

Webscale networking for the cloud era

NOKIA



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Webscale companies depend on Nokia

Nokia networking solutions enable webscale companies – such as cloud providers, colocation providers, digital infrastructure providers, global interconnection providers and content providers – to deliver richer cloud-based services, better serve their customers and increase operations efficiency.

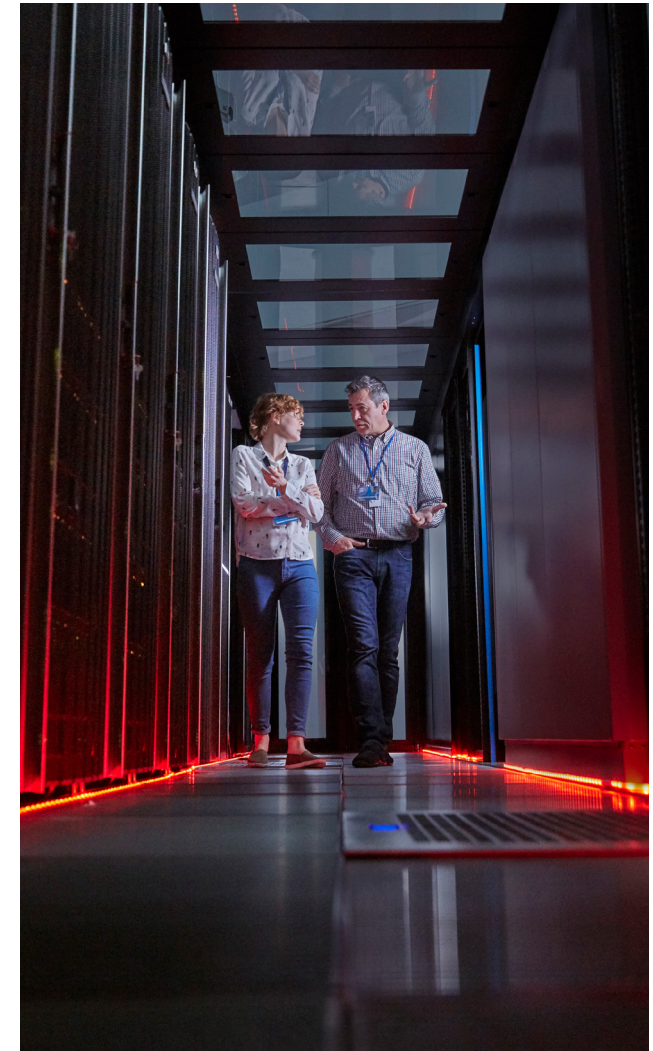
Webscale companies rely on data centers and the network infrastructure that interconnect them to deliver distributed cloud applications and services to their customers. Enterprise customers require agile, reliable and secure cloud communication and collaboration, while consumer demand online entertainment, video streaming and cloud gaming that deliver immersive, responsive and personalized user experiences.

The global pandemic changed the way that enterprises operate and do business and how consumers buy services and consume content. Increasing demand for cloud applications and services as well as 5G, IoT, AI and Industry 4.0 applications are driving the need for highly scalable data centers and greater connectivity. These data centers and the networks that connect them form a cloud ecosystem that enables digital transformation and the digital

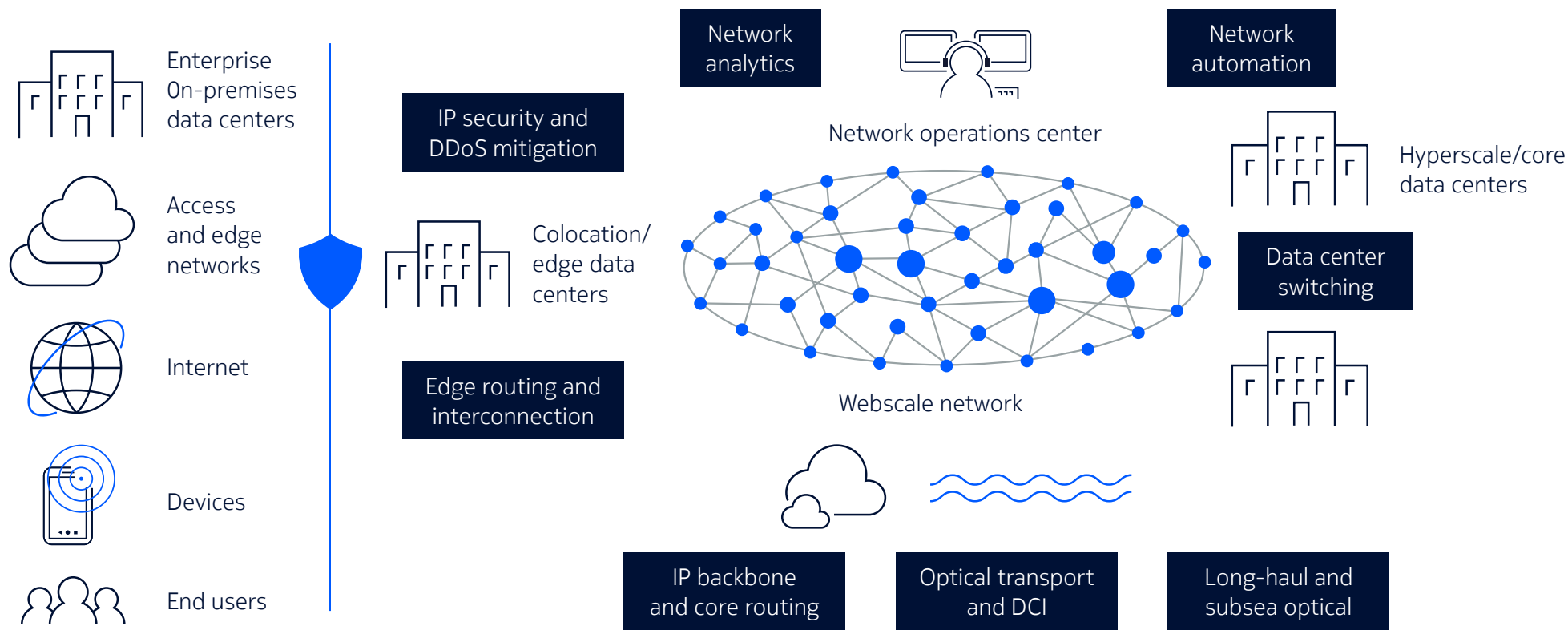
economy. This cloud ecosystem requires a highly interconnected infrastructure to deliver exceptional experiences for customers regardless of their location, highlighting the need for global and regional networks that connect and interconnect data centers in a scalable, secure and reliable way.

Webscale companies are at the heart of the cloud ecosystem and need to respond rapidly and easily to sudden and massive demand for additional capacity when and where needed. They need networking solutions that scales more easily and flexibly, is more agile and resilient, and more secure and efficient.

Nokia webscale networking solutions provide the answer, with high performance IP routing, high-capacity optical data center interconnect and open, automated data center switching to enable the delivery of more distributed cloud applications and more scalable data center interconnection. With advanced network analytics, IP security and NetOps automation, Nokia solutions also enable webscale companies to meet the operational demands of the cloud ecosystem more efficiently.



Webscale companies depend on Nokia



Learn more about...

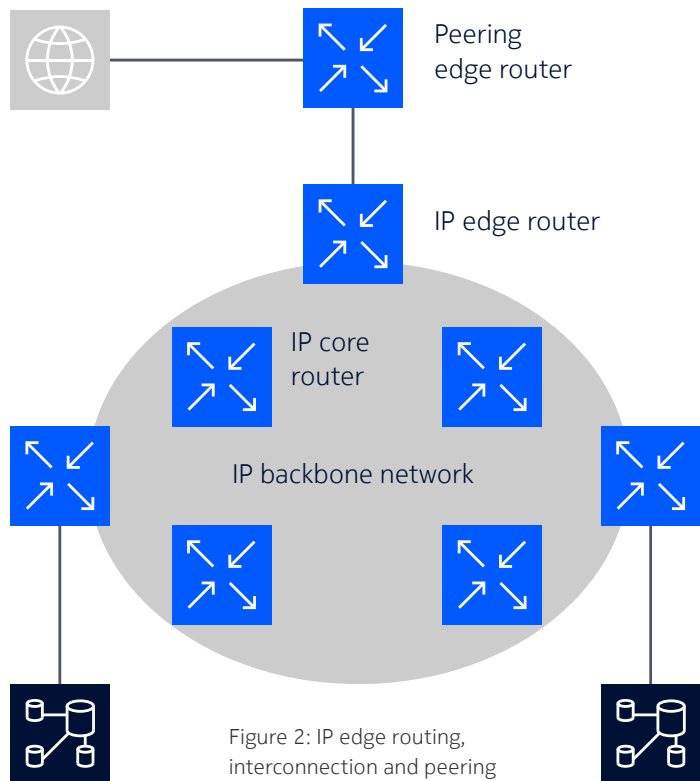
Nokia webscale solutions

CLICK HERE

Figure 1: Nokia webscale networking solutions

IP routing at scale

Webscale companies are focused on building larger, safer and more adaptable IP networks that provide interconnection for the cloud ecosystem. They need IP performance at scale to provide secure and reliable data center routing, gateway and edge functions such as peering and DDoS protection. In addition, they need highly scalable, high performance IP backbone networks to connect their core data centers in the cloud ecosystem.



The FP5 6.0 Tb/s network processor

The Nokia FP5 set a new standard in IP routing silicon design. It powers the industry's largest, highest-density and most advanced IP routers. With our IP edge and core routing platforms, FP5 helps you to:

- Achieve scale and performance at the network edge without compromising capabilities or intelligence
- Support high-density 10GE, 40GE, 100GE, 400GE, 800GE interfaces and clear channel 1Tb/s flows
- Adapt to changing network demands with real-time telemetry and insight-driven automation
- Provide enhanced packet intelligence and control to optimize traffic flow
- Provide IP network security with line rate encryption and protect against cyber-attacks with multi-level silicon-based DDoS mitigation
- Enable a 75% power reduction over previous FP silicon and future generation optics support
- Maximize value with routing platforms that deliver hardware and software extensibility.

[More about implementing webscale IP networks](#)

[CLICK HERE](#)

[Learn about the Nokia FP5](#)

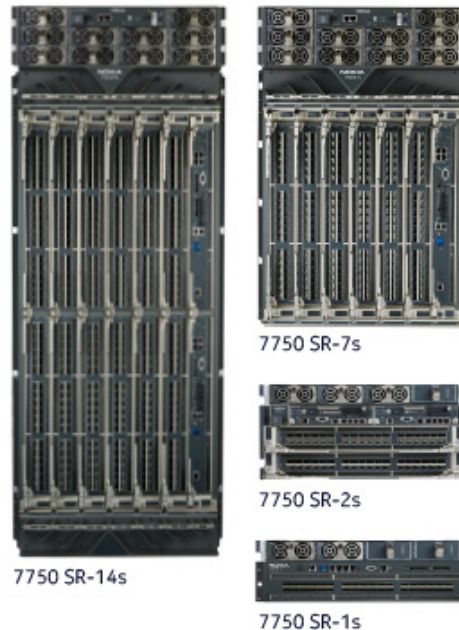
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IP routing at scale

Nokia 7750 SR-s Service Router

The Nokia 7750 SR-s series of IP edge routers takes performance to new heights. Powered by Nokia FP silicon and the comprehensive features of the Nokia Service Router Operating System (SR OS), you can:

- Deliver the massive scale, features and platform versatility essential for IP networking
- Scale from 3.2 Tb/s half duplex (HD) up to 288 Tb/s HD to fit a variety of edge and core roles
- Support 400ZR, 400ZR+ and 400G multihaul pluggable transceivers in different form factors to optimize density and performance
- Support EVPN, VXLAN, BGP, MPLS and segment routing
- Enable rich features such as traffic engineering and security at the edge while scaling and simplifying the core
- Unify automation and optimization across IP, MPLS, Ethernet and optical transport layers.



Find out more about the Nokia 7750 SR-s

[CLICK HERE](#)

IP edge routers

Nokia routers power Equinix Fabric™ to provide global IP interconnection

How Equinix uses Nokia routers

[CLICK HERE](#)

See our IP router portfolio

[CLICK HERE](#)

400GE access and peering

See why LINX is using Nokia IP/MPLS routers for 400GE access and peering.

Watch the LINX video

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Learn more about 400GE

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Empowering DE-CIX to run the world's premium interconnection services

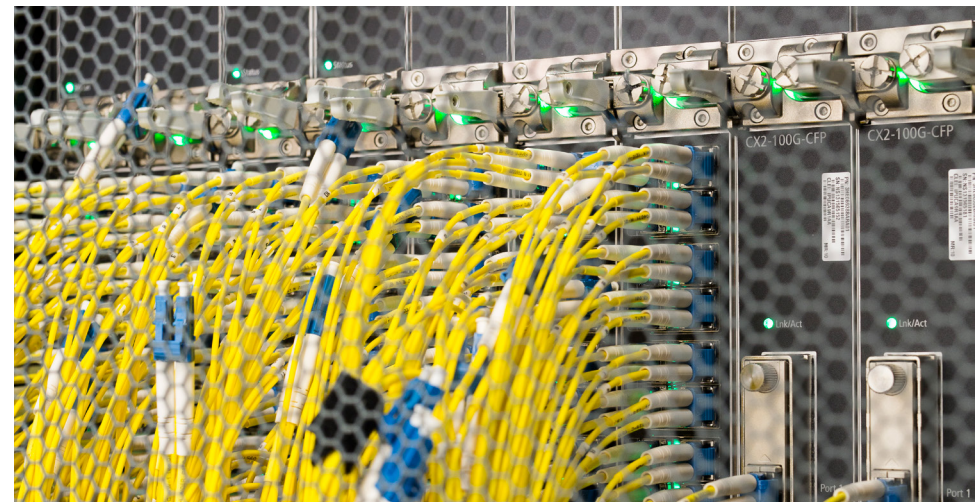
DE-CIX provides premium interconnection services and operates carrier and data center-neutral internet exchanges in Europe, Africa, North America, the Middle East, India and Asia. DE-CIX delivers state-of-the-art technology and services to meet the growing interconnection needs of its customers.

DE-CIX Frankfurt is the world's leading interconnection platform with the highest peak traffic in the world. It connects over 1,000 networks in almost 40 data centers in the Frankfurt region and regularly handles more than 12 Terabit per second of peak traffic. DE-CIX has upgraded the interconnection capacity of its **Apollon platform in Frankfurt** using new Nokia routers equipped with the latest FP5 technology.

The upgrade enables DE-CIX to boost 400 Gigabit Ethernet (GE) capacity and prepare for the future of 800 GE while significantly reducing power consumption. The Nokia routers play a critical role at the edge of the DE-CIX network providing the interconnection and peering between multiple networks. DE-CIX can effortlessly scale to meet the connectivity needs of its customers with fewer connections and much improved cost efficiency.

“ DE-CIX is well-known as a technology leader with the capability to build and operate a modern, scalable infrastructure. Through our partnership with Nokia, we have access to hardware of the latest generation to future-proof our platform and offer our customers reliable and seamless peering and interconnection services over the long term. ”

Dr. Thomas King, Chief Technology Officer, DE-CIX



[Read how DE-CIX is upgrading to 800GE with Nokia](#)

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[Read how DE-CIX is using Nokia routers](#)

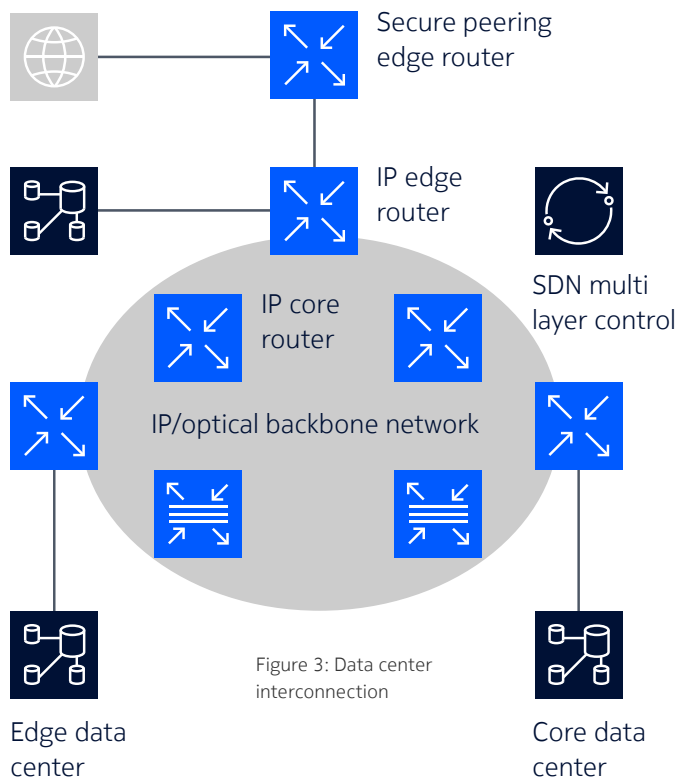
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[Learn more about Nokia FP5 technology](#)

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Optimized network architecture

Webscale companies need to scale their networks massively to support data center interconnection and cloud infrastructure with the right capabilities but at optimum performance and efficiency. Deciding where cloud applications should be located and processed – either at edge or core data centers depending on bandwidth, latency and reliability needs – determines the optimum network architecture for data center interconnection while ensuring efficiency and containing costs.



Evolving edge cloud infrastructure

Webscale companies with distributed data centers need to evolve their network architecture to support the requirements of new cloud applications and services. These applications and services create different compute and networking requirements at both edge and core data centers — which demands a new approach that ties edge to core in a much more scalable, agile and dynamic way. Data centers and cloud infrastructure need IP/optical networks that are more reliable, resilient and secure with greater operations and cost efficiency.

Choose the right IP platform for the right network functions

Nokia gives you a choice of IP edge and core router platforms with a range of functions, features and cost/performance capabilities for building cloud infrastructure and data center interconnection. Our IP router portfolio include access, aggregation and interconnection routers, edge routers for internet peering and data center gateway functions, and IP/MPLS and core routers for IP backbone applications. With the Nokia IP routing portfolio, you can:

- Use the Nokia FP5 routing silicon or best-of-breed merchant silicon, with both platforms running our common SR OS routing software for guaranteed interoperability
- Choose the best router platform for a particular role in your network architecture based on the required network features, functions and cost/performance
- Have confidence that both platforms run the same common routing software with the right features and functions you need.

[More about data center interconnection](#)

[CLICK HERE](#)

[Find out more about the Nokia IP router portfolio](#)

[CLICK HERE](#)

Optimized network architecture

A router OS proven in demanding and dynamic IP networks

The Nokia Service Router Operating System (SR OS) is built to power the most demanding, dynamic and reliable IP networks. This robust and scalable OS provides the foundation for our comprehensive portfolio of IP routers. It has been proven in more than 1,600 webscale, service provider and enterprise networks worldwide.

SR OS offers a consistent, simplified and highly reliable IP network operating environment. It supports a wide range of routing protocols for webscale applications, including EVPN, VXLAN, MP-BGP, IP/MPLS and Segment Routing.

Multi-layer IP/optical data center interconnection

Data center interconnection based on agile, flexible and high-performance multi-layer IP/optical infrastructure can support fast, scalable and reliable data center and cloud connectivity – satisfying both emerging and future application demands.

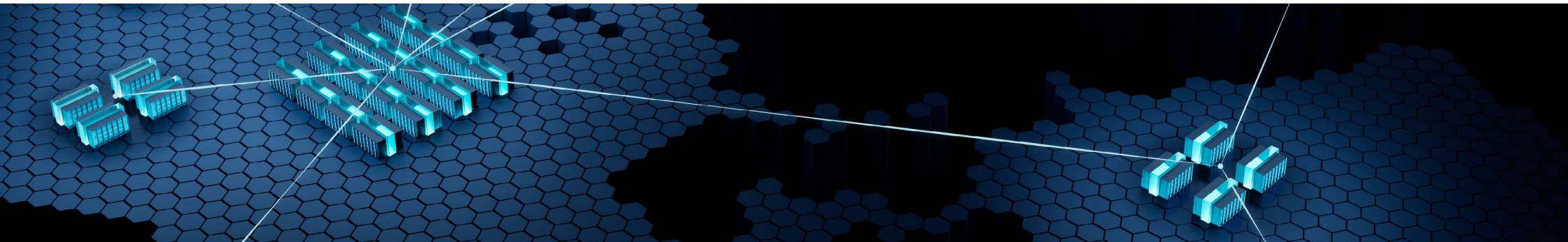
It can scale seamlessly, connecting edge and core data centers, providing IP interconnection and peering and ultra-scalable, flexible and agile optical data center interconnect. Multi-layer IP/optical co-ordination provides control and automation across IP and optical layers.

Find out about the Service Router Operating System (SR OS)

[CLICK HERE](#)

See how NorthC automates data center interconnection

[CLICK HERE](#)



Helping Equinix power customers' digital transformation



Equinix operates over 220 data centers in 63 markets, across 5 continents. It's home to the world's most interconnected data centers, connecting leading cloud providers, network operators, service providers and enterprises to their customers, partners and employees to enable exciting new business opportunities.

Interconnection makes it all happen — and it's the Equinix Fabric™ that provides the power to connect customers' distributed infrastructure and digital ecosystems. Nokia routers provide the interconnection capability, sitting at the heart of Equinix Fabric, running IP/MPLS and segment routing that enables an optimized network architecture with an intelligent edge and a high-performance core.

By partnering with Nokia, Equinix has a more scalable, automated and cost-effective solution with an architecture that supports their rapid growth and frees their customers to establish connections on demand between any two Equinix Fabric locations. Equinix chose Nokia edge routers with custom FP silicon as they offer high scalability, capacity and performance without compromising capability for edge functions such as segment routing and traffic engineering.



“ The first big goal given to us was to reduce the cost of the technology we had been using. Our second goal was architecture optimization — making sure that our architecture was a simple, single technology, low number of vendors, easy to debug, easy to provision services and coherent across all different services. ”

Muhammad Duranni, Chief Network Architect at Equinix

See how Equinix is boosting 5G and edge innovation with Nokia

CLICK HERE

Read how Nokia routers power Equinix Fabric™

CLICK HERE

Learn more about Nokia 7750 SR edge routers

CLICK HERE

High capacity optical data center interconnect

Deploying optical networks for cloud data center interconnect (DCI) across a metro, a region or on a global scale is complex and costly. That's why webscale companies maximize the fiber capacity and performance of wavelengths in their optical networks with the Nokia super coherent Photonic Service Engine (PSE) chipset and Nokia optical platforms such as the 1830 Photonic Service Interconnect – Modular (PSI-M).

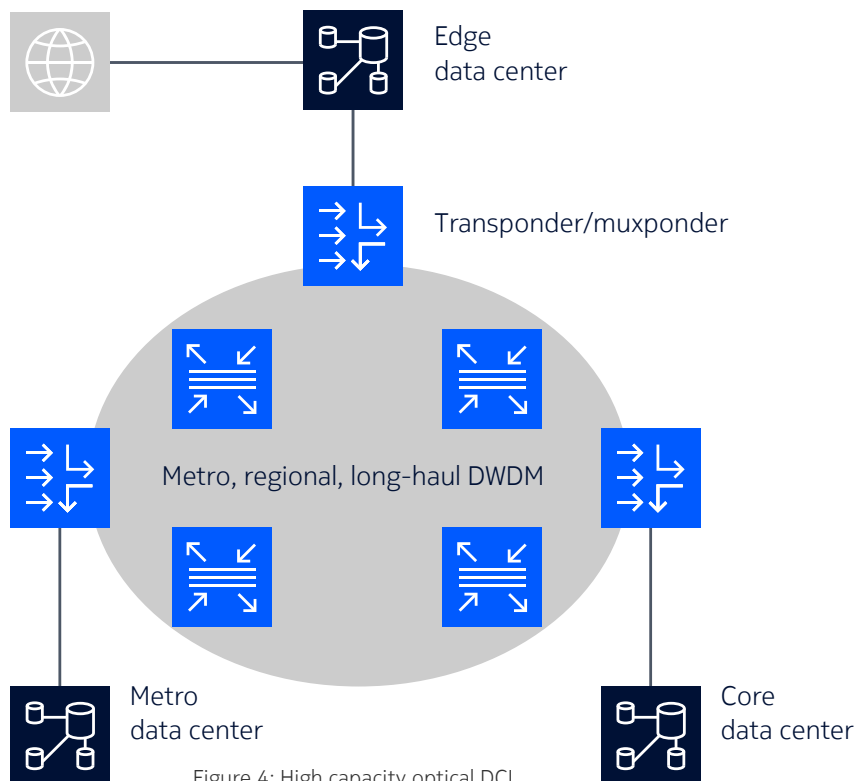


Figure 4: High capacity optical DCI

Optimize wavelength capacity and efficiency with the PSE-V

The Nokia super coherent PSE-V digital signal processor and silicon photonics help you achieve the best cost/performance for high capacity optical networking and DCI:

- Deliver optimal network capacity and reach over every wavelength on each route – from metro to subsea
- Push optical performance close to the Shannon Limit to achieve the maximum possible transmission rate
- Improve optical performance up to 25 percent and increasing fiber capacity up to 65 percent.

You can implement high-performance 100G – 600G wavelengths with fiber performance close to theoretical limits at any distance – from 10 km to 10,000 km and more.

[More about high-capacity optical DCI](#)

[CLICK HERE](#)

[Go beyond the limit with the PSE-V](#)

[CLICK HERE](#)

High capacity optical data center interconnect

Nokia 1830 PSI-M

The 1830 PSI-M provides flexible and scalable optical DCI for 100/400G clients in a cost-efficient, compact modular architecture. It supports four I/O interface modules that incorporate client optics and WDM line optics, functioning as an entire muxponder per module. Different modules support multiple 100/400G client interfaces and multiple WDM line interfaces at 100G to 600G line rates over metro, regional, long-haul and subsea distances.

The PSI-M has dual controllers and dual power supplies for redundancy, with modular fans that are field replaceable. Both AC and DC modular power supplies are available.

Optional “E” versions of each module provide AES-256 data encryption of the line ODU payload.



[Learn about the 1830 PSI-M](#)

[CLICK HERE](#)

Nokia 1830 PSI-CL

The compact, modular 1830 Photonic Service Interconnect – Compact Line (PSI-CL) is optimized for point-to-point DCI applications. The PSI-CL supports four I/O module slots that can be used with a mix of amplifier and protection switch cards, along with passive 48, 64 and 96 channel mux/demux units to create a complete WDM line system.

When paired with the 1830 PSI-M transponders, the PSI-CL provides a complete DCI solution to transport 100/400GE client services. The PSI-CL also provides WDM mux/demux and amplification where 400ZR coherent optics are directly integrated into IP routers.

Optical protection switch cards provide standard 1+1 and 1+2 network protection.



[Learn about the 1830 PSI-CL](#)

[CLICK HERE](#)

Data center interconnect

Read how ARC Solutions uses Nokia for data center interconnect.

[Read the press release](#)

[CLICK HERE](#)

[Discover the Nokia 1830 PSS](#)

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Optical networking

Over 40 webscalers use Nokia optical networking solutions.

[Read the GlobalConnect case study](#)

[CLICK HERE](#)

[Discover Nokia optical solutions](#)

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Enabling GlobalConnect to build the Nordic digital highway



GlobalConnect

GlobalConnect is the leading supplier of fiber-based data communications and data centers in Northern Europe. It's extensive fiber network and secure data centers form the platform for its customers' digital journeys. In addition, customers have access to market-leading network solutions, IT security, IT outsourcing and unified communications to help them focus on their core business and growth.

The company saw a growing market need for very high capacity, low latency and high availability transport links between major data centers and internet capacity to Europe's major internet exchanges. At the same time, GlobalConnect needed to consolidate multiple domestic networks into one large regional network.

Using the latest Nokia optical technology, GlobalConnect upgraded its optical backbone network to increase the capacity of its fiber. The technology also allowed GlobalConnect to increase the speeds from 10 Gb/s to 400 Gb/s for long haul, metro and regional links. This major upgrade provides GlobalConnect customers with access to 100 times more capacity.

Since implementing the network upgrade, GlobalConnect has implemented 600 Gb/s speeds to support high-capacity data center interconnect across the Nordics using Nokia PSE-V super coherent optics.



“ The latest Dense Wave Division Multiplexing (DWDM) technology maximizes and future-proofs our own optical fiber capacity and provides high availability through a flexible meshed network. The technology has already proved itself to be a winning concept in the first month of the project, delivering 12 x 100 Gb/s for a hyperscale customer only five weeks after project kick off. ”

[Jan Flemming Henriksen, Head of Optical at GlobalConnect](#)

[Read about the GlobalConnect 600 Gb/s deployment](#)

[CLICK HERE](#)

[Learn more about Nokia PSE technology](#)

[CLICK HERE](#)

[Read the GlobalConnect case study](#)

[CLICK HERE](#)

Subsea optical networks

Subsea cable operators – including Tier 1 cloud providers – demand line terminating solutions that make it easy to manage their own bandwidth and operate independently. Nokia subsea solutions utilize the industry's strongest optical transmission technology, supporting record setting non-regenerated span lengths, maximum spectral efficiency and optimized equipment costs. Integrating terrestrial and subsea networks through a common platform and components provides seamless connectivity and operational efficiency.

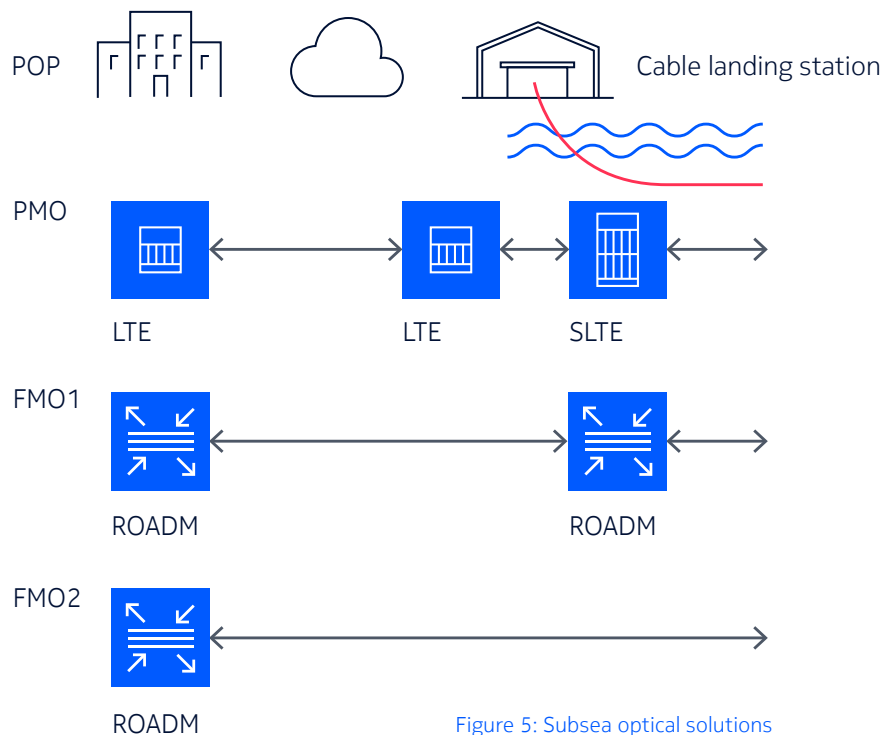


Figure 5: Subsea optical solutions

Maximize span length and efficiency, optimize costs

Utilizing our Photonic Service Engine (PSE) super coherent digital signal processor and complemented by innovations in wavelength routing and software control, Nokia's subsea solutions deliver performance and scale for any subsea cable facility.

The PSE optimizes capacity for each unique optical span, utilizing probabilistic constellation shaping (PCS), advanced SD-FEC coding and Nyquist filtering.

With leadership in subsea and optical networking, Nokia and its subsidiary **Alcatel Submarine Networks** are uniquely qualified to deliver high performance subsea cable solutions that:

- Maximize subsea cable transmission
- Seamlessly integrate subsea line terminating equipment (SLTE) with terrestrial networks
- Operate multiple SLTE on a single fiber to enable sharing of cable infrastructure and amortize costs between multiple customers
- Restore services across multi-operator lines to provide fault protection contingency plans through traffic re-routing.

[More about Nokia subsea solutions](#)

[CLICK HERE](#)

Subsea optical networks

Increased capacity and reduced power per transmitted bit

Using the Nokia PSE results in a capacity gain of between 25 and 68 percent and a 60 percent reduction in power required per transmitted bit. Further, Nokia's optical solutions include advanced wavelength routing capabilities, such as colorless, directionless, contentionless flex grid reconfigurable optical add-drop multiplexing (CDC-F ROADM) to further simplify equipment and reduce physical footprint and cost while opening new deployment opportunities.

- Optimize performance across any optical span - 25% capacity increase compared to advanced systems and up to a 68% increase compared to currently deployed systems.
- Unconstrained flexibility and programmability - Identical hardware supports any optical span and capacity requirement through software control.
- Reduce space and power requirements - reduces the need for regeneration, transponders and other equipment.



Low-latency subsea connectivity

Nokia trials 12,635 km connection from USA to Africa.

[Read the press release](#)[CLICK HERE](#)[Discover Nokia subsea solutions](#)[CLICK HERE](#)

Optical spectral efficiency

Nokia PCS achieves record-breaking spectral efficiency.

[Read the technical white paper](#)[CLICK HERE](#)[Read the solution app note](#)[CLICK HERE](#)

Open, automated data center switching fabrics

Accelerating demand for cloud-based applications is putting pressure on webscale network operations teams to scale data center networks quickly and easily to meet new business needs while containing costs and improving efficiency. Our next-generation data center fabric solution is driven by SR-Linux, a uniquely open, extensible and consumable Network Operating System (NOS), together with data center switching platforms that address the needs for massive scale and interconnectivity. Our Fabric Services System provides a declarative, intent-based NetOps toolkit needed to successfully automate data center network operations.

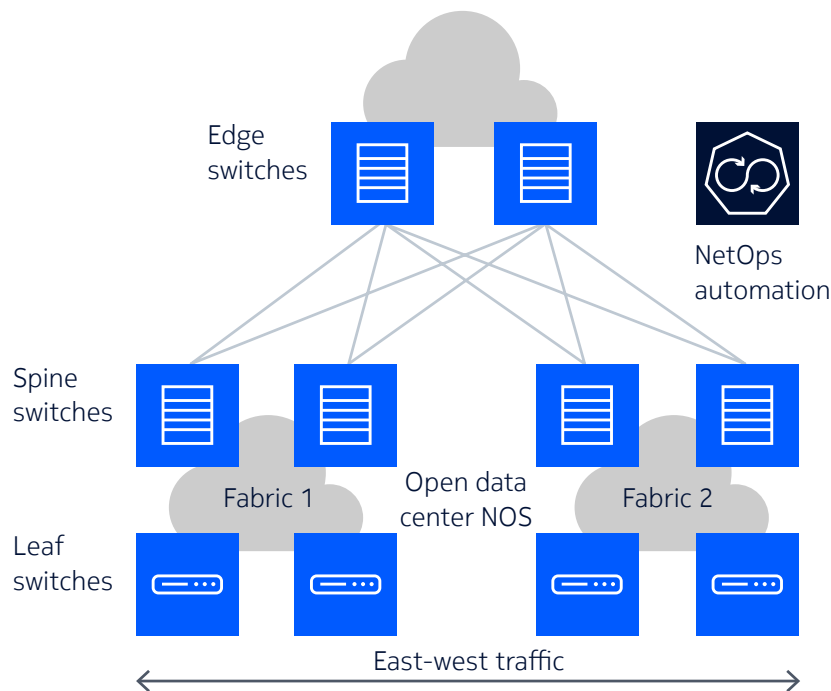


Figure 6: Data center switching fabric

Solve growing scale, operation and cost challenges

The Nokia Data Center Fabric solution is designed to enable networking teams to rapidly design and deploy, easily adapt and integrate and confidently operate and automate data center network fabrics at scale. The solution comprises:

- Nokia Service Router Linux (SR Linux): An open, extensible and resilient network operating system (NOS) based on standard Linux® that enables scalability, flexibility and efficiency in data center and cloud environments
- Nokia Data Center Switching Platforms: A portfolio of fixed form factor and modular platforms that deliver massive scalability, openness, aggregation and interconnection for data center top of rack (TOR), leaf, spine and super-spine applications
- Nokia Fabric Services System: A declarative, intent-based automation and operations toolkit that enables agility, improves efficiency and reduces risk for all stages of the fabric operations lifecycle.

[More about the Nokia Data Center Fabric solution](#)

[CLICK HERE](#)

[More about Nokia Data Center Switching Platforms](#)

[CLICK HERE](#)

Open, automated data center switching fabrics

Scale your data center fabrics

- Scale your data center networks without losing flexibility or openness
- Enhance and optimize your network operations and automation at scale with declarative intent
- Benefit from resilient and field proven IP routing protocol stacks including MP-BGP, EVPN and VXLAN
- Implement high-performance platforms with massive scale and port speeds up to 400GE.

[Learn more about SR Linux](#) [CLICK HERE](#)

Automate at scale

- Enable agile and scalable Day 0 design, Day 1 deployment and Day 2+ operations
- Deliver automation at scale by representing intent and configuration in YAML format
- Manage risk with the digital sandbox and provide true emulation of the data center fabric before changing the live network
- Easy integration with compute or storage, operational tools and cloud environments.

[Find out about Day 0, Day 1 and Day 2+ operations](#) [CLICK HERE](#)

Take control of operations

- Simplify network programmability with model-driven management and modern interfaces
- Deliver superior visibility and deep control via an open, scalable telemetry framework
- Write new applications with the NetOps Development Kit (NDK) that uses gRPC and protobufs to provide maximum flexibility
- Write your own Python based CLI plugins to monitor and tune system information.

[More about NetOps](#) [CLICK HERE](#)

Open data center NOS

Learn why Nokia is a leader in data center switching.

[Read the GigaOm Radar report](#) [CLICK HERE](#)

[Discover Nokia SR Linux](#) [CLICK HERE](#)

NetOps automation

A new approach to automate data center fabric operations.

[Read the EMA report](#) [CLICK HERE](#)

[Discover Fabric Services System](#) [CLICK HERE](#)

Advanced network analytics with real-time control

Webscale companies can deliver the application experiences their customers demand using an insight-driven IP approach that aligns business intent with service outcomes. Insight-driven networks provide a more efficient operational model based on advanced network analytics that combines network intelligence, visibility and control.

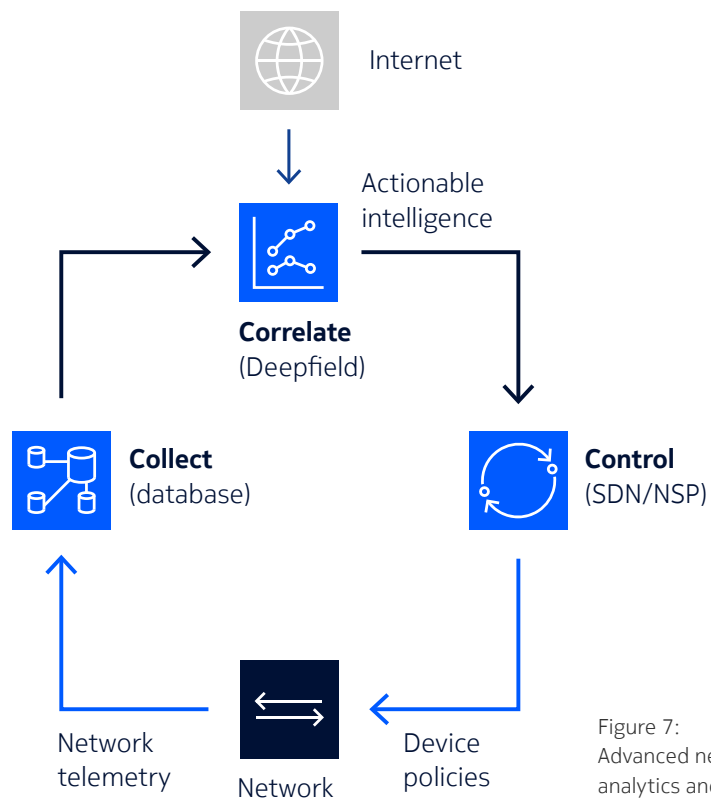


Figure 7:
Advanced network
analytics and control

Evolve your IP network for long term profitability

Nokia insight-driven IP networks let you run your network more cost-effectively and ensure you deliver the user experience your customers expect. With an insight-driven network, you can:

- Meet your capacity, cost and performance objectives
- Fine-tune your network based on real-time traffic insights
- Streamline your network operations
- Ensure service outcomes meet business intent

An insight-driven IP network provides a closed loop, objective-driven approach translates massive volumes of network data into insights to program network behavior and improve performance.

It offers a more efficient operational model based on advanced network analytics that combine network intelligence and visibility into how traffic flows across your network and the internet, and how your end systems and customers are consuming applications, services and using content delivery networks (CDNs).

[More about advanced network analytics](#)

[CLICK HERE](#)

Insight-driven networks with real-time control

Telemetry and model-driven programmability

Nokia IP routers powered by FP silicon provide the highly granular, push-based telemetry data and model-driven programmability that are key to advanced network analytics and automation. They help to:

- Enable fast decision making by visualizing high volumes of multi-dimensional network data
- Optimize the delivery of application traffic with highly granular flow control
- Make the network more reliable, responsive and secure with network programmability.

Big data analytics processing engine

Nokia Deepfield is a massively scalable analytics platform that ingests, processes and correlates petabytes of data to provide multi-dimensional network insight and analytics in real-time.

You can:

- Implement powerful network analytics without the need for additional appliances or probes
- Enrich network information with Deepfield Cloud Genome® and Secure Genome data sets
- Leverage data sets of up-to-date information about billions of IPv4 and IPv6 end points.

Network control and automation

The Nokia Network Services Platform (NSP) provides network control that translates intent into actions to program the network. It uses actionable insights to confirm that the outcomes meet your goals. NSP provides:

- A suite of applications for network management, orchestration and control
- An SDN resource controller to control the network and optimize traffic in real time
- An open programmable platform to automate operations and integrate with OSS systems.

Network analytics

Cyber threats and attacks are more frequent and impactful.

[Read the Deepfield report](#)

[CLICK HERE](#)

[Learn about Deepfield analytics](#)

[CLICK HERE](#)

Agile, responsive network automation

Webscale companies understand the need to automate multi-layer, multi-domain IP/optical networks to support multi-cloud environments from edge to core. Network automation increases cloud agility and helps the business respond faster to surges in customer demand and ensure application performance.

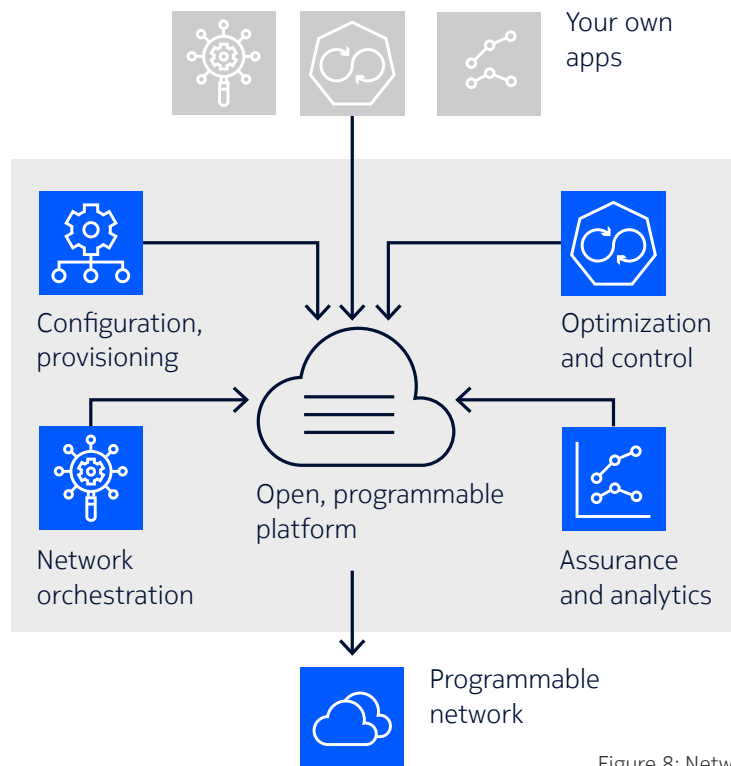


Figure 8: Network automation

Operational agility and speed matter

The Nokia Network Services Platform (NSP) delivers multi-layer SDN automation, simplifying complex multi-layer operations and cutting down the cost of repetitive tasks.

You're free to design custom workflows and automate routine tasks, reducing human error and system outages and delivering consistent, predictable outcomes.

NSP makes it easy for you to start automating and programming your IP and optical networks and quickly develop connected applications. NSP provides:

- Workflow design and automation capabilities
- Model-driven interfaces and multi-vendor support
- A developer portal with a wide range of open APIs
- Support for machine learning-driven automation
- Multi-layer coordination that spans IP and optical layers.

[More about IP/optical network automation](#)

[CLICK HERE](#)

Agile, responsive network automation

Abstract network complexity and diversity

NSP is a comprehensive platform that makes it simpler to combine IP, MPLS and optical technologies across multiple domains.

It uses intent-based networking to turn abstract service definitions into device-specific commands and make life easier for your operations team.

Keep up with fast-changing market demand

NSP aligns your network offering with your service requirements. Its flexible, modular and programmable approach helps you respond to customers' needs and quickly adapt to changing demand patterns. It provides open interfaces that simplify integration into your existing environment to enable faster deployment and service rollouts.

Get the most from your people and network resources

NSP reduces your operating cost by enabling you to rely on one management and control platform that supports common tools and practices. By automating repetitive tasks and complex workflows, NSP eases the pressure on your operations staff and networking tools. It also helps you make better use of your network capacity.

Enable traffic engineering with path control and optimization

NSP provides path control and optimization for cloud and 5G services that require low latency and high reliability. It provides visibility into the network topology, helps decide on which paths to reroute when congestion occurs and where to reroute them, optimizes traffic to run the network more efficiently and improves adherence to SLAs.

**More about
intent-based networking**

**CLICK
HERE**

**Google - how easy
is it to use NSP?**

**CLICK
HERE**

**More about
automating workflows**

**CLICK
HERE**

**Optimizing segment
routed networks**

**CLICK
HERE**

Network automation

Learn about the quantitative benefits of IP network automation.

Read the Analysis Mason report

CLICK HERE

Discover IP/optical automation

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IP security and DDoS protection

Cloud, 5G and IoT are opening the door to a new generation of network-level security threats and attacks on IP network infrastructure. Current solutions lack the scale and functionality to address the growing threat volume and complexity. At Nokia, we embed security into every layer of our IP network infrastructure. We deliver the at-scale, fully featured protection webscale companies need to guarantee the performance and integrity of their networks.

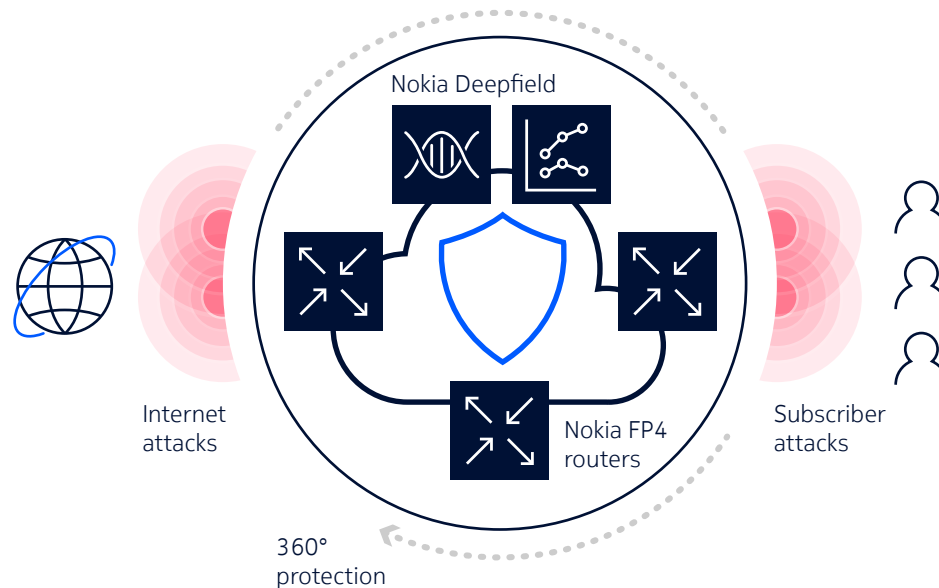


Figure 9: DDoS detection and mitigation

Beat the hackers and stop DDoS attacks

Volumetric DDoS attacks are increasing in sophistication, ferocity and frequency. Out-dated mitigation solutions that can't react in real-time to unravel the components of these sophisticated attacks give hackers more time to disrupt the network and services.

DDoS protection and mitigation

In this extraordinary threat landscape, no ordinary solution can shield your network from external and internal cyber threats and DDoS attacks. But Nokia Deepfield can. Webscale companies trust Deepfield to monitor, recognize and stop sophisticated, frequent and volumetric attacks — using the world's most holistic IP network intelligence and real-time analytics.

[More about Deepfield DDoS detection and mitigation](#)

[CLICK HERE](#)

Time for a new approach

Nokia Deepfield makes the IP network part of your security solution. It applies analytics to a range of real-time information such as network telemetry, machine data and contextual information from cloud servers and devices. Combined with Nokia IP routers powered by FP custom silicon with packet intelligence, control and massive filtering capacity, webscale companies can implement a highly scalable and cost-effective 360-degree DDoS mitigation solution.

Secure IP networks from within

To provide at-scale protection, IP network security must be like packet forwarding – a high-performance, highly scalable capability of the IP network itself. Nokia has pioneered this approach by embedding security into the DNA of every layer of the IP network, providing high-performance, fully featured and at-scale protection for your mission-critical IP networks.

Adopt a self-defending IP network

Our multi-layer embedded approach to IP network security begins with the Nokia FP custom silicon. It provides the filtering scale and performance to be a highly precise attack sensor and mitigation element, without compromising other services. It maintains network performance and service quality even during the most intense DDoS attacks.

Secure and hardened OS

Our highly secure and hardened SR OS is designed and tested to block attempts at manipulation and unauthorized access. SR OS leverages highly granular queueing in FP custom silicon to limit every control plane interaction to its fair share of the CPU. This stops volumetric attacks overwhelming the control plane, without impacting legitimate control plane interactions.

Nokia Secure Gateway

At the tools and applications layer, our integrated, high-performance IPsec gateway encrypts traffic across the network. A single Nokia Secure Gateway can support up to 32,000 end points and up to 960GB/s of encrypted traffic. Our Nokia SR OS Firewall protects the integrity of the control and management planes between trusted zones.

[Find out more about our IP Security solutions](#)

[CLICK HERE](#)

DDoS mitigation

Discover why we need a new architecture for DDoS mitigation.

[Read the infographic](#)

[CLICK HERE](#)

[More about Nokia Deepfield](#)

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Enabling an online gaming company to better detect DDoS attacks

To remain competitive, online gaming companies need to create cutting-edge gaming experiences and content that engages and captivates millions of avid players. DDoS attacks can have a devastating effect on companies' customers and business. Shutting down attacks without disrupting service becomes a mission-critical issue.

To handle the increased network load generated by so many online gamers, one webscale gaming company stores its content on multiple servers distributed across geographically dispersed data centers.

During a season premiere of a popular game, the company's legacy hardware-based DDoS protection solution failed to detect multiple concurrent, multivector attacks that were occurring across its distributed cloud infrastructure. The volume and sophistication of these attacks took one server offline and disrupted service for a very large number of players.

The gaming company deployed Deepfield Defender to overcome its existing DDoS security challenges and provide protection against a new generation of terabit-scale DDoS attacks. Deepfield allows the gaming company to see the composition of every DDoS attack and detect suspicious network activity in real time by combining advanced network analytics with unique, security-related network insight.



With Deepfield Defender, the gaming company has significantly increased its resilience against DDoS threats. It has also neutralized DDoS attacks that accompanied several of its subsequent game releases so that those attacks had no effect on the company's customers. As a result, customer confidence, satisfaction and loyalty increased dramatically, as has the company's online reputation.

[Read the full online gaming company case study](#)

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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 the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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