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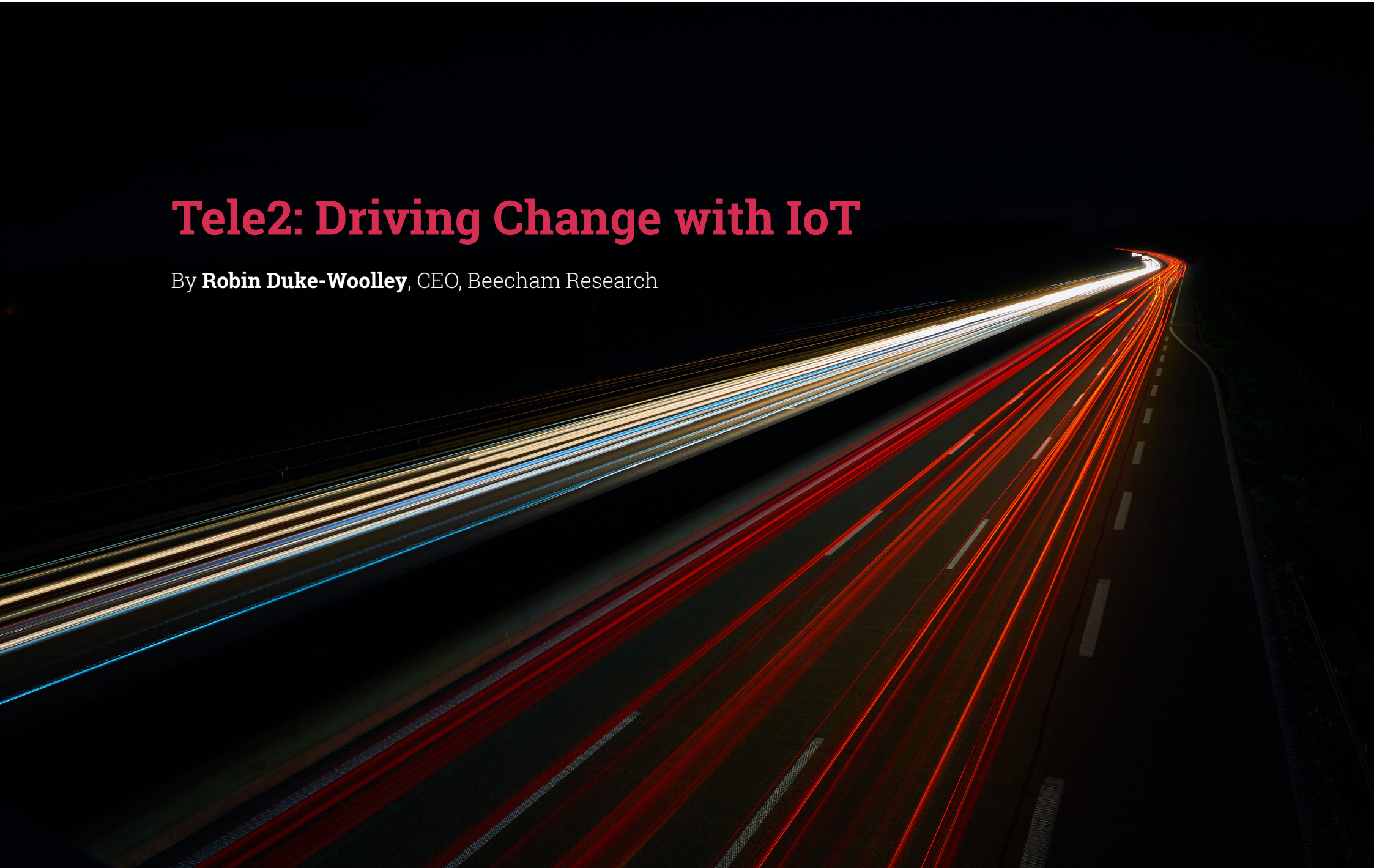
TELE2 INTERNET OF THINGS

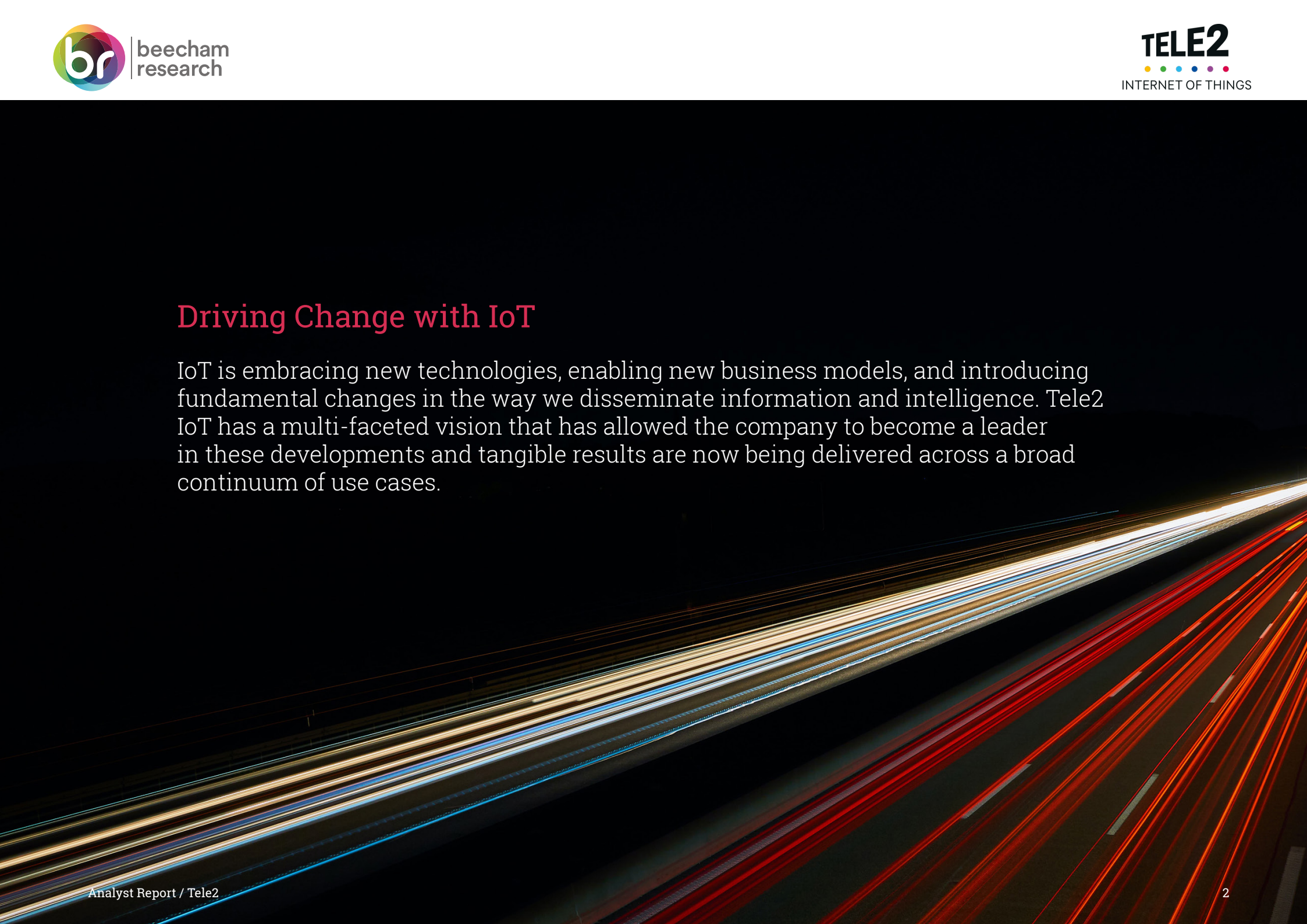
Tele2: Driving Change with IoT

By **Robin Duke-Woolley**, CEO, Beecham Research



Driving Change with IoT

IoT is embracing new technologies, enabling new business models, and introducing fundamental changes in the way we disseminate information and intelligence. Tele2 IoT has a multi-faceted vision that has allowed the company to become a leader in these developments and tangible results are now being delivered across a broad continuum of use cases.



IoT is now developing quickly

As IoT solutions become increasingly important to business operations, the challenges this presents are becoming more diverse while at the same time more in-depth. Compared with just a few years ago, IoT solutions are becoming:

- Critical to operations, requiring immediate and highly reliable, low latency data for automation and control
- Much larger, with deployments of 10,000+ connected devices becoming more common – towards Massive IoT.
- Extended, with consistent coverage required across borders and over large geographic distances including worldwide
- Interoperable – able to work with a wide range of other systems
- As a result of these, increasingly visible as targets for cyber-attack.

In addition to these, and partly because of them, IoT is enabling new business models that could not have existed before and where IoT is a fundamental part of the operation. For many of these, essential data and services are delivered through the connection itself. For these, no connectivity means no revenue so that connectivity – which is now wireless in 98% of cases – must be highly reliable.

At the same time, there is an increasing requirement for businesses to commit to sustainability goals and the ability to measure improvements in sustainability of business operations. This includes major connectivity providers and IoT has a significant part to play in this area as well.

Introducing Tele2 IoT

Tele2 IoT is a global mobile IoT connectivity provider. The former competence comes from preferred partnership agreements with more than 380 roaming partners in over 170 countries. Non-steered connectivity is provided on five continents using NB-IoT, LTE-M, 2G/3G and 4G/5G services.

The second competence is reflected in numerous IoT deployments, which have enabled Tele2 IoT to become a European top ten player with a healthy year-on-year growth rate of 22%. The company has focussed on key areas including connected healthcare, large scale EV charging and the EV ecosystem, smart cities, and agriculture.

In 2022, the company also set an ambitious target, to net-zero emissions by 2035, that has been approved by the SBTi (Science-Based Targets initiative). Science-based targets provide a defined pathway for companies to reduce greenhouse gas emissions, helping prevent the worst impacts of climate change and future-proof business growth. Tele2 IoT was the first company based in the Nordics and Baltics, and the second telco globally, to obtain this approval.

Recent market survey findings

For example, a recent survey among enterprise IoT users confirms that the IoT market is now moving quickly from the early adopter phase to early majority, resulting in significantly larger deployments.

As shown in **Figure 1**, to the question 'roughly how many IoT devices and/or terminals are currently connected in or through your business?', 33% of respondents already had over 5000 devices connected. To the second question 'how do you expect that to change in the next 24 months?', a massive 61% of respondents also expected growth of over 10% in the next 24 months, with 22% expecting over 40% growth. As this indicates, IoT growth is set to continue at a fast rate, with current deployments also increasing substantially in size.

In **Figure 2**, to the question 'what types of IoT applications is your business currently using or expecting to use within the next 24 months?', 72% of respondents chose remote monitoring and control in real time. Traditionally, M2M and early IoT applications were solely involved with remote monitoring in non-real time. While this choice still scores highly (59%), it has been significantly eclipsed by the increasing requirement for real time data which is set to dominate in the near future. This is a huge change for IoT solutions and requires considerable changes in support.

Figure 1. *Enterprise IoT users expecting strong growth in their IoT deployments*
Source: Beecham Research Nov 2022

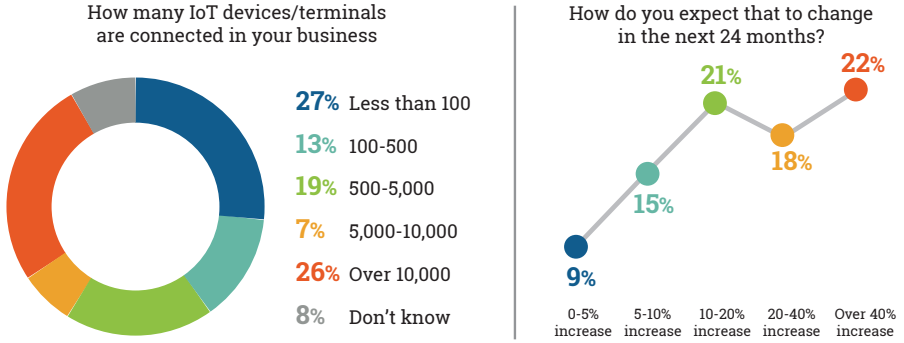
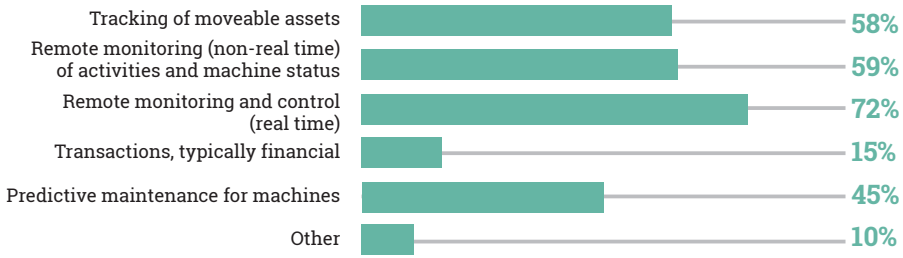


Figure 2. *What types of IoT applications is yours business currently using or expecting to use within the next 24 months?*
Source: Beecham Research Nov 2022



Meeting these IoT challenges

The increasing diversity and depth of the challenges now required to be delivered by IoT solutions represent a complex mix of support requirements that need increasingly specialist expertise to provide. The following are examples of some of the ways Tele2 IoT has responded to these:

1. *Scalable connectivity management – 2CONTROL*

2CONTROL Connectivity Management Platform (CMP) is based on Cisco's IoT Control Center. It is the backbone of Tele2's IoT offering and Cisco is a close partner. IoT Control Center minimizes the complexity and cost of connectivity management in cellular networks in order to increase the profitability of IoT business. It provides real-time visibility and control for enterprises providing connected services, along with IoT capabilities such as initialization, mobile services management, real-time interaction, support for diagnostics, billing and business automation. It provides for the management of IoT projects of any size, whether that's 100 or 100,000 devices.

All companies, regardless of their business, want to ensure that malfunctioning devices do not generate unexpected cost overruns. With IoT Control Center, users can create numerous rules that change a SIM's rate plan in response to a particular trigger. For example, if a SIM exceeds its usage limit for the current billing cycle, users might move the device to a different rate plan with more favourable rates and then switch it back to the original rate plan at the end of the month.

IoT Control Center also provides for the management of complex device lifecycles. By automating key transitions from one stage in the service lifecycle to another, users can design a near zero-touch provisioning flow, which ultimately results in lower costs, increased reliability, and the ability to scale quickly.

Regarding security, IoT Control Center contains a number of security features that address login security, fraud prevention, and a range of other activities. For example, it is also possible to monitor device IMEIs and other credentials by IMEI tracking and creating IMEA whitelists, so each time a device requests a data session, the user can validate the device IMEI against an approved list.

Automation rules enable users to ensure service reliability, manage costs, and scale business faster by programmatically controlling devices—without doing any programming. Users can quickly and easily set custom rules right from the IoT Control Center user interface, instructing the platform to monitor devices and, if specific triggers occur, take appropriate action instantly and automatically.

2. Secure, low latency, high reliability data transfer – 2ACCESS

As noted earlier, IoT activities are increasingly visible as targets for cyber-attack. Vulnerabilities in IoT are being exploited with malicious intent. To prevent this requires managing confidentiality, integrity, and availability.

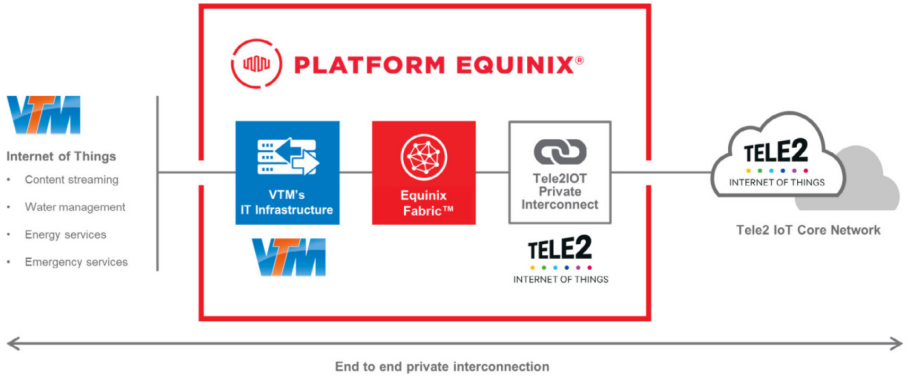
2ACCESS is the service that Tele2 IoT has created for this, substantially in partnership with Equinix, a leading digital infrastructure company. Many IoT devices will require the transfer of potentially sensitive data. It is essential that this data is adequately protected at all times, and that the user is aware what private data is being processed. If there is a need for a high level of confidentiality and integrity, end-to-end encryption can be provided by Tele2 IoT via private APN with IPsec VPN, Cloud Interconnect, or Private Interconnect in conjunction with Equinix.

A particularly striking example of this is for VTM, which needed fast, secure and reliable connectivity to meet the needs of the mission-critical industries it serves, including content streaming, water management, energy and emergency services. To securely and reliably deliver end-to-end interconnection that accelerates IoT data traffic to its customers, the company required low-latency connectivity without going over the public Internet. Equinix and Tele2 IoT, working together, enabled this.

VTM customers, such as fire, ambulance, and environmental safety services, require continuous communication across their IoT devices given that any disruption in service could mean a loss of life. Where most IoT solutions are based on IPsec tunnels, together with Equinix and Tele2 IoT, VTM provides innovative communication services based on direct and secure interconnection. By working together, the companies are providing VTM's customers with the non-stop access to IoT communication that their mission-critical services require.

Equinix Fabric™ software-defined interconnection delivers dedicated, virtual connections between the VTM and Tele2 IoT platforms, where data is captured from VTM's client's IoT devices. For VTM to keep control of its IoT device connectivity and oversee the cost and availability of its connections, it deployed Tele2 IoT's subscription-based 2CONTROL connectivity management platform, based on Cisco IoT Control Center. The Tele2 IoT platform delivers LTE-M, a low power wide area network radio technology designed for massive IoT applications. The Tele2 IoT platform also provides the management of the connectivity, SIM, data transfer and LTE-M that enables VTM to deploy stable, secure and unified connectivity.

VTM's IT infrastructure on Platform Equinix® is highly available, enabling the reliable access to communication for VTM's customers who cannot tolerate any disruption to their IoT services. It is configured redundantly between the Amsterdam (AM5 and AM7) Equinix International Business Exchange™ (IBX®) facilities, with dual connections to the Tele2 IoT platform in Sweden. This enables VTM to deliver continuous communication to its customers.



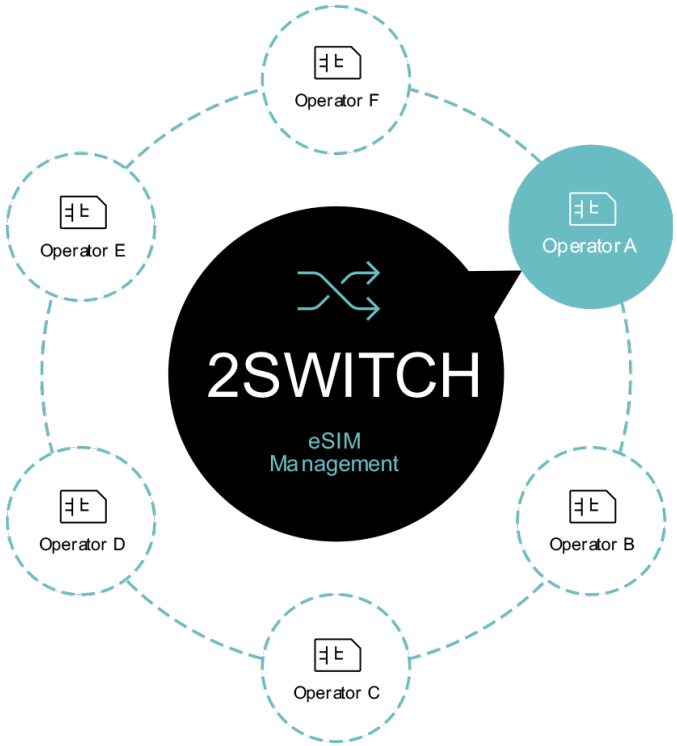
3. eSIM management – 2SWITCH

It is one thing to have global SIMs, but quite another to ensure the best coverage, price and data rates required for each device in a broad population, which may be worldwide. Traditionally, changing connectivity provider meant physically replacing SIM cards – an increasingly unattractive prospect that requires considerable field support and related cost and time. eUICC technology (embedded Universal Integrated Circuit Card) provides the means to change connectivity provider without the need for physically replacing SIMs, by updating over-the-air.

Tele2 IoT's service for achieving this is 2SWITCH, comprised of eUICC SIMs (or eSIMs), Virtual Profiles (subscriptions), and a Subscription Management System. GSMA has developed a set of specifications (SGP.01, SGP.02 etc.) demonstrating compliance with core requirements. This means subscription profiles from actors within the GSMA ecosystem can be securely downloaded onto the SIM, whether it is embedded or plug-in form factor.

In addition to this, Tele2 IoT provides access to a substantial geographical footprint that provides roaming to more than 580 operators in over 200 countries. Tele2 IoT also has preferred partnership agreements with more than 380 roaming partners in over 170 countries. The company's customers are typically MNO, MVNO or big players in industry verticals who need instant global roaming coverage.

As well as this, Tele2 IoT has launched automated one-way switching, meaning that when a SIM is deployed in one country, it will automatically switch to another profile if required by the use case. The next step will be to expand this feature later in 2023 to devices crossing country borders multiple times in their lifecycle.

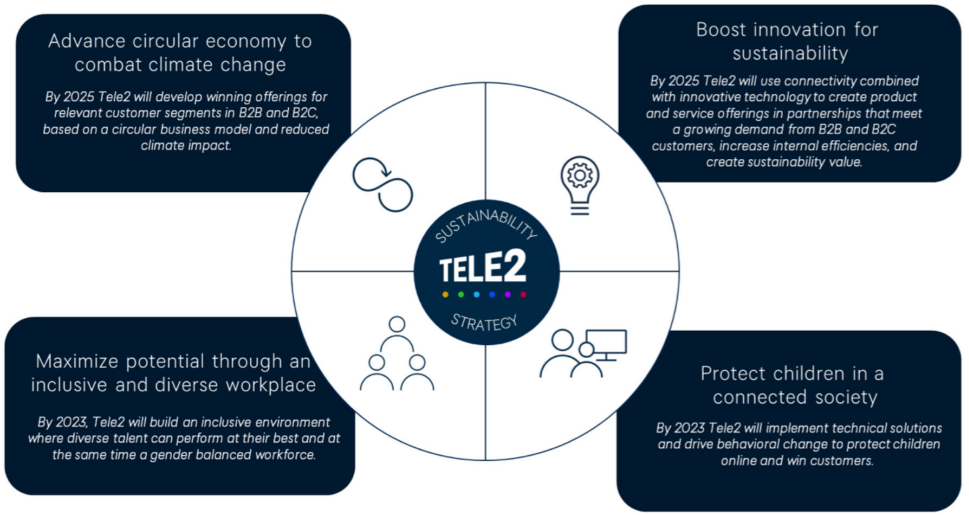


4. Sustainability

Sustainability means meeting society's needs without compromising the ability of future generations to meet their own needs. It is based on three pillars: the economy, society, and the environment. A circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products for as long as possible.

The transition to a society built on circular economy requires connectivity, which is why Tele2 has determined that connecting the circular society should be a corporate goal. To date the company has reduced emissions in its own operations by over 95% and is carbon offsetting remaining emissions until they can be reduced to zero, well ahead of the 2035 deadline.

Moreover Tele2 believes that sustainability should be an integrated part of the company's long-term success as a company, which underlines the importance of involving different parts of the operations and aiming for circularity in the value chain. For that reason Tele2 was the first telco in the Nordics and Baltics to adopt a circular economy target for network equipment in its own operations. The company has also been the project leader for a GSMA project on circular economy for devices.



AI4GREEN

Tele2 has led the European research project AI4GREEN investigating how AI can be used to reduce energy consumption in mobile networks between 30 and 40 percent while simultaneously optimizing capacity to meet consumer needs. The company's participation is an important part of the it's sustainability efforts and a step along the way to building Europe's most modern 5G network.

In recognition of its work on sustainability, in April 2023 Tele2 was placed top in the Financial Times list of 500 companies showing Europe's Climate Leaders 2023.

Example case studies

Tele2 IoT has a wide range of case studies to illustrate how it is responding to new IoT challenges, particularly in EV infrastructure and charging, healthcare, agriculture and smart cities. A small selection of these are as follows:

1. *Virta Global EV Charging Infrastructure*

Virta's cloud-based platform includes everything needed to build a charging business, from charging infrastructure management to end customer services and smart energy management solutions. It is an end-to-end solution for EV charging, providing services for companies who own and operate charging stations, as well as services for companies who want to provide mobile apps for drivers and want to handle payments and money flows. Virta's digital platform connects all of these hundreds and thousands of companies together so that EV drivers can charge their cars anywhere, whether that is in Europe or around the world, connecting charging station operators to hundreds of thousands of EV drivers.

But different companies in different countries use different kinds of hardware. Virta is a universal EV solution, removing the need to download apps for every country. It is a one stop shop for EV charging.

The need for mission critical connectivity is particularly acute in rural areas. In many cities, there are plenty of easily available charging stations but the further away from the city, the less charging stations there are. If the one to hand is not connected, there is an immediate problem – so, having a fully available network is vital to Virta's solution.

Because Virta works in 40+ different countries and with thousands of different customers all over the world, they needed an easy way to make and manage different configurations of their deployment. The answer for them was TELE2's 2CONTROL (Cisco IoT Control Center), which allows them to easily adjust rate plans and communication plans for different use cases and different markets.

2. *Candela Electric Speedboats*

Electric boats have been around in one form or another for over 100 years, but they've always faced the same issue: they had speed without range, or they had range without speed. Sweden's award-winning Candela Seven has changed all that. IoT and connectivity is crucial to their operations. A lot of data needs to be logged to help customers around the globe – so the boat could not be done without IoT.

The principle is that you cannot have a normal boat hull and then load it up with batteries, because even with the best lithium-ion batteries on the market – or even next generation – you will still get a really short range at high speeds because of the friction in the water. The only way to reduce that friction is to use hydrofoils, which are basically submerged wings under the hull that lift the boat above the water at speeds from 70 knots.

The whole carbon fiber structure is extremely light. The hull and deck is 240 kg, which is very light for an almost 8-meter-long boat. For comparison, a similar fiberglass boat would be almost 800 kg.

When it comes to IoT, Candela is an IoT-enabled product that uses IoT to serve customers globally. Data on everything from motor performance to the location of the boat is logged. If there is an anomaly in the electrical systems, for example, Candela can track that and also fix it remotely. Connectivity saves a lot of time and money for both Candela and Candela's customers. They do not need service centers all over the world because most problems can be fixed remotely through connectivity and IoT.

"IoT and connectivity is crucial to what we do. You really have to log a lot of data to help customers around the globe – so this boat could not be done without IoT".

3. *NoFence cattle grazing*

The NoFence patented grazing technology allows farmers to build geographical 'fences' via a smartphone application that connects with a collar worn by the animal. The geographical fence ensures that the animals are not only free to roam in a dedicated area, but that they are easily moved from one pasture to the next without having to physically move or build fences or other barriers. This not only saves time, money, and manpower, it is also in line with the growing regenerative agriculture movement, which among other things, helps reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity.

Reliable connectivity is a fundamental part of the Nofence solution – no connectivity literally means no geofencing. The company has been using Tele2 IoT SIM cards from the start and roaming has also been essential because livestock move around a lot.

See Tele2 IoT at **https://tele2iot.com/**