Illuminate your path to 5G
Optical Anyhaul designed for your 5G world
Scalable mobile transport capacity and efficiency

Today’s users demand high network performance and exceptional customer experiences. And these demands are only intensifying.

By 2025, 1.2 billion 5G connections will have been established.

If communications service providers (CSPs) are to scale up and scale out for 5G service delivery, they need the right mobile transport infrastructure. It’s the fundamental building block on which to establish a fully programmable transport fabric capable of empowering business innovation – and delivering the modern experiences today’s consumers demand.

A modern mobile network must handle diverse services with widely varying requirements – for capacity, latency, reliability, synchronization, mobility and energy efficiency. It must reach more endpoints, and become increasingly dynamic.

Optical Anyhaul is designed for your 5G world. It’s capable of supporting denser networks with more cells, providing higher capacity for new spectrum at higher frequencies, improving RAN performance, and taking advantage of virtualized network resources.
RAN evolution for diverse architectures

Why radio access networks are evolving

Next-generation mobile networks (5G) must boost capacity significantly to support an explosion in mobile device usage. The number of connected devices is expected to top 46B by 2020. And global consumption of digital content and services on these devices is forecast to increase by an average of 30 to 45 times from 2014 levels, according to a Nokia Bell Labs study. In some markets, growth may be as high as 98-fold.

5G networks must also address applications with highly-diverse requirements, which may range from high-bandwidth, high-definition video streaming to machine interconnectivity for the Internet of Things (IoT) and low-latency applications such as self-driving vehicles.

Higher wireless data rates generally require shorter radio transmission distances, enabled with additional small cells or through the gains achieved by centralizing baseband functions to improve inter-cell coordination.

What this means for mobile transport

Moving to either centralized RAN or cloud RAN (C-RAN) architectures presents some challenges. Fronthaul links transporting sampled radio signals using CPRI or OBSAI protocols have stringent bandwidth, latency, and jitter requirements. So, transport networks must be able to meet these targets or RAN performance will not be satisfactory. To address transport requirements and improve scale for 5G, new architectures are splitting baseband processing into higher and lower layer functions — and utilizing Ethernet fronthaul links.

As the boundaries of backhaul and fronthaul continue to blur, mobile transport networks must accommodate diverse protocols and traffic types and support each in accordance with their underlying service characteristics. In other words, they must have the flexibility to support ‘anyhaul.’ The Nokia 1830 Versatile WDM Module (VWM) and the 1830 Photonic Service Switch (PSS) are ideal for this role, providing mobile transport in support of CPRI fronthaul, Ethernet fronthaul, and Ethernet backhaul applications.
Optical Anyhaul: protecting your network investment

Use existing RAN equipment - such as radios that support CPRI/OBSAI and eCPRI - without further investment.

Reuse radio grey optics by translating signals to wavelengths, increasing reliability.

Minimize site acquisition costs by deploying almost anywhere - indoor or outdoor. By supplementing existing transport sites with new equipment, users can avoid additional facilities costs.
Optical Anyhaul supports your mobile transport strategy

As part of your broader mobile transport strategy, the Nokia Optical Anyhaul solution can deliver important benefits.

High bandwidth
By using WDM technology, CSPs can create high-bandwidth channels (10/100 Gbps wire speeds and higher) to optimize the use of fiber resources and reduce costs. The solution supports all protocols (CPRI, OBSAI, eCPRI, NGFI, and latency-sensitive Ethernet) with maximum reach.

Low latency
Nokia Optical WDM systems provide ultra-low latency transport links so they can support the strict latency requirements of CPRI/OBSAI protocols (150 microseconds RTT) and real-time Ethernet fronthaul applications.

Transparency
Because our solution is protocol agnostic, networks are more flexible and can support a variety of client and transport interfaces for both current and future services.

That’s because Optical Anyhaul enables passive and active transparent configurations that do not alter the underlying protocol in any way — an approach that avoids interoperability issues with RAN equipment.

Improved performance
Optical Anyhaul also caters to different services, with packet aggregation and flexible, optimized switching. Switching can occur at different layers, as needed, to meet end-to-end application requirements. And packet switching can be used for statistical muxing gains or to switch photonically where latency must be kept to a minimum.

Accurate synchronization distribution
The move to packet-switched Ethernet networks poses a synchronization challenge, because variable delays may be introduced that can degrade RAN performance. Nokia Optical solution avoids this issue by providing highly accurate (nanosecond range) synchronization distribution using 1588v2 Precision Time Protocol (PTP). It uses an out-of-band optical timing channel to distribute timing over existing packet/Ethernet switched networks.

High availability and QoS
Because today’s networks must be highly available and reliable, our solution offers G.8032 Ethernet ring protection, as well as G.8131 MPLS linear protection, both providing sub 50ms protection. In addition, deep packet buffers deliver high burst tolerance, even at high port rates, to maintain high QoS.
Transport network deployment and professional services

Nokia has extensive services-integration experience and expertise. Our Optical Anyhaul solution includes deployment and professional services that can help you design, implement, manage, and maintain optical transport networks — quickly and cost-effectively.

Goals:

• Near-perfect network performance and availability
• Fast integration, and flawless network rollout
• Future-proof (C-RAN, 5G)
A proven, high-performance solution, deployed globally

Delivers agility, scalability, and efficiency to meet diverse service demands

• Enables high-capacity data rates with efficient packet aggregation
• Delivers lower latency, with a maximum reach, end-to-end transport solution
• Provides a RAN-agnostic solution supporting any generation of mobile transport (3G, 4G, 5G)

Matches needs and environments with multiple transport options

• Offers passive, semi-passive, active transparent, and active framed options for diverse deployments
• Delivers best-in-class frequency (SyncE) and time synchronization distribution (IEEE 1588v2)
• Provides low latency with optional packet bypass and the best-in-class silicon on the market
• Enables high QoS with strict priority queuing and high-resiliency mechanisms (Ethernet Ring Protection and MPLS-TP)

Offers maximum performance at minimum cost

• Increases fiber efficiency and reduces C-RAN transformation costs
• Optimizes performance with a fully transparent, scalable solution
• Takes network manageability to the next level with a robust OAM toolkit
• Speeds and simplifies deployments to support distributed, centralized, and cloud RAN roll outs

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Discover how Optical Anyhaul is designed for your 5G world.

Go to whitepaper  Go to case study

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 virtual reality and digital health, we are shaping the future of technology to transform the human experience.

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