



engineerIT

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February/March 2025

FOR ENGINEERS, TECHNOLOGISTS, TECHNICIANS AND ICT INDUSTRY DECISION-MAKERS

COVER STORY:
Wojtek Piorko, Vertiv MD,
on meeting AI's
power demands

Parallel universes:
Fact or fiction?

The top cyber
threats for 2025

Future tech:
life in 2040



VERTIV™

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IBC ICYM: SNIPPETS FROM OUR WEEKLY NEWSLETTERS

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A VOICE FOR:



FROM THE EDITOR'S DESK

As we enter March 2025, I feel like the world isn't just turning – it's spinning. As the USA and Ukraine barter over Rare Earth Elements and AI gets closer to sentience by the day, we're in constant flux, seeing daily headlines that seem to belong in a futuristic space opera rather than the real world.

Well, at least it makes for some engaging journalism...

As I take on the role of Editor at *EngineerIT*, I'm excited to continue bringing you the news, opinions, innovations and insights propelling progress in our often surreal climate of constant change.

In this issue, we have curated forward-thinking perspectives from some of the top minds in information technology, telecommunications, and engineering.



When the Tailor makes a slight typo on the "Battle Gear" prompt

Wojtek Piorko, Vertiv's MD for Africa, shares lesser-known facts about power-hungry data centres.

Our former Editor and current Editorial Board Member, Hans van de Groenendaal, provides all the information engineers need to comply with ECSA standards.

We also examine the top cyber threats to watch this year and explore one of science's biggest questions: *Are parallel universes just a theory, or is there more to them?*

And finally, a very happy birthday to our Editorial Board Member, Chris Yelland, who turns a youthful 71 this month.

So, welcome aboard. There's no shortage of fascinating discussions ahead. I'm looking forward to keeping our readers engaged, informed and entertained.



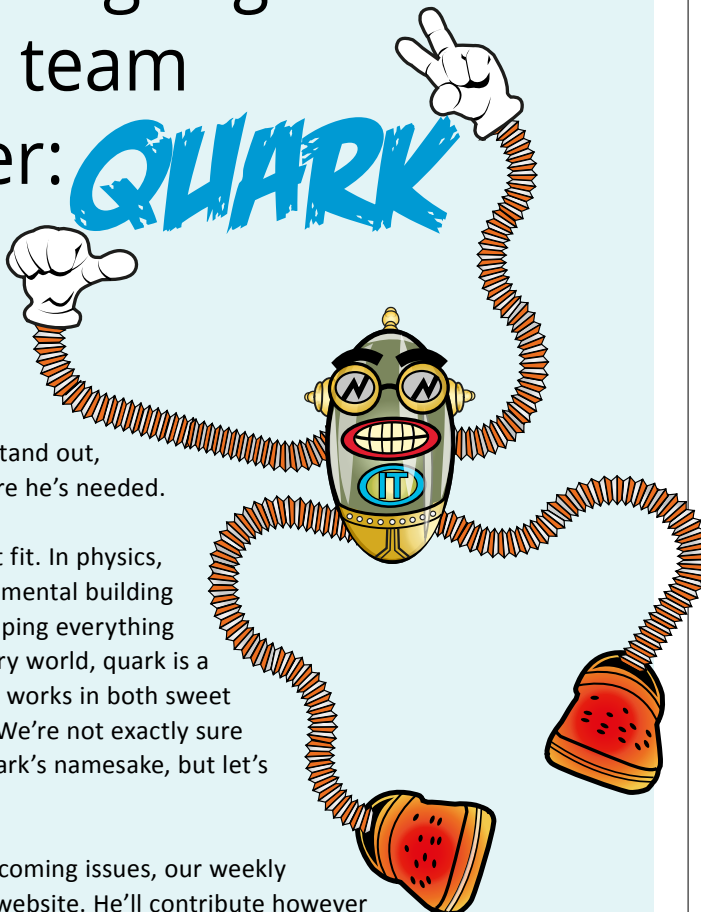
Justin Render
Editor, *EngineerIT*

Introducing *EngineerIT*'s newest team member: **QUARK**

Say hello to Quark, *EngineerIT*'s resident robot and "hack of all trades." Whether supporting the editorial team or helping advertisers stand out, Quark is always where he's needed.

His name is a perfect fit. In physics, quarks are the fundamental building blocks of matter, shaping everything we see. In the culinary world, quark is a versatile cheese that works in both sweet and savoury dishes. We're not exactly sure which of these is Quark's namesake, but let's hope for the former.

Look for Quark in upcoming issues, our weekly newsletter, and our website. He'll contribute however he can; you can expect him to pop up wherever innovation happens.

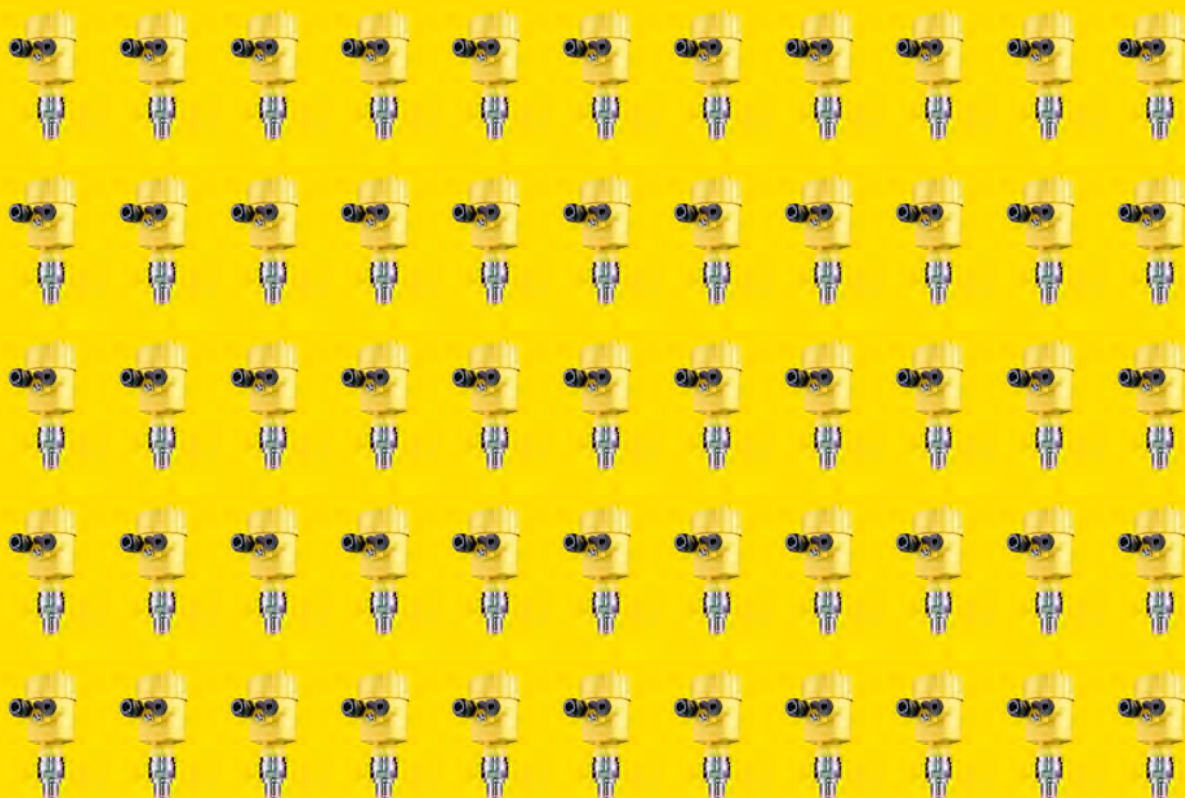


Highlights in this edition

- **Cover Feature: Wojtek Piorko, Vertiv MD, on meeting AI's power demands** – What's needed to keep up with AI's growing energy appetite?
- **Parallel universes: fact or fiction?** – Could multiple realities exist alongside our own?
- **The top cyber threats for 2025** – What businesses and individuals need to prepare for now.
- **Future tech: life in 2040** – A glimpse into the innovations that could shape the decades ahead.

With so much to explore, we hope you enjoy this *EngineerIT* issue!





WHAT'S MORE IMPORTANT THAN
A MILLION RADAR SENSORS?
ONE MILLION SATISFIED CUSTOMERS.

After 30 very successful years in radar measurement technology and 1 million sensors sold, an exciting new chapter is about to begin. Watch this space, so you don't miss out as we write the next pages in this best-selling story.

www.vega.com/radar

VEGA

Meeting AI's demands: Vertiv's role in transforming data centre power and cooling

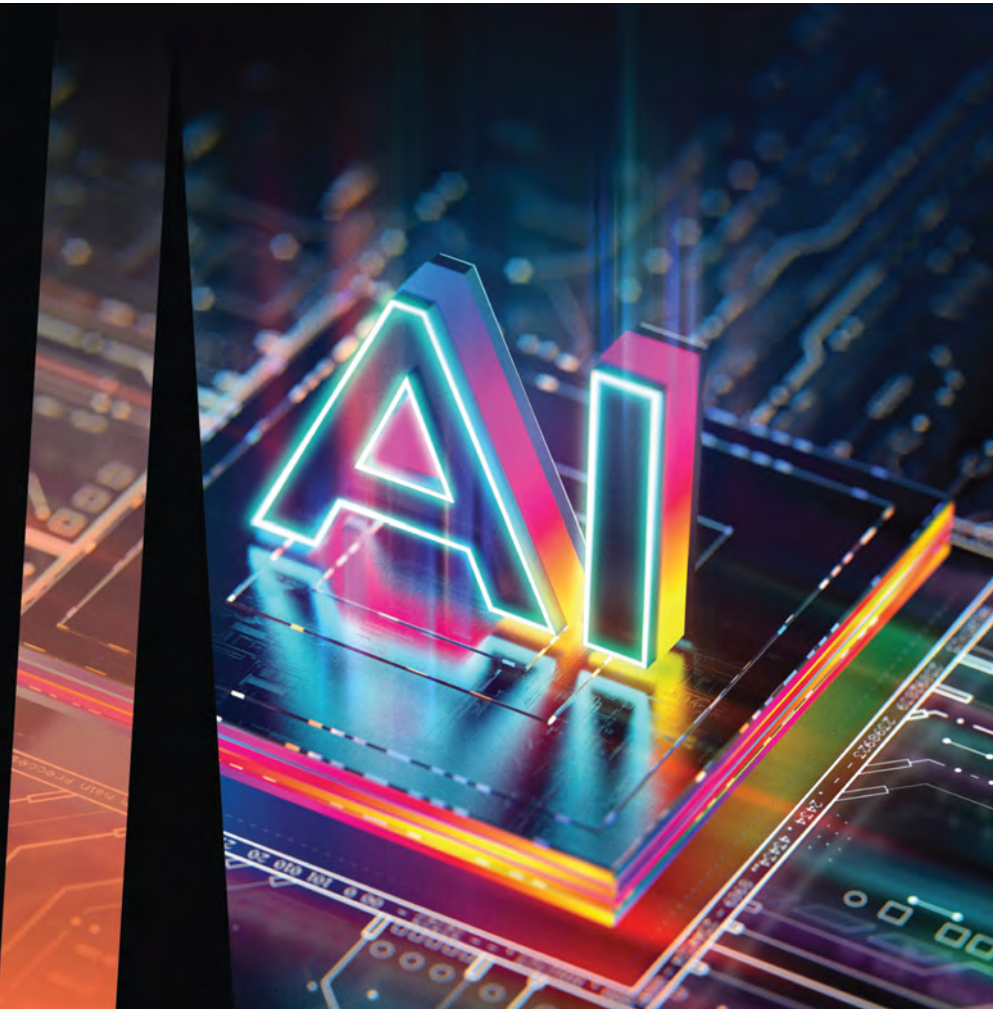


By Wojtek Piorko, MD for Africa at Vertiv

Artificial Intelligence (AI) is no longer just a trend; it is transforming industries from healthcare to finance. AI's rapid adoption is driving unprecedented workloads and computing demands, reshaping data centre infrastructure. According to [Canalys](#), AI will represent a \$159 billion opportunity by 2028, while [Statistica](#) highlights Africa's growing AI market, particularly in banking, finance and agriculture.

According to Statista, this trajectory highlights AI's potential to drive innovation and economic growth in Africa while also posing challenges for businesses to navigate the regulatory landscape. As such, industry stakeholders must carefully consider the opportunities and implications of this trend to effectively leverage AI's capabilities in Africa.

There are both challenges and opportunities when it comes to the adoption of AI in Africa. We know that enterprise AI is a powerful reality. Still, at the same time, education and training across the whole ecosystem is required – from the definition of the AI use case to the design of the supporting data centre infrastructure.



How is AI transforming data centres?

AI workloads require an evolution in data centre architecture, particularly in power and cooling. A recent [Vertiv study](#) shows that IT racks, which traditionally operated at 5 to 10kW, are now handling over 40kW per rack, sometimes exceeding 100kW. High-performance computing infrastructure powered by GPUs, such as NVIDIA's H100 chips, demands significantly more power and cooling than conventional servers.

To accommodate this shift, data centres must expand power capacity across the entire infrastructure, from grid to chip. Moreover, traditional air-cooling systems are often inadequate for AI hardware, which typically requires five times more cooling capacity than standard servers. As a result, liquid cooling is becoming the primary heat management strategy.

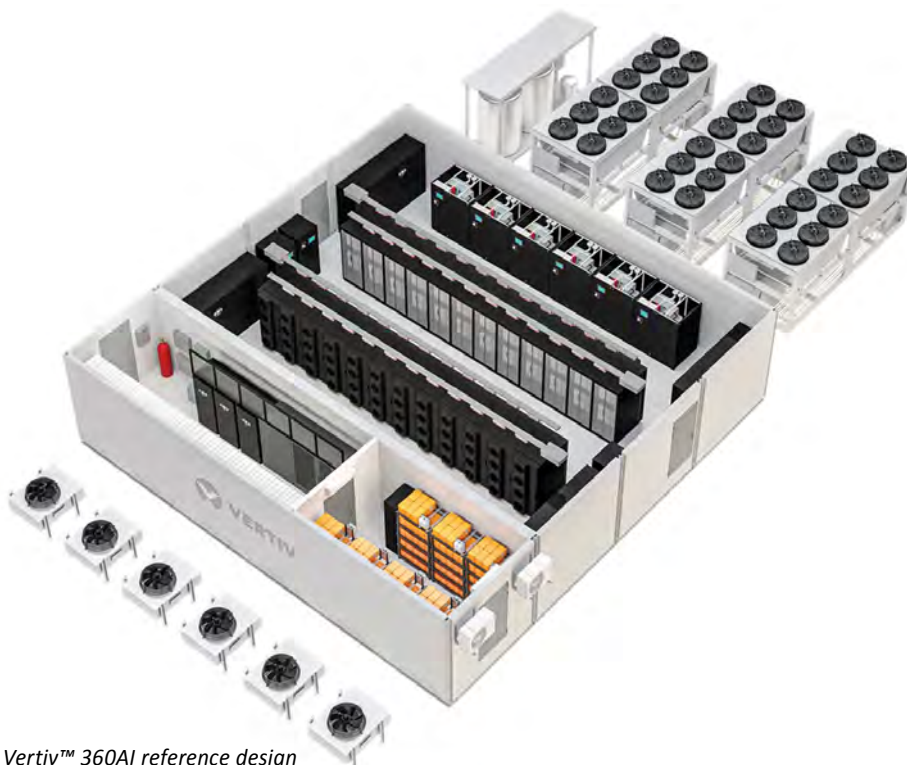
Vertiv's response to AI trends: power and cooling innovations

Meeting AI's rising power and cooling demands requires innovative, scalable solutions. [Vertiv™ 360AI](#) includes a complete portfolio of [power](#), [cooling](#) and [services](#) solutions for AI deployments, covering everything from small-scale pilot projects to large AI factories.

New cooling technologies are now commonplace in AI data centres:

- **Direct-to-chip liquid cooling:** Cold plates attached to GPUs and other high-heat components absorb and transfer heat to a liquid, which removes up to 95% of the heat.
- **Rear-door heat exchangers:** These systems remove residual heat from IT equipment, complementing air-cooling where necessary.

As AI adoption accelerates, cloud and colocation providers are diversifying investments, focusing on modular and future-ready designs. Scaling AI workloads efficiently is critical for competitiveness.



Vertiv™ 360AI reference design

To address the skill gap and help speed up AI implementation, Vertiv has developed a series of 30 to 40 reference designs tailored to different AI infrastructure requirements, based on workload demands. These include solutions ranging from straight forward single-rack systems consuming 100kW to large-scale setups of 500kW and even 1 to 2MW, with more being added.

The standardised reference designs span the full range of IT loads, enabling faster deployment cycles. They cover key elements such as power distribution, liquid cooling, busbars, switchgear, and pre-configured server solutions - including Dell hardware and NVIDIA chips - enabling seamless, efficient deployment.

Navigating the future of AI-driven data centres

As AI continues to scale, high-density and high-performance computing (HPC) deployments will become the norm, requiring data centres to manage growing power and cooling demands effectively. The infrastructure buildout is ramping up in preparation for generative and predictive AI growth.

Currently, the enterprise demand for [AI solutions](#) is growing from a small base but holds significant promise, providing a powerful incentive for continued investment and development in AI installations.

For more information, please visit [Vertiv's AI Hub](#), or contact Vertiv Africa on za.info@vertiv.com.





How to choose a temperature sensor for a specific application

By Mehrdad Peyvan at Analog Devices

Abstract

This article discusses how to choose the right temperature sensor for a specific application. It will provide an introduction to the different types of temperature sensors as well as cover their advantages and disadvantages. Lastly, current developments in remote/local sensing that are driving cutting-edge advancements to create more temperature sensors will be discussed.

Introduction

Temperature sensors are essential for a wide range of applications and uses, including consumer electronics, environmental monitoring, and industrial processing. To guarantee precise and accurate temperature readings, it is essential to select the correct temperature sensor. Selecting the most suitable temperature sensor can be difficult given the variety of alternatives in the market. This article provides guidance on selecting a temperature sensor best suited to a specific application.

Application

There exists a wide range of temperatures, and it is crucial to specify the temperature range that your application demands. Temperature range, accuracy, power consumption, size limitation, communication protocol (SMBus, SPI, I2C, 1-Wire®, etc.), and budget all need to be considered. Each of these requirements helps narrow down the selection of the most appropriate device.

Types of temperature sensors

Technically, the most popular four categories of temperature sensors available are:

- **RTD** (resistance temperature detector): RTDs offer excellent accuracy and stability over a moderate temperature range (-200°C to +850°C). If precision is the priority, an RTD is the right choice.
- **Thermocouple**: If a wide range of temperature measurements is required for an application, thermocouples are generally used. Their accuracy at high temperatures (-270°C to +1800°C) is low but they are the appropriate choice for high temperature situations.
- **Thermistor**: Thermistors are cost-effective and generally used in consumer electronics. They offer relatively good accuracy over a limited temperature range (-270°C to +1800°C).
- **Diode-based sensor**: Diode-based sensors utilize the voltage drop across a diode vs. the temperature. They are cost-effective and have limited temperature measurement (-55°C to +150°C), have fast response time, and are smaller than the other three types. Diode-based temperature sensors can be easily interfaced with a microcontroller, ADC, and ASICs. They have a wide range of applications from consumer electronics, industrial automation, data centers (storage systems), automotive, and many other diverse electronic applications.

Communication

The output of a temperature sensor can be an analogue voltage or digital signal. Modern temperature sensors use digital communication such as SMBus, SPI, I2C, and 1-Wire interfaces, offering simple communication with microcontrollers and other digital devices. A 1-Wire interface allows multiple sensors to be connected to a single data line.

Accuracy

Choosing a temperature sensor that is accurate is essential, especially for applications that require exact temperature readings. To achieve this, an RTD or a diode-based temperature sensor using calibration should be chosen. Table 1 shows a list of the latest, most accurate ADI temperature sensors with their communication interface and package.

Accuracy	±1°C	±0.5°C	±0.25°C	±0.1°C
			ADT7320 SPI 16-lead, 4 mm × 4 mm LFCSP	
	MAX31825 1-Wire 6-ball WLP	ADT7410 I²C 8-lead SOIC	ADT7420 I²C 16-lead, 4 mm × 4 mm LFCSP	
	MAX31875 I²C/SMBus 4-ball WLP	DS18B20 1-Wire TO-92, SOIC, µSOP	MAX31888 1-Wire 2 mm × 2 mm, µDFN	LTC2983/ LTC2984 Multisensor SPI LQFP
	MAX31827/ MAX31828/ MAX31829 I²C/SMBus 6-ball WLP	MAX31826 1-Wire 2 mm × 2 mm TDFN	MAX31889 I²C 2 mm × 2 mm, µDFN	ADT7422 I²C 16-lead, 4 mm × 4 mm LFCSP

Table 1: Accuracy of the Latest Temp Sensors

An example of a very accurate temperature sensor, the MAX31888, is shown in Figure 1. It’s a 1-Wire high precision, low power digital temperature sensor with stunning ±0.25°C accuracy from -20°C to +105°C for precision temperature monitoring. The IC consumes 68 µA operating current during measurement and has 16-bit resolution (0.005°C). The sensor communicates with a microcontroller over a 1-Wire bus that requires only one data line (and a ground reference) for communication. In addition, the sensor can derive power directly from the data line through parasite power, eliminating the need for an external power supply. The MAX31888 is available in a 6-lead µDFN package. The power supply voltage ranges from 1.7 V to 3.6 V for external power supplies. The operating temperature range is from -40°C to +125°C.

Power consumption and size

In battery-operated devices such as wearables, power consumption and size (they go hand in hand) are the key factors for choosing the lowest supply current and smallest device. Low power sensors can reduce the amount of time needed for charging and extending battery life, yet they maintain their accuracy. Figure 2 exhibits the latest low power temperature sensors vs. their accuracy.

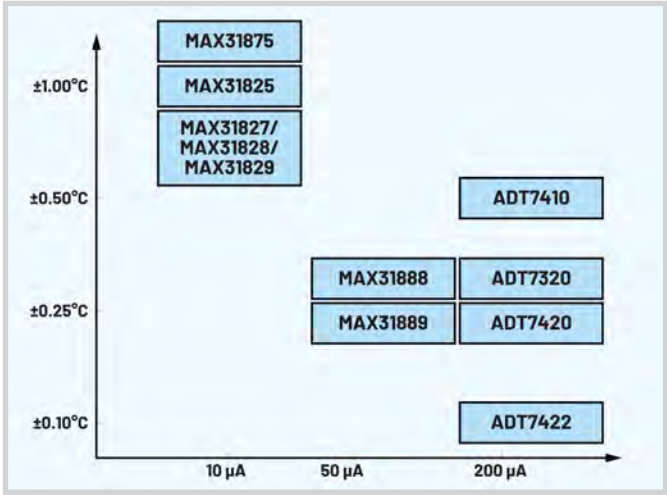


Figure 2: Low power temperature sensors vs. accuracy.

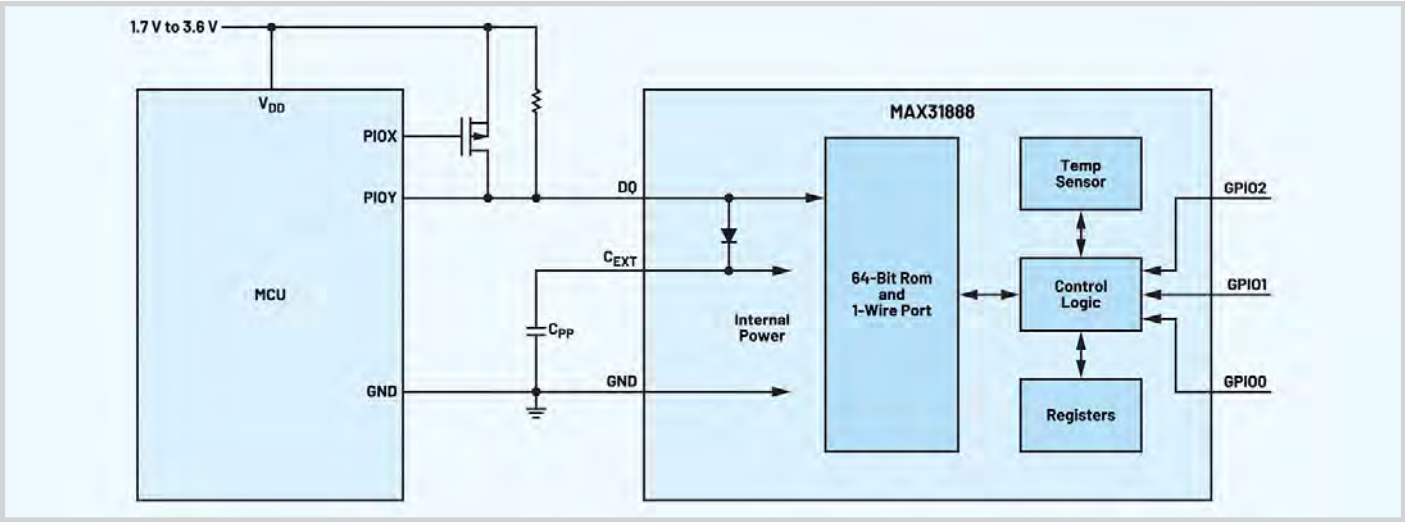


Figure 1: A typical MAX31888 application circuit.

The MAX31875 is a $\pm 1^\circ\text{C}$ accurate local temperature sensor with an I2C/SMBus interface. It uses $<10\ \mu\text{A}$ average power supply current. A typical application circuit is shown in Figure 3. The combination of extra small package size, excellent temperature measurement accuracy, and very low supply current consumption makes this product ideal for a variety of equipment, especially for battery-operated and wearable devices. The I2C/SMBus-compatible serial interface accepts standard write byte, read byte, send byte, and receive byte commands to read the temperature data and configure the behavior of the sensor. The MAX31875 is available in a 4-ball, wafer-level package (WLP) and operates over the -50°C to $+150^\circ\text{C}$ temperature range.

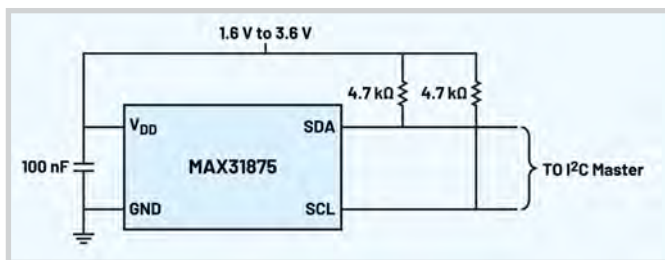


Figure 3: The MAX31875 typical application circuit.

CPU, FPGA, ASIC, etc. (with on-board thermal diode)

In order to safeguard high performance ICs like CPUs, FPGAs, and ASICs, semiconductor manufacturers incorporate a temperature-sensing diode-connected bipolar transistor. Since the thermal sensing transistor is placed on the IC die, the measurement accuracy is significantly higher than with other sensing techniques.

ADI offers several ICs made expressly to detect a thermal diode's temperature precisely and convert it to digital form. While some of these devices measure just one thermal diode, others can measure up to four or even eight. Figure 4 shows a few of these types of ICs, including the [MAX6654](#), [MAX6655/MAX6656](#), [MAX31730](#), [MAX31732](#), and [MAX6581](#).

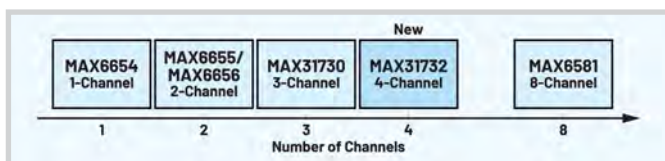


Figure 4: Remote/local multichannel temperature sensors.

With appropriate designing attention and internal and external filtering, remote diode sensors can be widely employed in electrically noisy environments such as displays, clock generators, memory buses, and PCI buses.

An example of a remote diode sensor is shown in Figure 5. The MAX31732 is the latest multichannel temperature sensor that monitors its own temperature and the temperatures of up to four external diode-connected transistors. A resistance cancellation feature compensates for high series resistance between circuit-board traces and the external thermal diode, while beta compensation corrects for temperature-measurement errors due to low beta sensing transistors.

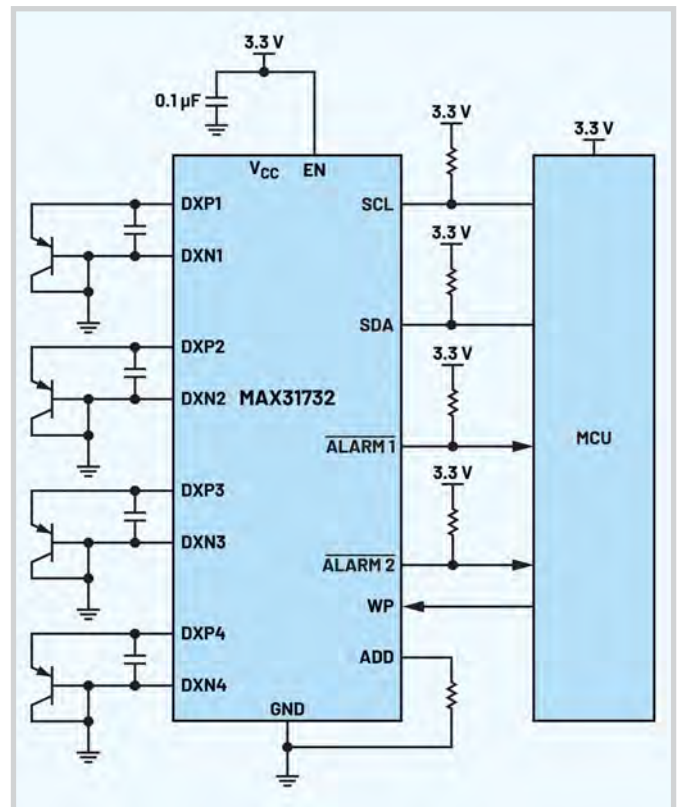


Figure 5: MAX31732 typical application circuit.

This device offers two open-drain, active-low alarm outputs, ALARM1 and ALARM2, that monitor the primary over/under temperature threshold levels, respectively. A nonvolatile memory (NVM) allows the sensor to program the configuration registers during power up without software/firmware intervention.

The 2-wire serial interface accepts SMBus protocols (write byte, read byte, send byte, and receive byte) for reading the temperature data and programming the temperature thresholds.

Conclusion

Choosing the right temperature sensor requires careful consideration of various factors, including application requirements, accuracy, surrounding conditions, output interface, power consumption, and cost. By understanding these factors and evaluating the available options, you can select a temperature sensor that meets your specific needs and ensures accurate and reliable temperature measurements in your application. Investing time and effort in choosing the right temperature sensor upfront can lead to improved performance, efficiency, and cost-effectiveness in the long run. Silicon temperature sensors have advanced significantly, becoming incredibly accurate to allow for a high degree of precision. In order to get exceptional accuracy, IC designers have put a great deal of work into calibrated trimming.

About the Author

[Mehrddad Peyvan](#) joined Analog Devices in 1995 and has held various positions during that time. He is currently in charge of temperature sensors and fan drivers in product applications in San Jose, California. He has an M.S. degree in electronics engineering.

A new e-hailing model set to shake up 2025

Twytch, a next-generation e-hailing platform, is launching in South Africa with a fresh approach to safety, affordability, and driver empowerment. Built on innovative new technology, Twytch aims to transform the ride-sharing industry, focusing on verified security measures, financial support for drivers, and a fairer pricing model for passengers.

Twytch is the first e-hailing platform in Africa to integrate blockchain-backed identity verification. In an exclusive partnership with Secure Citizen, the company is introducing Verifiable Credential (VC) technology to ensure that every user on the platform – drivers and passengers alike – is properly authenticated.

Raising the bar for security

“The e-hailing sector has struggled with safety concerns, from identity fraud to crimes involving unverified users,” says Martin Grunewald, Chief Executive: Global Growth at Secure Citizen. *“Twytch is leading the way with an industry-first identity verification system that sets new standards for trust and security.”*

Verifiable Credentials (VCs) are digital identity records stored on a decentralised blockchain, making them virtually impossible to forge or alter. Unlike traditional identification methods, VCs ensure only verified users can access the platform.

Denvin Naidoo, Safety and Security Lead: Twytch Africa, adds, *“Blockchain technology redefines trust in ride-sharing. Every ride is verified, every user is protected, and every trip is a safe space.”*

Empowering drivers with benefits

Twytch is also tackling a longstanding issue in the e-hailing industry – drivers’ financial security. Through a partnership with the Momentum Group, Twytch is offering access to essential benefits, including medical insurance and funeral cover.



“This partnership is about providing cost-effective, innovative solutions that empower both employers and their employees to lead healthier lives,” says Damian McHugh, Chief Marketing Officer at Momentum Health.

Beyond healthcare, Twytch is giving drivers access to banking and financial solutions, including vehicle insurance, retirement benefits, estate planning, and financial wellness programmes. Drivers will also receive subsidised data and access to smart devices.

Perhaps the most significant shift is Twytch’s decision to eliminate commission-based earnings. Instead, drivers will receive a fixed-rate payment structure, a daily meal allowance, an annual bonus, and subsidised benefits to reduce operational costs – an industry first.

Fair, transparent pricing for passengers

Twytch is scrapping unpredictable surge pricing for passengers in favour of a fixed-rate fare model that adjusts in real time based on traffic conditions. The price displayed when booking is the exact amount charged – no surprises, no hidden fees. The platform is also wholly cashless, with payments made via card or the in-app wallet.

A movement for change

“Twytch is more than just an e-hailing service – it’s a movement,” says Warrick Guest, Chief Creative Officer and co-founder of Wearevalora. *“We want to empower drivers, keep fares affordable, and set new safety standards.”*

Rodney Douglas, Twytch Operations Lead, Africa, adds, *“From financial support to professional training, we give drivers the tools they need to deliver a world-class experience. South Africans deserve better, and Twytch is here to deliver.”*

Twytch will launch in Johannesburg in February, with Durban, Cape Town, and Pretoria to follow. The long-term plan includes expansion across South Africa and into the rest of the continent. Driver recruitment is now open, with 12,500 drivers set to join the platform. Interested drivers can email drive@twytch.app for more details.





Don't sweat the pressure, focus on precision: Precise process, maximum savings with VEGABAR

Numerous challenges exist in process control, particularly in managing pressure across complex systems. Accurate measurements of differential pressure are essential for safety, efficiency, and optimising operational processes. For over 40 years, VEGA has provided pressure measurement solutions, establishing a reputation in sensor technology. VEGA offers cost-effective solutions intended to enhance process control and ensure operational efficiency, even in demanding environments. Process conditions can be extreme, with factors such as high temperatures, abrasive materials, and wide pressure ranges. The instrumentation used in these conditions must be durable and capable of maintaining accuracy under continuous strain.

The difference with VEGADIF

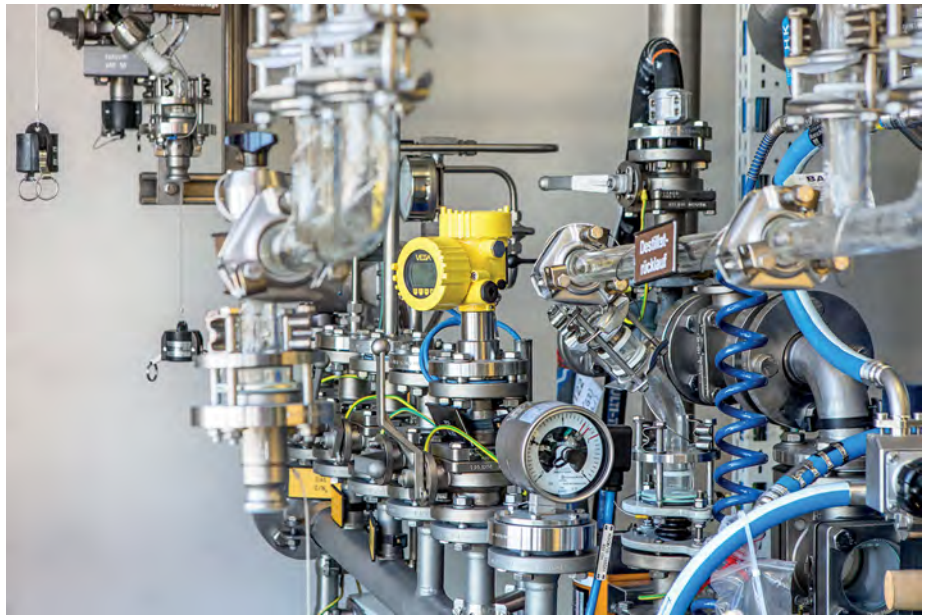
Differential pressure measurement is essential in manufacturing processes as it provides valuable information about flow rates, levels, and filter conditions, ensuring the safe and efficient operation of processing plants. Designed to perform well in fluctuating process conditions, the VEGADIF 85 offers strong construction and advanced measurement capabilities. It can measure both differential pressure and static pressure with high precision, making it suitable for monitoring pumps, filters, heat exchangers, and pipelines. In mining operations, precise measurement of differential pressure helps maintain stability in varying fluid compositions and pressures. In engineering applications, such as chemical or petrochemical processing, differential pressure control ensures optimised energy consumption, leading to cost savings and sustainability.



With support for HART communication, the VEGADIF 85 allows for remote monitoring of pressure conditions, assisting in facilitating maintenance activities, which is greatly beneficial in large-scale operations where equipment is located across vast operational areas.

40 years of pressure

backed by VEGA's 40 years of expertise, the VEGABAR range is engineered to offer accuracy and long-term stability under extreme process conditions, which is important for maintaining the integrity of operations and processes, as errors in pressure measurement can have consequences. All VEGABAR pressure instrumentation has a proven track record of operating with reliability and accuracy, making it a preferred choice for process engineers worldwide in various industries. The range complies with international standards, ensuring that all safety and operational guidelines are met. Whether monitoring pressure in explosive environments or handling high-pressure systems, VEGA provides peace of mind to operators. The costs of inaccurate pressure measurement can be substantial. Even minor inefficiencies can result in increased energy consumption, greater equipment wear and tear, and expensive downtime. VEGA has earned a reputation as a reliable and trustworthy partner.



The VEGABAR pressure range helps minimise risks, enabling proactive decision-making. Underperforming systems can be identified in real time, and critical adjustments can be made to prevent

unplanned maintenance and costly downtime. The VEGABAR range guarantees optimal system efficiency, leading to cost savings and supporting sustainability initiatives.

VEGA is known for its long history of innovation and is recognised as a global leader in the field of measurement technology. VEGA is dedicated to precision and reliability, and its customised solutions have had a positive impact on businesses worldwide, improving processes, efficiency, and quality standards. VEGA's sensors and instruments are known for setting new benchmarks in accuracy, durability, and performance, driven by a commitment to excellence.

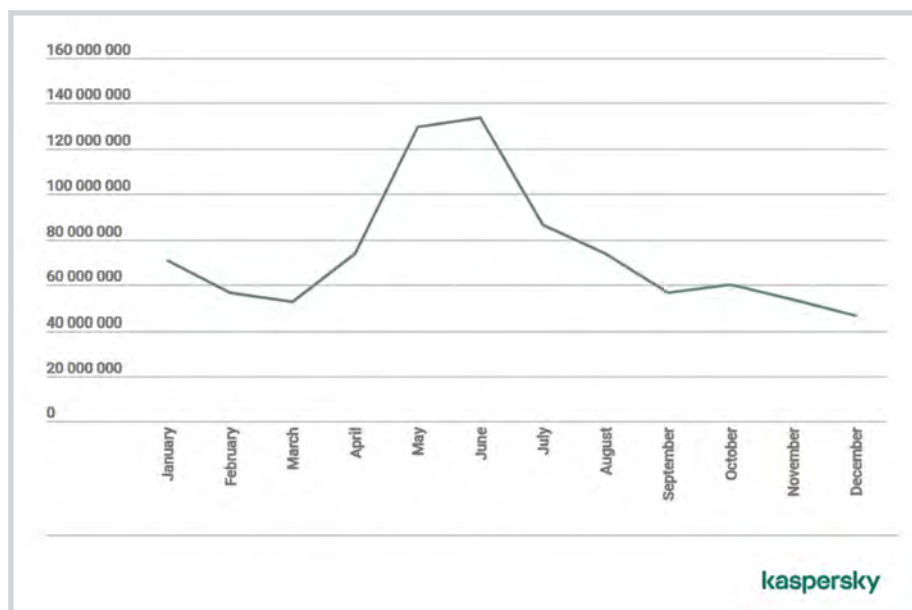
Kaspersky reports nearly 900 million phishing attempts in 2024 as cyber threats increase

Kaspersky's security software blocked over 893 million phishing attempts in 2024 – a 26% increase from 2023, when the total stood at nearly 710 million. The surge in attempts (shown in the graph below) between May and July is traditionally tied to the international holiday season when fraudsters frequently try to lure travellers with scams involving fake airline and hotel bookings, deceptive tour packages and too-good-to-be-true offers.

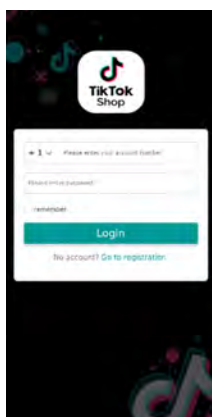
Experts observed a range of phishing and scam schemes aimed at stealing data and money and installing malicious software. In 2024, cybercriminals often mimicked the websites of well-known brands like Booking.com, Airbnb, TikTok, Telegram and others.

One ongoing campaign, for example, has been targeting TikTok Shop users. Cybercriminals created fake login pages designed to steal sellers' credentials. Additionally, scammers capitalised on trending news, orchestrating fraud schemes involving hyped topics like the cryptocurrency game Hamster Kombat and TON wallets.

Fraudulent schemes also capitalised on fake celebrity images in 2024, falsely promoting giveaways of valuable prizes to fans that were never delivered. The trend persists in 2025.



Attempts to click phishing links, Kaspersky security solutions, 2024



An example of a TikTok shop phishing.



Examples of fake celebrities' social media posts.

"While the core mechanics of phishing and scams remain unchanged, attackers constantly refine their disguises. They capitalise on trending news and hype-driven topics and even combine branding from multiple companies on a single phishing page to enhance their campaigns' efficiency."

"AI-driven tools help them to create compelling fake websites, making fraud harder to detect. These evolving tactics pose a growing risk – not just to financial security but also to personal identity protection. As a result, vigilance and robust cybersecurity solutions have never been more crucial," says **Olga Svistunova**, a security expert at Kaspersky.

Spam and malicious email campaigns

According to Kaspersky data, both individuals and corporate users encountered malicious email attachments more than 125 million times in 2024.

Cybercriminals used various tactics in email campaigns targeting businesses. These included sending emails with password-protected archives containing malicious content, SVG images disguised as harmless graphics and many other schemes. Attackers lured victims into clicking on malicious content through fake court appeals, fake deals, counterfeit official notifications and more.

Nearly every second email in a corporate mailbox – 47 % of global traffic, marking a 1.27 percentage point increase from the previous year – was spam. South African users encountered 20% more malicious emails than the previous year.

While spam includes different email threats, including those mentioned above, it is not always malicious and consists primarily of unsolicited advertisements. Experts note that last year's corporate spam trends prominently featured advertisements for AI solutions, related webinars, online promotion services, follower-boosting schemes and more.

To learn more about the spam and phishing threat landscape, visit [Securelist.com](https://www.securelist.com).

To avoid becoming a victim of phishing, scams or malicious messages, Kaspersky experts advise the following:

- Only open emails and click links if you are sure you can trust the sender.
- When a sender is legitimate, but the content of the message seems strange, it is worth checking with the sender via an alternative means of communication.
- Check the spelling of a website's URL if you suspect you are faced with a phishing page. If you are, the URL may contain mistakes that are hard to spot at first glance, such as a one instead of l or O instead of O.
- Use a proven security solution like [Kaspersky Premium](#) when surfing the web. Thanks to access to international threat intelligence sources, these solutions can spot and block spam and phishing campaigns.

Density Measurement System

Berthold LB 414

- Compact field device with integrated transmitter
- Perfect for density measurements in non-hazardous areas
- Simple and straightforward local display operation
- Process connection via 4-20mA/HART
- No recalibration required
- Impressively simple





Parallel universes: pseudo-science, fiction or quantum fact?

By Justin Render

In his book, *“Parallel Worlds: A Journey Through Creation, Higher Dimensions and the Future of the Cosmos”*, theoretical physicist Michio Kaku writes, *“In our universe, we are ‘tuned’ into the frequency that corresponds to physical reality. But there are an infinite number of parallel realities coexisting with us in the same room, although we cannot ‘tune into’ them. Although these worlds are very much alike, each has a different energy.”*

This explains, in part, a seemingly legitimate theory from a respected physicist – a good starting point for an article that may initially look like a hack piece.

Parallel universes have been a staple of sci-fi for over a century, imagined as alternate realities where history takes a different turn. But as physics digs deeper into the nature of our existence, these once-fanciful ideas are starting to look more like serious scientific possibilities.

From fan fiction to theory: the origins of parallel universes

The idea of alternate worlds isn’t new. As far back as Ancient Greece, philosophers speculated on the existence of multiple worlds. The concept took shape in modern fiction – primarily in the early 20th century. One of science fiction’s founding fathers, HG Wells, hinted at parallel dimensions in *Men Like Gods (1923)*; though the first clear example of “worlds colliding” came in 1934 with Murray Leinster’s *Sidewise in Time*.

Real science took a while to take the concept seriously. In 1954, physicist Hugh Everett III proposed the *Many-Worlds Interpretation (MWI) of quantum mechanics*. This theory suggests that every possible outcome of a quantum event happens in a separate, independent universe. For the first time, what was once an imaginative plot device launched a serious scientific debate.

Schrödinger’s cat is everywhere

Quantum mechanics doesn’t follow everyday logic. At the microscopic level, particles exist in multiple states at once until they’re observed – a phenomenon called superposition. This is the premise of Schrödinger’s famous thought experiment, where a cat inside a box is both alive and dead until someone opens the lid. (No actual cats were harmed.)

Everett pushed this idea further, arguing that instead of collapsing into one reality, the universe splits into multiple timelines, each reflecting a different outcome. If true, then every decision – however small – branches into a new universe. According to *Live Science*, *“Every quantum event produces a new, branching timeline; one that is just as real as the one we experience.”*

Google's quantum leap

Jumping ahead to the present – a future that even HG Wells couldn't imagine – and quantum computing may provide a glimpse of how parallel worlds interact.

In 2019, Google's Quantum AI Lab announced that its Sycamore processor had completed a calculation in minutes that would have taken the world's fastest supercomputer thousands of years. Their latest chip, Willow, has gone even further.

Dr Hartmut Neven, who leads Google's Quantum AI team, suggested that quantum computers might work by "borrowing" computational power from alternate realities. If true, then quantum computers aren't just fast – they might be proof that other universes exist.

The Large Hadron Collider and the Mandela effect

The Large Hadron Collider (LHC) has fuelled speculation (or conspiracy theories, depending on your perspective) that high-energy particle collisions at CERN could be interfering with reality itself.

This connects to the *Mandela Effect*, because the Collider is said to open portals to parallel universes, fuelling the phenomenon where large groups of people remember events differently

than recorded history. It is named for Nelson Mandela because of a commonly experienced memory that Mandela died in prison in the 1980s – not in 2013 when he really passed away.

The best-known examples of the Mandela Effect include the spelling of Berenstain Bears vs Berenstein Bears (it's *Berenstain*), or the false memory of a 90s film called Shazaam, supposedly starring Sinbad. The closest our reality has to this is the 1996 film *Kazaam*, starring Shaquille O'Neal.

Conspiracy theorists believe these are glitches in reality – evidence of timelines shifting, possibly due to quantum experiments at the LHC. While mainstream scientists dismiss this as a trick of human memory, those who support the idea point to quantum mechanics as a possible explanation.

Cosmic clues

Quantum mechanics isn't the only place parallel universes could manifest.

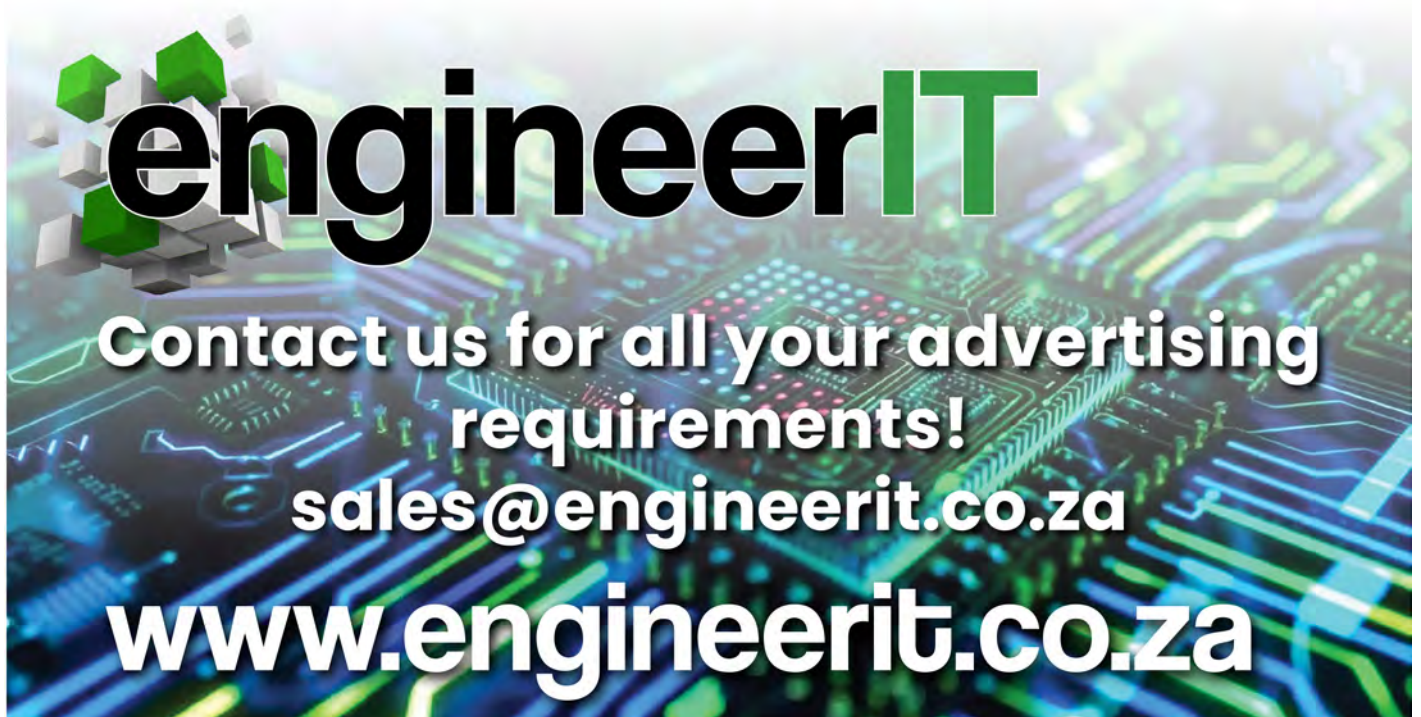
In 2015, astrophysicist Ranga-Ram Chary found unexplained patterns in the cosmic microwave background – the faint radiation left over from the Big Bang. Some physicists suggest this could be the aftershock of another universe colliding with ours.

Of course, the idea is controversial – even absurd. But it raises an important question: If other universes exist, how would we know? Could anomalies in cosmic radiation or unexpected quantum behaviours provide an explanation?

"There are two things you should remember when dealing with parallel universes. One, they're not really parallel, and two, they're not really universes." – Douglas Adams

The thing about multiverse theory is, that proving it – to date, at least – has been impossible. Scientists don't necessarily dismiss it outright but can't confirm it. Without direct evidence, parallel universes are just a thought experiment. But maybe quantum mechanics, astrophysics and computing advances could finally connect the dots.

For now, it is comforting to some of us that reality might not be as simple as it seems. Quantum computers, cosmic anomalies or the nagging sense that something isn't quite right power parallel universe theory as a real possibility. And if science is correct, the truth may be far stranger than fiction ever imagined.



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The breakthroughs that will reshape our world by 2040

Some of them are already here.

By Nicola Killops

In just 15 years, artificial intelligence, energy, transport, space exploration, and healthcare breakthroughs will fundamentally reshape our world. Some of these advancements are already in motion, while others remain on the cutting edge of scientific research.

By 2040, will humanity unlock the full potential of AI, conquer disease, and become a multi-planetary species – or will progress be slower than anticipated? The answers aren't guaranteed, but one thing is certain: the foundations of this future are being built today.

AI: from assistant to independent thinker

AI is already integrated into daily life, from autonomous vehicles to predictive analytics. But by 2040, it won't just assist humans – it may think for itself.

Experts are divided on the arrival of Artificial General Intelligence (AGI) – AI that understands, learns, and performs tasks across multiple domains at a human level. Some, like OpenAI's Sam Altman, predict AGI within the next decade, while others, such as MIT's Rodney Brooks, argue we're further away than most people think.

If AGI does emerge by 2040, it will redefine industries, accelerate scientific discoveries, and reshape global economies. AI-driven governance could optimise resource management, urban planning, and even diplomacy, but the risks are significant. Bias, misinformation, and automation-driven job displacement remain key concerns, and the debate over who controls advanced AI systems will only intensify.

Will AGI enhance human potential – or replace it? That remains the biggest question of the next two decades.



The end of fossil fuels? Renewable energy's defining moment

By 2040, fossil fuels could be obsolete – not because we ran out, but because cheaper, more efficient alternatives finally outcompeted them.

One of the most promising breakthroughs is nuclear fusion, which powers the sun. Research projects like ITER (France), Helion Energy (US), and China's 'Artificial Sun' experiment (EAST) have made significant progress in sustaining fusion reactions, though commercial viability is still a challenge. If cracked, fusion could supply unlimited clean energy, reshaping geopolitics and ending reliance on finite resources.

Meanwhile, next-generation batteries – such as solid-state, graphene, and quantum batteries – will make solar and wind power as reliable as coal. Countries like Germany, China, and the US are investing heavily in grid storage solutions, ensuring renewables provide 24/7 energy security.

However, a major issue remains: Will developing nations have equal access to these breakthroughs? Without equitable investment, the gap between energy-rich and energy-poor regions could widen, reinforcing global inequality.



The transport revolution: autonomous, hypersonic, and flying

By 2040, how we commute, travel, and move goods will be fundamentally different.

- Autonomous vehicles will likely dominate roads, with traditional human-driven cars phased out in urban centres. China and the US are leading in self-driving technology, while the EU focuses on legal frameworks for full automation.
- Hyperloop systems – high-speed vacuum trains pioneered by Elon Musk’s Boring Company – could replace short-haul flights, allowing city-to-city travel in minutes.
- Hypersonic passenger planes may cut long-haul travel times by 75%, making London to Sydney a four-hour journey.

Flying taxi, which companies like Joby Aviation and Archer are already testing, may become a common feature in mega-cities, easing congestion and reshaping urban planning.

However, while technology is advancing fast, infrastructure remains the biggest hurdle. Cities must be redesigned for new transit networks, and regulatory frameworks must balance innovation with safety.

Space: the era of human expansion

The following 15 years could be the most pivotal in space exploration since the Moon landing.

NASA, SpaceX, and China’s CNSA are competing to establish a permanent lunar base, with Artemis missions expected to return humans to the Moon by 2026. The goal? Mining lunar resources like helium-3 which could fuel fusion reactors.

Mars colonisation is more uncertain. SpaceX plans for a crewed mission by the late 2030s, but radiation exposure, psychological stress, and long-term sustainability remain significant barriers. Some scientists argue that Mars exploration is possible, but a self-sustaining colony is still decades away.



Meanwhile, orbital factories are emerging as a real business opportunity. Zero-gravity conditions allow for manufacturing ultra-pure pharmaceuticals, advanced semiconductors, and new materials – a multi-billion-dollar industry in the making.

Will humans permanently leave Earth behind by 2040? More likely, the next two decades will set the stage for a fully industrialised space economy, changing the global balance of power.

Healthcare: curing the incurable

Advances in gene therapy, AI-driven diagnostics, and regenerative medicine could eliminate many diseases and extend human lifespans.

- CRISPR gene editing is already curing genetic disorders. By 2040, this technology could eliminate conditions like cystic fibrosis and sickle cell disease before birth.
- Lab-grown organs and 3D-printed tissues may remove the need for organ donors, allowing patients to receive custom-made, rejection-free replacements.
- AI-driven diagnostics will predict illnesses before symptoms appear, revolutionising preventive medicine.

The most controversial development may be brain-computer interfaces (BCIs). Companies like Neuralink are working to restore movement in paralysed individuals, but cognitive enhancement raises ethical concerns. Will brain implants become as common as smartphones – and if so, who will have access?

Don't blink or you may miss it

The technologies of 2040 are already in development. The challenge isn’t whether they will exist – it’s how they will be implemented.

Will they benefit everyone or only the wealthiest nations and corporations? The choices made in the next decade will determine whether the future is one of shared progress or growing inequality.

Related reads and references to explore.

1. [*Forbes – 2050 Unveiled: A Glimpse into the Future*](#)
2. [*Tomorrow Today Global – How Technology Will Change Lives in the Next 20 Years*](#)
3. [*Global Trends 2040 – DNI Report*](#)
4. [*Medium – 7 Emerging Technologies That Will Reshape Our World by 2040*](#)
5. [*Quantum Zeitgeist – Predictions for 2040*](#)
6. [*Gadget – Welcome to 2050*](#)
7. [*WRI – 2050 Starts Now*](#)



Secure your professional status: ECSA registration for engineers and technologists

By Hans van de Groenendaal

"If you are working in engineering, ensure that you are registered with the Engineering Council of South Africa (ECSA)". This is the advice from **Gerhard Greeff**, Chairman of the Society for Automation, Instrumentation, Mechatronics and Computer Engineering (SAIMC) User Advisory Council.

"It is the law and secures recognition from the ECSA's committees that you meet the minimum requirements expected of a professional person. Professional recognition instils a sense of confidence in the mind of the public, since they can be assured that your competency has been assessed by other professionals (knowledgeable in your field of expertise).

"If you, as an engineer, are not ECSA registered, you may not sign off on projects. If an unregistered engineer does

and something goes wrong with the project that person will be held responsible in his/her personal capacity and could lead to a fine of up to twice the annual salary."

On 1 December 2000, the *Engineering Profession Act of 2000* was published in the *Government Gazette*. The act stipulated that only individuals registered with the Engineering Council of South Africa as professional engineering technicians, technologists or professional

engineers may do engineering work. The problem was that engineering work was not defined, resulting in it being impossible to implement the act.

ECSA took a different approach, which was not aligned with the approach to registration by the Council for the Build Environment. The differences were eventually resolved, and on 26 March 2021, the identification of Engineering work (IoEW) was published in *Government Gazette* 44333.

The categories are:

Professional, which is divided into

- Professional Engineer, Professional Engineering Technologist,
- Professional Certificated Engineer,
- Professional Engineering Technician.

Candidate, which is divided into:

- Candidate Engineer,
- Candidate Engineering Technologist,
- Candidate Certificated Engineer,
- Candidate Engineering Technician.

Specified categories prescribed by the council

The specified category provides for the registration of persons who cannot register in the professional category, but who perform critically important "work of an engineering nature which has a direct impact on public safety and health," for example, "Lift Inspectors".

The registration progress

Extensive documentation is required and is subjected to three types of peer review processes, each consisting of three registered professionals representing the candidate's discipline.

Technology is advancing at an unprecedented rate, and ECSA must keep track!

One of the most notable advances is blurring the traditional dividing lines between the various ISA-95 layers. ISA-95, also known as ANSI/ISA-95 or IEC 62264, is an international set of standards aimed at integrating logistics systems with manufacturing control systems.

It organises technology and business processes into layers defined by activities taking place, and it outlines how an enterprise can set up an interface to communicate among these layers. The ISA-95 model, which has long served as a framework for integrating enterprise and control systems, is now being reinterpreted to accommodate the seamless integration of processes across all levels of enterprise automation.

We see new areas of specialisation, such as Mechatronics and Computer engineering, requiring ECSA to change its registration framework. In response to

these technological advancements, the evolving needs of the industry and in line with the SAIMC's work over the years, ECSA requested SAIMC to assist with the discipline-specific guidelines (DSTG) for Mechatronics and Computer Engineering.

The incorporation of Mechatronics E and Computer Engineering consists of:

- Mechatronics Devices
- Factory Automation
- Process Automation

The incorporation of Computer Engineering includes

- Computer Engineering
- Manufacturing Operations Management (MOM) and
- Manufacturing Enterprise Solutions (MES)

MECHATRONICS ENGINEERING

Mechatronics Engineering is an interdisciplinary field that combines principles from mechanical engineering, electrical engineering, computer science, and control engineering. It focuses on designing and creating smart systems and products that enhance functionality and efficiency.

Factory Automation refers to the use of technology and control systems to operate machinery and processes in manufacturing environments with minimal human intervention. This can include the use of robotics, computer software, and other technologies to streamline production, improve efficiency, and ensure consistent quality.

Process Automation involves using technology to automate complex business processes and functions beyond just individual tasks. It typically includes integrating applications, restructuring labour resources, and using software applications throughout an organisation. The goal is to streamline operations, increase efficiency, reduce human error, and improve service delivery.

In the absence of an established Automation Engineering discipline in South Africa, SAIMC developed the Discipline Specific Training Guidelines (DSTG) to cater for Mechatronics Engineering and Factory Automation and Process Automation.

This made it possible for those involved in Factory Automation and Process Automation to register with ECSA and be interviewed by peers in their specific speciality areas.

COMPUTER ENGINEERING

Computer engineering is a discipline that integrates electrical engineering and computer science to develop computer systems. It involves designing and building hardware and software components, including microprocessors, circuit boards, and networks.

In the evolving landscape of integrated technologies, a new category of engineers has emerged: professionals who utilise computers to connect field devices with enterprise resource planning systems, directly impacting production systems. To support this emerging group, the SAIMC, in collaboration with the Engineering Council of South Africa (ECSA), developed the Computer Engineering Code of Practice for Computer Engineering.

The Identification of Engineering Work, as published in the Government Gazette Vol 669 on 26 March 2021, No. 44333, classifies the activities performed by practitioners in the fields of Manufacturing Operations Management (MOM) and Manufacturing Execution Systems (MES) as "Engineering Work," which falls under the regulation of the Engineering Professions Act 46 of 2000.

A challenge arises because many of these practitioners do not fit the traditional categories of technicians, technologists, or engineers and thus cannot register with the Engineering Council of South Africa (ECSA) under these classifications. Despite originating from non-engineering backgrounds, these individuals have evolved through specialised training and experience to perform work now recognised as "engineering work." To address this, SAIMC has established a specified category known as Enterprise Integration Practitioners within the ECSA.

Additionally, we have developed the Discipline Specific Training Guidelines (DSTG) to accommodate these practitioners, enabling those involved in

ENGINEERING STANDARDS

MOM and MES to register with the ECSA. This process includes peer interviews in their specific areas of expertise, allowing them to continue their current work.

Support your industry

The SAIMC is requesting individuals already registered as professionals (technicians, technologists, or engineers) to come forward and put their name on a list for training as assessors by ECSA. Nine individual assessors are required to assess the practical experience of an individual.

Registration with ECSA in the "Candidate" category is not sufficient, the person must have gone through the whole registration process which includes an interview.

You are encouraged to download the IoEW from the ECSA or the SAIMC website before you decide that you are not actually doing "engineering work".

Who is ECSA?

The Engineering Council of South Africa (ECSA) is a statutory body established under the Engineering Profession Act (EPA), 46 of 2000. ECSA's primary role is to regulate the engineering profession in terms of this Act. Its core functions are the accreditation of engineering programmes, registration of persons as professionals in specified categories and regulating the practice of registered persons.

Consequently, ECSA is the only body in South Africa authorised to register engineering professionals and bestow the use of engineering titles, such as Pr Eng, Pr Tech Eng, Pr Techni Eng, Pr Cert Eng, on persons who have met the requisite professional registration criteria.

ECSA is headed up by Refilwe Buthelezi, who has over five years' experience working with the Council. Her previous roles with the Council include serving in the fifth term Council of ECSA and holding the positions of Vice Chairperson of the Central Registration Committee and Member of the Audit and Risk Committee. She has also served as an accredited assessor, reviewer and moderator for professional registration.

Ms Buthelezi is a qualified engineer with over 16 years of business leadership experience in diverse management environments within the water, power and energy utility industries. She holds multiple qualifications, including a BEng in Electrical and Electronics, MEng in Engineering Management and a master's degree in business leadership.

Twoobii hybrid GEO-LEO Smart Satellite Services



Connecting the Cloud in Africa

The satellite industry has now fully evolved into a multi-orbit domain where both Low-Earth Orbit and Geostationary services are available to meet a range of requirements for high-availability services.

The next step is for architects to learn and appreciate that the **new will not** replace the old (LEO services will not replace GEO) and that **different technologies** have inherent strengths for **different requirements**. Examples of this are shown below:

GEO SERVICES	ATM	Retail	Business
	Primary Access	Primary access for Point-of-Sale devices	High availability for business data back-up, or broadband for smaller operations
LEO SERVICES	SD-WAN	Mines / Industrial / Gvt / Hospitality	
	High reliability primary or back-up	Primary and Back-up Access for mines, industrial plants, governments, hospitality & tourism operators.	

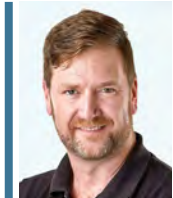
Q-KON has designed and developed the Twoobii hybrid GEO-LEO Smart Satellite Services platform, which is currently the only truly multi-orbit Smart Satellite solution available to the market in an end-to-end delivery and support model.



Contact us to find the perfect Satellite Service for your business requirements today!  www.qkon.com

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The big switch: moving to the cloud is like upgrading from a flip phone to a spaceship



By Nic Laschinger
CTO, Euphoria Telecoms

The flip phone was once considered a futuristic piece of technology, but compare it to today's iPhone and it feels positively pre-historic. The same can be said of old-school, on-premises tech like servers and PBX phone systems. Compared to new cloud systems, they're clunky, expensive to maintain, and not very flexible.

So, why haven't all businesses switched to the cloud yet? In a nutshell, because it's a big leap with lots of moving parts. But for businesses setting out on this journey, here is a roadmap to guide you along the way.

The cost conundrum: upfront vs. long-term savings

Switching to the cloud sounds expensive, and upfront, it can be. But you might be surprised when you break it down. As an example, a switch to a cloud server might rack up data transfer costs to move everything from a physical to a virtual server. But you're immediately cutting your costs on electricity, maintenance and hefty hardware upgrade bills.

When weighing up the financial aspects, look out for sneaky, hidden costs. Cloud PBX providers, for example, may try to hide behind connection fees and complex billing structures like paying for a full minute when you only spoke for 32 seconds. But there's nowhere to hide with per second billing- you just pay for what you use.

The real value of cloud tech

People often confuse cost with value. But value is more than just what you pay upfront. A switch to cloud means fewer system failures and frustrating downtime. It's also more agile so you can scale up or down easily to suit your needs.

But the big bonus lies in the way cloud technology supercharges big data analytics. The result? Smarter, faster business decisions, whether you're tracking customer behaviour, analysing call reports or spotting fraud before it even happens.

Like yoga for your business

Cloud systems are just more flexible than on-premises ones and they make your business more flexible too. Cloud based productivity suites and phones give your teams the flexibility to stay connected, no matter where they are in the world. Many of these solutions also integrate effortlessly, so your CRM, PBX, storage and data backups are all linked. This all makes for happier, more efficient and productive workplaces.

Add to this how simple the cloud is to scale. Gone are the days of waiting for a new line or additional storage to be physically installed, you can do this with a click of a button now.

Locking it down

It's a myth that on-premises systems are safer than the cloud. All it takes is one employee and a phishing email to bring the whole organisation to its knees. Cloud, on the other hand, offers multiple layers of security, including encryption and multi-factor authentication.

That said, there are still risks that both you and your cloud security provider should be on top of. Your phone system, for example, operates on the same networks as your computers, so if one is breached, the other is at risk.

Mind the (skills) gap

Switching to full cloud systems will need new skills like cloud architecture, DevOps and security and data governance. There is no getting around the fact that some of these are in short supply and expensive. So if you are making the switch, upskilling and retraining your existing people can be a smarter, more-cost effective solution.

Bear in mind that not every business is going to need full scale cloud architecture either. A small business can very easily get away with the tools and storage offered by productivity suites like Google, Microsoft and Zoho, coupled with a decent phone system. The skills required to get the best of these can easily be acquired through supplier training, and some online tutorials.

The big picture

Moving to the cloud isn't just about having shinier, faster systems. It's a strategic shift – a way to future-proof your business, cut down on inefficiencies, and get ahead of the competition. The companies that understand the financial, security, and skills implications will find themselves commanding their own spaceships instead of trying to hail one from their flip phones.

2025's most wanted malware: FakeUpdates maintains stronghold in cyber security threats

FakeUpdates continues to facilitate ransomware attacks while cybercriminals enhance their capabilities with AI-powered techniques

Johannesburg, SOUTH AFRICA, February 13th, 2025 – [Check Point® Software Technologies Ltd.](#) (NASDAQ: CHKP), a leading cyber security solutions provider, has released its Global Threat Index for January 2025, which highlights FakeUpdates' continued threat in the cyber landscape, playing a crucial role in facilitating ransomware attacks.

In the January Index, eight African countries are listed in the top 20 most attacked. Ethiopia in the top spot again as the most attacked country with a 100% Normalised Risk Index out of the 109 countries featured in the Index.

A [recent investigation](#) by security researchers revealed that a RansomHub affiliate used a Python-based backdoor to maintain persistent access and deploy ransomware across various networks. Installed shortly after FakeUpdates gained initial access, this backdoor demonstrated advanced obfuscation techniques along with AI-assisted coding patterns. The attack involved lateral movement through Remote Desktop Protocol (RDP) and established ongoing access by creating scheduled tasks.

Maya Horowitz, VP of Research at Check Point Software, commented *"AI is transforming the cyber threat landscape, with cybercriminals rapidly evolving their methods, leveraging AI to automate and scale their tactics and enhance their capabilities. To effectively combat these threats, organisations must move beyond traditional defenses and adopt proactive, adaptive AI-powered security measures that anticipate emerging risks."*



African countries featured in the top 20 are:

Threat index per african country

- Ethiopia at **1st place** with a Normalised Risk Index of 100.
- Zimbabwe at **5th place** with a Normalised Risk Index of 77,7.
- Angola at **9th position** with a Normalised Risk Index of 66,1.
- Uganda at **10th position** with a Normalised Risk Index of 64,5.
- Nigeria's Normalised Risk Index has increased since last month, moving from **position 13 to 11** with a Normalised Risk Index of 62,7.
- Kenya comes in at **position 14** with a Normalised Risk Index of 59,4.
- At **16th position** with a lower Normalised Risk Index than last month (11th) is Ghana with 58,9.
- Mozambique at the **17th position** has a Normalised Risk Index behind Ghana with 57,9.

South Africa is down three places at 66th position with a normalised Risk Index of 38.1 %. At position 97 is Egypt, the best performing country in Africa, with a normalised Risk Index of 31.1 percent, out of the 109 surveyed in the Index.

Top malware families

the arrows relate to the change in rank compared to the previous month.

1. ↔ **FakeUpdates** – FakeUpdates (AKA SocGhosh) is downloader malware initially discovered in 2018. It is spread through drive-by downloads on compromised or malicious websites, prompting users to install a fake browser update. FakeUpdates malware is associated with a Russian hacking group, Evil Corp, and is used to deliver secondary payloads after the initial infection.
2. ↑ **Formbook** – Formbook, first identified in 2016, is an infostealer malware that primarily targets Windows systems. The malware harvests credentials from various web browsers, collects screenshots, monitors and logs keystrokes, and can download and execute additional payloads. It spreads via phishing campaigns, malicious email attachments, and compromised websites, often disguised as legitimate files.
3. ↑ **Remcos** – Remcos is a Remote Access Trojan (RAT) first observed in 2016. It is often distributed through malicious documents in phishing campaigns. It bypasses Windows security mechanisms, such as UAC, and executes malware with elevated privileges, making it a versatile tool for threat actors.

Top mobile malware

1. ↔ **Anubis** – Anubis is a versatile banking trojan that originated on Android devices, with capabilities such as bypassing multi-factor authentication (MFA), keylogging, audio recording, and ransomware functions.
2. ↑ **AhMyth** – AhMyth is a remote access trojan (RAT) targeting Android devices, disguised as legitimate apps. It gains extensive permissions to exfiltrate sensitive information like banking credentials and MFA codes.
3. ↓ **Necro** – Necro is a malicious Android downloader that retrieves and executes harmful components based on commands from its creators.

Top-attacked industries globally

1. Education
2. Government
3. Telecommunications

Top ransomware groups

Based on data from ransomware "shame sites,"

Clop is the most prevalent ransomware group, responsible for 10% of the published attacks, followed by **FunkSec** with 8% and **RansomHub** with 7%.

1. **Clop** – Clop is a ransomware strain, active since 2019, that targets industries worldwide. It employs "double extortion," threatening to leak stolen data unless a ransom is paid.
2. **FunkSec** – FunkSec is an emerging ransomware group that surfaced in December 2024, with a data leak site blending ransomware incidents with data breaches.
3. **RansomHub** – RansomHub is a Ransomware-as-a-Service (RaaS) operation that emerged as a rebranded version of Knight ransomware. It has gained notoriety for targeting Windows, macOS, Linux, and VMware ESXi environments.

For the full January 2025 Global Threat Index and additional insights, visit the [Check Point Blog](#).



The next generation in metal sorting: REDWAVE XRF technology transforms the recycling industry

Precision sorting, higher margins, and a sustainable contribution to the circular economy

In the metal recycling industry, companies are increasingly challenged to improve the efficiency of their processes and raise the quality and purity of the sorted materials to new heights.

REDWAVE, the centre of excellence for recycling and sorting technologies within BT-Systems GmbH has achieved another milestone for the metal recycling industry with its latest generation of REDWAVE XRF sorting machines. By integrating the proven Spectral Analysis technology into its market-leading REDWAVE XRF sorting system, the company is unlocking new opportunities for metal recycling, particularly in aluminium recovery. This system enhancement now enables the processing

of a wide range of material streams, including ZORBA, e-scrap, used beverage cans (UBCs), IBA, and mixed metal fractions, while ensuring the accurate identification of aluminium alloys with high purity and quality.

Revolutionary flexibility and cost-effectiveness

BT-Systems GmbH's powerful REDWAVE XRF sorting machines have long been successfully used to separate aluminium and heavy metals such as copper, zinc, brass, and lead. Until now, aluminium could only be separated based on accompanying elements like copper or zinc, making the precise identification and sorting of various aluminium

alloys challenging. These technological limitations are now a thing of the past.

Combining spectral Analysis with XRF fluorescence technology in one REDWAVE sorting system allows for the analysis of a broader spectrum of material composition. Not only are individual element signals (peak-based analysis) detected, but the entire spectrum is utilised to enable significantly more precise alloy separation. Compared to other technologies, this system is equally effective with materials with contaminated surfaces, making it suitable for nearly all materials. This advancement opens up new possibilities in aluminium separation and significantly improves material purity and recycling quality.



REDWAVE XRF with Spectral Analysis

Why is this technology so promising?

The integration of REDWAVE Spectral Analysis into the REDWAVE XRF sorting system offers a multitude of benefits for companies in the metal recycling sector:

1. Maximised material purity and value creation:

Improved material quality through the concentration of aluminium alloys such as 6060/6063 or the sorting of aluminium series 1xxx–7xxx increases market value and opens access to highly lucrative markets. These include the growing demand for primary aluminium and specialised alloys, particularly in the automotive industry. Recycling companies can now deliver premium materials to high-value buyers, maximising their value creation.

2. Reduction of contaminants:

Spectral Analysis enables the detection of contaminants often found in aluminium streams, such as plastic, rubber, or wood. These unwanted materials are removed in a single step, resulting in cleaner end products and reduced reprocessing costs.

3. Increased flexibility and cost-efficiency:

A key advantage of the new REDWAVE XRF sorting system is its flexibility: one machine can meet a wide range of sorting requirements. Companies can separate heavy metals, stainless steel alloys, and now aluminium alloys with a single machine. This efficiency reduces the need for multiple machines and associated operating costs while also accelerating processing speed. Businesses can optimise their entire recycling workflow, achieving higher productivity with lower energy consumption.

4. Future-proof design:

The REDWAVE XRF technology's ability to adapt to new material requirements and market changes provides long-term investment security. By analysing the entire spectrum, the system is equipped to handle new materials and challenges, ensuring flexibility to meet future recycling demands.

5. Competitive advantage and higher margins:

Companies that extend their capabilities from conventional heavy metal sorting to the sorting of aluminium alloys can achieve "primary aluminium" specifications, strengthening their market position and securing higher margins.



Aluminium Cast / Aluminium Guss

The future of metal recycling

The future of metal recycling holds tremendous opportunities, mainly driven by the increasing demand for recycled aluminium in the automotive, construction, and electronics industries. Sustainability initiatives and mounting pressure to reduce CO₂ footprints are putting recycled materials in the spotlight. Additionally, recycling incinerator bottom ash (IBA), which contains valuable metals,

is gaining importance, as many of these materials have previously been underutilised.

Technological innovation is a key factor in the sector's progress. It enables companies to enhance efficiency and contribute significantly to the circular economy. Advanced technologies like the REDWAVE XRF sorting system with Spectral Analysis unlock new potential in metal recycling.

COMPANY INFORMATION

BT-Systems GmbH – Technological innovations for Recycling, Automation, and Logistics.

BT-Systems GmbH is a leading Austrian technology provider with 400 employees, an annual turnover of €150 million, and a global presence. As a pioneer in technological innovation and quality "Made in Austria," the company offers worldwide solutions in recycling, automation, conveying systems, and warehouse technology.

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The water crisis and how we might solve it – in theory

By Justin Render

South Africa's water crisis is accelerating, with experts warning the country could run out of drinking water by 2030 – or even sooner – without urgent intervention. Climate change, failing infrastructure and a growing population push demand beyond what's available. Waste should not be an option; however, almost 40% of the total municipal water supply is lost before it reaches municipal customers, according to the Water Research Commission (WRC).

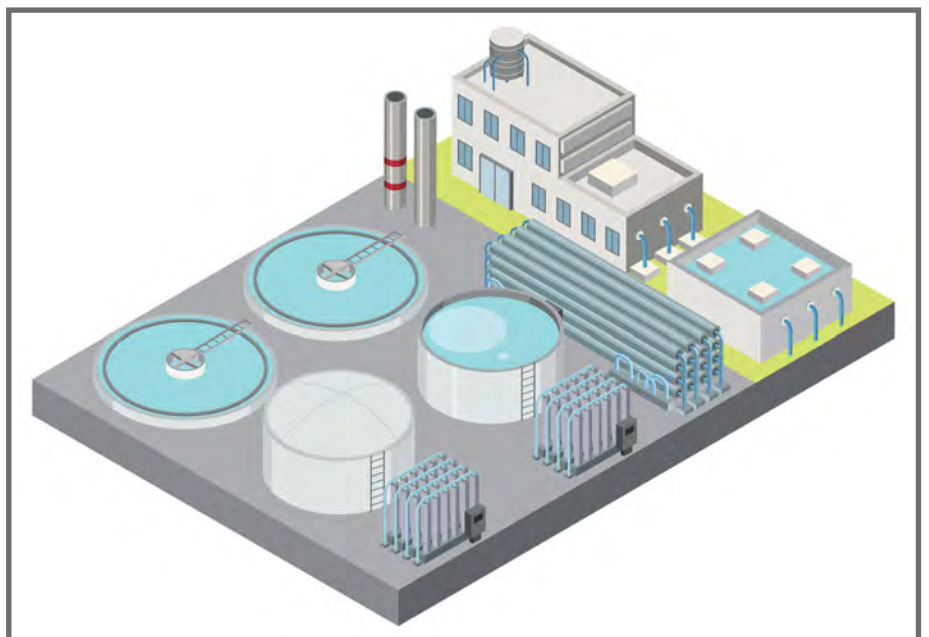
Solutions do exist. Here are some of the options that have the potential to keep the taps running. With political will and strategic investments, it is possible that we could avoid dry times ahead.

Desalination is expensive but may be inevitable

With 2,800 kilometres of coastline, South Africa is surrounded by water but still relies heavily on rainfall and groundwater. Desalination – converting seawater into drinkable water – seems like an obvious answer, but it's not that simple.

A steady supply is one of desalination's most significant advantages. Unlike reservoirs that fluctuate with rainfall, the ocean is an unlimited source, making desalination a climate-resilient solution for drought-prone regions. Advances in reverse osmosis and solar-powered desalination are also lowering costs, making these systems cheaper and more energy-efficient.

But the obstacles are significant. Traditional desalination plants require massive amounts of energy – something of a roadblock in a country facing water and energy crises concurrently. There's also the environmental impact to consider – if not appropriately managed, desalination can disrupt sensitive marine ecosystems, with highly concentrated brine waste threatening ocean life.



With an abundance of seawater around us, could we realistically adopt desalination?

Other countries have proved desalination is feasible. Israel now gets 85% of its household water from desalination – a standout, large-scale success. And Saudi Arabia's NEOM project is pioneering brine management strategies to reduce environmental damage. Cape Town and the Eastern Cape currently have small desalination plants, but without national investment, this will remain a temporary fix rather than a long-term solution.

AI-powered irrigation: a hope for farmers

Agriculture consumes nearly 60% of South Africa's available water, but inefficient irrigation means much of it never reaches crops. AI-powered irrigation may be the key to changing that. Australia and Spain have already made AI irrigation the standard in large-scale farming.

Smart sensors and IoT technology are already transforming farming in other parts of the world. Ground sensors track soil moisture and weather conditions in real-time, ensuring crops receive exactly the water they need – no more, no less. AI-driven machine learning models can predict rainfall patterns, automatically adjust irrigation schedules and detect leaks before they become major problems.

The impact is already clear. AI-driven irrigation has cut water use by 30% in pilot projects without lowering crop yields. Farmers using these systems save thousands of litres per hectare –

a revelation for a water-scarce country like South Africa.

But adoption has been slow. The most significant barriers are high initial costs and infrastructure gaps. Many small-scale farmers can't afford AI irrigation systems without government subsidies or private investment. Reliable electricity and internet connectivity are also essential for these systems to work, which remains a challenge in rural areas.

South Africa's potential in focus

Cities worldwide are adopting IoT-based water management systems. Smart meters detect abnormal consumption and automatically shut off leaks. Acoustic sensors listen for underground pipe leaks before they become catastrophic failures. AI-driven analytics predict high-risk areas for water loss, allowing municipalities to fix leaks before they happen.

Some progress has already been made. Johannesburg's smart meter rollout has shown promise to reduce water losses in test areas. Cape Town's pressure management system has cut leaks by up to 20%, proving that technology works when appropriately implemented. Expanding these solutions nationwide could save enough water to prevent major shortages, but municipal inefficiency, mismanagement and lack of funding remain serious barriers.

We cannot survive on tech alone

Desalination, AI irrigation and smart leak detection are all potential solutions, but they won't work without fixing more profound governance failures.

Corruption and mismanagement have cost billions meant for water projects. Ageing infrastructure is another issue – many of South Africa's dams, reservoirs and pipes are decades old, with repair backlogs growing yearly. There's also no clear long-term strategy. Water conservation policies tend to be reactive rather than proactive, and without a plan for securing the country's water future, solutions will remain disjointed.

Other countries have found ways to build resilience. Public-private partnerships (PPPs) have helped Singapore develop a stable water supply by bringing in private-sector expertise. Cities like Copenhagen use AI to optimise water tariffs, reducing waste and ensuring fair distribution. Governments in Australia and California offer subsidies for AI irrigation systems to help farmers adopt water-saving technology.

The dripping tap continues

South Africa's water crisis isn't looming – it's already here. The technology to reduce waste, improve efficiency and secure future supply exists. The real challenge is implementation.

With water shortages threatening food security, economic growth and public health, we have no time to lose. The solutions are available. The jury is out on whether South Africa will use them before it's too late.



Irrigation under fire: food security and water are precariously interlinked.

References and additional reading

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Affordable connectivity through mobile virtual network operators

By Craig Palmer, CEO of VAS-X

As major telecoms battle for dominance, mobile virtual network operators (MVNOs) are often overlooked. Yet, they are critical in increasing competition and closing the connectivity gap, particularly for underserved communities.

MVNOs provide mobile services to consumers while relying on an established network provider's infrastructure. They can offer more flexible, cost-effective packages without the need to build their own networks. This model appeals to brands with existing customer bases looking to strengthen relationships through personalised mobile offerings.

Many MVNOs partner with mobile virtual network enablers (MVNEs), which handle the technical side of operations, allowing MVNOs to focus on sales, customer service, and account management.

Globally, the MVNO market was worth over US\$78 billion in 2023 and is projected to grow to nearly US\$140 billion by 2030. The lines between telecoms, tech firms, and traditional industries are blurring as they build service ecosystems tailored to their customers' needs.

One example is Capitec, which has over a million customers on its Capitec Connect network, running on Cell C's infrastructure. Capitec clients collectively spend more than R2 billion a month on airtime from mobile operators, and the bank is seizing the opportunity to bring that spending in-house. Similarly, Standard Bank Mobile, operating on Cell C and MTN's networks, provides customers with airtime equivalent to their monthly banking fees.

Retailers are also entering the space. Pick n Pay has integrated airtime rewards into its Smart Shopper programme through PnP Mobile, while Shoprite and Mr Price run their own mobile networks. Internet service providers (ISPs) are also launching MVNOs, adding further competition to the market.

For consumers, this is a win. They benefit from loyalty rewards, lower data and airtime costs, and better value for money – especially important given rising living costs.

However, breaking into the South African market has not been straightforward.

Lycamobile, one of the world's largest MVNOs, shut down its local operations last year, struggling to adapt its business model to the South African landscape. Virgin Mobile, despite its strong global brand, also failed to gain traction.

Successful MVNOs leverage an existing customer base – ideally with an established billing or credit relationship and a loyalty programme. Standing out from traditional networks requires innovative marketing and the right technical support.

A robust operational and business support system (OSS/BSS) is essential for MVNOs to handle billing, provisioning, third-party integrations, and customer service. Competing with established networks means having an effective billing and CRM system to manage subscribers, process invoices, and provide a clear view of customer interactions across multiple services.

The challenge is that most existing OSS/BSS solutions used by traditional operators are too expensive for MVNOs. MVNOs need scalable, cost-effective platforms that offer converged billing and flexible growth options to remain competitive. Customers should be able to receive a single invoice for all services, ensuring simplicity and transparency.

Expanding access to affordable connectivity benefits everyone. With the proper infrastructure and strategic partnerships, MVNOs can create sustainable solutions that bridge the digital divide.

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The renewable energy shift South Africa can't afford to delay

South Africa's energy crisis isn't breaking news – it's been a slow-motion disaster for years, and after a surreal hiatus, load shedding is back. Rolling blackouts, an over-reliance on coal and a fragile grid have left businesses, households and entire industries in survival mode for well over a decade. We all collectively roll our eyes when the lights go out, and the generators start humming. Most of us have realised that waiting for a government-led miracle is no longer an option. [Read more.](#)

Electric dreams: Will machines ever imagine?

AI does not dream. Nor does it imagine. It doesn't autonomously generate other-worldly subconscious mashups of childhood memories and unfinished thoughts, and it never wakes up wondering why it was fighting a giant shrimp in its old high school. However, in its own way, AI hallucinates – and that is where things get interesting. [Read more.](#)

Future-proof learning: The role of robotics in education

Robotics and coding are transforming how students learn, introducing practical and essential skills for the modern world. In South Africa, introducing robotics and coding into the school curriculum for grades R to 9 marks a significant step towards equipping students with tools to think critically, solve problems, and tackle challenges creatively. [Read more.](#)

Bee-Bots: Is the buzz worth it?

Bees are the unsung heroes of agriculture, tirelessly pollinating over 75% of the world's food crops, from coffee and almonds to avocados and apples. Yet, their populations are plummeting at an alarming rate, threatening global food security. In South Africa, a country where crops like citrus and avocados drive both exports and local livelihoods, this crisis looms large. [Read more.](#)

AI in healthcare: Africa's hope?

Imagine, somewhere in the near future, a patient walks into a clinic in a rural community in South Africa. While they're waiting to see a doctor, they go to a self-service AI assistant kiosk that pulls up their medical history, recent symptoms and vital signs from a wearable device they've been using. The AI offers a preliminary diagnosis within minutes, suggesting further tests or treatments to guide the clinician's final decisions. In the doctor's consultation room, supported by the AI's insights, the doctor has more time to focus on the patient's specific needs, providing a human touch that no technology could replace. In the background, AI systems monitor local health trends in real-time, alerting clinics to outbreaks or resource shortages ensuring care remains proactive and efficient. [Read more.](#)

DeepSeek AI: A game-changer or a passing disruption?

The sudden rise of DeepSeek AI, a Chinese artificial intelligence startup, has sent ripples through global markets. Its capacity to develop a high-performing AI model with fewer resources than its Western counterparts has left investors rattled and industry leaders reassessing their next moves. [Read more.](#)

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