INDUSTRIAL DIGITALIZATION IS DRIVING DEMAND FOR PRIVATE MOBILE NETWORKS

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Abstract *– With pressing capacity, security and critical communication needs, industries and public agencies are seeking to establish their own private LTE and 5G networks. Here's a look at what is rapidly becoming the preferred approach to delivering wireless broadband connectivity to industrial campus environments.*

Index terms *– Ericsson, 5G evolution, private mobile networks.*

With 3GPP technologies able to meet increasing industry requirements on performance, as well as a broader range of spectrum options, the demand for private cellular networks is growing rapidly. According to Arthur D Little's predictions, the market for private campus networks, services and solutions are expected to be worth EUR 60-70 billion by 2025 [1].

Ericsson is a leading provider of private LTE and 5G networks and has partnered with a broad range of service providers to connect industries and enterprises whose businesses are rapidly digitalizing. In the first half of 2019, Ericsson entered agreements with Telefynica, Telia, Telstra, Vodafone, Deutsche Telecom, and Elisa to provide its Private Networks solutions.

Manuel Ruiz, Head of Mission Critical & Private Networks, Ericsson, says: "Industries benefit from the technical expertise and 5G evolution plans that service providers bring to their business. They can also rely on existing service provider investments to extend their operations to new, unexplored use cases. By doing so, they can focus on innovating and optimizing their core business, leaving the complexity and evolution of connectivity services in the capable hands of their service provider."

The demand for Private Network solutions comes from a variety of industries and enterprises that share a common need: to look beyond Wi-Fi for secure and highly reliable broadband connectivity.

From voice and data, to industrial connectivity

About 20km from its headquarters in Stuttgart, Germany, Mercedes-Benz is building a new, 220,000sq m production facility. At Factory 56, all production systems and machines will be connected

and operated via secure 5G that will achieve real-time low latency performance while handling enormous amounts of data. The 5G network, built by Ericsson and Telefynica Germany, will help Mercedes-Benz to boost the flexibility, precision and efficiency of its production operation.

Factory 56 is just one of Ericsson's ongoing projects that are enabling service providers to develop capabilities and gain experience of entering the private networks market.

About 400km away, another automobile factory is implementing Ericsson's 5G networking solutions for secure and near real-time data networking across the production chain.

At the e.GO electric car factory in Aachen, Germany, network slicing and mobile edge computing are set to enable secure automatic identification and delivery of production materials to each vehicle as it goes through the assembly process. The private 5G network, built together with Vodafone Germany, will support fully autonomous vehicles to replace the traditional production line, increasing operational speed and efficiency throughout the production chain.

And recently, Telstra's Mining Services announced its second official Private LTE mining partnership with Ericsson as the technology partner. The project involves the development of an underground private 4G network for South32's Cannington mine in North West Queensland. At full installation, it would be one of the largest LTE networks for underground mining in the world.

Ericsson is also using dedicated cellular network solutions at its own production facilities to increase production efficiency and sustainability. The private LTE network at Ericsson's factory in Tallinn, Estonia, is enabling the use of automated guided vehicles and augmented reality (AR) along with massive real-time data collection and analytics to create a more sustainable, efficient and safer production environment.

The extreme low latency and highly adaptable characteristics of Ericsson Private Networks is enabling the rapid integration of sensors, machines, in-vehicles such as built-in remote-control devices in a ship-to-shore crane at a port, and hand-held devices across a wide range of applications for industry enterprises.

Spectrum a key enabler for private networks

Regulators have been releasing more and more spectrum to traditional mobile network operators as well as specialist service providers, and in some countries even directly to local industries and enterprises. These moves have all helped to accelerate the growth and deployment of private networks.

Private networks can use licensed, unlicensed and, in some countries, shared spectrum in the 3.5-4.2GHz and 5GHz bands. In licensed spectrum, many countries have defined specific frequency ranges for public safety and/or utilities. Flexible in meeting varied market demands, Ericsson has been working with the utilities sector, for instance, to explore functionalities for critical communications such as eMBMS, enabling broadcast services for efficient group communications to large numbers of users simultaneously.

Ericsson is running collaborative projects with Orange Poland and German companies Innogy and 450Connect. These projects complement the experience from existing deployments in the utilities sector. Innogy, 450Connect and Ericsson have together launched a pilot project to confirm the suitability of LTE in the 450MHz frequency range for the critical communication needs of their energy operations in Germany. In particular, voice communications, decentralized power generation, telecontrol systems and smart meter gateways are being tested.

Other related projects

Telstra has implemented a private LTE network at a gold mine in Papua New Guinea. The private LTE network will allow Newcrest Mining, operator of the Lihir gold mine, to connect trucks, drills, excavators, bulldozers, shovels and barges for significant performance improvements in terms of reliability, speed and latency.

In China, Ericsson and China Mobile in Jiangsu are jointly running a PoC project to enable advanced use cases for manufacturing. Ericsson and Elisa have teamed up to successfully pilot a private cellular network for the operator and its customers.

Deutsche Telekom and Ericsson have announced a strategic campus networks partnership to address the growing market demand in Germany for mobile solutions at industrial sites. Ericsson has supported AT&T in deploying the FirstNet first responder network.

Industry 4.0

Industries are under constant pressure – to improve product quality, boost factory efficiency, stay competitive, enhance safety, security and sustainability, and remain profitable.

Continuing to drive operational efficiencies through traditional cost-cutting measures now provides only marginal gains. Industry 4.0 is about the significant transformation taking place in the way goods are produced and delivered – moving toward industrial automation and the flexible factory. To stay competitive, factories and warehouses must leverage the industrial internet of things (IIoT) and digitalization to become much more agile and efficient.

While industries have automated many processes, secure wireless connectivity empowers factory automation, making industrial automation possible on a much larger scale. By creating a digital foundation, industrial automation will increase productivity and performance. Huge gains await industries that cut the cord and go wireless. Wireless cellular connectivity supports the business outcomes that industry expects from Industry 4.0. For instance, in manufacturing, it enables flexible production by allowing smart factories to rapidly changeover production lines to shorten lead times.

Enable smart manufacturing

The transition to Industry 4.0 will depend on a successful adoption of many new technologies. To accelerate smart manufacturing, digital twins of machines and operations will be a necessity, as will factory automation and real-time control of equipment and tasks. For instance, Ericsson's factory in Tallinn has demonstrated that with augmented reality troubleshooting, the average fault detection time reduction combined with better ergonomics and faster information sharing, can boost productivity by up to 50%.

Industry 4.0 will help make smart machines smarter, factories more efficient, processes less wasteful, production lines more flexible and productivity higher. Built on the foundation of smart, secure, wireless connectivity there are opportunities to extend machine life through predictive maintenance, support rapid material handling, monitor every detail of the shop floor, and leverage collaborative robots simultaneously with mobile communication. This will help factories realize their goal of becoming a fully automated factory.

Wireless cellular solutions for factories and warehouses

Enterprises implementing Industry 4.0 need fast, reliable, secure wireless connectivity solutions. Ericsson's wireless connectivity solutions, purpose-built for industrial environments, provide secure, reliable coverage, high device density, predictable latency, and full visibility of machines, processes and data.

Ericsson offers global connectivity and user management through the IoT Accelerator as well as on-premise connectivity solutions for industries.

How the wireless factory improves efficiency for smart manufacturing

The manufacturing industry is entering Industry 4.0. In the quest for lean manufacturing and smart production, petabytes of data are being generated and streamed for analysis. This makes safe and sustainable management of data and devices a challenge.

Intelligence is being moved from the devices into the cloud for increased performance, cost-efficiency and flexibility. The requirements for lean manufacturing and concepts like digital twins in the production line call for a fast, stable, secure and simple connectivity solution. Digital transformation of an industrial environment is only as strong as its underlying foundation, which is why choosing a secure, reliable cellular connectivity standard is essential.

When you automate manufacturing, a dedicated 4G/5G network offers a smart, secure, wireless connectivity solution. By eliminating costly cabling, it enables easy reconfiguration of production lines for an agile factory. This flexible manufacturing helps meet customer demand for a variety of products. It has the benefits of cellular security for data and device integrity and an open platform for applications and services for factory developers, device manufacturers and OEMs. A private cellular network in the factory is the first step towards exploiting the value, efficiencies and gains of Industry 4.0 concepts and use cases. Any business or industry that wants to be part of the new wave of economic growth should start using 4G/LTE to begin the digital transformation now and quickly transition to 5G.

Simple Connectivity

Massive IoT means millions of devices like sensors, requiring a simple and secure way of adding, activating and managing new device connections.

Secure Connectivity

With more connected and wireless devices comes a higher risk of issues & cyber breaches. Secure transmissions, updates and ways to verify assets & data will be crucial.

Stable Connectivity

Critical IoT use cases require low latency and instant feedback. Processes will be orchestrated and

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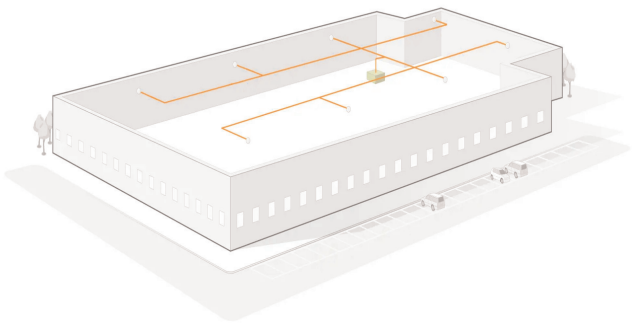
controlled remotely from the cloud and need a stable and resilient connection with SLA guarantees.

Ericsson Industry Connect

Operators of most manufacturing, logistics, and distribution plants want a communications solution that simplifies, not complicates [2].

That's why many are turning to Ericsson Industry Connect, a turnkey solution that solves the connectivity needs of the smart factory or warehouse with an unequalled level of ease. To deliver high reliability, high device density, robust security and predictable latency, Ericsson Industry Connect network relies on LTE technology, the trusted technology used in cell phones around the world.



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Easy to install and use

Installation and network setup are easy. Once setup is complete, you'll be up and running quickly, often within 24 hours

Highly reliable

No handoffs between access points means no dead spots – just reliable connectivity throughout the factory. No kidding.

Highly secure

Industry Connect keeps all data on premises using built-in LTE security protocols to increase data security.

Built for Industry 4.0. Ready for 5G

Built on the Ericsson 5G-capable cellular platform, Ericsson Industry Connect not only enables Industry 4.0 today, but also readies your operations for 5G.

References

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