



Ruggedized
Nokia Industrial
user equipment

In Nokia private
wireless solutions

NOKIA

In Industry 4.0 devices keeping teams and equipment connected in challenging environments

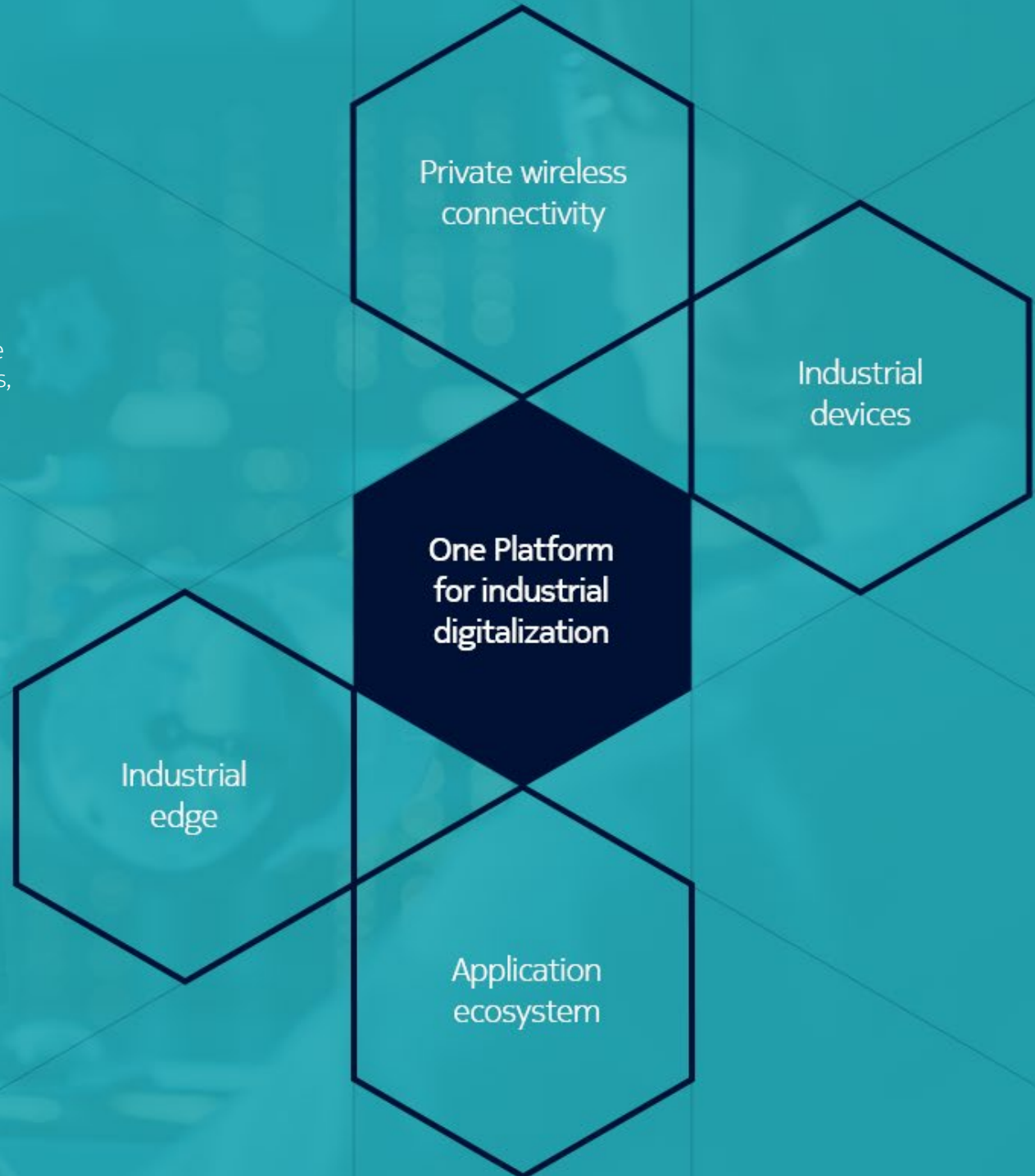
You need user equipment to connect your people and machines to your private wireless network. With reliable devices you can address your business digitalization goals efficiently. Whether your teams are working high up on an offshore wind turbine blade, in the depths of a dusty mine, battling the elements at a port, or working in hazardous environments with flammable substances you want to keep them safe and securely connected to central control. To maintain that connectivity your devices must be designed and manufactured to operate in the harshest conditions.

We test, validate and pre-integrate our Industrial devices end-to-end within our private wireless solutions to allow you to connect teams and assets rapidly and intuitively. We offer ruggedized equipment with high IP ratings, that are pre-integrated and tested with applications, including push-to-X voice and video.

All our Industrial devices are fully integrated with smart management tools and communications applications working over the Nokia Digital Automation Cloud (DAC) and Modular Private Wireless (MPW) solutions.

Reliably and securely connect your mobile workforce and industrial assets. Equip your teams with greater operational and environmental knowledge to enhance decision making. Access vital operational technology (OT) to enable compelling industry 4.0 use cases. Boost your productivity and efficiency and achieve your sustainability and safety goals more rapidly!

Nokia One Platform simplifies digital transformation and Industry 4.0 use cases. It includes industrial-grade private wireless connectivity and Wi-Fi, certified industrial devices, the industrial Edge (MXIE) and an ecosystem-neutral application ecosystem.





Connect teams,
vehicles and
equipment,
wherever they are

The Nokia ruggedized portfolio of equipment includes smartphones, workpads, fieldrouters, dongles, hotspots, video cameras and accessories – all verified and integrated with your 4.9G/LTE and 5G private wireless networks.

- Various form factors to address all needs from machines, IoT sensors and worker connectivity. Suitable for indoor/outdoor and vehicle use
- Industrial fieldrouters and dongles seamlessly manage interoperability between industrial equipment and the private wireless network
- Designed for heavy use to maintain connectivity in challenging environments for industries such as mining, oil and gas, manufacturing, ports and warehousing
- Engineered and hardened using industrial grade components and delivering high IP ratings (IP67 or IP68) and protection for safe use in hazardous situations
- Certified to meet the needs of a variety of markets and frequency bands, supporting private wireless frequency bands around the world, for 4.9G/LTE, 5G, CBRS or MulteFire
- Fully integrated with push-to-X applications and with comprehensive feature sets enabling efficient traffic for industrial protocols such as PROFINET, EtherCAT, OPC-UA and Modbus
- All tested, validated and pre-integrated by Nokia experts

Industry 4.0 promises to make your business more agile, more productive, more efficient and more sustainable. It will allow you take advantage of the Industrial Internet of Things (IIoT), artificial intelligence (AI), machine learning and augmented and virtual reality (AR/VR) to boost decision making and enable use cases such as autonomous vehicles and operations, predictive maintenance and accurate asset tracking.

To leverage Industry 4.0 capabilities for your enterprise, you must find a way to access your operational data. Robust, reliable connectivity between industrial vehicles and machinery and the communications network, holds the key to making this happen.

The Nokia portfolio of industrial grade, plug and play devices, running on our secure private wireless network solutions provides that vital connectivity. These devices make it possible for asset-intensive industries to take advantage of the Industry 4.0 use cases that best meet their digitalization needs and transform operations in the most intuitive way. In fact, most businesses will benefit from Nokia Industrial devices at least because they withstand wear and tear exceptionally well. To learn how to maximize the benefits of digitalization in other industries than the ones mentioned here, Nokia representatives are happy to help.

Designed
to add value
to any
industry



Boosting productivity in ports



Leverage autonomous operations to manage fluctuating shipping volumes more effectively, optimize turnaround times and reduce your costs.

Nokia ruggedized fieldrouters maintain a constant heartbeat connectivity between equipment such as autonomous straddle carriers and the 4G/LTE and 5G private wireless network. This ensures operations keep moving

but that equipment can be halted in an instant to ensure safety. For manned vehicles, Nokia Industrial dongles provide vital connectivity to the ERP system, allowing forklift drivers to receive work schedules and schedule adjustments in real-time.

Maintain the integrity of perishables in reefer containers by connecting Industrial IoT sensors to monitor temperature, airflow,

humidity, and light. Deviations to set data points trigger an alert on worker's handhelds and workpads, instructing them to investigate. Further equip your mobile workforce to scan and identify containers using Nokia Scene Analytics utilizing their phones.

Use Nokia Group Communications or Nokia Team Comms on workpads and handhelds, so teams can use simple push-to-X

to share voice, video and data on the same private wireless network. By connecting cameras to buildings and vehicles, around the yard or on drones, multiple video feeds can be delivered to central security teams to enhance safety and security.

Your need to constantly reinvent operations and optimize safety, sustainability, productivity and efficiency is driving digitalization in the mining industry.

In challenging, remote open pit and underground mining environments reliable, Nokia private wireless networks and Industrial devices provide the pervasive, low latency connectivity required to support your mission- and business-critical operations.

Nokia Industrial devices can withstand a range of weather conditions, dust, moisture and pressure waves from pit blasts.

Robust, hardened casings, high IP ratings and ATEX and IECEx protection offer vital protection and enable them to be used safely in these hazardous environments.

Ruggedized handhelds and workpads offer dedicated push-to-X buttons and reliable, secure group communications apps. Larger screens on workpads provide greater visibility for detailed map reading and work instructions.

Your teams can access current and historical equipment data, analytics and mixed reality to gain more information about

equipment and the environment, to enhance their decision making. Noise cancelling headsets, remote speaker microphones and other accessories keep them connected and allow them to communicate without removing PPE.

Keep your drills, trucks, loading vehicles, haulers and diggers reliably connected to the private wireless network using Nokia Industrial fieldrouters, to enable autonomous and tele-remote operation even as they traverse rough terrain. Extend productivity windows and reduce downtime and fuel consumption through more predictable behavior by

connecting autonomous haulage fleets. Take advantage of productivity gains with greater precision through autonomous driving, for example connecting and synching autonomous trucks with shovels for use cases such as hang time reduction.



Safer, more productive
and efficient mining



Smarter grids, safer societies

As you transition to more sustainable energy sources, you must find ways to incorporate them efficiently in their network, while keeping costs low and customer satisfaction high.

By connecting equipment using industrial IoT sensors, and 4G/LTE and 5G video cameras, companies can boost tracking and inventory capabilities as well as automation at large remote power plants, yards and sub stations. Remotely monitor equipment such as

cooling towers, pH and corrosion levels. Enable remote drone inspections to reduce the number of in-person visits. Leverage data feeds from equipment to enable predictive maintenance, reduce costs and downtime and extend equipment life.

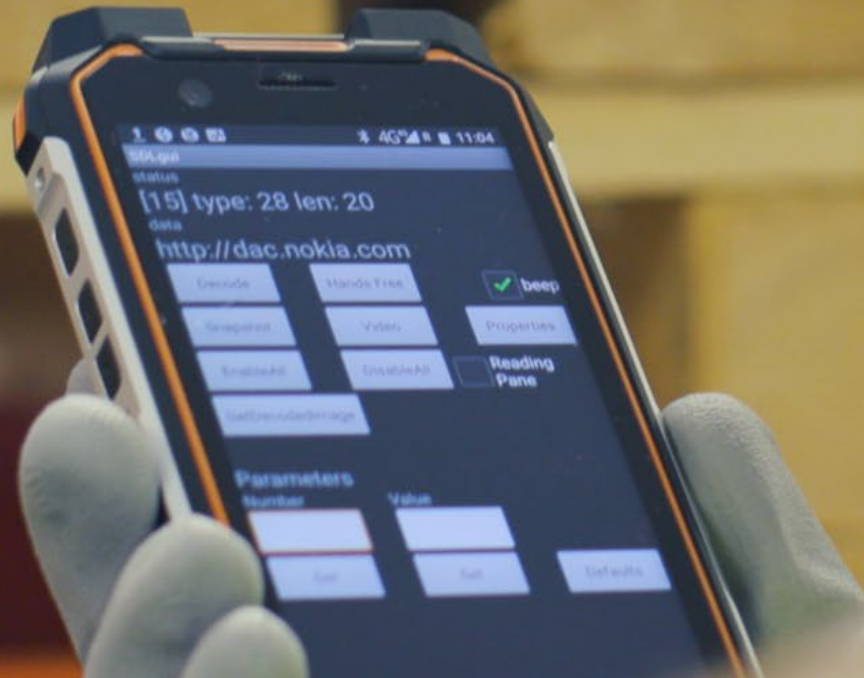
Ruggedized Nokia phones, handholds and workpads connect workers quickly via push-to-X voice and video on foot, in vehicles, at the top of a wind turbine blade, or on a vessel. High

IP protection, shock and electromagnetic resistance ensure reliable connectivity, with devices protected against harsh, unpredictable weather and ocean conditions.

Whether working at large solar wind, hydropower, natural gas or nuclear plants you can share information on the environment, equipment status and more to enhance worker safety and productivity. Support for positioning, navigation and timing

methods like network-based, GPS, GLONASS, BeiDou, and Galileo, allows you to pinpoint workers more quickly in emergency situations.

Nokia Industrial devices provide support for the low frequency private wireless bands that many utilities are adopting, including the 450-470 MHz spectrum (bands 31, 72) and emerging 410-430 MHz spectrum (as B87).



Track your assets for enhanced quality and productivity

Retrofit your trucks with barcode scanners connected over Nokia Industrial fieldrouters to securely track your assets. Our easy-to-use ruggedized handheld devices offer this functionality via a dedicated button for manual scanning. Your teams can use the same device to quickly set up a group call or share information via push-to-video.

Cameras connected over the private wireless network can be randomly repositioned with ease to allow for ultimate flexibility in monitoring and surveillance.

Connect sensors to report temperature, moisture and other parameters and leverage alerts on worker's handhelds and workpads to maintain quality of goods wherever they are being stored.

Accelerate smart manufacturing

In a manufacturing environment poor connectivity costs productivity, time and money. Wirelessly connect your operations across the factory floor and out in the industrial complex including AMRs, AGVs, production equipment, sensors and more.

Use our portfolio of ruggedized devices in conjunction with the Nokia Mission Critical Industrial Edge (MXIE) and powered by Nokia 4.9G/LTE or 5G private wireless networks, to meet the demands of the most stringent business-critical Manufacturing 4.0 use cases:

- Improve communications and coordination of the workforce and ensure they are safe with reliable connectivity and coverage across the entire campus.
- Connect cameras to deliver real-time feeds and combined with analytics, AI and machine learning for remote visual inspection and quality control.
- Benefit from predictive maintenance and zero fault manufacturing by equipping maintenance teams with workpads to access data feeds that trigger alerts to highlight and inform them of potential issues.
- Leverage mixed reality data over industrial workpads, allowing maintenance teams to see data overlaid onto industrial equipment, guiding them to areas that need attention. With access to current and historical data they can identify and resolve issues more rapidly.



Smart Cities solving the digital divide

During the pandemic, the true extent of the digital divide was uncovered as workers and students relocated to their homes. In the US alone, 17 million of the 55 million students that moved to online learning couldn't access the internet.

Around the world, governments, schools and non-profit organizations expanded initiatives to provide laptops and tablets and enable reliable connectivity for students and disconnected communities. Many are turning to private wireless.

Using Nokia end-to-end private wireless connectivity together with Nokia Industrial hotspots, the needs of smart cities, communities and students can be met in the most cost-effective way. In the US, many organizations can now leverage public networks in the Citizen Broadband Radio Services (CBRS) 3.5GHz band to drive down costs while supporting features such as bandwidth control, content filtering, safety issues and video monitoring on and off campus

Wherever your mobile workers are, you need to be able to connect them with central control teams at any moment.

Used in conjunction with Nokia Team Comms or Nokia Group Communications, your workers can leverage simple push-to-talk and video over their Nokia Industrial phones and handholds. They can access data from sensors and from central teams in real time to gain a big picture view of equipment status and the environment. This will better inform maintenance activities and allow them to be alerted to potential issues.

Nokia Industrial handholds support a wide range of 4G and 5G bands and offer IP68 protection against dust and water. The Nokia XR20 Industrial edition is ATEX/IECEx rated to operate in potentially hazardous environments.

Barcode scanning capabilities and Nokia Scene Analytics allow logistics companies, warehouses, ports and more to increase the efficiency of processing and tracking goods and containers.

Use Push to talk
and video and
access more
data than before
with robust
ruggedized
devices





Connect your machines and legacy technology using fieldrouters, dongles and hotspots

Your machinery and legacy industrial equipment are likely to be predominantly built with Wi-Fi connectivity in mind, but to support new Industry 4.0 use cases you need the pervasive reliable and low latency connectivity enabled by 4G/LTE and 5G private wireless. Autonomous automations at ports, mines and energy production plants and zero fault manufacturing use cases require heartbeat connectivity between the network and equipment, which cannot be reliably supported by patchy Wi-Fi.

Nokia dongles, fieldrouters and hotspots are compatible with Nokia private wireless networks and are pre-tested to allow you to connect operations quickly with high reliability and low latency.

Comprehensive feature sets enable efficient traffic for industrial communication protocols such as PROFINET, EtherCAT, OPC-UA and Modbus. They support a wide range of bands for 4G, 5G and MulteFire and come with highly ruggedized and anti-vibration designs for use in tough environments.

Nokia Industrial fieldrouters and dongles ensure vehicles and equipment remain connected to enable predictable operations across difficult terrain and offer protection against water and dust. The outdoor 5G fieldrouter is also ATEX/IECEx certified for use in zone 1 hazardous environments.

Nokia 4G and 5G hotspots deliver on-demand Wi-Fi connectivity to your private wireless network. Connect your remote mobile workforce, close the digital divide and equip teams, students and communities with consistent,

high-performance connectivity. Each hotspot can support tens of Wi-Fi users and connectivity across large indoor spaces*.

Choose from our range of standard dongles, indoor and outdoor fieldrouters with Fixed Wireless Access, ruggedized fieldrouters, and hotspots to keep your existing IT systems, machines, infrastructure and operations securely and reliably connected.

* The Nokia Industrial 4G hotspot HSxx401a supports 32 Wi-Fi users and a 10-meter transmission

And gain value from OT for new Industry 4.0 capabilities

Connect the Nokia Industrial 5G video camera to your private 5G wireless network in seconds straight out of the box. High quality images can be streamed in real time over the network, allowing you to benefit from:

- Real-time video analysis,
- Object detection for surveillance
- Face recognition
- Defect detection used for manufacturing quality control
- Road sign detection for autonomous vehicles

Use Nokia Scene Analytics with the Nokia Industrial 5G camera and leverage advanced video analytics to address safety, security and operational efficiency challenges. The solution can process thousands of video and IoT streams in real time, using machine learning and analytics to identify objects or people and send instant alerts to notify people to investigate.

Nokia Industrial 5G video camera



Increase usability with industrial accessories

In noisy and harsh environments and emergency situations, your teams need to connect quickly and simply. If they have to remove helmets or protective gloves to operate their device, it's going to add precious seconds and potentially compromise their safety.



Wearable camera with night vision

Nokia Industrial wearable camera is meant for professional users and allows remote collaboration by video calls and PTT calls. It can also be used as a handheld camera to reach difficult locations. It has integrated, adaptive illumination, low-light mode, and visual recording indicator LED.

Nokia Industrial wear cam is cost efficient, lightweight, easy to implement, made for everyday use and tested for harsh environments. There are many application areas. They can be used, for example, by security professionals, the police and first responders, manufacturing and maintenance and logistics teams.



Increase usability and safety for your teams

Working with leading critical communications company, Savox, we can offer a range of accessories that will enhance operational capability in critical team communication and protection in challenging environments.

Savox accessories have been designed and developed based on years of expertise and knowledge built from working with first responders such as firefighters as well as the workforce in manufacturing. Intrinsically safe products conforming to strict regulations and requirements include:

- Hand-held remote speaker microphones (RSMs)
- Helmet compatible headsets
- Headsets with noise cancellation



Equip your mobile workforce
with Industrial devices that
allow them to communicate
safely, intuitively and quickly,
whatever the situation!



Leverage
a unified approach
to managing
all your devices

Because our ruggedized devices are integrated with your networks, they are designed to deliver high performance in an industrial setting and allow you benefit from an extra layer of security.

Subscribe to Nokia Industrial device management to manage all your devices with minimal effort

- Zero touch onboarding and remote management of IoT and smart devices
- Automate actions taken when a device is discovered freeing you to focus on business-critical tasks
- Scale management to thousands of devices
- Gain a 24-7 view of all your connected devices to monitor their performance and manage them
- Click and deploy applications from the Nokia DAC catalog to meet your use case needs.
- Apply tight control and security for your smart devices using policies

Nokia Industrial device management - EMM

Manage and monitor the performance of your teams' handhelds, smartphones and workpads.

- Create profiles based on user location or role.
- Push updates and patches and applications to all devices or subsets of devices based on profile.
- Block applications, lock devices and wipe and remove a device from the network that has been reported lost or stolen.
- Enable location sharing in emergency situations and disable or enable for example the device camera.



Nokia Industrial device management - IoT

Manage IoT devices based on policies and scale delivery of updates, patches and applications to thousands of devices.

- Benefit from advanced device grouping and filtering based on your criteria
- Implement mass updates or delay pushing them to devices where mission-critical activity would be disrupted,
- Wipe devices remotely to ensure security if device is mislaid or stolen.
- Change device parameters as use case needs change for flexibility in operations.

Nokia Home Device Manager - Management Console

WELCOME DEVICES POLICIES ACTIONS DEVICE TYPES FIRMWARE ALARMS

Manage Device: RS621B00211700007

88123D_SRS621-B (RS621B00211700007)

DEVICE INFORMATION DEVICE DATA SERVICE TAGS USER TAGS DYNAMIC VARIABLES CUSTOM ATTRIBUTES ALARMS DEVICE DATA COLLECTION TRM DYNAMIC VARIABLE OBJECT LABEL MAPPING

Show All Parameters

Parameter	Value
EnableCWMP	true
URL	http://192.11.28.169:7003/c/
Username	RS621B00211700007
PeriodicInformEnable	true
PeriodicInformInterval	30

REFRESH DELETE SELECTED PARAMETER VIEW INTERFACE STACK

Device History

End Time	Policy	Function	Status	Substatus
06/27/2021 10:34		Back Up	Failure	Expiration Timeout
06/30/2021 11:01		Get Parameter Value...	Failure	Connection Request Fault
06/30/2021 11:00		Get Parameter Value...	Failure	Connection Request Fault
06/30/2021 10:27		Get Parameter Value...	Success	Not Available
06/30/2021 09:22		Get Parameter Value...	Success	Not Available

Queued Functions

QUEUE	QUEUE FUNCTION	QUEUE ACTION
Date	Function	

Gain a deeper understanding of your network with Nokia Network Digital Twin

Leverage your ultra-connected assets to gain a real-time view of your connected environment. Nokia Network Digital Twin gives you a view on how the device is perceiving your private wireless network and consolidates data from your myriad sensors in real time, allowing you to:

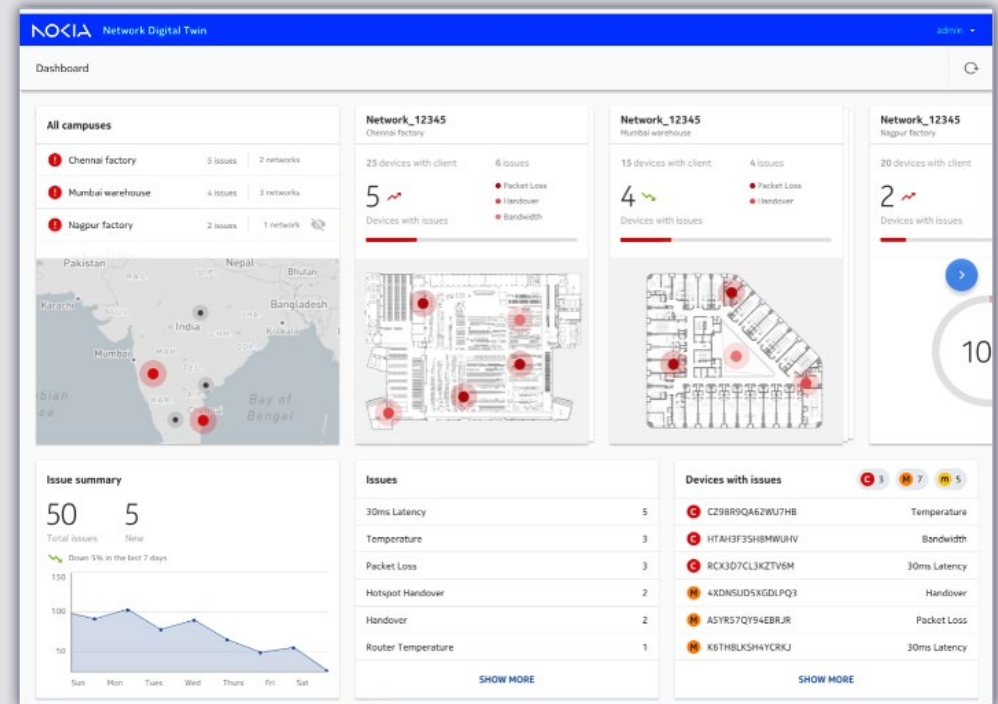
- See the status of all machines on your network
- Configure alerts to get notifications
- View and compare historical and real time data for in-depth analysis
- Run on-demand tests on devices to check on bandwidth and throughput

You can enrich your existing digital twin with data about both the devices and the connectivity.



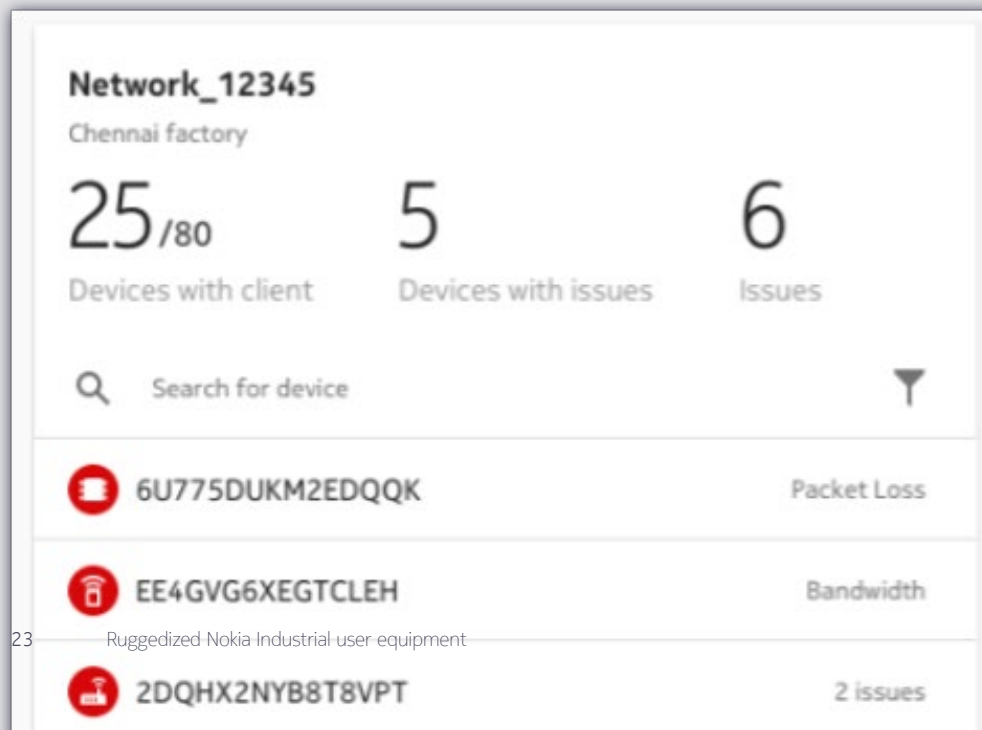
Transition to predictive maintenance

Teams can be alerted to take action if equipment connected over Industrial fieldrouters and dongles trigger data that falls out of the expected range. Leveraging AR and VR, the solution guides maintenance teams to areas that need attention, recommending actions to take to allow them to fix potential issues before they become a problem. By doing this you can reduce downtime and costs and prolong the life of your equipment.



Cut the time and cost of testing new configurations and use cases

Simulate changes in the virtual environment without impacting existing operations.




With Nokia Industrial ruggedized devices you get a rich portfolio of user equipment - handhelds, smartphones, workpads, fieldrouters, dongles, hotspots and CPEs — all verified and optimized to operate on your secure private wireless network.

Adopt a unified approach to your operations:

- Gain access to operational technology faster.
- Keep your teams connected and safe in the most intuitive ways.
- Securely track your assets and turn maintenance activities to predictive.
- Automate operations at a grand scale
- Equip your mobile workforce with more information and more ways to connect to keep them safe.
- Leverage centralized device management for greater visibility and control
- Implement the Industry 4.0 use cases that will allow you to achieve your digital operations goals faster.

Gain true value from your private wireless network by connecting your people and machines, reliably and effectively!

A photograph of three firefighters in blue helmets and black gear. They are looking at a ruggedized device held by the firefighter in the center. The device is a handheld rugged smartphone or tablet. The background is a blurred industrial or fire station setting.

Smarter,
safer,
simpler,
connected
operations



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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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