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# IoTNOW

HOW TO RUN AN IoT ENABLED BUSINESS

HANNOVER MESSE

SPECIAL EDITION

## COVER INTERVIEW

**Volt Active Data's Dheeraj Remella explains how to make smarter, faster and greener data decisions at the edge**

## IoT NOW CEO GUIDE TO HANNOVER MESSE 2025

**PLUS:** Exclusive Hannover Messe 2025 Event Preview • Edge intelligence shifts IoT's focus to more things, less internet • Trasna adds device management with IoTerop acquisition • How will dynamic convergence of AI, IoT and 5G deliver transformative opportunities? • IMC makes its move to fix IoT security mess • Head to the edge for intelligent action • u-blox hangs up on cellular business • Augury raises US$75m • e& partners with IBM for AI governance • Read the latest News, Features and Interviews at **www.iot-now.com**

# Is your IoT safe?

Security breaches – and regulations trying to address them – are growing exponentially. It is more difficult than ever to navigate the IoT cybersecurity landscape, both in terms of regional standards and vertical markets.

The IoT M2M Council (IMC) and the Global Certification Forum (GCF) are glad to announce a new Joint Task Force to evaluate a holistic, global certification program for IoT security. The program will investigate ways to ensure that all layers of the IoT stack – device, network, cloud platform and application – are secure.

The first working meeting of the Joint Task Force on IoT Security will be held on 10 March 2025, starting at 1:30 p.m. CET, in a hybrid (online/in-person) format. The live meeting takes place at the fairgrounds of the NuernbergMesse (Germany) on the eve of the embedded world exhibition – but remote, online attendance will also be possible. To register your interest and provide input, please use the link provided below.

**https://go.iotm2mcouncil.org/securityprogram**

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# IoT NOW CEO GUIDE TO HANNOVER MESSE 2025



## IN THIS ISSUE

# More things, less internet

As access to connectivity for IoT devices becomes simpler thanks to SIM innovations, it's important to take a step back and assess whether data transit is really necessary. Parallel innovation in edge intelligence and on-device data processing, potentially augmented by AI, now means that IoT devices don't need to send all their data to a centralised datacentre to boil the ocean of data. Instead, intelligent decisions can be made on the device itself – with super-low latency – and then only relevant, valuable data needs to be sent to the centre

**George Malim,** managing editor

The benefits of this are huge and multi-dimensional. Network costs can be saved by reducing the sheer volume of data sent to centralised processing. Cloud and/or data centre operational costs can be saved by doing less processing centrally. Time can be saved enabling quicker decisions to be made by the device rather than pinging queries back and forth across the network before decisive action can be taken.

In some cases, the benefits of connected devices communicating directly with each other in a federated way rather than with the centre in a hub and spoke fashion can be achieved. Benefits here could be that a device communicates to neighbouring devices that it is experiencing a problem and needs to shut down. These devices can then set up additional capacity to handle an expanded workload.

The benefits of adding greater intelligence to IoT devices can be compelling and are limited by the usual constraints of cost, security, imagination and acceptance. There is a hill to climb for some because they have only recently become familiar with cloud servers and as-a-service computing rather than traditional ownership. This next step of placing greater emphasis on device intelligence is a step too far today.

Tomorrow though, the benefits of reduced latency, lower cost and vastly reduced environmental impacts will not be ignored. Saving energy in terms of transmission and in the datacentre, especially as AI sees vast increases in network and server workloads, will be a prerequisite for profitable operations. For some, energy costs can break the business case so the intelligent edge will become essential.

Yes, IoT devices will still need to connect but these intelligent things at the edge will ensure data transmission and centralised processing workloads are minimised. IoT will be more about the things and less about the internet.

Enjoy this CEO Guide to Hannover Messe 2025!

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## Trasna adds device management with IoTerop acquisition

**Trasna**, a semiconductor and IoT provider, has announced its acquisition of **IoTerop**, an IoT device management platforms and software specialist. This acquisition strengthens Trasna's ability to deliver complete solutions from chip design and SIM manufacturing to cloud-based remote management services. IoTerop's products, which include the Alaska IoT management platform and Iowa software development toolkit, are already deployed across millions of devices globally. This addition to its product portfolio further strengthens Trasna's hardware and software connectivity offer, reinforcing its position as a key player in enabling the growing number of IoT devices worldwide.

IoTerop brings a proven track record in IoT device lifecycle management, with its Alaska and Iowa solutions widely adopted by large-scale connectivity providers and industries such as smart cities, utilities, automotive and industrial IoT sectors. Its products are designed to support the next generation of IoT networks, such as NB-IoT, 5G and Lightweight M2M (LwM2M). The company has been a leading advocate of open standards in IoT, promoting interoperability across IoT ecosystems. For Trans, this move rounds off a year of significant expansion

**Stéphane Fund**, Trasna

following its acquisition of **Workz** and the opening of a new semiconductor R&D and semiconductor facility in India.

Stéphane Fund, the chief executive of Trasna, said, "Acquiring IoTerop is an important step in our journey to become the leading enabler of IoT connectivity including device management. Its IoT expertise and trusted device solutions complement our growing portfolio perfectly. The addition strengthens our comprehensive offering for customers, enabling them to deploy highly optimised and scalable solutions that make connectivity and device management easier and more secure for everyone."

## u-blox shifts focus to GNSS solutions, hangs up on cellular business

**u-blox** has announced the decision to increase focus on its Locate business and phase out its cellular business. This change positions u-blox as a leading and dedicated provider of global navigation satellite system (GNSS) semiconductor solutions in a dynamic and growing market, while retaining its value creative short-range business.

By further focusing on the Locate business, the company says it will be better positioned to drive innovation, use its unique technology assets and address expanding opportunities within the global positioning market, including autonomous vehicles, industrial IoT and tracking applications. u-blox has concluded that phasing out the cellular business is the most viable course of action to ensure the company's long-term strategic focus and operational efficiency. u-blox's cellular business currently has more than 200 employees and generated revenue of CHF 27 million (US$30m) and an adjusted EBIT loss in excess of CHF 15 million (US$16.6m) in H1 2024.

"This strategic shift will enable us to unlock even greater potential within the positioning technology market and accelerate the development of cutting-edge solutions for our customers," said Stephan Zizala, CEO of u-blox. "Our efforts to find a viable path forward for the cellular business did not pan out, including exploring a potential sale, leading us to the decision to phase out this business. We will do our utmost to support our employees, customers and partners impacted by this decision."

**Stephan Zizala**, u-blox

## News in Brief

### Telenor IoT expands US access with Verizon Business

**Telenor IoT** customers with connected devices in the US can now get local access to **Verizon Business**' cellular IoT network in the US. This extends Telenor IoT's global managed IoT connectivity service by enabling more flexible access to the US market. This is an important step following the partnership announced in July 2023 between Telenor IoT and Verizon Business, aiming to simplify and enhance connectivity on a global scale.

Telenor IoT provides access to networks in more than 200 countries using a combination of roaming and local access. The partnership with Verizon Business will complement Telenor's global roaming access and give Telenor customers the option of eSIM-based local access on Verizon's network in the US.

### Augury raises US$75m from investors

**Augury** has announced that it has raised US$75m, with the round being led by **Lightrock** with participation from several of Augury's existing investors – **Insight Partners**, **Eclipse**, **Qumra Capital** as well as **Schneider Electric Ventures** and **Qualcomm Ventures**. The new round represents an increase in valuation for Augury, which maintains its position as the only unicorn startup in the Production Health category. Since its last funding round in 2021, Augury has seen a five-fold increase in revenues, tripled customer base among Fortune 500 manufacturers, and expanded its product portfolio from asset performance and reliability to incorporate AI-driven solutions for process optimisation.

# News in Brief

## RespondHealth partners with Microsoft

**RespondHealth** has announced a new integration with **Microsoft** to bring AI-powered solutions to the healthcare and life sciences (HLS) sectors. This collaboration integrates RespondHealth's real-world health data sources, including patient records from over 200 million Americans, with Microsoft Azure OpenAI Service, to help turn complex data into actionable insights. This offering will provide HLS organisations with new solutions to facilitate and accelerate ongoing evaluation of pharmaceutical efficacy, identify precise patient cohorts for clinical trials, analyse market trends and develop performance optimisation strategies that benefit healthcare stakeholders.

## Vodafone Business IoT expands connectivity in the Middle East with Mobily

**Vodafone Business IoT** is partnering with **Mobily** – a Saudi technology, media and telecommunications company – to offer Internet of Things (IoT) connectivity services in the Kingdom of Saudi Arabia. As a result, Vodafone Business IoT's customers will now be able to deploy their connected IoT devices to more places in the Middle East.

This new agreement means that Mobily will grant Vodafone Business IoT's customers access to its extensive network coverage in the country. This means that IoT customers installing and operating connected devices using the Vodafone Global SIM+ will have reliable and secure connectivity that complies with local regulatory requirements.

**Olivier Pauzet**, Sequans

## Sequans and Soracom expand partnership with new evaluation kits

**Sequans Communications**, a provider of cellular IoT semiconductors and modules, and **Soracom**, a provider of cellular IoT connectivity with full MVNO capabilities, have announced the expansion of their partnership. This collaboration aims to simplify the development of IoT projects by offering evaluation kits (EVKs) powered by Soracom's global IoT connectivity. IoT application developers now have access to Sequans' LTE-M/NB-IoT and Cat 1bis technology, combined with Soracom's global connectivity. The EVKs are available in two variants:

- LTE-M/NB-IoT (Sequans Monarch2 GM02S EVK): This second-generation LPWA technology from Sequans features ultra-low power consumption and a compact form factor, making it ideal for applications such as smart utility meters, industrial sensors, health and fitness trackers and more.
- LTE Cat 1bis (Sequans Calliope2 GC02S1 EVK): Featuring Sequans' Cat 1bis technology, certified in North America and Europe. It can operate on any LTE network worldwide, ideal for deployments that require global coverage with cross border connectivity, such as connected vehicles, logistics tracking systems and telematics.

"We are thrilled to deepen our partnership with Soracom and provide developers with the tools they need to launch their IoT solutions quickly and efficiently," said Olivier Pauzet, the EVP of marketing and strategy at Sequans. "The combination of Sequans' hardware and Soracom's connectivity creates an effective and efficient solution that can make scaling an IoT deployment easier by ensuring a smooth transition from the evaluation stage to full deployment."

## e& partners with IBM to strengthen AI governance and compliance framework

**e&** has collaborated with **IBM** to deploy a pioneering, end-to-end, multi-model artificial intelligence (AI) and generative AI governance solution. Announced at the World Economic Forum 2025 in Davos, this collaboration intends to enhance e&'s AI governance framework to promote compliance, oversight and ethical practices across its growing AI ecosystem, reinforcing e&'s commitment to establishing robust governance, risk management and regulatory oversight across its AI usage.

The solution will use IBM's watsonx. governance enterprise AI and data governance platform, combined with IBM Consulting's expertise in AI implementation, build on e&'s commitment to scale AI responsibly and track ROI while addressing compliance requirements, transparency and ethical oversight of AI models.

"At e&, we are committed to leading by example and setting the global benchmark when it comes to establishing robust AI governance practices," said Dena Almansoori, the group chief AI and data officer at e&. "By adopting IBM watsonx. governance, we're taking a decisive step forward in our AI journey. This collaboration ensures transparency, explainability and efficiency across our AI operations, raising the bar for AI governance in the industry."

**Real-time data analytics are growing IoT's impact in rail freight**

## *Freight rail industry set to surpass US$20bn in IoT revenue by 2032*

The freight rail industry has been receiving investments to digitise operations. According to global technology intelligence firm **ABI Research**, revenues for rail car IoT in freight rail will surpass US$20bn by 2032. "The global railcar telematics market is driven by the increasing demand for efficient, safe and cost-effective transportation systems," said Adhish Luitel, the principal analyst at ABI Research. "This expansion can be attributed to advancements in digitalisation and the integration of IoT technologies due to heightened emphasis on real-time data analytics enabling preventive maintenance."

Vendors like **Amsted Digital**, **Wabtec**, **Nexxiot** and **ZTR** are some of the emerging players in this space within North America. In addition to this, **RailPulse**, a coalition created by railcar owners in North America, including Class 1 and 2 railroads, lessors and railcar-owning shippers, with the goal of pushing rail digitisation is also driving the adoption of digital solutions.

Unlike Europe, the North American market is underpenetrated when it comes to IoT-based visibility. North America presents a large total addressable market (TAM) of nearly two million railcars. So far, machine vision and sensor-based inspection devices mounted on the side of the tracks, usually at rail-grade crossings, have been at the forefront.

"Rail braking inspections are critical to ensure safety and compliance in the industry. These checks verify that the air brake system is functioning properly across the entire train, which can span over a mile in length. However, the process can be time-consuming as manual inspection for each car requires constant coordination between the train crew and the control centre. This is when IoT technologies can provide efficiency gains," concludes Luitel.

## *Berg Insight forecasts strong growth for IoT connectivity management platforms*

**Berg Insight** has released new findings about the market for IoT connectivity management platforms (CMPs), a standard component in the value proposition from mobile operators and IoT MVNOs around the world. Market dynamics in the IoT CMP market have evolved in recent times as vendors focus on responding to the challenge of declining average revenue per user (ARPU) for IoT connectivity services.

**Cisco** is one of the largest IoT CMP providers globally. The company has a strong position in all major geographies and partnered with about 60 mobile operators worldwide at the end of 2024. The number of SIMs managed with Cisco IoT Control Center reached about 262 million. **Aeris** ranked as the second largest IoT CMP vendor with 28 mobile operator partners and 84 million connected devices at the end of 2024. The company took over the loss-making IoT business of **Ericsson** in early 2023 and has since the acquisition managed to modernise and streamline operations, while merging its legacy platform and the IoT Accelerator into a single platform. **MAVOCO** has emerged as a significant player in recent years with more than 10 mobile operator partners at the year-end. MAVOCO's IoT CMP is cloud- and core-agnostic, allowing mobile operators to utilise existing infrastructure to cost-effectively address IoT customers globally. Other IoT CMP vendors with a meaningful number of IoT CMP deployments are **Comarch**, **Nokia** and **Vodafone**, the firm says. IoT CMPs are also a key component in the value proposition from vendors such as **1NCE**, **1oT**, **emnify**, **Eseye** and **floLIVE**, which operate as technology providers for mobile operators, as well as IoT MVNOs.

## News in Brief

### *Kaleido Intelligence and Mobilesquared announce merger*

**Kaleido Intelligence** and **Mobilesquared** have announced their merger, forming a single entity in 2025. This alignment brings together two global authorities in messaging, roaming and IoT market intelligence, enabling the brands to use their combined expertise and shared values.

Jon King, chief commercial officer at Kaleido Intelligence, said, "The merger of Mobilesquared and Kaleido Intelligence is a natural fit. Both organisations have earned global recognition for delivering meticulous, detailed, trusted insights and data and advisory services. The depth of Mobilesquared's expertise in the messaging landscape complements Kaleido's extensive coverage of the roaming and IoT ecosystems."

Nick Lane, the chief messaging officer and founder at Mobilesquared, said, "It's amazing news that we can now take our five-year partnership to the next level with the announcement of this merger."

# Make smarter, faster and greener data decisions at the edge

The IoT revolution has seen a vast increase in the number of connected devices across industry, in our homes and communities. The ability to fuel processes with data and then act on it is increasing sustainability, enhancing productivity and eliminating waste. However, processing of the data itself carries a growing burden of communication and storage costs and inefficient centralised data processing. The next step is to embrace edge data processing to minimise data transmission, lower latency in the decision-making cycle and enable automated systems to make decisions quickly.

This new wave is underpinned by data processing technologies that can harness the power of artificial intelligence and machine learning to intelligently enable automated operations that are optimised and sustainable. Dheeraj Remella, the chief product officer at Volt Active Data, tells George Malim, the managing editor of IoT Now, how the company is helping organisations across all industries optimise their data from the edge to the centre

**George Malim: It seems obvious that the more that can be done at the edge, the less needs to be transmitted for centralised processing. How are you seeing edge intelligence reduce data transmission?**

**Dheeraj Remella:** In my view, edge intelligence is actually a two-pronged enabler of greater efficiency. It's not just an enabler of reduced data transmission, it also enables reduced storage. Sensor-based IoT, telemetry and many other services are all generating a lot more data but not all of this needs to be stored and it should not be stored. In many cases, data has already lost its relevance and if you store it, it makes it harder to search for data points that contain value among the slew of irrelevant information.

Edge data processing enables you to understand what the data is telling you about what is happening in a device right now. That doesn't mean you must send all the device data to a centralised processing location. Instead, you can understand the data where and when it's created, and send a useful outcome to central processing. For example, in the oil and gas industry all the sensors and data points may be generating a 'system normal' response. You don't need to send ▶

all the data that feeds into that to the centre, just simply send the metrics that changed i.e. the delta data.

Edge intelligence means you can consolidate a lot of disparate data from various sources and transmit only the valuable outputs. That saves on transmission cost and also on the cost of storage and its CO2 footprint. Edge computing gives you the ability to look at data, consolidate it, dehydrate it and even get rid of it. Don't forget, a lot of data is ephemeral by nature.

**GM: Decentralised processing offers clear advantages in terms of cutting down on transmission of data and reducing the amount of centralised data storage. Are there other advantages?**

**DR:** Yes, absolutely. Your edge computing conditions are relevant to the situation at the edge. This can be very different from one location to another. For example, a solar farm in Arizona is very different to one in Minneapolis because they operate in entirely different weather conditions. There's nothing environmentally common you can bring to each of those operations, so the data processing has to be decentralised. ▶

**Dheeraj Remella**
Volt Active Data

***The next fundamental technology is edge connectivity***

This makes sense because if you were operating these locations in a centralised way, the centre would have to process data from Arizona that was showing large amounts of generation thanks to uninterrupted sunlight while the solar farm in Minneapolis might be covered in snow. There's no justification for sending this sort of easy-to-understand data to a central processing location. By decentralising, you can distribute the work and do what's relevant where you are and take what you need at the control level.

When I look at layers of intelligence, you have device level intelligence, system level intelligence and organisation level intelligence. The device level has a very singular context – in the case of a solar farm, the data might be: it's cloudy here. At the system level, there are multiple devices operating as a system, so the solar farm might change the angle of its solar arrays to maximise the sunlight it receives. The organisation level contains multiple systems and therefore has the potential to identify something that could be doing harm at the device level.

The organisation level of data intelligence can identify something that is going to cause something to happen somewhere else downstream. A technology that is able to bring all of this data together and combine that with near-past context data, and take appropriate action automatically based on a decision, offers compelling value.

For example, a vibrating drill bit could cause damage when it breaks but a sensor on the machine can measure that data and this data can be assessed against historic data so the system understands when the drill bit will break. It can then arrange for it to be replaced well in advance of failure. To be useful, decisions such as this need to be made in a very low latency manner and you need to find the fastest path to make a meaningful action.

**GM: You talked about decision-making, how is that embedded into the process?**

**DR:** The need here is for real-time decision making. Edge intelligence enables near-instantaneous data analysis, leading to optimised operations and reduced waste in various industries. The usage flow is that the data from the device is processed by near-edge intelligence so only valuable data is transmitted to the cloud/central datacentre. This data is then used to trigger actions and alerts. This process is moving from human-centric to machine-centric and, with 30% of downtime typically caused by human error, customers can save US$1 million per event, depending on what industry they're in. This leads to the evolving needs for decision and event-response automation to depend on human intervention only for anomalies unknown in the past.

**GM: What technologies are supporting this level of automated decision making?**

**DR:** AI and machine learning are underpinning system capabilities. AI looks at data and uses unsupervised learning to understand what is happening and this is where the human-machine interface versus machine-to-machine communication comes in. Machine-to-machine communication doesn't require natural language processing (NLP) – no one cares, they just need the API to be exposed and action to be triggered. In contrast, the human-machine interface benefits from NLP, so the system understands the human's intent.

The next fundamental technology is edge connectivity. The more mission critical the lower the latency and the greater the resilience is required. The 6G radio access network or 5G private networks are critical enablers and for lower volumes of data low power networks such as LoRaWAN are ideal provided they can transfer the data quickly.

We also see messaging technologies like Kafka, streamlining data movement and AI Agents to orchestrate how data is analysed, acted upon and orchestration of event-response chains.

**GM: How does Volt Active Data help here?**

**DR:** When people talk about real-time processing, the traditional approach is to stitch together a composite architecture. The problem with that is that it is disconnected and fractured. So, there's a need to go back and forth between the layers. This causes an increase in latency and more chances for things to go wrong. What Volt has ▶

done is to put all the capabilities needed as features together in a single shell. You can put thousands of inputs together and use machine learning models to derive value by inference on streaming data.

You get adaptive intelligence in a single layer which allows us to have very low latency. Having all of the different layers traditionally interacting is very damaging from a latency point of view and that is our key differentiator.

Every superhero has an origin story. Volt's is that it was created at MIT and Brown University to provide a unified way to process data at scale like NoSQL but without the compromises of the NoSQL database. Volt was made to bring transactional in-memory storage and logic processing and combine that with streaming data patterns.

**GM: The environmental impact of data processing is set to spiral radically upwards. How can organisations mitigate this?**

**DR:** We're seeing some great innovation in this area. The integration of renewable energy with data processing is essential and we're seeing micro-data centres deployed at the edge that can be powered by local renewable energy sources, enhancing sustainability. That ability to harness solar or wind energy locally to power a data centre is a positive development but even more interesting than this is the development of smart utilities to handle how renewable energy can contribute to the grid.

The ability to distribute renewable energy is essential. Every house that has a solar panel can produce electricity and sell it back into the grid but this creates the need to constantly match every flow through the grid from the right producer to the right consumer.

This is a highly complex problem with lots of dynamic considerations to accommodate. It's where edge and regional calculation can come in handy. The challenge is to manage distribution of renewable energy without losing the energy in transit. Renewable energy is generated regardless of demand. If the wind blows, the turbine turns so the challenge for the grid is where can I store or how can I find a user that needs the energy right now. This is a data and capacitive problem that Volt is looking into.

We've been a big proponent of the sense-control cycle, which has now evolved into observe, sense and interact. Real-time visual intelligence is unlocking new applications by enabling machines to see, analyse and respond in real time.

The observe capability is not just to give a way to people to identify a single issue but a means to determine multiple things. For example, in a wind farm, real-time video analytics can continuously monitor turbine blades for structural wear, ice buildup or damage from extreme weather. Using high-resolution cameras and AI-driven analysis, operators can detect cracks, misalignments or debris before they lead to catastrophic failures. Thermal imaging cameras can also identify overheating components, allowing for proactive maintenance to prevent costly repairs and unplanned downtime. By integrating real-time visual intelligence, wind farms can maximise efficiency, improve safety, and ensure consistent energy production. This type of application can be utilised in smart cities, oil and gas and smart airports and we are working in all of these.

We see the industrial IoT (IIoT) sector facing the challenges of enabling sustainable operations. There's a lot we can do here to help come back from the damage that is being done. Automation of processes and sensor hardware enable rapid identification of defects so reducing downtime can be accelerated with less wasted energy and materials. The goal is to be pro-active not reactive and data, processed with minimal latency with edge intelligence and then acted upon, provides the template for optimised operations of the future.

Volt Active Data is engaging with use cases across the globe to address the most difficult data processing challenge of our time: having scale, speed, consistency and resiliency all at the same time. With AI and machine learning, sensor innovations and the benefits of edge and device intelligence, we see a new era of data-enabled automated decision making boosting productivity, reducing waste and improving safety.

***Our customers face several challenges today. While pricing is one issue, those with SIMs at the edge struggle with inadequate experiences***

**www.voltactivedata.com**

# Data decisions at the edge: Smarter, faster and now greener

By 2026 there will be around 91 zettabytes of unnecessarily stored data – that's over four times today's volume. The exponential growth of data is undeniable, and while businesses continue to prioritise efficiency, automation and intelligence through real-time data processing, a new and equally critical priority has emerged: sustainability

Sustainability discussions often centre around reducing emissions, optimising supply chains or transitioning to renewable energy. However, a frequently overlooked factor is how we process and manage data. Traditional, centralised datacentres consume vast amounts of energy, but real-time edge data processing offers an alternative – one that not only reduces environmental impact but also enhances operational efficiency. **Volt Active Data** does this, but more on that later. First – let's look at how intelligent edge data processing gives companies a big advantage.

## Four significant advantages of intelligent edge data processing

### 1. Sovereignty

Data regulations are becoming increasingly stringent, especially in industries like telecommunications, finance and manufacturing, making data sovereignty a growing concern.

Edge data processing addresses this challenge by:

- **Local data control:** Processing data at the edge allows businesses to keep sensitive information within local jurisdictions, ensuring compliance with regulatory requirements and minimising legal risks.
- **Reduced transmission risks:** Companies reduce the need to transmit sensitive information over long distances, thereby lowering exposure to potential breaches and ensuring greater data security.

This localised control not only enhances data governance but also ensures that companies can maintain regulatory compliance without sacrificing performance or efficiency.

***This localised control not only enhances data governance but also ensures that companies can maintain regulatory compliance without sacrificing performance or efficiency***

### 2. Security

With increasing cyber threats, ensuring data security is paramount. Edge computing enhances security by:

- **Reduced attack surface:** Processing data locally reduces the need to send information across networks, minimising the potential for data breaches during transmission.
- **Real-time threat detection:** Volt Active Data's real-time processing capabilities allow businesses to detect and respond to security threats instantly, rather than waiting for batch processing or delayed analytics.

This decentralised approach ensures that businesses can protect sensitive data, detect anomalies as they occur and mitigate risks before they escalate.

### 3. Data immediacy

One of the most transformative benefits of edge data processing is in immediacy – or the ability to process data, make decisions and take actions in real-time.

- **Faster processing:** Data is processed as it's created, eliminating delays associated with cloud round-trips and ensuring that businesses can act before data becomes irrelevant.
- **Industry applications:** In industries like manufacturing, logistics and energy, even a second of delay can mean the difference between optimal performance and costly downtime. Edge processing ensures that decisions are made instantly, enhancing operational efficiency and reducing waste.
- **Automated responses:** With Volt, businesses can trigger automated actions immediately, from adjusting production parameters to flagging security breaches, ensuring that operations remain smooth and efficient. ▶

In a world where data has an expiration date, edge processing ensures that businesses can use data while it's still valuable, driving timely and impactful decisions.

## 4. Sustainability

Sustainability is no longer just a corporate goal; it's a business imperative. Intelligent edge helps with:

- **Energy efficiency:** Processing data locally reduces the energy required for data transmission across networks and the power needed for large-scale data storage in energy-intensive datacentres.
- **Reduced hardware footprint:** Edge processing minimises the need for extensive infrastructure to support data-heavy workflows, reducing both energy usage and environmental impact.
- **Optimised resource allocation:** Real-time analysis at the edge allows businesses to adjust processes and operations dynamically, minimising waste and optimising energy use, particularly in energy management systems.

Better efficiency, optimised resource allocation, and reduced hardware footprint – a win, win, win.

## Data processing and sustainability: Real-world applications and challenges

The poster child for real-time edge data processing as a sustainability enabler is intelligent manufacturing – namely, utilising real-time data from across entire systems to drive holistic improvements in process optimisation,

These other real-world applications highlight how industries can harness edge computing to achieve both business success and sustainability goals simultaneously.

- **Smart grids:** Sensors deployed across power grids collect real-time data on energy usage, enabling dynamic load balancing and optimised energy distribution, reducing waste and enhancing grid reliability.
- **Smart agriculture:** Sensors in farms monitor soil moisture, weather conditions and crop health, enabling precise irrigation and fertiliser application, reducing water usage and optimising yield.
- **Connected vehicles:** Real-time traffic data processed at the edge optimises routes, reduces congestion and lowers fuel consumption, contributing to greener transportation networks.

These use cases highlight edge data processing's power, but there are some challenges with it too, namely:

- **Device limitations:** Edge devices often have limited processing power and storage capacity, requiring careful data selection, efficient processing and optimisation algorithms.
- **Security:** Processing data at the edge increases exposure points, demanding robust encryption, data integrity and real-time threat detection.
- **Network infrastructure:** Reliable connectivity between edge devices and central systems is essential for effective data transmission, especially when real-time insights are critical.

## A sustainable approach - data optimisation at the edge

Volt Active Data's real-time data platform empowers businesses to process and act on data the moment it's created. That means applications that are faster, smarter and more secure. It also means sustainability. This might sound like a leap, but by processing data closer to where it's generated – at the edge of networks, in devices and on-site – companies can transfer to the cloud only the data that needs to be stored, optimise energy consumption, enhance real-time decision-making and make use of the data before it expires. Volt accomplishes this through:

1. **Lightweight, high-performance processing:** Volt's platform efficiently processes large volumes of data on resource-constrained edge devices without compromising speed or accuracy.

2. **Built-in security and data integrity:** With ACID compliance, real-time anomaly detection and secure data handling, Volt ensures that sensitive information is protected at every stage.

3. **Reduced network dependency:** Volt processes data locally at the edge, transmitting only critical insights, ensuring operational continuity even in disrupted network conditions.

Real-time data processing, employed at the edge, is more than just an architectural consideration. It enables businesses to:

- Use data before it expires and lose its value
- Process data, make decisions and take actions that have immediate business impact
- Improve sustainability, security and efficiency across operations
- Optimise processes and operations dynamically based on real-time insights.

At Volt Active Data, we empower businesses to innovate without compromising on sustainability. We believe the right data innovation is sustainable data innovation. ■

**www.voltactivedata.com**

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# Head to the edge for intelligent action

Early phases of IoT depended on cheap, dumb devices communicating sensor data to centralised servers for processing, analysis and ultimately action to be taken. As IoT has scaled up, it's time to optimise the volume of IoT device communication and harness the power of AI and other technologies to enable greater functionality on devices itself. The ability to add greater intelligence to devices at acceptable costs is balanced by the need to cut costs on networking and cloud resources and achieve green goals by reducing the energy consumption of communication and computing. Greater intelligence at the edge has the potential to meet these requirements

***"As attention continues to shift to AI as a step change for business intelligence, we are witnessing many enterprises making meaningful changes through IoT deployments"***

For simple IoT devices the traditional model of communicating data at specific times or, if urgent, continuously has been the central value proposition of IoT. Instead of not knowing if a remote fuel tank is empty or a streetlight bulb is out, IoT enables data to be sent informing organisations that action needs to be taken. However, for huge volumes of other IoT-enabled devices and machines, the data they collect is far more sophisticated.

A sensor on an industrial machine might be able to deduce that increased vibration, higher than normal operating temperature and louder noise are indicative of an upcoming component failure. Not all of this data needs to be communicated all of the time and an intelligent device can parse the data, identify what's important and communicate that or, in other scenarios, take action immediately to protect the machine or preserve uptime.

Decision trees and processes can be streamlined and latency-sensitive use cases can take action rapidly. These benefits are compounded by lower costs, reduced environmental impacts and security benefits.

## AI and greater autonomy

The now accelerating growth in deployment of IoT devices comes at the same time as AI has reignited interest and greater autonomy within IoT devices goes hand-in-hand with the ability to embed greater intelligence at the edge. According to **IoT Analytics**, the number of connected IoT devices was projected to increase by 13% in 2024, reaching 18.8 billion by year-end. 40 billion IoT devices are projected by 2030.

This growth in uptake is backed by research from **Omdia** which cites a significant surge in confidence among enterprises utilising IoT solutions. Enterprises continue to integrate IoT into their workflows while reaping benefits from productivity gains and cost savings, to improved worker safety, the firm says. Its sixth annual survey which included nearly 600 enterprises across ten countries and eight different verticals discovered that 95% of respondents expect to see measurable benefits from IoT within two years of deployment.

"As attention continues to shift to AI as a step change for business intelligence, we are witnessing many enterprises making meaningful changes through IoT deployments," says John Canali, the IoT principal analyst at Omdia. "Business of all sizes can use IoT deployments to make data driven decisions that significantly improve their business outcomes."

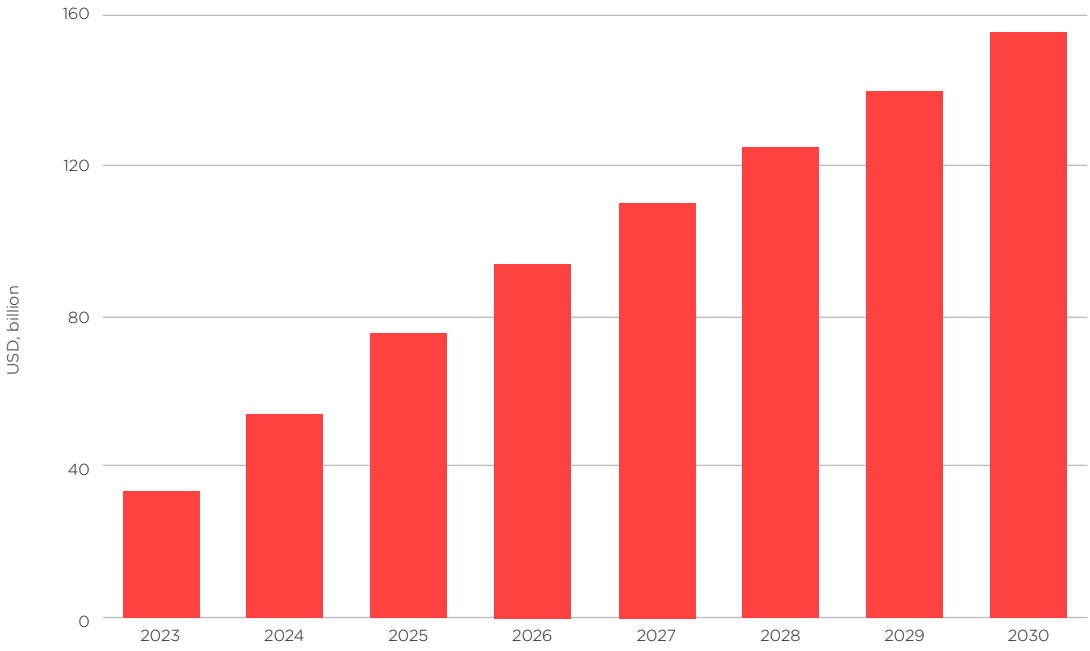
## Avoid complexity

The survey results uncover opportunities for IoT vendors across the value chain but Omdia cautions both vendors and enterprises against adding unnecessary complexity in their IoT strategies. "56% of companies are now investing over US$1 million on IoT in 2024, a significant increase from 36% in 2023," adds Andrew Brown the IoT practice lead at Omdia. "IoT has now reached maturity, fuelled by cloud computing and hyperscale connectivity, delivering tangible benefits in shorter timeframes."

Certainly, the AI use cases that involve edge devices are proliferating. **STL Partners** has conducted analysis of 12 leading edge AI uses and finds that these suggest a total addressable market reaching US$157 billion by 2030. The firm says the proportion of revenue directly attributable to AI will grow from 69% in 2024 to 72% in 2030, as applications become increasingly infused with AI, making the technology integral to the delivery of use cases. Computer vision will be the largest edge AI use case in 2030, representing 50% of the entire edge AI addressable market.

Industrial use cases see edge AI having immense appeal and increasing amounts of richer data will be generated at edge devices which will be able to process and analyse inputs both at the edge and at centralised cloud resources. However, this ▶

**Figure 1: Total edge AI addressable revenue 2023-2030**




Source: STL Partners

will involve huge volumes of sophisticated data so careful handling and approaches to data operations (DataOps) will be necessary.

Knud Lasse Lueth, the CEO at IoT Analytics, comments: "Industrial digital transformation holds immense potential, but 62% of companies face severe challenges, particularly in areas like data management and integration complexity. The emerging field of industrial DataOps is showing promise, offering manufacturers a way to simplify their digital infrastructure and enabling key industrial use cases. We're seeing innovative solutions from both start-ups and large incumbents, signalling that this technology is poised to play a central role in successful digital transformations."

Anand Taparia, principal analyst at IoT Analytics, adds: "Industrial connectivity is evolving beyond just linking industrial systems. It's about creating a data-driven ecosystem. With advancements like DataOps, manufacturers can access and manage data more efficiently than ever, unlocking new levels of productivity and operational intelligence. The global industrial connectivity market is projected to grow from US$89 billion in 2023 to US$104 billion by 2028, with software, especially DataOps, being the fastest-growing segment at 49% CAGR."

## Changing habits

The growth of datacentres is accelerating because of changing digital habits, increased adoption of cloud-based services, AI and machine learning (ML), and cryptocurrency trends as tools businesses use to increase profits and reduce operating costs. According to **ABI Research**, the number of data centres is expected to reach more than 24,000 sites by 2030, with a CAGR of 12%.

Currently, the firm says, businesses are increasingly turning to generative AI to optimise processes. AI applications and training models are estimated to use 10-20% of the datacentre electricity today, a critical concern for grid infrastructure. The resultant rapid need and expansion of the datacentre sector is posing an increased energy demand challenge to the grid, projected to reach 2,477 Terawatt Hours (TWH) by 2030.

"Compute power of power-hungry GPUs and cooling are the most energy-intensive processes within the datacentre, amounting to 80% of the energy demand," explains Rithika Thomas, the Sustainable Technologies senior analyst at ABI Research. "Integrating new retrofit technology into existing datacentre infrastructure and responsible compute are critical to reduce demand on the grid, restrain the surge in energy demand, and limit Scope 1-3 emissions."

## Sustainability targets

Reducing the environmental impacts of datacentres is crucial for sustainable digital transformation, supporting climate change mitigation and adaptation efforts. Efforts are being made to create greener datacentres by assessing their power sources and cooling needs. Moving to renewables and adopting new approaches go some of the way to mitigating the impacts.

"By establishing green building standards, incentivising the use of renewable energy sources, regulating the use of cooling refrigerants and supporting efficient e-waste management practices, governments are pushing the concept of sustainable datacentres to optimise operations, reduce costs and mitigate climate risk," confirms Thomas. "Achieving Net Zero for datacentres is a continuous journey rather than a final destination."

Enhancing the efficiency of the data centres themselves isn't the only lever organisations have to pull. By doing more data processing and enabling distributed AI at the edge, less traffic travels to the data centre for centralised processing, taking strain off the network and reducing potential wastage of resources.

# Hannover Messe will cover all the key industrial comms angles

At leading industrial trade fair Hannover Messe, held in Hannover, Germany, over 4,000 companies from the mechanical engineering, electrical engineering and digital sectors, as well as the energy sector, will come together to present solutions for a high-performance, well-connected, and sustainable industry, reports Antony Savvas.

The event at the Messegelände will take place on 31 March to 4 April 2025, and is expected to attract well over 130,000 on-site attendees to listen to over 1,600 speakers and visit over 4,000 exhibition stands. Over 14,000 products and solutions will be on show, and 300-plus startups will also be in attendance


## 5G and industrial wireless

The 5G & Industrial Wireless Arena at the show is a central innovation hub for industrial communications. The arena will offer over 40 exhibitors, an informative stage programme, and offers suppliers and users a platform for networking, new partnerships and "forward-looking business models", say the show organisers.

"Wireless communication systems, such as 5G/6G technologies or LoRaWAN, are key drivers of digitalisation and automation in industry. They enable flexible, scalable and customised networking solutions that form the basis for smart manufacturing and the Industrial Internet of Things (IIoT)," the organisers add.

The 5G & Industrial Wireless Arena is supported by **VDMA** and **ZVEI**, and will be located in Hall 14. "The enormous response in 2024 showed that the 5G & Industrial Wireless Arena is the leading platform for industrial wireless communication," says Miriam Solera, managing director of VDMA wireless communications for machines (WCM).

Leading exhibitors here in 2025 include **Siemens**, **Fraunhofer**, **Logicalis**, **5G-ACIA**, VDMA WCM, **Steute**, **Huawei** and **IMEC**.


## Robotic applications

Today, modern robotic systems perform high-precision tasks that could previously only be carried out by humans. Artificial intelligence is making them increasingly flexible and enabling them to perform complex tasks that raise efficiency and productivity in industry to a new level.

The show's "Application Park - Robotics. Logistics. Automation." section offers a platform for experts to get to know "pioneering developments" in these areas.

Intelligent robot systems, autonomously driving devices, AI applications, image recognition tools, and more will be presented. With over 30 exhibitors, the Application Park offers a platform that seeks to make technical visions "tangible" and bring visitors closer to the potential of modern robotics.

The three nominees for the Robotics Awards 2025, from Germany, Canada and Belgium, will also present their submitted solutions here.

## Embedded

The Embedded Park in Hall 9 will cover embedded components and software at the edge and across the electronics industry. Visitors can also get a useful overview in the integrated Speakers Corner, getting first-hand expert knowledge and direct contact with leading companies in the industry.

Visitors are being promised insights into the latest technologies and best practices, offering them inspiration for their own projects through "concrete application examples".


## Quantum

Attendees can also find out how quantum technologies are set to revolutionise industry. The potential of quantum computers, secure quantum communications, and precise quantum sensors will be "brought to life" at the Quantum Technology pavilion. Visitors will be able to exchange ideas with leading experts, companies and innovators to discover new business opportunities and collaborations.

Areas of application and potential to be covered at the Quantum Technology pavilion include:

- **Production:** optimise complex processes with quantum algorithms that work faster and more precisely than ever before
- **Material development:** Use quantum simulations to explore innovative materials and chemical processes
- **Communication:** Implement quantum cryptography for "completely tap-proof" data transmission
- **Sensors:** Achieve higher precision accuracy in measurement and navigation systems ▶

## Cybersecurity


***Growing threats are exacerbated by talent shortages and cost pressures***

Newer technologies such as AI, cloud computing, data analytics, 5G, and blockchain are not only driving industrial transformation, but also becoming prime targets for cyber criminals.

Hannover Messe promises to to put a focus on the topic of IT/OT security, with leading developers in the field showcasing solutions to address both current and future cyber threats. As the integration of information technology (IT) and operational technology (OT) continues to expand across global industry, the rise of the Industrial Internet of Things (IIoT) also threatens to escalate cyber risks.

Key players in cybersecurity, including the German Federal Office for Information Security (BSI), and the German Cybersecurity Organization (DCSO), alongside companies including **Eye Security**, **Infodas**, **Rhebo** and **Secunet**, will be present in the Industrial Security Circus arena in Hall 16. They will outline the threats, as well as offer some of the solutions to mitigate them.

Marcel van Asperdt, chief information security officer at Eye Security, who will speak on the Industrial Security Circus stage, says growing threats are exacerbated by talent shortages and cost pressures. "Affordable solutions are essential, especially for small- and medium-sized enterprises," he says. "Continuous security monitoring combined with cyber insurance cover offers the best protection." That said, cyber insurance is not cheap, and it isn't getting any cheaper. So no doubt that will be a talking point at the show too.

Rhebo is a player in industrial network cybersecurity, with its attack detection system for OT. Uwe Dietzmann, the company's sales manager, describes cybersecurity as a "key competitive factor" in the European Union, particularly against the backdrop of new cybersecurity laws like NIS-2 and the Cyber Resilience Act. "Visitors to the Industrial Security Circus can look forward to the most sophisticated and powerful OT security portfolio on show, from OT core to IIoT edge, and from initial risk assessment to the operation of an attack detection system," promises Dietzmann.

The NIS2 directive, which came into force in October 2024, establishes a unified legal framework to uphold cybersecurity in 18 critical sectors across the EU, and applies to all companies doing business in the EU region, including managed service providers.

Eye Security's Van Asperdt highlights the urgency of complying with NIS-2, predicting that adherence to the new cybersecurity law will be "challenging". He says: "NIS-2 will significantly tighten cybersecurity requirements, even for companies not directly affected. Companies acting now will strengthen their resilience, protect supply chains, and avoid costly, last-minute upgrades. Waiting is not an option – attackers don't adhere to deadlines."

As mentioned, Germany's BSI is also contributing to the debate. Jens Kluge from the BSI's Department C 25 – Industrial Control and Automation Systems, says: "Only by collaborating with industry and academia can we tackle the challenging tasks. At Hannover we will showcase our specific solutions in the areas of AI, industrial security, and cloud security, as well as collaboration opportunities like the Alliance for Cybersecurity."

The BSI will also promote the Common Security Advisory Framework (CSAF), a solution designed to deliver enhanced cyber resilience. "We developed this standard in collaboration with international partners," Kluge says. Both the CSAF standard and its freely available tools are intended to evolve continuously, contributing to the long-term development and maintenance of safer nations.

## Startups

Over 300 startups will take an active part in the show. The Startup Area in Hall 2 is a central meeting place for young companies, established companies and investors. Pitches, presentations, master classes and networking events will create a platform for information exchange and cooperation.

The Startup Area offers numerous side events that specifically promote the exchange between startups and established companies. A special attraction is the Industrial Startup Stage, where young firms can present their ideas and products. "You can look forward to exciting pitches, inspiring presentations, and lively discussions on the topics of startups, innovation and networking," the organisers say.

In addition, startup products and services will also be found in other exhibition areas, such as Digital Ecosystems, and Energy for Industry, for instance. ▶

## Exhibitors

A taste from the many exhibitors at the show comes from **Volt Active Data** and **CONTACT Software**.

"We will be engaging with industry leaders around pragmatic ideas on how real-time edge data processing and decisioning drives sustainability and operational efficiency," says Caroline Long, EMEA and APAC marketing director at Volt Active Data. By "pragmatic", Volt Active Data means things like:

- **Reduced network traffic:** Local data processing lowers energy usage by minimising long-distance data transfers
- **Optimised resource utilisation:** Edge analysis enables efficient resource allocation and minimises waste in applications like energy management
- **Real-time decision-making:** Faster responses to changing conditions improve operational efficiency and reduce downtime
- **Lower carbon footprint:** Reducing datacentre loads through local processing decreases overall energy consumption

So how does Volt Active Data see the market currently? Long says "real-time" is now "table stakes", there is "growing demand" for sustainable digital transformation and real-time operational insights, and that edge data processing offers a "practical path to sustainability" without "sacrificing performance".

And what is Volt Active Data looking to get out of the event? "We want to create awareness of how intelligence at the edge can address multiple objectives, such as process efficiency improvement, sustainability goals, improved security, and predictive operations," Long says. "We also want to connect with industry partners and explore collaboration opportunities."

She adds: "Hannover Messe is a premier platform for the industrial internet of things, and the 2025 theme around sustainable technologies and industrial transformation aligns with our mission to help industries process data smarter, faster, and greener."

CONTACT Software says it will showcase how companies can accelerate their digital transformation with "seamlessly connected processes" and artificial intelligence.

CONTACT Software will seek to demonstrate how companies are able to speed up processes and empower data-driven decision-making through intelligent connectivity. Visitors, it promises, will experience the interaction between cloud-based PLM and IoT solutions, and industrial AI applications. The company will also offer "proven best practices" to "future-proof" their business models, and "enhance" cost and resource efficiency, and achieve "lasting competitive advantages".

CONTACT says it will bring this vision to life with a digitally connected racing team, showcasing how companies can increase their value creation across the entire product lifecycle. Visitors can take the wheel of an electric race car on a virtual track and discover through real-time operating data how PLM, IoT, and AI can work "seamlessly together" within the CONTACT Elements platform.

CONTACT Elements includes over 50 "flexibly combinable" software modules that enable companies to connect their IT systems with the Internet of Things to create end-to-end business processes – both on-premises and in the cloud.

The spotlight will be on the swift integration of digital solutions to use data more efficiently throughout a company. The three central topics of digital engineering, smart manufacturing, and management intelligence will be covered, and will be used to illustrate how end-to-end data-driven processes can accelerate a comprehensive digitalisation strategy.

With Hannover Messe covering all the emerging and evolving industry sweet spots of 5G/6G, IIoT, Industry 4.0, digital twins, AI, quantum computing, robotics, cloud security standards, and many other topics, there is certainly something for everyone at the show.

Hannover Messe 2025 will take place on Monday 31 March to Friday 4 April at the Messegelände, Hannover, Germany.

## Conference programme

There is a full conference programme across various halls, with many hundreds of speakers ready to give their views on a variety of key industry topics, including:

**DIGITAL TRANSFORMATION STAGE:**
"Industrial transformation and progress: Digital and sustainable. Flexible and efficient."
**Hall 17, booth E44**

**ENERGY TECHNICAL FORUM:**
"Engineering robust energy infrastructures."
**Hall 13, booth E68/9**

**EMBEDDED PARK AND SPEAKERS CORNER:**
**Hall 9, booth F76**

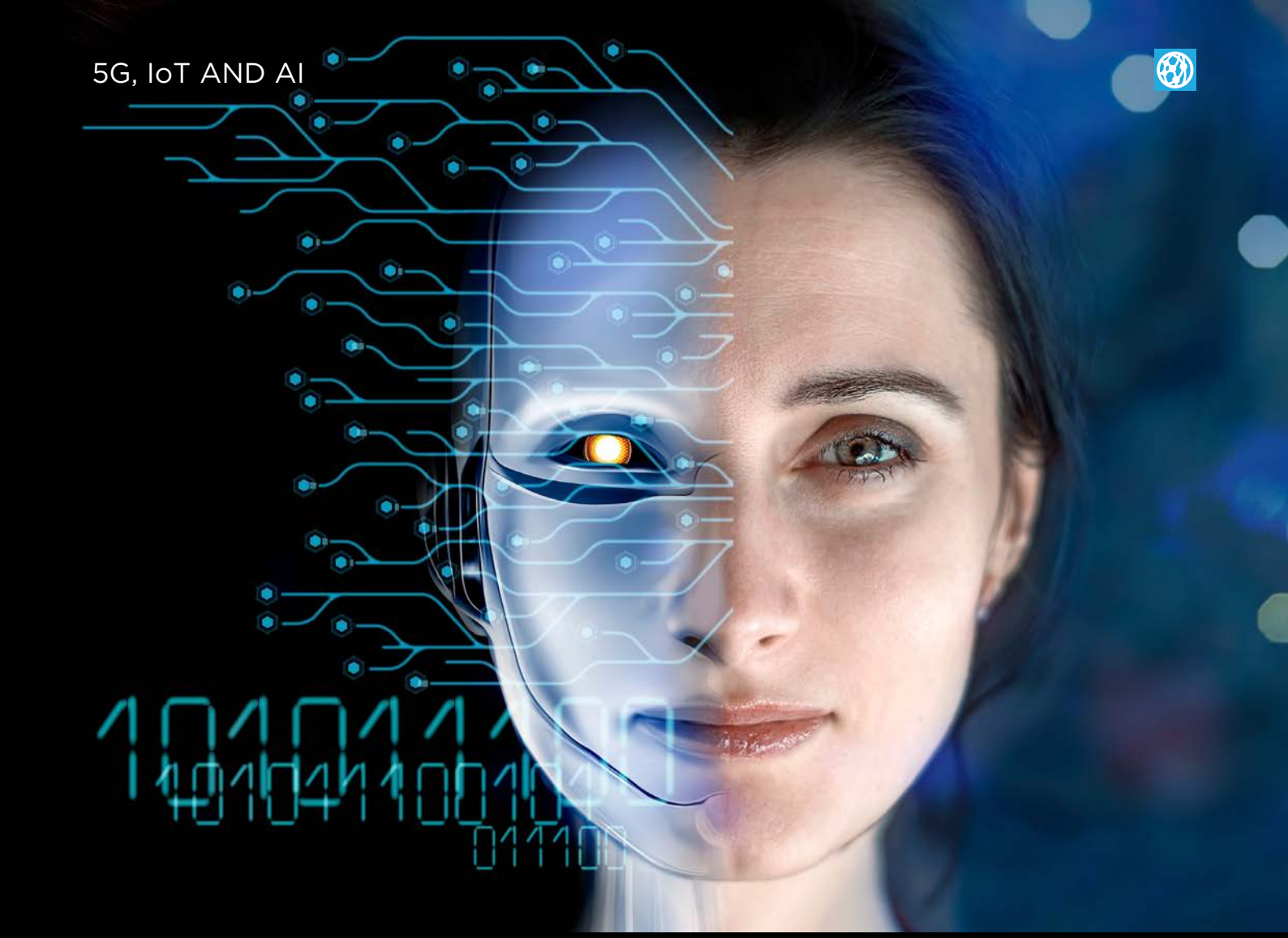
**INDUSTRIAL STARTUP STAGE:**
**Hall 2, booth D10**

**INDUSTRY 4.0 STAGE:**
"Topics and trends in networked production and digitisation."
**Hall 8, booth D17**

**INDUSTRIAL SECURITY CIRCUS STAGE:**
**Hall 16, booth A12**

**ROBOTALK: APPLICATIONS AND INSIGHTS:**
"The Future of Automation starts here."
**Hall 6, booth D51**

**TRADE AND INVEST STAGE:**
**Hall 12, booth B68**



# The dynamic convergence of 5G, IoT and AI

The merging of artificial intelligence (AI), Internet of Things (IoT) and 5G is driving intelligent connectivity while also providing transformative opportunities for virtually every sector and shaping the rapid evolution of our digital economy. These technologies are each powerful on their own but when working in tandem, they create efficiencies, fuel innovation and further enhance new applications, writes Laurent Laisney, a senior industry strategist at Teradata

Looking at 5G adoption in particular, while it has been slower than expected, these networks will lead by the end of the decade offering flexible infrastructure that's critical to support IoT. With more organisations looking into innovative ways to use these technologies together, it's apparent that strong data governance must play a critical supporting role. Having a strong data and analytics platform acting as the glue that holds these technologies will help companies to unlock true value and new potentials.

## The development of 5G

Although AI and IoT have already progressed significantly, improving the telecoms sector, we have yet to witness the full potential of 5G. So far, it hasn't lived up to its promise to reform how we work and play. This leads to the debate on whether 5G was overhyped, or if have we just been expecting too much too soon. To explore this further, let's take the following two facts about the technology into consideration. ▶

Firstly, it's still early in the evolution of 5G. There's still much to do to build out the infrastructure. This is supported by **GSMA**'s annual Global Mobile Economy Report which highlighted that 5G connections make up only about 20% of total connections. Not only that but they're not expected to overthrow 4G's predominance until 2028. This means that 5G won't make up the majority of connections until the end of the decade – although, it will surpass five billion connections at that time.

Secondly, providing fast connections to end users was never the only objective of 5G. The broader motivation is to develop stronger, more flexible and configurable communications infrastructure - exactly what IoT needs. Only by using 5G networks can we have the capacity and capability to link millions of smart devices such as sensors, cameras and robots. It provides us with the opportunity to add intelligence to the plethora of systems in use - from optimising network management and traffic to predicting potential system overload. Therefore, to ensure these connections are accomplished in an efficient and seamless manner, telecommunications service providers, specialist integrators and individual businesses should invest in public and private 5G networks.

## Unlock data-driven insights

While the convergence of 5G, IoT and AI will provide benefits, it's worth considering how to govern the vast amounts of data that would result from this. Intelligent devices benefitting from 5G, IoT and AI accumulate and share myriads of data – data that must be managed and used effectively to drive decision-making. Therefore, in order for companies to be able to unlock valuable insights, they will firstly need to create a robust data foundation to deploy data analytics and AI at a significant scale.

To illustrate how these technologies will support the telecoms sector, for example, let's look at a few emerging use cases:

- **Improved connectivity and speed:** 5G technology provides much faster data transfer speeds and lower latency compared to previous generations. When paired with IoT, data from millions of IoT devices can be transmitted, processed and analysed much faster and more efficiently. AI can then optimise network management and traffic routing to increase speed and reduce congestion, improving the overall user experience.

- **Enhanced network management:** AI algorithms can manage and optimise network traffic more efficiently. It will also help in predicting traffic patterns and potential system overload, allowing telecoms operators to allocate resources efficiently. As a result, it reduces the chances of network outages and ensures stable connectivity for users.

- **Dynamic data analytics:** IoT devices generate huge amounts of data. AI can analyse this data in real-time, offering insights that can be used for predictive maintenance, efficient energy management and so on. This not only helps in refining such services but also in identifying new opportunities while also improving customer satisfaction.

It's worth noting again that without efficient data governance to create synergy among the three frontier technologies, companies will not be able to experience any valuable results from their efforts.

Technology providers play an important role in providing the right data and analytics solutions companies need to use 5G, IoT and AI to innovate and grow. For example, enhanced microservices that live within cloud analytics and data platforms for AI can enable customers to load data from 5G networks that monitor key performance indicators and predictions from the 5G core network.

As 5G networks continue expanding worldwide, more businesses are looking to explore the value of public and private 5G networks as part of a wider digital adoption. As seen above, the powerful triad has the potential to improve and modernise many existing processes to automate, create efficiencies and drive productivity. To ensure these efforts do not go to waste and instead help companies gain valuable insights, it's important to ensure there's a strong data architecture that holds them together. Collaborating with reliable technology third parties that understand a business's unique journey is therefore imperative in successfully using AI, IoT and 5G to further innovate and gain competitive advantage.

***Technology providers play an important role in providing the right data and analytics solutions companies need to use 5G, IoT and AI to innovate and grow***

# How to maximise datacentre uptime while minimising CO2 emissions

The datacentre sector is experiencing unprecedented pressure from a number of directions. Customers are demanding the highest levels of performance and sustainability, alongside financial, environmental and political pressure to improve energy efficiency. At the same time, recent growth in the demand for datacentres is set to accelerate further with increasing investment in AI infrastructure, and growing concern about a lack of capacity in AI-ready datacentres. Anu Kätkä, an expert in environmental monitoring and control from Vaisala, explains how datacentre companies can respond to external pressures by utilising the latest measurement technologies to optimise both energy efficiency and operational uptime

***The control of heating ventilation and air conditioning (HVAC) systems can only be as accurate and precise as the sensors upon which they depend***

Datacentres account for at least 1% of global electricity consumption, so notwithstanding escalating energy costs, and in the context of climate change, it is essential that datacentres are able to optimise their energy efficiency and reduce CO2 emissions.

Up to 40% of energy consumption in datacentres is used for cooling and air conditioning. So, reduction in energy use for these purposes will help to improve energy efficiency. However, the performance of computers and servers in datacentres can be adversely affected if there is insufficient cooling – overheating can cause IT equipment to fail, resulting in significant and costly downtime. A fine balance therefore exists between minimising the energy consumption of cooling operations and maximising the uptime of IT equipment. This is why accurate, reliable sensors play such an important role.

The control of heating ventilation and air conditioning (HVAC) systems can only be as accurate and precise as the sensors upon which they depend. If the measurements are inaccurate, the output of the building management system (BMS) controller will also be inaccurate. If a poor-quality sensor gives an incorrectly high temperature reading, the controller will react by over cooling and thereby increasing energy costs and emissions. If the same sensor gives an incorrectly low reading, cooling will be insufficient, which can lead to IT equipment working inefficiently or even breaking down.

## Measurement stability

It is important to remember that measurement precision is not just about accuracy at the time of installation. All sensors drift over time, to a greater or lesser degree, so measurement stability is vitally important. Some sensor suppliers claim very high accuracy, but they may not have high stability, which means that measurements from these sensors will damage energy efficiency, even after a short period. Good-quality sensors provide accurate measurements that remain accurate in the long term. By ensuring the controller has accurate inputs it is possible to precisely control indoor conditions and optimise energy efficiency.

Highlighting the importance of sensor accuracy, **Vaisala** participated in a simulation based on three real datacentres in Europe, and found that a setpoint temperature difference of just 1°C (resulting from imprecise sensors) could increase annual energy usage by as much as 8.5%.

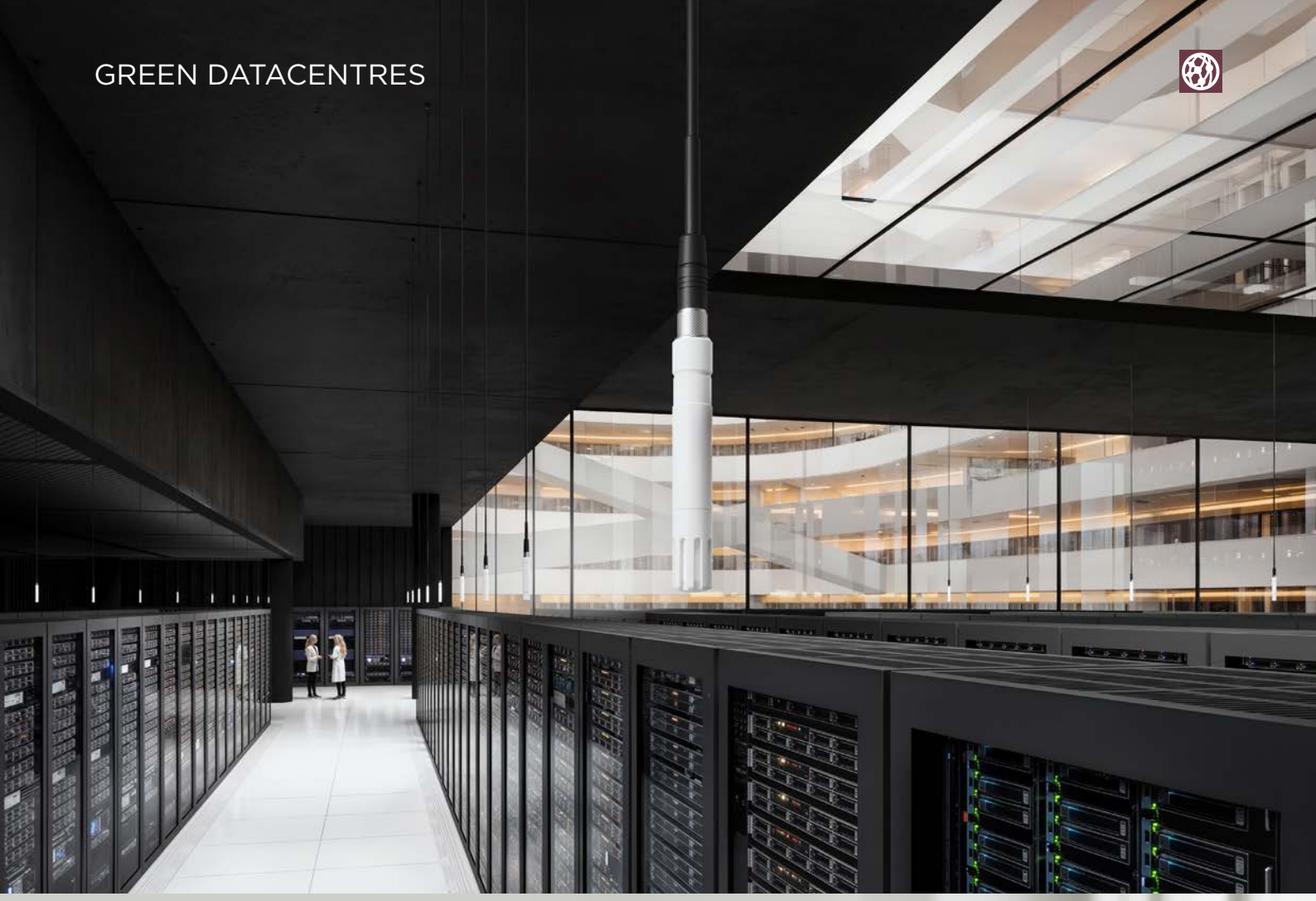
An important point to note here, is that the cost of high-quality sensors is insignificant (and almost non-existent) in comparison with both the energy efficiency that they enable and with the value of the IT assets that they help protect.

## Take advantage of weather forecasts

By anticipating upcoming hot weather, datacentres can use predictive cooling to avoid early chiller startup, make optimal use of free cooling and reduce chiller operating hours. This proactive approach translates into further energy savings and a lower carbon footprint.

## Change sensors to reduce emissions and cabling

Typically, the internal environments of datacentres are monitored by hundreds or even thousands of sensors, and each instrument needs a connection with the BMS controller so that it can report the measurement values. Sensors with analogue signals require a dedicated cable from each sensor to the controller. However, if operators can switch to a fieldbus connection it becomes possible to daisy-chain the instruments so that only one cable is needed, and thereby dramatically reduce the cabling requirement. ▶



For example, a 100-metre aisle with 30 instruments, each with dedicated cables spaced three meters apart, with a three-metre cable drop, would require 1695 metres of cable weighing 110kg. However, in stark contrast, a fieldbus communication protocol would allow sensors to be daisy-chained, requiring just 187 meters of cable, weighing just 12kg. That amounts to 89% less cabling, which leads to more efficient power distribution and lower energy losses; reducing energy consumption and lowering CO2 emissions.

## How to choose a sensor provider

Most reputable businesses are looking to lower their greenhouse gas emissions – in their own processes, in the use of their products, and in their supply chains. Consequently, when choosing sensors, it makes sense to look for a provider with a sustainability focus. For example, Vaisala's instruments are produced using renewable electricity and the company has set science-based targets for reducing emissions.

## Uptime is non-negotiable

Both temperature and humidity levels must be very carefully maintained to achieve the uptime requirements of large datacentres. However, larger data halls can be more challenging to monitor because they have a greater potential for temperature variation - meaning it's important that there are sufficient numbers of temperature sensors to ensure that all servers are monitored. In addition to the temperature issues discussed above, IT equipment is also adversely affected by humidity. Low levels increase the risk of static electricity, while high levels of humidity can result in condensation, both of which can damage delicate equipment. Datacentres often have no maintenance workers onsite, so equipment reliability is crucial.

With Vaisala equipment currently operating on the planet Mars, the long-term reliability of Vaisala sensors in remote locations is beyond question. In addition, Vaisala has developed portable reference probes so that datacentre maintenance staff can perform a quick calibration check on installed sensors. Vaisala equipment does not therefore need to be sent offsite for calibration, and service staff do not need to bring large amounts of equipment onsite – a useful feature for remote locations.

Accurate, stable sensors, weather forecast utilisation, daisy chaining with fieldbus connectivity, and sustainability-focused supply chains all contribute to operational reliability and therefore uptime, whilst also minimising CO2 emissions. ■

**Anu Kätkä**
Vaisala

# Fixing the IoT security mess – IMC makes its move

The red-flag warnings sound all too familiar and come from various, reputable sources. The number of cyber-attacks on IoT devices more than doubled in 2024 over the previous year. More than a third of all distributed denial of service (DDoS) attacks are now directed at IoT devices. Multi-Tbps DDoS attacks are now commonplace. Nation-state bad actors are engaged on the playing field. The cost of a single, average IoT-device breach is now north of U$300,000, writes Keith Kreisher, the executive director of the IoT M2M Council

***It's also worth noting that the cost of cyber-insurance is high and getting higher – one thumbnail estimate sets a US$10 million policy at US$250,000 annually***

As someone who's been hanging around the IoT sector for more than ten years, I can say with confidence that interest in IoT security has tended to lag other, sexier developments, like new connectivity models, edge compute and hyper-scaled cloud platforms. The old adage is, "Everybody wants cybersecurity, but nobody wants to pay for it." That's about to change fast.

## Tectonic shifts in the IoT security landscape

The biggest single change in how industry experts are perceiving IoT security comes in the form of government regulations. That includes the CRA and RED in Europe, the Cyber Trust Mark in the US, and the PSTI in the UK, to name just a few. In Europe, the new regs have real teeth, with potential penalties of up to 2.5% of global revenues for violators. Most of these regulations are based on combinations of ETSI and NIST standards and most concentrate largely on IoT devices or last-mile, in-the-home topography.

Fragmentation and specialisation among standards development organisations (SDOs) means that relatively few SDO's are covering all fundamental layers of the IoT stack, like mid/long-range networks and cloud/app platforms. And crucial elements of IoT security, like software bill of materials (SBOM) management, are getting ignored. Finally, current standards require that those deploying IoT technology must be impervious to various kinds of attack, but they offer IoT suppliers and adopters almost no advice on how to make that happen.

While this is going on, hackers are upping their game. "Living Off The Land" (LOTL) attacks now seek to control administrative tools and camouflage malicious activity while masking their activity with typical network behaviours, ultimately acting themselves as network administrators. Everything has an AI angle these days and IoT security attacks are no exception. AI technology can automate the process of scanning for device vulnerabilities, allow for real-time adjustments that sharpen incursions, and provide behavioural analysis to maximise damage and cover tracks.

It's also worth noting that the cost of cyber-insurance is high and getting higher – one thumbnail estimate sets a US$10 million policy at US$250,000 annually. And those policies may not indemnify against breaches if cyber-hygiene is not maintained (see SBOMs). Who carries the liability for all of this? Depending on conditions and contractual agreements, it may be any combination of the IoT solutions provider, the adopter or both.

## A global initiative with a new, holistic approach

There are glimmers of light amidst all of this dreariness. Recent surveys done by my organisation – the **IoT M2M Council** (IMC) – shows that a strong majority (over 70%) of IoT solutions providers are viewing security as a revenue opportunity, perhaps for the first time. The key, as always, will be for IoT adopters that are buying the technology to accept this as a cost of doing business. New regulations, penalties and other liabilities will no doubt help to clarify the situation, but we still need answers.

That's why the IMC and the **Global Certification Forum** (GCF) have now formed a Joint Task Force on IoT Security – a working group that will evaluate the feasibility of an IoT security certification program that covers all layers of the IoT stack and, hopefully, streamlines compliance on a global scale. Group consensus is that this holistic approach – backed by a standards set with prescriptive advice – is required for a certification that truly adds value for product makers, developers and enterprise users, as well as solutions providers.

The project brings together the largest worldwide certification body for communications devices – the GCF – with the largest trade organisation dedicated to the global IoT sector – the IMC. The former brings deep understanding of the global ecosystem for testing and certification – not just ▶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The author would like to thank the following individuals for their contributions to this position paper: Ellen Boehm (SVP IoT, Keyfactor), Thami El Idrissi (Strategy Director, Eurofins), Syed Z Hosain (Founder, Aeris), Enrico Milanese (Head of Product Security, Telit Cinterion), Sri Ramachandran (CTO, Somos), Harald Remmert (CTO Cellular, Digi), Markus Soppa (Managing Director, filancore).

for devices but also for networks and cloud/app platforms. The latter brings the expertise of its Sustaining/Board companies and an awareness platform to reach 28,000 qualified IoT adopters worldwide, covering 30 different vertical markets of applications.

Work conducted by the IMC-GCF Joint Task Force on IoT Security is non-binding and companies that have already agreed to join the JTF include **Aeris**, **Anritsu**, **AWS**, **Cisco Systems**, **DEKRA**, **Digi International**, **Element Material Technologies**, **Eurofins**, **filancore**, **Finite State**, **Giesecke + Devrient**, **Globalstar**, **Keyfactor**, **Keysight**, **MultiTech**, **QUALCOMM**, **Quectel**, **Rohde & Schwarz**, **Samsung Eletronics**, **SGS, Somos**, **Tartabit**, **Tata Communications**, **Telefonica**, **Telit Cinterion**, **Thales**, **TUV**, **Verizon** and **Vodafone**.

The Joint Task Force held its first (online) meeting in early February, and its first working meeting took place on 10 March in a hybrid (live/online) format, from the fairgrounds in Nuernberg, Germany on the eve of the **Embedded World** exhibition. The JTF has already divided into three tracks that will separately (but interdependently) examine the project's Technical Scope, Business Modeling, and Testing Models/Procedures. A series of regular, roughly monthly, online meetings will occur throughout 2025, with an eye towards drawing conclusions that can be ratified by both the IMC and GCF at the end of the year.

The project ahead is enormous and big questions remain. To what extent can the effort use existing, public-domain standards? Where are possible gaps in those standards? Is it possible to capture all layers of the IoT stack in a single standards set? Can such an effort be automated? How would such a standards set be curated? The answers will be the work of the new IMC-GCF Joint Task Force on IoT Security. Wish us luck!

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To get more information on the IMC-GCF Joint Task Force on IoT Security, please go to **https://www.iotm2mcouncil.org/imc-gcf-joint-task-force-on-iot-security/**

# Our pick of the IoT industry's upcoming events

**TMC Annual Meeting & Transportation Technology Exhibition**
9-12 March 2025
Orlando, Florida, USA
**https://www.iot-now.com/event/tmc-annual-meeting-transportation-technology-exhibition/**

**Embedded World 2025**
11-13 March 2025
Nuremberg, Germany
**https://www.iot-now.com/event/embedded-world-2025/**

**Hannover Messe 2025**
31 March - 4 April 2025
Hannover, Germany
**https://www.iot-now.com/event/hannover-messe-2/**

**DTX Manchester 2025**
2-3 April 2025
Manchester, UK
**https://www.iot-now.com/event/dtx-manchester-2025-the-norths-biggest-digital-it-event/**

**National Cyber Security Show**
8-10 April 2025
Birmingham, UK
**https://www.iot-now.com/event/national-cyber-security-show/**

**LogiPharma 2025**
8-10 April 2025
Lyon, France
**https://www.iot-now.com/event/logipharma-2025/**

**GITEX AFRICA**
14-16 April 2025
Marrakech, Morocco
**https://www.iot-now.com/event/gitex-africa-2/**

**Intelligent Manufacturing Kuala Lumpur**
14-16 May 2025
Kuala Lumpur, Malaysia
**https://www.iot-now.com/event/intelligent-manufacturing-kuala-lumpur/**

**The Battery Show Europe**
3-5 June 2025
Stuttgart, Germany
**https://www.iot-now.com/event/the-battery-show-europe/**

**Intelligent Automation North America**
4-5 June 2025
Santa Clara, California, USA
**https://www.iot-now.com/event/intelligent-automation-north-america/**

TRANSFORMA INSIGHTS

Global Advisors on IoT, AI and Digital Transformation

Every year Transforma Insights publishes its list of IoT 'Transition Topics' highlighting where we expect to see seismic change occurring during the year. This year the list focuses on the application of Artificial Intelligence to IoT, network technology transitions, changing commercial dynamics and the growing impact of IoT regulations.

## Transforma Insights 2025 IoT Transition Topics

- AIoT
- Management and orchestration of Distributed AI
- eSIM orchestration vs connectivity reseller
- Monetising 5G (particularly SA) with IoT
- Decision points and pivots in support for LTE, NB-IoT and public LoRaWAN
- Satellite IoT and likely disruption
- Impact of regulations on delivering IoT solutions
- Geopolitics and polarisation of markets
- Verticalisation of IoT
- Market segmentation, channels and partner programmes

To learn more about the Transition Topics, you can find more details in our press release: transformainsights.com/news/transition-topics-2025

The Transition Topics will form the basis of a significant part of the research agenda for the Transforma Insights Advisory Service in 2025, as well as sponsored Position Papers and Virtual Briefings. To learn more about our 2025 Research Agenda, or to discuss sponsorship opportunities, please contact us at enquiries@transformainsights.com

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