

Case study

# Powering Logistics 4.0 with Ericsson Private 5G

CJ Logistics' trailblazing  
journey – digitally transforming  
business operations



**ERICSSON**

In  
partnership  
with



# CJ Logistics breaks ground with private 5G network

**Case study:**  
CJ Logistics-Ericsson partnership

**Industry:**  
Warehousing and logistics

## Executive summary

CJ Logistics, a leading South Korean logistics company, is pioneering an innovative approach to deliver on growing demands for rapid deliveries and real-time analytics and insights.

By establishing its own private 5G network, operated on industry spectrum and powered by Ericsson's leading private 5G product, it achieved a major market milestone: the first full-scale commercial deployment of a private 5G network within the logistics sector.

Ericsson Private 5G is a 4G and 5G private network built for industrial use – making it a powerful enabler of Logistics 4.0. This will ensure that CJ Logistics meets the intricate and fast-paced demands of material flow across warehouses and distribution networks, delivering groundbreaking enhancements to operational efficiency.

Private 5G is a key innovation platform with the potential to revolutionize global supply chains. In the case of CJ Logistics, it has not only narrowed the margins for precise material movement, thus raising the standards for safety, security, and control, but has also delivered impressive 20 percent productivity gains and approximately 15 percent capital expenditure savings. These gains are primarily driven by decreased hardware installations and the expenses linked to issues such as downtime and latency.

Looking ahead, the inherent scalability of Ericsson Private 5G positions CJ Logistics for future growth, reinforcing its commitment to sustained success in an ever-evolving industry.

smart manufacturing has the potential to revolutionize the landscape of commerce and productivity. At the core of this adaptation lies the seamless flow of data and materials, orchestrated in harmony by smart logistics systems. This integration assumes a pivotal role in bolstering supply chain efficiency, enabling just-in-time production, minimizing downtime and optimizing resource allocation within the realm of smart manufacturing processes.

In this evolving landscape, private 5G emerges as a groundbreaking technology, guaranteeing connectivity that supports innovative end-to-end solutions for precise material flow, streamlined supply chains, heightened safety measures, cost reduction and sustainable practices.

## Revolutionizing efficiency and connectivity in logistics

Logistics 4.0, the digital transformation of logistics operations and centers, is propelling global supply chains into a new paradigm. This is driven by the need for interconnected digitization, accelerated automation and secure connectivity that keeps critical data on-site.

It is a significant factor in the ongoing evolution of the logistics industry, which reached a value of USD 10.41 trillion in 2022 and is projected to reach USD 14.08 trillion by 2028.\*

Smart logistics is also poised to reshape the foundations of various industries. Notably, constructive collaboration with

## At a glance

### Goal

- Logistics 4.0 transformation
- Enhance efficiency, safety and supply chain optimization

### Approach

- CJ Logistics has partnered with Ericsson for innovation
- Private 5G integration for seamless communication
- Deployed first in greenfield warehouses
- Started with low-risk but impactful use cases

### Transformative outcomes

- Installed 22 radio dots instead of 300 Wi-Fi access points
- Achieved 15% cost benefit over Wi-Fi
- Realized a 20% increase in productivity with ultra-low latency
- Established future scalability for Logistics 4.0 demands

### Future

- Innovative applications
- AGV, AMR and sensor integration
- Enhanced docking, with the potential for autonomous driving



\* Source: Research and Markets, Global Logistics Market Report and Forecast 2023-2028, available at: <https://www.researchandmarkets.com/reports/5775157/global-logistics-market-report-forecast>.

At the forefront of this transformative wave is CJ Logistics, South Korea's largest integrated logistics company. Demonstrating an unwavering commitment to innovation, CJ Logistics has pioneered the industry's first commercial launch of a private 5G network through the deployment of Ericsson Private 5G at its Ichiri center in Icheon City, Gyeonggi-do.

## Logistics 4.0: the role of next-gen supply networks

Connectivity plays a pivotal and interconnected role within the logistics center's overarching ecosystem, overseeing tasks ranging from the intricate choreography of receiving, sorting and categorizing goods to the coordination of loading and unloading processes. As articulated by Sangcheon Ryu, CIO of Information Technology at CJ Logistics: "It serves as a backbone, enabling seamless communication, data exchange and coordination among various devices, systems and stakeholders involved in complex operations."

Moreover, it has spearheaded transformative advancements, notably autonomous systems, which are driving the arrival of Logistics 4.0 and the digital transformation of supply chains. Equally significant is connectivity's facilitation of tools like Personal Data Assistants (PDAs), scanners and specialized equipment, contributing to optimal inventory management and enhanced safety measures.

### Connectivity challenges

Despite these technological advancements, uninterrupted connectivity remains a challenge, particularly in large warehouses or complex, device-dense environments.

CJ Logistics faced a significant obstacle: ensuring reliable Wi-Fi coverage

throughout its extensive warehouses. To address this, it implemented substantial measures, deploying 300 access points (APs) across its network. Despite these efforts, challenges persisted, manifesting as dead zones or lost and weakened signals – presenting significant barriers to effective data transmission and real-time device communication.

Ryu points out that these issues have had a significant impact on operations: "Beyond cost and installation concerns, large warehouses have experienced technical limitations, such as persistent shadowed zones leading to signal loss, which in turn hampers productivity. Challenges like frequency interference and sluggish speeds have compromised effectiveness. Collectively, these issues underscore the inadequacy of existing connectivity solutions in propelling logistics services forward as desired."

### Challenges with the existing connectivity solution:

- a. Coverage and maintenance challenges:** Inadequate signal coverage (dead zones) and maintenance challenges due to the intricacy of overseeing the substantial number of deployed APs.
- b. Signal congestion/ interference:** Network congestion, especially during peak operating hours, has led to data bottlenecks and slower response times, affecting logistical performance.
- c. Data transmission delay and high latency:** High network latency and compromised throughput have delayed real-time applications such as conveyor systems.
- d. AGV and AMR limitations:** Inadequate server response times, caused by high

## Key Figures for CJ Logistics

**Founded:** 1930

**Operates in:** 36 countries, 161 cities

**Logistics hubs worldwide:** 249 warehouse and distribution centers

**Center size:** Between 20,000-40,000 sqm

**Annual parcel shipments:** 1.7 billion parcels handled in 2022

network latency, have limited efforts to improve operational speeds of up to 200 on-site automated guided vehicles (AGVs) and autonomous mobile robots (AMRs).

- e. Network downtime:** Unplanned network downtime, averaging six hours annually, has resulted in significant financial repercussions, including losses in labor hours, reduced productivity and increased expenses.
- f. Scalability challenges:** Wi-Fi's relative lack of infrastructural versatility makes it unsuitable to scale faster for innovative technologies such as robotics, AI and the Internet of Things (IoT).

Given these challenges, the pressing need to discover a reliable solution that could seamlessly match CJ Logistics' next-generation requirements became evident. During its search, the company thoroughly evaluated all available options. In the end, only a single solution offered the required blend of availability, latency, cost-effectiveness, ease of maintenance, scalability and security: Ericsson Private 5G.

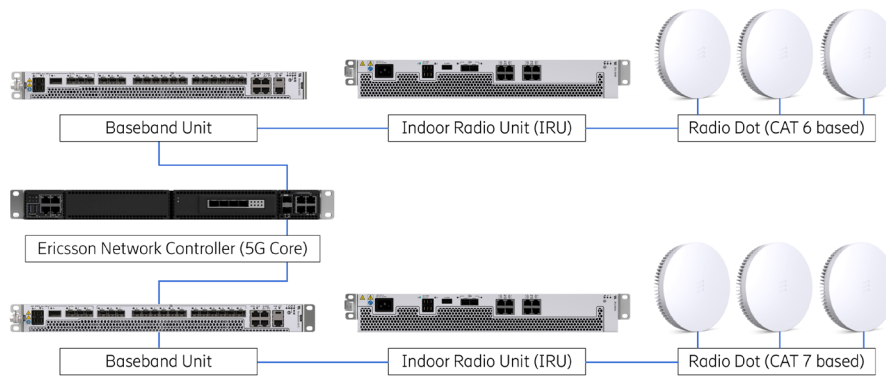
### A collaborative approach: CJ Logistics and Ericsson

The decision to embark on a collaborative journey with Ericsson was driven by a confluence of critical factors:

- 1. Deep understanding of pain points:** Ericsson demonstrated a profound comprehension of CJ Logistics' pain points, particularly concerning the productivity challenges associated with Wi-Fi technology.
- 2. Proactive approach and value proposition:** Coupled with an enticing value proposition, Ericsson's proactive approach was demonstrated through a commitment to innovative problem-solving.
- 3. Robust local partnerships:** Ericsson's robust network of local partners ensured that CJ Logistics would have unwavering support throughout the journey, reinforcing its confidence in Ericsson's ability to deliver on its promises.



Ryu says: "There were many reasons why we selected Ericsson. Firstly, Ericsson understood our pain points regarding the productivity issues with Wi-Fi technology. In addition, Ericsson presented a very proactive approach and an excellent value proposition to us. They also had strong local partners who could provide support. With this foundation, we knew Ericsson would be a great partner for us."



Ericsson deployed Ericsson Private 5G, with 22 radio dots and six integrated radio units.

# 15%

The initial capital investment required for implementing the Ericsson Private 5G network was approximately 15 percent lower than that for a Wi-Fi deployment.

### Private 5G vs commercial 5G vs Wi-Fi

The choice to elevate private 5G above alternative solutions like commercial 5G was far from arbitrary; instead, it stemmed from methodical analysis and a focus on long-term viability.

While exploring commercial 5G options from service providers, it became evident that limited coverage in remote areas – distant from hotspots, such as urban centers – could potentially lead to a bottleneck. Ryu says: "This prompted us to opt for Ericsson Private 5G, as it offers equivalent 5G service quality with a more cost-effective investment approach than traditional carriers. Additionally, the ability to utilize dedicated industry spectrum ensures our network's reliability and performance, making it a strategic choice for our organization."

This decision was further fortified by CJ Logistics' three key priorities: cost, security and scalability. In-depth evaluations revealed that the initial capital investment required for implementing the Ericsson Private 5G network was approximately 15 percent lower than that for a Wi-Fi deployment. Furthermore, incurring ongoing per-device monthly charges under a commercial 5G model was also deemed untenable.

Given these compelling factors, investing in Ericsson Private 5G emerged as the logical choice.

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### The right solution

Ericsson deployed Ericsson Private 5G, with 22 radio dots and six integrated radio units, operating on CJ Logistics' own industry spectrum. CJ ONS took on the pivotal role of system integration, skillfully amalgamating the various components to create a unified and efficient solution.

Ericsson Private 5G not only meets current needs but also aligns with CJ Logistics' future vision for Logistics 4.0. With impressive scalability, low and predictable latency and fast data transfer, it transforms current logistics operations and prepares for future demands. An added advantage is the elimination of extra physical deployments due to Ericsson Private 5G's ability to handle an increasing number of devices, enhancing scalability potential.

### Current use cases

Through this digital transformation, CJ Logistics has established an optimized plan for next-gen technology solutions for its logistics centers, capitalizing on opportunities to explore and implement novel use cases.

### Ericsson Private 5G enables:

**Faster data transfer:** Real-time communication and minimal delays in transmitting instructions and order updates.

**Reduced and predictable latency:** Swift and predictable responses to unexpected events, like emergencies or critical system failures, ultimately enhancing overall operational resilience and effectiveness.

**Optimized communication:** Secure and reliable communication, eliminating

potential network congestion and communication disruptions.

**Heightened data security:** Enhanced data security, safeguarding sensitive information related to orders, inventory and customer details.

**Safety enhancement:** 5G-enabled autonomous solutions, such as AGVs enhance operational safety within logistics centers, mitigating traditional risks inherent in manual forklift operations.

**Real-time monitoring:** Immediate identification of any issues or bottlenecks through high-definition cameras and AI-enabled applications, allowing for prompt corrective actions and minimal disruptions to the workflow.

**Enhanced synchronization:** Improved synchronization between devices and the central system, enabling accurate tracking of items, minimizing errors and reducing the need for manual corrections.



The rapid integration of Ericsson Private 5G has enabled seamless connectivity for PDAs, tablets and mobile scanner devices. These tools are instrumental in tasks like goods handling, inventory management through barcode scanning and optimizing processes like order processing and real-time reporting.

The implementation of Ericsson Private 5G is already yielding quantifiable benefits, especially in the picking process where pick time has been significantly reduced. This has led to an impressive 20 percent increase in overall productivity by minimizing manual intervention, enhancing precision and enabling real-time communication between devices and systems.

And by eliminating isolated subnetworks and connecting to a single private 5G network, AGV and AMR fleets can now operate simultaneously, at high speeds and in a safer manner. This is facilitated by lower latency, greater bandwidth capacity and improved overall facility control.

Moreover, increased automation enhances productivity and safety, especially in the centers' conveyor systems. These systems expedite tasks and bolster safety by minimizing human intervention and ensuring greater accuracy.

## Tomorrow's logistics with 5G-powered evolution

As the industry's needs continue to change, CJ Logistics is committed to remaining at the forefront of this ongoing transformation. Future use cases are in the pipeline, driven by the understanding that staying at the cutting edge of innovation is essential for leadership and a competitive advantage.

With a maturing 5G-enabled device ecosystem, it envisions utilizing private 5G for diverse sensor applications in logistics centers, ranging from 5G-enabled computer

vision to IoT gateways. Its overarching objective is to eliminate cable dependencies by connecting scanners and sensors via private 5G, streamlining operational infrastructure and amplifying flexibility and convenience.

To address rising logistics demands, a notable focus is on adding more autonomous systems like AGVs and AMRs – key to Logistics 4.0. Unmanned and remote-controlled operations are practical today, and CJ Logistics sees them becoming the standard practice in the industry.

Undoubtedly, 5G-enabled modules possess the capability to revolutionize autonomous operations, boosting efficiency and averting accidents. Specifically, integrating automation for safety during handling, loading, unloading and parking stands as a crucial aspect of CJ Logistics' strategy. This is why it is presently engaged in trials for autonomous inter-warehouse transportation and aspires to expand it to transport between warehouses.

"Unmanned operations are valuable both within and between the warehouses, targeting diverse facets of safety and operational efficiency. Within the premise, the integration of further autonomous solutions emerges as a pivotal strategy for accident prevention and process optimization – this encompasses the refinement of tasks such as goods retrieval from conveyor belts, streamlining loading and unloading procedures and effectively mitigating the inherent risks associated with forklift operations," Ryu says.

As CJ Logistics looks to the future, these groundbreaking smart applications highlight the company's dedication to not only addressing the evolving industry requirements but also shaping and revolutionizing the logistics landscape with innovative end-to-end solutions.

## Some of the key use cases being embraced by the logistics industry

**IoT connectivity:** Warehouses use IoT sensors (e.g., radio frequency identification tags, smart shelves) for real-time inventory tracking and optimizing operations

**AGVs:** Enhancing efficiency and safety through optimized routes of self-controlled vehicles

**Video surveillance and security:** Improving facility safety with faster incident response

**Collaborative robotics:** Boosting productivity by working alongside humans for tasks like picking and packing

**Wearable tech for worker safety:** Monitoring real-time health, safety compliance and hazard alerts

## About CJ Logistics

For over 90 years, CJ Logistics, South Korea's leading integrated logistics company, has been a trailblazer in innovation within the Korean logistics industry. Through its steadfast commitment to technological convergence, consistent investment and a sustainable growth strategy, CJ Logistics has expanded globally, operating in 36 countries with 249 warehousing and distribution centers worldwide. The company prides itself on seamlessly integrating advanced technologies like AI and data analytics to drive digital logistics transformation while promoting sustainable growth. With a culture of continuous improvement, CJ Logistics remains at the forefront of shaping the future of logistics to meet evolving customer needs on a global scale.

## About Ericsson

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York. [www.ericsson.com](http://www.ericsson.com)

