

**NOKIA**



# Upgrade to faster, smarter retail logistics

Move more inventory in less time and at lower cost

## Automate and accelerate retail warehouse and distribution center operations

In the retail industry, competition is fierce and margins are razor-thin. Every second wasted on logistics tasks further reduces that profitability — especially in the grocery business where delays directly affect product quality.

To keep inventories moving as efficiently as possible, the warehouses and distribution centers that supply retail businesses must operate at peak productivity at all times. That means:






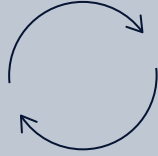
- Staff need mobile technologies that let them seamlessly connect and get more done during each shift
- Equipment and processes must be automated
- Inventory movements must be tracked in real time.

### **Drive digital transformation with a Nokia private wireless network**

A Nokia industrial-grade private wireless network brings reliable, low-latency 4.9G LTE and 5G connectivity to every area of your facility. You have a single, secure wireless network that allows you to digitally transform your operations in a cost-effective way:

- Extend reliable, high-throughput wireless network coverage throughout all indoor and outdoor spaces
- Use mobile connectivity to increase staff efficiency and automate your operations
- Take advantage of new applications for real-time communications and inventory tracking
- Reduce total cost of ownership (TCO) compared to traditional structured cabling and Wi-Fi in storage and distribution facilities.

An industrial-grade private wireless network from Nokia drives new levels of efficiency and productivity.

<p>Very high reliability</p> 	<p>Intrinsically secure</p> 	<p>Large outdoor and pervasive indoor coverage</p> 
<p>Predictable performance <small>(data rate and latency)</small></p> 	<p>High multi-user capacity</p> 	<p>Full mobility</p> 

## Why not use Wi-Fi?

Like many retail supply hubs, you may be relying on Wi-Fi connectivity to run your operations. The problem is Wi-Fi can't provide the reliable, industrial-grade connectivity you need to digitally transform a warehouse or distribution center.

Wi-Fi is great for homes and offices, but the high demands in industrial environments exceed its capabilities, especially when applications rely on large numbers of sensors and video feeds. Applications can unexpectedly stop working, or work intermittently, causing unpredictable behaviors, downtime and outages you can't afford. And Wi-Fi's limited coverage range make it very challenging to bring consistent, high-capacity wireless coverage to all indoor and outdoor areas of large-scale facilities.



## Step into the future of retail logistics today

With a Nokia industrial-grade private wireless network to support your digital transformation, you have a strong foundation to take advantage of applications, devices and technologies that you help move more inventory faster and work smarter. Here are just a few examples of what becomes possible.

### **Improve mobile inventory management**

Your staff may already be using handheld devices to scan inventory and tablets to look up inventory and order details while on-the-move in your facility. When these mobile devices are connected to a highly reliable private 4.9G LTE or 5G network, service quality is always consistent and predictable, even when many devices are simultaneously connected.

Staff can scan more inventory and access more information in less time to complete more tasks on each shift. And they never have to worry they're working in an area of the facility that doesn't have adequate wireless coverage to get the job done.

### **Keep staff connected in real time**

To work at maximum efficiency, your staff need the ability to instantly communicate and collaborate with each other and with broader teams whenever needed, using voice or video.

Our private wireless network solutions include applications for real-time push-to-talk (PTT) and push-to-video (PTV) communications on handheld devices and tablets. Staff can instantly connect no matter where they are in the facility. And there's no need to spend time and money maintaining a separate mobile radio platform for PTT and PTV communications.

## Track inventory, equipment and staff locations

When everyone knows the exact location of inventory, equipment and people, no one has to waste time searching for items or information. You also have the data needed to monitor your progress against key performance indicators (KPIs).

Your private wireless network powers the Nokia High Accuracy Indoor Positioning (HAIP) application. This precision positioning application uses Bluetooth Low Energy (BLE) technology and small, battery-powered tags that are attached to pallets, forklifts, pallet jacks, other equipment and staff to let you track their movements within your facility.

With the Nokia HAIP application, you can use geo-fencing technology to receive alerts when goods and people cross defined boundaries. You also can view historical heatmaps of where goods and people have been to reduce losses of high-value goods and equipment.

## Accelerate mobile robots to execute faster

Autonomous mobile robots (AMRs) are the next-generation wireless version of autonomous guided vehicles (AGVs) that move goods throughout a warehouse or distribution center.

These faster, more advanced autonomous robots rely on video, LiDAR laser sensing and simultaneous localization and mapping (SLAM) technologies to freely navigate, fulfill orders and transport goods in your facility. Only a private 4.9G LTE or 5G wireless network provides the reliability and bandwidth needed to power AMRs in a safe and efficient way.

## Use driverless forklifts to safely increase productivity

Smart forklifts also complete warehouse tasks without assistance from an onboard driver. With the right add-on technologies, smart forklifts can upload video images of the pallets they've moved, scan bar codes and radio frequency identification (RFID) tags on inventory and pallets and share data with inventory control systems and warehouse management systems (WMSs).

## Alibaba connects hundreds of AGVs using a Nokia private wireless network

Alibaba is a Chinese multinational company that specializes in e-commerce, retail, internet and technology. When Cainiao Smart Logistics Network Limited, the company that helps Alibaba meet its logistics vision for fulfilling customer orders, opened a massive 30,000 square meter warehouse, the company turned to Nokia for assistance.

Nokia helped Cainiao set up a private wireless network that uses unlicensed spectrum to connect more than 100 AGVs in the facility. The Nokia network:

- Significantly reduced network transmission delays
- Improved uplink performance
- Increased network stability and efficiency.

## With zero-touch logistics, productivity skyrockets

At our new product introduction factory in Oulu, Finland, we're using a private 4.9G LTE wireless network to support faster and more efficient AMRs that transport only the required amount of material to flexible assembly workstations.

After the upgrade from legacy AGVs that used Wi-Fi, logistics productivity in the Oulu factory increased by 100 percent. With less manual materials handling, quality issues and scrap volumes were also reduced.

The guaranteed, low-latency wireless communications a private LTE or 5G network provides are essential to ensure safe operation of smart forklifts and to maintain communications with other systems so vital data is never lost.

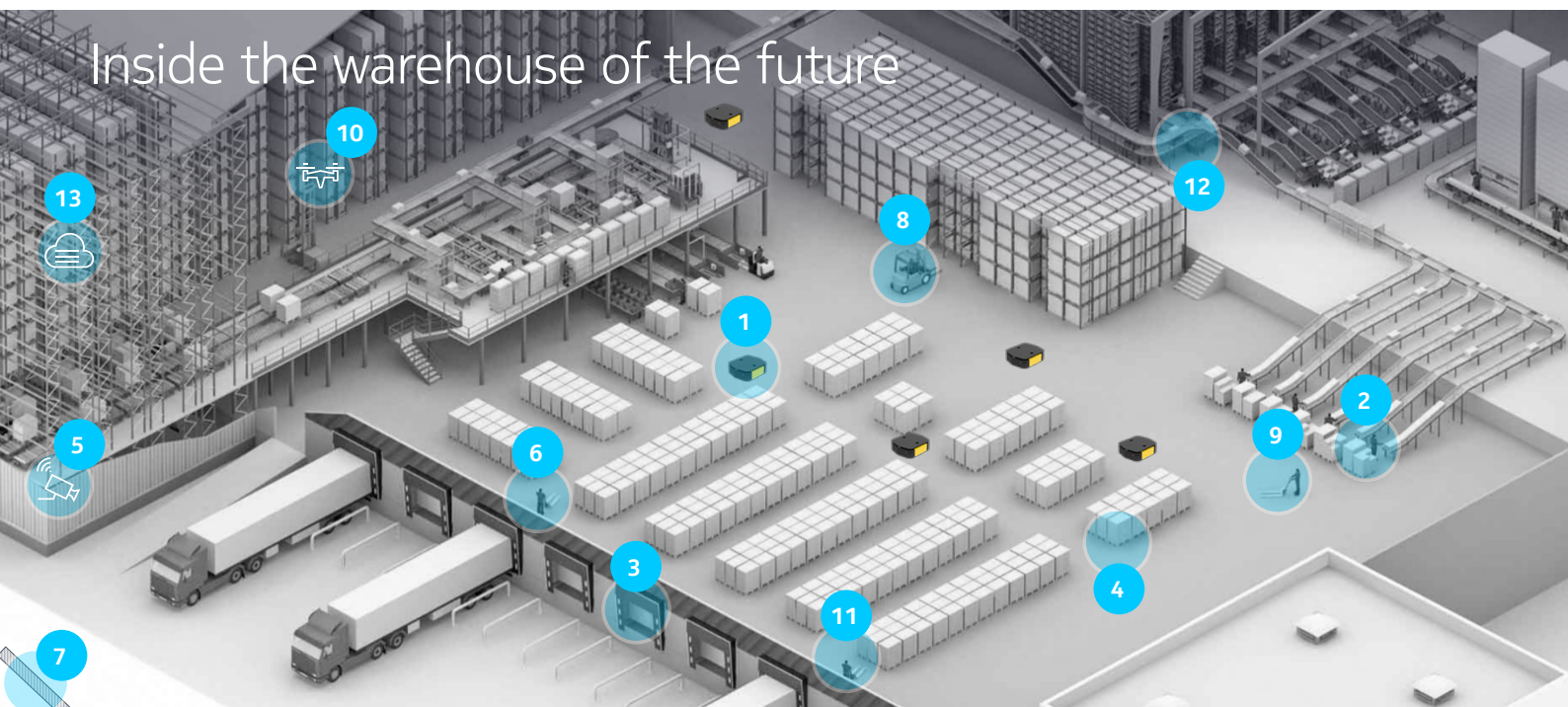
## Extend visibility and improve security throughout your site

It's often prohibitively expensive to extend video monitoring technologies to parking lots and remote perimeter areas at large warehouse and distribution center sites.

With a private wireless network, it's much more affordable to take video security systems and remote monitoring technologies to every corner of your property. This comprehensive visibility helps you reduce liability costs associated with parking lot incidents and losses due to product and equipment thefts.

## Rely on Nokia to digitally transform your retail logistics operations

Nokia provides all of the network, application and compute resources you need to digitally transform your operations and upgrade to faster, smarter retail logistics.



- |   |   |  |  |
|---|---|--|--|
| 1. Automated vehicles                               | 5. Operational and surveillance video cameras with video analytics capabilities | 8. Predictive maintenance of material handling systems | 12. Simplified and future-proof back-haul networking infrastructure  |
| 2. Digitalized warehouse operations                 | 6. Voice communications   | 9. IoT powered smart workers                           | 13. Cloud-native IT systems and seamless multi-hub interconnectivity |
| 3. Smart facility management                        | 7. Gate automation  | 10. Indoor and outdoor drones                          |  |
| 4. Precise indoor and outdoor positioning solutions |   | 11. VR/AR enabled training and picking                 |  |

## **Accelerate digitalization with a Nokia industrial-grade private wireless network**

A Nokia private network gives you dedicated, industrial-grade wireless coverage and capacity that's easy to deploy in any indoor-outdoor warehouse or distribution center site. It includes:

- A 4.9G LTE or 5G New Radio access network that provides indoor or outdoor small cells or macro cells for device connectivity.
- An enterprise-grade, 4.9G and 5G core network that is the heart of the system, providing network connectivity to your applications, the internet and other public or private networks.
- Network management tools and systems that provide the end-to-end visibility and information you need to operate and maintain the network.

Simply choose the network deployment approach that meets your unique needs:

- The Nokia Digital Automation Cloud provides the easiest route to your own private wireless network. You get an integrated, plug-and-play solution that runs on your premises and is delivered as a service. You also get a digital automation platform with Nokia applications that are ready to run.
- A Modular Private Wireless network gives you complete control over the way you build and operate your private wireless network. You can customize the network end-to-end to meet your most demanding requirements.

## **Meet mission-critical requirements with the all-in-one Nokia MX Industrial Edge**

The Nokia MX Industrial Edge is the first off-the-shelf edge solution for mission-critical industrial operational technology needs. It gives you an on-site, scalable cloud compute platform that hosts a Nokia private wireless network and includes a library of ready-to-run Nokia applications. It also provides connectors for industrial protocols as well as IoT connectors that provide efficient, secure connectivity to applications hosted in the public cloud.

To optimize TCO and simplify edge computing for operational technologies, the MX Industrial Edge platform is delivered as a service.

## **Expand your capabilities with applications**

No matter which Nokia private networking solution you choose, you have fast and easy access to applications that are key to accelerating your operations, including:

- Nokia push-to-talk and push-to-video applications
- The Nokia HAIP application, which lets you reliably track inventory, equipment and staff locations indoors with accuracy up to 30 cm
- Third-party applications
- Your own in-house applications.

## **Reduce infrastructure requirements with a Nokia Passive Optical Network**

In addition to your Nokia private wireless network, you'll always need some level of fixed network connectivity in your facility. Instead of using Ethernet cabling for your fixed network, deploy a Nokia Passive Optical Network to aggregate fixed network traffic onto a high-speed fiber optic link.

With a Nokia PON deployed alongside your Nokia private wireless network, you can:

- Increase network performance for mobile and fixed network access
- Eliminate the racks and switches needed to manage and interconnect Ethernet cables
- Reduce equipment cooling costs.

## **Connect all of your sites with a Nokia IP/MPLS network**

The teams in your warehouses, distribution centers and retail sites need to connect and communicate with one another over the wide area network. A Nokia IP/MPLS network delivers the resiliency, multiservice support and rich quality of service (QoS) needed for secure data communications. As you automate and digitalize your operations, your retail logistics operations team can harness the full power of the IP/MPLS network to support new innovations.

## **Extend coverage with a Nuage Networks software-defined WAN**

Nuage Networks from Nokia gives you a flexible software-defined wide area network (SD WAN) you can use to access the public cloud and to provide site-to-site connectivity using low-cost commodity broadband options. This can translate to substantial savings over traditional IP/MPLS broadband delivery models.



# Choose the leader in private network solutions for industries

More than 300 large enterprise customers depend on Nokia's industry-leading private wireless network solutions for resilient, high-performance connectivity. And we've deployed more than 1,800 mission-critical networks for leading organizations across the manufacturing, utilities, railway, smart city, mining, financial, and healthcare industries.

We understand how to use networks, applications and technologies to target the specific challenges each industry faces. We combine our technical expertise with our leadership in some of the world's biggest and most advanced digital transformation projects to help retail warehouses and distribution centers step into the future today.

**For more information visit our website: [Supply chain | Nokia](#)**

## About Nokia

At Nokia, we create technology that helps the world act together.

As a trusted partner for critical networks, we are committed to innovation and technology leadership across mobile, fixed and cloud networks. We create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable and inclusive world.

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