# Network Services Platform

Automate, manage and control
transport networks in the 5G era

NOKIA

5G is a game changer. It promises higher performance, lower latency and more flexibility to provide new on-demand services that meet strict quality of service requirements. But delivering on these promises will create unprecedented challenges for your network operations.

Our Network Services Platform (NSP) helps you answer the many challenges that 5G brings by automating your IP, optical and microwave networks to ensure maximum service speed, performance, reliability and security. With NSP, you can simplify your operations, respond to fast-changing demands and get the most from your resources.

# What you get with NSP

## Simplicity

### Abstract complexity without limiting capabilities

NSP makes it easier to build and maintain multivendor networks that combine IP, MPLS, optical and microwave technologies across multiple domains. It is a comprehensive, user-friendly platform that turns abstract service definitions into device-specific commands to simplify operations on even the most complex networks.

## Efficiency

### Get the most from your people and network resources

NSP reduces your infrastructure and operating costs by enabling you to rely on one management, orchestration and control platform that supports common tools and practices. By automating repetitive tasks and complex workflows, NSP eases the pressure on your skilled network operations staff and specialized networking tools. By steering traffic to optimal paths, it helps you make better use of your network capacity.

## Agility

### Keep up with fast-changing market demand

NSP aligns your network offering with your service requirements by mapping connectivity-specific service-level agreements (SLAs) to underlying traffic engineering policies. Its flexible, modular and programmable approach helps you respond to customers' needs and quickly adapt to changing demand patterns. NSP's open interfaces make it easy to integrate and deploy the platform into your existing environment. This helps you accelerate service rollouts.

## Quality

### Ensure a high quality of experience for every user and application

NSP is a carrier-class platform that enables you to deliver performance that meets increasingly stringent requirements. It provides the tools you need to troubleshoot the network, fix issues quickly, move traffic and reconfigure the network before an incident actually occurs. NSP uses intent-based networking and closed-loop automation to achieve your intended outcomes and maintain them in real time in unexpected or evolving traffic and network conditions.

# Quantified benefits from real NSP deployments

An Analysys Mason study has quantified the cost and time savings that network operators have achieved with NSP.

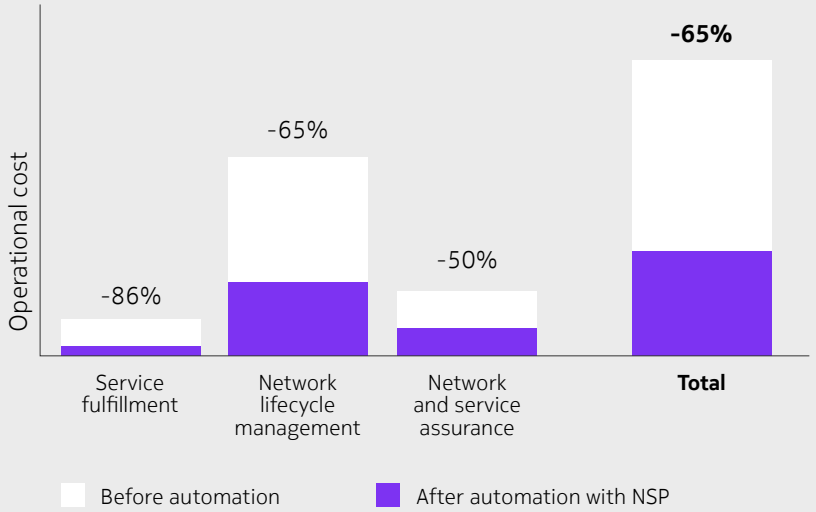
Operators can avoid 65 percent of operating costs by automating service fulfilment, network lifecycle management, and network and service assurance. Automated processes enable cost avoidance by reducing labor time, order fallout and errors.

NSP helps reduce labor time by 68 percent by automating many tasks that are performed manually. With NSP, the automated deployment and configuration of new equipment and services reduces time to revenue by 88 percent.

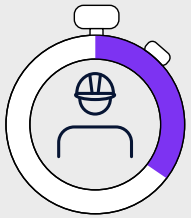
Automation also enables operators to avoid human errors and improve operational accuracy, leading to an 85 percent reduction in error processing.

NSP uses automatic alarm triage to help to identify the root cause of problems and fix them, enabling a 71 percent reduction in mean time to repair.

To learn more about the study and the quantitative benefits of NSP, visit nokia.com/networks/automation/ip-and-optical-network-automation/measurable-benefits/.

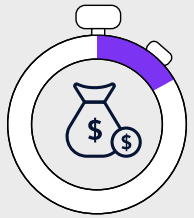



**Labor time**



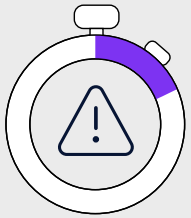
68%
reduction

**Time to revenue**



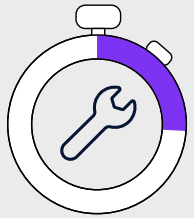
88%
reduction

**Error processing**



85%
reduction

**Mean time to repair**



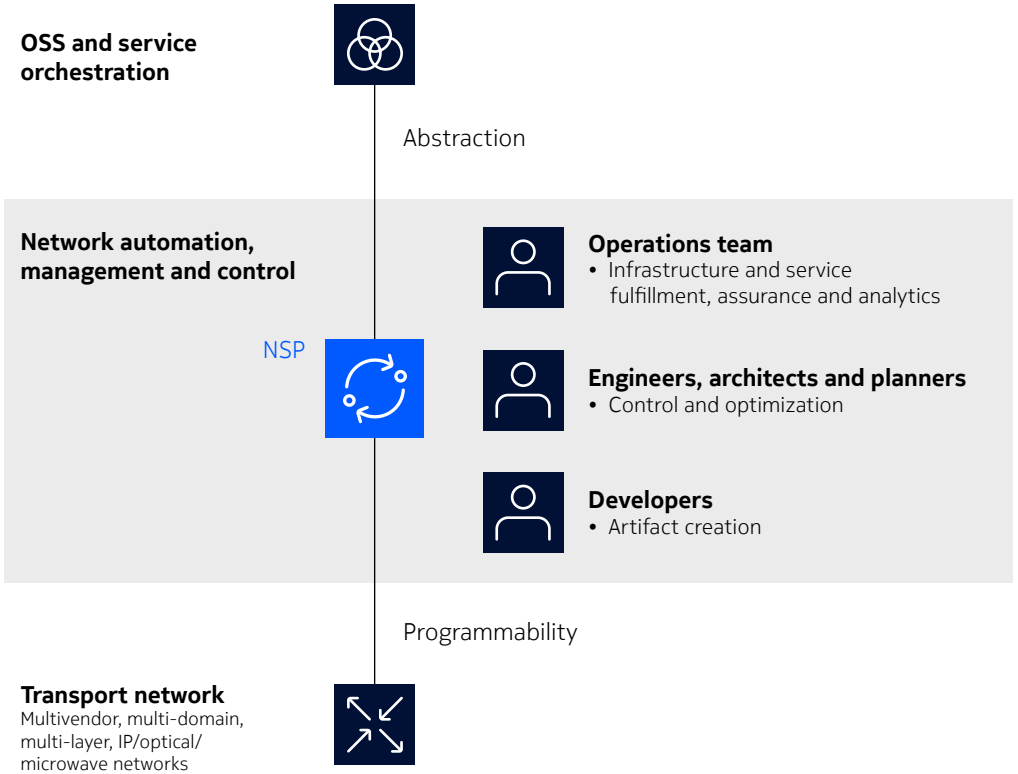
71%
reduction

# NSP answers your need for more responsive, efficient and reliable IP, optical and microwave networks

NSP is an open, modular and programmatically extensible platform that can support flexible deployment and integration options for automating transport domains.

With NSP, you get solutions that enable your operations team, engineers and developers to take on their key challenges with greater efficiency.

| User | Challenge | NSP solution |
|---|---|---|
| Network operations team | Support all network management, orchestration and control use cases | A complete set of ready-to-use functions |
| Network engineering team | Control the network and optimize traffic in real time | An SDN resource controller |
| Engineer or developer | Automate network operations and simplify integration with multivendor networks and service orchestrators | An open, programmable platform |



# What NSP can do for you and your network

## Equipment configuration

### Quickly commission new network equipment

NSP uses a model-driven approach to automate tasks such as MPLS configuration and path setup on equipment from any supplier. It ensures that your network is ready for service fulfilment in minutes.

## Network service delivery

### Get consistent provisioning that makes the best use of available network assets

NSP elevates service fulfillment by making network service deployment fully programmable and placing network services on the best possible resource paths to meet your bandwidth, latency and resiliency targets. It uses real-time network insight to help keep your services on these targets.

## Network and service assurance

### Anticipate, isolate and resolve issues before they impact the user experience

NSP provides supervision, reporting and prediction tools that help you efficiently troubleshoot network problems, pinpoint root causes and improve network performance. It uses machine learning to detect and diagnose issues fast, and proactively prevent issues where possible.

## Path control and traffic optimization

### Make the best use of network assets

NSP acts as an external SDN controller Path Computation Element (PCE) that ensures the best placement for network-wide paths and tunnels and steers traffic to avoid delays and congestion. It enables you to compute optimal multi-layer paths across multiple domains to meet SLAs relating to cost, latency, resiliency and bandwidth.

## IP/optical coordination

### Boost operational efficiency and service availability in IP/optical networks

NSP provides unified network visualization and coordination across the IP and optical layers. Its powerful correlation and automation capabilities help you make your multi-layer, multi-domain network more efficient and resilient.

# 5G network slicing made simple and efficient

The highly complex nature of 5G network slicing is transforming network operations as we know them. To generate value, a slice needs to meet the specific service requirements – including latency, reliability, throughput and cost targets – of a variety of customer segments.

As you move from supporting a few to several thousand network slices, you will need to fully automate lifecycle management for network slices. This automation must enable you quickly to instantiate, configure, assure and optimize every slice with minimal effort.

**With NSP, you get a solution that completely automates the creation, assurance and optimization of transport slices.**

You define your intent to connect a 5G service from specific endpoints. NSP automates the creation of transport slices using the available underlayer technologies (IP, optical, microwave), tunnels (IP, MPLS, SR, ODU/OCH) and network services (L0, L1, L2, L3). Its choices ensure that the services will meet SLA requirements now and during their entire lifecycle.

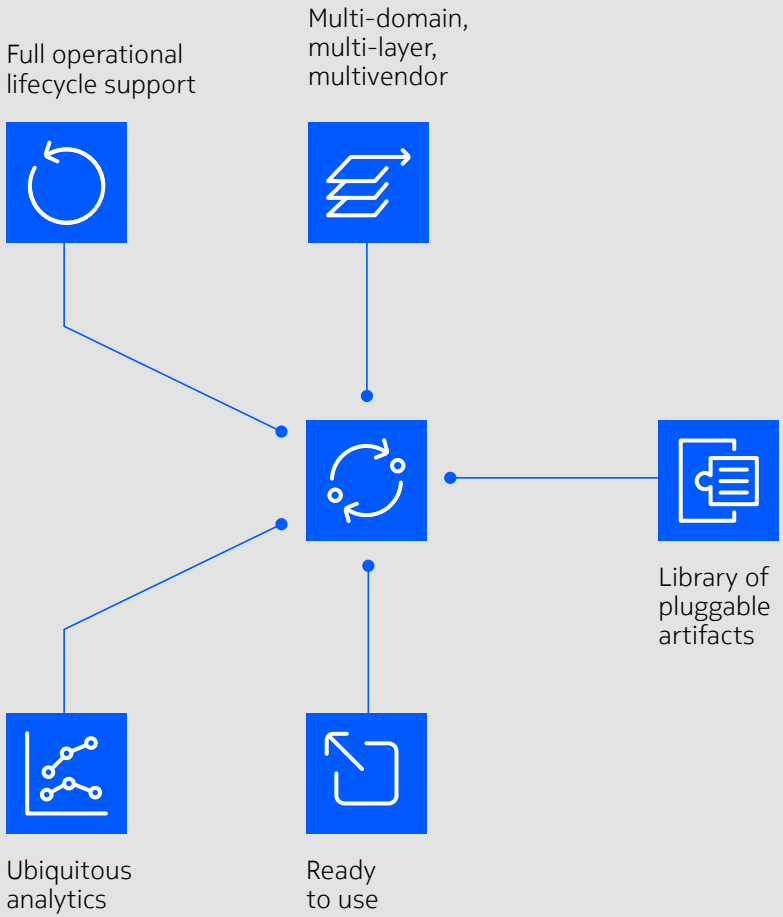
# Why choose Nokia NSP?

## Comprehensive

**The only platform you need for network management, orchestration and control**

NSP lets you manage, orchestrate and control your transport network across multiple domains, technologies and equipment suppliers. Instead of using several network management solutions and controllers, you can rely on one fully integrated platform that supports common tools and practices. NSP's comprehensive capabilities make tasks simpler for your teams and help promote efficiency and reduce OPEX across your business. They also simplify OSS integrations by making them less complex and expensive to develop. This helps you roll out network equipment and services faster.

- **Full operational lifecycle support:** Use one unified platform to create, configure, provision, optimize and assure network services.
- **Multi-domain, multi-layer and multivendor support:** Manage IP, MPLS, optical and microwave technologies from various suppliers and coordinate them across network layers.
- **Ubiquitous analytics:** Use full Layer 0 to Layer 7 analytics coverage to generate reports on past events, supervise current performance and predict potential risks.
- **Library of pluggable artifacts:** Simplify network configuration and service provisioning with easily customizable workflows, intent types and adapters.
- **Ready to use:** Use NSP out of the box by taking advantage of artifacts from the library to integrate it into your existing environment.

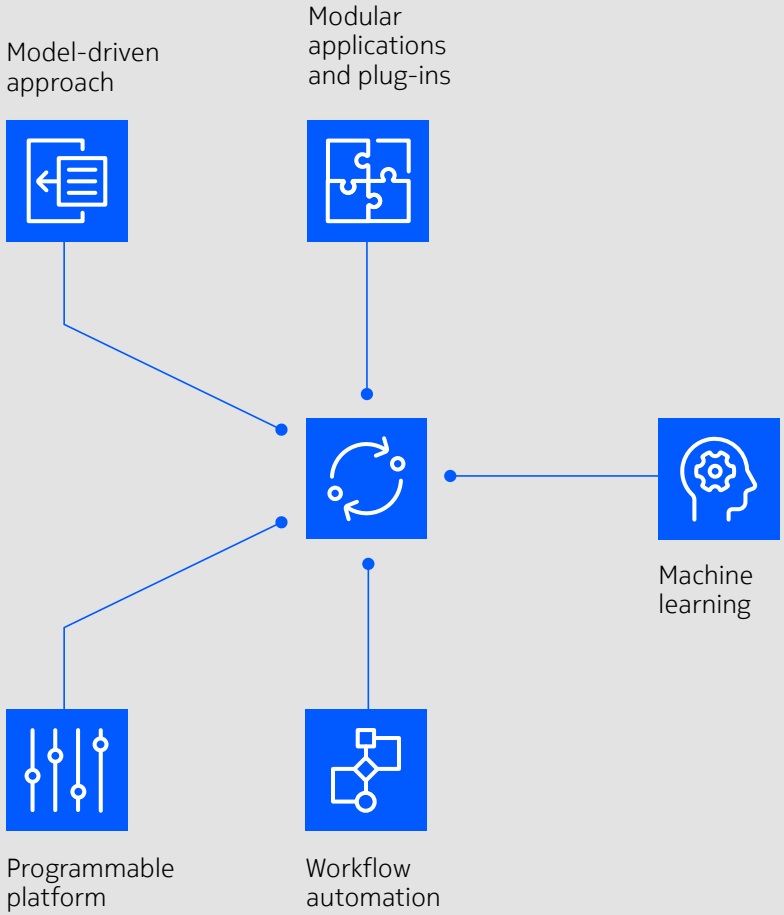


# Adaptable

**A platform that helps you keep up with continuously evolving requirements**

NSP's flexible and modular approach allows you to match deployment requirements (including FCAPS) now and in the future. It can leverage your past investments by integrating and interworking with your existing systems. It also caters to small network deployments and can scale in step with traffic and network growth. NSP can easily adapt to changing conditions, making it a safe choice for the future, one that lets you evolve your operations at a pace that works for your business.

- **Model-driven approach:** Quickly deploy or upgrade equipment from any supplier in the run-time environment using network mediation based on multivendor YANG models.
- **Modular applications and plug-ins:** Choose apps and plug-ins that let you respond to specific requirements or prioritize urgent needs.
- **Programmable platform:** Customize NSP to fit your specific operational environment.
- **Workflow automation:** Design custom workflows and automate sequences of routine and repetitive tasks.
- **Machine learning:** Discern trends, detect anomalies and find the root causes of network incidents faster with augmented assurance capabilities that learn from past experiences.

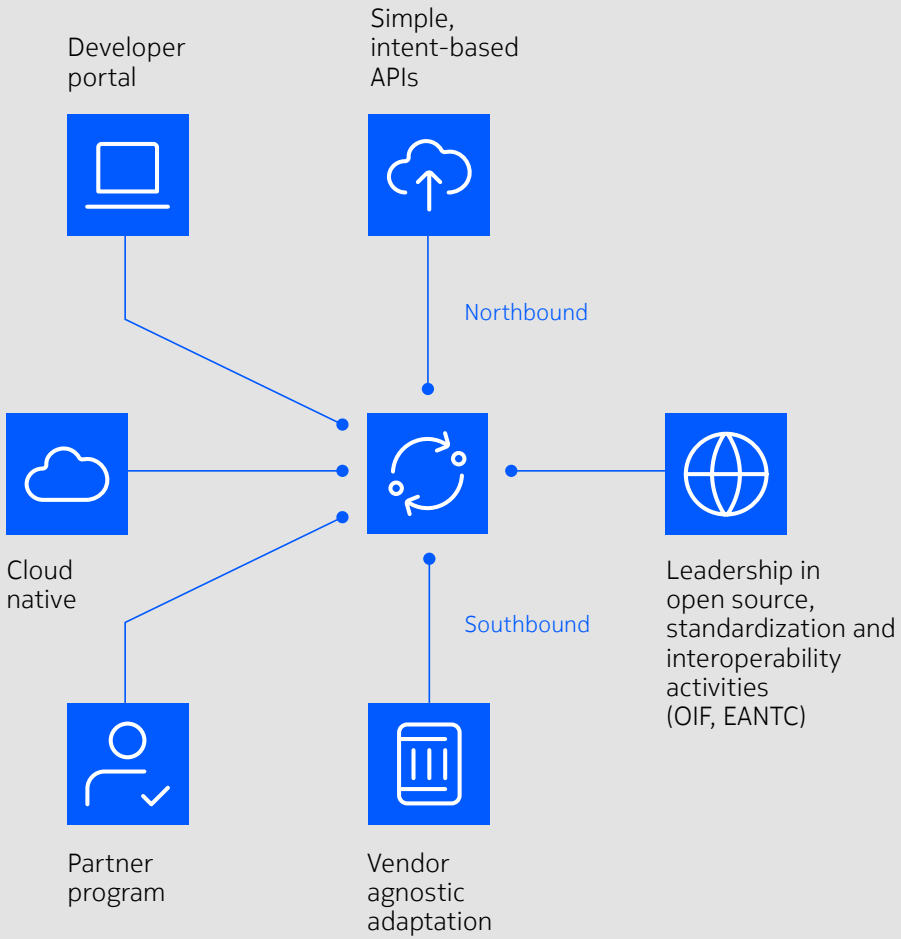


# Open

## Embracing openness for greater flexibility

NSP is fully aligned with the evolution towards open, multivendor environments to give you more flexibility in the way you build your network and services. This openness allows you to take advantage of the full breadth of NSP's functionality and simplify integration with other systems. NSP complements this openness with a proprietary operating system that provides carrier-class performance, stability, scalability and security.

- **Simple, intent-based APIs:** Use standards-based (i.e., IETF) northbound APIs to access all NSP functionality.
- **Vendor agnostic:** Use all the features of NSP with your network equipment of choice. NSP abstracts away differences between equipment suppliers by mediating many standard and proprietary data models and a comprehensive range of management protocols, including NETCONF/YANG, gNMI/gRPC, CLI and SNMP.
- **Cloud-native:** Take full advantage of the cloud with applications that are built as micro-services and run on a containerized and dynamically orchestrated platform.
- **Developer portal:** Get instant access to documented APIs, code snippets, tutorials and a virtual lab that will help you quickly build on-demand, automated networks. Visit network.developer.nokia.com
- **Partner program:** Benefit from a program that allows us to work with OSS partners to accelerate the availability of high-quality software that has been validated for NSP.
- **Leadership in open source, standardization and interoperability activities (OIF, EANTC):** Choose a cutting-edge platform that's always up to date with the latest standards. We play an active and collaborative role in key industry groups by driving the evolution of open source and standards, as well as contributing to the latest interoperability activities.

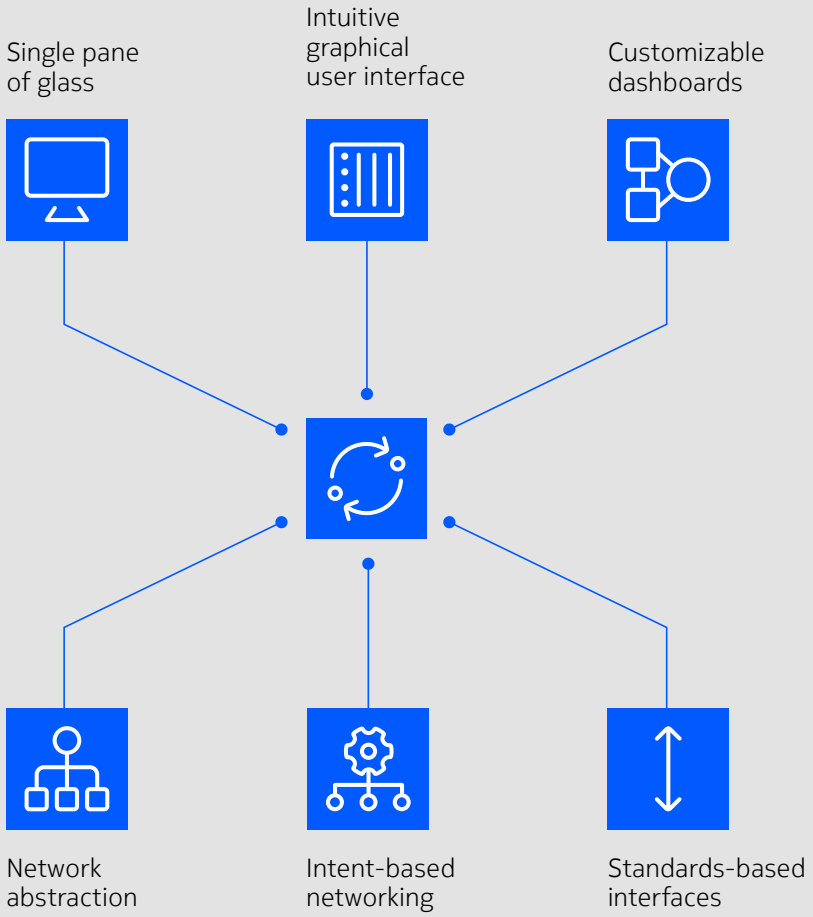


# Simple to use

## Designed with the user in mind

NSP is a user-friendly platform that makes your life easier so you can do the job quicker and become more productive. It reduces the pressure on your skilled network operations staff and removes your need for special networking tools by automating repetitive tasks and operational procedures.

- **Single pane of glass:** Use one platform for provisioning, assurance and optimization across the IP network, and extend visibility across optical, fixed access and mobile access through close integration with Nokia WaveSuite, Altiplano and MantaRay.
- **Intuitive graphical user interface:** Work faster and more efficiently with a user-centric interface that is easy to navigate.
- **Network abstraction:** Cut through network complexity with a platform that brings you meaningful information rather than deep details.
- **Intent-based networking:** Get the outcomes you want with a platform that translates your intent into configuration artifacts that can be executed automatically and persistently over time.
- **Machine-assisted assurance:** Process large data sets in near-real time to discern trends, detect anomalies and find the root causes of network incidents.
- **Customizable Network Health Summary dashboards:** Get a bird's-eye view of the entire network with dashboards that provide easy navigation for deep-dive troubleshooting and equipment and service inventory views that help you understand, diagnose and resolve problems quickly.
- **Standards-based interfaces:** Enable cost-effective integration into the existing operational environment, and rapid introduction of new services.



# NSP industry leadership by the numbers

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**About Nokia**

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.

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.