SOLUTION BRIEF

Transform your business: Unlock the power of AI and digital twin-based services

NOKIA

Best network performance with most precise AI-based twins

Our services for Mobile Networks leverage a unique combination of digital twins, AI and automation. AI-powered digital twins provide a real-time view of an entire network and its performance.

- Our digital twins automatically recommend or trigger the right actions at the right time across network design, deployment, optimization and hardware maintenance.
- With these new capabilities, we can help you achieve a prime position in network performance and maximize the business value of your network's lifecycle.

Best possible performance for your customers at any time

Have you ever been faced with a super complex challenge in network design, network optimization, site deployment, all while supporting millions of pieces of hardware? Have you wished you had a crystal ball to get the best possible solution for every problem in network design, deployment, optimization and care?

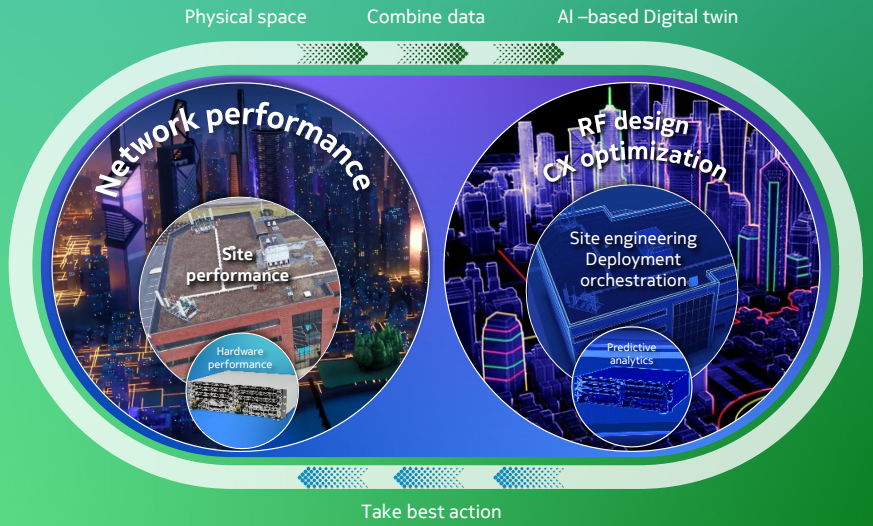
While our services experts do not rely on magic, they come equipped with the powerful combination of AI/ML, digital twins and automation. This combination helps solve complex problems in the real world and achieve business outcomes much faster than traditional approaches.

Digital twin advantage

Digital twins are created by combining real world data into exact 3D models. By applying an AI algorithm on a digital twin, you can interact virtually with your physical property, from early network design stages to maintenance. Doing so enables you to find the best course of action to take with your physical network.

The combination of AI and digital twin creates a wealth of benefits:

- **Select the best decision out of thousands of options:** Design the most suitable physical RAN infrastructure with precise 3D RF design and achieve 20% higher downlink throughput.
- **Discover the precise location of previously hidden issues:** Detect unserved areas of demand in multi-story buildings with pinpoint accuracy and predict hardware faults with up to 90% accuracy, 14 days in advance.
- **Run reliable simulations prior to costly physical deployments:** Simulate the business outcome of different beam sets, parameter setting and cell power levels. Determine targeted measures for site upgrades with highest Return on Investment (ROI), resulting in up to 40% fault management cost reduction.
- **Gauge realistic measurements of your network performance:** Measure the real performance of your network in all areas, even indoors, with RD maps combined with actual geo-spatial traffic data.
- **Create an automated and accurate process:** Work with the digital twin as a single, consistent, updated master source for all processes to produce correct Bill of Materials (BOMs), and speed up the entire deployment process (from site engineering to site acceptance), effectively leading to 60% less site visits.



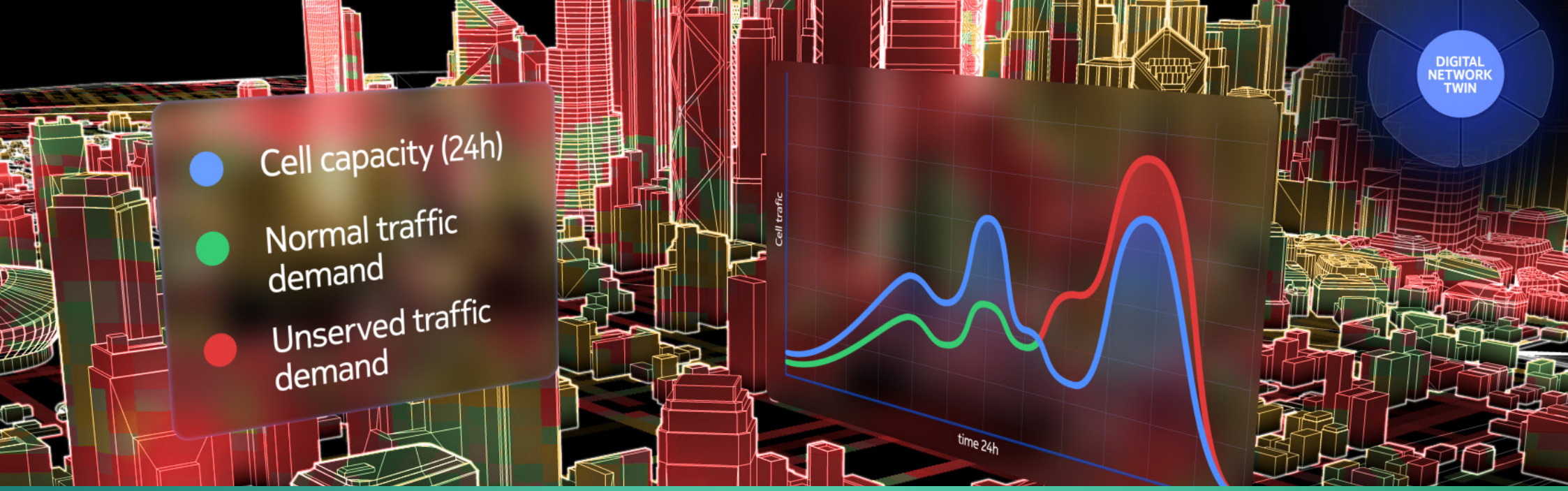
The REAL view on performance drives the entire network lifecycle

By using the digital twin, we gain an in-depth understanding of your network's performance. It keeps you in full control of the millions of physical entities in your network, even in the most complex and dynamic environments.

- **Design and optimization:** When designing and optimizing your network, you must choose between several thousand beam set patterns to avoid negatively impacting your customers' network experience. For example, using default beam sets in Massive MIMO deployments may result in sub-optimal coverage and capacity. Our digital network twin approach analyzes site-specific spatial distribution data and real network KPIs to select the best-fitting beamforming pattern for each radio site.

- **Deployment:** A digital site twin provides a comprehensive 3D model of the site and its inventory anytime, anywhere. The BIM compatible digital site twin uses AI/ML to automate design decisions based on actual site conditions, leading to sustainable, optimized choices. This full 3D visualization reduces site visits by two thirds, streamlines communication, shortens survey and design times, and enhances health and safety.

- **Care:** Today's mobile networks are overly complex, but adding AI and machine learning enhances care efficiency, unlocking new use cases in the care O&M environment. Our digital platforms help contextualize data, enabling Predictive Hardware Analytics which allow experts to anticipate and prevent service-impacting incidents before they occur. Closed-loop automation allows for proactive corrective actions, such as hardware reset. Our AI digital assistant accelerates information access by 40%, enhancing both operations and maintenance efficiency.



Nokia AI-based network twins, site twins and hardware analytics provide the REAL view for laser sharp action

In our mobile network services, we use digital twins as they offer transformational benefits throughout the entire lifecycle of a network – design, deploy, optimization and care. We are working with AI-based digital twins that mirror physical infrastructure on three different levels – network, site, hardware.

- **AI/ML-based digital network twins** provide a real view of a network and its performance. Network twins are the master source for our network design and optimization services.
- **AI/ML-based digital site twins** provide a real view of the performance of each and every site. Site twins are the master source for site upgrades, simulations, deployment orchestration and safety evaluations.
- **AI/ML-powered hardware analytics** enable customers to mirror the performance of every baseband card and every antenna element to detect any anomaly, make precise predictions of hardware health and propose the correct action.

AI in Services Portfolio – Network design and optimization services

We are enhancing our digital network twin and AI/ML-based network design and optimization services in two dimensions:

- 3D Massive MIMO beam set optimization (PMI and SRS) and a new digital design automation framework lead to both the best possible 5G network designs and fastest possible services delivery to our customers.
- AI/ML-driven interference analysis and root cause analysis, combined with a comprehensive knowledge base, precisely locates sources of interference within 100 meters. It then identifies the optimal mitigation strategy, ensuring precise and efficient resolution of the interference.

AI in Services Portfolio – Deploy services

The Nokia digital site twin offers an unprecedented level of detail, providing a master source of information for site engineering. It further facilitates digital deploy build & installation solutions and improves collaboration with customers and partners. This results in better planning, coordination and risk management, increasing safety and eliminating two out of three unnecessary site visits.

- Our new **Hazard Detection Lens uses** AI and Augmented Reality (AR) to enhance on-site safety by:
  - Providing AI-driven safety alerts and real-time hazard detection.
  - Enabling real-time video monitoring with instant hazard warnings.
  - Being compatible with smartphones for on-the-go use.
  - Focusing on high-risk areas like working at heights and electrical safety.
  - Supplementing, not replacing, existing safety protocols.
  - Storing hazard data securely in the local cloud for future analysis.
  - Functioning even in areas with no network coverage.

AI in Services Portfolio – Care services

Our predictive hardware analytics is a new portfolio, enabled by AI/ML, which supports experts in predicting network issues and avoiding service-impacting incidents through algorithm platforms. Predictive Analytics also **enables** mitigative action such as software resets, using closed loop automation. Additionally, Nokia AI digital assistant accelerates access to network data and Nokia documentation, streamlining maintenance and operations.

As a result, this helps customers to:

- De-risk site downtimes over predictions.
- Plan proactive field activities.
- Improve spare part management & logistics.
- Extend asset lifetime.
- Enhance end-user customer quality perception, thereby increasing retention.

Why Nokia?

Combination of most precise twins, most precise AI algorithm, automation and product knowledge

- **We combine digital twins, AI and process automation with product expertise.**
  Our digital twin is not just a visualization tool - it is a complete platform for network & site design, as well as a master source for all deployment processes. This combination ensures faster time-to-target network performance, higher network deployment speed and quality, and faster problem resolution.

- **We combine a wide range of data sources to get the complete, REAL view.**
  Digital site twins are created by combining several types of data into a single platform, including 3D models, sensor data and real-time performance data. Doing so simulates, thereby optimizing, material choices, energy use and maintenance schedules.

- **We use the most precise twins a master data source to drive the entire network lifecycle.**
  The network twin can be continuously updated with L3 traffic, performance measurements and network configurations, supporting the full lifecycle throughout design, deployment and care. The site twin is updated throughout a fully digitalized deployment process, from site surveys to final site acceptance. This enables clear separation of indoor and outdoor traffic, ensuring precise optimization actions.

- **We use the most precise AI algorithms to make exact predictions, even regarding safety.**
  By identifying potential problems before they occur, digital twins can also help reduce downtime and improve safety. Engineers can use digital twins to simulate health and safety risks, while the AI algorithm predicts the exact amount of unserved traffic and suggests the most efficient ROI measures. These may include installing new antennas, utilizing new spectrum or deploying software features such as carrier aggregation. We can proactively identify possible hardware faults with 90% accuracy, 14 days before the incident occurs.

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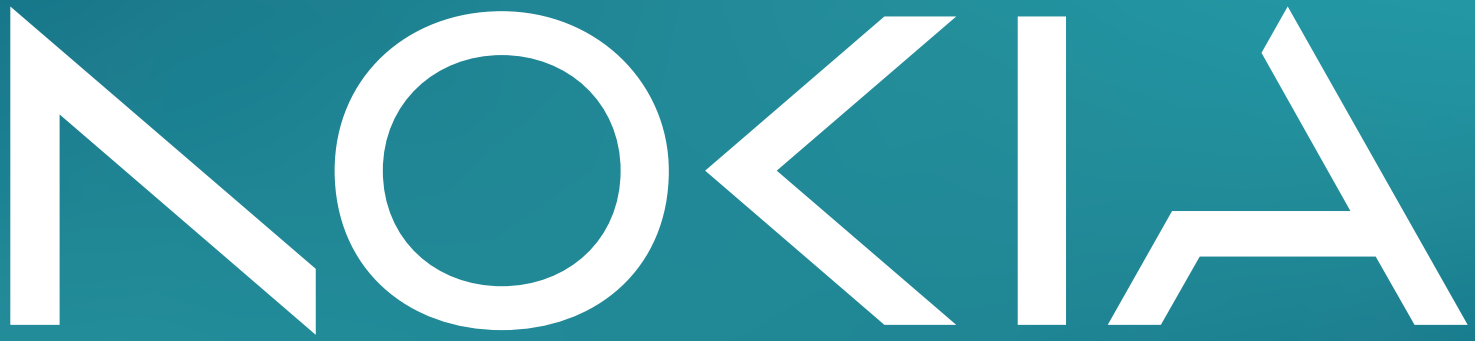

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.