Ericsson Enterprise Wireless Solutions

How 5G Private Networks are driving industrial digitalization
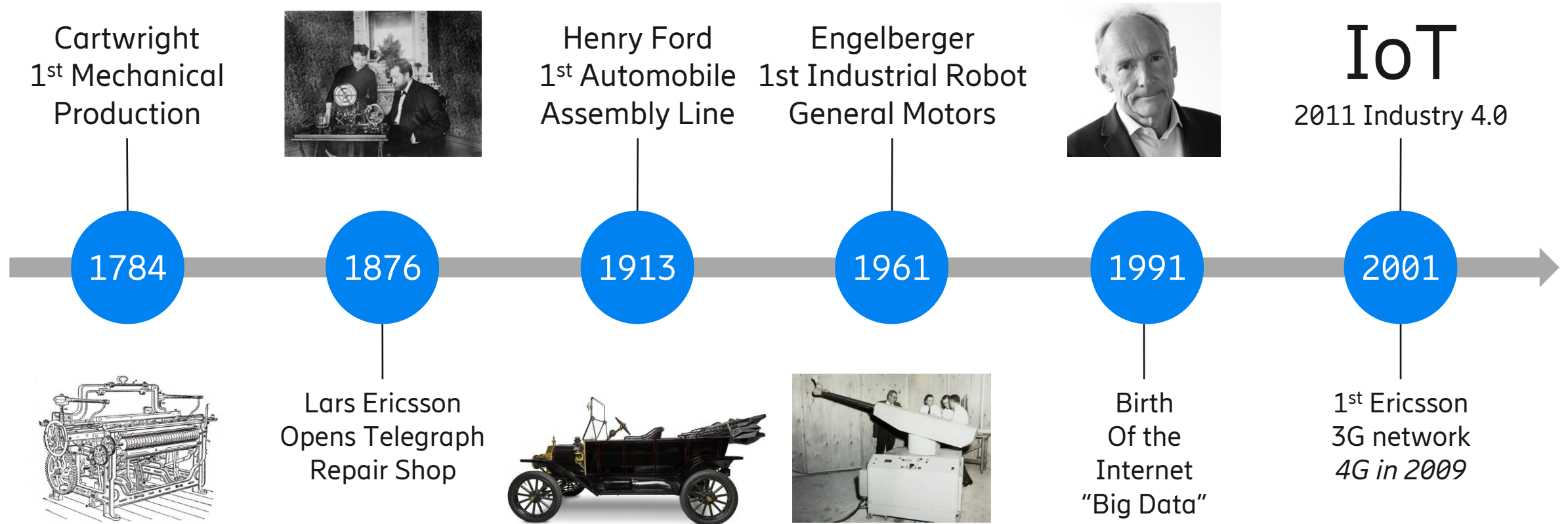with fast, secure, and reliable connectivity

Duncan Hawkins, VP, Private Cellular
Networking Sales
EMEA, Ericsson Enterprise Wireless Solutions

Joe Wilke, VP, Private Cellular
Networking Sales Engineering,
EMEA, Ericsson Enterprise Wireless Solutions

Key Industry and Digital Moments in Time

Cartwright
1st Mechanical
Production

Henry Ford
1st Automobile
Assembly Line

Engelberger
1st Industrial Robot
General Motors

IoT
2011 Industry 4.0

1784   **1876**   **1913**   **1961**   **1991**   **2001**

Lars Ericsson
Opens Telegraph
Repair Shop

Birth
Of the
Internet
"Big Data"

1st Ericsson
3G network
4G in 2009

The pace of innovation is accelerating

82%

Must invest in digital transformation or be left behind

In fact,

49% vs **20%**

Digital transformation more important than macroeconomic challenges

And they ...

52% & **56%**

Identify operational resilience and cybersecurity as biggest challenges
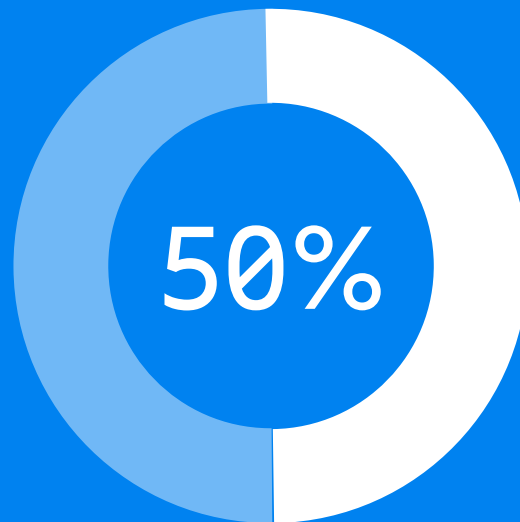
Industrial Digitalization Global Projection

USD 516.69 Billion

CAGR 18.38%

Forecast Years

USD 113.86 Billion

USD XX Billion

Historical Years

Base Year

| 2022 | 2021 | 2020 | 2023 E | 2024 F | 2025 F | 2026 F | 2027 F | 2028 F | 2029 F | 2030 F | 2031 F | 2032 F |

Source: **Straits Research**

Industrial Digitalization Swiss Lens
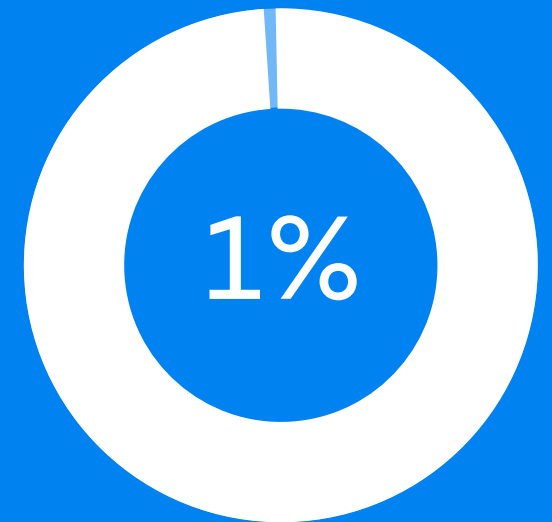
+22%

12mth Earnings growth Industry & Materials Sectors

50%

of Top 100 by Revenue have 5G Propensity

25%
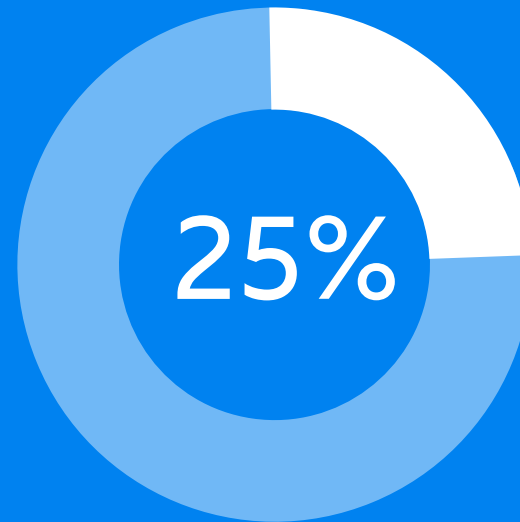
of GDP is from Industry
1% from agriculture

1%

of Business >SME
~5,500 Companies

Cellular connectivity is fundamental to Industrial use cases
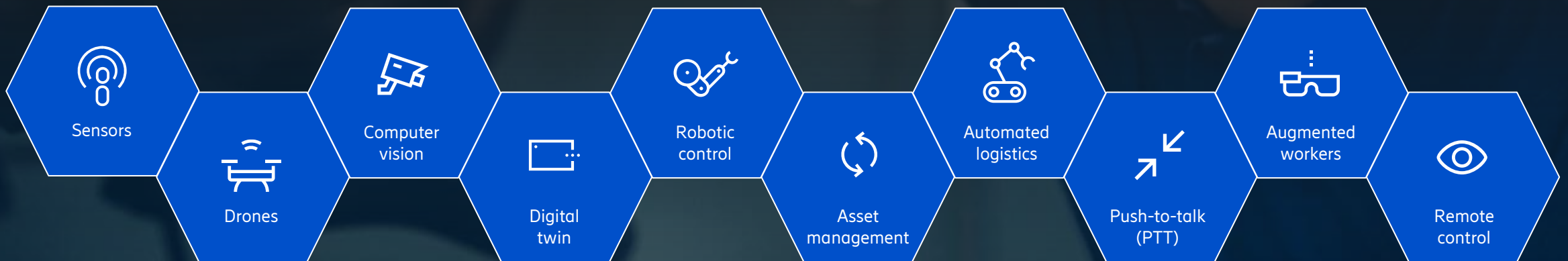
Digitalization

Implement new use cases by integrating wireless sensors, cameras, and drones, as input to digital models and AI analytics

Automation

Take full advantage of industrial control, automation, and remote control throughout the production process

Connected Assets

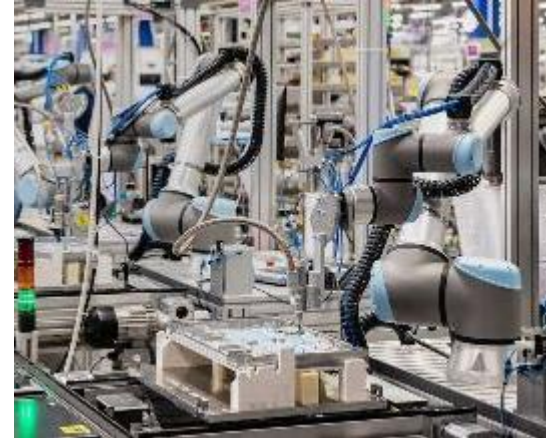Boost worker capabilities with XR immersive reality, location awareness for safety and machine interaction

Sensors

Drones

Computer vision

Digital twin

Robotic control

Asset management

Automated logistics

Push-to-talk (PTT)

Augmented workers

Remote control

Manufacturing Challenges and Needs

Customer:
Tailored products
$\Rightarrow$ Flexible Production Lines

Internal:
Efficiency
— Product Quality
— Equipment Uptime
— Material Handling

Employee:
Connected Worker
— Worker Safety
— Internal & External Communication
— Retain/attract talent

Society:
Sustainability
— Energy consumption
— Carbon footprint
— Environmental impact

How can 5G help make production smart?

Connect
things to the Network

Collect
data through the Network

Analyze
data retrieved from the Network

Act
on decisions through the Network

Increased Network availability

High Quality Data is a key asset

Enable M2M interactions

Customer value is generated by transforming real-time data into business value

Ericsson Private 5G in action
Make 5G-enabled networks and security technologies pervasive for enterprises

Advanced Industry 4.0 at Nestle

Taking advantage of 5G technologies requires flexible, high throughput, low latency networks connecting many massive numbers of devices.

Automation

Advanced Industry 4.0 With Atlas Copco

Cellular tightening tools with private network supporting high-quality solutions, digital twins and documentation

Tools

5G for industrial protocols

Cellular networks' high reliability enables factories to cut-the-cable even for demanding protocols like PROFINET/PROFISAFE

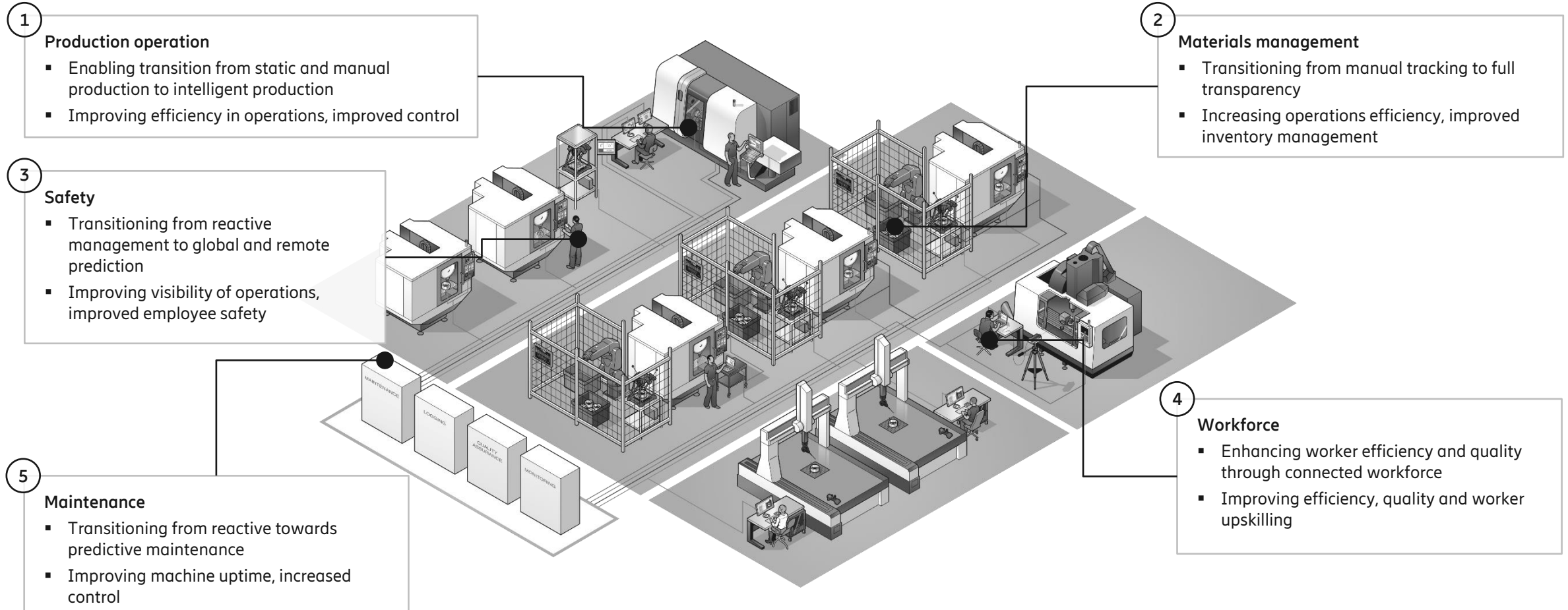**Network Stability**

5G enabling remote support

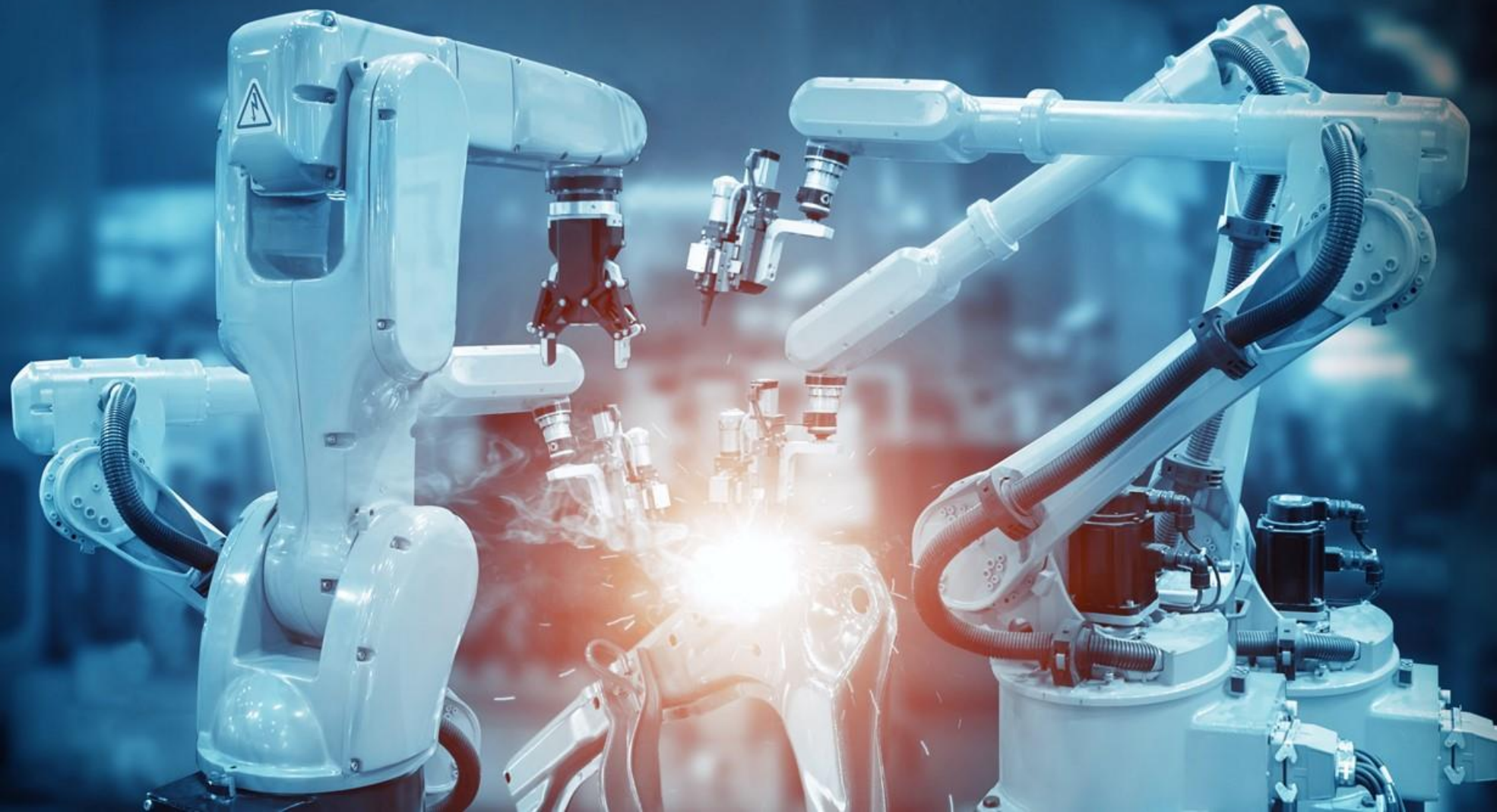Workers get support from remote experts and assets in the cloud.

Remote

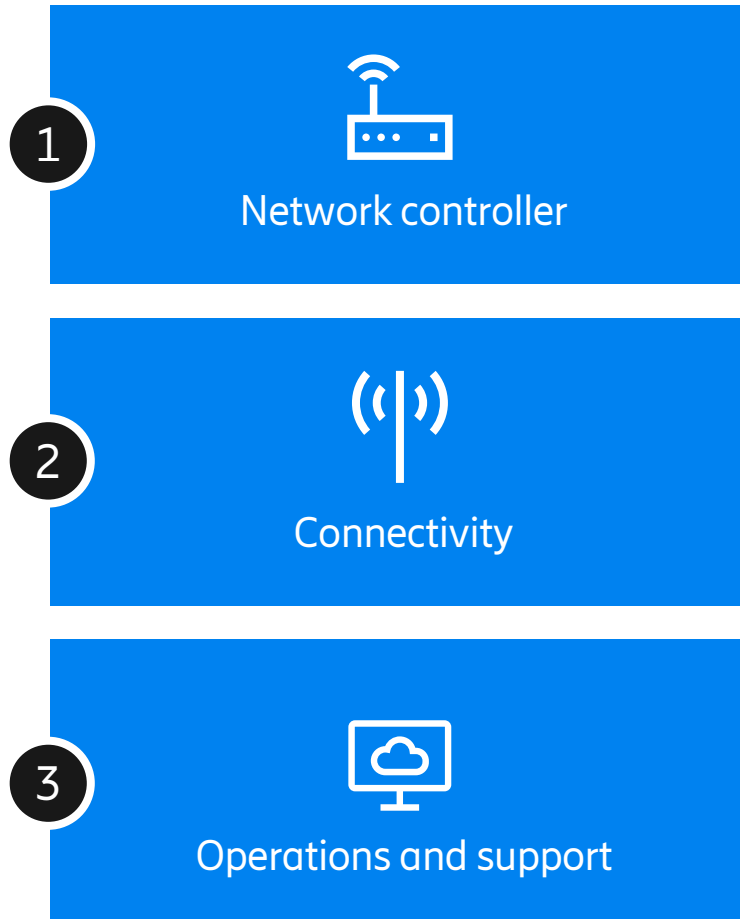# Smart manufacturing has benefits across the manufacturing plant

— Key processes of manufacturing plant and possibilities of smart manufacturing

1 Production operation
- Enabling transition from static and manual production to intelligent production
- Improving efficiency in operations, improved control

2 Materials management
- Transitioning from manual tracking to full transparency
- Increasing operations efficiency, improved inventory management

3 Safety
- Transitioning from reactive management to global and remote prediction
- Improving visibility of operations, improved employee safety

4 Workforce
- Enhancing worker efficiency and quality through connected workforce
- Improving efficiency, quality and worker upskilling

5 Maintenance
- Transitioning from reactive towards predictive maintenance
- Improving machine uptime, increased control

Ericsson Private 5G offering

1 Network controller

2 Connectivity

3 Operations and support

Capacity

3 Gbps	25 Gbps

Devices

100 to 20,000

50 SIM Cards included, additional SIM card packages can be ordered

Mode

4G	5G

Type

Indoor Radio Dot
Outdoor Micro, Macro, AIR

Area

1M Sqm
>1M Sqm

Level

Gold	Silver	Bronze

Global availability

Licensed and industry spectrum

Ericsson Radio Portfolio

Coverage or advanced use cases

Ecosystem

Device and gateway vendors, tool and heavy equipment makers, software vendors, system integrators, business consultants.

100+ partners engaged

Ericsson Private 5G radio portfolio
Award winning radio portfolio compatible with Ericsson Private 5G

RAN compute

4G + 5G in one box

Server room and outdoor deployment

Best-in-class power consumption

Radio dot

Smallest form factor

Indoor coverage with high capacity

Micro radio

Small form factor

Indoor or outdoor coverage

Macro radio

High output power

Outdoor wide area coverage

AIR

Spectral efficiency

High capacity

Energy-efficient Ericsson radios win Red Dot Product Design Award

Ericsson Private 5G
Open eco-system

Ericsson engages a rich ecosystem
Ecosystem partners completing an end-to-end solution

Ericsson ecosystem program

Device and gateway vendors, tool and heavy equipment makers, software vendors, system integrators, business consultants

110+
partners engaged

Independent software vendors
Applications ecosystem
Application enablement platforms
Manufacturing execution systems (MES)
Enterprise resource planning system (ERP)
Location platforms

Cellular network 4G /5G (public, sliced, Private Network)

Device partners and HW

Modules

Cellular gateways
Current loop
Ethernet
RS232
Analog I/O
Digital I/O

Machinery
Sensors
Actuators
Handhelds
Wearables
Cameras
Drones

Wired via gateway or integrated module, grid power

Integrated with cellular module or chipset, battery
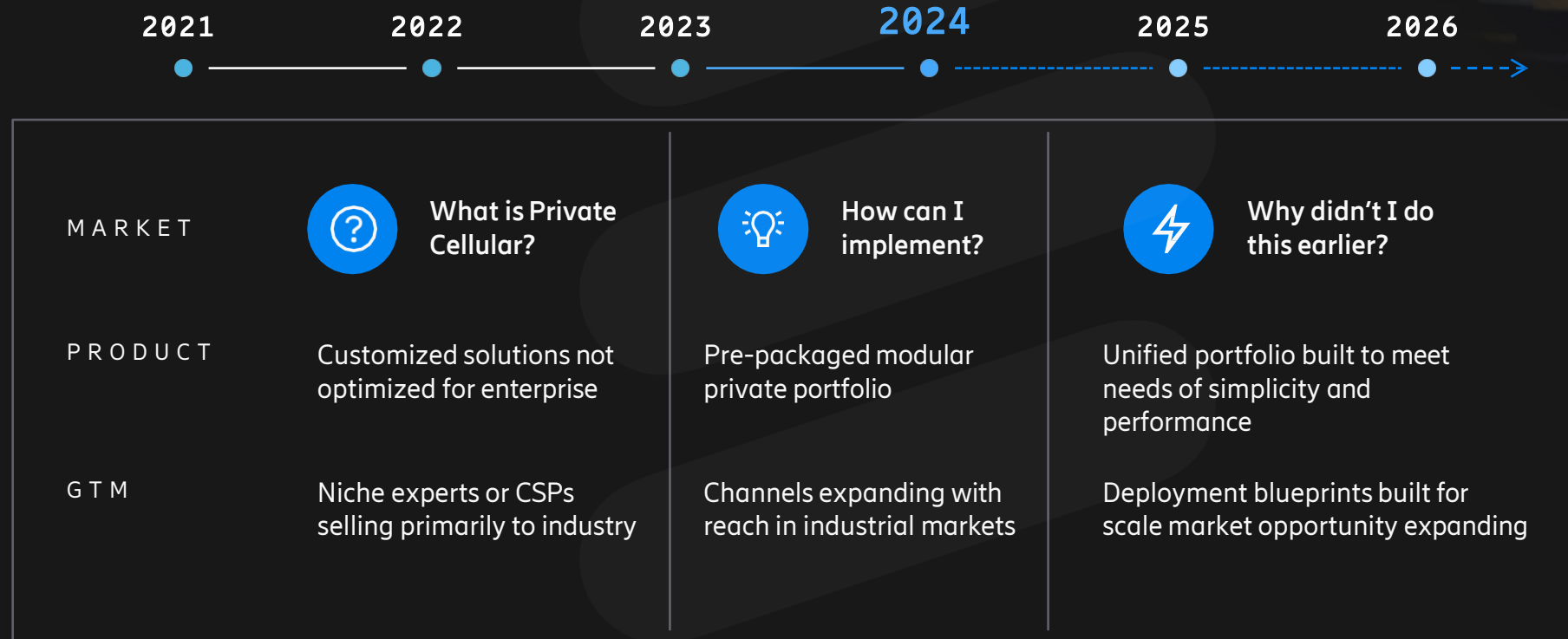
Professional services
System integrators and business advisors

ericsson.com/industry4.0

Ericsson Private 5G Insights

Private 5G Market Evolution

Private cellular is an early-stage market and we are starting to see repeatable use cases, which lead to higher sales velocity and faster scaling across verticals.
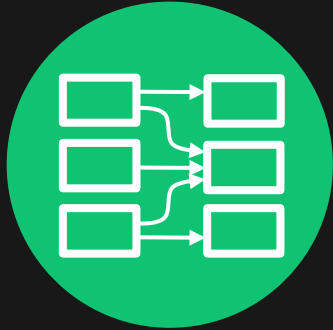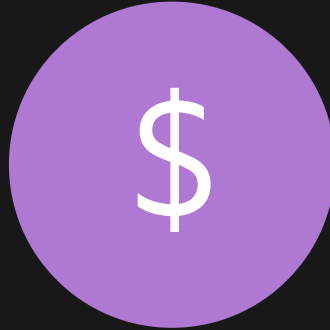
2021   2022   2023   **2024**   2025   2026

	What is Private Cellular?	How can I implement?	Why didn't I do this earlier?
MARKET			
PRODUCT	Customized solutions not optimized for enterprise	Pre-packaged modular private portfolio	Unified portfolio built to meet needs of simplicity and performance
GTM	Niche experts or CSPs selling primarily to industry	Channels expanding with reach in industrial markets	Deployment blueprints built for scale market opportunity expanding

Our Customer Journey

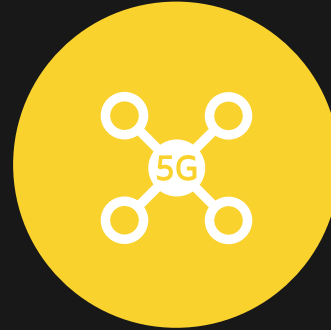| Identify Challenges	Use Case Matching	Use Case Contribution	Design Cellular Network	RoI Assessment	Execute
Find the Challenges for the Enterprise Customer	Find Solutions through matching of challenges to use cases – prioritize!	Financial Model- Use Case and Enterprise dependent	Engineer the best solution based on site, use cases, capabilities	Conclude the RoI Calculation	Set-up Project, deploy, run and optimize

Our Real Outcomes

Double Output

Reduced Downtime
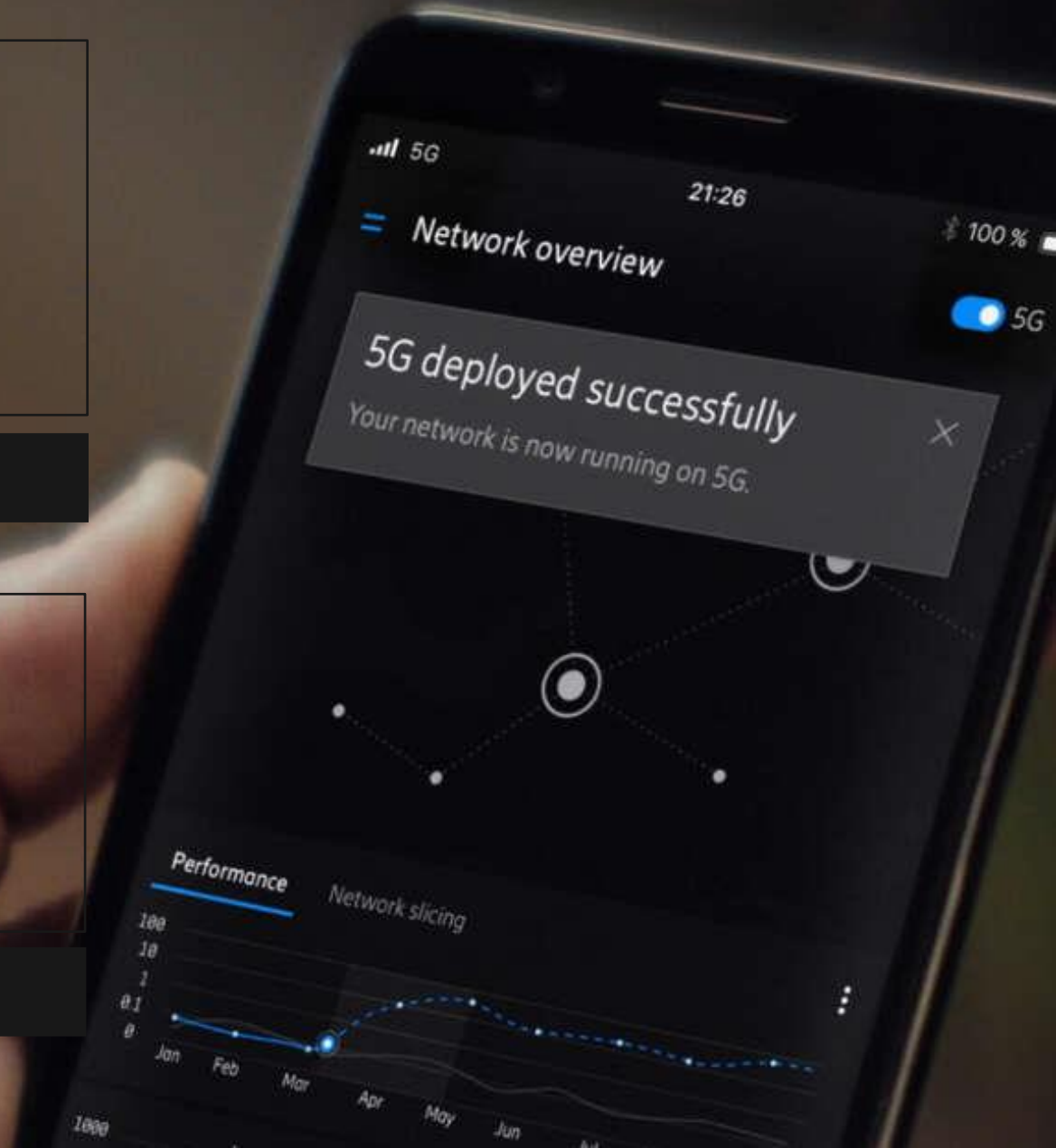
70%

Quicker Deployment

Business Performance

60%

Reduction in Cables

34%

Reduced Waste

Efficiency & Sustainability

5G

21:26

100%

Network overview

5G

5G deployed successfully

Your network is now running on 5G.

Performance   Network slicing

100
10
1
0.1
0

Jan Feb Mar Apr May Jun

1000

Summary

- 5G is a technology addressing industrial needs in the context of Digitalization, automation and connectivity of assets

- Use cases can be developed serving different industries in particular manufacturing and process industries

- Ericsson's EP5G comes as a pre-integrated, simple yet sophisticated solution enabling industries to consume 5G and partners to create values for the end customers

- Ericsson invests into an open eco-system with device makers, software vendors, system integrators and other types of partners targeting at well working e2e solutions

- Swiss regulators have launched extra spectrum that helps industries and enterprises to overcome Challenge in the context of transformation and innovation.

Secure reliable industrial solutions

Provided by Ericsson Industrial 5G partners

Independent software vendors
Applications ecosystem
Application enablement Platforms
Manufacturing Execution Systems (MES)
Enterprise Resource planning System (ERP)
Location platforms

SAS · HITACHI Inspire the Next · software AG · ptc · HEXAGON · kx · PRATEXO · VANDERLANDE
DASSAULT SYSTEMES · SMS digital · grouptalk · here · UNIKIE · Telit Cinterion · yahsat · UAVIA
SAP · Extreme networks · UL UNMANNED LIFE · Mobile Tornado · Quuppa · STREAMWIDE · CLARTEK

Cellular Network 4G /5G (public, sliced, Private Network)

Professional services
System Integrators &
business advisors

becker · MUGLER TELCO NETWORKS
AMBRA SOLUTIONS · CAMPUS GENIUS
GlobalLogic · sigma Connectivity
Capgemini · COCUS
tietoevry · FUJITSU
semco maritime · GRAYMATTER
KEYSIGHT TECHNOLOGIES · KPMG
REJLERS · MEDIA BROADCAST
TILSON · DIGITAL NORDIX
CONNECT · umlaut
DXC.technology · AFRY
TATA CONSULTANCY SERVICES · ISN challenge NETWORKS
CellAntenna · TMC
sopra steria · T Systems
COMSOL · ROHDE&SCHWARZ
Privinnet

Device partners & HW

cradlepoint part of ERICSSON · HMS · DELL Technologies
ADVANTECH · DIGI · Hewlett Packard Enterprise
MULTITECH · AVI · inseego
robustel · AMIT · AAEON
AMBRA SOLUTIONS · SEMTECH · Beijer
peplink · FUJITSU · msi · OPTION
WESTERMO · TELTONIKA · MOXA · EUROTECH · ADLINK

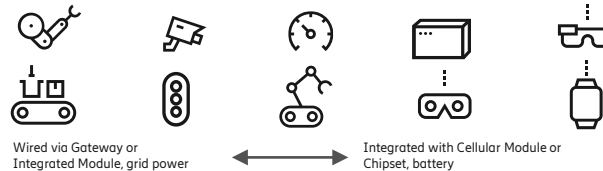**Modules**
QUECTEL · Telit Cinterion · SEMTECH · SEQUANS · Sim Com

Cellular Gateways
Current loop
Ethernet
RS232
Analog I/O
Digital I/O

Machinery
Sensors
Actuators
Handhelds
Wearables
Cameras
Drones

Wired via Gateway or
Integrated Module, grid power

Integrated with Cellular Module or
Chipset, battery

ORing · inspur · ASKEY · D-Link · Aatmunn · realwear · PHOENIX CONTACT · BOSCH · SIEMENS · Enaex STRONGER BONDS
CISCO · Panasonic INDUSTRY · ZEBRA · AXIS · KOLLMORGEN · GE · Epiroc · HEXAGON MANUFACTURING INTELLIGENCE
NavigateWorx · ascom · BARTEC · ecom A PEPPERL+FUCHS BRAND · MiLVUS ROBOTICS · Soliton · ABB · Atlas Copco · SICK
TAOGLAS · i.safe MOBILE

4G **5G**
unmatched
reliable
wireless
coverage

ERICSSON

Ericsson Enterprise 5G
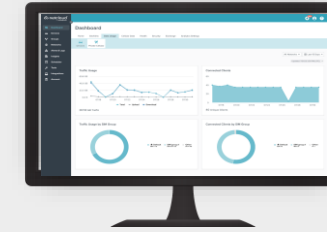
Private cellular solution optimized for enterprise

End-to-end solutions

Best-in-class performance

Simple yet sophisticated

Fit for purpose radio portfolio

The confidence to connect anything…. Anywhere. **SIMPLY.**

Cloud or Local Management

Flexible Deployment Models

On-premises   AWS/Azure

or

Converged 4G/5G core with high-availability

4G & 5G Global Spectrum Support

Indoor   Indoor & Outdoor   Outdoor

Ericsson's leadership in Enterprise RAN technology
More Coverage. More Mobility. More Reliability.

Radio Dot ——————— **Indoor Radio Unit (IRU)** ——————— **Baseband**

Performance

- **Capacity and flexibility** enabled by centralized baseband.
- **Seamless mobility** with multicast RF transmission eliminating need for handoff zones.
- **Scalable** to 10M+ sq. ft while minimizing required rack space.
- **Software feature** parity with macro network.

Deployment

- **Installation** simplified resulting in up to 60% reduced cabling cost and up to 70% faster install time compared to DAS.
- **Equipment** has a small footprint and low power consumption.
- **Simplicity** with no additional gateways or switches required.

Deployed in over 70 countries across enterprise operations and public facing environments

Ericsson Private 5G
Optimized for Business-Critical Use Cases

IPSEC TOGGLE   TIME CRITICAL COMMUNICATION   HANDOVER EVENT VISIBILITY

QR SIM ACTIVATION   SIM GROUP ENHANCEMENT   HYPER-V SUPPORT   REMOTE UPF   GEO REDUNANCY

UNIFIED OPERATIONS   CUSTOMER TRANSPORT   BRING YOUR OWN SAS   ML & AIOps   MULTIPLE APN

FLEX DEPLOYMENTS   LOCAL MANAGEMENT   RADIUS   SESSION CONTINUITY   VERIFY MOBILE APP

BREAK-FIX SUPPORT   SIM TO IMEI BONDING   VOICE INTEGRATION   MULTIPLE LAN PROFILES

SUBACCOUNT SUPPORT   MULTIPLE DNN   ZERO-TOUCH   DYNAMIC RAN   MULTI-SITE

ENTERPRISE LAN INTEGRATION   ACTIONABLE INSIGHTS   ACTIVE DIRECTORY

Precise Indoor Positioning
A new feature in Ericsson Radio Dot System that revolutionizes Enterprise customer ROI

- Enables precise location tracking for devices attached to the Ericsson Private 5G network

- Device-agnostic — works for all devices

- It's based on Multi-lateration positioning in which the Radio Dot System measures the relative time of arrival of 5G uplink signals to multiple radio dots
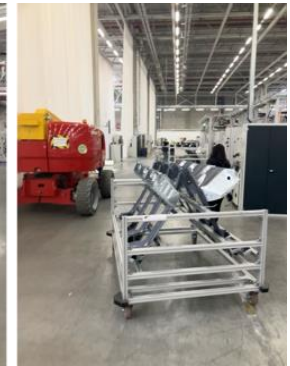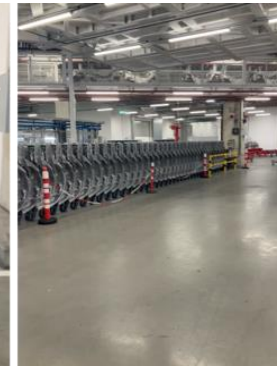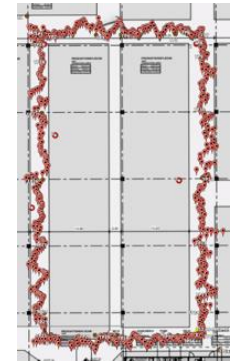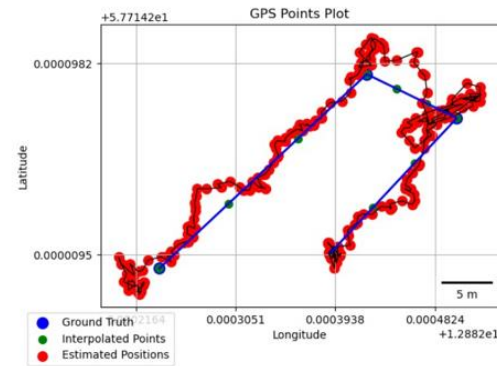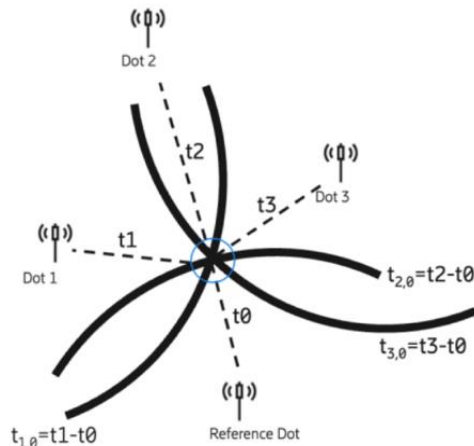
Successfully tested in harsh RF environments in industrial customers, Location Precision of ~1m