Nokia WaveSuite
Open applications for optical network transformation
As a network leader, you know that your optical network needs to adapt to a new communications era driven by bandwidth-intensive applications. Communications that link people, machines, and things are introducing new requirements for network scale, agility, and connectivity. With Nokia WaveSuite, you can address these requirements with a simplified, abstracted network that increases operational efficiency, optimizes CAPEX, and generates new revenue.
The rise of digital technologies is creating unprecedented opportunities for optical network operators. By intelligently connecting people, machines, and data, you can enrich the customer experience. Generate new revenue. Control CAPEX growth. And make your operations ultra-efficient. But you need the right tools.

Nokia WaveSuite software enables you to use automation to monetize your optical network, deploy it more efficiently, and optimize its performance. Based on open networking initiatives, our WaveSuite applications jump-start your digital transformation by enabling you to move to a more scalable, agile, deterministic, and secure network fabric. They provide focused, lightweight tools and success-based economics, all driven by a business-optimized user experience.

Service Enablement applications help you increase revenue without making a large CAPEX and OPEX investment. These open applications enable you to create a more consumable network that supports more customers and new go-to-market channels. They expand your revenue potential by using our patented business relationship-aware software models to virtualize the network and support new services and business partnerships based on the optical network as a service (NaaS) model. Our optical NaaS implementation goes beyond traditional VPN service models by adding hierarchy to enable virtual network operators at each level to define and independently operate multiple levels of virtual connectivity services.
Node Automation applications take a revolutionary approach to streamlining service deployment, activation, and troubleshooting. These applications simplify equipment selection by associating service catalogs with abstracted views of supporting equipment. They automatically create and track workflows throughout the service lifecycle and make it easy to associate installation and troubleshooting functions with company installers, contractors, or end customers. For work order execution, these applications leverage the flexibility and ubiquity of mobile devices to automate tasks that stand between you and new revenue. The end results are fast service deployment, fewer site revisits, faster time to revenue, and satisfied customers.

Network Insight applications use real-time network intelligence to help you make smarter business, operational, and infrastructure decisions. These applications combine Nokia Bell Labs automation algorithms with astute analytics to maximize the performance of fiber optic links and wavelengths. Leveraging real-time network data, they let you select different levels of learning and automation to address your operational environment.

You can deploy WaveSuite applications independently or in combination. When deployed together, the applications enable you to extract more capacity from the network, monetize this capacity instantly, and deploy service supporting equipment quickly.

WaveSuite applications support open northbound and southbound interfaces. They can run in multivendor environments or Nokia environments, which support some of the industry’s most advanced networking capabilities. Integrated software-defined networking (SDN) solutions with controllers, such as the Nokia Network Services Platform (NSP), can help reduce the integration costs associated with open networking.
Service enablement: Creating a more consumable network

A communications innovation explosion has transformed business interactions. Connectivity is now essential for business success. Network wholesalers need to get bandwidth into the hands of their customers quickly to extend their retail reach and empower the middle layer of wholesale network consumers that depend on connectivity for their business success. In an increasingly competitive world, many enterprises can’t afford the costs and complexities of running an optical network. Enterprise applications represent new optical NaaS opportunities for optical network operators.

Our WaveSuite Service Enablement applications use business relationship-aware hierarchical models that allow each business layer to focus on what it does best. As an optical network operator, you can use this software to run a massive network, sell wholesale and retail services, or operate a cloud network that requires scalable and flexible customer connectivity. It enables you to partner more easily with IT systems integrators, cloud operators, and carrier-neutral providers that have their own unique and varied end customer channels.

As an owner and operator of physical optical network infrastructure, you are at the root of the tenancy hierarchy. At the hierarchy’s intermediate levels, the service providers are virtual network providers that resell virtual connectivity to other virtual network providers or end subscribers using independent and secure hierarchical user views for service fulfillment, assurance, and inventory.
Our Service Enablement applications allow wholesale operators to streamline delivery of infrastructure to multiple retailers. It also gives retail customers the same level of flexibility to sell optical NaaS to their customers. Other types of operators can use our software to augment their service catalogs with wavelength, Carrier Ethernet, or optical NaaS services and give their sales force new ways to grow revenue. The software enables those with connectivity-intensive business models to focus on their business strengths and goals and avoid making a significant investment in optical networking.

The Service Enablement applications achieve hierarchical business relationship awareness by hiding end customers from the virtual providers’ underlying infrastructure provider. They provide a wide range of customized branding opportunities to reinforce the customer relationship with the provider.

Turning up optical services has traditionally been slow and difficult. Customers are now accustomed to cloud services that can be provisioned with the click of a button. The Service Enablement applications enable you to use web-based portals to offer services that are as fast and easy to turn up as cloud services. Service dashboards provide an at-a-glance summary view of multi-tenanted services from within a service portal. Service reporting provides tenants with a historical summary of service performance as compared to service-level agreement (SLA) target metrics in the service level specification (SLS).

Business relationship-aware service and network inventory applications track free and allocated service resources. Virtual network owners throughout the hierarchy can use these applications to track their specific resources. These owners can also request additional resources from their underlying provider using tools that clearly depict where network capacity is available. A success-based cost model allows you to introduce WaveSuite Service Enablement applications with minimal investment and risk.
With these unique capabilities, optical NaaS customers can operate virtual networks as if they were their own physical networks, without the associated operational complexities. These customers can independently deploy MEF-compliant Carrier Ethernet and wavelength services and optical NaaS without continuous coordination with, or visibility of, the underlying physical network infrastructure.

Our Service Enablement applications also bypass the massive effort and complexity involved in adapting back-office systems to support new services. As a lightweight and extremely focused solution for optical services, WaveSuite can drive transformation in this area and keep you from having to take on a much larger and more expensive project.

Ultimately, WaveSuite Service Enablement applications allow you to increase revenue by evolving to a more consumable and cost-effective network that supports more customers and channels to market. Customer service portals and open APIs for fulfillment, assurance and inventory functions facilitate the automation of service lifecycles at all levels of the service enablement network hierarchy.

WaveSuite Service Enablement is the right choice for optical network operators that want to uniquely address the market for more business-driven bandwidth.
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<th>Challenges</th>
<th>WaveSuite Service Enablement Solution</th>
<th>Benefits</th>
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<tr>
<td>Create more paths to market</td>
<td>Virtualize the network with business relationship-aware optical NaaS</td>
<td>Creates more channels to market by supporting partners, systems integrators, and network retailers with business relationship-aware, hierarchical, optical NaaS offers</td>
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<td>Support new service offers</td>
<td>Enhance low-value-add connectivity services with new hierarchical optical NaaS-based offers</td>
<td>Increases revenue potential by supporting new differentiated service offers</td>
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<td>Use automation to make transport as consumable as cloud services</td>
<td>Provide end-user service portals or APIs that support automated fulfillment, assurance, and inventory throughout the service enablement network hierarchy</td>
<td>Creates a more consumable and streamlined network Lowers OPEX</td>
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<td>Support new services with shrinking budgets</td>
<td>Support a success-based, pay-as-the-service-grows cost structure Provide a lightweight alternative to large OSS/BSS investments Use open interfaces to facilitate integration with existing operational environments</td>
<td>Supports a low-risk, high-reward service introduction investment Lowers CAPEX</td>
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Node automation: Rapidly deploy service-supporting equipment

Like many optical network operators, you may be moving to SDN architectures to streamline the service delivery process. But setting up service connectivity is only part of this process. You also need to consider the selection, ordering, commissioning and activation of optical networking equipment.

Traditionally, these functions have been labor-intensive, error-prone, and slow to perform, all of which can dissatisfy customers and delay service revenue. Automated equipment commissioning and service activation are particularly important because there could be large numbers of Carrier Ethernet and wavelength service customer endpoints. The automation of these functions reduces on-site time for installers and minimizes the need to revisit sites to correct commissioning errors.

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<td>Rapidly deploy service-supporting equipment</td>
<td>Provide a simplified, easy-to-use service catalog view that shows the equipment required to implement MEF-compliant Carrier Ethernet and wavelength services</td>
<td>Reduces the expertise required to implement services</td>
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<td>Enable end-to-end work order processing</td>
<td>Use abstracted service data models to simplify work order creation, tracking, and contracting tasks</td>
<td>Improves workforce scalability and minimizes cost by making it easier to contract equipment installation tasks</td>
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<tr>
<td>Enable rapid on-site equipment commissioning and service activation</td>
<td>Provide work order processing client software for mobile devices that enables on-site technicians to implement work orders and activate services</td>
<td>Simplifies equipment commissioning by leveraging common mobile devices</td>
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WaveSuite Commissioning Expert applications modernize the equipment deployment process to enable faster time to service revenue and ensure customer satisfaction. They get service-supporting equipment up and running quickly, after which SDN controllers and applications can provide dynamic SLA customization and assurance.

The WaveSuite Commissioning Expert node automation application rapidly identifies the optical networking equipment required to support Carrier Ethernet and optical wavelength services. It simplifies service work order entry, provides end-to-end work order processing, and automates equipment commissioning and service activation.

The Commissioning Expert mobile application uses the flexibility and ubiquity of mobile devices to automate work order execution from start to finish. It reduces service deployment time, reduces the need to revisit sites, and ensures faster time to revenue and satisfied customers.
Network Insight: Maximize your network’s potential

In an environment of intensely scrutinized budgets, many optical network operators are looking for economical ways to address the growing bandwidth demands of an increasing connected world. They want a safe and agile approach that can run the network at maximum potential, enable automation, and learn intelligently.

WaveSuite Network Insight applications increase network efficiency by using Nokia Bell Labs automation algorithms and advanced analytics to safely maximize network potential. They intelligently and automatically route and shape wavelengths for maximum network performance and availability while efficiently filling wavelengths to minimize their numbers and related costs. When required, they maximize fiber assets by using Nokia PSE-3 super coherent technology to scale wavelengths to industry-leading levels. To ease their introduction into the operational environment, Network Insight applications support user-selectable levels of automation and learning, and in-depth, network-synchronized scenario analysis.

The Network Insight applications combine a proven software base with Nokia’s decades of unique optical networking experience and expertise to provide a suite
of open applications. These applications include:

**Optimizer**, which assures optimal optical network performance based on current and future optical transmission performance indicators. Optimizer enables the dynamic adjustment of programmable network capabilities. It supports adjustments based on measured transmission parameters and past wavelength performance rather than designing the network with traditional end-of-life parameters.

**Health and Analytics**, which uses streaming telemetry, historical big data records, performance monitoring, trending analysis, prediction, and machine learning to proactively analyze and predict network behavior, and monitor network health.

We continue to develop Network Insight applications that optimize CAPEX by making the optical network run at its maximum potential and reduce OPEX by supporting intelligent network automation and scenario analysis.

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<td>Extract more network capacity to address bandwidth demands without compromising SLAs</td>
<td>Run the network hotter and more efficiently without compromising network safety or availability</td>
<td>Maximizes and delays CAPEX investment while giving the network more agility to handle increasing dynamic bandwidth demands</td>
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<td>Strike the right balance between manual operations and a fully automatic network that can learn intelligently</td>
<td>Provide user-selectable levels of automation and learning Use in-depth scenario analysis to aid network planning</td>
<td>Eases the transition to a more automated approach to extracting maximum network performance</td>
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Enabling a network transformation

The Nokia WaveSuite applications provide the tools, economics, and business optimization you need to transform your optical network, meet the demands of digital services, and seize new business opportunities. These open applications accelerate your transition toward network automation, and monetization.

They can help you extract more capacity from your network, scale it more cost-effectively, and use it to generate new revenues.

To learn more about how Nokia WaveSuite software can help you get new value from your optical network, visit networks.nokia.com/products/wavesuite.
About Nokia

We create the technology to connect the world. Powered by the research and innovation of Nokia Bell Labs, we serve communications service providers, governments, large enterprises and consumers, with the industry’s most complete, end-to-end portfolio of products, services and licensing.

From the enabling infrastructure for 5G and the Internet of Things, to emerging applications in digital health, we are shaping the future of technology to transform the human experience. networks.nokia.com

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