

An aerial night view of a city, likely New York City, with glowing fiber optic paths connecting various parts of the city. The paths are depicted as bright, glowing lines of light, primarily in shades of orange and red, weaving through the dark urban landscape. The city lights are visible in the background, creating a dense, illuminated scene. A large, white, stylized 'K' shape is overlaid on the right side of the image, pointing towards the center.

Coherent Routing

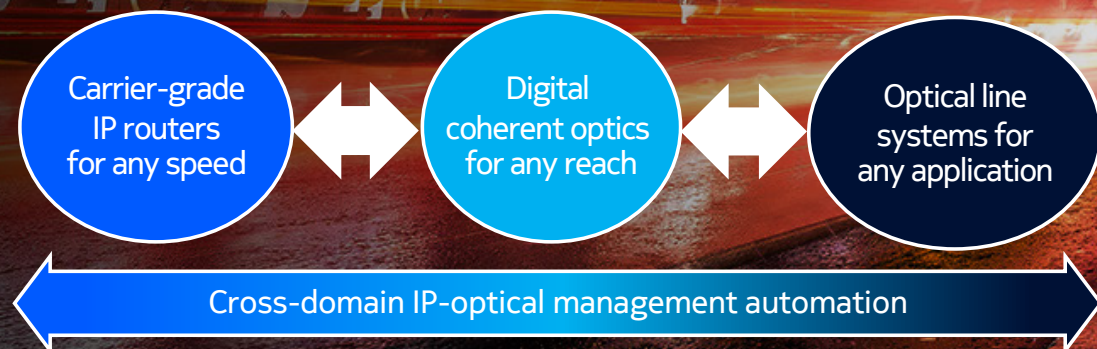
Build application-optimized
IP-optical networks with
digital coherent optics

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Nokia coherent routing

Relentless demand for more capacity at a lower cost per bit is reshaping IP-optical network designs. Nokia Coherent Routing combines digital coherent optics (DCOs), carrier-grade IP routers, optical line systems and cross-domain automation to deliver scalable, cost-efficient IP over DWDM from 100 to 800 Gbps—and beyond.

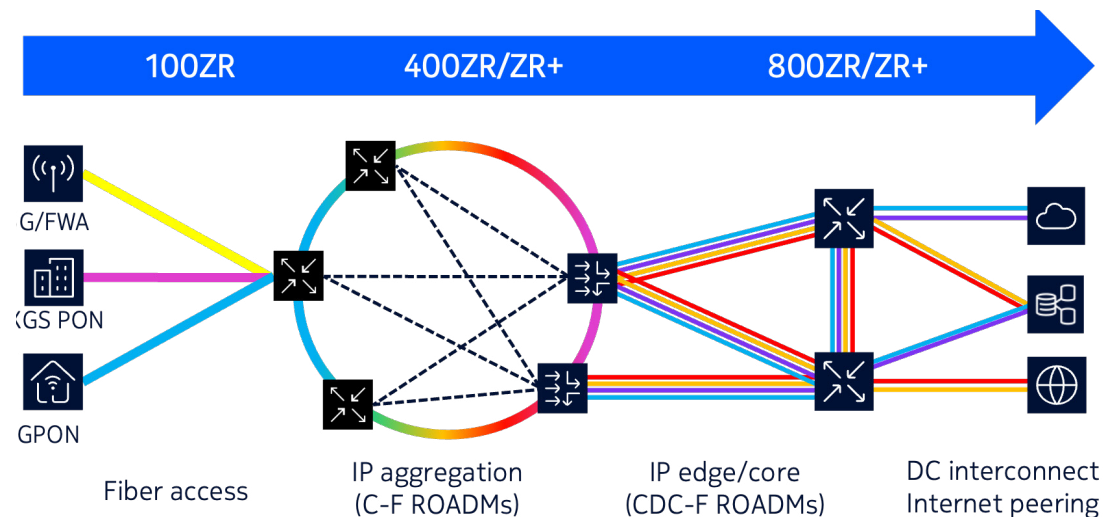


Digital coherent optics for any reach

Balance performance and operations across capacity, reach, spectral efficiency, space, power and cooling constraints. Nokia offers a full range of profile-optimized ZR and ZR+ pluggable Digital Coherent Optics (DCOs) so you can optimize any IP link for your application needs.

ZR and ZR+ DCOs are profile-optimized for small pluggable formfactors and can be equipped in Nokia 7750 SR, 7730 SXR and 7250 IXR routing platforms.

- 100G ZR QSFP28: Ideal for IP access and aggregation with an amplified reach up to 300 km.
- 400G ZR/ZR+ QSFP-DD: High-density metro-regional IP aggregation and edge.
- 800G ZR/ZR+ OSFP and QSFP-DD: High-capacity DCI, Internet peering and multi-span metro-regional backbones with mesh ROADMs. 800ZR+ adds flexible data rates, break-out options, C+L band support and thousand-kilometer reach.





A full range of pluggable and modular coherent optics to cover any reach and application

Technology	100G ZR	400G ZR	400G ZR+	800G ZR	800G ZR+ with PCS
Formfactor	QSFP28	QSFP-DD	QSFP-DD, CFP2	QSFP-DD800	QSFP-DD800
Breakout options	1x 100G	1x 400G	1 x 400G 1-4 x 100G	1 x 800G 1 or 2 x 400G 4 or 8 x 100G	1 x 800G 1 or 2 x 400G 4 or 8 x 100G
Optical channels	64x 100G (C-band)	64x 400G (C-band)	64x 400G (C-band)	32x 800G (C-band)	32x 800G (C-band)
Transmit power	-8 to -4 dBm	-10 to -6 dBm	-10 to +1 dBm	-2 dBm	Up to 0 dBm
Amplified reach	Up to 300km	Up to 120km	Up to 1000km	Up to 120Km	>1500km (800G)
ROADM support	Limited	No	Yes	No	Yes
Applications	Access	Metro DCI	Metro-regional	Metro DCI	Metro-long haul



Nokia 800G ZR/ZR+ DCO

Routers designed for pluggable coherent optics at any speed

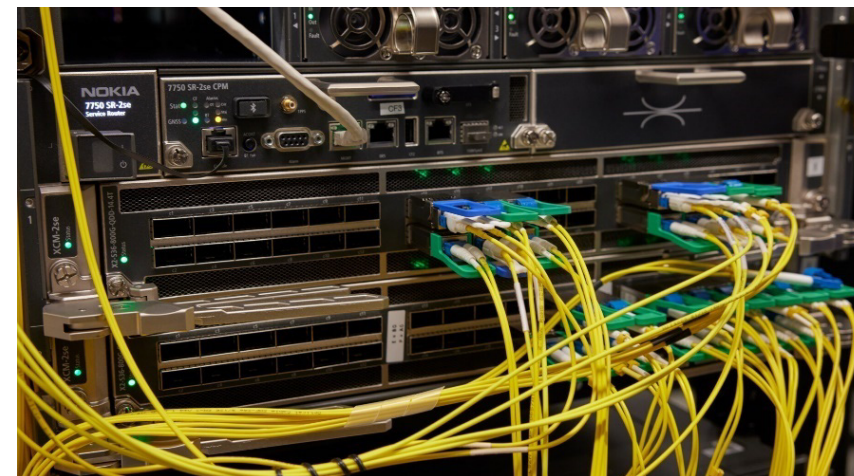
Nokia IP routers are engineered to host high-performance pluggable coherent optics at scale, ensuring power and cooling headroom and operational control.

Platforms and applications:

- Nokia 7750 SR/SR-s (FP4): 100/400GE aggregation, edge, peering and DCI.
- Nokia 7750 SR/SR-se (FP5): 100/400/800GE aggregation, edge, core, peering and DCI.
- Nokia 7730 SXR: 100/400GE service interconnect for aggregation and edge.
- Nokia 7250 IXR: High-density 100/400GE IP interconnect aggregation.

Engineered for DCOs:

- Enhanced power and cooling for ZR+ modules with 0 dBm output at full port density.
- Flexible interfaces for 100G QSFP28, 400G QSFP56-DD and 800G OSFP and QSFP112-DD formfactors.
- SR OS interworking with OIF CMIS for coherent module management.



Optical line systems for any application

Deploy, operate and maintain IP over DWDM efficiently across any distance and topology with Nokia 1830 PSS/PSI-L and 1830 GX line systems.

Maximize fiber capacity and reach with DWDM multiplexors, in-line amplification and dynamic gain equalization.

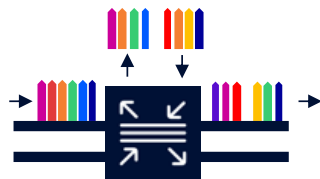
Use reconfigurable OADMs (ROADMs) to provision and restore wavelengths across any topology, minimizing routing hops and O-E transitions.

For simple point-to-point use cases, plug in the QSFP-DD pluggable line system: an 8-channel DWDM MUX with integrated amplifiers that consumes ~3 W and interconnects up to eight ZR DCOs over a single fiber pair up to 120 km.



DWDM multiplexing

Combine multiple wavelengths onto a single fiber to boost utilization.



Reconfigurable optical add-drop multiplexing

Add, drop and switch any speed/color across fibers and directions.



In-line optical amplification

Monitor and boost power for reaches of 1000 km and beyond.



Optical protection switching

1+1 wavelength protection against fiber cuts and line-side failures, reducing the need for redundant IP interfaces.



Dynamic gain equalization

Keep WDM channel power within optimal limits for peak performance.



Assurance and troubleshooting

Real-time fiber monitoring to detect and locate cuts and sense impairment-driven degradation.

IP-optical management coordination

Avoid manual, error-prone workflows.
Coordinate and automate IP-optical
operations from a single pane of glass.

The Nokia Network Services Platform (NSP),
with optical management and control from
Nokia WaveSuite and Transcend,
coordinates end-to-end operations using
the ONF Transport API (TAPI) for multi-layer
visibility and multivendor interworking.

Intent-based networking and Zero-Touch
Provisioning accelerate service turn-up and
abstract complexity.

Pre-validated use case blueprints and
programmable, model-driven interfaces let
teams customize and automate services,
networks and devices.

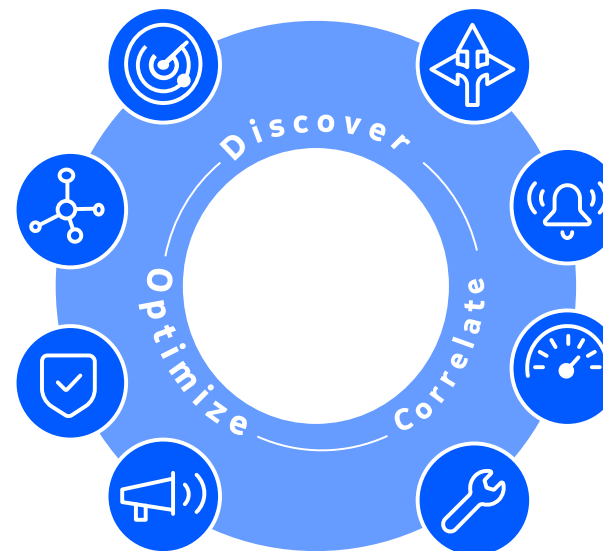
NSP cross-domain IP-optical coordination and automation use cases

Multi-layer IP-optical
topology discovery

Cross-domain
connectivity
management

Multilayer protection
and link restoration

Optical aware
IP routing



Physical path
diversity analysis

Cross-domain
assurance and
troubleshooting

Elastic IP/optical
bandwidth control

Coordinated repair
and maintenance

Partner with a global leader in IP and optics

As a global leader in IP and optics, Nokia is uniquely qualified to help you remove technology barriers and transform your IP-optical network for profitable growth:

Unleash the power of digital coherent optics and optical line systems to rev up your routers and light up your fiber for maximum capacity.

Optimize your deployment for any application across any packet transport architecture.

Streamline and automate your IP-optical network operations with our multivendor cross-domain management solutions.

Resources

[Nokia Coherent Routing eBook](#)

[Nokia IP network solutions](#)

[Nokia optical network solutions](#)

[Nokia IP-optical coordination](#)

Or visit www.nokia.com/ip-networks/coherent-routing/



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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.

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