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MODERN ENTERPRISE IT - FROM THE EDGE TO THE CORE TO THE CLOUD

ISSUE I 2024

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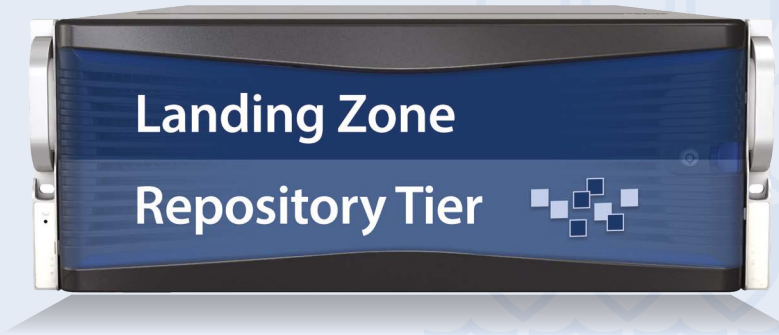

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VIEWPOINT

By Phil Alsop, Editor

AI everywhere?

WELCOME to the first 2024 issue of Digitalisation World. We start the year with a comprehensive look at, yes, you've guessed it, AI – the buzz topic of last year, this year and maybe quite a few years to come. I write fresh from having watched a fairly knockabout, simplistic debate on a news programme which was discussing the idea of driverless cars. As ever, in today's news-light world, the nuances of the discussion were buried beneath the two extremes of opinion. The technology fans will admit no criticism of digital solutions – driverless cars are fantastic, will improve safety on our roads, will become mobile offices etc.; tech opponents are convinced that driverless cars will kill us all!! Of course, the truth lies somewhere in the middle.

However, I believe that, when it comes to the promotion and development of digital solutions across all walks of life, there is a growing danger that the technology lobby has so embedded itself in governments across the world that objective decision-making is under threat. Is any government which relies so heavily on complex cloud solutions as the foundation of much of its crucial day to day activities going to be able to stand up to the supplier(s) of these solutions when it comes to credible, meaningful regulation, or even say 'NO' to new ideas – like driverless cars, for example?

Clearly, there's a delicate balance at play. If every government across the world threw out their major IT suppliers and sought alternative solutions, who would suffer the most? The hyperscalers would loose

significant revenue streams (but presumably not the money of myriad businesses and private individuals); the governments would descend into total chaos. So, maybe not such a delicate balance after all!

Apologies if my thoughts above are not the positive, life-affirming words required as we start a new year, but I do think that the direction of travel of the digital world is gaining a momentum that could take us to some dark places, unless governments recognise these dangers and act accordingly. I always come back to the scandal which allows the social media platforms to wash their hands of virtually all responsibility when it comes to the content they 'enable'.

I suspect a future of driverless cars is not quite as sinister a threat as other (mis)uses of AI to come, but it will be fascinating to watch how the AI explosion evolves and how much appetite there will be to regulate it.

Happy New Year!

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How Artificial Intelligence makes network deployments faster, safer and smarter

AI-powered systems and Machine Learning (ML) algorithms are being increasingly deployed to enhance the accuracy, efficiency, and safety of field operations across diverse sectors

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DIGITALISATION WORLD

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Business leaders ready to embrace AI and other emerging technologies

Research highlights C-suite and Finance and Accounting expectations and concerns around the adoption of Generative AI and other emerging technologies.

C-SUITE AND FINANCE and accounting (F&A) leaders around the world believe the modern business has to embrace new technologies like AI to streamline their financial operations, though many admit they may lack the requisite talent to execute on it, according to a survey commissioned by digital finance transformation leader BlackLine, Inc).

An overwhelming majority of respondents said that cloud computing (80%), generative AI (78%), and new kinds of AI (76%) are essential for improving business resiliency in the face of future disruption. However, the current shortage of skills in F&A could be exacerbated by a lack of skills in these new technologies, putting further strain on the skills gap. A third of those surveyed (34%) identified the ability to use new technology or software as a key skill needed to help their company remain agile in the face of disruptive events, yet more than a quarter (28%) said not having the right skills on their F&A team today or the ability to develop them would be a problem for the adoption of AI and other new technologies.

The survey, conducted recently by independent research agency Censuswide, asked 1,339 C-suite and F&A professionals around the world (US, Canada, UK, France, Germany, Australia, and Singapore) about their views on emerging technologies and their potential impact on F&A and businesses more broadly. Therese Tucker, co-CEO of BlackLine, said: "Financial automation technology is now a necessity for F&A departments, and businesses are excited and optimistic about how technology like AI can further streamline processes and augment existing systems. While there is understandable apprehension in the adoption of emerging technologies, therein also lies a valuable opportunity for F&A leaders to enable the upskilling of their teams through automation." "Business leaders must continue to proactively embrace available technologies to reduce time spent on manual tasks, cut down on errors in financial data, and provide visibility that will help them make faster, smarter, and more informed decisions."

When asked specifically about how AI could positively impact their industry, C-suite and F&A professionals highlighted five key benefits:

1. Enhanced audit capabilities, which would improve the identification of patterns and detection of potential fraud or errors
2. The ability to process large volumes of financial data at high speed, which will lead to more insightful analysis
3. Automation of repetitive tasks, which will improve accuracy and reduce errors
4. The ability to analyze large sets of financial data to identify compliance gaps
5. Improved analysis of historical financial data to help improve forecasting capabilities.

However, while the overall response to AI technology was positive, some variations were observed among regions. US respondents displayed the highest confidence, with 91% believing that AI could effectively prepare F&A departments for disruption. In contrast, confidence among European respondents was lower, with percentages ranging from 72% in the UK to 57% in Germany. Hurdles remain

Respondents also recognized the hurdles the F&A industry will need to overcome to adopt AI technology effectively. The most commonly identified of which is training AI models to understand and interpret complex financial data accurately. Trusting the outputs of AI and ensuring robust governance frameworks to stop the potential misuse of AI, were also key concerns.

Bridging the skills gap

As businesses explore how they can harness these technologies, most concede that they lack sufficient expertise in these areas. 62% said their organization does not have enough team members with deep technical knowledge to identify and resolve complex accounting issues. Additionally, bringing these skills into F&A departments is proving particularly difficult.

Nearly two-thirds (64%) struggle to recruit and retain enough skilled F&A employees to fulfil internal control responsibilities. Only around a third of respondents said their F&A department currently has sufficient skills when it comes to strategic thinking (35%) and the ability to analyze data (34%).

Even fewer (29%) feel they currently have the skills to be able to use new technology or software.

1-in-2 businesses lose employees when DX projects fail

Nearly 9 in 10 senior business leaders (88%) said that just 50% or less of their digital transformation (DX) projects completed in the past year achieved the expected goals or outcomes, which has impacted the employee experience.

ENDAVA has launched a sponsored IDC InfoBrief, Leveraging the Human Advantage for Business Transformation. Exploring how organisations are tackling the evolution to the digital business era, the InfoBrief uncovers the roadblocks, tactics and outcomes of digital transformation (DX) efforts in the last year, as well as strategic drivers and approaches to integrating major technologies shaping the landscape, such as artificial intelligence (AI) and automation.

The research, which surveyed business leaders and decision-makers across the globe, revealed that the overwhelming majority (88%) said that only 50% or less of their DX projects in the past year met the expected goals or outcomes. And when businesses miss the mark on DX projects, it's not just their infrastructure or competitive position that suffers.

While 62% reported failure resulting in them being less technically mature than competitors and having a longer time to market, key challenges damaging the employee experience emerged as consequences too. Many are facing frustrated staff (56%), as well as a rise in staff attrition (50%) and a less stimulating work environment (44%).

The causes of lacklustre results from digital transformations reinforce the notion that strategies too often neglect to prioritise a people-first approach in the planning, design and implementation of digital initiatives.

For example, 39% of respondents indicated that a lack of employee buy-in was a key reason for failing to meet expected outcomes, implying a need for cultural considerations to encourage user engagement. This was followed by conflicting opinions from leadership (36%) and a lack of collaboration internally (33%), demonstrating a struggle to successfully navigate organisational dynamics or engage stakeholders throughout projects. When reflecting on failed DX projects, over half recognised that investments would have been better channelled into people-centric projects such as upskilling staff (55%) and improving IT and line of business communication (50%).

Amid the rapid advancement of AI and the generative AI boom over the last few years, the survey also uncovered strong levels of current implementation and adoption plans in the pipeline, with almost half (49%) of the respondents having already deployed AI in their organisation or running a proof of concept.

Many organisations recognised the impact of retaining a human influence on their use of AI, with 51% declaring it as very or extremely important. Similarly, automation strategies were aimed at empowering a stronger employee experience and freeing people to work more strategically. 58% said their automation strategy is highly or very highly focused on removing mundane tasks, and 54% agree that employee engagement and satisfaction are integral.

The data on DX shortcomings, however, highlights a gap between many businesses' intentions for digital projects and the ability to bring these to fruition.

Despite this, for those who do get DX projects right, there are promising employee and customer outcomes beyond the business benefits. As well as achieving outcomes such as process optimisation (62%), cost reduction (57%) and revenue increases (53%), respondents also reported improved customer experiences (45%) and an uptick in employee productivity, satisfaction and retention (42%) when initiatives were effectively managed.

Endava CEO John Cotterell commented: "The success of digital solutions is inherently reliant on understanding how people will respond to new technologies. This research reinforces the fact that nurturing amazing products and services demands a human-centric approach throughout every stage of digital evolution. In practice, this is all about people, understanding user needs and expectations, working through cultural barriers to adoption and collaborating with employees to build engagement from the outset.

It's encouraging that more and more businesses are recognising the importance of human response to new technologies, as well as the potential impact of not prioritising people within technical development.

As they shape their digital strategies for the year ahead and beyond, developing inclusive digital solutions and constantly being mindful of people will go a long way towards bridging the gap between innovative products and market success."

Composite AI will be central to success

While 83% of technology leaders say AI has become mandatory, 95% say generative AI would be more beneficial if it were enriched and prompted by other types of AI.

DYNATRACE has published the findings of an independent global survey of 1,300 CTOs, CIOs, and other technology leaders in large organizations. The research reveals that organizations are increasing their investments in AI across all areas of their business to improve productivity, automate tasks, reduce costs, and keep pace with the competition.

Alongside the clear advantages of AI, however, there are also challenges and risks that organizations need to manage, from ensuring the outputs of generative AI are trustworthy to support business-critical use cases to maintaining compliance with internal policies and global regulations related to data security and privacy.

These findings underscore the need for a composite approach to AI, whereby organizations combine multiple types of AI – such as generative, predictive, and causal – and different data sources – such as observability, security, and business events. This approach brings precision, context, and meaning to AI outputs.

The complimentary report, The state of AI 2024: Challenges to adoption and key strategies for organizational success, is available for download.

Findings from the research include:

- 83% of technology leaders say AI has become mandatory to keep up with the dynamic nature of cloud environments.
- 82% of technology leaders say AI will be critical to security threat detection, investigation, and response.
- 88% of technology leaders expect AI to extend access to data analytics to nontechnical employees through natural language queries.
- 62% of organizations have already changed the job roles and skills they are recruiting for because of AI.
- 88% of technology leaders think AI will enable cloud cost efficiencies by supporting FinOps practices.
- 61% of technology leaders will increase investment in AI over the next 12 months to speed up development by automatically generating code.

"AI has become central to how organizations drive efficiency, improve productivity, and accelerate innovation," said Bernd Greifeneder, Chief Technology Officer at Dynatrace.

"The release of ChatGPT late last year triggered a significant generative AI hype cycle. Business, development, operations, and security leaders have set high expectations for generative AIs to help them deliver new services with less effort and at record speeds. However, as organizations endeavor to realize the expected value, it becomes evident that generative AI requires domain-specific tuning and integration with other technologies, including other types of AI. In addition, organizations must use AI securely and responsibly and monitor it closely to manage cost and user experience. This will help them provide accurate results, reduce expenses, and prevent employees from exposing sensitive data or creating vulnerabilities in their environments."

Additional findings include:

- 93% of technology leaders are concerned that AI could be used for non-approved uses as employees become more accustomed to using tools such as ChatGPT.
- 95% of technology leaders are concerned that using generative AI to create code could result in leakage and improper or illegal use of intellectual property.
- 98% of technology leaders are concerned that generative AI could be susceptible to unintentional bias, error, and misinformation.
- 95% of technology leaders say generative AI would be more beneficial if enriched and prompted by other types of AI that can provide precise facts about current states and accurate predictions about the future.

"One of the most significant challenges organizations face with generative AI is achieving meaningful responses that users can trust to solve specific use cases and problems," continued Greifeneder. "Especially for use cases that involve automation and depend on data context, taking a composite approach to AI is critical. For instance, automating software services, resolving security vulnerabilities, predicting maintenance needs, and analyzing business data all need a composite AI approach. This approach should deliver the precision of causal AI, which determines the underlying causes and effects of systems' behaviors, and predictive AI, which forecasts future events based on historical data.

Predictive AI and causal AI not only provide essential context for responses produced by generative AI but can also prompt generative AI to ensure precise, non-probabilistic answers are embedded into its response. If organizations get their strategy right, combining these different types of AI with high-quality observability, security, and business events data can significantly boost the productivity of their development, operations, and security teams and deliver lasting business value."

AI and cloud transformation dominate IT investment priorities for 2024

Businesses continue to grapple with IT recruitment and training challenges as they seek to keep up with accelerating technology advancements.

NEW RESEARCH by Rackspace Technology, in association with VMware, finds that despite ongoing economic uncertainty, businesses are committed to prioritizing their IT investments in 2024, particularly in transformative technologies such as artificial intelligence (AI) and cloud transformation.

According to the 2024 IT Outlook Report, which surveyed 1,420 global IT professionals, 63% of organizations plan to re-calibrate their investments in 2024. Moreover, artificial intelligence dominates as the top priority, with 65% of respondents identifying pervasive artificial intelligence as the technology that will have the most significant positive impact on their organization over the next 12 months. The survey also underscores the continued adoption of the cloud. When asked about the makeup of their organization's IT infrastructure and how it will evolve over the next 12 months, edge computing, private cloud, and public cloud increased as a percentage of workloads, while data centers, colocation facilities, and mainframes declined.

"These results highlight a decisive shift in artificial intelligence from the technical curiosity and pilot programs in 2023 to accelerating business outcomes through the industrialization of Responsible AI solutions in 2024," said Srini Koushik, President of Technology and Sustainability at Rackspace Technology. "In the cloud arena, the increased focus on the edge and private cloud indicate that organizations are simultaneously migrating more of their critical workloads while adopting a more sophisticated workload-aware approach to their overall cloud infrastructure." As generative AI continues to mature and grow in importance, 33% of organizations say they have either completed prototypes and are taking projects into production or already have projects underway and plan to expand them, while another 66% of respondents are either currently ideating on the use of generative AI or plan to do so.

Just 1% of respondents have no plans to use generative AI. Moreover, 67% of those surveyed say they will have generative AI either integrated into some processes or fully integrated into all processes in 12 months.

While many organizations are using AI primarily for "table stakes" tasks such as sentiment analysis and code development, the use cases where respondents see the greatest expected benefit include security (54%), new product development (50%), increased productivity (45%) and enhanced speed and efficiency in existing work processes (42%).

At the same time, organizations report challenges in implementing AI programs. 42% of survey participants acknowledge demonstrating the value of AI as a hurdle, while insufficient technological infrastructure support for AI was noted by 38%, followed by a shortage of skilled IT talent, at 32%. Organizations also continue to grapple with data governance policies and strategies in response to AI. Less than half (46%) of organizations have policies or strategies in place to address privacy concerns, and only 42% say they have addressed data bias.

"While some organizations have already implemented AI-powered solutions, many are still in the early stages, grappling with the considerations and challenges associated with AI adoption," added Koushik. "They are not just contemplating but actively addressing the issues associated with the widespread integration of AI into their business processes and operations, marking a crucial phase in their transformative journey."

Private Cloud, Edge Ascending

The survey highlights an ongoing evolution in companies' cloud strategies as workloads migrate away from within the organization's walls. When asked to compare their current infrastructure with their projected infrastructure composition over the next three years, private cloud rose by 4%, while public cloud saw a smaller increase, with concurrent decreases observed in workloads running on other servers, including mainframes and on-premises data centers.

Edge computing is also becoming a priority, with 30% of organizations saying it will be part of their IT infrastructure makeup in 12 months, compared to 26% today. 75% of respondents say they are employing a hybrid cloud strategy today.

Survey participants identified resource shortages and security/compliance risks as their primary challenges in transitioning to the cloud, at 34%. This was followed by concerns such as cost overruns (33%), resistance to change (28%), inappropriate cloud provider selection (24%), and a lack of stakeholder buy-in (23%).

Digital infrastructure spend to rise as IT leaders combat AI, security and ESG challenges

61% of IT decision-makers expect their organisation's investment in data centre infrastructure to increase between now and 2030.

OVER THE NEXT DECADE, more than three in five (61%) IT decision-makers anticipate a rise in their organisation's investment in data centre infrastructure to address upcoming challenges. Looking ahead, 95% of businesses view digital infrastructure as a potential risk.

These insights are the findings of a new report titled 'Understanding the infrastructure challenges and investments as you navigate the next decade' from Telehouse International Corporation of Europe, a leading global data centre service provider. 250 UK IT decision-makers were surveyed to understand their perspectives on digital infrastructure challenges, opportunities and goals for the next ten years.

At a time when AI is developing faster than any other previous innovation, the research highlights integrating AI and data analytics as the biggest infrastructure challenge IT decision-makers believe they are likely to combat in the next decade.

Three years ago (2020), when Telehouse previously asked this

question, AI integration was closer to the bottom of the list of key challenges anticipated, cited by 23% of respondents compared to 33% today – a 43% rise.

With cyber-attacks growing in frequency and sophistication, 'maintaining security and compliance' is the second biggest challenge IT decision-makers foresee in 2030. In fact, cyber-attacks are the most feared driver of network downtime over the next ten years, highlighted by one-third (33%) of respondents.

Navigating the ever-complex regulatory landscape and grappling with new compliance responsibilities is only likely to become more challenging in the future with AI already moving too fast to regulate.

The third biggest challenge anticipated by 29% of IT decision-makers in 2030 is 'reducing the environmental impact of IT infrastructure'. With 17% of organisations committing to achieve net-zero by 2030 or sooner, the pressure is on to improve operational efficiency, reduce energy consumption and carbon emissions by the fast-approaching deadline.

"As organisations look ahead to the coming decade and beyond, the value of incorporating colocation is evident. With the need to improve operational resilience and take full advantage of emerging technologies, the computational capabilities found in modern-day data centres are suited to the challenge. Leading colocation providers consistently roll out customised solutions to meet their clients' needs, such as high-performance systems for AI applications and sustainable tools," Mark Pestridge, Executive Vice President & General Manager of Telehouse Europe.

More than half admit to ignoring cybersecurity alerts due to information overload at work

More than half of today's office workers are ignoring important cybersecurity warnings due to being overwhelmed and fatigued from digital communication.

NEW RESEARCH from CybSafe has shed light on an alarming trend in today's workplaces. Digital overload and multiple new communication channels are not only reducing productivity but are leading to a decline in engagement with cybersecurity training. As a result, people are increasingly ignoring cybersecurity notifications and are more likely to display risky cybersecurity behaviours like clicking on phishing emails or ignoring notifications to turn on Multi-Factor Authentication (MFA).

More than half (54%) of today's office workers are ignoring important cybersecurity alerts and warnings due to information overload from digital communication. 47% admitted to feeling the information overload is having an impact on their ability to identify threats such as suspicious emails.

With 72% confirming they feel at least occasionally overwhelmed with the amount of information and communications they get at work, it's little wonder cybersecurity engagement is being impacted as a result. Today's workers are frequently interrupted by the buzz of notifications, reminders, and messages on various platforms.

The new research is released as ICO data indicates a 41% year-on-year increase in data security incidents reported to the body between Q2 2022 and Q2 2023. Cyber incidents (a type of breach with a clear online or technological element which involves a third party with malicious intent.) saw a significant 157% increase over the same period, with ransomware and malware events seeing particularly prominent increases of 241 and 550%, respectively.

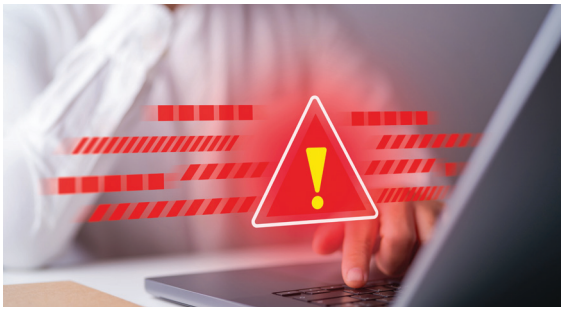
As cyber threats evolve and increase in complexity, the implications of these trends are concerning. Risks range from individual data compromises to significant business data theft.

Worryingly, the survey of 1000 office workers uncovered important cybersecurity warnings are going unnoticed. The digital deluge is affecting employees' ability to spot cyber dangers. 41% feel information overload is impacting their ability to retain and apply knowledge gained from cybersecurity training sessions - a fact being displayed by people's self-reported security behaviours.
Daily habits show a slip in safe actions and higher engagement in risky behaviour.

36% admit to occasionally cutting corners on cybersecurity practices
7% admitted they often skip steps like using safe networks or setting strong passwords, all in the name of saving time

Less than 1 in 4 employees - 23% - report being engaged with their cybersecurity training. And 41% say there's just too much information to remember and use. This shows that companies need to stop and consider better ways to help employees change their behaviour and engage with cybersecurity. If the end goal of an organisation's cybersecurity programme is culture change, access to training in itself is not evidence the training is being consumed or internalised within the workforce. There is more work to be done on how and where leaders are communicating cybersecurity best practices to their workforce.
The survey lays bare the obstacles hindering cybersecurity training. The top barriers:

- Time constraints (42%)
- Interest and motivation (30%)
- Complexity of training materials (15%)
- No direct relevance to daily roles (10%)



The research also found 77% of people expect their digital experiences to be as frictionless and personalised as consumer experiences. This suggests leaders need to do more if they want to see stellar cybersecurity engagement within their workforce.

Oz Alashe MBE, CEO of CybSafe, reacted to the research, stating, "As time goes on, organisations understand the question 'do our people have access to cybersecurity information?' is the wrong one. Instead, many are now asking, 'How do we give cybersecurity support in a way that will engage workers and lead to genuine behavioural change?'

"We must empathise with the workforce of today. Employees are caught in an erratic stream of emails with varying levels of importance and instant messages on multiple platforms, not to mention social media-it isn't surprising cybersecurity information is getting lost along the way. Importantly, however, this inconsistency isn't merely inconvenient or irritating— it's actively undermining the goal of informed cybersecurity behaviour. This is the issue we now need to tackle as security professionals."

"As a result, CISOs need to consider not only the material their people are consuming but on what platform it is being delivered to them and in what way."

Less than one in ten European businesses succeeding with digital transformation initiatives

Just 7% of businesses say they are meeting or exceeding their digital transformation targets according to a report from CI&T, a global digital specialist, produced in collaboration with the Global CxO Institute.

THE RESEARCH REPORT, 'Accelerating Digital Efficiency With The AI Multiplier', explores the efficiency imperative based on survey responses from 100 digital business leaders across European enterprises.

The failure of many to hit their targets comes even though technology budgets are on the up. Nearly six in ten (59%) organisations say budgets increased in 2023 and more investment is coming in 2024 - two-thirds of businesses are set to increase their investments by at least 10% next year.

But, whilst investment is increasing, so too is the pressure to achieve results when it comes to operational improvements and financial returns. To maximise their budget potential, an overwhelming majority (91%) of businesses recognise they must improve efficiency across the whole of their technology operations.

The top five areas where they believe efficiencies must be made are:

1. IT and data strategies
2. Data management
3. Customer operations and service platforms
4. Cyber security
5. Ecommerce and payment platforms

The research finds that AI, including generative AI, is considered the catalyst to efficiency improvements, with 80% of respondents expecting this technology to have a positive impact on their business.

And AI is already top of the agenda for many when it comes to investment. Three-quarters of businesses (76%) are already using generative AI or expect to do so in the next 12-18 months and almost one in ten (8%) describe widescale use across their organisation.

They see generative AI as making the largest contribution to organisational efficiencies in the following areas

6. Technology architecture and platforms
7. End user product features
8. Organisational orchestration
9. Innovation development
10. Software development process

This for many is the first act of the introduction of AI into their business - looking inside the corporate walls to drive efficiency before venturing beyond to open up more opportunities. Organisations are also starting to look at accelerating the speed of innovation to bring new products and services to market to support business growth. This is an area where AI and generative AI can have a real impact.

The top five areas where businesses are looking to achieve efficiency in innovation delivery are:

11. Business case development/KPI setting
12. Proposition development
13. Service mapping and design
14. Scaling a Minimum Viable Product (MVP) to full release
15. Scaling Proof of Concept to MVP

Ross Sleight, Chief Strategy Officer EMEA at CI&T, comments: "Digital transformation and the digitising of operations is fundamental to businesses today and requires consistent investment.

It's not just about the cost savings that these programmes bring but the broader pursuit of better performance through efficiency and speed.

What's important is an alignment of the organisational priorities and a clear understanding of the value that can be achieved to set realistic goals, combined with the right skill sets, processes and people to deliver on this transformational journey.

With many turning to AI it's important to recognise it isn't a magic bullet. Relying on AI to deliver business efficiencies is like building your castle on sand. Without solid foundations, such as organisational efficiency, it won't have a lasting impact on your organisation and any initial benefits will be quickly washed away."

SDC AWARDS 2024

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The top trends impacting infrastructure and operations for 2024

GARTNER has highlighted the six trends that will have significant impact on infrastructure and operations (I&O) over the next 12 to 18 months.

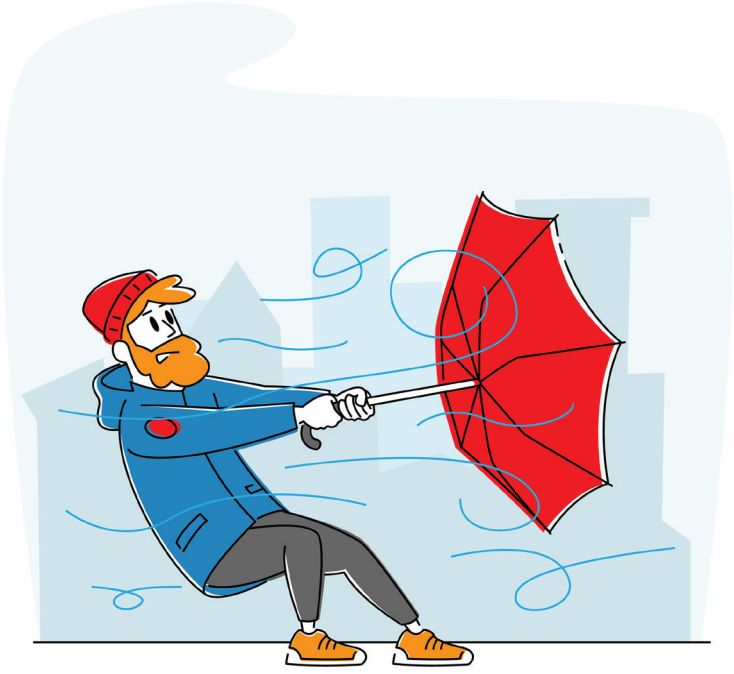
"I&O LEADERS have little time, skills and budget to track emerging trends and the full impact of those on I&O," said Jeffrey Hewitt Vice President Analyst at Gartner. "I&O leaders should use the top trends impacting I&O for 2024 to identify which are most likely to impact their organization and implement effective tactics to respond."

Here are the top trends impacting I&O in 2024:

Trend No. 1: Machine Customers

Machine customers are nonhuman economic actors that obtain goods or services in exchange for payment, such as virtual personal assistants, smart appliances and connected cars. Gartner expects the number of machine customers to rise over time steadily and that by 2027, 50% of people in advanced economies will have AI personal assistants working for them every day.

"There are strong upsides to machine customers that are driving interest and adoption in them, however they come with challenges such as requiring a reworking of operating and business models," said Hewitt. "I&O leaders should identify appropriate machine customer use cases, the technology processes and skills required, and build capabilities around digital commerce and generative AI in order to align optimally."



Trend No. 2: AI Trust, Risk and Security Management (AI TRiSM)

AI TRiSM supports AI model governance, trustworthiness, fairness, reliability, robustness, efficacy and data protection. I&O must implement and support the new forms of risk and security management that AI require. Gartner predicts that by 2026, organizations that operationalize AI TRiSM will see their AI models achieve a 50% improvement in terms of adoption, business goals and user acceptance.

"AI TRiSM improves AI implementation efficiencies and helps prevent the financial, regulatory, societal and ethical consequences of potential issues with AI," said Hewitt.

Trend No. 3: Augmented-Connected Workforce

Augmented-connected workforce is the intentional management, deployment, and customization of technology services and applications to support the workforce's experience, well-being and ability to develop their own skills. It accelerates onboarding and drives business results which has a positive impact on key stakeholders.

"This is a relatively new way of thinking for I&O which requires new skills and workflow views," said Hewitt. "It also requires collaboration outside of I&O and IT which takes specific focus, and sometimes executive involvement, outside of IT to achieve that engagement."

Trend No. 4: Continuous Threat Exposure Management (CTEM)

A CTEM program is an integrated, iterative approach to prioritizing potential threats and continually refining security posture improvements. Technology growth requires a new approach to dealing with

potential threats. This expands the attack surface and broadens exposure beyond the average IT environment. CTEM is a new approach that prioritizes exposures rather than centering on fixing all vulnerabilities.

"CTEM produces a shift from a preventative-only approach to more mature, strategy-augmenting-preventative controls with detection and response capabilities," said Hewitt. "Establish a CTEM team within I&O to cover on-premises infrastructure as well as cloud and edge vulnerabilities."

Trend No. 5: Democratized Generative AI (GenAI)
GenAI enables the democratization of knowledge and skills by enabling the use of conversation and natural language. A Gartner poll of 1,400 executive leaders in September 2023 found that 55% of organizations are in piloting or production mode with GenAI. GenAI products are democratizing due to the confluence of cloud and open source. GenAI for I&O has two main aspects – the use of GenAI within I&O and the impact of GenAI on I&O.

"Democratized GenAI offers a new working paradigm and can present agility, adaptability and composability improvements for I&O," said Hewitt. "If it is overused or used unnecessarily, it can generate unacceptable costs and negative environmental impacts."

Trend No. 6: Nationalism Versus Globalism
Nationalism versus globalism consists of country-led initiatives to reduce dependencies on foreign products, talent and services. International conflicts create a focus on more nationalistic views that push a more domestic approach to technologies which will put pressure on I&O teams to seek solutions that keep more technologies, resources and talent in their own country.

"There are many initiatives in place today that impact the focus of IT resources from a more global view to a more nationalist approach. Shifts in these initiatives can produce new risks for countries that are currently using providers outside their country," said Hewitt.

"I&O leaders should identify dependencies and their risks and lead in the creation of action plans to deal with the potential impactful shifts that may occur in national regulations and policies that affect I&O."

Only 12% of infrastructure & operations leaders exceed CIO performance expectations

IN THE FACE of continued economic headwinds, only 12% of infrastructure and operations (I&O) leaders rate their function's performance as exceeding CIO expectations, according to a new Gartner, Inc. survey.

"I&O leaders must support senior leadership by proactively contributing to their organization's ability to navigate economic uncertainty," said Cameron Haight, VP Analyst at Gartner. "Their destinies are interlinked, as a failure by the business to execute the proper strategy will have repercussions across the organization."

The survey was conducted from April through July 2023 among 122 I&O leaders from enterprises in North America, EMEA and Asia/Pacific whose growth was impacted by external threats in 2022 and 2023.

I&O Leaders Face Cybersecurity, Supply Chain and Talent Threats
I&O leaders cited cybersecurity risks as the most frequent threat impacting enterprise growth this year. Supply chain disruptions and talent and skills shortages are listed as the second- and third-most-important external threats deemed to impact growth, closely followed by inflationary pressures (see Fig. 1 overleaf).

While seeking to combat many of these threats, I&O leaders are also being asked to meet organizational expectations with funding that only keeps pace with inflation at best.

In 2023, 41% of I&O leaders' budgets increased but stayed steady relative to inflation, while 37% of budgets were either cut or stayed steady but declined in real terms due to inflation. Just 27% of I&O leaders' budgets increased and grew relative to inflation.

"While it remains to be seen what 2024 budgets will look like, the lack of real funding growth observed to date could cause projects to be deferred into next year, causing a cascading appropriations challenge," said Haight. "Given this scenario, I&O leaders must work smarter to achieve business outcomes with fewer resources."

Top Actions for I&O Leaders to Navigate Economic Headwinds
Based on the survey findings, Gartner identified three key actions that successful I&O organizations were adopting to counteract the forces of

➤ Figure 1. I&O Leaders' Top External Threats Impacting Enterprise Growth. Source: Gartner (December 2023)

economic uncertainty. I&O leaders that leveraged these practices were three times more likely to help their enterprises better navigate a turbulent economy.

These actions include:

1. Developing a workplace environment that improves well-being and inclusiveness

I&O leaders often face challenges recruiting and retaining the necessary talent to achieve their objectives. Within I&O teams that were rated as the most effective, 84% of leaders reported building a welcoming and inclusive workplace. Furthermore, 79% of I&O leaders at highly effective organizations ensured the holistic wellness of employees by holding them accountable for personalizing their well-being progress.

2. Undertaking actions that improve I&O efficiency through enhanced analysis capabilities

Maximizing the impact of technology and other investments remains a critical focus for I&O leaders amidst continued economic uncertainty. According to the survey, 89% of leaders in highly effective I&O organizations formulate strategies for process transformation and optimization, and 82% identify opportunities to reduce technology costs through economies of scale or cross-enterprise synergies.

3. Enhancing I&O's ability to become a full-fledged partner in digital business activities

I&O leaders may struggle to be viewed as a key partner with business leaders, due to an inability to easily link IT investments to business outcomes. To enhance their contribution to the organization's digital business strategy, the survey found that 92% of effective I&O leaders foster better coordination of I&O digital investments across lines of business or product lines.

Additionally, 84% apply objective analysis to translate enterprise priorities into investments that advance digital business potential, and 79% provide a common language for business and I&O stakeholders to coordinate digital investment decisions.

AI will be the fulcrum that accelerates business growth

According to Forrester, firms that actively harness generative AI (genAI) to enhance experiences, offerings, and productivity will realize outsized growth and will outpace their competition.

BETWEEN July and September 2023, the number of enterprises that are in the experimentation and expansion stages of implementing genAI jumped from 62% to 71%, representing one of the fastest mass adoption rates of a new technology in the enterprise.

GenAI success, however, requires full enterprise support and turning the technology's friction points — BYOAI and coherent nonsense — into opportunities. To harness the full potential of genAI, leaders should:

- **Make trust an intrinsic part of their enterprise's genAI foundation**
  A deliberate and cohesive approach to trust is essential for long-term success. Companies that help their employees and customers understand the nuances of privacy and security will empower their users to be more confident and innovative in their use of this technology.
- **Stay focused on practical, measurable use cases**
  GenAI use cases most often involve the augmentation or transformation of an existing product, service, or business process. In initial prototypes and use cases, select projects that lean toward employee-facing or offline generation, as opposed to real-time generation with a chatbot.

- **Explore and invest in skills that are both known and emerging**
  To harness genAI successfully, both employees and leaders need to upskill continually. These include technical as well as soft skills to communicate the impact of genAI transparently and openly with employees.
- **Differentiate by relying on their own business data**
  Foundational models are powerful tools but accessible to everyone. To create differentiation, organizations should rely on their own business data to build genAI models and applications.

"Generative AI has the power to be as impactful as some of the most transformative technologies of our time," said Srividya Sridharan, VP and group research director at Forrester. "The mass adoption of generative AI has transformed customer and employee interactions and expectations. As a result, genAI has catapulted AI initiatives from 'nice-to-haves' to the basis for competitive roadmaps. Forrester's research is designed to help business and technology leaders utilize genAI to gain a long-term competitive advantage."

GenAI-powered skills development will drive $1 trillion in productivity gains

In a business landscape where productivity and revenue growth stand at the forefront of organizational priorities, the role of generative AI (GenAI) is taking center stage.

INTERNATIONAL DATA CORPORATION (IDC) foresees a major paradigm shift taking place, with 35% of enterprises worldwide using GenAI to co-develop digital products and services by 2025, potentially doubling their revenue growth compared to their competitors. And as this adoption accelerates, IDC predicts that the implementation of skills development powered by GenAI and automation will enable organizations to drive $1 trillion in productivity gains worldwide by 2026.

The pivotal question arises: what will customers prioritize as they build their GenAI road maps? The responses to a recent global C-suite survey carried out by IDC suggest that much of the focus over the next 18–24 months will be on driving productivity improvements, especially in relation to the sales, IT, and finance functions.

Indeed, over 50% of the respondents emphasized that productivity gains are the most important business outcome they are targeting for the next 18 months.

In 2024, GenAI tools will enable senior leaders to double the productive use of unstructured data by uncovering untapped insights and knowledge. But Jyoti Lalchandani, IDC›s group vice president and regional managing director for the Middle East, Türkiye, and Africa (META), expects priorities to evolve as organizations broaden their sights beyond productivity.

"For most organizations, it is easy to develop hundreds of productivity use cases around GenAI, but many are already questioning whether they are over-pivoting on cost reduction and not focusing enough on how GenAI can help them to grow their revenues," says Lalchandani. "We expect the emphasis on productivity gains to give way to revenue growth outcomes in the next 3–5 years, with sales, IT, finance, operations, and supply chain functions all reporting revenue growth expectations from GenAI. Providers must track this shift carefully with their core buyers to ensure that their GenAI solution offerings continue to align with the evolving business goals of their customers."

How Generative AI will radically change application development

AI is revolutionising the way software engineering teams conceptualise, construct, and evaluate applications. AI-augmented development has become a strategic trend with profound implications for the industry. It presents a solution to the ever-growing need for faster software production, aligning with the increased reliance of businesses on digital applications to meet their operational and customer needs.

BY VAN BAKER, VP ANALYST AT GARTNER

GARTNER predicts that by 2026, generative AI will significantly alter 70% of the design and development efforts for new web applications and mobile apps. In response to the increasing business requirements, IT leaders must spearhead the integration of AI-enhanced development tools and methodologies that empower software engineers to produce top-tier applications.

Generative AI and its transformative potential in application development

The integration of AI in software development promises to revolutionise various aspects of the process. For instance, AI coding assistants can significantly reduce the time and effort software engineers invest in tasks such as coding, documentation, debugging, and refactoring. These tools are evolving, enabling engineers to handle even more complex activities with ease.

AI-augmented testing tools are also making waves, accelerating the testing process by optimising test efforts and offering early feedback on the quality of release candidates. This enhances the consistency of testing across various dimensions, including unit, API, functional, and nonfunctional testing.

Design-to-code tools are becoming increasingly

AI-augmented, streamlining front-end development by generating production-ready HTML, CSS, and JavaScript directly from UX design tools like Figma.

Unlocking the Potential of AI-Enhanced Software Engineering

In the current landscape of rising demand for enterprise software, look to tap into the potential of AI-enhanced software engineering tools for optimal results. To effectively harness the power of AI in software development, IT leaders should consider the following key recommendations.

Firstly, to enhance efficiency, designate senior members within software engineering teams to oversee the seamless integration of AI-driven coding assistants. Collaboration with security, legal, and compliance departments is also crucial to address and mitigate potential risks associated with AI-generated code and text, ensuring the integrity and compliance of the software.

Secondly, focus on optimising the testing process. Employ AI-augmented testing tools to generate test code, create test data, and develop stubs. By making AI augmentation an integral component of your continuous quality strategy, software development and testing become more efficient and robust.

For accelerated development, embracing design-to-code tools is recommended. These tools can convert front-end designs into functional code, streamlining the development process. In doing so, it is essential to involve UX designers and front-end developers to ensure the seamless adoption of these tools and alignment with the established design system.

It's important to justify the investment in generative AI technology by clearly articulating its value proposition. This technology should not be viewed merely as a cost reduction tool or a replacement for staff; instead, it should be positioned as a force multiplier that enhances the productivity and efficiency of software engineering teams.

By harnessing generative AI tools, software engineering teams can create more value, streamline processes, and accelerate innovation. To establish a clear understanding of this value, define and measure productivity metrics that reflect the impact of generative AI on project outcomes and delivery timelines.

Moreover, set expectations with business executives that their increasing demand for quicker delivery of digital products will naturally lead to a heightened need for software engineering talent.

As we move into 2024, Gartner anticipates that generative AI and machine learning will significantly alter the landscape of web and mobile application design and development. The demand for software engineers who can effectively utilise these AI tools will surge, and it's crucial to dispel misconceptions about AI's capabilities. These tools are not replacements for engineers but force multipliers that enhance productivity and creativity.

AI-augmented development is a strategic trend with far-reaching implications. It offers a solution to the ever-growing need for faster software production in response to increased business reliance on digital applications. Ultimately, integrating AI-augmented tools into the DevOps cycle promises streamlined workflows and improved developer experiences.

Could edge computing unlock AI's vast potential?

Artificial intelligence (AI) technologies are providing transformational business benefits across many sectors. AI has set new standards of personalisation for customers and users, and teams are now achieving efficiencies across workflows that have been previously unattainable.

BY WAYNE CARTER, VP ENGINEERING, COUCHBASE

ALTHOUGH many enterprises are in their infancy with the technology, AI-enhanced services are already delighting customers and users – with the vast increase in speed of delivery perhaps the most significant upgrade for businesses. To give a simple example, a US airline recently saved 280 seconds per chat – 73,000 hours per quarter – by automating its chat channel for handling customer interactions.

As a result of AI, customer and end-user expectations are higher than ever. Many now expect real-time, hyper-personalized offers – and they expect them instantly. Internally, different business departments now expect to be able to quickly draw on AI to reduce their workload and automate repetitive tasks, at scale. Speed is king, and AI promises to deliver just that.

As businesses explore further AI use cases, many may rightly be asking: will the current IT infrastructure be able to power this new generation of services?

One computing model in particular, edge computing, has previously demonstrated the ability to reliably power fast business applications. To illustrate its potential, the market value of edge AI in 2022 stood at $14.7 billion. With the AI race set to pick up pace though 2023 and beyond, could edge help businesses amplify the performance of their applications?

Living on the edge

To recap, edge computing is the deployment of computing and storage resources at the location where data is produced and consumed. This differs from more traditional cloud-based setups where data is processed at a data center. The upshot is that data at the edge uses less bandwidth and can be processed, analyzed and accessed much faster. In practice, this might mean a railway station – for instance – places sensors within the station buildings and infrastructure, or within the train, to collect and process data about train speeds, track use, signaling and other business critical factors.

Similarly, both physical and online retailers have used edge computing to power on-the-spot item recommendations, while manufacturers have seen success predicting and preventing problems with high-speed factory processes. In all these cases, processing the relevant data closer to its source at the edge of the network results in better quality data and much faster recommendations and insights. Ultimately, edge computing helps businesses make the most of the vast number of different touchpoints that users, or customers, are now accustomed to. IDC estimates the number of connected IoT devices will reach 55.7 billion by 2025.

How does the edge model support AI applications?

Beyond the increased performance that AI applications demand, a key benefit of the edge model is reliability and resilience. Consumers have taken to AI, with 73% worldwide saying they trust content produced by generative AI, and 43% keen for organizations to implement generative AI throughout customer interactions. Businesses that can't keep their AI-powered services running will suffer from declining customer satisfaction and even a drop in market share.

When a traditional data center suffers a power outage – perhaps due to a grid failure or natural disaster – apps reliant on these centralized data centers simply cannot function. Edge computing avoids this single point of failure: with compute more distributed, smart networks can instead use the processing power nearest to them to keep functioning.

There are also benefits when it comes to data governance. If sensitive data is processed at the edge of the network, it doesn't need to be processed in a public cloud or centralized data center, meaning fewer opportunities to steal data at rest or in transit. Better data governance means more trust in AI applications, and much smoother sharing of information between business employees, partners and customers.

Finally, there are cost savings to think about. Cloud service providers often charge businesses to transfer data from their cloud storage. And given that AI-driven applications rely on large volumes of data – with applications in industries such as digital marketing sifting through literally billions of data points – these charges can rack up very fast if data is pulled from the cloud.

This isn't to say edge computing is a completely flawless way of harnessing AI. It isn't always appropriate for AI to run at the edge. For example, deep learning AI training utilizes immense amounts of data in centralized clouds, where storage and horsepower are constrained only by cost.
But smaller machine learning AI models can run at the edge directly on edge devices, enabling them to make on-the-spot recommendations to a user based on local data and the current situation.

A solid foundation for AI-driven business

Businesses today are enamored by AI, it's fair to say. They can see its transformative power, and want this power coursing through their enterprises. But to really make the most of AI, they must ensure the right architecture is in place to leverage the benefits of AI at the edge. Modern mobile databases, which can run at the edge, in the cloud and on mobile devices, are one powerful tool for doing this.

It's a cliché that AI is only as useful as the data it's fed. Perhaps it would be more accurate to say it's only as useful as the data it's fed fast. Processing data quickly is vital for AI to flourish, and edge computing – though it's no silver bullet – can help hugely.

Data storage for an AI-enabled world

The field of data storage is continuously evolving to meet the needs of organizations operating in an increasingly data-rich, AI-enabled world. By staying informed about the latest innovations, businesses can consider all the ways they could stay ahead of the curve and future proof their infrastructure.

BY DAN MCCONNELL, SENIOR VICE PRESIDENT PRODUCT MANAGEMENT AND ENABLEMENT AT HITACHI VANTARA

DIGITAL TRANSFORMATION, in some form or other, has been the goal of most organisations in recent years, thanks, in part, to the explosive growth of data and the cloud. To modernise and transform their IT systems, businesses have been busy leveraging new cloud-native technologies, implementing automated and agile IT systems, and deploying new types of applications and services.

However, the emergence of AI – and now GenAI – has brought with it yet another seismic shift in technology innovation. Data is AI's lifeblood and storage systems, which have been the backbone of cloud computing to date, are now also the backbone of AI applications. In fact, high IOPS and high throughput storage systems that can scale for massive datasets are a required foundation for large language models (LLMs) and machine learning (ML) models, where millions of nodes are needed. Plus, flash, on site and in the cloud, can all offer the denser footprints, aggregated performance, scalability and efficiency to accelerate AI model and application development.

In the context of such a fast-changing technology landscape, organisations must continue to review whether their current data infrastructure is fit for purpose – and for the future.

The rise and rise of Hybrid Clouds

Hybrid cloud has long been seen as a flexible and scalable storage solution. So much so that while in

2021, the global hybrid cloud market was valued at $US 85 billion, it is expected to reach $US 262 billion by 2027. Hybrid clouds are network infrastructure configurations that combine at least one linkage between public and private cloud networks. These configurations are managed using software-defined networking technologies that meld these disparate networks under a single pane of glass control. Users of the hybrid cloud can therefore interact with it as if it were one seamlessly unified network.

The real benefit of hybrid clouds is to enable digital transformation initiatives. Traditional IT infrastructures have been on-premise, costly, and prone to obsolescence. While developing hybrid clouds requires new investment, the availability of resources and services in the public cloud allows companies to flexibly make adjustments and improvements to their IT infrastructure, with the confidence that they will meet business needs.
It comes as little surprise then, that a 2022 report found that more than four in five organisations were deploying a hybrid cloud model – an increase over the previous year – due to the flexibility provided by balancing data between public cloud, private cloud and on-premises. However, as data volumes continue to grow exponentially, the complexity of managing multiple environments can lead to a lack of integration across data sources that limits a company's ability to extract business value. It can also increase management costs.

Challenges can include a lack of data mobility – it can often be expensive to get data out or to move it across or between the different cloud environments. There can also be data management complexities, as each cloud may have its own separate toolset. Moreover, if you want to replicate data across different environments, making sure that it's consistent across the different clouds must be factored in.

For all these reasons, it's important that businesses think holistically about their data storage needs – particularly in the context of rapid AI development this year and beyond. We're all navigating these uncharted waters, seeking the right strategies for success, be it to optimise internal workflows, industrial settings, or client interactions. But what should our approach to data storage be and what innovations are we seeing?

A unified approach to data storage

Firstly, it goes without saying that businesses need clean and accessible data. However, on top of that, a recent report highlighted how data-intensive technologies and applications are exacerbating the already-strained infrastructure and hybrid cloud environments on which they run. In fact, three quarters of business leaders are concerned their current infrastructure will be unable to scale for the future, and, according to an Uptime data resiliency survey, 80% of data centre managers and operators

have experienced some type of outage in the past three years. It's clear that a new strategic approach is needed.

Happily, the technology now exists to create one, unified architecture to efficiently manage these challenges, by providing a single data plane across block, file, object, cloud, mainframe, and software-defined storage workloads. A data platform that will address all environments, managed by a single AI-enabled software stack. This allows businesses to run all applications anywhere — on-premises or in public cloud.

By eliminating infrastructure silos, businesses are empowered to build a data foundation that enables them to consume the data they need, when and where they need it. In this way, organisations can optimize their cloud journeys and avoid costly pitfalls that hinder their digital transformation success.
The field of data storage is continuously evolving to meet the needs of organizations operating in an increasingly data-rich, AI-enabled world. By staying informed about the latest innovations, businesses can consider all the ways they could stay ahead of the curve and future proof their infrastructure.

Challenges can include a lack of data mobility – it can often be expensive to get data out or to move it across or between the different cloud environments. There can also be data management complexities, as each cloud may have its own separate toolset

Best practices for making AI deployments more ethical and sustainable

Artificial Intelligence, commonly called AI, encompasses a wide range of capabilities and has gone through many cycles of hype and technological advancement over the years. Now, AI can perform many of the cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with an environment, problem-solving, and exercising creativity.

BY JAN STAPPERS, DIRECTOR OF REGULATORY SOLUTIONS AT NAVEX

MANY PEOPLE have interacted with AI regularly over the years with technology such as voice assistants or pop-up website customer service chatbots. However, it is important to note that its applications extend far beyond the conveniences of the internet and are frequently used within private systems to address diverse needs. In fact, recent research conducted by NAVEX and Forrester Consulting found that 98% of survey respondents expect AI to play a crucial role in GRC programs of the future – expecting this revolutionary technology to enhance performance and enable operational improvements.

Today, AI is developing rapidly, especially with the advent of easily accessible Natural Language Processing (NLP), popularized for consumer use by ChatGPT. But even five years ago in 2018, which feels like a lifetime ago from a technology perspective, the European Commission Joint Resource Centre predicted the global focus on artificial intelligence. “There is strong global competition on AI among the US, China, and Europe. The US leads now, but China is catching up fast and aims to lead by 2030. For the EU, it is not so much a question of winning or losing a race but of finding the way of embracing the opportunities offered by AI in a way that is human-centered, ethical, secure, and true to our core values.”

Modern businesses are jumping at the chance to incorporate artificial intelligence to speed up and solve real-world workplace problems. Using AI can improve efficiency by operationalizing repeatable tasks, enabling more accurate data analysis, and facilitating predictive analytics, resulting in time and cost savings. Many companies are starting to use AI in their Governance, Risk, and Compliance (GRC) data analysis and reporting.

Governance and Legislation

When deploying AI, companies should ensure they meet all applicable regulations and encourage its sustainable and ethical use. At present, there are

many global initiatives, governance, and legislation policies organizations should align to depending on the relevant jurisdiction. Some of the proposed and existing AI governance include:

- European Union: AI Act
- United States: Blueprint AI Bill of Rights
- Australia: Ethics Framework
- Brazil: Rules for Artificial Intelligence
- Japan: Governance Guidelines for AI Principles in Practice
- IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems
- OECD: Tools for Trustworthy AI
- UNESCO: Recommendation on the Ethics of Artificial Intelligence

The European Union AI Act

Artificial Intelligence holds the potential to usher in numerous benefits, including improved healthcare, safer and more sustainable transportation, enhanced manufacturing processes, and cost-effective energy solutions – and with great capability comes great responsibility. As such, the European

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Union embarked on a bold initiative to regulate AI as a critical component of its digital strategy to foster its responsible and innovative development. In April 2021, the European Commission introduced the world's inaugural regulatory framework for AI, designed around a risk-based approach. This evaluates AI systems used across various applications and categorizes them according to the risks they may pose to users.

The extent of regulation varies depending on the risk level, ensuring more advanced and potentially risky AI applications receive heightened scrutiny. These comprehensive rules require AI systems to be overseen by humans; with transparent, traceable, non-discriminatory, and environmentally friendly practices for evaluation. Notably, the regulations impose bans on practices such as biometric surveillance, emotion recognition and predictive policing AI systems. Moreover, the EU recognizes the need for customized regulations for general-purpose AI and NLP models, acknowledging the diverse nature of AI applications. To facilitate innovation, the EU establishes regulatory sandboxes – real-world environments where public authorities can test AI systems before deployment. Further, the regulations empower individuals with the right to voice complaints about AI systems, ensuring their concerns are addressed and that AI operates in a manner aligning with societal values and norms. This groundbreaking AI Act sets a global precedent for the responsible and secure adoption of AI technologies.

While the framework recommendations are not binding, they will help organizations orient around a principles-based approach to AI risk management. They will be well-positioned for the future of AI regulation. Led by the organization's experience managing regulatory change, the steering committee should stay abreast of this quickly evolving landscape to ensure they stay on the right side of any new rules or laws. With the potential of technology and the promised regulatory attention, starting early is to your benefit.

Understanding the risks

Likely, your organization is already using AI in some unofficial capacity, also known as "shadow AI," either directly or through third-party vendors. While these applications may not pose immediate risks, it is crucial to gain a comprehensive understanding of their various uses and ensure they align with your company's ethical and security standards. Additionally, AI is already integrated safely into many of the products and software you regularly employ. However, it is imperative to incorporate AI into the overall assessment of its usage within your organization.

The Chief Compliance Officer (CCO) should closely collaborate with their IT and cybersecurity counterparts with AI governance as a pivotal driver for this alignment. This collaborative approach aids in dismantling internal risk silos, ensuring that AI-related risks are comprehensively assessed across the entire enterprise. The 2023 NAVEX 2023 State of GRC Report highlights that right now, "Four in ten respondents (43%) said they are challenged by data silos." Given the far-reaching impact of AI on the business, the first step in establishing AI governance is forming a steering committee. It should remain adaptable as AI technology is continuously evolving, as is its utilization within the organization. Involving stakeholders such as the Chief Information Security Officer (CISO), Chief Information Officer (CIO), General Counsel, and others is essential to holistically address bias-related concerns, privacy, security, legal compliance, and customer satisfaction.

AI governance is a long-term strategy that will undergo continuous evolution and must encompass the active participation of multiple departments.

Best Practices

To ensure AI is deployed sustainably and ethically, businesses should follow the below best practices:

- Define company uses and technology requirements for AI
- Conduct thorough third-party risk assessments of any chosen AI provider
- Businesses led by CCO to evaluate vendor risks
- Establish and enforce appropriate country policies and use of governance
- Communicate with relevant users and employees about AI tool usage
- Provide mandatory AI training during new hire onboarding, and extend to all other appropriate employees and users
- Ensure a "private system" is in place that allows AI to integrate with software for search, analysis, translation, and more – private systems allow companies to avoid exposing confidential information while still using AI

Overall, the world of AI is rapidly evolving with immense potential to transform industries and improve workplace efficiency. Businesses are increasingly recognizing its value in boosting efficiency, enabling data-driven decision-making, and achieving critical business goals.

However, to ensure ethical and sustainable AI deployment, best practices must include defining technology requirements, conducting thorough risk assessments, and providing training to employees. Embracing private systems that allow AI integration while protecting confidential information is another valuable strategy.

As AI adoption continues to grow, organizations have a commitment to responsible and secure AI adoption. By embracing ethical AI use and staying ahead of regulatory changes, companies can ensure they are well-positioned to harness the potential of artificial intelligence, while mitigating its associated risks.

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How Artificial Intelligence makes network deployments faster, safer and smarter

The rapid advancement of Artificial Intelligence (AI) has revolutionised many industries and processes. AI-powered systems and Machine Learning (ML) algorithms are being increasingly deployed to enhance the accuracy, efficiency, and safety of field operations across diverse sectors.

BY DEEPAK HARIE, VICE PRESIDENT, TECHNICAL SUPPORT SERVICES AT NOKIA

WHEN IT COMES to rolling out networks, it's important that all parties have a deep commitment to ensure the health and safety of all the employees and partners involved. The aim is simple: everyone should go home safely at the end of the day. AI and ML play a big role in transforming the way we monitor and ensure the safety of everyone in the field. In addition, they make the quality verification process faster and more accurate right from the start, while helping optimise network performance. In this way, artificial intelligence is a true game-changer for network deployments.

In this article, I will explore the applications and benefits of AI in quality verification and how it can help ensure the health and safety of those working in field activities of mobile network deployments.

Embracing AI and ML for deployment services

The validation of site quality as well as ensuring compliance with health and safety regulations are of critical importance in network deployments. Both are prone to human error and subjectivity, which can lead to rework, site revisits, increased cycle time and increased risk of operational hazards.

Embracing artificial intelligence and moving away from manual work helps minimise human error and enhance the accuracy of the verification processes. At the same time, it's necessary to acknowledge that the adoption of AI and ML in network deployment operations is not without its obstacles.

This is true with all disruptive technologies. In my experience, these four aspects can greatly contribute to a positive result:

1. Applying standard processes everywhere

A uniform way to work on all site deployments helps optimise operations and establish important routines. If processes vary between different sites, it may lead to oversights, which can then result in unfortunate safety hazards.

2. Ramping up expertise in data analytics

When adopting new digital tools, it is important to provide the users with appropriate competence development and opportunities to ramp up their skills. Otherwise, the benefits of the new technologies are left unexploited.

3. Adopting a positive mindset
There can be resistance to digitalisation especially when the old manual-intensive tasks are proven to work well enough. However, AI can take away the repetitive and the most time-consuming part of the workload, letting human personnel concentrate on more motivating and value-adding tasks.

4. Ensuring data security and legislative compliance
Data security is a valid concern, and embedding security thinking into all products and solutions will help to navigate a complex landscape. For example, in some regions, AI-related legislation designed to protect personal privacy may limit the extent to which AI can be leveraged when processing data. Trying to find the best solution in compliance with local regulations will really help to improve the chance of success.

Achieving enhanced quality with First Time Right approach

Utilising AI and ML for RAN deployments in Europe produces great results, increasing First Time Right achievements by up to 30 percent. A 'First Time Right' approach means, for example, that the amount of site re-visits decreases, resulting in concrete cost savings.

With the further enhancements of digital platforms and the increasing expertise in leveraging artificial intelligence, this can improve even more. With AI, quality verification can also be completed more quickly than with traditional methods - up to 25% faster, in my experience. The beauty of AI is that it can achieve time savings across the entire deployment process, making the deployments much faster and more cost-effective.

Artificial intelligence has allowed us to institutionalise a new and improved way of working. In short, we leverage AI and ML for these five critical tasks:

- Technical site surveys
- Site quality self-assessments conducted by the field crew
- Site quality audits conducted by a supervisor
- Customer acceptance checks for site quality
- Health and safety checks prior to starting field activities

AI/ML-based automation is essential for the safety and quality of modern field operations

The industry-first approach to using AI and ML set out in this article enhances the safety, speed and quality of network deployments. The benefits are multifold: Artificial intelligence enables automated inspections by analysing vast amounts of data collected from field activities. Machine learning algorithms can identify defects, anomalies, or deviations from desired quality standards and customer-specific checklists. AI-powered systems can monitor compliance with health and safety regulations such as the use of personal protective equipment as well as hazard recognition in real-time.

As Artificial Intelligence continues to evolve, I believe that it has an ever-growing potential to transform critical processes in network deployments. Leveraging AI and ML technologies in field activities can drive efficiency, reduce costs, and most importantly, protect the well-being of workers.

Everyone, everywhere

Powering an inclusive digital economy with fast, custom ML solutions.

BY DR LESLIE KANTHAN, CEO AND CO-FOUNDER OF TURINTECH

THE PAYMENTS INDUSTRY has been one of the pioneers in adopting and scaling machine learning (ML) and AI. From fraud detection to facilitating seamless transactions and democratising access to banking, its influence is becoming ever apparent in our daily lives.

In the midst of the Generative AI wave, numerous companies are engaged in a frantic race to integrate artificial intelligence into their products and features. This urgency stems from the recognition that traditional ML development processes are often slow, sometimes taking months to complete. Additionally, the quality of the model code is not always guaranteed, leading to potential issues such as failed production, sluggish predictions, and costly computational requirements.

As a result, Mastercard, a global technology company in the payments industry, is partnering with TurinTech's evoML platform to accelerate the creation of customised ML models. It's all part of its overarching mission to connect and power an inclusive digital economy that benefits everyone, everywhere, by making transactions safe, simple, smart and accessible.

Driving the mission with evoML

By leveraging the cutting-edge evoML platform in conjunction with the deep and extensive expertise in AI and ML from its professional services area, Mastercard aims to streamline and accelerate the customisation and deployment of ML models on-premises, saving significant time and effort compared to traditional labour-intensive methods.

The versatility of the evoML platform empowers companies to generate ML code directly from raw data, but its benefits go beyond that. It can also be utilised to optimise the performance of existing models, enhancing speed, efficiency, and cost-effectiveness. By saving substantial time, domain experts can redirect their focus towards value-adding strategic tasks, fuelling innovation and driving business growth.

A standout advantage of the evoML platform is its commitment to genuine code ownership. Mastercard's clients will have the exclusive ability to download the model source code, granting them the freedom to tailor the models to their unique business needs through customisation and experimentation. This unprecedented level of flexibility opens up a world of exciting possibilities, enabling Mastercard to deliver unparalleled levels of business value to their clients.

Accelerate key use cases with pre-trained models

The combination of Mastercard's expertise and TurinTech's evoML platform is giving clients bespoke ways to advance their ML projects. Clients can get custom ML projects up and running in production within weeks. To accelerate setup and implementation, we include 4 pre-trained AI models that address common client questions:

- Which cardholders will stop spending?
- Which cardholders run small businesses?

- Which cardholders are most likely to add their card to online services like subscription services, eCommerce sites, and digital wallets?
- How do cardholders spend in eCommerce?

Advantages of pre-trained models

- **Higher Accuracy:** custom models are more sensitive to the nuances of client-specific data, leading to more accurate predictions.
- **Efficiency at Scale:** evoML automates much of the manual process involved in ML development, from feature engineering to hyperparameter tuning, allowing Mastercard to scale their solutions without sacrificing quality.
- **Dynamic Learning:** as clients' data evolves, the models adapt, learning from new patterns and behaviours to maintain their predictive power.

By incorporating these pre-trained models into clients' ML ecosystems, Mastercard is giving them a significant head starts in addressing these crucial use cases. This not only saves time but also reduces the complexity of model development and ensures a higher level of accuracy in predictions, benefiting both businesses and end-users.

Additionally, the evoML platform's advanced features are designed to help Mastercard's clients tackle one of the biggest challenges in AI: bias mitigation. With an ethical AI framework, the platform can help ensure that the AI models are not only accurate but also fair and transparent, which is particularly important in the financial sector. Mastercard's commitment to ethical AI through this partnership showcases their dedication to responsible innovation.

> The versatility of the evoML platform empowers companies to generate ML code directly from raw data, but its benefits go beyond that. It can also be utilised to optimise the performance of existing models, enhancing speed, efficiency, and cost-effectiveness

By merging Mastercard's expertise with Turintech's cutting-edge technology, the partnership can continue to unlock new ML capabilities to help power an inclusive digital economy for everyone, everywhere.

The shift toward digital operators

Why service providers are embracing the change.

BY MELCHIOR AELMANS, CHIEF ARCHICTECT, GLOBAL SERVICE PROVIDERS AT JUNIPER NETWORKS

AS THE NETWORK has become a constant and ubiquitous aspect of daily life, demands have advanced far beyond the legacy expectation of just providing connectivity: from relying on 'always connected' services to operating mission-critical networks. The network needs to deliver a superior experience for operators, internet of things (IoT) devices, business and residential users, while reducing power and space consumption, operational expenses and removing pain-points like repetitive manual tasks.

Service providers are evolving into Digital Operators by strategically crafting and providing services centred around customer experience, adopting an experience-first networking approach. This transformation involves adept utilisation of automation, AI (Artificial Intelligence) and ML (Machine Learning) and orchestration to optimise and enhance service delivery, ensuring a seamless and customer-centric digital experience.

This can be done with AI and ML capabilities; detecting and resolving network issues before disruptions occur, essentially making the network self-driving and self-healing by leveraging closed loop automation. Also, translating business intent and data-driven decisions to make consuming digital services easy and rewarding for end customers (businesses and individuals alike) is important. This decade is all about transparency of the network and its components to the operator and actionable insights where the network operator's intent is enriched with queried (network) data, interpreted by AI/ML and ultimately closing the loop with suggested optimisations and potential

fully automated operations. That is what makes the digital operator.

Challenges before success

Building a fully autonomous network, however, presents significant challenges. Many of these issues arise from the fact that network operations today still heavily rely on manual actions and lack robust detection mechanisms of security threats and vulnerabilities. Limited visibility, manual configuration and provisioning, reactive troubleshooting, complexity and scale, lack of predictive capabilities, as well as skill gaps and resource constraints, are just some of the challenges that operators face. Addressing these challenges requires a paradigm shift towards automation, AI/ML-driven analytics and closed-loop systems.

By implementing advanced automation technologies, such as intent-based networking, software-defined networking and network orchestration, service providers can overcome these hurdles. By embracing automation and AI/ML-driven analytics, service providers can enhance network visibility, improve efficiency and proactively detect and resolve issues, which also contribute to lowering the energy consumption thus making operations more sustainable. They can shift from reactive to proactive operations, predict and prevent network problems (not to mention automatically mitigate the problem that do occur), and optimise network performance. Recognising the limitations of manual operations and investing in automation and AI/ML technologies is crucial for service providers to address current network issues, enhance operational efficiency and deliver reliable and high-performing services to customers.

Customer journey analysis

What would this look like in practice? Well, imagine the journey of a couple who have been using a shared mobile phone plan. Recently, they realised that their teenage son needs his own phone for school and social activities. By leveraging data analysis, personalised offers, intuitive interfaces and efficient backend processes, a digital operator could seamlessly facilitate the journey of adding a new member to a shared mobile phone plan in an optimal way for the customer. This automation would not only enhance customer experience but also provide the telco with valuable insights for optimising its services and anticipating future needs. When fully automated and integrated, within an hour or two of initiating the transaction, the couple's son could have his own phone service up and running, ready to enjoy the benefits of connectivity.
The telco's systems would automatically update the shared account to reflect the addition, ensuring accurate billing and transparent management of the family's mobile services.

Digital operator journey

Now let's look at the journey of a digital operator as they recognise the growing demand for a service and aim to efficiently initiate, deploy and monitor it to meet customer needs within a short timeframe. The operator's intelligent orchestration systems should leverage AI and ML algorithms to continuously analyse network performance, customer behaviours and usage patterns. These algorithms also prove very beneficial to manage the SLA's. The systems are designed to detect signals that indicate the need for a new service, such as increased data consumption, specific app usage or customer requests. By monitoring these signals in real-time, the operator can proactively identify the demand for the service and initiate the deployment process.

Once the need for the new service is detected, the operator's closed-loop automation system comes into action. It intelligently orchestrates the deployment process by automatically configuring the network resources, allocating bandwidth and ensuring optimal service quality. By leveraging AI/ML, the system can make intelligent decisions on resource allocation based on demand and network conditions. Throughout the deployment process, the closed-loop automation system continuously monitors the service's performance. It collects real-time data on network performance, user experience and service quality metrics. In the event of any performance degradation or anomalies, the closed-loop automation system triggers automated remedial actions. It should dynamically adjust network parameters, reroute traffic or allocate additional resources to ensure uninterrupted service delivery. This closed-loop feedback mechanism enables the operator to swiftly address any service disruptions or issues, minimising downtime and maximising customer satisfaction.

The AI/ML capabilities continuously learn from network data and user feedback, which will help the system to identify new opportunities for improvement. It will autonomously fine-tune network configurations, optimise resource allocation and even suggest personalised service enhancements for individual customers. Thus, the digital operator could efficiently initiate, deploy and monitor a new service on their network.

This automation not only accelerates the time-to-market for the service but also ensures seamless performance, proactive issue resolution and continuous optimisation. Ultimately, it empowers the operator to deliver exceptional customer experiences and stay ahead in the ever-evolving, highly competitive digital landscape.
In short, network automation and orchestration is a foundational component for the digital operator while improving the customer experience, eliminating the impact of human error and reducing the cost of customer churn. But not just that, also the network should automatically adjust for optimal bandwidth and power usage using closed-loop monitoring and so reduce carbon footprint, the number of manual actions and become much more end-customer centric.

Developing a DataOps culture?
Focus on incentives

What comes first: a cultural framework or the specific components and rituals within that culture? In other words, can you create a culture within a team or organization top-down, or should it evolve gradually the other way round?

BY RYTIS ULYS, ANALYTICS TEAM LEAD AT OXYLABS

THE ANSWER to this question is important because standard advice about building a DataOps culture tends to recommend building the framework with processes first and hoping that the team obediently follows it. However, that may not be the best strategy because culture typically doesn't evolve that way.

Culture is the sum of collective actions and values

DataOps advocates usually recognize that a cultural shift might be required to maximize the benefits of this agile approach. Understanding how cultures develop — and benefit the people within them — is therefore critical to creating a strategy that accelerates this transformation.

So, what is culture? Taken in the context of human evolution, culture can be summed up as a collection of values, beliefs, and rituals that form a specific environment.

Let's use Italian culture as an example, which is famous for its unique art, cuisine, architecture, social habits, and more. The citizens of Italy didn't develop a plan to create this culture at first, and it didn't require any mass "buy-ins" or consensus to get started. Instead, it gradually evolved to encompass the various lifestyle aspects unique to people living in that part of the world.

A similar analogy is the recent evolution of "digital" culture, where consumers moved a substantial part of their personal, vocational, and social activities online. Leaders of tech companies probably didn't plan to create this culture in the beginning. Most of them focused on creating apps and platforms people wanted to use, allowing the culture to evolve naturally over time.

DataOps benefits everyone in the game but not everyone knows it

DataOps is an agile framework that combines a set of practices and methodologies aimed at streamlining and unifying data operations. Building a DataOps system can be challenging for a few reasons.

Besides requiring a cultural shift, implementing DataOps involves integrating multiple moving parts, including automated data pipelines, version control tools, Continuous Integration and Deployment (CI/CD) practices, monitoring systems, containerization and orchestration tools, security protocols, compliance requirements, and more.

That's a tall order, and many organizations face challenges implementing even some of these components. Members of your team accustomed to legacy technology may struggle to adapt to new systems and deal with disruptions in their everyday habits, processes, and procedures. However, if you can convince your teams that DataOps will benefit them directly, then you are well on your way to implementing DataOps with greater speed, efficiency, and enthusiasm.

DataOps can significantly improve various business initiatives and processes throughout your organization. Moreover, it can benefit employees directly by cutting down workloads, saving time, increasing efficiency, and improving results. DataOps provides analysts with high-quality insights that enable effective decision-making

DataOps streamlines the collection, transformation, and analysis of data for reporting purposes. Improving these processes helps your analysts gain accurate insights that enable effective, strategic decision-making.

Data engineers value DataOps because it cuts down on their workload

Managing data warehouses efficiently is critical for all data-driven organizations. DataOps improves the process by automating data loading, transformation, and maintenance tasks to reduce workloads on data engineers.

DataOps additionally facilitates the data migration process, ensuring that information is not lost or corrupted during the transition. Besides reducing redundant tasks, increased data migration efficiency produces better quality data that benefits every area of your organization.

DataOps accelerates AI initiatives

AI-based initiatives, such as predictive analytics powered by machine learning, benefit immensely from an effective DataOps strategy. DataOps can accelerate the development and deployment of machine learning models through processes that streamline and optimize data preparation, feature engineering, and model deployment.

DataOps produces high-quality data that improves marketing and product development

Understanding consumer preferences and customer behavior is critical to successful marketing, product development, and customer service. DataOps helps aggregate and analyze data from various sources to provide high-quality insights for optimizing your overall marketing strategy, including:

- Product optimization
- More effective marketing campaigns
- Consumer research
- Full personalization
- Better customer service

DataOps supports inventory and logistics managers

DataOps improves supply chain management by streamlining processes that track inventory, product demand, and logistics data. Monitoring these activities in real time can reduce costs and enhance customer service.

DataOps supports security and compliance efforts

DataOps enhances fraud detection systems by continuously monitoring and analyzing transaction data to identify irregular patterns and highlight suspicious activities. Besides supporting your security teams, DataOps additionally helps your organization meet compliance requirements by ensuring that data used for reporting is accurate, auditable, and meets regulatory standards.

How to promote a DataOps culture

Developing a culture of any type takes time, however the process can be accelerated by focusing on the diverse needs of your team. Start with leadership and ensure a solid top-down commitment by highlighting the primary benefits of DataOps for your organization, including reduced costs, improved efficiency, and greater productivity. Next, provide the education and training required to communicate the principles and benefits of DataOps to your teams, including data engineers, data scientists, analysts, and other organizational stakeholders. Emphasize the need to break down data silos and ensure everyone understands that the shared ownership of data assets and data-related processes benefits the entire organization.

It's also important to consider that culture is never stagnant — it constantly evolves over time to adapt to the changing needs of your organization. Encourage this evolution through continuous feedback and input from all stakeholders, and regularly measure KPIs to track progress.

Cultivating a DataOps culture ultimately depends on your team

In conclusion, developing a robust DataOps culture is a dynamic, continuous process that depends on your team's collective actions and values. Like all cultures, it's not a blueprint that can be imposed from the top. Instead, it evolves organically in alignment with the incentives and benefits that resonate with individuals and teams.

Implementing DataOps is not easy, but the benefits to your organization outweigh any temporary challenges. Expedite the process by focusing on incentives that promise improved productivity, reduced costs, and superior results for the entire organization.

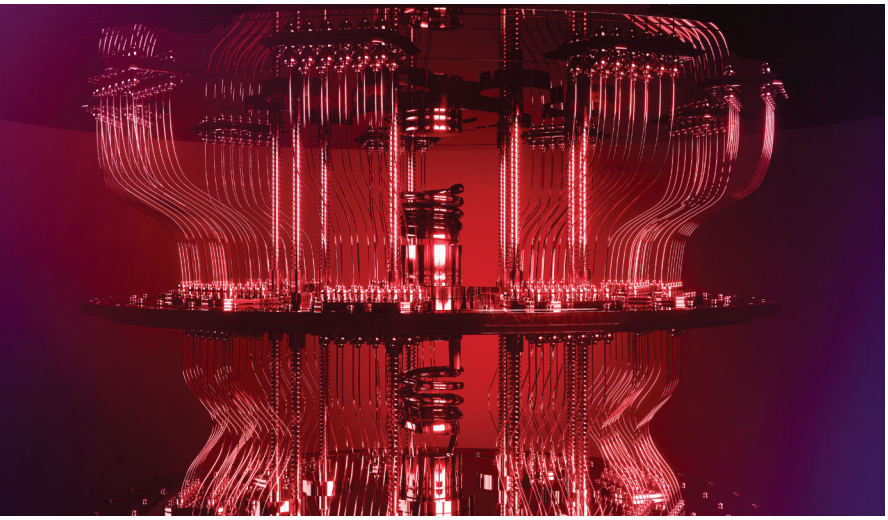
The rise of quantum ecosystems in 2024 and beyond

Quantum technology allows us to harness the fundamental laws of quantum mechanics to solve problems that are either intractable or even impossible using today's technology.

BY DR. PHILIP KRANTZ, QUANTUM ENGINEERING SOLUTIONS TEAM AT KEYSIGHT TECHNOLOGIES

AREAS WHERE quantum technology can offer profound impact include complex simulations and computations, secure communication, and more powerful imaging and sensor techniques. Governments and industries have recognised the necessity to invest in quantum research and early adoption of quantum-technological applications to ensure competitiveness and to be prepared for any disruptive advancements within the scope of their interests.

As a response to the steady scientific progress within the quantum community during the past decades, many branches of quantum technologies have moved out of university labs into start-up ventures, high-tech companies, as well as military. Consequently, the community has broadened from mainly being explored by quantum physicists to requiring a wide blend of expertise and backgrounds, ranging from various engineering disciplines to including business professionals, investors, and entrepreneurs.



As part of this transition, academic and industrial quantum hubs, quantum incubators, as well as local and national quantum ecosystems have risen during the past years – most aiming to build up and foster a workforce composition required for long-term success. To this end, there has been an increased need to attract talent, both from outside these ecosystems as well as training of local students and engineers to enable sustainable technological growth.

In this article, we will discuss a few ongoing trends we are seeing when it comes to building up quantum ecosystems.

National quantum technology initiatives

Building up world-leading expertise in quantum technologies takes a long time, requires substantial investments, and is often facilitated through an already existing academic quantum research community. Quantum ecosystems, i.e., collaborative environments of academic and industrial quantum research teams, are often created to support mutual interests in terms of both attracting the workforce, as well as synergistically benefiting from other members' strengths and competencies.

These local quantum ecosystems expand both organically via education and inorganically through attracting workforce and industries from other places to get established within the ecosystem. Therefore, access to state-of-the-art technology, beneficial start-up culture, and world-leading research teams are all examples of important factors needed for ecosystems to become successful and self-sustaining.

Oftentimes, however, ecosystems experience "knowledge gaps" prohibiting them from making fast progress on certain technologies. One example is when the capability to produce high-quality quantum processor units (QPUs) is missing. For instance, due to the lack of an advanced and dedicated cleanroom facility. One common trend that we often see is that such ecosystems procure a commercial quantum processor (sometimes also including all required cryogenics and quantum control systems) containing the qubit modality (or modalities) that the country seeks to pursue. This way, local experience in quantum control and algorithms can be gained in parallel with the development of local cleanroom fabrication processes and the exploration of optimal qubit designs. During the past years, several commercial alternatives for QPUs as well as parametric amplifiers have entered the market. Quantum-as-a-service (QaaS) – cloud, device testing, and fabrication services

As mentioned, getting started in quantum technology requires time, money, and manpower. This has yielded an increased market need for quantum service providers to offer quantum-as-a-service (QaaS), including for instance remote cloud access to quantum processors, test beds for device characterisation, as well as foundries that offer fabrication services to clients. This way, quantum research teams have the option to strategically outsource parts of their operation to a third-party QaaS provider, which can have an important impact for startups entering the quantum ecosystem with limited time and resources. While this is currently happening on a very limited scale, interest in QaaS will increase in 2024 and beyond. In addition, we foresee that QaaS providers may in the long run enter a role to standardise device operation, characterisation, and fabrication which allows for future benchmarking of both quantum processors as well as qubit-adjacent technologies.

Quantum in the classroom

Another ongoing trend we are seeing is an increased need for a qualified and diverse workforce as countries ramp up their national quantum initiatives. To address this bottleneck, we foresee that the number of dedicated higher education programs focusing on quantum technologies will continue to increase in 2024 and beyond. Oftentimes, these programs are constructed in close collaboration with industrial partners, with access to state-of-the-art quantum control and readout technologies, so that students acquire relevant and up-to-date skills, preparing them for future quantum careers. There are also numerous industrial internships and mentorship programs that can help guide students in their future career choices.

In addition to pure technical programs, there will also be an increased focus on quantum technology among business schools and entrepreneurship programs. This comes from an increased drive for business professionals to obtain basic training in quantum technology, helping them to be competitive in the highly dynamic quantum community.

Gender equality in quantum

Another very positive and uprising trend is the many ongoing efforts on gender equality, aiming at increasing the ratio of women working in quantum technologies. Having access to a diversified and gender-balanced workforce is important for any industry and quantum technologies are certainly no exception.

With the worldwide advancement in quantum technology research and development, the community is expanding beyond the academic realm and into startups, high-tech companies, and the military. This will give rise to quantum hubs, incubators, and local and national ecosystems all trying to build a workforce able to seize the quantum opportunity. Solving the talent gap is critical to realising the potential of quantum in the coming years and decades.

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Defeating downtime:
Strategising failover solutions

As network downtime plagues businesses globally, enterprise decision-makers must look towards wireless failover to ensure business continuity.

BY JAMES BRISTOW, SVP EMEA AT CRADLEPOINT

EARLIER THIS YEAR, an IT failure left thousands of Lufthansa passengers across the globe stranded. The failure was caused by damage to fibre cables during construction in Frankfurt, bringing the organisation's massive operation to a standstill. Network downtime is one of the significant challenges facing businesses today.

This challenge is multiplied when applied to distributed enterprises, like Lufthansa, whose network is mission-critical to global operations. For example, in 2021, Amazon missed out on $34 million in sales during a 59-minute period of internet outage. It's a problem that companies don't want to face, but it is almost inevitable.

So, what can enterprises do to safeguard themselves against this issue and cover network calamities like cable outages? The only concrete solution to ensure business continuity is to deploy wireless backups powered by cellular broadband in a process called failover.

Enterprises must consider six essential strategies when deploying wireless failover to maximise their ability to continue operations, no matter the issue. But before we dive into these, it is important to understand what failover connectivity is and how it meets the demand of enterprises.

What is failover, and can it withstand the pressures of enterprise?

Due to the distributed nature of most enterprises and cloud-based operations becoming the norm, wide-area networks (WANs) are critical to the day-to-day operations of an organisation. But these networks can go down instantly for many reasons, resulting in branches losing connection to corporate networks or the cloud. Failover, in its various forms, acts as a backup and allows an enterprise to continue operations while the outage is fixed.

The most effective failover strategies increase the diversity of network components and connections by building Wireless-WAN links on 4G and 5G broadband. This significantly reduces single points of failure that could hinder operations, offering flexible, powerful, and cost-effective backups able to withstand the pressure of distributed enterprises. Moreover, using 4G LTE and 5G and their subsequent technologies will improve network uptime and application and service performance.

It is almost a no-brainer for enterprise decision-makers to boost their business continuity using wireless failover. However, there are specific considerations to undertake that will maximise an enterprise's business continuity using wireless failover.

Ensuring branch continuity with wireless failover: 5 strategies

1. Link diversity

Most enterprise connections depend on a single wire running to an internet provider. This wire acts as a single point of failure and, if disabled, will bring the entire organisation to its knees. In some instances, an organisation might install a second wire as a backup mechanism. While this may seem a solid option, it will most likely be placed alongside the wire it backs up; thus, it is subject to the same risks. In the case of Lufthansa, a backup wire would have probably suffered damage as well.

The solution is adding a backup wireless link to your existing branch network, providing a diverse fallback that is far less susceptible to the risks that impact wired connections. The more diverse links an enterprise has, the less it has to worry about a single point of failure.

2. Dual-carrier connectivity

As we've seen time and time again, most recently with Virgin Media, relying on one internet provider or telecom carrier can be risky. Like a single wired connection, various issues out of an enterprise's control can result in their business operations being hamstrung by their providers' outage. It is highly unlikely that two carriers will be down simultaneously. So, when it comes to installing wireless backups, it is imperative to ensure dual-carrier connectivity at the same time. Where both links work in tandem, or as primary and backup, cancelling the risk posed by carrier/provider outage.

3. Hardware redundancy

Hardware going down always poses a risk to business continuity, especially when it comes to wireless router backups. As a result, enterprises must look to deploy redundant or mirrored routers which protect against router downtime. This is especially important for enterprises running non-stop operations, as the routers monitor each other and act as a backup in case the primary fails.

Redundant or mirrored routers also allow organisations to manage and maintain their routers without risking day-to-day network usage, acting as further failure points.

4. Traffic spikes

Traffic spikes and network congestion are constant risks to any connected enterprise. Whatever the reason for a sudden surge, it can significantly hinder an organisation's operations.

In the event of a traffic spike, backup wireless links can be used as an avenue to offload the under-pressure primary connection automatically. Once the traffic wave has settled, the backup link is automatically released, and normal traffic levels continue to pass through the primary connection.

5. Out-of-band management

Due to various reasons, enterprises often lose visibility and access to many of their branch devices, resulting in site visits or proxy troubleshooting.

Wireless backup links render both solutions completely outdated by providing alternative network management options when a device is unreachable or 'out-of-band'. In addition, these links offer entirely remote management, enhancing the ability of enterprise engineers to fix network issues wherever.

The time for failover is now

As network downtime plagues businesses globally, enterprise decision-makers must look towards wireless failover to ensure business continuity or risk the same fate as Lufthansa. By following the steps above, enterprises will be able sleep-easy at night, knowing that it will take a cataclysmic event to knock out their network while reaping the benefits that 4G and 5G technologies offer.