general public in the Gulf to design more human cities, with less interest in achieving technological prowess for the sake of them.

Ratti said that is the reason the MIT piloted the cloud cast concept in 2017 in Europe, Middle East and Asia.

He added that at the architectural scale through the renovation of the headquarters of the Agnelli Foundation in Turin, Italy, the MIT pioneered a new technology for personalised heating and cooling – a kind of “thermal bubble” that follows individuals inside the building and allows for better comfort and a reduction of energy waste.

“We have sampled not only in Cambridge, Massachusetts but also in Kuwait City and in South Korea,” he said. “In early September 2018, we will show the result of our research at the architecture biennale in Seoul.”

Ratti said with the interest shown around smart city initiatives across the Middle East and in particular the Gulf Cooperation Council (GCC), in the future, the region will initiate a robust platform to not only monitor changes in collective

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health, but to understand which chemicals are being released into the water by industries, to monitor security threats.

"In short, we could say we will see more 'sensible' cities and less smart or [those with] technology prowess," he said.

### GCC looks towards future

Hasan Zuberi, smart cities consultant Dubai-based Key Options, said Gulf states comprising countries (Bahrain, Oman, Kuwait, Qatar, Saudi Arabia, and UAE) that are part of the GCC are home to some key smart city projects.

Zuberi said GCC countries are now working smart city initiatives and several governments have relaunched programmes to give a new boost to progress and ensure that the region's cities can match and even exceed other global cities in the adoption of smart city systems.

[Tom Pegrume, vice-president, emerging markets in Europe, Middle East and Africa at Hitachi Data Systems](#), said the Middle East saw an initial rush of excitement five years ago about smart city initiatives and is now shifting from installing the technology infrastructure to an era of big data analytics, gaining new insights that can enhance operational efficiencies and quality of life across transport, healthcare and energy.

Central to smart city success is for GCC governments to adopt an open data platform, which shares citywide data on a single platform. Governments

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worldwide, [led by Copenhagen in Denmark](#), have in turn monetised such a platform, with a "City Data Exchange" that charges for organisations and developers to access and use the data.

"The biggest challenge facing Middle East smart city leaders is breaking down barriers to share data between the public, private and academic sectors," said Pegrume.

"Smart city leaders also need to upskill staff to become data scientists and app developers to analyse city data to drive social innovation and new digital revenue streams."

[Rasheed Al Omari, business solutions strategist, Middle East and North Africa, at VMware](#), agreed with Pegrume on sharing data and said the first critical step towards shaping a smart city involves the creation of a reliable shared-services platform that aligns all of a city's services.

"Acting as a foundation, it will connect all of a city's smart technologies – from electricity grids through to water meters and all other utilities," he said.

For example, said Al Omari, VMware AirWatch already works closely with Tel Aviv Municipality in Israel to provide its traffic wardens with an AirWatch-managed Samsung Note 5, essentially providing them with a digital workspace that allows them to work from any location.

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“They can use the devices for ticketing by logging tickets and filling reports that include pictures, time and GPS stamps of the parking contraventions, all while on the go,” he said.

“Other cities including the likes of Doha and Kuwait City are also pushing smart city development, with the latter already using technology to improve sustainability, citizen wellbeing and economic development.”

In Saudi Arabia, Orange Business Services is working on a number of major smart city projects. These include the King Abdullah Financial District (KAJD), being built by the Al Ra'idah Investment company, which is the largest of four smart cities in Saudi Arabia being built with a collective investment of more than \$70bn.

In addition, Orange Business Services recently signed a smart city consulting agreement with Jeddah Economic Company to design ICT infrastructure and smart services for the master developer building Jeddah Tower, which will be 1km tall when complete.

“The implementation of the smart city components is considered as an essential step for delivering an environmentally friendly self-sustainable project. The construction of the infrastructure is going according to the set timeframe along with the supply of utilities,” said [Mounib Hammoud, CEO of Jeddah Economic City](#).

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## Potential of smart cities

[Tarig M Enaya, Saudi Telecom Company's senior vice-president of enterprise](#), said there is "huge potential" in the realm of smart cities.

"But expectations for what can be achieved with smart cities have not been structured correctly," he added. "There is huge potential, but how we address that potential is key to the success of smart cities and the whole realm of the internet of things [IoT] and, more importantly, its transformative impact on our economy and society."

A key measure of success for smart cities and IoT will be in whether the customer sees the "real value" of such interconnectivity, said Enaya.

As an example, he pointed to an area in Saudi Arabia's south which suffers from frequent rainfall. There, he said, sensors – which are connected to a sophisticated environmental analytics system – help predict the risk of floods and give local residents vital time to prepare. "That saves lives. That is value that smart cities bring," he added.

[Bulent Unsal, head of Telco – Middle East and North Africa, at SAP](#), said the Middle East is at the global forefront of smart cities innovation, with telecoms transformation enabling autonomous vehicles that can transform government, transport and logistics sectors.

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“SAP is driving some of the Middle East’s smart cities and smart future of connected vehicles, IoT, cloud and telecommunications through innovative digital marketplaces and partnerships,” said Unsal.

In Oman, Schneider Electric recently partnered with Knowledge Oasis Muscat to launch a showcase smart city innovations that could enable residents and businesses to save time and money on their utilities.

According to Schneider Electric, the initiative is in support of the Oman Vision 2020 nationwide transformation agenda aimed at enabling smart utilities across the Gulf state.

“As Oman’s population and business sector grows, the government needs to ensure safe, reliable, efficient and smart utilities,” said [Nasser Al Malki, acting director general, Knowledge Oasis Muscat](#).

“In partnership with Schneider Electric, we are digitally transforming with IoT solutions that can predict and meet energy demand, and enable people to monitor and optimise their utilities usage in real time.”

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## ■ Case study: Logistics firm GWC moves from paper to digital HR in three months

Bill Goodwin, premium content editor

Gulf Warehousing Company (GWC), a 2,000-strong logistics services company based in Qatar, has introduced cloud-based technology to replace paper processes used by its human resources (HR) department.

**GWC**, which has operations in Qatar, Dubai and Bahrain, implemented SAP's SuccessFactors talent management HR cloud service to a tight three-month deadline.

The project was part of a wider business IT project, which included replacing Oracle E-Business Suite with SAP ERP ([enterprise resource planning](#)) for finance, payroll, procurement, inventory and facilities management, alongside a suite of SAP HR software.

The company has set up HR hubs, known as PEG (people, engage, grow) centres, containing computer terminals where staff from 30 different nationalities can update their HR records, request training, book holidays and take part in online training.

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[Tia Prang](#), senior director of human resources at GWC, tells Computer Weekly her aim was to provide employees, which include 1,200 drivers, delivery people and other blue collar workers, with rapid access to HR services.

“We will become more efficient. Managers can see the status of job vacancies, from recruiting to job offer, right at their fingertips. Employees can see all the training courses. They come forward and take control of their own training. If we don't have a course, they can request it,” she says.

### Technology saves time

The technology has reduced the time it takes GWC to move from issuing a job requisition to making a job offer, from over a week to a few days – nearly a 60% reduction.

Managers can see real-time updates on the progress of each job application and the number of applicants for each role, information which previously had to be manually created using spreadsheets. They can approve or reject recruitment requests from their mobile phones.

GWC has also been able to automate its annual employee appraisals, introducing “smart” goals, which allow employees and managers to align their personal goals with the company's objectives, for the first time in the organisation.

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“Managers can plan employee development, manage their department goal more effectively and cascade [goals] from the corporate level to the individual,” says Prang.

The system has freed up the company's HR staff and managers from a labour-intensive process which required the manual collection and processing of more than 5,000 paper forms each year.

“That admin burden was high and data was not always accurate. Communication from management to employees was not there,” she says.

**Better record-keeping**

The project, which went live in June 2016, has given employees the ability to keep their personal records up to date for the first time. Managers can see at a glance what skills employees have and whether they are prepared to relocate overseas.

Managers, who may be responsible for up to 100 employees, can also use their mobile phones to navigate a live organisational chart, see pictures of their staff, and click on them to learn more about them – replacing paper charts compiled by the HR team, which quickly became out of date.

“HR credibility has improved significantly because the information is more visible to the business. We have become more efficient and effective in supporting our business”

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## Tia Prang, Gulf Warehousing Company

In the past, HR staff kept manual records of training, but now the information, including training certificates, is accessible online. This is important, because GWC is required to undergo regular compliance audits, which includes an assessment of staff training.

“We get audited all the time – internal and external audits. Safety is very important. We need to make sure we meet the audit certification,” she says.

## Data cleansing

Prang began work on the HR upgrade programme when she joined GWC in May 2015, starting with a three-month data cleansing project to update the company's HR data.

That meant working with directors to ensure that job titles, salary grades and business units were recorded consistently across the organisation. For example, Prang found that an IT manager could be described as an “infrastructure manager” or a “manager of IT” in different parts of the organisation.

The timetable for rolling out SAP's HR technology was aggressive, with a target go-live date of 1 June 2016. Prang decided to start with the standard policies and procedures built into the SAP technology and work backwards to develop HR processes for the company.

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"Most companies have policies and procedures, and put them in technology. I started off with the technology because the technology has pre-defined policies. I did not change the policies, but I tweaked the workflow," she says.

Prang decided to speed up decision-making by bringing together the 12 HR staff responsible for implementing the project with specialist consultants to make quick decisions.

### Choice of technology

Prang looked at a variety of technologies from [Lumesse](#), which provides talent management software, Oracle's Fusion Human Capital Management software and others, before choosing SAP. She ruled out Workday, a major cloud HR service provider, because it lacked a strong presence in the Middle East.

"What I liked best about SAP was the innovation. The function is real time, and once you do data entry, it is real-time results," she says. "Back to speed and agility, you need good data to make business decisions."

Another consideration was SAP's ability to handle multiple languages and multiple regions with different tax laws.

Most importantly, says Prang, SAP has made significant investment in SuccessFactors, which means the software will continue to be supported in the long term. "I don't want to pick an application that exists today and disappears the next. I want stability," she says.

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And because SAP is used worldwide, there is a ready pool of SAP specialists to recruit from, should a member of IT staff with SAP skills decide to leave, for example.

### Roll out

The team rolled out three projects at the same time: SAP HCM (human capital management), an on-premise HR system; [SuccessFactors](#) talent management software; and [Fiori](#), which GWC uses to manage payslips and standard HR letters, covering issues such as reimbursement and overtime.

The SuccessFactors modules include compensation, onboarding, performance and goals solution, recruitment and learning.

Simultaneously, the IT team introduced SAP's in-memory database, [Hana](#), and a range of other SAP software – [materials management](#), [sales and distribution](#), [plant maintenance](#), [finance and control](#), and [warehouse management](#). “We did the whole business side,” says Prang.

The company decided against SAP's cloud-based HR software, Employee Central, because it felt the payroll function had not been adequately tailored to the needs of Qatar. “The confidence level for Employee Central is not quite there. I need localisation, and it's not quite there yet in Qatar,” she says.

The company stores its payroll and employee master data on on-premise SAP software, but uses SAP's cloud services for [talent management](#). The team

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implemented SuccessFactors, including learning, succession, development, performance and mobile applications in just three months.

With people from more than 30 different nationalities working in the company, training people how to use the new system was challenging. The company produced training programmes and presentations in different languages and identified super-users who could help other team members with questions they had. "It is like a 'train the trainer' concept," says Prang.

### Next steps

The project has made a huge difference to the HR department, Prang tells Computer Weekly.

"HR credibility has improved significantly, as has the trust level, because the information is more visible to the business. We have become more efficient and effective in speed in supporting our business," she says.

In the future, Prang would like to introduce SAP's Employee Central cloud-based HR technology, which could be used for managing transfers and job changes, currently managed on-premise IT systems. "Employee Central will empower HR further, making it much easier to make changes," she says.

SAP is expected to end support of its on-premise HCM system in 2025 to focus more on cloud services, including Employee Central.

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But Prang says she needs to wait a bit for Employee Central to mature enough to introduce into Qatar. "They are not quite ready yet, so I would say, not for another three or six months."

Another priority is to introduce e-learning, so that employees can use the PEG centres to complete online courses, as well as book classroom training.

### Lessons for the future

Prang advises other companies embarking on HR IT projects not to attempt to roll out three HR systems simultaneously. "It is very exhausting. My team members, even though we have 12 people in HR in addition to an implementation team, did it all. That meant long hours and working some weekends," she says.

Prang and her staff turned up to every meeting, even when they had colds or flu, to ensure that the project remained on track.

She would advise HR organisations to listen to the ideas of their staff and to encourage them to take ownership of the project. That means speaking in a language they can understand, and avoiding technical terms.

"You have to win heart and mind of employee and manager. Only then will they use the technology. It's important that technology is fun, but if they are not using it, it's a waste of time and money," says Prang.

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The system is now being used by more than 2,000 employees for goal-setting and performance appraisal, and is widely used in the organisation for recruitment. Senior managers are using the tools for succession planning.

Prang admits the company needs to do further work to encourage employees to keep their HR data up to date. "We still need push to encourage people to add personal data. Some do, some do not," she says.

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## ■ Visa reveals 'rare' datacentre switch fault as root cause of June 2018 outage

Caroline Donnelly, datacentre editor

Visa has revealed a “rare defect” in a datacentre switch is what stopped millions of credit card transactions from being carried out during its [UK-wide outage on Friday 1 June](#), in a letter to the Treasury Select Committee.

The Committee is understood to have contacted the credit card payments firm, seeking both clarification over the cause of the outage and assurances about what action Visa is taking to prevent a repeat of it occurring at a later date.

Over the course of the 11-page missive, Visa expands on its previous explanation of a “[hardware failure](#)” being the cause of the 10-hour outage by laying the blame on a defective switch in its primary UK datacentre, which – in turn – delayed its secondary datacentre from taking over the load.

The primary and secondary datacentre are setup so that either one has sufficient redundant capacity to process all the Visa transactions that take place

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across Europe should a fault occur, and the systems are tightly synchronised to ensure this can happen at a moment's notice.

"Each datacentre includes two core switches – a primary switch and a secondary switch. If the primary switch fails, in normal operation the backup switch would take over," the letter reads.

"In this instance, a component within a switch in our primary data centre suffered a very rare partial failure which prevented the backup switch from activating."

This, in turn, meant it took longer than intended to isolate the primary datacentre and activate the backup systems that should allow its secondary site to assume responsibility for handling all of the credit card transactions taking place at that time.

The firm's UK datacentre operations team were alerted to the faulted switch at 2.35pm on Friday 1 June, after noting a "partial degradation" in the performance of the company's processing system, before initiating its "critical incident" response protocols, the letter continues.

"It took until approximately 19:10 to fully deactivate the system causing the transaction failures at the primary datacentre," the letter continues.

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“By that time, the secondary data centre had begun processing almost all transactions normally. The impact was largely resolved by 20:15, and we were processing at normal service levels in both datacentres by Saturday morning at 00:45, and have been since that time.”

Visa is also quick to point out that at no point during the incident did a “full system outage” occur, but admits the percentage of transactions that were processed successfully did fluctuate, with peak periods of disruption occurring between 3.05-3.15pm and again between 5.40pm-6.30pm.

During these times, around 35% of attempted card transactions failed, but this failure rate dropped outside of these periods to 7%.

“Over the course of the entire incident, 91% of transactions of UK cardholders processed normally; approximately 9% of those transactions failed to process on the cardholders' first attempt,” the letter continues.

### Failed transactions

In total, [51.2m Visa transactions were initiated during the outage, and 5.2m failed to go through.](#)

Since the outage resolved, Visa said it has focused its efforts on preventing a repeat of the events of 1 June, but admits it is still not clear on why the offending switch failed when it did.

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“We removed components of the switch that malfunctioned and replaced them with new components provided to us by the manufacturer,” the company said.

It is also working with its hardware manufacturer to conduct a “forensics analysis” of the faulty switch, Visa added, and undertaking a “rigorous” internal review of its processes.

“We are working internally to develop and install other new capabilities that would allow us to isolate and remove a failing component from the processing environment in a more automated and timely manner,” it said.

“Bringing in an independent third party to ensure we fully understand and embrace lessons to be learned from this incident.”

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## ■ Formula One switches from on-premise to machine learning on AWS

Cliff Saran, managing editor

The Formula One Group (Formula 1) has signed up Amazon Web Services (AWS) as it moves most of its infrastructure from on-premise datacentres to the public cloud.

According to AWS, Formula 1 will use [machine learning](#) and [data analytics](#) services in the Amazon public cloud to accelerate its cloud transformation. Among the services being used is [Amazon SageMaker](#), a fully managed machine learning service that enables developers and scientists to build and deploy machine learning models; [Lambda](#), [AWS's event-driven serverless computing service](#); and AWS's analytics service.

Using Amazon SageMaker, Formula 1's data scientists are training [deep learning](#) models with 65 years of historical race data, stored in both [Amazon DynamoDB](#) and [Amazon Glacier](#), said AWS. The tool enables the data

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scientists to obtain race performance statistics for making race predictions and give fans insight into the split-second decisions and strategies adopted by teams and drivers.

For example, AWS said Formula 1 data scientists can predict when the window of opportunity is opening and closing for teams to pit their cars for maximum advantage, as well as determine the best timing for changing tyres.

By streaming real-time race data to AWS using Amazon Kinesis, Formula 1 can capture and process key performance data for each car during every twist and turn of the F1 circuits. This data can then be processed using advanced machine learning in SageMaker.

By sharing these insights with fans through television broadcasts and digital platforms, Formula 1 is improving fans' experience, said AWS, allowing them to dive deep into the inner workings of their favorite teams and drivers.

AWS said Formula 1 has also selected AWS Elemental Media Services to power its video asset workflows, enhancing the viewing experience for its 500 million fans worldwide.

Pete Samara, director of innovation and digital technology at Formula 1, said: "By leveraging Amazon SageMaker and AWS's machine learning services, we are now able to deliver these powerful insights and predictions to fans in real

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time.

“We are also excited that the Formula 1 Motorsports division will run high-performance compute workloads in a scalable environment on AWS. This will significantly increase the number and quality of the simulations our aerodynamics team can run as we work to develop the new car design rules for Formula 1.”

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## ■ IPsoft's digital worker is part of a shift in human productivity

Karl Flinders, EMEA content editor

Human workers need to be ready to change how they work because [artificial intelligence](#) (AI) learns to do things faster, more accurately and at a lower cost – and the risk posed to organisations not adopting the technology becomes greater than the risk of being an early user.

At its annual summit, IPsoft updated customers on the latest qualifications of its cognitive agent, Amelia.

AI will be used to help solve complex problems facing humanity, such as searching for a cure for cancer and building machines that can take people to Mars and beyond, but at the same time, AI is quickly learning to do a great number of more mundane human jobs.

Perhaps it is not as headline-grabbing, but the transformations in how organisations operate will be vital if humans are to push the boundaries of their existence. Whereas machines took over the activities of manual workers during

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the industrial revolution of the 18th and 19th centuries, AI is now doing the same for white-collar professionals – and it goes way beyond basic tasks to those done by knowledge workers.

Even medics are able to [cut out large chunks of their work by using](#) AI. For example, according to the [Annals of oncology](#) journal, scientists trained an AI using 100,000 images of melanoma cancer cells, and normal birthmarks or moles. It was then tested using 300 dermoscopic images, and 100 of the most difficult photos from this sample were handed to [dermatologists](#) to assess, so that their conclusions could be compared with the results from the AI.

The doctors, more than half of whom had over five years' experience, correctly classified 87% of the melanomas while the AI identified 95% of the cancer samples accurately. This use of the technology frees up time for medics to focus on matters such as beating cancer, rather than just spotting it in its early stages.

So the digital worker has arrived and it is clearly more than an automated food-ordering bot. In a large enterprise, imagine a member of staff that can understand and communicate in many languages, turn his or her hand to HR requests and IT helpdesk alerts, working 24 hours a day in multiple locations. Simultaneously, the employee is undertaking an extensive programme of education just so he or she can do more for you.

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This technology is available today through a platform-based AI that can be trained to be used in whatever way the user wishes. It can never be human, but can make humans superhuman.

One example is IPsoft's cognitive agent Amelia, which can be a banker, a tech expert, an HR manager or whatever a business wants it to be.

The AI platform can now answer questions and solve problems ranging from technical issues to employees' holiday requests described to it in [natural language](#), whether it be verbally or through text. Imagine asking the system why the network had slowed down and being given the answer almost immediately – and an offer to fix it.

This is what Amelia offers, although it is usually the case that Amelia alerts the technician to the problem in the first place. Then, when it's fixed, the technician can ask Amelia to look at his or her diary and find a good time to take a couple of days off. Or it could be a food-ordering interface if a fast-food chain wanted to put it at its front end.

It is the ability to understand natural language, combined with its ability to acquire and retain knowledge, that makes Amelia something like the [HAL 9000](#) in the science fiction classic [2001: A Space Odyssey](#). Before going off-script, HAL was monitoring all spacecraft systems as well as astronaut wellbeing, with communication through voice, and even taking food orders.

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This type of digital worker in enterprises holds the promise of cutting costs and improving productivity dramatically.

Gartner predicts that in 2018, 500 million users will save two hours a day because of AI-powered tools. And the financial savings are unprecedented when it comes to automating knowledge workers.

McKinsey estimated recently that the automation of knowledge work will enable the creation of between \$5.2tn and \$6.7tn globally in extra economic value. For example, bankers, wealth managers and healthcare specialists – not just personal assistants – are a few examples of the roles where chunks of work are being automated through AI.

For example, a mortgage can be generated from an application in a matter of hours rather than a few weeks using AI tools that can automatically check what needs to be checked.

All this is clearly not lost on businesses and developers. According to the [McKinsey Global Institute](#), European organisations spent between \$3bn and \$4bn on AI in 2016, investment in North America reached \$23bn, and China spent even more.

[Chetan Dube, CEO at IPsoft and former professor at New York University](#), says: “Never before has a revolution of this magnitude hit the planet in just quantitative terms, not hyperbole.

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“But is this hype, or is this real? Is this *Westworld* – is it science fiction?”

At its annual Digital Workforce Summit, IPsoft and its customers gathered to answer some of these questions by sharing their experiences of creating and using Amelia. There was a long list of customers, including Spanish bank BBVA, the UN, insurance giant AIG and mobile network operator Vodafone, and the attendance of leading scientists was evidence that today's businesses are using technology that was previously only found alongside brains in jars in the laboratories of the world's universities.

But it is no longer the case that you have to be highly technical or scientific to control and develop the AI. Simple tell it what you want to be done and it will try to do it and learn from the experience, even if it needs human help to complete it the first time.

The ability to understand and respond to natural language is one of Amelia's selling points. Imagine Amazon's chatbot Alexa or Apple's Siri solving complex IT issues or completing important business processes, rather than turning the lights off or explaining Faraday's law of induction and then telling you the capital of the Turks and Caicos Islands.

But starting to use the technology will not be that simple. The accelerated pace of the technology's development means that it will be a massive leap for organisations. But IPsoft's Dube says it is a giant leap that is less risky than holding back and waiting to see how your competitors do.

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## Vodafone and Amelia

A couple of years ago, mobile network operator Vodafone began using Amelia to support its IT services desk. Speaking at the IPsoft summit, Karen Brunet, technology shared services director at Vodafone, said that after early success, the company created a dedicated team to work with IPsoft to develop the technology further.

This requires a different approach to what many IT departments are used to because, unlike most software, AI does not require programming but needs to be trained, she said.

Amelia is now available in seven of Vodafone's countries of operation, in three languages. Currently, 58% of contact to its IT services desk goes through Amelia.

"Right now, we have 20,000 chats with Amelia a month and 53% of chats are completed by Amelia without any human intervention and in the others, Amelia hands over to a human agent," says Brunet. "We believe that, in the next few months, we are going to increase this autonomy and think we will be closer to 65% completed by Amelia."

For the business case, the company piloted the use of Amelia on four different journeys through the service desk. Brunet says users should focus the roll-out

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of this type of technology on high-volume processes. "If you don't have the volumes, you have a nice tech toy, but not the benefits to the business."

The company achieved a return on its investment in Amelia through savings in just 24 months, she says.

All the operations where Amelia was implemented were offshored already, so the impact on internal staff was minimal.

This might not be the case for other businesses taking up the technology. IPsoft often refers to Amelia as the most human of AI platforms, but what about the humans currently occupying Amelia's future roles?

### Effects on the workforce

Speakers from the US financial industry took the stage to talk about their experiences with AI, and made no bones about its potential to replace people. Three speakers agreed that one-third of the average enterprise workforce could and should be cut immediately when AI is fully rolled out.

Although sentiment might be less severe in Europe, this is a clear direction of travel. In the IT sector, what happens in the US usually happens in the UK some time later. But the speakers said they expected a further third of workers to benefit from learning to work with AI and expanding their own horizons, while the final third of staff will have roles alongside the AI.

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It is disruption of this type that means that although AI is already “an unstoppable freight train”, as one user at the IPsoft event described it, there is much for humans to learn and prepare for to smooth the coexistence of robots and people.

This is a challenge that Dube recognised: “On one side it's curing world hunger and cancer, and on the other side it's the dystopian final invention.”

But the promise of AI creating many new jobs is a positive counter-argument. According to Gartner, by 2020, AI will create more jobs than it eliminates.

Humans have to train Amelia to work, after all, and by freeing up humankind from mundane tasks, who knows what future roles will be needed? According to a US Department of Labor report, 65% of today's schoolchildren will eventually do jobs that don't yet exist, with software robots as colleagues doing the mundane work.

And coexisting with robots may soon go beyond interaction with software, if one of Dube's predictions is realised. By 2025, he says, people will walk past an android in the corridor at work and not realise it is not human.

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