



LTE and 5G digitalization with Nokia  
Digital Automation Cloud

NOKIA

Industrial-grade private wireless connectivity, applications and user equipment.



# Digital automation is transforming industries

Industrial-grade private wireless connectivity is your key to achieving Industry 4.0 benefits like increased efficiency, sustainability and safety. Having pervasive, reliable and secure connectivity for workers, sensors and machines combined with edge computing capabilities on a digitalization platform allows you to run applications when and where the business needs. If achieving that sounds challenging, it is. Industrial environments tend to be large, distributed, rugged, and interference prone with hulking and dense obstacles like steel shipping containers and production line systems, making it difficult to ensure reliable wireless connectivity.

That's why we created Nokia Digital Automation Cloud. This easy-to-use industrial-grade digitalization platform for private wireless, applications and user equipment will help accelerate your transformation journey, using 4.9G and 5G to deliver the benefits of Industry 4.0. It's a scalable end-to-end solution that makes your site ready for today's use cases, as well as whatever challenges tomorrow brings.

## Know your standards

4.9G, the latest generation of 4G/LTE before 5G, currently caters for over 85% of today's industrial use cases. 5G is enabling next generation solutions with ultra-low latency and massive throughput benefiting new use-cases such as high-speed robots.



# Value beyond connectivity

Nokia Digital Automation Cloud takes everything that Nokia knows about delivering massive, mission-critical wireless networks and condenses it into an enterprise user-friendly yet powerful plug-and-play private wireless connectivity and edge computing platform. High-performance and secure by design. Ready to deliver on the promise of Industry 4.0.

It's packaged as an easy end-to-end subscription service, combining reliable and pervasive 4.9G/LTE or/and 5G connectivity with on-premise data management and processing, integrated application framework and device management. In short, it's everything your organization needs to support industrial use-cases leveraging real-time data for smart manufacturing, predictive maintenance, remote operations and Industrial Internet of Things (IIoT) opportunities.

The possibilities that Nokia DAC opens up are endless, across industrial environments as diverse as mining, ports, manufacturing, logistics, airports, wind farms, health care and many more.



# Up and running in 20 minutes

The Nokia DAC plug and play solution lets you quickly deploy a highly reliable, low latency and secure industrial-grade private wireless network, right out of the box.

It can take less than 20 minutes to get a simple set-up activated and the network offers wide and deep indoor and outdoor coverage with dependable Quality of Service.

Incredible solution simplicity means there's far less demand on your staff to understand underlying technologies during set-up and operation and once deployed, you can almost forget about it. Ops teams can rapidly roll out a high-performance private network, whenever and wherever the business needs it, with proven 4.9G/LTE connectivity for all your applications and assets that can be readily upgraded to 5G SA (standalone) when the time is right and the 5G industrial management partner ecosystem has developed.

Your IT team or management partner can centrally administer as many secure multiple local networks as you need, around the world. Thanks to a transparent subscription model, you can pay as you grow and therefore grow at both the pace and cost your organization requires.





# Plug, play, optimize

End-to-end platform for private wireless connectivity and automation. Comes with spectrum, edge computing, access points, applications and a portfolio of ruggedized user equipment.



# There's no other solution quite like it

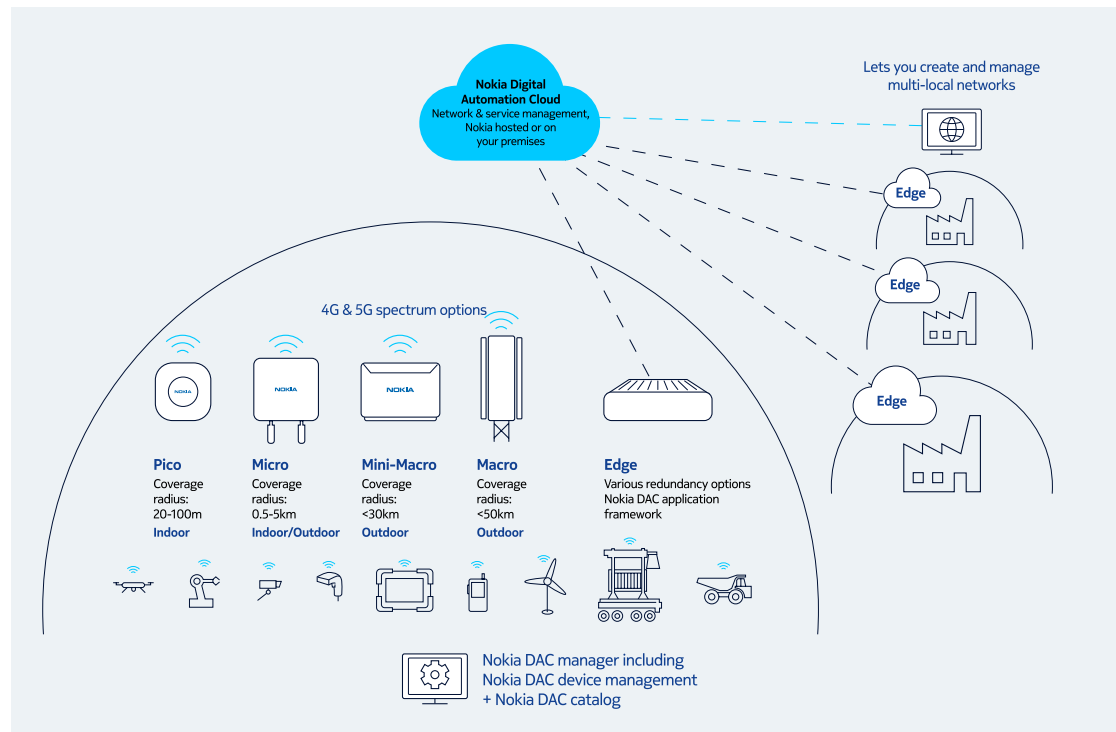
Nokia deployed the first private wireless network in 2012, and all the enterprise experience and insight into customer requirements we have gained since have gone into the creation of Nokia Digital Automation Cloud. The industry's first private wireless as-a-service solution, it remains the only private wireless offering with a fully integrated digital automation platform.

By deploying your own private wireless Nokia DAC, you can take connectivity challenges off your mind. This end-to-end, fully comprehensive solution comes with edge computing hardware, radio access points, a catalog of applications, and a ruggedized device portfolio, in one brilliant integrated bundle.

A range of spectrum options gives you the secure, responsive indoor and outdoor connectivity you need anywhere in the world: unlicensed (MulteFire and Nokia DAC unlicensed), shared (CBRS), or licensed spectrum (industry specific or leased). A web-based portal makes it easy to manage sites, anywhere in the world, deploy applications and manage devices across all or selected locations.

There's also the option to choose Nokia's own or third-party applications like Microsoft Azure, and IoT stacks from our Nokia DAC catalog, with click and deploy installation.

**A unique end-to-end solution with spectrum options like never before.**





# LTE and 5G – we've got you covered

Nokia DAC private wireless is the perfect solution for powering your digital transformation whether you're on a planned migration journey starting with field-proven 4.9G/LTE or are ready to go direct to 5G standalone (SA).

Here are just some of the ways that smart, seamless DAC connectivity and applications can help you win in industrial environments:

- Increase productivity with a flexible change of machinery layout
- Improve safety with alerts from locally analysed sensor and video data
- Deliver real-time location tracking for autonomous machinery and workforces with Nokia DAC High Accuracy Positioning
- Ensure pervasive connectivity with fast and robust handover mechanisms allowing for the remote operation of innovative autonomous vehicles, robotics, drone technology and more
- Ensure security by monitoring facilities remotely and in real-time
- Drive better business efficiency with automated goods handling
- Power collaborative communications and real-time decision making with secure push-to-talk and push-to-video, whichever solution best meets your needs.



# Vital intelligence at the edge

Edge computing is transformational in industrial environments. It brings computing power close to the places that need it, delivering faster response times and increased reliability. And by supporting local data analytics for AI-driven process optimization and local data break-out, it keeps confidential data on site.

Nokia DAC makes the edge work for you. Powerful edge computing solutions support the deployment of highly demanding use cases such as AR and VR and IIoT data processing. The edge cloud also contains click and deploy digital automation applications, such as high-accuracy object positioning, real-time video analytics and many more. Using the industry-standard OS agnostic Kubernetes operator micro-services framework, it can also run advanced IoT solutions and easily integrate third-party applications.

You can manage all your network applications through a user-friendly self-service portal. Supporting sensors, video cameras, machines and other devices, this low-latency edge cloud connectivity can increase automation, drive security and improve real-time logistics and asset tracking.





# A ruggedized industrial user equipment portfolio

There's no need to shop around for industrial-grade user equipment: Nokia DAC also offers a complete range of Nokia Industrial devices, pre-tested and optimized for many different use-cases. They can all be plugged in, managed, controlled and supported using Nokia DAC device management, which delivers seamless device onboarding and the scalability to manage thousands of devices.

We offer solutions for workers, machines and sensors connectivity, creating a comprehensively connected industrial ecosystem

- Speed up item handling and increase efficiency with smart barcode scanners
- Customize Nokia Industrial workpads with dedicated buttons for different applications
- Integrate industrial dongles and routers effortlessly with private wireless and edge computing, legacy systems and infrastructure.



# Verified, tested and integrated with your Nokia DAC network

## **Portfolio of Nokia Industrial user equipment**

- Manage, control and support via Nokia DAC device management
- Choose from a selection of industrial handhelds, workpads, routers, dongles and hotspots to connect people and machines for communication and data transmission

## **Designed for rough environments**

- Designed and developed for heavy use in demanding environments and industries, such as manufacturing, ports, and mines, with hardened enclosure and industrial grade components and high IP ratings (IP 67 and IP 68)

## **High performing devices for different technologies**

- Different form factors manufactured and certified to address various markets and frequency bands, covering your requirements for 4G, 5G and MulteFire
- Validated and tested with Nokia in-house expertise
- Comprehensive feature set supporting efficient PROFINET communication and other protocols including EtherCAT, and Modbus.

## **Easy to manage and access**

You get integrated device management in the Nokia DAC private 4G/5G wireless network. When you manage your user equipment with our tool you can:

- Manage the full range of devices from one single tool
- Monitor the performance of the devices that are part of your network
- Change the parameters of your devices when/if your use case changes
- Ensure devices are always updated with the latest firmware and software
- View and list your assets in one centralized dashboard
- See where your devices are deployed, making on-site service easy
- Build location-based rules for your mobile devices, like geo-fencing



# Use case: Nokia 5G ‘factory of the future’ in Oulu, Finland is powered by Nokia DAC

This award-winning smart factory producing 5G equipment leverages a Nokia DAC wireless network for secure, reliable connectivity across assets within and outside the factory: responsive, adaptive and pervasively connected. IoT analytics running on edge cloud and a real-time digital twin of operations data help the facility to deliver:

- 40% greater equipment effectiveness
- 30% more efficient material feed operations
- Reduction in system maintenance work and new device connection time
- Flexibility in factory floor changes with a wireless solution and introduction of new applications and data points to the digital twin solution.



# Use case: Nokia DAC provides robust wireless connectivity for mining

- NORCAT: The NORCAT Underground Centre serves as a hub for mining technology innovation, enabling start-ups, SMEs and international companies to develop, test and showcase emerging technologies in an operating mine environment. Nokia DAC supports mission-critical communication and automates business-critical processes in these underground mines, overcoming specific technical challenges, such as coverage in tunnels, integration with existing UHF/VHF systems and spectrum availability.
- CENG: We also partner with CENG — the Centre of Excellence in Next Generation Networks — which uses Nokia DAC to develop new digital transformation use cases and accelerate mining innovation.
- For our partner SANDVIK, Nokia Digital Automation Cloud enables the operation of autonomous loaders and trucks and the real-time monitoring of underground and outdoor premises to keep people and equipment safe. It also empowers remote diagnostics and predictive maintenance, as well as asset management, control and authentication.
- Nokia access points are ruggedized and well suited for harsh conditions in mines.





# Use case: Nokia DAC extends 5G capabilities to Toyota Production Engineering

Our private wireless network solution enables TPEC to integrate next-generation manufacturing use cases, accelerating its digital transformation and future automotive IoT vision with devices that enable equipment digitization and visualization.

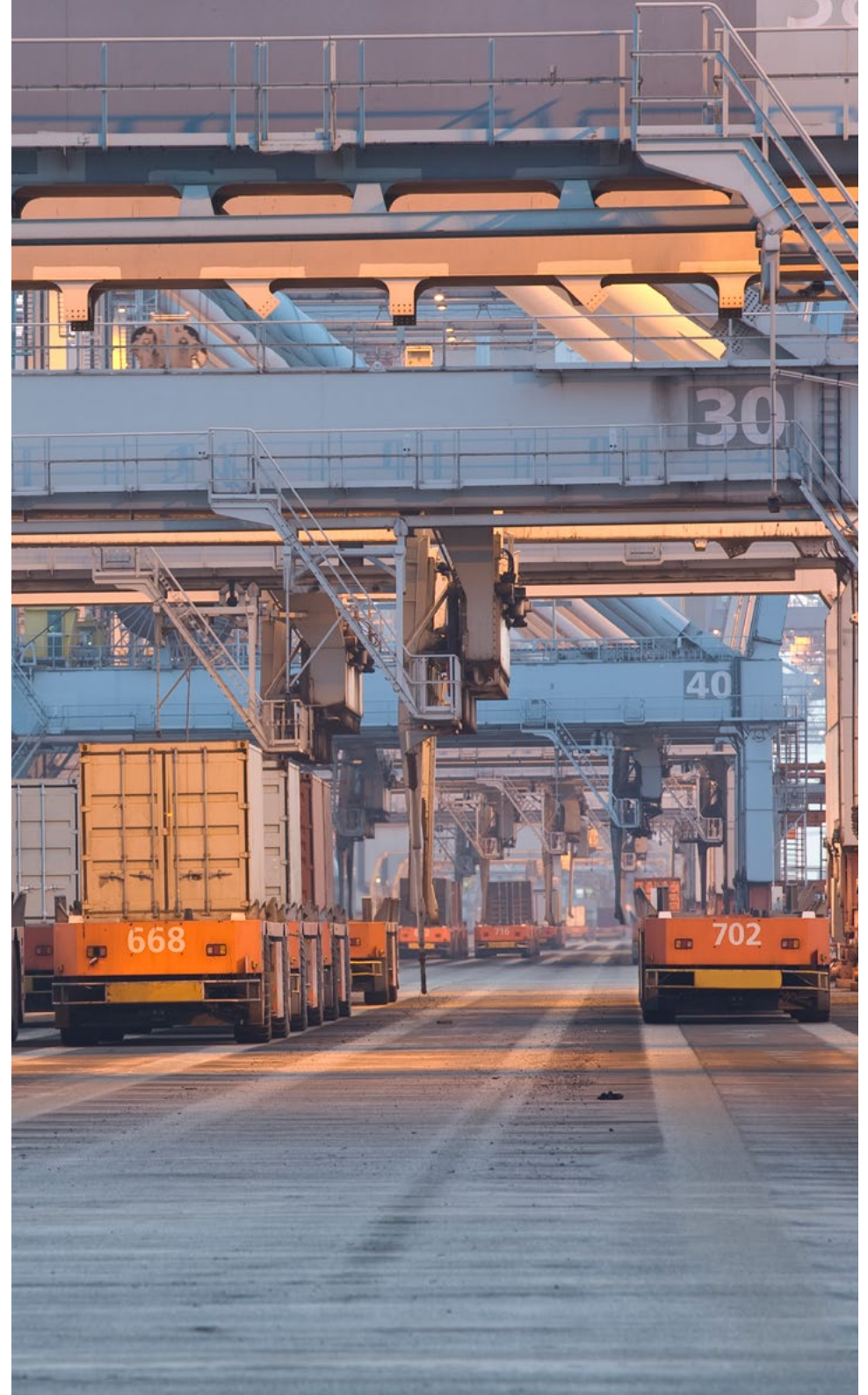
- Evolving the manufacturing process to become more automated and responsive
- Delivering transformational applications, services and workflows
- All with super-fast speeds, ultra-low latency and multiple simultaneous connections via Massive MIMO.



# Take the fastest and surest path to Industry 4.0

Nokia DAC helps you accelerate the advantages of industrial digitalization while reducing cost and risk. With easy end-to-end private wireless connectivity you can significantly smooth and speed your journey ahead.

- Enjoy reliable, pervasive, high-security, industrial-grade network connectivity with a comprehensive private wireless solution that quickly plugs and plays
- Exercise complete control over data, which stays local until you say so, only leaving the network via secure channels that you authorize
- Deploy an independent and isolated network that offers both indoor and outdoor coverage, dedicated equipment and SIM based authentication to increase security
- All powered by a distributed cloud framework that lets you centrally manage multiple local services, fully compatible with a 5G architecture
- Benefit from a catalog of applications enabled by DAC application framework
- Our teams are ready to work with your existing Communication Service Provider or Systems Integrator to design and implement a solution customised to your needs.







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#### **About 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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